

CHECKLIST**APPENDIX -1**

Date:

Sub: BHEL Prebid tender vide: _____ for M/s. IOCL, Mathura Refinery located at Mathura, Uttar Pradesh, India (IOCL NIT vide RFQ Number: 9050M25E08

The following documents are submitted by us along with the Bid as mentioned in Tender Document towards fulfilment of Tender Terms.

Document	Document Description	Document Submission(Yes/No)
BHEL SCC	Special Conditions of Contract of BHEL	
BHEL ITB - 18	Instructions to Bidder (BHEL)	
Annexure-1	Technical Specification of High Speed Motor	
Annexure-2	Clarification & Deviation Format	
Annexure-3	Price Bid Format [GePNIC BOQ Format]	
Annexure-4	Declaration on bidder's company letter head regarding banning orders	
Annexure-5	Power of Attorney on vendor's letter head	
Annexure-6	Bid bond format for 1% of MoU value	
Annexure-7	List of consortium banks	
Annexure-8	Advance Bank Guarantee (ABG)	
Annexure-9	Self-Certification and Undertaking by Bidder regarding Insolvency/Liquidation Process under NCLT	
Annexure-10	Technical Pre-Qualification Criteria	
Annexure-11	Financial Pre-Qualification Criteria	
Annexure M	In Principle MoU between BHEL and High Speed Motor Vendor	
Annexure-I of BHEL ITB	Major Activities Timelines	
ANNEXURE-II of BHEL ITB-18	Framework Confidentiality Agreement Cum Undertaking	
Annexure - III of BHEL ITB-18	Proforma for self-certification by Supplier for minimum local content on their letter head for tender value above Rs 10 Crore	
Annexure - IV of BHEL ITB-18	Proforma for self-certification by Supplier for Compliance to Clause No 20 (B)-Land border sharing	
Annexure - VI of BHEL ITB-18	BHEL Integrity Pact	
Annexure - VII of BHEL ITB-18	Bank Guarantee for Performance Security (PBG)	

Yours faithfully,

Signature:

Name and Designation

For and on behalf of (Bidder
details)



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TECHNICAL SPECIFICATION OF HIGH-SPEED ELECTRIC MOTOR

Project : High speed Motor for NPRU unit of Mathura Refinery, IOCL
Client : IOCL Mathura
Service : HPC High speed Motors
Quantity : 2 nos. (1W+1S)
Location : IOCL, NPRU unit of Mathura Refinery, Mathura, India

1. Introduction

M/s Indian Oil Corporation Limited (IOCL) intend to replace the HPC Condensing Turbine with High-Speed Electric Motor along with Accessories. In this regard M/s Indian Oil Corporation Limited (IOCL) floated tender in GeM portal (Tender No: 9050M25E08) for Design, Engineering, Manufacturing, Packaging, Testing, Supply, Transportation and Supervision of Erection and Commissioning of High-Speed Electric Motor for replacement of HPC Condensing Turbine Along with Accessories, Mandatory Spares, Commissioning Spares, Special Tools & Tackles and Third-Party Inspection at NPRU Unit of IOCL Mathura Refinery.

2. Purpose

The purpose of this specification is to bring out the requirements to be met by the HPC High speed Motor Vendor for supply of 2 no. High speed Motors for IOCL Mathura Refinery, Mathura. The High-speed Motors shall be designed, manufactured, inspected & tested, supplied, supervised for erection and commissioning and performance guarantee tested at site as per the applicable documents attached with this specification.

3. Prequalification criteria

As per the attached Annexure-10

4. Technical Requirements of High-Speed Electric Motor

4.1 High Speed Electric Motor (Item No. 18N-KM-201) Driver with hot stand-by VFDs, along with all Auxiliaries, spares, cables, and instrumentation & controls, and spare high-speed motor.

Type	Squirrel Cage Induction Motor
Service	Compressor Duty (HPC)
Power	Refer the compressor operating conditions
Rated Speed	Refer the compressor operating conditions
Ingress Protection	IP55
Temperature Class	T3
Gas Group	IIB
Hazardous class	Zone II
Duty Cycle	S1 – Continuous
Rated Output/Voltage/Frequency	To be provided by vendor

Rev. No.	Revisions	Prepared	Approved	Date
00	First issue	AUSC & Anil P	BLJ	25-10-2025



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4.2 Applicable compressor operating conditions:

S.No.	Operating Case	Power (KW)	Speed (RPM)
1	Normal	4119	5460
2	Design	4593	5605
3	Turndown	3349	5247

Note:

1) Compressor Train: High Speed Motor + MCL 522. Above indicated power values are at compressor coupling.

2) Motor shall be designed to meet all the above operating conditions.

4.3 Motor Rating shall be as per the clause 1.1.15.1.8, page 7 of 26 of Technical Part for HPC High Speed Motor Package (page 216 of 505) of IOCL NIT

4.4 Considering above tender condition, Motor Rating shall be 5052 kW(4593kW*1.1)

4.5 In addition, bidder shall follow and comply IOCL NIT along with applicable corrigendum

4.6 Applicable compressor interface data will be shared against NDA.

5. Technical Requirements of Variable Frequency Drive (VFD) for High Speed Motor

5.1. Technical Requirements

Each VFD shall be designed to drive the associated high-speed induction motor with full operational reliability and redundancy. The drives shall be capable of handling the compressor load profile and designed for continuous duty operation under the specified ambient conditions.

The VFD system shall include input dry-type isolation transformer, power converter, control modules, protection systems, and all auxiliaries required for safe and reliable operation.

5.2. Construction and Design Features

- Each VFD shall be provided as a free-standing, floor-mounted, air-cooled panel of IP42 protection or better.
- All enclosures shall be fabricated using cold-rolled steel, powder-coated with epoxy paint (minimum thickness 60 microns).
- Ventilation system shall include redundant (N+1) cooling fans with individual monitoring and protection.
- The VFD shall include local input isolation breaker (VCB type) and be equipped with suitable electrical and mechanical interlocks.
- The control and power compartments shall be physically and electrically segregated.
- Busbars shall be electrolytic grade copper with appropriate sleeving and shrouding.
- All wiring shall use FRLS cables with double compression nickel-plated brass glands.

5.3. Performance and Protection



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- Efficiency (including transformer): Minimum 95% at rated load.
- Power factor: ≥ 0.9 under rated load.
- Overload capacity: 150% for 60 seconds.
- Duty: Continuous (Class I as per IEC 146-1).
- Noise Level: ≤ 85 dB(A) at 1 meter.
- Vibration: As per IEC 68-2-6.
- EMI/RFI compliance: As per IEC 801 Parts 2, 3, and 4.
- Built-in protections shall include overload, overcurrent, short circuit, ground fault, over temperature, and phase loss.
- In addition to the above, redundant numerical protection for the synchronous motor to be considered. For the detailed protection function requirements, please refer to the main tender document.

5.4. Controls, Monitoring and Communication

- Local/remote operation via selector switch.
- Door-mounted LCD/touchscreen interface for control, monitoring, and diagnostics.
- Parameters such as voltage, current, frequency, torque, speed, and power shall be displayed and communicated via Modbus/IEC 61850.
- Event logging, disturbance recording (minimum 3 s pre/post), and trending features shall be available.
- Redundant 110V AC UPS-based control supply scheme.

5.5. VFD Input Transformer

- Type: Dry-type, air-cooled (AN/AF) transformer.
- HV: 6.6 kV, LV: As per VFD design.
- Class of insulation: H-class.
- Independent transformer for each VFD.
- Impedance, insulation level, and harmonics capability as per IS/IEC for VFD duty.

5.6. Auto Changeover Control Panel

A redundant PLC/relay-based changeover control system shall be provided for automatic and manual switchover between two VFDs. The system shall ensure uninterrupted operation with total transfer time ≤ 1 second and no single point of failure. All I/Os between VFDs, DCS, and field panels shall be routed through this panel.

5.7. Testing, Inspection, and Documentation

- Routine and type tests as per IS/IEC standards.
- Type test reports of similar design to be submitted with the bid.
- Factory inspection and witness testing by IOCL representatives.
- Vendor to submit all drawings, SLDs, data sheets, QAP, and harmonic analysis reports for approval.



5.8. Commissioning

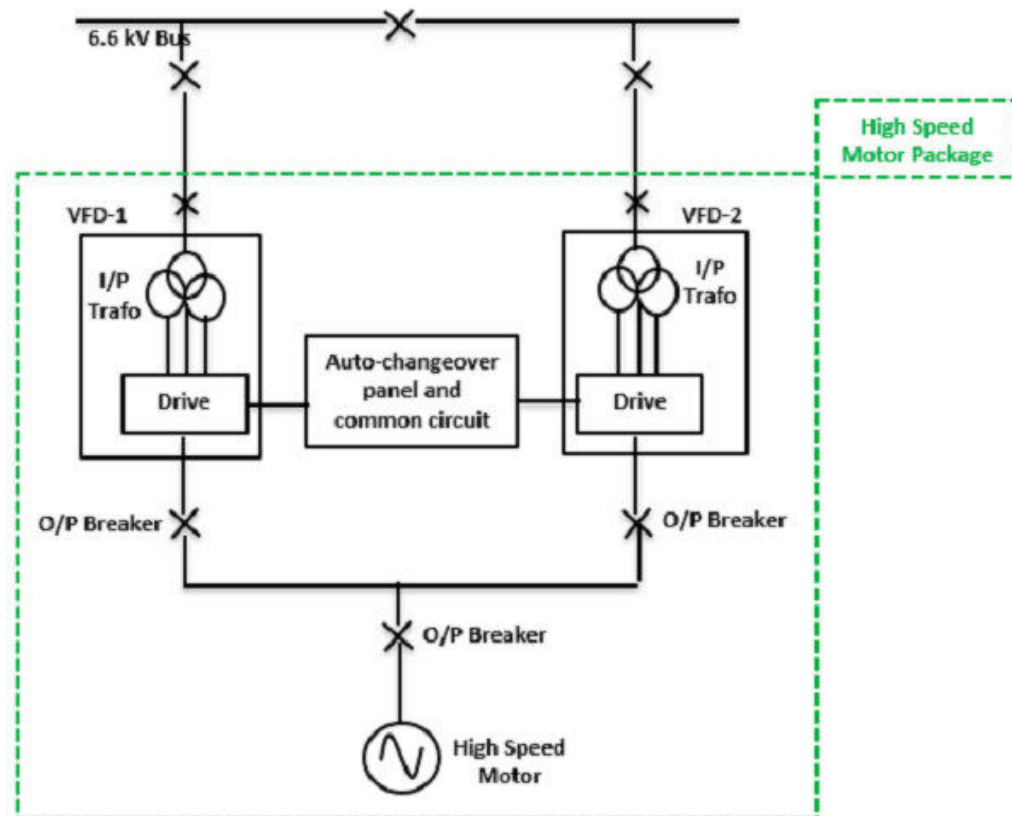
The bidder shall quote the lumpsum charges for the site testing and supervision of erection and successful commissioning at site for the high-speed electric motor, VFD and its associated auxiliaries supplied along with. All travel, lodging, and logistics shall be bidder's responsibility. Per diem charges to be quoted for reference.

5.9. Cables

- HSM to VFD power and control cables are to be included in the supply.
- Cables between LT supply to VFD are not in the supplier's scope.

5.10. Typical SLD (for reference)

Typical SLD





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6. Scope of supply & works

Vendor's Scope for each motor shall include but not limited to the following:

6.1 Complete High-speed motor package:

One High Speed Motor along with all auxiliaries, Power cables from I/P Transformer to VFDs and from VFDs to the motor, Coupling with guard, Commissioning spares, LCS, EPB, instrumentation and controls etc.

6.2 Hot stand by VFDs, Input Transformers, PLC and associated control and protection system.

6.3 Main and hot stand by VFDs along with its Input Transformers, Input and output breakers, Auto change-over panel, PLC, commissioning spares, instrumentation and controls.

6.4 Spare High-Speed Motor.

- a) One number spare high-speed motor (same as main high-speed motor) for one to one replacement.
- b) Spare motor to be provided with proper metal stand for keeping the motor. Suitable arrangement for periodic rotation of rotor with bearing lubrication facility to be considered.

6.5 Mandatory Spares: Mandatory spares for high speed motor package and hot stand by VFDs as per the list given in the separate heading.

6.6 Site Supervision, Testing & Commissioning:

- a) Site supervision by an Expert Engineer during erection, installation, testing and commissioning of the equipment like VFDs, Transformers, Motor etc. on per man-day rate basis.
- b) Erection and installation plan of equipment like high speed motor, VFDs etc has to be vetted by the Site Engineer and ensure site supervision of all activities.
- c) Commissioning of equipment has to be done under the supervision of site engineer.
- d) Requirement of any special tools and tackles, consumables (excluding the items in Vendor's scope) has to be intimated to the Owner by the Vendor well in advance.
- e) Vendor to arrange on its own, the lodging, boarding and transportation facility for their personnel without any price implication to IOCL.

6.7 CPWAMC:

- a) Composite Post Warranty Annual Maintenance charges for five years for VFDs, PLCs supplied by the Contractor.
- b) Any supply or/and services which are incidental to complete the scope of supply of the package in totality shall be deemed to be included in the scope of Vendor.
- c) For detailed conditions of CPWAMC, refer annexure CPWAMC conditions attached with this document.



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6.8 The scope of work related to design & engineering shall include (but not limited to) the following:

- a) Electrical and mechanical design of high-speed motor (including motor bearing selection)
- b) Review and validation of Input data from Owner including dedicated site survey.
- c) Determine acceptable table top stiffness.
- d) Motor data for Torsional Analysis of compressor train
- e) Study of existing base plate, frame and foundation for compatibility with proposed motor.
- f) Study of existing RCC table top foundation of the Compressor – turbine.
- g) Motor vendor to provide motor oil requirements, the Oil grade shall be ISO VG 46
- h) Motor Lateral analysis according with API541.
- i) Design & supply of motor surge protection comprising of LA, surge capacitor, if required as per motor design.
- j) The complete high-speed motor package shall be designed and engineered such that the replacement job of turbine with high speed motor can be completed within 25 (twenty-five) days (Gregorian calendar). The bidder shall submit the bar chart schedule of the envisaged activities for completion of replacement job. The opinion of IOCL regarding the acceptability of the submitted bar-chart schedule of envisaged activities shall be final and binding upon the bidder.
- k) **The Vendor to mention in their offer, the weight of the heaviest component of the high-speed motor which needs to be erected at site. The erection weight of this heaviest component should not be more than 10 M ton.**

Note: Coupling (Dry flexible type) between motor and compressor will be supplied by BHEL, motor vendor to provide shaft end details during detail engineering

6.9 Vendor shall study, review and confirm the suitability of the existing RCC foundation (along with the existing base frame) of the Compressor-Turbine assembly where new High-Speed Motor shall be installed. Vendor shall submit the design adequacy report for the existing foundation (and existing base frame) including FEM, static and dynamic design analysis report as per IS codes and available literature of repute. The vendor may recommend nominal modification/strengthening, if required, to be carried out in the existing foundation. However, OWNER envisages and desires that no avoidable modifications should be carried out in the existing foundation to minimize the shutdown time of the plant. The offers requiring modifications in RCC foundation which increases the shutdown duration shall render the offer liable for rejection. The opinion of IOCL regarding the increase in shutdown duration due to proposed modification in RCC foundation shall be final and binding upon the bidder.

6.10 Any modifications in the RCC foundation, existing combined base frame of compressor-turbine and compressor rotor shall be proposed by the Vendor during bidding stage itself.

6.11 Any additional/further modification to the above, proposed by the vendor after award of the contract shall render the contract liable for termination as per GPC clause 26.0 and its sub-clauses.



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6.12 Vendor to supply the following measuring and testing equipment along with the high speed motor package (as defined in clause 1.1.4.1 of IOCL NIT) which shall be required for testing and measurement of various parameters during commissioning of the complete package: -

S.No	Item Description	Make	Qty	Remarks
1	Oil BDV Kit	Baur / Megger/High Voltage Diagnostics	1	For TR oil testing
2	Battery Impedance tester	Megger / Fluke/ AVO	1	For battery bank testing
3	Three Transformer turns ratio kit, 250V excitation voltage with vector group detection and mag balance test	PDIC / Megger / Heafely / Doble/ VANGUARD	1	For VFD transformer testing
4	SFRA kit for Transformer testing. 10Hz to 30Mhz, 24V peak to peak with FRLS measurement	PDIC / Megger / Omicron / Doble/ VANGUARD	1	For VFD transformer testing
5	Intrinsically safe multi-meter	Fluke/ Chauvin Arnoux /Ecom	2	For earth pit testing in hazardous area
6	Intrinsically safe clamp on meter	MetraVi / Catest	2	For earth pit testing in hazardous area
7	Vacuum Bottle tester -	PDIC / Crest test system/Vanguard	1	For vacuum bottle testing of VCB of motors
8	Ohm-Meter	Megger / Fluke/ PROGRAMMA	1	Measurement of resistance in VFD panel
9	DC earth fault locator	Megger / Fluke/CSD	1	For location of DC earth fault in control circuit

6.13 Vendor's scope of supply/work shall include the requirements as specified in the respective Data sheets, Engineering Specification, design basis, Applicable standards & project specifications attached with tender. Vendor scope of supply shall include as a minimum but not limited to the items listed in the scope of supply

6.14 Inspection & Testing at manufacturers shop will be witnessed by Third party inspection agency (TPIA) of Owner for all items mentioned in Vendor's scope of supply. TPIA shall be



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appointed by vendor as per approved TPIA list given elsewhere in this tender. The charges towards Third party inspection shall be included in the supply price for package.

6.15 Bidder to note that during detail engineering stage, the high-speed motor package shall be studied for HAZOP and SIL review. HAZOP and SIL (Safety Integrity Level) study shall be carried out at Owner's Office. Vendor shall participate in the study at his own cost for a minimum of 2 days. All modifications based on the recommendations on HAZOP & SIL study shall be implemented by vendor without any additional cost and schedule impact to Purchaser.

6.16 Special Tools and tackles required for operation and maintenance. Spares parts for commissioning and start up.

6.17 Packing & transportation

6.17.1 Packing shall be suitable for Sea transportation and also site conditions mentioned in the tender document.

6.17.2 Packing shall be suitable for outdoor storage for a period of 24 months.

6.17.3 Any special requirements in order to meet the above-mentioned storage period shall be clearly mentioned in the offer and included in Vendor scope.

6.18 Technical documentation as per the tender requirements. Schedule shall be mutually discussed and agreed during Prebid MOU.

6.19 Technical interface information to BHEL for downstream activities. Schedule shall be mutually discussed and agreed during Prebid MOU.

6.20 Inspection & testing shall be as per IOCL specifications and approved Quality plan. Mechanical Run Test & other tests as per QAP shall be performed for each motor at Vendor works. Routine Tests shall be witnessed by BHEL & end customer. Vendor to inform 2 months in advance before the scheduled Routine Tests.

6.21 Third party inspection as per approved Quality plan shall be included in vendor scope. Consider the clause "Third Party Inspections" in this specification and IOCL NIT.

6.22 Lumpsum charges for Supervision of erection & commissioning and Performance guarantee test at site.

6.23 Detailed Bill of material shall be followed and comply as per IOCL NIT along with applicable corrigendum

6.24 In addition, bidder shall follow and comply IOCL NIT along with applicable corrigendum

7. Site and utility data:

7.1 Site Environmental conditions:

Site location	Mathura Refinery, Mathura, Uttar Pradesh.
Ambient temperature	Max: 50 Deg C, Min 5 Deg C
Design Ambient Temperature	45 Deg C.



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Relative humidity	Avg. 90%
Altitude	< 1000 M above MSL
Atmosphere	Corrosive (Sulphur)
Seismic zone	Zone IV as per IS-1893
Ignition temperature class / Gas group	Zone 2, Group IIA, IIB, T3
Indoor operating temperature	+5°C to +45°C
Outdoor air temperature range	-20 to +50°C

7.2 Input power system data:

Power Supply	6.6KV, 3phase
Voltage variation	+/-10%
Rated frequency	50 Hz
Frequency variation	+/-3%
Combined voltage & Frequency variation	10%
Fault level	40KA for 1sec
Control Voltage	Single phase, 110V AC from UPS (Two nos. redundant), Current rating (to be provided by vendor)

8. Deviations:

- 8.1 Vendor is required to quote strictly as per "IOCL NIT" (Technical Requirements)". However, if vendor wishes to give deviations which cannot be complied with time/ cost implications, such deviations, if any, shall be listed and submitted in prescribed format.

If deviations in prescribed format are not submitted it is deemed that all the Specifications are being complied in-toto. Acceptance of deviations is subjected to BHEL/end customer approval.

NOTE-1: Vendor shall note that only those deviations to specifications, standards & codes (if any), shall be permitted which are technically infeasible to be met, provided suitable justification for the same is furnished. Deviations, which can be complied with extra cost and /or time implication, shall not be permitted.

NOTE 2: Any deviations/deletions/corrections made elsewhere in the body of the vendor's proposal will not be taken cognisance of and all such deviations shall be deemed to have been withdrawn by the vendor.

- 8.2 Any deviations NOT accepted by the BHEL/ end customer shall be withdrawn by OEM without any time/ cost implication to BHEL/ end customer. No cost addition will be allowed during post bid on account of deviations withdrawal.

9. Mandatory Spares

- 9.1 The manufacturer shall provide at least following mandatory spares along with the supply of each motor.

9.1.1 One set of Bearings (DE and NDE side)



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9.1.2 One number External Cooler fan

9.1.3 One set Terminal studs / Bushing Assembly

9.1.4 One number Temperature indicator assembly.

9.1.5 One set Supports insulators (one set for each motor), if applicable

9.1.6 One set of motor differential CT for installation at panel end for similarity of design + 1 spare motor differential CT

9.1.7 One set (3 nos) of motor cable end termination kit

9.1.8 One number LA and surge capacitor if included in design

9.2 The following list is for the mandatory spares for VFD and its accessories.

Sl. No	Description of the components	Qty (nos.)
	Mandatory spares to be supplied along with two sets of VFDs (as per "i" to "vii")	01 set as mentioned below
i.	Power components i.e., Power cells/IGBT/IGCTs/Thyristors/Diode for CSI etc depending upon Technology used.	For each type-20 % or minimum 4 (whichever is higher)
ii.	All type of electronic card such as VFD Power converter cards; Firing card, processor, IO card, Driver board, Power supply cards, Power fuses, VFD Control cards, VFD Display cards/ VFD Display unit, communication card etc.	For each type-20 % or minimum 2 (whichever is higher)
iii.	VFD / Panel Cooling fans	For each type-20 % or minimum 4 (whichever is higher)
iv.	Semiconductor fuses	For each type & make-20 % or minimum 6 (whichever is higher)
v.	Communication cables/ ribbon cables/FO cables used for internal circuitry	1 set
vi.	Capacitor AC/DC	For each type & make-20 % or minimum 4 (whichever is higher)
vii.	complete set of removable air filter installed in one drive panel (other than installed in drive)	2 sets
	Relay/ PLC based changeover panel as per specification	01
	Mandatory spares to be supplied along with Relay based changeover panel	01 set as mentioned below
a.	Multilin M60 (or equivalent)/PLC System	1 no



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b.	Splitters/Transducers	For each type & make -20 % or minimum 2 (whichever is higher)
c.	Switches	For each type & make-20 % or minimum 2 (whichever is higher)
d.	Auxiliary relays/contactors/Fuse/MCBs/ power supply/	For each type & make-20 % or minimum 2 (whichever is higher)
e.	All type of electronic card such as processor/ IO / power supply/ Communication network hardware/ one main numerical relay/ PLC internal battery 2 nos and any other card as available in system.	For each type-20 % or minimum 2 (whichever is higher)

10. Commissioning and 2 years O&M Spares

The bidder shall list and quote the commissioning and 2 years O&M spares along with the offer.

10.1 E&C Spares list price shall be included in base scope

10.2 2 Year O&M spares list shall be provided

11. Special Tools & Tackles

11.1 The Vendor shall supply complete new and unused set of all special tools and tackles required for equipment installation, operation and maintenance of the equipment supplied.

11.2 Special tools and tackles are to be supplied for each motor and its auxiliaries.

11.3 Vendor to provide Spreader bars/ Slings/ Shackles required for transportation/ unloading/ handling at site.

12. Inspection & Testing requirements:

12.1 To comply with IOCL NIT along with applicable corrigendum

12.2 Bidder need to submit detailed Quality Plan for the equipment's being supplied to BHEL for further approval. The inspection shall be carried out in line with the approved Quality Plan

12.3 BHEL/ Customer representative reserves the right to visit vendor office/ vendor workshop/sub-vendor workshop, where the ordered items are under manufacturing/ testing for the purpose of inspection or expediting, irrespective of whether or not the stage of inspection is hold / witness / review or even if the stage is not mentioned in ITP / Approved QAP.

13. Third Party Inspections:

13.1 For within India inspections, as per the BHEL TPI

13.2 For outside the India inspections, bidder to quote including TPI as per the IOCL NIT TPI list



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14. Performance Guarantee

14.1 To comply with IOCL NIT along with applicable corrigendum

15. Loading Criteria and penalty criteria

15.1 To comply with IOCL NIT along with applicable corrigendum

16. Delivery period

16.1 Refer BHEL NIT

17. Guarantee/ Warranty period

17.1 To comply with IOCL NIT along with applicable corrigendum & BHEL NIT

18. Training

18.1 To comply with IOCL NIT along with applicable corrigendum

18.2 The bidder shall conduct an online training through virtual platform for familiarization and detailed description of offered VFD model within two weeks of issue of LOA.

18.3 Vendor has to arrange for at least three training session at site to IOCL team at site after installation & successful commissioning. Further, hands on training at IOCL site is to be given by vendor to all concerned people for at least two days.

18.4 Vendor has to arrange for a two-day training session at factory for three people from IOCL. Further, hands on training at IOCL site is to be given by vendor to all concerned people for at least two days.

18.5 For commissioning of the relay/PLC panel, an OEM engineer must be available to program the relay/PLC as well as to provide the hands -on training to IOCL team at site.

18.6 Training at site – The training program will comprise of classroom training and explanation of details of main equipment along with associated auxiliaries including MMS (Vibration monitoring) and VFD system etc. The group to be trained will comprise of persons from various disciplines such as Operation, Mechanical, Electrical & Instrumentation etc. All required facilities for classroom training at site shall be provided by Owner. Training is to be provided to Owner at no extra cost.

19. Project co-ordination meetings

19.1 Vendor shall include in their scope the costs to participate in multiple pre/post award meetings such as Techno-commercial meetings, kick-off meeting, SIL study, Design / progress review meetings etc. as necessary in BHEL / Customer offices.

20. Documents to be submitted along with offer and post order:

20.1 To comply with IOCL NIT along with applicable corrigendum



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21 Vendor shall sign technical specification document and submit the following.

- 21.1.1 Motor technical data sheet
- 21.1.2 Necessary modification required on existing base-frame to accommodate the Motor
- 21.1.3 Inputs required for Torsional Analysis
- 21.1.4 Lube Oil Consumption details for Motor
- 21.1.5 Motor TSI Scheme: Vibration probes, RTD's, speed probe (if applicable)
- 21.1.6 Motor & VFD logics
- 21.1.7 Filled in Motor PTR with PO details
- 21.1.8 Motor Performance details
- 21.1.9 SLD with scope demarcation
- 21.1.10 Motor GA Drawing indicating total weight and maximum maintenance weight
- 21.1.11 Motor and VFD overall dimensional drawing indicating the following: -
 - 21.1.11.1 Location of various connections.
 - 21.1.11.2 Mounting details on base plate.
 - 21.1.11.3 Motor Shaft end details.
 - 21.1.11.4 Instrumentation list.
 - 21.1.11.5 Cross-sections drawings of Motor & VFD
 - 21.1.11.6 GA & Schematic drawings of VFD.
 - 21.1.11.7 Table of terminal points of VFD & Motor
- 21.1.12 Filled in Mandatory Spares List of Motor
- 21.1.13 Data required as per this specification
- 21.1.14 Typical Quality Plan
- 21.1.15 Electrical load list
- 21.1.16 Utility List (If applicable)
- 21.1.17 Filled in deviation list
- 21.1.18 Bill of materials clearly indicating the consumables and other materials



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21.2 A comprehensive write up/ brochures on details of product profile, manufacture & testing facilities and quality control procedures, Organization chart and Manpower resources.

21.3 List of commissioning spares.

21.4 List of 2-year O&M spare parts.

21.5 List of special tools and tackles for repair and maintenance.

21.6 Schedule of submission of drawings for BHEL/ Customer approval.

21.7 Schedule of design, manufacture, shop testing and delivery.

21.8 Any other applicable documents as per IOCL NIT along with applicable corrigendum

22 Sub-Vendors:

22.1 To comply with IOCL NIT along with applicable corrigendum

22.2 Sub-vendors are subjected to BHEL/ end customer Approval.

23 Location and Environmental Conditions:

23.1 To comply with IOCL NIT along with applicable corrigendum

24 HAZOP & SIL study

Bidder to note that during detail engineering stage, the high-speed motor package shall be studied for HAZOP and SIL review. HAZOP and SIL (Safety Integrity Level) study shall be carried out at Owner's Office. Vendor shall participate in the study at his own cost for a minimum of 2 days. All modifications based on the recommendations on HAZOP & SIL study shall be implemented by vendor without any additional cost and schedule impact to Purchaser.

25 Requirement of NDA

Any other applicable technical data of existing compressor & Turbine will be shared by BHEL, upon submission of Non-Disclosure Agreement (on Rs 100 stamp paper) by the high-speed motor manufacturer to the commercial department of BHEL as per the NDA format annexed with the tender.

26 Memorandum of Understating

26.1 The high-speed motor manufacturer needs to sign MOU with BHEL in line with the qualification criteria and conditions mentioned in the IOCL NIT.

26.2 **Special Note:** The selected High-speed motor manufacturer in this pre-bid tie-up, shall not quote separately for this tender directly to the IOCL Mathura.

**ELECTRICAL MACHINES ENGINEERING
HYDERABAD****TG66659**

Rev No.: 00

Page **15** of **16****27 PRICE FORMAT:**

27.1 With the techno-commercial part of their offers, the bidders will provide original un-priced price format, strictly in the BHEL price format provided and other commercial charges as per the commercial terms attached with the enquiry.

27.2 The price format shall be same for un-priced and priced offer.

27.3 No other price format will be accepted.

27.4 The evaluation shall be done as per the attached price schedule format based on unit rates.

28 Miscellaneous data and conditions:

For all other miscellaneous data and applicable conditions, which are not specifically mentioned in this, are to be considered from IOCL NIT along with applicable corrigendum and subsequent communication (if any).

[illegible]



SPECIAL CONDITIONS OF CONTRACT (SCC) FOR ENTERING INTO MOU			
BHEL is submitting Bid to M/s. IOCL Mathura Refinery, NPRU Unit located at Mathura, Uttar Pradesh, India for “High Speed Electric Motor for replacement of HPC Condensing Turbine Along with Accessories, Mandatory Spares, Commissioning Spares, Special Tools & Tackles and Third Party Inspection at NPRU Unit of IOCL Mathura Refinery” (IOCL NIT Number 9050M25E08). BHEL has to tie up with a Supplier for scope of supply as per IOCL NIT & BHEL NIT for above site as per scope documents. BHEL desires to have a Pre-bid tie up with High Speed Electric Motor–Supplier with an MoU on "back to back" basis in line with end Customer NIT.			
BHEL ENQUIRY NO: HY/EM/PUR/IOCL MATHURA/ HIGH SPEED ELECTRIC MOTOR/MOU/2025/001		NAME OF THE SUPPLIER	OFFER REF. NO. :
Date		CONTACT PERSON	OFFER DATE :
BID DUE date :		E-MAIL ID	
		PHONE NO:	
BHEL Requirements			Supplier Response (Yes/No)
A	For complete Techno-Commercial conditions of the tender, Suppliers are requested to refer to the following documents: a) BHEL Technical Specification Number: TG66659-R00 [Annexure – 1] b) IOCL Mathura GeM Enquiry Number: GEM/2025/B/6744032, Dated: 01-10-2025 c) IOCL Mathura “High-Speed Electric Motor Package” NIT Number: 9050M25E08 d) BHEL Special Conditions of Contract (SCC). i.e., this document -- To be duly filled up by Supplier e) BHEL Instructions to Bidder (ITB-18) - To be duly filled up [for the terms & conditions which are not mentioned in SCC]. f) BHEL Annexures: 2 to 11 In general, all the requirements indicated in ITB & SCC are applicable. In case of any conflict between this document SCC or ITB-18, this document (SCC) shall prevail upon. Note: a) The Supplier's offer should consist of the Enquiry / Special conditions format (i.e., this document) and the ITB-18 (enclosed) duly filled in, signed and stamped. BHEL reserves the right to reject the offers submitted in any other format. Commercial Conditions quoted in any place other than these two formats, including stated in Supplier's General Terms and conditions, if any, shall be summarily ignored. b) It is the sole responsibility of the Supplier to understand both technical and commercial requirements of the tender before submission of two-part bid within the due date. All the clarifications (if any) regarding technical and commercial terms shall be clarified before submission of offer. Any deviations to the clauses on account of interpretations & assumptions shall not be allowed. Revised price / Impact price will be allowed only in the event of change in technical / commercial conditions by BHEL. (Refer clause 5B(iii) of ITB-18).		Supplier to Confirm
BHEL Requirements			Supplier Response (Yes/No)



A1	SUBMISSION OF OFFERS- TECHNO-COMMERCIAL BID (Part-1); Refer Note A3 below		
a	Website Link: Please follow the link >> https://dipp.gov.in/public-procurements for all circulars. Enquiry has been floated in BHEL Government e-Procurement Portal [GePNIC] with Two Part bids. Supplier are required to submit their bids electronically on the GePNIC Portal only (URL: https://dipp.gov.in/public-procurements) using valid Digital Signature Certificates [Class-III], on or before the bid submission date and time. Bidders are required to register themselves at https://dipp.gov.in/public-procurements. This tender document along with the following documents duly filled in, signed and stamped shall constitute the offer. Supplier to confirm that the offer is in total conformity with the specification. Writing words like "Refer Offer" is not acceptable Only the deviations agreed to by end customer in pre-bid queries /amendment etc. are allowed.(also refer clause "a7" below)	Supplier to Confirm	
a1	i) MOU Document -Annexure M (~~ANNEXURE M~~ In Principle MoU between BHEL and Supplier for IOCL Mathura Project) ~~The Supplier Bidder~~ has to sign an MOU with BHEL as per the attached "In principle MoU" document in Annexure M. ii) L1 bidder shall sign a MOU with BHEL as per "IOCL tender PQC Note 2 for 3.3 " valid for at least 2 (Two) years, from the date of scheduled bid submission to IOCL. iii) Detailed MOU with L1 Supplier will be entered in accordance with Terms & Conditions mutually agreed between BHEL & Supplier along with the Customer on "back to back basis", later. Subject to BHEL bagging the contract from the end Customer, BHEL will place a Purchase order on Supplier which shall be in line with the terms and conditions mutually agreed as per this tender document as well as the MOU. BHEL reserves the right to reject the offer without the Signed document of In-principle MOU.	Supplier to Confirm	
a2	TECHNICAL BID -As per end Customer specifications for IOCL, Mathura Enquiry Document Number "9050M25E08" & GeM Tender GEM/2025/B/6744032, Dated: 01-10-2025, amendments (as applicable) and BHEL Technical Specification [Annexure-1] of High Speed Electric Motor) attached for the project. NOTE : Annexure-1 (Technical Specification) to be mandatorily submitted duly signed and stamped, without which the offer will not be considered for evaluation	Supplier to Confirm	
a3	Integrity pact - Annexure - VI of BHEL ITB (Refer Clause S below) BHEL Integrity Pact has to be mandatorily furnished for consideration of Supplier offer.	Supplier to Confirm	
a4	Customer Tender Specification "9050M25E08" with the clarifications/amendments & Pre-bid clarifications etc. (applicable to Supplier's scope) is attached for details required for preparation of Supplier Offer. To be confirmed by Supplier on back to back basis for Supplier Scope only.	Supplier to Confirm	
a4-1	Supplier shall submit Pre-Bid queries if any to BHEL. Supplier to review the replies of all the pre-bid queries, Technical amendments, Commercial amendments issued by IOCL / BHEL shall also be complied w.r.t end customer requirements. Supplier shall also submit a copy of above mentioned documents (replies of pre-bid queries, Technical amendments, Commercial amendments) duly signed & stamped on each page along with their offer as a token of their acceptance. The above documents shall form a part of Bidding Document. Supplier has to fulfil the Pre-qualification Criteria (PQC) [Technical & Financial] [Refer Annexure 10 & 11]	Supplier to Confirm	
a5	BHEL's ITB document (BHEL ITB-INSTRUCTION TO BIDDER REV 18) to be submitted duly filled and signed.	Supplier to Confirm	

BHEL Requirements	Supplier Response (Yes/No)



a6	Agreement Cum Undertaking -(ANNEXURE-II of BHEL ITB) to be duly filled and signed.	Supplier to Confirm	
a7	(i) Supplier is required to quote strictly as per tender specifications. However, if Supplier wishes to give deviations which cannot be complied with time/ cost implications, such deviations, if any, shall be listed and submitted in the attached format – refer Annexure - 2. If deviations in prescribed format are not submitted it is deemed that all the Customer Specifications are being complied in-toto. Acceptance of deviations is subjected to BHEL/ end customer approval. NOTE-1: Supplier shall note that only those deviations to specifications, standards & codes (if any), shall be permitted which are technically infeasible to be met, provided suitable justification for the same is furnished. NOTE 2. Any deviations/deletions/corrections made elsewhere in the body of the Supplier's proposal will not be taken cognisance of and all such deviations shall be deemed to have been withdrawn by the Supplier. (ii) Any deviations NOT accepted by the BHEL/ end customer shall be withdrawn by Supplier without any time/ cost implication to BHEL/IOCL. No cost addition will be allowed during post bid on account of deviations withdrawal.	Supplier to Confirm clause and attach the duly filled format.	
a8	Unpriced Price Bid format (Annexure 3) indicating items as either Quoted/Not Quoted to be submitted in Techno-commercial bid failing which bid may be rejected.	Supplier to Confirm	
a9	Any other information required in the Bidding Documents/Any other document as required in the end Customer Bid documents / deemed required for the bid/or considered relevant by the Bidder : Supplier to indicate and confirm.	Supplier to Confirm	
a10	In case of any additions, deletions and changes in scope of supplies and works initiated by end Customer, if any at a later stage Supplier & BHEL will discuss with end Customer and mutually agree on price and time implication/financial commitment.	Supplier to Confirm	
a11	Whether bidder is currently serving any banning orders issued by BHEL/IOCL/ Ministry of Petroleum & Natural Gas /Department of Expenditure (DoE) debarring them from carrying on business dealings with BHEL/IOCL/ 'all the attached/ subordinate offices, autonomous bodies and CPSUs under MoS'/ 'all Central Govt. Ministries/ Departments' respectively"" (declaration on bidder's company letter head). (Annexure-4)	Supplier to Confirm and provide declaration	
a12	Supplier to furnish on Supplier's letter head (Annexure-5)	Supplier to Confirm and submit the document	
a13	Supplier to furnish APPENDIX -1 CHECK LIST	Supplier to Confirm	
a14	The Acknowledgement copy of EMD [Refer clause Y] to be enclosed with the Technical bid.		

BHEL Requirements		Supplier Response (Yes/No)
a15	<u>Third Party Inspection [TPI]:</u> Bidder has to indicate factory test location for all the items as per submitted Quality Plan, if place of inspection is within India, in such case, Material shall be inspected by BHEL TPIA or joint inspection by BHEL/BHEL TPIA and End Customer (if applicable) as per approved quality plan and specification. Offers will be loaded by 0.1735% towards TPI charges to arrive the total destination cost to BHEL and TPI charges will borne by BHEL. In case, place of inspection is out side India, TPI to be engaged by bidder & TPI charges shall be in bidder's scope. Inspection agencies shall be as per IOCL approved agencies (As per clause 28 [General Notes], XXIII, 4 of IOCL Tender document "9050M25E08").	Supplier to Confirm
A2	SUBMISSION OF PRICE BID (Part-2)- See Note A4 below	



a2-1	This tender document along with the following documents duly filled in, signed and stamped shall constitute the offer. Price Bid as per (Annexure 3) enclosed as per Note A4 below. NOTE: It is mandatory for the Supplier to indicate "QUOTED" against all items in the Price Schedule submitted along with the Technical and unpriced commercial bid. If the Bidder fails to quote for any item in the Price bid, offer of such bidders will not be considered for further evaluation.	Supplier to Confirm	
A3	NOTE for TECHNICAL BID Submission: The offer containing the above along with other documents should be uploaded in GePNIC Portal against "Technical Cover" only "PDF" documents allowed.	Supplier to Confirm	
A4	NOTE for PRICE BID Submission: The offer containing the "Annexure 3" should be uploaded in GePNIC Portal against "BOQ"	Supplier to Confirm	
	NOTE: The Offers have to be mandatorily submitted as per points A1, A2, A3, A4 above. BHEL reserves the right to reject the Bids which are not submitted as per above.		

BHEL Requirements		Supplier Response (Yes/No)	
B	PROCESS OF FINALISATION OF TENDER.		
	The Supplier has to sign an MOU with BHEL as per the attached "In principle MoU" document in Annexure M (ANNEXURE-M-In Principle MoU between BHEL and Supplier). Detailed MOU with Supplier will be entered in accordance with Terms & conditions mutually agreed between BHEL & Supplier along with the end Customer on "back to back basis" upon receipt of end customer order/LOI. BHEL will evaluate the Techno-Commercial Bid. The tender documents which are complying to scope, quality and delivery requirements will be Technically Qualified. BHEL will open the price bid only upon Technical bid qualification. BHEL will subsequently evaluate the price offer of Supplier for entering into "Pre-Bid Tie Up" with BHEL and submit offer from BHEL to the end customer. Subject to BHEL bagging the contract from the end Customer, BHEL will place a purchase order on Supplier which shall be in line with the terms and conditions mutually agreed as per this tender document as well as the detailed MOU. However, Order for CPWAMC shall be placed directly by IOCL, Mathura to the Supplier after the expiry of defect liability period.	Supplier to Confirm	
B1	EVALUATION CRITERIA: Evaluation shall be done on overall lowest landed cost basis. Note 1: Since this tender invokes technical and commercial loading, the evaluated price as per NIC should not be considered as final. The final evaluated cost shall be updated after applying loading factors if any. Note 2: CPWAMC price of each year should not be less than 3% of VFD. CPWAMC charges offered for each subsequent year should be same or higher than preceding year. The CPWAMC charges shall be offered within range of 3 to 10% of cost of equipment. In case bidder quotes for any of the schedule 1.07 to 1.11, is less than the prescribed limit, then the offer shall be evaluated and ordering shall be done as below- The corresponding differential amount shall be reduced from supply quoted rate (supply item of schedule 1.04) and shall be added in the corresponding CPWAMC schedule for evaluation and ordering. IOCL, Mathura shall place a separate order for this CPWAMC directly to the Supplier after the expiry of defect liability period. Payment term for CPWAMC: 100% pro rata by IOCL against monthly bills to be submitted by Supplier duly certified by IOCL Engineer-in-Charge. Refer IOCL Mathura tender document "Special Conditions of Contract for CPWAMC".		



B2	LOADING CRITERIA: Technical Loading of Offers in Case of Deviations: As per Technical Specification [Annexure-1]. Commercial Loading of Offers in Case of Deviations: Deviations (Commercial as well as Technical) from the tender specifications and conditions are generally not acceptable. However, deviation if any, shall be brought out clearly with proper justification in the offer. The deviation, if considered by BHEL, shall be loaded for comparison, while evaluating the offer. If a bidder unconditionally withdraws any deviation before price bid opening, the same shall not be loaded. Loading criteria in respect of major commercial conditions where deviations if any are as mentioned below. Any other loading if applicable Shall be as per ITB-18. Bidders are requested to submit the offer in line with terms and conditions provided in Tender document. 1. PAYMENT TERMS: The payment terms applicable should be clearly indicated. Loading shall be done on the differential amounts at a rate of 9.6% per annum simple interest as defined in the tender for the following periods: (a) Drawing approval – 80% of the delivery period. (b) Receipt of raw materials at Supplier’s works – 50% of the delivery period. (c) Final 10% against dispatch document - one month. Basis of loading: The Bids shall be loaded on total order value. Total order value means supply price of items 1.01 to 1.04 of price schedule [Annexure-3]. 2. PERFORMANCE BANK GUARANTEE (PBG): Performance Bank Guarantee (PBG) shall be furnished as per tender documents. PBG shall be as per BHEL format. In case bidder does not agree to submit PBG as per tender requirement, equivalent percentage loading shall be done. In case a bidder offers to give a PBG for less than 05% of order value, loading shall be done for the differential amount. In case of Differential Amount: <table><tr><td>Amount Offered by Bidder</td><td>Loading</td></tr><tr><td>a) 05%</td><td>Nil</td></tr><tr><td>b) Less than 05%</td><td>Differential between the offered percentage and 05%</td></tr></table> Basis of loading: The Bids shall be loaded on total order value. Total order value means supply price of items 1.01 to 1.05 of price schedule [Annexure-3]. 3. PENALTY CLAUSE: In case of Deviation to Penalty clause, loading is applicable to the extent to which not agreed by Bidder.	Amount Offered by Bidder	Loading	a) 05%	Nil	b) Less than 05%	Differential between the offered percentage and 05%		
	Amount Offered by Bidder	Loading							
a) 05%	Nil								
b) Less than 05%	Differential between the offered percentage and 05%								
C	ITEM DETAILS & SCOPE OF WORK								
	Description of the Supplier's scope of work: Design, Engineering, Manufacturing, Packaging, Testing, Supply, Transportation and Supervision of Erection and Commissioning of High Speed Electric Motor Package for replacement of HPC Condensing Turbine. Below is the breakup for scope of supply. 1. Supply of Complete High Speed Motor Package inclusive of commissioning spares etc. 2. Supply of Spare High Speed Motor 3. Supply of Mandatory Spares 4. Supply of Hot stand by VFDs, Input Transformers, PLC 5. Site Supervision, Testing [TPI as applicable] and Commissioning at site IOCL, Mathura, Uttar Pradesh State. 6. Comprehensive Post Warranty Annual Maintenance Contract [CPWAMC] for item 4 above for 1st, 2nd, 3rd, 4th & 5th years. Commissioning Spares and Special Tools & Tackles etc. as applicable, Supplier to confirm to the same on back to back basis for the scope applicable to Supplier as per NIT and corrigendum's /addendums etc.	Supplier to Confirm							



	For the above scope, IOCL, Mathura Floated GeM Tender GEM/2025/B/6744032, Dated: 01-10-2025 and amendments (as applicable) also may be referred.		
D	DELIVERY TERMS		
D(i)	Vendor offer shall be on FOR Destination basis up to BHEL, Hyderabad. BHEL reserves the right to reject the offers submitted with any other Delivery Terms as per BHEL ITB document.	Supplier to Confirm	
D(ii)	Supplier to confirm a). IOCL Mathura General Conditions of Contract (GCC) and b). Annexure-1 of Technical Specification of BHEL for Packing & Loading.	Supplier to Confirm	
D(iii)	Any missing / short supply items in the Supplier shipment noticed after delivery, the same shall be delivered directly to IOCL Mathura site on DDP basis only. Any such items required in a short span of time shall be supplied on immediate basis at IOCL Mathura site on DDP basis by Supplier without any additional time/ cost implication to BHEL	Supplier to Confirm	

BHEL Requirements		Supplier Response (Yes/No)	
E	DELIVERY PERIOD		
	Supplier to confirm delivery period as: Total quantity to be delivered in 18 months from date of BHEL PO on FOR basis up to BHEL, Hyderabad. For Supervision of E&C and PR test: Supplier has to depute service engineer within 10 days from date of intimation. In case of an emergency during E&C, PR test Supplier shall depute their expert within shortest possible time. NOTE: Supplier to please note BHEL reserves the right to reject the offer with unsuitable deliveries.	Supplier to Confirm	
F	PRICE SCHEDULE		
F(i)	Supplier to confirm to submit prices in BHEL Price format (Annexure 3). The rates stated in the Price Schedule and the lump sum price(s) shall not be subject to escalation or increase for any reason whatsoever up to validity. Quoted prices are firm and fixed till complete execution of the entire order. Bidder must quote the price in this Price Schedule format only. The format shall not be changed and/or retyped. Bidder to clearly indicate 'Quoted' against each Sr. No. in the price column in the unpriced Price Schedule. Bidder to submit Price part of above Price schedule in their Priced Bid and Unpriced part with the Unpriced Bid.	Supplier to Confirm	
F(ii)	Bidder to quote price for scope as detailed in clause C and Delivery terms as per clause D above.	Supplier to Confirm	



F(iii)	a. Supervision of Erection & Commissioning and Performance Run [PR] Test: Terms & Conditions for Supervision Services of erection & commissioning and PR Test of High Speed Electric Motor shall be as per below: - BHEL shall reimburse economy class airfare to and from the nearest Airport to New Delhi Airport against documentary evidence. - Transportation charges to and from New Delhi Airport to refinery / Project Site at MATHURA Refinery, shall also be reimbursed against submission of documentary evidence (limited to maximum First AC Railway Fare between New Delhi station and Mathura Station). - The per diem rates shall include lodging, boarding, mob and demob, local transport, medical, all insurance including third party, income tax, all taxes & all other incidental charges. - The per diem rates shall exclude GST which shall be payable extra. - Per diem rates shall apply from the date the supervisory personnel reach site and up to the day they leave site. No payment shall be made for the transit period. - Working hours as those prevailing at site – up to eight hours a day (excluding lunchtime of 1 hour), Monday through Saturday and holidays as applicable to site personnel shall apply. - Vendor's supervisory personnel shall observe / abide by site working conditions prevailing in the existing refinery, safety codes and Indian laws. - For evaluation purpose site supervision of erection, testing and commissioning at site 60 (sixty) man-days shall be considered for Evaluation for Supervision Services. - However, payment shall be made as per actual number of man-days. - Bidder to ensure compliance to guidelines on PPE (Personal Protective Equipment) & Other Safety Norms. b. Overtime Charges for Site Supervision of erection, testing and commissioning: <table border="1"> <thead> <tr> <th>Sl.No.</th><th>Description</th><th>Man Day rates in INR</th><th>Remarks</th></tr> </thead> <tbody> <tr> <td>1</td><td>Overtime rate / hour beyond normal 8 hours work on normal working days</td><td>₹ _____</td><td>Vendor to indicate here</td></tr> <tr> <td>2</td><td>Overtime rate / hour for work on weekly off days / holidays (as applicable to Refinery site).</td><td>₹ _____</td><td>Vendor to indicate here</td></tr> </tbody> </table>	Sl.No.	Description	Man Day rates in INR	Remarks	1	Overtime rate / hour beyond normal 8 hours work on normal working days	₹ _____	Vendor to indicate here	2	Overtime rate / hour for work on weekly off days / holidays (as applicable to Refinery site).	₹ _____	Vendor to indicate here	Supplier to Confirm	
Sl.No.	Description	Man Day rates in INR	Remarks												
1	Overtime rate / hour beyond normal 8 hours work on normal working days	₹ _____	Vendor to indicate here												
2	Overtime rate / hour for work on weekly off days / holidays (as applicable to Refinery site).	₹ _____	Vendor to indicate here												

BHEL Requirements			Supplier Response (Yes/No)
G	PAYMENT TERMS All payments shall be made by BHEL to Supplier after receipt of corresponding payments from end customer. Taxes & Duties: Supplier to comply with clause 11 of ITB-18 on GST requirements.		
G(a)	Payment for Complete high speed motor package along with hot stand-by VFD, Input Transformers, Power Cables, Accessories & Spare High Speed Motor as per Price schedule [1.01, 1.02 & 1.04 of Price Schedule Annexure-3] i) 5% of total PO value of respective line items against approval of drawings (Equipment Layout, Electrical SLD, P&ID's (Lube Oil P&ID, Cooling water P&ID) & manufacturing schedule) and motor data sheets at least in Code-2 against certification by BHEL Engineering & against submission of Bank Guarantee (BG) for an equivalent amount valid till contractual delivery date (CDD) plus 3 months. However, BG has to be extended based on actual delivery.	Supplier to Confirm	



ii) 10% of total PO value of respective line items against receipt & identification of raw materials (raw material for stator & rotor cores and copper for windings) & Major Components of VFD at Supplier's works against certification by BHEL/IOCL/CONSULTANT/TPI agency and submission of bank Guarantee (BG) for equivalent amount valid till contractual delivery date (CDD) plus 3 Months. However, BG has to be extended based on actual delivery.	Supplier to Confirm	
iii) 75% of total PO value of respective line items against receipt & acceptance of all material at BHEL, Hyderabad together with full taxes, duties.	Supplier to Confirm	
iv) 5% of total PO value of respective line items on receipt of Final/As built Drawings/Documents/Data/Manual in requisite number of copies/sets/CDs as per VDR specified in Purchase Requisition against certification by BHEL Engineering.	Supplier to Confirm	
v) 5% of total PO value of respective line items on successful commissioning and Performance Run test at site.	Supplier to Confirm	

BHEL Requirements			Supplier Response (Yes/No)
G(b)	Mandatory Spares as per Price schedule:	Supplier to Confirm	
	1. 100% payment of total PO value of respective line item on receipt & acceptance of spares at BHEL, Hyderabad after dispatch of main equipment.		
G(c)	Payment for Site Supervision, Testing and Commissioning Charges as per price bid schedule	Supplier to Confirm	
	100% prorated against monthly bills to be submitted by Supplier duly certified by IOCL & BHEL Engineer-in-Charge.		
G(d)	Note to Payment Terms: 5% & 10% against BG (as mentioned in Point No G(a) i & ii) shall be released only after receipt & acceptance of PBG as per tender terms. - If bidder does not take 5% & 10% payment against BG (as mentioned in the Point No G(a) i & ii above) and supplies the material, then 90% payment shall be released to the bidder as per terms and conditions mentioned in clause Point No G(a)(iii). 1st Milestone payment shall be released only after receipt of PBG and manufacturing schedule. Performance Bank Guarantee shall be submitted within 14 days of PO. In case of Bulks PBG shall be submitted at the time of dispatch. - Certification for identification of major raw material, in the above payment terms, shall be carried out by BHEL/IOCL/ CONSULTANT/TPI agency, as applicable. - In case final/As-built Drawings /Documents / Data / manual in requisite number of copies/sets/CD as per VDR are not submitted within 12 months from the date of supply of last item of the Initial order, for reasons not attributable to bidder; then the supply payment on hold on this account shall be released against invoicing and submission of Bank Guarantee of equivalent amount valid for a period of 6 months initially and shall be extended till commissioning of the system. - Successful commissioning and Performance Run test (PRT) at site as mentioned in Point No G(a) of vi shall mean the PRT of the High speed Motor package at Site, coupled with the existing compressor as defined in the Technical Documents of the Contract. In case, Successful commissioning and PRT at site is not completed within 12 months from the date of supply of last item of the Purchase Order, for reasons not attributable to Vendor; then the payment on hold on this account against supply shall be released against invoicing and submission of Bank Guarantee of equivalent amount valid for a period of 6 months initially and shall be extended till commissioning of the system.		

BHEL Requirements			Supplier Response (Yes/No)
H	PRICE REDUCTION FOR NEGOTIATIONS/ REVERSE AUCTION WITH END CUSTOMER		
	In the event of price reduction by BHEL with the end customer, corresponding price reduction shall be passed on to BHEL by Supplier.	Supplier to Confirm	
I	PENALTY CLAUSE:		
I (i)	Supply and supervision Penalty Clause:		



	In the event of delay in supply /part-supply of goods &supervision, Penalty as detailed below is leviable. a). Penalty of 0.5% of PO value per week or part there of shall be levied, limited to a max of 5% (five percent) of total order value. b). Date Reckoned for Penalty for FOR delivery term: Material Receipt date at BHEL Hyderabad. c). Date reckoned for Supervision Penalty: Penalty shall be levied after 10 days of intimation. d). Timelines as mentioned in the Annexure-I of BHEL ITB will be considered for reckoning delivery. Imposition, recovery or settlement of this penalty shall not affect BHEL's right to performance, compensation and termination of the order.	Supplier to Confirm	
I(ii)	PERFORMANCE PENALTY: As per Clause B "LOADING AND PENALTY CRITERIA" of "Special Purchase Conditions" of IOCL, Mathura NIT Document "9050M25E08"	Supplier to Confirm	

BHEL Requirements		Supplier Response (Yes/No)	
J	DEFECT LIABILITY: "Defect Liability Period" in respect of: i. Bulk Consumables shall be the date of delivery plus 6 (six) months. ii. In the case of other Material(s) shall be 18 (eighteen) months from the date of delivery or 12 (twelve) months after the same have been put in service or commissioned, whichever is earlier. iii. In the case of altered or replaced Material(s): a. For bulk consumables: In case of repair / replacement, Vendor shall extend the warranty of such part further for a period of 6 (six) months from the date of supply of repaired/replaced material. However, in no case the warranty of repaired/ replaced part shall exceed 12 (twelve) months from last supply. b. In case of other materials: In case of repair/ replacement, Vendor shall extend the warranty of such part further for a period of 12 (twelve) months for other materials from the date of repair/ replacement. However, in no case the warranty of repaired / replaced part shall exceed 24 (twenty-four) months from the date of commissioning or 30 (thirty) months from last supply, whichever is earlier. In case of extended Warranty period, extension of Performance Bank Guarantee shall not be required.	Supplier to Confirm	
K	BID BOND / BANK GUARANTEE SUBMISSION (on Non Judicial Stamp Paper for applicable value) Refer Clause L3 below for List of Banks	Supplier to Confirm	
K1	BID BOND: As per BHEL norms, the Supplier to confirm to submit a bid bond for 1% bid value within 30 days of signing of MOU as security deposit valid up to 9 months. BHEL Bank Guarantee format enclosed Document (No deviations) to be submitted ,duly filled-in (Annexure 6)	Supplier to Confirm	
K2	PERFORMANCE SECURITY (PBG): Supplier has to submit Performance Security; value of PBG should be 5% of the contract value. The performance security should be in the same currency as the contract. Performance Security is to be furnished as per Annexure-VII of BHEL ITB within 14 (fourteen) days after PO. This should be valid up to Defect Liability period plus three months claim period. The performance security will be forfeited and credited to BHEL's account in the event of a breach of contract by the supplier. PBG for CPWAMC: Within Ten days of placement of Order by IOCL for CPWAMC, Supplier/Original equipment manufacturer shall submit PBG for 5% of complete CPWAMC order value valid for complete CPWAMC period + 3 months claim period.	Supplier to Confirm	



	In case Supplier/Original equipment manufacturer finds it difficult to get BG with complete CPWAMC period, they can submit BG with interim validity of minimum 2 years & subsequently the same to be renewed before expiry. In absence of a valid PBG, payment for CPWAMC shall not be released.		
K3	Refer Annexure- 7 for List of Consortium Banks for BG	Supplier to Confirm	
L	Bid Validity: 07 Months from technical bid opening date of end customer M/s. IOCL Mathura. The rates stated in the Price Schedule and the lump sum price(s) shall not be subject to escalation or increase for any reason whatsoever up to validity period. Quoted prices are firm and fixed till complete execution of the entire order. Bidder must quote the price in this Price Schedule formats only. The formats shall not be changed and/or retyped.	Supplier to Confirm	
M	ARBITRATION: As per clause no. 46 of BHEL ITB-18 Document enclosed	Supplier to Confirm	
N	APPLICABLE LAWS AND JURISDICTION OF COURTS: As per Clause 47 of BHEL ITB-18 Document enclosed	Supplier to Confirm	

BHEL Requirements		Supplier Response (Yes/No)	
O	LIMITATION OF LIABILITY: The maximum liability shall be limited to 100% of total contract value except in case of fraud, deliberate default, negligence or misconduct by the vendor. The vendor shall not be liable for consequential losses on account of production, revenue or profit.	Supplier to Confirm	
P	BREACH OF CONTRACT, REMEDIES AND TERMINATION: As per Clause 27 of BHEL ITB-18 Document enclosed	Supplier to Confirm	
Q	INSURANCE: Supplier to consider the insurance for their personnel, general liability and employer's liability, etc. including Transit Insurance till BHEL, Hyderabad.	Supplier to Confirm	
R	INTEGRITY PACT		
R(i)	Integrity pact Confirm to submit duly filled signed & stamped along with the tender enquiry or separately in advance to the undersigned The above enquiry is falling under the purview of "Integrity Pact" as per & Government of India guidelines for which Independent External Monitor (IEM) would be nominated. Kindly note that this is a mandatory requirement and you are requested to send the signed copy of integrity pact (document attached) in 2 Originals immediately to the address below to process the tender". Please note that without the "Integrity Pact" the offer will not be considered & will be summarily rejected. Mr. Venu Kumar V Dy. General Manager/PUR/EM Ground Floor, Administrative Building BHEL, Ramachandrapuram Hyderabad, India- 502032 Ph: +91 40 2318 5058, +91 9441742683 Mr. Srinivasa Rao K Sr. Manager/PUR/EM Ph: +91 40 2318 2130, +91 9276609755	Supplier to Confirm	



BHEL Requirements			Supplier Response (Yes/No)
R(ii)	IEM details 1. Shri Sarat Kumar Acharya, Ex-CMD, NLC iem1@bhel.in 2. Shri R. Mukundan, IRPS (Retd.) iem2@bhel.in 3. Shri Madan Lal Meena, IAS (Retd.) iem3@bhel.in NOTE: No routine correspondence shall be addressed to the IEM (phone/ post/ email) regarding the clarifications, time extensions or any other administrative queries, etc on the tender issued. All such clarification/ issues shall be addressed directly to the tender issuing (procurement) department's officials whose contact details are provided below. Contact Persons: Shri Venu Kumar V, venukumar@bhel.in, +91 40 2318 5058, +91 9441742683; Srinivasa Rao K, srinivasark@bhel.in , +91 40 2318 2130, +91 9276609755	For information	
S	Note: Supplier/ Supplier to confirm that all Customer's NIT points along with Corrigendum's/Amendments/revisions etc. and Pre-Bid Clarification Clauses are agreed to on "back to back" basis for both the Technical and Commercial T & C for the scope applicable to Supplier.	Supplier to Confirm	
T	NOTE 1: The Bidder shall bear all costs associated with the preparation and submission of its Bid, Site visits, clarifications meetings in or out of the End Customer or Bidder(BHEL) offices and BHEL shall in no case be responsible or liable for those costs, regardless of the conduct or outcome of the Bidding Process. NOTE 2: BHEL reserves the right to accept or reject any bid and to annul the bidding process and reject all bids at any time without thereby incurring any liability to the affected Bidder or any obligation to inform the affected Bidder of the grounds for the BHEL's action.	Supplier to Confirm	
U	2 years Operation & Maintenance (O&M) Spares: Vendor shall furnish an itemised list of recommended spare parts with unit prices for two years normal and continuous operation of the complete high-speed motor package (including mechanical, electrical and instrumentation spares), required over and above the mandatory spares. Two year spares shall be ordered by the IOCL separately and will not be considered for evaluation.	Supplier to Confirm	
V	All charges for issuance (including extensions, etc.) of Bank Guarantee shall be borne by Supplier	Supplier to Confirm	
W	EARNEST MONEY DEPOSIT(EMD):	Nil	
W1	i. EMD shall be furnished before tender opening / along with the offer in full as per the amount indicated in the NIT. ii. The EMD of Rs. 40,00,000/- [Rupees Forty Lakhs only] is to be paid only in the following forms: a) Electronic Fund Transfer credited in BHEL account (before tender opening). b) Banker's cheque/ Pay order/ Demand draft, in favour of 'Bharat Heavy Electricals Limited' and payable at Regional HQ issuing the tender (along with offer). c) Fixed Deposit Receipt (FDR) issued by Scheduled Banks/ Public Financial Institutions as defined in the Companies Act (FDR should be in the name of the Contractor, a/c BHEL marking lien in favour of BHEL) (along with offer). The Fixed Deposit in such cases shall be valid for a period of 45 (forty-five) days beyond the final bid validity period. d) Bank Guarantee from any of the Scheduled Banks. In such cases shall be valid for a period of 45 (forty-five) days beyond the final bid validity period. iii. No other form of EMD remittance shall be acceptable to BHEL		



W2	EMD by the Bidder will be forfeited as per NIT conditions, if: i. The bidder withdraws or amends its/his tender or impairs or derogates from the tender in any respect within the period of validity of the tender or if the successful bidder fails to furnish the required performance security within the specified period mentioned in the Tender. ii. EMD by the Bidder shall be withheld in case any action on the tenderer is envisaged under the provisions of extant "Guidelines on Suspension of business dealings with suppliers/ contractors" and shall be forfeited in case of suspension iii. EMD of the unsuccessful bidders shall be returned at the earliest after expiry of the final bid validity period and latest by the 30th day after the award of the contract. However, in case of two packet or two stage bidding, EMD of unsuccessful bidders during first stage i.e., technical evaluation etc. shall be returned within 30 days of declaration of result of first stage i.e. technical evaluation etc. iv. EMD of successful Bidder shall be refunded on conclusion of the order/ receipt of a performance security as mentioned in NIT. v. EMD shall not carry any interest. vi. Micro and Small Enterprises (MSEs) or start-up's as recognized by Department for Promotion of Industry and Internal Trade (DPIIT) shall be exempted from payment of EMD.			
W3	Modes of deposit: (i) Electronic Fund Transfer credited in BHEL account (Before opening of Tender). In case EMD is remitted through EFT mode, the Account details to be mentioned as per below: BANK ACCOUNT DATA FOR RTGS / NEFT MODE OF PAYMENT 1 Party Code: 2 Option: RTGS / NEFT 3 Beneficiary Details: 3.1 Name of Beneficiary: BHARAT HEAVY ELECTRICALS LIMITED 3.2 Address: RAMACHANDRAPURAM, HYDERABAD, TELANGANA-502032 3.3 Bank Name: STATE BANK OF INDIA 3.4 Branch Name: BHEL TOWNSHIP, HYDERABAD-502032 3.4 Account No.: 62048154115 3.5 Account Type: Current Account 3.6 Bank IFSC Code: SBIN0020075 3.7 Bank MICR Code: 500002370 Kindly note, the Acknowledgement copy to be enclosed with the Technical bid.			
	Signature			
	Name			
	Stamp /Seal			

Annexure-2

Deviations/ Clarifications list

Project : High speed Motor for NPRU unit of Mathura Refinery, IOCL

Vendor: _____

[illegible]

ANNEXURE-4

Declaration w.r.t. not serving Banning orders

The Bidder hereby declares that neither the bidder themselves, nor any of its allied concerns, partners or associates or directors or proprietors involved in any capacity, are currently serving any banning orders issued by BHEL/IOCL/ Ministry of Petroleum & Natural Gas / Department of Expenditure (DoE) debarring them from carrying on business dealings with BHEL/ IOCL/ 'all the attached/ subordinate offices, autonomous bodies and CPSUs under / 'all Central Govt. Ministries/ Departments' respectively”

Signature of Authorized Signatory

Name of Signatory:

Seal of the Bidder

Note:

This Declaration should be on printed letterhead of the Bidder, and should be signed by a person competent and having the Power of Attorney (Power of Attorney shall be annexed)

ANNEXURE-5

Power of Attorney (on vendor's letter head)

Date:

To,

BHEL Hyderabad

Attn: DGM/ Pur-EM

Sub: BHEL pre-bid tender vide: **HY/EM/PUR/ IOCL MATHURA/ HIGH SPEED ELECTRIC MOTOR / MOU / 2025/001** for IOCL Tender No. **9050M25E08**

Dear Sir,

We _____ do hereby confirm that Mr. _____ (Name(s), position held and address) is/are authorized to represent us to tender, negotiate and conclude the agreement on our behalf with you against your Tender Invitation No. **HY/EM/PUR/ IOCL MATHURA/ HIGH SPEED ELECTRIC MOTOR / MOU / 2025/001** for applicable to scope the areas of High speed motor vendor for Design, Engineering, Manufacturing, Packaging, Testing, Supply, Transportation and Supervision of Erection And Commissioning of High Speed Electric Motor for replacement of HPC Condensing Turbine Along With Accessories, Mandatory Spares, Commissioning Spares, Special Tools & Tackles And Third Party Inspection at NPRU Unit of IOCL Mathura Refinery.

We confirm that we shall be bound by all the whatsoever our said agents shall commit.

Yours faithfully,

Signature:

Name and Designation

For and on behalf of

Note:

This letter of authority should be on printed letterhead of the Bidder, and should be signed by a person competent and having the Power of Attorney (Power of Attorney shall be annexed)

PROFORMA OF BANK GUARANTEE (in lieu of SECURITY DEPOSIT)

In consideration of the Bharat Heavy Electricals Limited ¹ (hereinafter referred to as the 'Employer' which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns) incorporated under the Companies Act, 1956 and having its registered office at through its Unit at... ..(name of the Unit) having agreed to

_____ exempt | Name Of the Vendor / Contractor I having its registered office at— ²
Supplier) _____ (hereinafter called the said Contractor

which term includes supplier), from demand under the terms and _____ conditions of the Contract reference No. dated 3 valued at Rs..... • ⁴ (Rupees (hereinafter called the said Contract) of Security Deposit for the due fulfilment by the said contractor of the terms and conditions contained in the said Contract, on production of a Bank Guarantee for FRS. _____ (Rupees

_____ only), we (indicate the name and address of the Bank) having its Head Office at (address of the head Office) (hereinafter referred to as the Bank) at the request of _____ [Contractor(s)] do hereby undertake to pay to the Employer an amount not _____ exceeding Rs.in the event of any breach by the said Contractor(s) of any of the terms and conditions contained in the said Contract.

we, (indicate the name of the Bank), do hereby undertake to pay the amounts due and payable under this guarantee without any demur, merely on a demand from the Employer. Any such demand made on the bank, shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs._____

We undertake to pay to the Employer any money so demanded notwithstanding any dispute or disputes raised by the Contractor(s) in any suit or proceeding pending before any Court or Tribunal relating thereto our liability under this present being absolute and unequivocal.

The payment so made by us under this guarantee shall be a valid discharge of our liability for payment hereunder and the Contractor(s) shall have no claim against us for making such payment We, further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Contract and that it shall continue to be enforceable till all the dues of the Employer under or by virtue of the said Contract have been fully paid and its claim satisfied or discharged or till _____ office / Department /Division of Bharat Heavy Electricals Limited certifies that the terms and conditions of the said Contract have been fully and properly carried out by the said contractor(s) and also including the satisfactory performance of the equipment during guarantee period and accordingly discharges

this guarantee. Unless a demand or claim under this guarantee is made on us in writing on or before the 7, we shall be discharged from all the liability under this guarantee thereafter.

We, (indicate the name of the Bank) further agree with the Employer that the Employer shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Contract or to extend time of performance by the said contractor(s) from time to time or to postpone for any time or from time to time any of the powers exercisable by the Employer against the said contractor(s) and to forbear or enforce any of the terms and conditions relating to the said Contract and we shall not be relieved from our liability by any reason of any such variation or extension being granted to the said contractor(s) or for any forbearance, act or omission on the part of the Employer or any indulgence by the Employer to the said contractor(s) or by any such matter or thing whatsoever which under the law relating to sureties would but for this provision have effect of so relieving us.

This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor(s).

We, ... BANK lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Employer in writing.

Notwithstanding anything to the contrary contained hereinabove:

- a) The liability of the Bank under this Guarantee shall not exceed.....8
- b) This Guarantee shall be valid up to . _____9
- c) Unless the Bank is served a written claim or demand on or before _____¹⁰ all rights under this guarantee shall be forfeited and the Bank shall be relieved and discharged from all liabilities under this guarantee irrespective of whether or not the original bank guarantee is returned to the Bank.

We, (indicate the name of the Bank) lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Employer in writing.

Date Day of

_____ for (indicate the name of the Bank)

(Signature of Authorised signatory)

* This date to be indicated should not be earlier than 60 days after the date contemplated under the contract.

¹ NAME AND ADDRESS OF THE EMPLOYER. I.e. Bharat Heavy Electricals Limited

² NAME AND ADDRESS OF THE VENDOR /CONTRACTOR / SUPPLIER.

³ DETAILS ABOUT THE NOTICE OF AWARD/CONTRACT REFERENCE

⁴ PROJECT/SUPPLY DETAILS

⁵ BG AMOUNT IN FIGURES AND WORDS

VALIDITY DATE

⁷ DATE OF EXPIRY OF CLAIM PERIOD

BG AMOUNT IN FIGURES AND WORDS.

⁹ VALIDITY DATE

¹⁰ DATE OF EXPIRY OF CLAIM PERIOD

Note:

1. Units are advised that expiry of claim period may be kept 213 months after validity date.
2. In Case of Bank Guarantees submitted by Foreign Vendors-
 - a. From Nationalized/Public Sector I Private Sector/ Foreign Banks (BG issued by Branches in India) can be accepted subject to the condition that the Bank Guarantee should be enforceable in the town/city or at nearest branch where the Unit is located i.e. Demand can be presented at the Branch located in the town/city or at nearest branch where the unit is located.
 - b. From Foreign Banks (wherein Foreign Vendors intend to provide BG from local branch of the Vendor country's Bank)
 - b.1** In such cases, in the Tender Enquiry/ Contract itself, it may be clearly specified that Bank Guarantee issued by any of the Consortium Banks only will be accepted by BHEL. As such, Foreign Vendor needs to make necessary arrangements for issuance of Counter Guarantee by Foreign Bank in favour of the Indian Bank (BHEL's Consortium Bank). It is advisable that all charges for issuance of Bank Guarantee/ counter- Guarantee should be borne by the Foreign Vendor. The tender stipulation should clearly specify these requirements.
 - b.2** In case, Foreign Vendors intend to provide BG from Overseas Branch of our Consortium Bank (e.g. if a BG is to be issued by SBI Frankfurt), the same is acceptable. However, the procedure at sl.no. b.1 Will required to be followed.

- b.3**The BG issued may preferably be subject to Uniform Rules for Demand Guarantees (URDG) 758 (as amended from time to time). In case, of Foreign Vendors, the BG Format provided to them should clearly specify the same.
- b.4**The BG should clearly specify that the demand or other document can be presented in electronic form.

ANNEXURE-7

LIST OF CONSORTIUM BANK

Sl. No.	NAME OF THE BANK
1	State Bank of India
2	Canara Bank
3	IDBI Bank Limited
4	ICICI Bank Limited
5	HDFC Bank Limited
6	Axis Bank
7	IndusInd Bank Limited
8	Bank of Baroda
9	Exim Bank
10	Indian Bank
11	Punjab National Bank
12	Union Bank of India
13	Yes Bank Limited
14	RBL Bank Ltd.
15	Standard Chartered Bank
16	Indian Overseas Bank
17	Kotak Mahindra Bank Limited
18	Federal Bank Limited
19	Hongkong and Shanghai Banking Corporation Ltd

BANK GUARANTEE FOR ADVANCE

Bank Guarantee No: Date:

To

NAME

& ADDRESSES OF THE BENEFICIARY

Dear Sirs,

In consideration of Bharat Heavy Electricals Limited¹ (hereinafter referred to as the 'Employer' which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns)

incorporated under the Companies Act, 1956 and having its registered office at _____ through its Unit at.....(name of the Unit) having awarded to..... (Name of the Vendor / Contractor / Supplier), with its registered office at _____ (hereinafter called "the Vendor/Contractor/Supplier"

which expression shall include its successors and permitted assigns) a contract Ref

No.....dated valued at Rs.....(Rupees -----)/FC.....(in words.....) for(hereinafter called the 'Contract')

AND WHEREAS the Employer has agreed to advance to the Vendor/Contractor/Supplier, a sum of Rs..... (Rupees..... only), equivalent to _____% of the said value of the Contract (hereinafter called "the said Advance"), upon the condition, that the said Advance shall be secured by a guarantee for Rs/ FC ----- (Rupees/ FC -----) from a Bank as hereinafter appearing.

We, ..., (hereinafter referred to as the Bank), having registered/Head office at and a branch at being the Guarantor under this Guarantee, hereby irrevocably and unconditionally undertake to forthwith and immediately pay to the Employer any sum or sums up to a maximum amount but not exceeding Rs/FC ----- (Rupees/FC -----) without any demur, merely on your first demand and without any reservation, protest and recourse and without the Employer needing to prove or demonstrate reasons for its such demand.

Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. _____.

We undertake to pay to the Employer any money so demanded notwithstanding any dispute or disputes raised by the Vendor/Contractor/Supplier in any suit or proceeding pending before any Court or Tribunal, Arbitrator or any other authority, our liability under this present being absolute and unequivocal.

The payment so made by us under this Guarantee shall be a valid discharge of our liability for payment hereunder and the Vendor/Contractor/supplier shall have no claim against us for making such payment.

We, the Bank further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Contract and that it shall continue to be enforceable till all the dues of the Employer under or by virtue of the said Contract have been fully paid and its claims satisfied or discharged.

We>>>> Bank further agree that the Employer shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Contract or to extend time of performance by the said Vendor/Contractor/Supplier from time to time or to postpone for any time or from time to time any of the powers exercisable by the Employer against the said Vendor/Contractor/Supplier and to forbear or enforce any of the terms and conditions relating to the said Contract and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Vendor/Contractor/Supplier or for any forbearance, act or omission on the part of the Employer or any indulgence by the Employer to the said Vendor/Contractor/Supplier or by any such matter or thing whatsoever which under the law relating to sureties would but for this provision have effect of so relieving us.

The Bank also agrees that the Employer at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor, in the first instance without proceeding against the Vendor/Contractor/Supplier and notwithstanding any security or other guarantee that the Employer may have in relation to the

Vendor/Contractor/Supplier's liabilities.

This Guarantee shall remain in force upto and including.....and shall be extended from time to time on the request of the Employer for such period as may be desired by the Employer.

This Guarantee shall not be determined or affected by liquidation or winding up, dissolution or change of constitution or insolvency of the Vendor/Contractor/Supplier but shall in all respects and for all purposes be binding and operative until payment of all money payable to the Employer in terms hereof. However, unless a demand or claim under this Guarantee is made on us in writing on or before the we shall be discharged from all liabilities under this Guarantee.

We, ... BANK lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Employer in writing.

This Bank Guarantee shall be governed, construed and interpreted in accordance with the laws of India.

Courts at Hyderabad shall alone have exclusive jurisdiction over any matter arising out of or in connection with this Bank Guarantee

Notwithstanding anything to the contrary contained hereinabove:

The liability of the Bank under this Guarantee shall not exceed.....

This Guarantee shall be valid up to

Unless the Bank is served a written claim or demand on or before _____ all rights under this guarantee shall be forfeited and the Bank shall be relieved and discharged from all liabilities under this guarantee irrespective of whether or not the original bank guarantee is returned to the Bank

We, _____ Bank, have power to issue this Guarantee under law and the undersigned as a duly authorized person has full powers to sign this Guarantee on behalf of the Bank.

For and on behalf of
(Name of the Bank)

Date.....

Place of Issue.....

¹ NAME AND ADDRESS OF THE EMPLOYER. i.e Bharat Heavy Electricals Limited

² NAME AND ADDRESS OF VENDOR /CONTRACTOR / SUPPLIER

³ DETAILS ABOUT THE NOTICE OF AWARD/CONTRACT REFERENCE

⁴ CONTRACT VALUE AND PROJECT/SUPPLY DETAILS

⁵ BG AMOUNT IN FIGURES AND WORDS

⁶ VALIDITY DATE

⁷ DATE OF EXPIRY OF CLAIM PERIOD

Note:

1. Units are advised that expiry of claim period may be kept 3-6 months after validity date. It may be ensured that the same is in line with the agreement/ contract entered with the Vendor.

ANNEXURE-9

Self-Certification and Undertaking by Bidder regarding Insolvency/Liquidation Process

(on non-judicial stamp paper of appropriate value)

To,

BHEL

4th Floor, Administrative Building

BHEL, Ramachandrapuram

Hyderabad, India- 502032

Sub: Tender for..... - Submission of Undertaking by.....

Ref: Invitation for Bid No.....Dt.....

Dear Sir,

The undersigned hereby certifies that no corporate insolvency resolution/liquidation process has commenced in respect of the bidder herein as on the date of submission of tender documents pertaining to the above referred Invitation for Bid.

We undertake to inform BHEL as soon as any corporate insolvency resolution/liquidation process, is initiated against us.

Thanking you,

Yours sincerely,



ELECTRICAL MACHINES ENGINEERING HYDERABAD

PQC

Annexure-10

Page 1 of 2

TECHNICAL PREQUALIFICATION CRITERIA

Project : High speed Motor for NPRU unit of Mathura Refinery, IOCL
Client : IOCL Mathura
Service : HPC High speed Motors
Quantity : 2 nos. (1W+1S)
Location : IOCL, NPRU unit of Mathura Refinery, Mathura, India

A. Prequalification Criteria

The bidder needs to meet the Pre-qualification Criteria as per the IOCL NIT (SI.10, Page 3 of 69).

In addition to the above, the bidder shall meet the following:

- The Bidder shall have at least 1 (ONE) no. experience for Design, engineering, procurement and supply of High-speed Electric Motor for a job of replacement of turbine with a highspeed electric motor, having a minimum rated output of 4 MW and rated speed greater than 4500 rpm, in an existing turbine driven compressor system in last 15 (fifteen) years. The installed High-speed Electric Motor should have been directly coupled with the compressor shaft with a suitable mechanical coupler. The reference compressor shall have completed minimum ONE (1) Year of satisfactory operation with the high-speed electric motor at site.

Note 1 for 1: "Design & Engineering" shall mean design & engineering for the job of replacement of turbine with high-speed electric motor.

Note 2 for 1: The Bidder shall furnish a Memorandum of Understanding (MoU), who meets the criteria mentioned in point no 1.1 & 1.2 and have supplied High speed Electric Motor for a job of replacement of turbine with a high speed electric motor (having a minimum rated output of 4 MW and rated speed > 4500 rpm, in an existing turbine driven compressor system in last 15 (fifteen) years), clearly indicating the scope of work, responsibilities and stating that Design, engineering, manufacturing and Supply of the Electric Motor shall be carried out by the High Speed Motor supplier. **The MoU shall be valid for at least 2 (Two) years, from the date of scheduled bid submission.**

- 1.1. The original Equipment Manufacturer of the high-speed motor being supplied shall have designed, engineered, manufactured, packaged, tested and supplied from the proposed manufacturing plant, in the last 15 (fifteen) years, at least 1 (One) no. High Speed Induction Motor, which is from the same model / series, as offered and is similar in terms of rated shaft power, voltage and speed as offered. As a minimum, the referenced High-Speed Motor package shall have completed minimum 1 (One) Year of operation at site.

Note-1 for 1.1: Similar rated shaft power, voltage and speed would mean 80% or higher w.r.t to the offered Motor.

Note-2 for 1.1: The 15 (Fifteen) year and 1 (One) year of operation shall be reckoned as ending on the last day of the month immediately preceding the month in which last date of bid submission falls. (In case of extended bid submission date, original bid submission date shall be considered).

Rev. No.	Revisions	Prepared	Approved	Date
00	First issue	AUSC & Anil P	BLJ	29-12-2025

**ELECTRICAL MACHINES ENGINEERING
HYDERABAD****PQC**

Annexure-10

Page 2 of 2

1.2. The bidder / "Original Equipment Manufacturer of the high speed electric motor being supplied" must furnish at least 1 (One) no. past supply reference of "Electric Motor driven with Variable Frequency Drive(VFD)" (with 80% or higher motor rating as offered, with rated speed greater than 4500 rpm & with same type of variable speed control device, as offered)" for a compressor package(as per API 617, Part 1 & 2), which may be from a different model, which has been designed, engineered, packaged, tested and supplied, from the proposed manufacturing plant. As a minimum, the referenced Electric Motor driven centrifugal gas compressor package shall have completed minimum 1 (One) Year of operation at site.

B. Memorandum of Understandings to be signed by the bidder

Following MoU is to be signed by bidder with BHEL as applicable.

1. If the High-Speed Electric Motor supplier is qualified as per clause 3 of Technical criteria [10.1] of IOCL Tender document "9050M25E08" page no's 5 of 69, the supplier has to sign a MoU with BHEL as per as per the attached "In principle MoU" document in Annexure M.

C. Documents to be submitted

The bidder needs to submit all the required documents to meet the Pre-qualification Criteria as per the IOCL NIT along with applicable corrigendum.

In addition to the above, the bidder shall submit the following:

1. Earlier supplied reference Purchase Order (PO) copies, covering compliance with the motor rating as per the Prequalification Criteria, explicitly define the scope of work as "Design, engineering, procurement, and supply of a High-Speed Electric Motor for replacement of a turbine with a high-speed electric motor."

Annexure-12 of BHEL SCC
Financial Pre-Qualification Criteria [F PQC]

Project: High speed Motor for NPRU unit of Mathura Refinery, IOCL

Vendor: _____

The following documents as mentioned in Financial Pre-Qualification requirement shall be submitted along with technical bid:

[illegible]

ANNEXURE-M

In Principle Memorandum of Understanding between M/s BHEL and High speed Electric Motor Supplier M/s _____ For INDIAN OIL CORPORATION LIMITED(IOCL), Mathura Project

This "In principle Memorandum of Understanding" (hereinafter referred to as "**MoU**") is made and entered into between

M/s Bharat Heavy Electricals Limited, a company registered in India under the Indian Companies Act, 1956 and having its registered office at BHEL House, Siri fort, New Delhi-110049 and inter-alia a manufacturing unit located at Ramachandrapuram, Hyderabad, Telangana, India (hereinafter referred to as "**BHEL**" which expression unless repugnant to the context or meaning hereof shall mean and include its successors and permitted assigns)

AND

M/s _____, a company registered in and having its principal place of business at _____ (hereinafter referred to as "M/s _____" which expression shall, unless repugnant or contrary to the context, be deemed to include its successors and permitted assigns

BHEL & M/s _____ are herein after individually referred to as "a Party" and collectively as "the Parties".

PREAMBLE

WHEREAS, M/s. **INDIAN OIL CORPORATION LIMITED(IOCL), Mathura** (here in after referred to as "**Customer**") has floated a Domestic Tender vide RFQ Number: 9050M25E08 located at IOCL, Mathura, Uttar Pradesh State, India (here in after referred to as the "**Project**")

WHEREAS, BHEL, a leading engineering manufacturing company in India, is inter-alia engaged in engineering and supply of Power plant equipment, Centrifugal Compressors, Gas Turbine Generator, Steam Turbines Generators & Auxiliaries etc. For the present project, BHEL is the Bidder for "**High speed Electric Motor & its associated auxiliaries, etc.**"

WHEREAS M/s _____ is a leading engineering manufacturing company in and is inter- alia engaged in engineering and supply of High speed Electric Motor & its associated auxiliaries, etc.

Whereas BHEL and M/s _____ to synergize their strengths, potentials and capabilities agreed to cooperate with each other to participate in the Project and collaborate with each other for the Project and perform the Contract for the execution of the Project, in the event such is awarded to BHEL.

WHEREAS M/s _____ has submitted a bid to BHEL which was opened on _____, based on which BHEL will be submitting the bid to the Customer.

WHEREAS, the Parties have decided to enter into this "**In principle MoU**" which sets forth their respective rights and obligations with respect to the Project and each other.

In Principle, the parties agree as under:

1. To co-operate with each other in terms of this MoU to jointly perform the said Project, if awarded to BHEL in accordance with the terms and conditions as set out below.

2. The Parties agree to work together in good faith and in the event BHEL being successful in its bid to the Customer, BHEL and M/s _____ shall together to agree upon Terms and Conditions with Customer, on basis of which, BHEL shall place the Purchase Order on “Back to Back basis” on M/s _____ for the scope applicable to M/s. _____ as defined in SCC, ITB, ANNEXURE(S), etc. in BHEL Prebid tender. Externally, BHEL shall act as the contracting party of the Customer and, in particular, be the signatory of the Tender and the Contract with the Customer.
3. In the event of price reduction by BHEL with the end customer, corresponding price reduction shall be passed on to BHEL by M/s _____.
4. BHEL shall be liable to the Customer for the obligations under the Customer Contract. M/s _____ shall only be responsible for all obligations for their scope of work under the BHEL Purchase Order placed on M/s _____ after award of Customer Contract on BHEL.
5. BHEL with the support of M/s _____ shall be responsible for the integration, coordination and completeness of the entire Scope of Work under the Customer Contract. M/s _____ and BHEL shall be responsible for the performance guarantees of their respective scope of work as per Customer/ BHEL Contract.
6. Parties intend to enter into a detailed MOU based on terms and conditions finally settled with Customer on mutually agreed terms and conditions as per Clause 2 above at a later date before release of PO from BHEL on M/s _____

Bharat Heavy Electricals Limited, BHEL, Ramachandrapuram Hyderabad, India- 502032 Date :	M/s _____ Date :



(Attachment to Enquiry No. XXXXXXXXXX Due on Date XX.XX.XXXX for submission by 11.00 hrs to open from 14.00 hrs.)

INSTRUCTIONS TO BIDDER (ITB)**NOTE: Bidder to confirm in affirmative by typing "YES" or "Applicable Data" in the response column. Deviations, if any shall be recorded in deviations/comments column (Separate sheet can be attached if needed). Non deviatable clauses are indicated as "NON DEVIATABLE".**

Sl. No.	DETAILED TERMS & CONDITIONS	BIDDER RESPONSE (YES/NO)	DEVIATIONS / COMMENT
1	SCOPE OF SUPPLY: Signed & Sealed offers are invited for the Scope of Supply of goods or services or both as detailed in the enquiry. Relevant enclosures/supporting documents / catalogue, if any shall be enclosed to the technical offer.		
2	DEFINITIONS		
A	'The Buyer' means BHEL-HPEP, Ramachandrapuram, Hyderabad-502 032 of Bharat Heavy Electricals Limited (A Govt. of India Undertaking) incorporated under the companies Act having its registered office at BHEL House, Siri fort, New Delhi-110049, India and shall be deemed to include its successors and assigns. It may also be referred to as BHEL.		
B	'The Bidder' means the persons, firm, company or organization on whom the Purchase order is placed and shall be deemed to include the bidder's successors, representatives, heirs, executors and administrator as the case may be. It may also be referred to as Contractor, supplier or bidder.		
C	'Contract' shall mean and include the Purchase order incorporating various documents viz., Notice Inviting Tender (NIT), Offer, Letter Of Intent/Acceptance (LOI/LOA), Instruction to Bidders (ITB) and Special Conditions of Contract (SCC), specifications, inspection/quality plan, schedule of prices and quantities, drawings, if any, enclosed by Bidder/ provided by the Buyer or his authorized nominee and the samples or patterns if any to be provided under the provision of the contract. In case of any inconsistency or contradiction between any of the documents, the order of precedence shall be Purchase Order, LOI/LOA followed by Minutes Of Meeting (MOM), NIT, SCC, ITB.		
D	'Parties to the contract' shall mean the bidder and the buyer as named in the main body of the Purchase Order.		
E	'Goods/Material' shall include Works and Services which are incidental or consequential to supply.		
3	GENERAL INSTRUCTIONS:		
A	Mode of submission of offer shall be as indicated in SCC		Non Deviatable
B	The quotation should be neatly typed and free from over writing/ erasures. Any correction or addition must be authenticated. The offer including annexures and brochures should be submitted in English / Hindi. All Pages of Techno Commercial Bids (Main Pages), ITB, SCC should be signed and Stamped. If there is a conflict in case of bilingual submission, the submission in English will be final. Prices shall be quoted both in figures and words. In case of any discrepancy in value, the prices quoted in words shall be considered for evaluation and establishing L1 Status. Any discount / revised offer / bids submitted by a bidder on his own shall be considered, provided it is received on or before the due date and time of offer / bid submission (Part-1). Conditional discounts shall not be considered for evaluation of tenders.		Non Deviatable
C	Incomplete offers are liable for rejection.		Non Deviatable
D	Bidders to please note that the Terms & conditions contained in this document and SCC are to be read fully before submission of quotations.		Non Deviatable
E	Bidders are advised to comply with ITB and SCC, should there be any deviations (where deviations are permitted), it shall be entered in the deviation column. BHEL reserves the right to reject such offers or load the bid suitably for evaluation.		Non Deviatable
F	Offers shall be submitted directly, only by the bidder or by their authorized representative / agent and the offer should be in line with the regulatory guidelines (i.e. A valid Agency agreement between principal bidder and agent / representative shall be attached and the agreement shall cover the scope of services rendered by Agent, Agency Commission and any other information called for as per the regulatory guidelines). OEM / Mill details shall be provided if bidder is not a manufacturer. Bid envelopes shall bear the name of Bidder. In case of submission through authorized representative/agent, the name of representative/agent should also be mentioned apart from bidder name.		Non Deviatable
G	Offer received after the specified time and date of submission will be rejected. No further correspondence shall be entertained.		Non Deviatable
H	Unsolicited offers will not be considered.		Non Deviatable
4	OTHER PARTICULARS (Please indicate applicable data)		
A	Name of the Bid currency (freely tradable foreign currency for imports and Indian Rupees for indigenous purchase).		
B	Name of the Port of loading and Port of Discharge (applicable to imports).		

5	BID SUBMISSION PROCEDURE FOR CONVENTIONAL TENDER:		
A	For Single Part Bids:		
	The complete bid shall be submitted in a single sealed cover superscribing the Tender number and due date, addressed to Sr DGM/CMM, Vendor Complex, BHEL, Hyderabad and sent by appropriate mode to above address or dropped in tender box located at vendor complex on or before the specified time and date of submission of offers, preferably in the bidder's envelope. E- mail bids shall be sent to mail ID pricebid_hyd@bhel.in only as an attachment.		Non Deviatable
B.	For two-Part Bids:		
i	The offer is to be submitted in two parts viz., Techno-commercial Bid - (Part-I), with all technical specification & scope including bill of material etc., Earnest Money Deposit (EMD)(wherever applicable) and unpriced bid with all applicable Commercial Terms and Conditions, rates of agency commission, duties, taxes and other charges, Signed and Stamped ITB and SCC, <u>except the price</u>, shall be kept in a separate sealed cover, superscribing enquiry No. (Techno-Commercial Bid) and due date AND Price Bid (Part-II), containing ONLY the price (including agency commission, if any) and the applicable duties/taxes/other charges shall be kept in a separate sealed cover superscribing Enquiry no. (Price bid) & due date. Both the above covers (Part –I & II) shall be kept in a Third cover superscribing Enquiry no. & due date. Bidder can also submit offer through email. Technical offer to be submitted to mail ID technicalbid_hyd@bhel.in, and price bid to be submitted to mail ID pricebid_hyd@bhel.in only as an attachment. Interchanging the information in the mails may lead to rejection of the offer. Bidder shall have no claim on e-mail offers sent to any other e-mail ID. In case of e-mail offers, the mail subject should contain Enquiry Number, Due date and Bidder name. Bidder address including contact details shall be mentioned in the content of the mail. Without these details, the offer is liable for rejection. All techno commercial terms & conditions mutually agreed prior to price bid opening shall prevail and supersede any terms and conditions specified otherwise in price bid.		Non Deviatable
ii	The bidders whose bids are techno commercially not accepted will be informed and EMD shall be returned wherever submitted.		
iii	Bidders will be allowed to submit the impact on their quoted prices due to changes in technical scope, specifications, and commercial terms/conditions as specified in NIT which in the opinion of BHEL , warrant changes in prices.		Non Deviatable
C	Bids shall be opened on due time and date in the presence of bidders who may like to be present. Only one representative of each bidder shall be permitted to attend the bid opening. Only the price bids of bidder (in case of two part bid) whose techno commercial bids are accepted will be opened later on a specified date.		Non Deviatable
6	DELIVERY TERMS		
A	Indigenous Purchase		
	a. Terms of Delivery for dispatches to BHEL Hyderabad (HPEP) shall be FOR Destination. b. Terms of Delivery for Direct Dispatch (DD) items shall be Ex Works. i. Incase specified in SCC that insurance is in customer/BHEL scope, price quoted shall include Freight charges up to Destination. ii. Otherwise, price quoted shall include Freight and Insurance upto Destination. However, beneficiary for insurance shall be BHEL.		
B.	Imports		
	The goods shall be delivered on FCA capital airport basis in case of freight by Air and CIP basis in case of freight by Sea.		
7	Documentation for Payment		
A	Indigenous Purchase		
	Following documents shall be submitted immediately on dispatch of material to BHEL HPEP / Site a. Two numbers of Original Tax Invoice (Refer ITB clause no 11 for Tax Compliance)/ e-invoice of GST Portal if applicable) b. Packing List - clearly showing number of packages, gross weight and net weight. c. Test/Warranty/Guarantee certificates, O&M Manual (If specified in SCC) d. Insurance intimation/declaration certificate e. Pre-dispatch Inspection report /Third Party Inspection Certificates. f. Consignee copy of LR signed & stamped by Customer/Site representative for DD Items g. e-waybill h. Any other documents as specified in SCC.		Non Deviatable

B	Softcopies of the above documents shall be uploaded in SUVIDHA portal https://suvidha.bhel.in/suvidha/ or https://hpep.bhel.com/mm/main.jsp Vendor Bills tab. immediately after dispatch of the material. Upload of Documents is mandatory for material Entry. Imports i) Bidder shall inform BHEL the readiness of material along with packing details 30 days in advance from the date of delivery. For Hazardous cargo/DG cargo, supplier must provide the following documents prior to handing over shipment to freight forwarder, wherever freight is in BHEL scope: 1. Valid MSDS 2. DGD certificate with appropriate UN numbers. 3. Labelling and marking on DG cargo along with photo of packaging. 4. Self-declaration for consignment 5. Packaging Certificate as per DG Standards 6. TSA Approved Truckers details to be provided to forwarder at the time of shipment In addition to the above, supplier should ensure to comply all IATA DG regulations, if any new requirement is added in future. ii). Bidder shall also upload the soft copy of the dispatch documents consisting of BL / AWB, Invoice, delivery note, packing list, country of origin & Test certificates and other documents as specifically indicated in the SCC in PRADAN Portal (https://hpep.bhel.com/mm) within Five days from the B/L date for sea shipment and One day from AWB date for Air shipment and sent to email ids: mssea@bhel.in, msair@bhel.in, cmmfe@bhel.in. iii) AWB/BL must contain the information of BHEL GST no., and PAN no. iv) Air Shipments: Bidder shall ensure the following a) Port of discharge -- Mumbai/Chennai/Hyderabad (as indicated in SCC). b) Consignee shall be BHEL, Hyderabad. Material shall be air freighted through cargo mode only and not through Courier. c) Upon handing over the cargo to the forwarder, bidder shall ensure the acknowledgement receipt with wordings "Cargo handed over in sound condition for Air freighting". Note: Warehouse receipt will not be considered for penalty calculations. d) In case of CIF/ shipments, bidder shall also inform BHEL the information about discharge port agent details and cargo arrival information within one day from the date of Shipment. e) Following dimensions of single package may be noted. - i). Maximum dimension of the cargo(ODC) -- 125" x 88" x 63" - ii). Maximum weight of the cargo -- 3.5 MT. If any package dimension or weight exceeds the above set limits, it will be treated as Over Dimension Cargo (ODC) or Over Weight Cargo and bidder shall inform BHEL 30 days in advance to the delivery date to enable BHEL to finalize the freight forwarder. - f). If package falls under Hazardous category, bidder shall communicate BHEL 30 days in advance period with document support. v) Sea Shipments:- bidder shall ensure the following - a). Port of discharge -- Nhavaseva/Mumbai/Chennai. - b). Place of Delivery / Final Destination for CIP shipments - Nhavaseva CFS / Chennai CFS. - c). In case of FOB shipments, bidder shall handover the material to BHEL nominated forwarder and obtain the cargo receipt. - d). If the material cannot be containerized in 20 or 40 GP containers, an advance information of 30 days prior to the delivery date shall be communicated to BHEL for necessary arrangements and finalisation of freight forwarder. - e). For CIP shipments 1. In case of FCL shipments, Detention free period must be 14 days. 2. Bidder shall also inform BHEL the information about discharge port agent details and cargo arrival information within 5 days from the date of Shipment. 3. No charges for the services rendered till place of destination will be payable by BHEL. Incase liner / forwarder insist for charges, not in the scope of BHEL, the same will be adjusted from bidder account. 4. In case of CIF shipments -- Bidder must select a forwarder/liner whose discharge port published tariff for THC and other services is available. Any charges over and above the published tariff will not be borne by BHEL or will be adjusted from the bidder's bill. 5. bidder must insure the cargo for 110% of material value including the freight amount. (vi). Recovery charges for non-submission of documents: - Bidder shall submit all the required documents to BHEL as prescribed in the Purchase order and NIT.		

	If BHEL incurs any charges such as Penalty, demurrage, container detention, wharfage, storage, Ground rent etc., due to non - compliance / non - submission of documents prescribed in Purchase Order/ NIT/Letter of credit, the same shall be recovered from the bidder as under: 1. EUROPE/USA/Black Sea/ Far East/Middle East/South East sector A. For FOB Sea Consignments:- Penalty for late submission / negotiation of documents beyond 14 days shall be as under: <table><tr><th rowspan="2">Sl. no</th><th rowspan="2">Period (From Date of Bill of Lading)</th><th>Recoverable Charges</th><th colspan="2">Recoverable Charges per day per container</th></tr><tr><th>LCL per week/ Break bulk cargo per day</th><th>20FT Container</th><th>40FT Container</th></tr><tr><td>i</td><td>Upto 14th day</td><td>Nil</td><td>Nil</td><td>Nil</td></tr><tr><td>ii</td><td>15th day onward</td><td>USD 10</td><td>USD 110</td><td>USD 200</td></tr></table> B. For CIP Sea Shipments: - Bidder shall provide rates for detention charges after free period at the time of offer itself in case of engagement of 20FT Container and 40FT category. In case of late presentation of documents to the bank recovery will be effected from the Bidder as per the rates quoted by the Bidder at the time of offer in this regard. In case of Break bulk cargo and LCL, Demurrage charges shall be recovered at the rate of USD 1 per Ton per day and storage charges at the rate of USD 10 per week respectively shall be charged as late presentation charges. (vii) Description of items in invoice, packing list, BL / AWB or LR shall be same as PO item description. Bidders shall ensure that invoice shall contain PAN nos. of both bidder and BHEL along with other tax related numbers. BHEL PAN AAACB4146P and BHEL TAN HYDB00086C Any other additional documents sought by the statutory authorities, the same shall be produced by the bidder on priority basis. (viii) Bidder shall provide package details including number of packages, gross weight, net weight etc. (ix) The bidder shall provide the following documents at the time of submission of offer: a) No Business Connection in India declaration issued by the bidder as per the format specified. (or) b) (i) No Permanent Establishment in India declaration issued by the bidder as per the format specified. (ii) Tax Residence Certificate issued by the bidder's tax authorities. (iii) Form 10F, as attached in Annexure V, to be issued by the bidder. c) In case the bidder has a Business Connection in India as per Section 9 of Income Tax Act or significant economic presence in India as per rule 11 UD of IT Act or Permanent Establishment in India as per Article 5 of Double Taxation Avoidance Agreement between India and the bidder's country, the bidder shall provide a withholding tax order issued by the Indian Income Tax authority for recovery of applicable tax.	Sl. no	Period (From Date of Bill of Lading)	Recoverable Charges	Recoverable Charges per day per container		LCL per week/ Break bulk cargo per day	20FT Container	40FT Container	i	Upto 14th day	Nil	Nil	Nil	ii	15th day onward	USD 10	USD 110	USD 200		
Sl. no	Period (From Date of Bill of Lading)			Recoverable Charges	Recoverable Charges per day per container																
		LCL per week/ Break bulk cargo per day	20FT Container	40FT Container																	
i	Upto 14th day	Nil	Nil	Nil																	
ii	15th day onward	USD 10	USD 110	USD 200																	
8	Delivery Schedule																				
	The tendered goods shall be delivered within the period stipulated in NIT/ SCC as accepted. Inordinate delay/early supply are liable for rejection/Hold on payment.		Non Deviatable																		
9	Pricing Terms																				
	Quoted price shall be inclusive of Packing & Forwarding and shall remain firm and valid during the execution of PO. Offers with PVC will be rejected outright except in cases where specifically called for in the SCC.		Non Deviatable																		
10	PRICE VALIDITY :																				
	Unless otherwise specified, offer shall be valid for a period of 90 days from the date of bid opening (Technical bid /part-I in case of two part bid). However the prices quoted for spare parts of the Main equipment shall be kept valid for a period as specified in SCC.		Non Deviatable																		

11	Taxes & Duties (RATE TO BE INDICATED by the bidder against the space provided)	
A	Indigenous Purchase i) Only valid GST registered bidders will be considered for the tender. The GSTIN of the bidder should be clearly mentioned in the offer. ii) If bidder is exempted from GST registration under any provision of the GST Law, a declaration with due supporting documents should be furnished for considering the offer. iii) Bidder to quote the applicable taxes in the following manner: - Harmonized System of Nomenclature (HSN) of Goods - Services Accounting Code(SAC) of Services. - IGST/CGST/SGST/UTGST: Rate of Tax to be quoted as extra in % against the space provided iv) Bidders to ensure correct applicability of IGST/CGST/SGST/UTGST based on the Inter / Intra state movement of goods/services. v) In case Bidder has opted for GST Composition Scheme, the same may be stated explicitly both in their technical and price bids. An undertaking to the effect that any change in the status of the bidder will be intimated. vi) Any other taxes & duties not covered anywhere above may be indicated separately. Taxes deducted at source: - TDS as per the extant statutes shall be deducted. - In case bidder does not provide PAN details, higher rate of tax shall be deducted as per the Act. - Concessional certificates, if any, should be provided well in time for lower deduction of tax.	Non Deviatable
	Terms & Conditions to be complied 1. All invoices (incl. Credit Notes, Debit Notes) to contain BHEL HPEP GSTIN ie 36AAACB4146P1ZG. Invoices submitted should be in the format as specified under GST Law. All details as mentioned in Invoice Rules including Dealer GST registration number (GSTIN), invoice number with date of issue, quantity, rate, value, taxes with nomenclature – CGST, SGST, UGST, IGST mentioned separately, HSN Code / SAC Code etc. 2. Reimbursement of GST amount will be made only upon completion of the following: i. Bidder declaring such invoice in their GSTR-1 Return/ IFF ii. Receipt of Goods or Services and Submission of Tax invoice by BHEL iii. The tax invoice is reflected in the GSTR2B of BHEL, HPEP (buyer). Payment of GST will be made only if it is matching with data uploaded by the Bidder in GST portal. 3. In case of discrepancy in the data uploaded by the bidder in the GSTN portal vis-a-vis the tax invoice or in case of any shortages or rejection in the supply, then BHEL will not be able to avail the tax credit. The same would be available in PRADAN Portal for the bidder's information. Bidder has to rectify the data discrepancy in the GSTN portal or issue credit note or debit note (details also to be uploaded in GSTN portal) for the shortages or rejections in the supplies or additional claims for processing of such invoices. 4. In cases where invoice details have been uploaded by the bidder but failed to remit the GST amount to GST Department within stipulated time, then GST on the invoices in default will be recovered from the bidder along with the applicable interest. 5. In case GST credit is delayed/denied to BHEL due to non/delayed receipt of goods and/or tax invoice or expiry of timeline prescribed in GST law for availing such ITC, or any other reasons not attributable to BHEL, such GST amount will be recoverable from bidder along with interest levied/ leviable on BHEL. 6. GST TDS deducted as per GST Act, is uploaded in GSTN portal along GSTR7. Bidders can directly download the GST TDS Certificate from the GSTN Portal. 7. Bidders to note that Rules & Regulations pertaining to E-way bill system are to be strictly adhered to, as and when notified by Govt. authorities. 8. Vendors who fall under the E-Invoice regulations, i.e., having an annual turnover of Rs. 10 crores (Rs 5 crore w.e.f 01.08.2023) in the previous year shall issue e-invoice in line with Rule 48(4) of CGST Rules failing which GST amount will not be reimbursed to the vendor even if the other requirements are fulfilled. 9. In case the vendor is exempted by the GST department under the Rule 48(4) of CGST Rules from issuing E-invoice, a declaration as prescribed in the Notification 17/2022 - Central Tax dated 01-08-2022 shall be provided on the invoice. 10. Vendors who do not fall under the E-Invoice regulations, i.e., whose annual turnover is less than Rs. 10 crores (Rs 5 crore w.e.f 01.08.2023) in the previous year have to give an undertaking indemnifying BHEL that the vendor is not falling under the E-invoice requirement category and that in case of any breach of this E-invoicing requirement, the vendor indemnifies BHEL of any consequences that may arise due to such a breach. 11. No GST shall be levied on liquidated damages / penalty.	



B.	Foreign Purchase (Imports) The offered price shall be inclusive of all the Taxes and duties as applicable in country of export / country of dispatch for the quoted price. Taxes deducted at source: a. In case of goods or services subject to Income tax in India, such tax as per the extant statute shall be recovered. b. In case bidder does not provide necessary documents for beneficial taxation (Refer clause 7-B-(ix) a-c of ITB), the TDS deduction shall be at the maximum percentage stipulated as per the provisions of Income Tax Act.		Non Deviatable
12	Payment Terms: Unless otherwise specified in SCC, following shall be the terms of Payment.		
A	Indigenous: a. Micro & Small Enterprises (MSEs) - 100% Direct EFT payment within 45 days b. Medium Enterprises - 100% Direct EFT payment within 60 days c. Non MSME Bidders - 100% direct EFT Payment within 90 Days Note A. Above due date is reckoned from the date of Receipt of material or 15 days from the date of submission of complete set of documents as per PO whichever is later. Objections, if any on the invoice, available on SUVIDHA portal need to be closed. In such instances, due date is reckoned from the closure of objections. Vendors are advised to get familiarized with the document exchange feature on SUVIDHA portal. Payment will be made for Material accepted value. B. MSEs (covered under MSME Act) need to register and renew periodically and update the same with BHEL C. The taxes that are reimbursed are limited to applicable taxes as on the Purchase Order delivery date or the amount actually paid whichever is less. D. Adherence to the above time schedule of payment is contingent upon Bidder complying with GST provisions and availment of Input Tax Credit by BHEL before the date of payment. E. In case of packaged items, 10% of supply value will be retained till completion of total supplies. F. Bidders to comply with clause 11 on GST requirements G. MSE benefits are not applicable to Traders / Wholesalers registered as MSEs. G. MSME vendors may avail the facility of invoice discounting through Trade Receivables Discounting System(TREDs) platforms like RXIL, INVOICEMART, M1XCHANGE and any other platforms onboarded from time to time.		
B	Imports: i) 100% payment (less Indian Agency Commission, if any) shall be through Wire Transfer with a credit period of 45 days - Cash Against Documents (CAD) ii) In case Bidder opts for Letter of Credit payment, the LC Usance period shall be 90 days with respective bank charges to respective accounts and loading of 0.50% iii) Indian Agency commission if payable and so specified in the Purchase order shall be paid in Indian Rupees, considering the SBI TT selling exchange rate, as on the date of payment after successful completion of the contract.		
C	Conditions for LC: a. LC validity period will be 90 days and for any extension, applicable charges will be to bidder's account. b. LC will be opened after successful completion of pre dispatch inspection prior to the scheduled / agreed delivery date. LC will be opened within 15 bank working days from the date of request.		Non Deviatable
D	Conditions for both Indigenous & Foreign Bidders: a. In case Bidders insist for lesser Credit period and BHEL accepts, a loading of 0.60% for every 15 days reduction will be applicable. b. In case PBG as required is not furnished, Payment will be released deducting the BG amount, which will be paid after expiry of warranty period against submission of supplementary claim. c. Payment does not imply in any respect whatsoever a waiver of Buyer's right to performance of the Order. Buyer is entitled to set off claimable debts against claimable liabilities with the bidder by means of a setoff Note.		Non Deviatable
E	Wherever EMD is applicable, the EMD will be paid back to unsuccessful bidders within fifteen days after award of the contract. Successful bidder's EMD will be retained till submission of Performance Bank Guarantee (PBG). Tender Fee wherever applicable is not refundable. No interest shall be payable by BHEL on earnest money or security deposit or any money due to the contractor by BHEL.		Non Deviatable

13	Penalty clause:		
	In the event of delay in supply /part-supply of goods, Penalty as detailed below is leviable a. Penalty of 0.5% per week or part there of shall be levied, limited to a max of 10% (ten percent) of delayed portion value / order value (as specified in SCC). b. Penalty applicable for delay in documentation is as per SCC. c. Date Reckoned for Penalty - Indigenous Orders with delivery terms FOR HPEP: C Note date. - Indigenous Orders (Others): Date of e-waybill. - Imports: For CIP/CIF Orders: IGM date - Imports: For FOB Orders: AWB / BL date - Imports: - For FCA Orders: - Date of acknowledgement from Freight Forwarder. - For Ex Work Orders (both air and sea): - Latest of Air Freight Request (AFR), Invoice, Packing List, Inspection date (if applicable) or any other documentary evidence confirming material readiness. d. In case of Deviation to above Penalty clause, loading applicable to the extent to which not agreed by Bidder. e. Timelines as mentioned in the Annexure 1 will be considered for reckoning delivery.		
14	Excess materials supplied beyond tolerance limit as specified in PO will not be paid and bidder may raise credit note for the excess/unaccepted material as per GST law.		Non Deviatable
15	Rejected materials , if any, shall be collected by the bidder within 90 days of such communication to the bidder. Beyond this period the bidder forfeits their right to the materials.		Non Deviatable
16	Guarantee / Warranty Period: Wherever required, and so provided in the specifications/SCC/Purchase Order, the bidder shall guarantee that the goods supplied shall comply with the specifications laid down, for materials, workmanship and performance. a. Guarantee period shall be 12 months from the date of commissioning or 18 months from the date of supply whichever is earlier. b. In case erection & commissioning is involved, guarantee period shall be 12 months from the date of commissioning. c. In case of equipment bought as a package which are intended to be incorporated in installations or systems, the guarantee period shall be 12 months from the date of commissioning of such equipment. The guarantee period shall be extended by the period during which the goods are not in compliance. If the delivery is found to be non-complaint, bidder shall replace, repair or re-execute the as requested by BHEL. If the bidder defaults on his obligations, buyer has the right to proceed to replace, repair or re-execute at the bidder's expense. A guarantee period as described above shall apply afresh to replaced, repaired or re-executed parts of a delivery. Loading for deviation: In case warranty specified in SCC is over and above the period mentioned in b & c above; loading will be 1% per annum for the deviation in warranty end period, on the contract value. Expected commissioning period is as indicated in SCC.		Non Deviatable
17	PERFORMANCE BANK GUARANTEE (PBG) (Applicable in case mentioned in SCC) In case enquiry specifically spells out PBG requirement, PBG is to be submitted by Bidder in requisite format as per Annexure VII. Further detailing on PBG as specified in SCC. The PBG shall be for the performance of the goods and shall remain binding notwithstanding such variations, alterations or extensions of item as may be made, give, conceded or agreed to between the Bidder and BHEL under these Terms and conditions or otherwise.		Non Deviatable
NOTE: Deviations (Commercial as well as Technical) from the tender specifications and conditions are generally not acceptable. However, deviation if any, shall be brought out clearly with proper justification in the offer. The deviation, if considered by BHEL, shall be loaded for comparison, while evaluating the offer. If a bidder unconditionally withdraws any deviation before price bid opening, the same shall not be loaded. Loading criteria in respect of major commercial conditions where deviations if any are accepted shall be as per clause No.18. The Bidders may specifically note the following.			

18	Evaluation and Loading Criteria: i) Evaluation Currency for this tender shall be “INR”. ii) Evaluation of prices shall be done item-wise unless otherwise specified in the SCC. iii) Evaluation shall be on the basis of delivered cost, i.e. “Total Cost to BHEL” w.r.t the finalized technical scope and commercial conditions (after considering incidence of applicable taxes and duties and loading). iv) In the course of evaluation, if more than one Bidder happens to occupy L1 status, effective L1 will be decided by soliciting discounts from the respective L1 Bidders. In case more than one Bidder happens to occupy the L1 status even after soliciting discounts, the L1 Bidder shall be decided by a toss/draw of lots, in the presence of the respective L1 Bidders or their representatives. Ranking will be done accordingly. BHEL decision in such situations shall be final and binding. INDIGENOUS a. Bidder shall ensure to indicate the applicable taxes against each line item, failing which the same will be considered as inclusive/NIL. b. Ex-works offers received (as against FOR Destination mentioned in enquiry) shall be loaded by 2% of Ex-works value. c. GST and any other charges quoted will be added to the base price. However, in case input credit is available for GST (SGST, CGST/IGST), the same shall be excluded for arriving at “Total Cost to BHEL” IMPORTS For evaluation of offers in foreign currency, exchange rate (TT selling rate of State Bank of India) as on the date of bid opening (Part-I, in case of two-part bids) shall be considered. If the relevant day happens to be a bank holiday, then the forex rate as on the previous bank (SBI) working day shall be taken. In case of foreign Bidders, the quoted CIP price shall be loaded by the following factors to arrive at “Total Cost to BHEL”: - Import duty as applicable on the date of Part-I bid opening. - Loading will be as per the table below <table><tr><td></td><td>Ex Works</td><td>FOB/F CA</td><td>CIF/C FR</td><td>CIP</td></tr><tr><td>Foreign Inland freight and insurance</td><td>2%</td><td></td><td></td><td></td></tr><tr><td>Marine freight and marine insurance</td><td>3%</td><td>3%</td><td></td><td></td></tr><tr><td>Destination Port handling charges</td><td>0.50%</td><td>0.50%</td><td>0.50%</td><td></td></tr><tr><td>clearing charges & inland freight and insurance</td><td>2%</td><td>2%</td><td>2%</td><td>2%</td></tr></table> COMMON LOADING FOR IMPORTS & INDIGENOUS that will be added for arriving the "Total Cost to BHEL" A. Loading on Deviated Penalty clause shall be 10% or to the extent to which the bidder has opted for deviation. B. Loading for payment terms as per clause 12 of ITB C. Loading for deviation in Warranty & PBG as per clause 16,17.		Ex Works	FOB/F CA	CIF/C FR	CIP	Foreign Inland freight and insurance	2%				Marine freight and marine insurance	3%	3%			Destination Port handling charges	0.50%	0.50%	0.50%		clearing charges & inland freight and insurance	2%	2%	2%	2%
	Ex Works	FOB/F CA	CIF/C FR	CIP																						
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clearing charges & inland freight and insurance	2%	2%	2%	2%																						
19	Procurement directly from the manufacturers/ suppliers shall be preferred. However, no agent shall be allowed to represent more than one manufacturer/ supplier in the same tender. Moreover, either the agent could bid on behalf of the manufacturer/ supplier or the manufacturer / supplier could bid directly but not both. In case bids are received from both from the manufacturer/ supplier and the agent, bid received from the agent shall be ignored.																									
20	RIGHT OF REJECTION /NON- PLACEMENT OF PO: BHEL reserves the right to accept or reject any or all bid/s in full or part without assigning any reason whatsoever.																									
21	INTEGRITY PACT Bidders shall have to enter into Integrity Pact with BHEL as per Annexure VI - for Tender value of rupees two crores and above and shall be signed by the authorized signatory along with the offer, failing which Bidder’s offer will be rejected.																									
22	Public Procurement																									
A	Make in India For this Procurement, the local content to categorize a bidder as a Class I local bidder / Class II local bidder / Non-Local bidder and purchase preference to Class I local bidder, is as defined in Public Procurement (Preference to Make in India) order No P-45021/2/2017-PP(BE-II) dated 04-06-2020 issued by DPIIT as amended from time to time. Proforma for self-certification for minimum local content and auditor’s certification is given in Annexure III.																									

B	Any Bidder from a country which shares a land border with India will be eligible to bid in this tender only if the bidder is registered with competent authority. GOI website https://www.mea.gov.in/ to be referred for latest details of competent authority and exemptions . Proforma for self-certification for compliance is given in Annexure IV.												
C	Startups: For Start-ups duly registered with DPIIT (Copy of certificate to be provided), condition of prior turnover and prior experience in Public Procurement may be relaxed subject to meeting of Quality and Technical Specifications. Startups are exempt from paying EMD.												
23	Benefits earmarked for Purchase from Micro & Small Enterprises (MSEs) – Indigenous Purchase												
A	All Micro and Small Enterprises (MSEs) as defined in MSE Procurement Policy are exempt from Paying EMD. NSIC/UDYAM registered bidders shall submit NSIC/UDYAM Certificate along with bid documents. Any Bidder falling under MSE category shall furnish the following details & submit documentary evidence/ Govt. Certificate etc. in support of the same along with their techno-commercial offer. <table border="1"><tr><th>Type under MSE</th><th>SC/ST Owned</th><th>Women Owned</th><th>Others (excluding SC/ST & Women Owned)</th></tr><tr><td>Micro</td><td></td><td></td><td></td></tr><tr><td>Small</td><td></td><td></td><td></td></tr></table> Note: If the bidder does not furnish the above in the tender, offer shall be processed construing that the bidder is not falling under MSE category. Date to be reckoned for determining the deemed validity will be the last date of Technical bid submission. Non- submission of such document will lead to consideration of their bid, at par with other bidders and MSE status of such bidders shall be shifted to Non- MSE Category till the bidder submits these documents.	Type under MSE	SC/ST Owned	Women Owned	Others (excluding SC/ST & Women Owned)	Micro				Small			
Type under MSE	SC/ST Owned	Women Owned	Others (excluding SC/ST & Women Owned)										
Micro													
Small													
B	MSE suppliers can avail the intended benefits in respect of the procurements related to the Goods and Services only (Definition of Goods and Services as enumerated by Govt. of India vide Office Memorandum F. No. 21(8)/2011-MA dtd. 09/11/2016 office of AS & DC, MSME) and subsequent amendments & clarifications, if any. Documents NSIC/UDYAM Certificate submitted by the bidder shall be verified by BHEL for rendering the applicable benefits.												
C	If an enterprise falling under MSME category as defined in the Act, graduates to a higher category from its original category or beyond the purview of the Act, it shall continue to avail all non-tax benefits of its original category notified by the Ministry of Micro, Small and Medium Enterprise for a period of three years from the date of such graduation to the higher category.												
D	BHEL HPEP is registered with TReDS (RXIL , M1XCHANGE , InvoiceMart) platform. MSME bidders are requested to get registered with TReDS(RXIL / M1XCHANGE / InvoiceMart/ exchanges added from time to time) platform to avail the facility as per the GOI guidelines.												
24	Inspection Measuring and Test Equipment (IMTE) used by the Bidder/ Contractor or sub-contractor shall be calibrated, maintained and controlled. Calibration shall be valid and IMTE maintained in sound condition during usage.												
25	ISO-9001, ISO14001 & OHSMS 45001 shall be complied.												
26	If BHEL registered supplier is not quoting against this NIT, supplier shall send regret letter positively with valid reasons for not participating. Repeated lack of response on the part of supplier may lead to deletion of such registered supplier from BHEL's approved supplier's list as per BHEL SEARP Guidelines.												
27	<u>BREACH OF CONTRACT, REMEDIES AND TERMINATION</u> 27.1 BREACH OF CONTRACT: The following shall amount to breach of contract: i. Non-supply of material/ non-completion of work by the Supplier/Vendor within scheduled delivery/ completion period as per contract or as extended from time to time. ii. The Supplier/Vendor fails to perform as per the activity schedule and there are sufficient reasons even before expiry of the delivery/ completion period to justify that supplies shall be inordinately delayed beyond contractual delivery/ completion period. iii. The Supplier/Vendor delivers equipment/ material not of the contracted quality. iv. The Supplier/Vendor fails to replace the defective equipment/ material/ component as per guarantee clause. v. Withdrawal from or abandonment of the work by the Supplier/Vendor before completion as per contract. vi. Assignment, transfer, subletting of Contract by the Supplier/Vendor without BHEL's written permission resulting in termination of Contract or part thereof by BHEL. vii. Non-compliance to any contractual condition or any other default attributable to Supplier/Vendor. viii. Any other reason(s) attributable to Vendor towards failure of performance of contract. In case of breach of contract, BHEL shall have the right to terminate the Purchase Order/ Contract either in whole or in part thereof without any compensation to the Supplier/Vendor. ix. Any of the declarations furnished by the contractor at the time of bidding and/ or entering into the contract for supply are found untruthful and such declarations were of a nature that could have resulted in non-award of contract to the contractor or could expose BHEL and/ or Owner to adverse consequences, financial or otherwise. x. Supplier/Vendor is convicted of any offence involving corrupt business practices, antinational activities or any such offence that compromises the business ethics of BHEL, in violation of the Integrity Pact entered into with BHEL has the potential to harm the overall business of BHEL/ Owner. Note- Once BHEL considers that a breach of contract has occurred on the part of Supplier/Vendor, BHEL shall notify the Supplier/Vendor by way of notice in this regard. Contractor shall be given an opportunity to rectify the reasons causing the breach of contract within a period of 14 days. In case the contractor fails to remedy the breach, as mentioned in the notice, to the satisfaction of BHEL, BHEL shall have the right to take recourse to any of the remedial actions available to it under the relevant provisions of contract												

	27.2 Remedies in case of Breach of Contract.: i. Wherein the period as stipulated in the notice issued under clause 27.1 has expired and Supplier/Vendor has failed to remedy the breach, BHEL will have the right to terminate the contract on the ground of "Breach of Contract" without any further notice to contractor. ii. Upon termination of contract, BHEL shall be entitled to recover an amount equivalent to 10% of the Contract Value for the damages on account of breach of contract committed by the Supplier/Vendor. This amount shall be recovered by way of encashing the security instruments like performance bank guarantee etc available with BHEL against the said contract. In case the value of the security instruments available is less than 10% of the contract value, the balance amount shall be recovered from other financial remedies (i.e. available bills of the Supplier/Vendor, retention amount, from the money due to the Supplier/Vendor etc. with BHEL) or the other legal remedies shall be pursued. iii. Wherever the value of security instruments like performance bank guarantee available with BHEL against the said contract is 10% of the contract value or more, such security instruments to the extent of 10% contract value will be encashed. In case no security instruments are available or the value of the security instruments available is less than 10% of the contract value, the 10% of the contract value or the balance amount, as the case may be, will be recovered in all or any of the following manners: iv. In case the amount recovered under sub clause (a) above is not sufficient to fulfil the amount recoverable then; a demand notice to deposit the balance amount within 30 days shall be issued to Supplier/Vendor. v. If Supplier/Vendor fails to deposit the balance amount within the period as prescribed in demand notice, following action shall be taken for recovery of the balance amount: a). from dues available in the form of Bills payable to defaulted Supplier/Vendor against the same contract. b). If it is not possible to recover the dues available from the same contract or dues are insufficient to meet the recoverable amount, balance amount shall be recovered from any money(s) payable to Supplier/Vendor under any contract with other Units of BHEL including recovery from security deposits or any other deposit available in the form of security instruments of any kind against Security deposit or EMD. vi. In-case recoveries are not possible with any of the above available options, Legal action shall be initiated for recovery against defaulted supplier/Vendor. vii. It is an agreed term of contract that this amount shall be a genuine pre-estimate of damages that BHEL would incur in completion of balance contractual obligation of the contract through any other agency and BHEL will not be required to furnish any other evidence to the Supplier/Vendor for the purpose of estimation of damages. viii. In addition to the above, imposition of liquidated damages, debarment, termination, de-scoping, short-closure, etc., shall be applied as per provisions of the contract. ix. Non-performance of contract attracts penal provisions in line with BHEL guidelines for Suspension of Business Dealings (SBD). Note: 1) The defaulting Supplier/Vendor shall not be eligible for participation in any of the future enquiries floated by BHEL to complete the balance work. The defaulting contractor shall mean and include: (a) In case defaulted Supplier/Vendor is the Sole Proprietorship Firm, any Sole Proprietorship Firm owned by same Sole Proprietor. (b) In case defaulted Supplier/Vendor is The Partnership Firm, any firm comprising of same partners/ some of the same partners; or sole proprietorship firm owned by any partner(s) as a sole proprietor.
28	Any other terms and conditions of the bidder attached / referred against the tender enquiry will not be considered.
29	All drawings, patterns and tools supplied by BHEL or made at BHEL's expense are BHEL's property. These cannot be used or referred to any other party and must be used only in the execution of BHEL's orders.
30	Any amount payable by the bidder under any of the conditions of this contract shall be liable to be adjusted against any amount payable to the bidder under any other work / contract awarded by BHEL HPEP or any other BHEL Units. This is without prejudice to any other action as may be deemed fit by BHEL.
31	The bids of the bidders who are on the banned list and also the bids of the bidders, who engage the services of the banned firms, will be rejected. The list of firms banned by BHEL is available on BHEL web site: www.bhel.com
32	Ordering and confirmation of order The bidder shall send the order acceptance within one week from the date of LOI/Purchase order or such other period as specified/agreed by the Buyer. Buyer reserves the right to revoke the order placed if the order confirmation differs from the original order placed. Buyer shall be legally bound, only if agreed for any deviation explicitly in writing. The acceptance of deliverables or supplies by Buyer as well as payments made in this regard shall not imply acceptance of any deviations. The Purchase order will be deemed to have been accepted if no communication to the contrary is received within one week (or the time limit as specified /agreed by the Buyer) from the date of P.O. Buyer, is at liberty to send signed P.O. through electronic media such as e-mail and the receipt of which shall be treated as receipt of order.
33	Execution The whole contract is to be executed in the most workman like manner, substantial and approved as per the contracted terms.
34	Progress Report The bidder shall render such report as to the progress of work and in such form as may be called for by the Buyer from time to time. The submission and acceptance of such reports shall not prejudice the rights of the buyer in any manner. Bidder shall communicate to BHEL immediately, the change of address, ownership, contact person(s), the mobile numbers and e-mail of the dealing person concerned. Milestones shall be periodically updated by bidder through PRADAN Portal (https://hpep.bhel.com/mm/). Non updation will adversely affect service rating of bidder performance.

35	Non-disclosure Obligations
	Drawings, technical documents or other technical information received by one party shall not without the consent of the other party, be used for any other purpose than that for which they were provided. They may not, without the consent of the submitting party, otherwise be used or copied, reproduced, transmitted or communicated to third parties. All information and data contained in general product documentation, whether in electronic or any other form, are confidential and binding only to the extent that they are by reference expressly included in the contract. The bidder shall, as per agreed date/s but not later than the date of delivery, provide free of charge any information and/or drawings which are necessary to permit the Buyer to erect, commission, operate and maintain the product. Such information and drawings shall be supplied as specified in technical specification. All intellectual properties, including designs, drawings and product information etc. exchanged during the formation and execution of the contract shall continue to be the property of the submitting party. The bidder shall provide Buyer with all information pertaining to the delivery in so far as it could be of importance to Buyer. The bidder shall not reveal confidential information to its own employees not involved with the tender/contract and its execution and delivery or to third parties, unless Buyer has agreed to this in writing beforehand. The bidder shall not be entitled to use the Buyer's name in advertisements and other commercial publications including website without prior written permission from Buyer. In the event of violation of the confidentiality as agreed, BHEL will take legal action as deemed fit. Non-disclosure agreement to be entered as per Annexure- II wherever applicable.
36	Inspection and Testing
A	The goods and stores shall be manufactured by approved quality system and each part/component may be inspected and tested by the Buyer prior to shipment and shall comply with relevant requirements. Buyer has the right to inspect at any stage during manufacture/ delivery.
B	Buyer or his authorized representative shall be entitled at all reasonable times during execution to inspect, examine and test at the bidder's premises the material and workmanship of all stores to be supplied under the contract, and if the part of the stores are being manufactured at other premises, the bidder shall obtain for buyer or his authorized representative permission to inspect, examine and test as if the said stores are being manufactured at the bidder's premises. Such inspection, examination and testing, if made shall not release the bidder from any obligation under the contract. For indigenous bidders all costs related to first inspection request shall be borne by the buyer and the cost of subsequent inspections due to non-readiness of material/rework/ rejections shall be borne by the bidder. In case of imports all inspection charges including third party inspections if any shall be borne by the bidder. The cost of inspection staff/third party specified by the Buyer shall be borne by bidder unless otherwise specifically agreed. If the contract provides for tests on the premises of the bidder or any of his sub-contractor/s, bidder shall be responsible to provide such assistance, labor, materials, electricity, fuels, stores, apparatus, instruments as may be required and as may be reasonably demanded to carry out such tests efficiently. Cost of any type test or such other special tests shall be borne by the bidder unless otherwise specifically agreed in the contract. The Bidder shall give the authorized representative of the buyer reasonable notice in writing of the date on and the place at which any stores will be ready for inspection/ testing as provided in the Contract. Annexure – I, may strictly be complied with or the time lines. Any delay in submission of the documents by the bidder will not alter the delivery date.
37	Quality and Condition of the Deliverables
	The bidder shall be responsible for compliance with applicable technical, safety, quality, environmental requirements and other regulations in relation to products, packaging and raw and ancillary materials.
38	Packaging and Dispatch
	The bidder shall package the deliverables safely and carefully and pack them suitably in all respects considering the peculiarity of the material for normal safe transport by sea/air/rail/road to its destination suitably protected against loss, damage, corrosion in transit and the effect or tropical salt laden atmosphere. The packages shall be provided with fixtures/hooks and sling marks as may be required for easy and safe handling by mechanical means. Special packaging conditions/ environmental conditions as defined in the NIT shall be fully complied. Each package must be marked with consignee name, address, P.O. number, Package Number, gross weight & net weight, dimensions (Lx B x H) and bidder's name. The packing shall allow for easy removal and checking of goods on receipt and comply with carrier's conditions of packing or established trade practices. Packing list for goods inside each package with P.O. item No. & quantity must also be fixed securely outside the box to indicate the contents. If any consignment needs special handling instruction, the same shall be clearly marked with standard symbols/instructions. Hazardous material should be notified as such and their packing, transportation and other protection must conform to relevant regulations.
39	Contract variations; Increase or decrease in the scope of supply
	Buyer may vary the contracted scope during execution due to exigencies of project requirement. If the bidder is of the opinion that the variation has an effect on the agreed price or delivery period, Buyer shall be informed of this immediately in writing along with technical details, and in the event of additional work, submit a quotation with regards to the price and period involved, as well as the effect this additional work will have on the other work to be performed by the bidder. Wherever unit rates are available in the contract, the same shall be applied to such additional work. The bidder shall not perform additional work before buyer has issued written instructions/amendment to the purchase order to that effect. The work which the bidder should have or could have anticipated in terms of delivering the service (s) and functionality (ies) as described in this agreement should be executed by the bidder without any price implication. In case of no change in the scope / technical specifications, bidder shall endeavor to keep the material ready and intimate the same to BHEL within the contractual delivery date, failing which, the delay if any will be attributed to supplier, and any upward price variation thereof for delivery at a later date is not admissible.
40	Rejected/Short shipments/ warranty/guarantee replacements
	In case of any short shipment during initial supply which is subsequently dispatched by the bidder or any guarantee / warranty replacements shall be dispatched on "DDP-Delivered duty paid BHEL stores" basis for imported items and "FOR-BHEL Stores/designated destination" basis for indigenous items.

41	Export Administration Regulations
	If a delivery includes such technology and / or supply that is subjected to the export regulations the bidder shall obtain due permissions, approvals, license etc.
42	Force Majeure
	The bidder shall not be considered in default if delay occurs due to causes beyond their control such as Acts of God, Natural calamities, Fire, Frost, Flood, Civil War, civil commotion, riot, Government Restrictions. Only those causes that have duration of more than seven days shall be considered cause of force majeure. Notification to this effect duly certified by local chamber of commerce/statutory authorities with supporting documents shall be given by the bidder to BHEL by registered letter/courier service immediately without loss of time. In the event of delay due to such causes the delivery schedule shall be extended for a length of time equal to the period of Force Majeure or at the option of BHEL the order may be cancelled. Such cancellation would be without any liability whatsoever on the part of BHEL. In the event of such cancellation the bidder shall refund any amount advanced or paid to the bidder by BHEL and deliver back any material issued to him by BHEL and release facilities, if any provided by BHEL.
43	Non-waiver of Defaults
	If any individual provision of the contract is invalid, the other provisions shall not be affected.
44	Settlement of Disputes
	Except as otherwise specifically provided in the contract, all disputes concerning questions of the facts arising under the contract, shall be decided by the Buyer, subject to written appeal by the bidder to the buyer, whose decision shall be final. Any disputes of differences shall to the extent possible be settled amicably between the parties thereto, failing which the disputed issues shall be settled through arbitration The bidder shall continue to perform the contract, pending settlement of disputes(s).
45	Conciliation clause
	CONCILIATION CLAUSE FOR CONDUCTING CONCILIATION PROCEEDINGS UNDER THE BHEL CONCILIATION SCHEME, 2018: The Parties agree that if at any time (whether before, during or after the arbitral or judicial proceedings), any Disputes (which term shall mean and include any dispute, difference, question or disagreement arising in connection with construction, meaning, operation, effect, interpretation or breach of the agreement, contract or the Memorandum of Understanding, penalty deduction, time extension), which the Parties are unable to settle mutually, arise inter-se the Parties, the same may, be referred by either party to Conciliation to be conducted through Independent Experts Committee to be appointed by competent authority of BHEL from the BHEL Panel of Conciliators. The proceedings of Conciliation shall broadly be governed by Part-III of the Arbitration and Conciliation Act 1996 or any statutory modification thereof and as provided in Procedure in http://www.bhel.com/index.php/story_details?story=2454 . The Procedure together with its Formats will be treated as if the same is part and parcel hereof and shall be as effectual as if set out herein in this ITB
46	ARBITRATION
	46.1 Except as provided elsewhere in this Contract, in case Parties are unable to reach amicable settlement (whether by Conciliation to be conducted as provided in Clause 45 herein above or otherwise) in respect of any dispute or difference; arising out of the formation, breach, termination, validity or execution of the Contract; or, the respective rights and liabilities of the Parties; or, in relation to interpretation of any provision of the Contract; or, in any manner touching upon the Contract (hereinafter referred to as the 'Dispute'), then, either Party may, refer the disputes to IAMC (International Arbitration and Mediation Centre, Hyderabad) and such dispute to be adjudicated by Sole Arbitrator appointed in accordance with the IAMC Rules. 46.2 A party willing to commence arbitration proceeding shall invoke Arbitration Clause by giving notice to the other party in terms of section 21 of the Arbitration & Conciliation Act, 1996 (hereinafter referred to as the 'Notice') before referring the matter to IAMC. The Notice shall be addressed to the Head of the Unit, BHEL, executing the Contract and shall contain the particulars of all claims to be referred to arbitration with sufficient detail and shall also indicate the monetary amount of such claim including interest, if any. 46.3 After expiry of 30 days from the date of receipt of aforesaid notice, the party invoking the Arbitration shall submit that dispute to IAMC and that dispute shall be adjudicated in accordance with their respective Arbitration Rules. The matter shall be adjudicated by a Sole Arbitrator who shall necessarily be a Retd Judge having considerable experience in commercial matters to be appointed/nominated by the respective institution. The cost/expenses pertaining to the said Arbitration shall also be governed in accordance with the Rules of the respective Arbitral Institution. The decision of the party invoking the Arbitration for reference of dispute to a specific Arbitral institution for adjudication of that dispute shall be final and binding on both the parties and shall not be subject to any change thereafter. The institution once selected at the time of invocation of dispute shall remain unchanged. 46.4 The fee and expenses shall be borne by the parties as per the Arbitral Institutional rules. 46.5 The Arbitration proceedings shall be in English language and the seat and venue of Arbitration shall be Hyderabad. 46.6 Subject to the above, the provisions of Arbitration & Conciliation Act 1996 and any amendment thereof shall be applicable. All matters relating to this Contract and arising out of invocation of Arbitration clause are subject to the exclusive jurisdiction of the Court(s) situated at Hyderabad. 46.7 Notwithstanding any reference to the Designated Engineer or Conciliation or Arbitration herein, a. the parties shall continue to perform their respective obligations under the Contract unless they otherwise agree. Settlement of Dispute clause cannot be invoked by the Contractor, if the Contract has been mutually closed or 'No Demand Certificate' has been furnished by the Contractor or any Settlement Agreement has been signed between the Employer and the Contractor. 46.8 It is agreed that Mechanism of resolution of disputes through arbitration shall be available only in the cases where the

	value of the dispute is less than Rs. 10 Crores. 46.9 In case the disputed amount Claim, Counter claim including interest is Rs. 10 crores and above, the parties shall be within their rights to take recourse to remedies other than Arbitration, as may be available to them under the applicable laws after prior intimation to the other party. Subject to the aforesaid conditions, provisions of the Arbitration and Conciliation Act, 1996 and any statutory modifications or re-enactment thereof as amended from time to time, shall apply to the arbitration proceedings under this clause. 46.10 In case, multiple arbitrations are invoked (whether sub-judice or arbitral award passed) by any party to under this contract, then the cumulative value of claims (including interest claimed or awarded) in all such arbitrations shall be taken in account while arriving at the total claim in dispute for the subject contract for the purpose of clause 46.9. Disputes having cumulative value of less than 10 crores shall be resolved through arbitration and any additional dispute shall be adjudicated by the court of competent jurisdiction. In the event of any dispute or difference relating to the interpretation and application of the provisions of commercial contract(s) between Central Public Sector Enterprises (CPSEs)/ Port Trusts inter se and also between CPSEs and Government Departments/Organizations (excluding disputes concerning Railways, Income Tax, Customs & Excise Departments), such dispute or difference shall be taken up by either party for resolution through AMRCD (Administrative Mechanism for Resolution of CPSEs Disputes) as mentioned in DPE OM No. 05/0003/2019-FTS-10937 dated 14-12-2022 as amended from time to time.		
47	Applicable Laws and jurisdiction of Courts		
	This contract shall be governed by the Law for the time being in force in the Republic of India. Subject to clause 46 of this contract, the Civil Court having original Civil Jurisdiction at Hyderabad, shall alone have exclusive jurisdiction in regard to all matters in respect of the Contract."		
48	BHEL-Fraud prevention policy shall be adhered to.		
	The Bidder along with its associate/ Collaborators/ Sub-contractors/ sub-bidders/ consultants/ service providers shall strictly adhere to BHEL Fraud Prevention policy displayed on BHEL Website http://www.bhel.com and shall immediately bring to the notice of BHEL management about any fraud or suspected fraud as soon as it comes to their notice. List of nodal officers is hosted on BHEL Hyderabad website https://hpep.bhel.com/ .		
49	Suspected Cartel Formation		
	The Bidder declares that they will not enter into any illegal or undisclosed agreement or understanding, whether formal or informal with other Bidder(s). This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process. In case , the Bidder is found having indulged in above activities, suitable action shall be taken by BHEL as per extant policies / guidelines .		
50	Treatment of cases regarding conflict of interest: The bidder notes that a conflict of interest would said to have occurred in the tender process and execution of the resultant contract, in case of any of the following situations: i) If its personnel have a close personal, financial, or business relationship with any personnel of BHEL who are directly or indirectly related to the procurement or execution process of the contract, which can affect the decision of BHEL directly or indirectly; ii) The bidder (or his allied firm) provided services for the need assessment/procurement planning of the Tender process in which it is participating; iii) Procurement of goods directly from the manufacturers/ suppliers shall be preferred. However, if the OEM/ Principal insists on engaging the services of an agent, such agent shall not be allowed to represent more than one manufacturer/ supplier in the same tender. Moreover, either the agent could bid on behalf of the manufacturer/ supplier or the manufacturer/ supplier could bid directly but not both. In case bids are received from both the manufacturer/supplier and the agent, bid received from the agent shall be ignored. However, this shall not debar more than one Authorized distributor (with/ or without the OEM) from quoting equipment manufactured by an Original Equipment Manufacturer (OEM) in procurements under a Proprietary Article Certificate. iv) A bidder participates in more than one bid in this tender process. Participation in any capacity by a Bidder (including the participation of a Bidder as a partner/ JV member or sub-contractor in another bid or vice-versa) in more than one bid shall result in the disqualification of all bids in which he is a party. However, this does not limit the participation of an entity as a subcontractor in more than one bid if he is not bidding independently in his own name or as a member of a JV. The Bidder declares that they have read and understood the above aspects, and the bidder confirms that such conflict of interest does not exist and undertakes that they will not enter into any illegal or undisclosed agreement or understanding, whether formal or informal with other Bidder(s), in this regard. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process. In case, the Bidder is found having indulged in above activities, the same will be considered as a violation of the tender conditions, and suitable action shall be taken by BHEL as per extant policies/guidelines.		
51	Escalation Matrix		
	Details	Name	Contact Number
	Authorised representative		
	Technical In-charge		
	Finance and Taxation		
	Escalation for above		



52	Grievance Redressal Mechanism
	To promote transparency and ensure fair treatment of all bidders, a structured Grievance Redressal Mechanism is in place to address any concerns or issues arising during the tendering process or in subsequent business dealings with the company. Suppliers/Contractors are requested to follow the below escalation process for grievance resolution: 1. First Level: Any grievance should initially be addressed to the designated Dealing Officer, whose contact details are provided in the Notice Inviting Tender (NIT)/Contract. 2. Second Level: If the issue remains unresolved, it may be escalated by lodging a formal grievance through the SUVIDHA Portal: https://suvidha.bhel.in/suvidha/. Responses will be provided in accordance with the defined escalation matrix.”

Note: Purchase officer has to fill Annexure-I while sending enquiry

(To be executed on Non- Judicial Stamp Paper for an appropriate value.
To be stamped as an agreement)

(For Suppliers on Unit's / Division's PMD)

ANNEXURE-II

Framework Confidentiality Agreement Cum Undertaking

This Agreement made on this the _____ day of (month) _____ 20 ____ ("Effective Date") by and between M/s. BHARAT HEAVY ELECTRICALS LIMITED, having registered office at "BHEL House", Siri Fort, New Delhi – 110049 (India), acting through its _____ Unit (hereinafter may be referred to as "BHEL" or "the company").

And

M/s. _____ (address) _____
represented by authorized representative Sri _____ (herein after referred to as the "Supplier").

The supplier and the company may, unless the context otherwise requires, hereinafter be collectively referred to as "Parties" or singly as the "Party".

RECITALS

Whereas, BHEL is engaged in the design, engineering, manufacturing, construction, testing, commissioning and servicing of a wide range of products, systems and services for the core sectors of the economy, viz. Power, Transmission, Industry, Transportation, Renewable energy, Oil & Gas and Defence and providing associated services to varied customers in relation to which BHEL / its affiliates own valuable information of a secret and confidential nature.

Whereas the Company may, in connection with contract(s) (as defined hereunder) placed or to be placed upon the supplier, or otherwise, from time to time, make available, Technical Information as is defined hereunder.

And Whereas BHEL is willing to provide such Technical Information to the Supplier from time to time and the Supplier understands and acknowledges that such Technical Information is valuable for the Company and as such is willing to protect confidentiality of such information, subject to the terms and conditions set out hereunder.

Now therefore, in view of the foregoing premises and in consideration of the mutual covenants and agreements hereinafter set forth, the parties agree as under:

1. Definitions:

Unless the context so requires, in this Agreement, the following terms will bear the meaning ascribed to the said term in this clause.

- A. **“Contract”** means the contract entered into with a supplier and includes a Purchase Order, or a Work Order for procurement of any goods or for provision of any services.
- B. **“Effective Date”** means the date of this Agreement as mentioned in the preamble of this Agreement.
- C. **“Supplier”** includes a Contractor or a Vendor of the Company whether for supplying of goods or for providing any services under a Contract or both.
- D. **“Technical Information”** includes Drawings, and / or Product Standards and / or Specifications and / or Corporate / Plant Specifications and / or Technological Process Sheets and / or Technical Data Sheets and / or Jigs & Fixtures and / or Pattern & Dies and / or Special Gauges and / or Tools etc. Belonging to or wherein the Company has acquired from a third party a right of user and includes any improvement thereto from time to time whether carried out by the Company or by the Suppliers.
- E. **“Intended Purpose”** means the purpose for which the Technical Information is provided to the supplier under or in connection with a contract.
- F. **“Improvement”** includes any modification made to, or adaptation of, the Technical Information which enhances or is calculated to enhance the performance (Whether in terms of effectiveness or in terms of efficiency or both) of the product and / or the service to be provided by the Supplier under a Contract.

2. This Agreement shall come into force / deemed to have come into force, as the case may be, on the Effective Date; or, on the first date when the Technical Information or any part thereof is provided by BHEL to the supplier; whichever is earlier.

3. **Agreement deemed to be incorporated in each contract:** Unless and to the extent otherwise stipulated in the Contract, the conditions of this Agreement are deemed to be incorporated in all Contracts which may be entered into between the Company and the Supplier. Further, unless otherwise stipulated, the obligations under this Agreement are and will be independent of the obligations under the Contracts and such obligations of the Supplier hereunder will remain of full effect and validity notwithstanding that the period of validity of the Contract has expired by efflux of time stipulated therein; or, the contract has been discharged by performance or breach; or, the termination of the Contracts for any reason whatsoever.

4. **Ownership:**

4.1 The Company may, from time to time, make available to the Supplier, Technical Information on a non-exclusive basis by way of loan.

4.2 The Supplier acknowledges and agrees that all Technical Information and copies thereof that are or may be provided by the Company to the Supplier, are and shall remain the property of

BHEL or that of the concerned entity from whom BHEL has obtained the Technical Information and such Technical Information are and shall constitute trade secrets of the BHEL. Nothing in this Agreement or in any disclosures made hereunder by or on behalf of the Company shall be construed as granting upon the Supplier any patent, copyright or design or any other intellectual property rights of whatsoever description that subsists or may hereinafter exist in the Technical Information. Furthermore, nothing in this Agreement or in any disclosures made hereunder by or on behalf of the Company shall be construed as granting upon the supplier any license or right of use of such patent, copyright or design or any other intellectual property rights of whatsoever description which may now or hereafter exist in the Technical Information except for use of the Technical Information strictly in accordance with this Agreement and the contract and / or as directed in writing by the Company, solely for the Intended Purpose under the Contract.

- 4.3 Neither party is obligated by or under this Agreement to purchase from or provide to the other party any service or product and that any such purchase / sale of any product and / or service by one party to the other party will be governed by the Contract if any, that may be entered into by and between the Company and the Supplier.
- 4.4 The Supplier is / has been made well aware and acknowledges that the Technical Information being / which may be shared with it by the Company has been either generated by the Company by incurring huge investment and cost or obtained from foreign collaborators under Technical Collaboration Agreement (TCA) with stringent confidentiality conditions.
- 4.5 The supplier agrees and undertakes to adhere to confidentiality requirements as applicable to BHEL under a TCA and also ensure that the confidentiality requirements are adhered to by all its concerned employees or sub-contractors /suppliers (where permitted to be engaged by BHEL). Any damages, losses, expenses of any description whatsoever, arising out of or in connection with a breach of the confidentiality requirements under a TCA owing to any act or omission on the part of the supplier or its employees or sub-contractors / suppliers that is claimed by a foreign collaborator from the Company shall be wholly borne by the Supplier and it shall keep BHEL fully indemnified in this behalf. The demand by the Company shall be conclusive upon the Supplier who shall thereupon forthwith pay to the Company without demur, dispute or delay the amount as demanded without demanding any further proof thereof.
- 4.6 The Supplier agrees and undertakes that unless so decided and advised by the Company in writing all rights / title to any Improvement to the Technical Information shall vest in the Company. The Supplier undertakes and agrees to inform forthwith to the Company of any such Improvement made to the Technical Information and transfer all drawings / documents or other materials connected with such Improvement to the Company and also agrees to fully cooperate with the Company for protecting the Company's interests in such Improvements

in the Technical Information including but not limited to obtaining necessary protection for the intellectual property rights in such improvement, if so desired by the Company. If a question arises whether a modification amounts to improvement to the Technical Information, the same shall be decided by the Company and such decision shall be final and binding upon the supplier.

5. Use and Non – Disclosure:

5.1 Unless otherwise stipulated by the Company, all Technical Information made available to the supplier, by the Company shall be treated as Confidential irrespective of whether the same is marked or otherwise denoted to be Confidential or not.

5.2 The Supplier undertakes and agrees that the Technical Information in its possession shall be held in strict confidence and will be used strictly in accordance with this Agreement and solely for the Intended Purpose under the Contract. Use of the Technical Information for any other purpose other than Intended Purpose is prohibited.

5.3 In particular, the Supplier shall not use Technical Information or any Improvement in its possession for the manufacture or procurement of the product(s) or components or parts thereof or use the Technical Information or any portion thereof or any modification or adaptation thereof in any form to provide any product and / or service to any third party, without the prior written consent of the Company.

5.4 The Supplier shall not disclose any of such Technical Information to any third party without the prior written consent of the Company. The Supplier agrees that without prior written consent of the Company, the supplier shall not disclose to a third party about the existence of this Agreement, or of the fact that it is / was in possession of or has experience in the use of any Technical Information nor shall the Supplier share in any manner whatsoever, with a third party, the name or details of any Contract(s) awarded by the Company to it or performed by the Supplier or the scope of work thereof or share any document or correspondence by and between the Company and the supplier in or in connection with this Agreement or such Contract(s). Notwithstanding what is stated elsewhere, the overall responsibility of any breach of the confidentiality provisions under this Agreement shall rest with the Supplier.

5.5 This Supplier undertakes and agrees not to make copies or extracts of and not to disclose to other any or all of the Technical Information in its possession, except as follows:

(a) The Supplier may disclose the Technical Information to such of its officers and employees strictly to the extent as is necessary for such officer or employee for the Intended Purpose, provided that the Confidential Information (or copies thereof) disclosed shall be marked

clearly as the confidential and proprietary information of Company and that such officers and employees shall similarly be bound by undertakings of confidence, restricted use and non-disclosure in respect of the Technical Information. The Supplier shall be responsible for any breach of such confidentiality provisions by such officers and employees.

- (b) With the prior written consent of Company, the supplier may disclose for the Intended Purpose such Technical Information as is provided for in such consent to such of its professional advisers: consultants, insurers and subcontractors who shall be similarly bound by undertakings of confidence, restricted use and non-disclosure in respect of such Technical Information.
- (c) The Supplier shall not be prevented to make any disclosure required by (i) order of a court of competent jurisdiction or (ii) any competent regulatory authority or agency where such disclosure is required by law, provided that where the supplier intends to make such disclosure, it shall first consult Company and take all reasonable steps requested by it to minimize the extent of the Technical Information disclosed and to make such disclosure in confidence and also shall cooperate with the Company in seeking any protective order or any other remedy from proper authority in this matter.

6. Exceptions:

The Obligations of the Supplier pursuant to the provisions of this agreement shall not apply to any Confidential Information that:

- a) was / is known to, or in the possession of the Supplier prior to disclosure thereof by the Company;
- b) is or becomes publicly known, otherwise than as a result of a breach of this agreement by the Supplier.
- c) is developed independently of the Disclosing party by the Supplier in circumstances that do not amount to a breach of the provisions of this Agreement or the Contract;
- d) is received from a third party in circumstances that do not result in a breach of the provisions of this Agreement.

- 7. The Obligation of maintaining confidentiality of the Technical Information on each occasion, shall subsist for the entire duration during which the Technical Information / equipment is in possession of the Supplier and shall thereafter subsist for a further period of _____ years from the date when the complete Technical Information has been returned in portions on different dates, the period of ____ years will be reckoned from the date when the last portion of the Technical Information has been returned. Notwithstanding the expiry of the confidentiality obligation, the obligation of the Supplier under clause 5.4 shall continue to subsist for a further period of _____ years.

8. Warranties & Undertakings:

- a) The Supplier undertakes to ensure the due observance of the undertakings of confidence, restricted use and non-disclosure by its persons to whom it discloses or releases copies or extracts of the Technical Information.
- b) The Supplier shall keep the Technical Information or improvement made therein properly segregated and not mix up the same with any other material / documents belonging to him / it or to any other third party.
- c) The Supplier further undertakes that he / it shall not hypothecate or give on lease or otherwise alienate or do away with any of the Technical Information and / or equipment of the Company, made available to him / it, and undertakes that he / it shall hold the same as a trustee, in capacity of custodian thereof and use / utilise the same solely for the purpose of executing the contract awarded by the Company.
- d) The Supplier further undertakes that he / it shall return all the equipment and / or Technical Information as far as practicable in the same condition in which the same was made available to him / it by the Company together with any Improvement thereon and the documents connected with such Improvement, to the Company forthwith upon completion of the scope of work or contract for which such Technical Information was provided by the Company to it or as directed by the Company together with a confirmation by way of an affidavit or in such manner as directed by the Company that it has not retained any equipment and / or Technical Information / improvement thereof. In case any such equipment and / or Technical Information or thereof shall remain in his possession or is not capable of being returned, the retention and use of such Technical Information or improvement thereto shall continue to be governed by this Agreement.
- e) The Supplier undertakes to indemnify the Company for all the direct, indirect and / or consequential losses, damages, expenses whatsoever including any consequential loss of business, profits suffered by the Company owing to breach by the Supplier of its obligations under this Agreement and / or the confidentiality requirements, if any, contained in the Contract and that the Supplier hereby agrees that the decision of the Company in all such or any such matter/s shall be final and binding on the Supplier. On mere written demand of the Company, the Supplier shall forthwith and without demur or delay pay to the Company any such sum as determined by the Company as the amount of loss or damage or expense which has been suffered by the Company. The Supplier agrees that the Company shall be entitled to withhold and appropriate any amount payable to the Supplier under any Contract then existing between the Company and the Supplier, in case the Supplier fails to make payment, in terms of the written demand, within 7 days thereof. Without prejudice to the forgoing actions, in respect to any breach of this Agreement, the Company shall be entitled to take

any other action against the Supplier as per applicable laws, the Contract, Company's applicable policies, guidelines rules, procedures, etc.

9. Without prejudice to any other mode of recovery as may be available to the Company for recovery of the amount determined as due as per Clause 9 (f) hereinabove, the Company shall have a right to withhold, recovery and appropriate the amount due towards such losses, damages, expenses, from any amount due to the Supplier in respect of any other Contract (s) placed on him / it by any department / office / unit/ division of the said Company.

10. Arbitration & Conciliation:

Except as provided elsewhere in this Contract, in case amicable settlement is not reached between the Parties, in respect of any dispute or difference; arising out of the formation, breach, termination, penalty deduction, validity or execution of the Contract; time extension, or, the respective rights and liabilities of the Parties; or, in relation to interpretation of any provision of the Contract; or, in any manner touching upon the Contract, then, either Party may, by a notice in writing to the other Party refer such dispute or difference to the sole arbitration. Sole arbitrator to be appointed by Head of the Unit - BHEL, HPEP.

The Arbitrator shall pass a reasoned award and the award of the Arbitrator shall be final and binding upon the Parties.

Subject as aforesaid, the provisions of Arbitration and Conciliation Act 1996 (India) or statutory modifications or re-enactments thereof and the rules made thereunder and for the time being in force shall apply to the arbitration proceedings under this clause.

The seat of arbitration shall be Sangareddy / Hyderabad, Telangana. The language of arbitration shall be English and the documents shall be submitted in English.

The cost of arbitration shall initially be borne equally by the Parties subject to the final apportionment of the cost of the arbitration in the award of the Arbitrator.

Subject to the arbitration in terms of clause 46 of ITB (clause 27 of ATC GeM), the courts at Sangareddy, Telangana State shall have exclusive jurisdiction over any matter arising out of or in connection with this contract.

Notwithstanding the existence or any dispute or differences and/or reference for the arbitration, the Contractor shall proceed with and continue without hindrance the performance of its obligations under this Contract with due diligence and expedition in a professional manner except where the Contract has been terminated by either Party in terms of this Contract.

ARBITRATION FOR CONTRACT WITH PUBLIC SECTOR ENTERPRISE (PSE) OR A GOVERNMENT DEPARTMENT

In the event of any dispute or difference relating to the interpretation and application of the provisions of commercial contract(s) between Central Public Sector Enterprises (CPSEs/ Port Trusts inter se and also between CPSEs and Government Departments/Organizations (excluding disputes concerning Railways, Income Tax, Customs & Excise Departments), such dispute or difference shall be taken up by either party for resolution through AMRCD as mentioned in DPE OM No 4(1)/2013-DPE(GM/FTS 1835 dated 22-05-2018

CONCILIATION CLAUSE FOR CONDUCTING CONCILIATION PROCEEDINGS UNDER THE BHEL CONCILIATION SCHEME, 2018: The Parties agree that if at any time (whether before, during or after the arbitral or judicial proceedings), any Disputes (which term shall mean and include any dispute, difference, question or disagreement arising in connection with construction, meaning, operation, effect, interpretation or breach of the agreement, contract or the Memorandum of Understanding, penalty deduction, time extension), which the Parties are unable to settle mutually, arise inter-se the Parties, the same may, be referred by either party to Conciliation to be conducted through Independent Experts Committee to be appointed by competent authority of BHEL from the BHEL Panel of Conciliators.

The proceedings of Conciliation shall broadly be governed by Part-III of the Arbitration and Conciliation Act 1996 or any statutory modification thereof and as provided in Procedure in http://www.bhel.com/index.php/story_details?story=2454 . The Procedure together with its Formats will be treated as if the same is part and parcel hereof and shall be as effectual as if set out herein in this ITB

11. Governing Law & Jurisdiction:

This agreement shall be construed and interpreted in accordance with the laws of India and shall have exclusive jurisdiction of Sangareddy/Hyderabad courts, Telangana, India.

SIGNATURE

WITNESSES

1

Name:

Address:

2

Name:

Address:

Auditor's certification with respect to minimum local content on the letter head of Statutory Auditor for tender value above Rs.10 crore

"We _____ the statutory auditor of M/s _____ (name of the bidder) hereby certify that M/s _____ (name of manufacturer) meet the mandatory Local Content requirements of the Goods and/or Services i.e. _____ (to be filled as notified in the policy) quoted vide offer No. _____ dated _____ against BHEL's tender No. _____ by M/s _____ (Name of the bidder)."

Annexure - IV

Proforma for self-certification by Supplier for Compliance to Clause No 20 (B)

I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India and I certify that M/s.... (Name of firm) is **not from such a country/is from such a country** (delete whichever is NOT applicable) and has been duly registered with the Competent authority (delete if NOT applicable) . I hereby certify M/s fulfills all requirements in this regard and is eligible to be considered . (where applicable , valid registration by the competent authority shall be attached)

Sd/-

Authorised Signatory with Stamp

INTEGRITY PACT**Between**

Bharat Heavy Electricals Ltd. (BHEL), a company registered under the Companies Act 1956 and having its registered office at "BHEL House", Siri Fort, New Delhi - 110049 (India) hereinafter referred to as "The Principal", which expression unless repugnant to the context or meaning hereof shall include its successors or assigns of the ONE PART

and

_____, (description of the party along with address), hereinafter referred to as "The Bidder/ Contractor" which expression unless repugnant to the context or meaning hereof shall include its successors or assigns of the OTHER PART

Preamble

The Principal intends to award, under laid-down organizational procedures, contract(s) for _____

_____ (hereinafter referred to as "Contract"). The Principal values full compliance with all relevant laws of the land, rules and regulations, and the principles of economic use of resources, and of fairness and transparency in its relations with its Bidder(s)/ Contractor(s).

In order to achieve these goals, the Principal will appoint panel of Independent External Monitor(s) (IEMs), who will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

Section 1- Commitments of the Principal

- 1.1 The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles: -
 - 1.1.1 No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.
 - 1.1.2 The Principal will, during the tender process treat all Bidder(s) with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential/ additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.
 - 1.1.3 The Principal will exclude from the process all known prejudiced persons.
- 1.2 If the Principal obtains information on the conduct of any of its employees which is a penal offence under the Indian Penal Code 1860 and Prevention of Corruption Act 1988 or any other statutory penal enactment, or if there be a substantive suspicion in this regard, the Principal will inform its Vigilance Office and in addition can initiate disciplinary actions.

Section 2 - Commitments of the Bidder(s)/ Contractor(s)

- 2.1 The Bidder(s)/ Contractor(s) commit himself to take all measures necessary to prevent corruption. The Bidder(s)/ Contractor(s) commits himself to observe the following principles during participation in the tender process and during the contract execution.

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- 2.1.1 The Bidder(s)/ Contractor(s) will not, directly or through any other person or firm, offer, promise or give to the Principal or to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material, immaterial or any other benefit which he/ she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.
- 2.1.2 The Bidder(s)/ Contractor(s) will not enter with other Bidder(s) into any illegal or undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.
- 2.1.3 The Bidder(s)/ Contractor(s) will not commit any penal offence under the relevant Indian Penal Code (IPC) and Prevention of Corruption Act; further the Bidder(s)/ Contractor(s) will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.
- 2.1.4 Foreign Bidder(s)/ Contractor(s) shall disclose the name and address of agents and representatives in India and Indian Bidder(s)/ Contractor(s) to disclose their foreign principals or associates. The Bidder(s)/ Contractor(s) will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.
- 2.2 The Bidder(s)/ Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.
- 2.3 The Bidder(s)/ Contractor(s) shall not approach the Courts while representing the matters to IEMs and shall await their decision in the matter.

Section 3 - Disqualification from tender process and exclusion from future contracts

If the Bidder(s)/ Contractor(s), before award or during execution has committed a transgression through a violation of Section 2 above, or acts in any other manner such as to put his reliability or credibility in question, the Principal is entitled to disqualify the Bidder(s)/ Contractor(s) from the tender process, terminate the contract, if already awarded, exclude from future business dealings and/ or take action as per the separate "Guidelines on Banning of Business dealings with Suppliers/ Contractors", framed by the Principal.

Section 4 - Compensation for Damages

- 4.1 If the Principal has disqualified the Bidder (s) from the tender process before award / order acceptance according to Section 3, the Principal is entitled to demand and recover the damages equivalent to Earnest Money Deposit/ Bid Security.
- 4.2 If the Principal is entitled to terminate the Contract according to Section 3, or terminates the Contract in application of Section 3 above, the Bidder(s)/ Contractor (s) transgression through a violation of Section 2 above shall be construed breach of contract and the Principal shall be entitled to demand and recover from the Contractor an amount equal to 5% of the contract value or the amount equivalent to Security Deposit/ Performance Bank Guarantee, whichever is higher, as damages, in addition to and without prejudice to its right to demand and recover compensation for any other loss or damages specified elsewhere in the contract.

Section 5 - Previous Transgression

- 5.1 The Bidder declares that no previous transgressions occurred in the last 3 (three) years (to be reckoned from date of bid submission) with any other company in any country conforming to the anti-corruption approach in India that could justify his exclusion from the tender process. The date of such transgression, for the purpose of disclosure by the bidders in this regard, would be the date on which cognizance of the said transgression was taken by the competent authority. The transgression(s), for which cognizance was taken even before the said period of three years, but are pending conclusion, shall also be reported by the bidders.
- 5.2 If the Bidder makes incorrect statement on this subject, he can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason or action can be taken as per the separate "Guidelines on Suspension of Business dealings with Suppliers/ Contractors", framed by the Principal.

Section 6 - Equal treatment of all Bidder (s)/ Contractor (s) / Sub-contractor (s)

- 6.1 The Principal will enter into Integrity Pacts with identical conditions as this Integrity Pact with all Bidders and Contractors.
- 6.2 In case of a joint venture, all the partners of the joint venture should sign the Integrity Pact. In case of Sub-contracting, the Principal Contractor shall be solely responsible for the adherence to the provisions of IP by the sub-contractor(s).
- 6.3 The Principal will disqualify from the tender process all Bidders who do not sign this Integrity Pact or violate its provisions.

Section 7 - Criminal Charges against violating Bidders/ Contractors /Subcontractors

If the Principal obtains knowledge of conduct of a Bidder, Contractor or Subcontractor, or of an employee or a representative or an associate of a Bidder, Contractor or Subcontractor which constitutes corruption, or if the Principal has substantive suspicion in this regard, the Principal will inform the Vigilance Office.

Section 8 -Independent External Monitor(s)

- 8.1 The Principal appoints competent and credible panel of Independent External Monitor (s) (IEMs) for this Integrity Pact. The task of the IEMs is to review independently and objectively, whether and to what extent the parties comply with the obligations under this Integrity Pact on receipt of any complaint by them from the bidder(s).
- 8.2 The IEMs are not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the CMD, BHEL.
- 8.3 The IEMs shall be provided access to all documents/ records pertaining to the Contract, for which a complaint or issue is raised before them as and when warranted. However, the documents/records/information having National Security implications and those documents which have been classified as /Top Secret are not to be disclosed.
- 8.4 The Principal will provide to the IEMs sufficient information about all meetings among the parties related to the Contract provided such meetings could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the IEMs the option to participate in such meetings.

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- 8.5 The role of IEM is advisory and the advice of IEM is non-binding on the Organization. However, as IEMs are invariably persons with rich experience who have retired as senior functionaries of the government, their advice would help in proper implementation of the IP.
- 8.6 For ensuring the desired transparency and objectivity in dealing with the complaints arising out of the tendering process, the matter should be examined by the full panel of IEMs jointly, who would look into the records, conduct an examination, and submit their joint recommendations to the Management. In case the full panel is not available due to some unavoidable reasons, the available IEM(s) will conduct examination of the complaints. Consent of the IEM(s), who may not be available, shall be taken on record.
- 8.7 The IEMs shall examine all the representations/grievances/ complaints received by them from the bidders or their authorized representative related to any discrimination on account of lack of fair play in modes of procurement and bidding systems, tendering method, eligibility conditions, bid evaluation criteria, commercial terms & conditions, choice of technology/ specifications etc.
- 8.8 The CMD, BHEL shall decide the compensation to be paid to the IEMs and its terms and conditions.
- 8.9 IEMs should examine the process integrity, they are not expected to concern themselves with fixing of responsibility of officers. Complaints alleging mala fide on the part of any officer of the Principal should be looked into by the CVO of the Principal.
- 8.10 If the IEMs have reported to the CMD, BHEL, a substantiated suspicion of an offence under relevant Indian Penal Code / Prevention of Corruption Act, and the CMD, BHEL has not, within reasonable time, taken visible action to proceed against such offence or reported it to the Vigilance Office, the IEMs may also transmit this information directly to the Central Vigilance Commissioner, Government of India.
- 8.11 After award of work, the IEMs shall look into any issue relating to execution of Contract, if specifically raised before them. As an illustrative example, if a Contractor who has been awarded the Contract, during the execution of Contract, raises issue of delayed payment etc. before the IEMs, the same shall be examined by the panel of IEMs.
- 8.12 However, the IEMs may suggest systemic improvements to the management of the Principal, if considered necessary, to bring about transparency, equity and fairness in the system of procurement.
- 8.13 The word 'Monitor' would include both singular and plural.

Section 9 - Pact Duration

- 9.1 This Integrity Pact shall be operative from the date this Integrity Pact is signed by both the parties. Any violation of the same would entail disqualification of the bidders and exclusion from future business dealings.
- 9.2 If any claim is made/ lodged during currency of this Integrity Pact, the same shall be binding and continue to be valid despite the lapse of this Pact as specified above, unless it is discharged/ determined by the CMD, BHEL.

Section 10 - Other Provisions

- 10.1 This Integrity Pact is subject to Indian Laws and exclusive jurisdiction shall be of the competent Courts as indicated in the Tender or Contract, as the case may be.
- 10.2 Changes and supplements as well as termination notices need to be made in writing.

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- 10.3 If the Bidder(s)/ Contractor(s) is a partnership or a consortium or a joint venture, this Integrity Pact shall be signed by all partners of the partnership or joint venture or all consortium members.
- 10.4 Should one or several provisions of this Integrity Pact turn out to be invalid, the remainder of this Integrity Pact remains valid. In this case, the parties will strive to come to an agreement to their original intentions.
- 10.5 Only those bidders / contractors who have entered into this Integrity Pact with the Principal would be competent to participate in the bidding. In other words, entering into this Integrity Pact would be a preliminary qualification.
- 10.6 In the event of any dispute between the Principal and Bidder(s)/ Contractor(s) relating to the Contract, in case, both the parties are agreeable, they may try to settle dispute through Mediation before the panel of IEMs in a time bound manner. If required, the Principal may adopt any mediation rules for this purpose. However, not more than five meetings shall be held for a particular dispute resolution. The fees/expenses on dispute resolution shall be equally shared by both the parties. In case, the dispute remains unresolved even after mediation by the panel of IEMs, either party may take further action as per the terms & conditions of the Contract.

For & On behalf of the Principal
(Office Seal)

Place _____

Date _____

Witness: _____
(Name & Address) _____

For & On behalf of the Bidder/ Contractor
(Office Seal)

Witness: _____
(Name & Address) _____

BANK GUARANTEE FOR PERFORMANCE SECURITY

Bank Guarantee No:

Date:

To

NAME

& ADDRESSES OF THE BENEFICIARY

Dear Sirs,

In consideration of Bharat Heavy Electricals Limited (hereinafter referred to as the 'Employer' which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns) incorporated under the Companies Act, 1956 and having its registered office at _____ through its Unit at.....(name of the Unit) having awarded to (Name of the Vendor / Contractor / Supplier) with its registered office at _____ hereinafter referred to as the 'Vendor / Contractor / Supplier', which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns), a contract Ref No.....dated valued at Rs..... (Rupees -----)/FC.....(in words.....) for (hereinafter called the 'Contract') and the Vendor / Contractor / Supplier having agreed to provide a Contract Performance Bank Guarantee, equivalent to% (.... Percent) of the said value of the Contract to the Employer for the faithful performance of the Contract,

we, ... (hereinafter referred to as the Bank), having registered/Head office at and inter alia a branch at being the Guarantor under this Guarantee, hereby, irrevocably and unconditionally undertake to forthwith and immediately pay to the Employer any sum or sums upto a maximum amount of Rs ----- (Rupees -----) without any demur, immediately on first demand from the Employer and without any reservation, protest, and recourse and without the Employer needing to prove or demonstrate reasons for its such demand.

Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. _____.

We undertake to pay to the Employer any money so demanded notwithstanding any dispute or disputes raised by the Vendor / Contractor / Supplier in any suit or proceeding pending before any Court or Tribunal, Arbitrator or any other authority, our liability under this present being absolute and unequivocal.

The payment so made by us under this Guarantee shall be a valid discharge of our liability for payment thereunder and the Vendor / Contractor / Supplier shall have no claim against us for making such payment.

We the bank further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Contract/satisfactory completion of the performance Hyderabad ee period as per the terms of the Contract and that it shall continue to be enforceable till all the dues of the Employer under or by virtue of the said Contract have been fully paid and its claims satisfied or discharged.

We BANK further agree with the Employer that the Employer shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Contract or to extend time of performance by the said Vendor / Contractor / Supplier from time to time or to postpone for any time or from time to time any of the powers exercisable by the Employer against the said Vendor / Contractor / Supplier and to forbear or enforce any of the terms and conditions relating to the said Contract and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Vendor / Contractor / Supplier or for any forbearance, act or omission on the part of the Employer or any indulgence by the Employer to the said Vendor / Contractor / Supplier or by any such matter or thing whatsoever which under the law relating to sureties would but for this provision have effect of so relieving us.

The Bank also agrees that the Employer at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor, in the first instance without proceeding against the Vendor / Contractor / Supplier and notwithstanding any security or other guarantee that the Employer may have in relation to the Vendor / Contractor / Supplier 's liabilities.

This Guarantee shall remain in force upto and including..... and shall be extended from time to time for such period as may be desired by Employer.

This Guarantee shall not be determined or affected by liquidation or winding up, dissolution or change of constitution or insolvency of the Vendor / Contractor / Supplier but shall in all respects and for all purposes be binding and operative until payment of all money payable to the Employer in terms thereof.

Unless a demand or claim under this guarantee is made on us in writing on or before the we shall be discharged from all liabilities under this guarantee thereafter.

This Bank Guarantee shall be governed, construed and interpreted in accordance with the laws of India.

Courts at Hyderabad shall alone have exclusive jurisdiction over any matter arising out of or in connection with this Bank Guarantee

We, ... BANK lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Employer in writing.

Notwithstanding anything to the contrary contained hereinabove:

- a) The liability of the Bank under this Guarantee shall not exceed.....
- b) This Guarantee shall be valid up to
- c) Unless the Bank is served a written claim or demand on or before _____ all rights under this guarantee shall be forfeited and the Bank shall be relieved and discharged from all liabilities under this guarantee irrespective of whether or not the original bank guarantee is returned to the Bank.

We, _____ Bank, have power to issue this Guarantee under law and the undersigned as a duly authorized person has full powers to sign this Guarantee on behalf of the Bank.

For and on behalf of
(Name of the Bank)

Dated.....

Place of Issue.....

¹ NAME AND ADDRESS OF EMPLOYER I.e Bharat Heavy Electricals Limited

² NAME AND ADDRESS OF THE VENDOR/ CONTRACTOR/ SUPPLIER

³ DETAILS ABOUT THE NOTICE OF AWARD/ CONTRACT REFERENCE

⁴ CONTRACT VALUE

⁵ PROJECT/ SUPPLY DETAILS

⁶ BG AMOUNT IN FIGURES AND WORDS

⁷ VALIDITY DATE

⁸ DATE OF EXPIRY OF CLAIM PERIOD

Notes:

1. It is advised that expiry of claim period may be kept 3-6 months after validity date. It may be ensured that the same is in line with the agreement/ contract entered with the Vendor.
2. The BG should be on Non-Judicial Stamp paper/e-stamp paper of appropriate value as per Stamp Act prevailing in the State(s) where the BG is submitted or is to be acted upon or the rate prevailing in the State where the BG was executed, whichever is higher. The Stamp Paper/e-stamp paper shall be purchased in the name of Contractor/sub-contractor /vendor/ Bank issuing the guarantee.

3. **In Case of Bank Guarantees submitted by Foreign Vendors-**

a. From Nationalized/Public Sector / Private Sector/ Foreign Banks (BG issued by Branches in India)

can be accepted subject to the condition that the Bank Guarantee should be enforceable in the town/city or at nearest branch where the Unit is located i.e. Demand can be presented at the Branch located in the town/city or at nearest branch where the Unit is located.

b. From Foreign Banks (wherein Foreign Vendors intend to provide BG from local branch of the Vendor country's Bank)

b.1 In such cases, in the Tender Enquiry/ Contract itself, it may be clearly specified that Bank Guarantee issued by **any of the Consortium Banks only** will be accepted by BHEL. As such, Foreign Vendor needs to make necessary arrangements for issuance of Counter- Guarantee by Foreign Bank in favour of the Indian Bank's (BHEL's Consortium Bank) branch in India. It is advisable that all charges for issuance of Bank Guarantee/ counter- Guarantee should be borne by the Foreign Vendor. The tender stipulation should clearly specify these requirements.

b.2 In case, Foreign Vendors intend to provide BG from Overseas Branch of our Consortium Bank (e.g. if a BG is to be issued by SBI Frankfurt), the same is acceptable. However, the procedure at **sl.no. b.1** will required to be followed.

b.3 The BG issued may preferably be subject to Uniform Rules for Demand Guarantees (URDG) 758 (as amended from time to time). The BG Format provided to them should clearly specify the same.

NUMBER #	TEXT #	TEXT #	NUMBER #	TEXT #	NUMBER	TEXT	TEXT #	NUMBER #	TEXT#	TEXT #	NUMBER #	NUMBER	NUMBER	NUMBER #	NUMBER #	NUMBER #	NUMBER #	TEXT #
Sl. No.	Item Description	Item Code / Make	Quantity	Units	Estimated Rate in Rs. / P		Addition / Deduction	Addition / Deduction Values	Currency Conversion against each Item	Quoted Currency in INR / Other Currency	BASIC RATE in Figures To be entered by the Bidder in Rs. / P	GST (If applicable in Percentage)	HSN / SAC Code	TOTAL AMOUNT excluding Taxes in Rs. / P	TOTAL AMOUNT including Taxes in Rs. / P	TOTAL AMOUNT in Words		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17		
1	IOCL Mathura Refinery High-Speed Electric Motor Package																	
1.01	Supply of Complete High Speed Motor Package inclusive of Commissioning spares, Special Tools & Tackles etc	1.1an1	1.00	EA	1.00		Excess(+)	1	Full Conversion	INR		0.00		0.00	0.00	INR Zero Only		
1.02	Supply of Spare High Speed Motor along with associated rotating stand	1.1an2	1.00	EA	1.00		Excess(+)	1	Full Conversion	INR		0.00		0.00	0.00	INR Zero Only		
1.03	Supply of Mandatory Spares	1.1an3	1.00	EA	1.00		Excess(+)	1	Full Conversion	INR		0.00		0.00	0.00	INR Zero Only		
1.04	Supply of Hot stand by VFDs, Input Transformers, PLC	1.1an 4	1.00	EA	1.00		Excess(+)	1	Full Conversion	INR		0.00		0.00	0.00	INR Zero Only		
1.05	Site Supervision, Testing and Commissioning, Supervision & Support for Performance Run Test Charges at site IOCL Mathura, Uttara Pradesh State	1.1an 5	60.00	Man Days	1.00		Excess(+)	1	Full Conversion	INR		0.00		0.00	0.00	INR Zero Only		
1.06	CPWAMC of item at Schedule 1.04 for 1st year	1.1an 6	1.00	SU	1.00		Excess(+)	1	Full Conversion	INR		0.00		0.00	0.00	INR Zero Only		
1.07	CPWAMC of item at Schedule 1.04 for 2nd year	1.1an 7	1.00	SU	1.00		Excess(+)	1	Full Conversion	INR		0.00		0.00	0.00	INR Zero Only		
1.08	CPWAMC of item at Schedule 1.04 for 3rd year	1.1an 8	1.00	SU	1.00		Excess(+)	1	Full Conversion	INR		0.00		0.00	0.00	INR Zero Only		
1.09	CPWAMC of item at Schedule 1.04 for 4th year	1.1an 9	1.00	SU	1.00		Excess(+)	1	Full Conversion	INR		0.00		0.00	0.00	INR Zero Only		
1.1	CPWAMC of item at Schedule 1.04 for 5th year	1.1an 10	1.00	SU	1.00		Excess(+)	1	Full Conversion	INR		0.00		0.00	0.00	INR Zero Only		
Total in Figures														0.00	0.00	INR Zero Only		
Quoted Rate in Words														INR Zero Only				



Design, Engineering, Manufacturing, Packaging, Testing, Supply, Transportation and Supervision of Erection and Commissioning of High-Speed Electric Motor for replacement of HPC Condensing Turbine Along with Accessories, Mandatory Spares, Commissioning Spares, Special Tools & Tackles and Third-Party Inspection at NPRU Unit of IOCL Mathura Refinery.



**INDIAN OIL CORPORATION LIMITED
MATHURA REFINERY**

Design, Engineering, Manufacturing, Packaging, Testing, Supply, Transportation and Supervision of Erection And Commissioning of High Speed Electric Motor for replacement of HPC Condensing Turbine Along With Accessories, Mandatory Spares, Commissioning Spares, Special Tools & Tackles And Third Party Inspection at NPRU Unit of IOCL Mathura Refinery.

OPEN DOMESTIC COMPETITIVE BIDDING

INVITED BY

DEPUTY GENERAL MANAGER(MATERIALS)
INDIAN OIL CORPORATION LIMITED
MATHURA REFINERY
MATHURA, UTTAR PRADESH (U.P.)
PIN-281005

Phone: +91- 0565-2417286
**e-mail: dhimanv@indianoil.in, ashokkumar8@indianoil.in,
kumarabhishek1@indianoil.in**



Design, Engineering, Manufacturing, Packaging, Testing, Supply, Transportation and Supervision of Erection and Commissioning of High-Speed Electric Motor for replacement of HPC Condensing Turbine Along with Accessories, Mandatory Spares, Commissioning Spares, Special Tools & Tackles and Third-Party Inspection at NPRU Unit of IOCL Mathura Refinery.

M/s. Indian Oil Corporation Limited (IOCL), hereinafter also referred to as the “IOCL” invites e-Bids in total compliance to technical specifications, scope, terms & conditions of enquiry documents / attachments on GEM website <https://gem.gov.in> in single stage two bid system. The request for quotation / notice inviting tender is as follows:

1.0	Tender No	9050M25E08
2.0	Type of Bid	Domestic Open Competitive Bidding (Two Bid System)
3.0	Name of Goods	High Speed Electric Motor at NPRU Unit of Mathura Refinery
4.0	Brief Scope of Supply	Design, Engineering, Manufacturing, Packaging, Testing, Supply, Transportation and Supervision of Erection And Commissioning of High Speed Electric Motor for replacement of HPC Condensing Turbine Along With Accessories, Mandatory Spares, Commissioning Spares, Special Tools & Tackles And Third Party Inspection at NPRU Unit of IOCL Mathura Refinery. For complete details refer bid document (technical part)
5.0	Completion Time / Stipulated Delivery period	<u>20 (Twenty) Months on FOT site basis with “freight prepaid “from the date of Fax of Acceptance.</u> Date of Receipt of material at Mathura Refinery site shall be considered as the date of delivery. <u>Offers not meeting the delivery requirement shall be rejected.</u>
6.0	Tender Download Schedule	Bidder to refer GeM portal related to this tender.
7.0	Start date for Submission of tender Last date for submission of tender	Bidder to refer GeM portal related to this tender.
8.0	Techno commercial tender opening date	Bidder to refer GeM portal related to this tender.
9.0	Bid Security/EMD	EMD amount is Rs 21,37,000.00/- (Rs Twenty One lakhs Thirty Seven Thousand only) EMD is to be submitted by the bidders in the form of Bank Guarantee or Insurance Surety bond on GeM portal in the prescribed format of GeM.



Design, Engineering, Manufacturing, Packaging, Testing, Supply, Transportation and Supervision of Erection and Commissioning of High-Speed Electric Motor for replacement of HPC Condensing Turbine Along with Accessories, Mandatory Spares, Commissioning Spares, Special Tools & Tackles and Third-Party Inspection at NPRU Unit of IOCL Mathura Refinery.

		Scanned copy of the same is to be uploaded by Seller in the online bid and hard copy of the same will have to be submitted directly to the buyer within 5 working days of bid opening. • Only those Physical BG/ISB instruments found matching with the copy submitted in the GeM portal shall be considered as valid. • IOCL shall not be responsible for postal/courier delay, non-receipt or loss in transit. • In case bidder does not submit EMD as mentioned above, then the bid shall be liable for rejection.
10.0	Pre-qualification Criteria (PQC)	The intending tenderers shall have to furnish proof of their pre-qualification and experience along with the Part-I (Techno-commercial bid).
10.1	Technical Criteria	1. The bidder can be either of the following: I. The bidder is a manufacturer of High-Speed Electric Motor, then bidder needs to meet the technical PQ criteria as mentioned in point no 2. OR II. The bidder is a manufacturer of centrifugal gas compressor (as per API 617, Part 1 & 2), then bidder needs to meet the technical PQ criteria as mentioned in point no 3 <u>Note for 1:</u> In case the bidder intends to qualify the technical PQC using credentials of their foreign principal(s)/group company/ holding company in any of the cases mentioned above (I / II), the bidder shall additionally comply to point no. 4. <u>2. In case bidder qualifies in point 1(I) i.e as a High-Speed Electric Motor Manufacturer</u> 2.1 The Bidder shall be the manufacturer of the proposed High Speed Electric Motor. 2.2 The Bidder shall be the Single Point Responsibility Vendor (SPRV) for the contract. 2.3 The Bidder shall have at least 1 (One) no. experience for “Design, engineering, manufacturing, testing and supply of High-speed Electric Motor for a job of replacement of turbine with a high-speed electric motor, having a minimum rated output of 4 MW and rated speed greater than 4500 rpm, in an existing turbine driven compressor system” in last 15 (fifteen)



Design, Engineering, Manufacturing, Packaging, Testing, Supply, Transportation and Supervision of Erection and Commissioning of High-Speed Electric Motor for replacement of HPC Condensing Turbine Along with Accessories, Mandatory Spares, Commissioning Spares, Special Tools & Tackles and Third-Party Inspection at NPRU Unit of IOCL Mathura Refinery.

		years. The installed High speed Electric Motor should have been directly coupled with the compressor shaft with a suitable mechanical coupler. The reference compressor shall have completed minimum 1 (One) Year of satisfactory operation with the high-speed electric motor at site. Note for 2.3: “Design & Engineering” shall mean design & engineering for the job of replacement of turbine with high-speed electric motor. In case, experience of “Design and engineering” mentioned above is not met by the Bidder on his own, the Bidder may qualify provided he engages a Subcontractor (hereafter referred as Engineering Sub-Contractor) who meets the Design and engineering qualification requirements mentioned in clause above (hereafter referred as Engineering experience) on his own. In such a case, at the time of bidding, in addition to submission of relevant documents in support of the qualification of “Engineering Subcontractor”, the Bidder shall also furnish a Memorandum of Understanding (MoU) with the Engineering Subcontractor (which shall be valid for 2 (Two) years from the date of scheduled bid submission) and the MOU shall be converted into definite contract agreement, valid for the entire duration of the Contract including defect liability period, between the successful bidder & the Engineering Subcontractor, within 25 days from acceptance of the tender by IOCL. In case the successful bidder fails to submit to IOCL, a bona-fide contract agreement with his designated Engineering Sub-Contractor within the stipulated time period, the Contract shall be liable for termination. Additionally, in case of award of the tender to the Bidder, the Engineering Sub-Contractor identified during bidding stage shall not be changed during the subsistence of the Contract without prior approval of IOCL. 2.4 The bidder shall have designed, engineered, manufactured, packaged, tested and supplied from the proposed manufacturing plant, in the last 15 (fifteen) years, at least 1 (One) no. High Speed Induction Motor, which is from the same model / series, as offered and is similar in terms of rated shaft power, voltage and speed as offered. As a minimum, the referenced High Speed electric Motor package shall have completed minimum 1 (One) Year of operation at site.



Design, Engineering, Manufacturing, Packaging, Testing, Supply, Transportation and Supervision of Erection and Commissioning of High-Speed Electric Motor for replacement of HPC Condensing Turbine Along with Accessories, Mandatory Spares, Commissioning Spares, Special Tools & Tackles and Third-Party Inspection at NPRU Unit of IOCL Mathura Refinery.

		Note 1 for 2.4: Similar rated shaft power, voltage and speed would mean 80% or higher w.r.t to the offered Motor. Note-2 for 2.4: The 15 (Fifteen) year and 1 (One) year of operation shall be reckoned as ending on the last day of the month immediately preceding the month in which last date of bid submission falls. (In case of extended bid submission date, original bid submission date shall be considered). 2.5 The bidder must furnish at least 1 (One) no. past supply reference of “Electric Motor driven with Variable Frequency Drive(VFD) (with 80% or higher motor rating as offered, with rated speed greater than 4500 rpm & with same type of variable speed control device, as offered)” for a compressor package(as per API 617, Part 1 & 2), which may be from a different model, which has been designed, engineered, packaged, tested and supplied, from the proposed manufacturing plant. As a minimum, the referenced Electric Motor driven centrifugal gas compressor package shall have completed minimum 1 (One) Year of operation at site. 3. <u>In case bidder qualifies in point 1(II) i.e as a centrifugal gas Compressor Manufacturer</u> 3.1 The Bidder shall be a manufacturer of centrifugal gas compressor (as per API 617, Part 1 & 2). 3.2 The Bidder shall be the Single Point Responsibility Vendor (SPRV) for the contract. 3.3 The Bidder shall have at least 1 (ONE) no. experience for Design, engineering, procurement and supply of High-speed Electric Motor for a job of replacement of turbine with a high-speed electric motor, having a minimum rated output of 4 MW and rated speed greater than 4500 rpm, in an existing turbine driven compressor system in last 15 (fifteen) years. The installed High speed Electric Motor should have been directly coupled with the compressor shaft with a suitable mechanical coupler. The reference compressor shall have completed minimum ONE (1) Year of satisfactory operation with the high-speed electric motor at site.



Design, Engineering, Manufacturing, Packaging, Testing, Supply, Transportation and Supervision of Erection and Commissioning of High-Speed Electric Motor for replacement of HPC Condensing Turbine Along with Accessories, Mandatory Spares, Commissioning Spares, Special Tools & Tackles and Third-Party Inspection at NPRU Unit of IOCL Mathura Refinery.

		Note 1 for 3.3: “Design & Engineering” shall mean design & engineering for the job of replacement of turbine with high-speed electric motor. In case, experience of “Design and engineering” mentioned above is not met by the Bidder on his own, the Bidder may qualify provided he engages a Subcontractor (hereafter referred as Engineering Sub-Contractor) who meets the Design and engineering qualification requirements mentioned in the clause above (hereafter referred as Engineering experience) on his own. In such a case, at the time of bidding, in addition to submission of relevant documents in support of the qualification of Engineering Subcontractor, the Bidder shall also furnish a Memorandum of Understanding (MoU) with the Engineering Subcontractor (which shall be valid for 2 years from the date of scheduled bid submission) and the MOU shall be converted into definite contract agreement, valid for the entire duration of the Contract including defect liability period, between the successful bidder & the Engineering Subcontractor within 25 days from acceptance of the tender by IOCL. In case the successful bidder fails to submit to IOCL, a bona-fide contract agreement with his designated Engineering Sub-Contractor within the stipulated time period, the Contract shall be liable for termination. Additionally, in case of award of the tender to the Bidder, the Engineering Sub-Contractor identified during bidding stage shall not be changed during the subsistence of the Contract without prior approval of IOCL. Note 2 for 3.3: In case the bidder do not have experience of procurement and supply of High speed Electric Motor, the Bidder shall furnish a Memorandum of Understanding (MoU) with a High Speed Electric Motor Supplier, who meets the criteria mentioned in point no 3.4 & 3.5 and have supplied High speed Electric Motor for a job of replacement of turbine with a high speed electric motor (having a minimum rated output of 4 MW and rated speed > 4500 rpm, in an existing turbine driven compressor system in last 15 (fifteen) years), clearly indicating the scope of work, responsibilities and stating that Design, engineering, manufacturing and Supply of the Electric Motor shall be carried out by the High Speed Motor supplier. The MoU shall be valid for at least 2 (Two) years, from the date of scheduled bid submission.



Design, Engineering, Manufacturing, Packaging, Testing, Supply, Transportation and Supervision of Erection and Commissioning of High-Speed Electric Motor for replacement of HPC Condensing Turbine Along with Accessories, Mandatory Spares, Commissioning Spares, Special Tools & Tackles and Third-Party Inspection at NPRU Unit of IOCL Mathura Refinery.

		The MOU shall be converted into definite contract agreement, valid for the entire duration of the Contract including defect liability period, between the successful bidder & High Speed Motor supplier, within 25 days from acceptance of the tender by IOCL. In case the successful bidder fails to submit to IOCL, a bona-fide contract agreement with his High Speed Motor supplier within the stipulated time period, the Contract shall be liable for termination. Additionally, in case of award of the tender to the Bidder, the High-Speed Motor supplier identified during bidding stage shall not be changed during the subsistence of the Contract without prior approval of IOCL. 3.4 The original Equipment Manufacturer of the high speed motor being supplied shall have designed, engineered, manufactured, packaged, tested and supplied from the proposed manufacturing plant, in the last 15 (fifteen) years, at least 1 (One) no. High Speed Induction Motor, which is from the same model / series , as offered and is similar in terms of rated shaft power, voltage and speed as offered. As a minimum, the referenced High Speed Motor package shall have completed minimum 1 (One) Year of operation at site. Note-1 for 3.4: Similar rated shaft power, voltage and speed would mean 80% or higher w.r.t to the offered Motor. Note-2 for 3.4: The 15 (Fifteen) year and 1 (One) year of operation shall be reckoned as ending on the last day of the month immediately preceding the month in which last date of bid submission falls. (In case of extended bid submission date, original bid submission date shall be considered). 3.5 The bidder / “Original Equipment Manufacturer of the high speed electric motor being supplied” must furnish at least 1 (One) no. past supply reference of “Electric Motor driven with Variable Frequency Drive(VFD)” (with 80% or higher motor rating as offered, with rated speed greater than 4500 rpm & with same type of variable speed control device, as offered)” for a compressor package(as per API 617, Part 1 & 2), which may be from a different model, which has been designed, engineered, packaged, tested and supplied, from the proposed manufacturing plant. As a minimum, the referenced Electric Motor driven centrifugal gas compressor package shall have completed minimum 1 (One) Year of operation at site.



Design, Engineering, Manufacturing, Packaging, Testing, Supply, Transportation and Supervision of Erection and Commissioning of High-Speed Electric Motor for replacement of HPC Condensing Turbine Along with Accessories, Mandatory Spares, Commissioning Spares, Special Tools & Tackles and Third-Party Inspection at NPRU Unit of IOCL Mathura Refinery.

		<u>Common Point applicable for both High Speed Motor Manufacturer and Centrifugal Gas Compressor Manufacturer.</u> 4. If the bidder is an Indian subsidiary of the Foreign Principal and is using the credentials of its Foreign Principals: Credentials of the <u>Foreign Principals (holding more than 50% shares in Indian subsidiary) or Another subsidiary (called “Group Company”) of the Foreign Principal (where the Foreign Principal holding more than 50% shares) or Foreign Principal’s Holding Company</u> can be used. The foreign principal (Incase Group company or Foreign Principal’s Holding Company is involved, the foreign principal along with the Group Company or Foreign Principal’s Holding Company) shall be required to furnish a legally enforceable undertaking that they shall be jointly and severally liable, along with the bidder, for the successful execution of the order, if awarded. Bidder (Indian subsidiary) shall have manufacturing facility of centrifugal gas compressor / Induction Motor / VFD in India. 5. In case all the criteria mentioned in point 2.3, 2.4, 2.5 or 3.3, 3.4, 3.5 are not available from single past reference, more than one reference can be cited/considered to meet the above qualification requirements. 6. The time periods mentioned in above clause(s) shall be reckoned as ending on the last day of the month immediately preceding the month in which last date of bid submission falls. (In case of extended bid submission date, original bid submission date shall be considered.) 7. A bidder (i.e., the bidding entity) shall, on no account submit more than one bid either directly (as a single bidder) or indirectly (as a sub-contractor) failing which following actions shall be initiated: (a) All bids submitted by such bidder (say “A”) either as a single bidder or sub-contractor, shall stand rejected (b) If another bidder (say “B”) has proposed bidder “A” as a sub-contractor then bidder “B”’s bid shall also be rejected. However, in case the bidder “B” has also proposed an alternative sub- contractor



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		who is other than the bidder “A”, then bidder “B”’s bid shall be evaluated with the proposed alternative sub-contractor only. Hence, every bidder shall ensure in his own interest that his proposed sub-contractor is not submitting alternative/ multiple bids. Wherever a bidder proposes a sub-contractor, consent/ MOU with the sub-contractor shall be enclosed. Note 7: However, in case OWNER has proposed a list of sub-contractors/ sub-vendors in the enquiry document itself which shall be common for all the bidders, the provision at (b) above shall not be applicable as long as only the sub-contractors/ sub-vendors are common in case of various bidders. However, if any of such sub-contractors/ sub-vendors happens to be a bidder also, clause (b) above shall be applicable.
10.2	COMMERCIAL EXPERIENCE CRITERIA	For experience, the order (s) executed by the bidder, during the <u>last Fifteen (15) years</u> ending on the last day of the month immediately preceding the month in which the last date of bid submission falls, (in case of extended bid submission date, original bid submission date shall be considered) should be considered as under: A) Three orders each executed for “similar item” where executed value is not less than the amount equal to INR 24,69,38,000 /- (Rs Twenty-Four Crores Sixty-Nine Lakhs Thirty-Eight Thousand only) OR B) Two orders each executed for “similar item” where executed value is not less than the amount equal to INR 32,92,51,000 /- (Rs Thirty-Two Crore Ninety-Two Lakhs Fifty-One Thousand Only) OR C) One order executed for “similar item” where executed value is not less than the amount equal to INR 41,15,64,000 /- (Rs Forty-One crore Fifteen Lakhs Sixty-Four Thousand Only) Notes: “Similar” item is defined at Sr. no. 10.4. - The executed value shall be considered on landed cost basis i.e. inclusive of all supply including mandatory spares, 3D modelling, Hazop charges, including taxes, duties, TPI charges, P&F & freight. - In case the value of executed order(s) submitted by the bidder does not have clarity with regard to inclusion/exclusion of Service tax/GST, the amount appearing in the certificate shall be considered inclusive of tax and shall be evaluated accordingly.



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10.3	FINANCIAL CRITERIA	Annual Turnover (ATO): The Annual Turnover (ATO) of the bidder during any of the preceding three financial years (2021-22, 2022-23, 2023-24) should be at least Rs. 29,63,25,000/- (Rs Twenty-Nine Crore Sixty Three Lakhs Twenty Five thousand only)
10.4	Similar item shall be defined as	Supply of Motor Package involving HT Motor with or without accessories and with or without VFD. Or Supply of Compressor Package involving HT motor with or without VFD. Note 1: "HT motor: shall mean electric motor with rated voltage of 3300V or above. Note 2: In case, the reference job involves site installation / construction / maintenance / operation works also, the portion towards site installation / construction / maintenance / operation works shall not be considered in evaluation.
10.5	Additional Technical Requirement (if any)	Additional Technical Requirement – Refer Technical Part.
10.6	Documentation	The bidder shall furnish documentary evidence as below to establish that the bidder meets the Bidder Qualification Criteria / Pre-Qualification Criteria as given above: 10.6.1 For Technical pre-qualification Criteria (refer SI.No.10.1 above): The bidder shall furnish documentary evidence as below to establish that the bidder meets the Pre-Qualification Criteria as given above: a. Bidder shall complete and submit the Experience Record Performa enclosed with the bid document (along with supporting documents mentioned therein) to establish that the bidder meets the Bidder Qualification Criteria as per clauses of this document. b. For fulfilling the technical experience criteria, following documents shall be considered as valid proof for meeting the criteria: • Purchase Order / Work Order / Letter of Award issued by Owner /PMC. • Copies of Purchase Order and Inspection release note (IRN), Supply Invoice, Completion certificate by client towards



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		meeting PTR requirements based on which qualification is sought. • General Reference List for the proposed equipment. • Latest Product Catalogues of the manufacturer for the proposed equipment. • Completion certificate issued by Client/ Consultant/ Main Contractor. • Certificate for satisfactory operation for 1 year from client / Certificate of release of full security deposit (Bank guarantee) by client against the defect liability period / Certificate of completion of performance guarantee & test run (PGTR) with completion date at least 1 year prior to the last day of the month immediately previous to the month in which the original bid submission date falls / For reference jobs of IOCL, in support of successful operation of one year, the qualification of reference job order submitted by the bidder shall be checked internally by IOCL based on the information submitted with the bid. • Approved technical documents like Detailed engineering Drawings/datasheets/ATEX certificates/PESO certificates etc. • MOU(s) (if applicable) • In case Indian subsidiary (bidder) using the credentials of its Foreign Principals or Group company, Indian Bidder shall also provide documents regarding manufacturing facility of compressors / Induction Motors / VFD in India like Past Orders, PTR and details / capabilities of manufacturing facility. • In case Indian subsidiary (bidder) using the credentials of its Foreign Principals or Group company, holding company, Indian Bidder shall also provide Documents for establishing the bidder as a subsidiary of the Principal. • In case qualification is sought as per Clause 4, bidder shall also submit the following in addition to above: - Copy of scope/activity matrix between the bidder and Principal or bidder and Group Company. - Documents for establishing the bidder as a subsidiary of the principal. - Corporate Guarantee of the Principal or the Group Company. Additionally, A declaration shall be furnished on the company letter head that bidder, parent or group company (As applicable) shall be jointly & severally responsible for order execution, in case of award.



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		- Documentary evidence like copies of Purchase Order and Inspection release note (IRN), towards meeting PTR • In case the bidder seeks to qualify the PQC for this tender on virtue of credentials of a company acquired by the bidder previously, the Bidder shall provide documentary evidence of such acquisition, which is bona-fide and unequivocally proves that the technical and intellectual know-how for the job experience has been acquired by the bidder from the company with whom the experience originally belongs, and the bidder is free to use the credential for bidding for tenders. • In case where the Bidder cites the reasons of Non-Disclosure Agreement (NDA) for its inability to submit necessary documents / figures / data in support of meeting the experience criteria, a certificate, in original, certifying all the required information, issued by CEO / CFO of the company along with a declaration that the bidding company is not in a position to submit the required documents owing to the NDA with an endorsement by Chartered Accountant/ Statutory Auditor/ Certified Public Accountant (not being an employee or a Director or not having any interest in the bidder(s) company / firm) may be accepted. Wherever, Chartered Accountant / Statutory Auditor / Certified Public Accountant (not being an employee or a Director or not having any interest in the bidder(s) company / firm) is not in a position to endorse such CEO / CFO's certificate due to local regulations, CEO / CFO's certificate in original without endorsement may be accepted provided a reference to the local regulation restricting this endorsement is given in the CEO / CFO certificate. 10.6.2 For Commercial Experience Criteria (refer Sl.No.10.2 above): For fulfilling the experience criteria, any one of the following documents shall be considered as valid proof for meeting the criteria: - Purchase Order copy along with invoice(s) {With self-certification that supplies against invoice has been successfully executed}. Uploading the invoice(s) on the e-portal is considered as self certification by the bidder that supplies against the invoices have been successfully executed to the required value. - Purchase Order copy along with Bank Certificate indicating payment against the PO. - Purchase Order along with Execution certificate by client indicating executed order value. In case the execution certificate does not



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		mention the executed value, the bidder shall have to submit other documents as mentioned here indicating executed value. iv.) In case bidder cites any reference of job executed for IOCL and bidder has not / is not able to furnish documentary evidence, the internal records of IOCL shall be considered against proof of fulfilment of commercial or technical experience criteria. LR date / RC (101/103 movement type in SAP) date (if LR date is not available in SAP) shall be deemed as date of execution v.) In case multiple orders have been placed against a single rate contract and the cumulative order value satisfies the PQC, it may also be considered, subject to submission of other documents as mentioned above. Multiple GeM contracts against one GeM bid on a particular vendor is to be considered as a single PO for PQC evaluation. vi.) In case where the bidder cites the reasons of Non-Disclosure Agreement (NDA) for its inability to submit necessary documents in support of meeting the experience criteria, a certificate, certifying all the required information, issued by CEO/CFO of the company along with a declaration that the bidding company is not in a position to submit the required documents owing to the NDA with an endorsement by Chartered Accountant/ Statutory Auditor/Certified Public Accountant (not being an employee or a Director or not having any interest in the bidder(s) company / firm) may be accepted. Wherever Chartered Accountant / Statutory Auditor / Certified Public Accountant (not being an employee or a Director or not having any interest in the bidder(s) company / firm) is not in a position to endorse such CEO/CFO's certificate due to local regulations, CEO /CFO's certificate in original without endorsement may be accepted provided a reference to the local regulation restricting this endorsement is given in the CEO /CFO certificate. vii) In case currency indicated in the BQC related document submitted by Bidder towards qualification of value of experience criteria is other than in Indian Currency/specified foreign currency, the value of work shall be derived to Indian Currency / specified Foreign currency considering “Bill Selling (foreign exchange) Rate of State Bank of India” as on the date of award of work. viii) Acceptance of PQ Documents of related / unrelated parties shall be as follows <table><tr><th>Sl. no.</th><th>Scenario</th><th>Financial credentials (Clause 10.3)</th><th>Techno-commercial Experience criteria by (Clause 10.2)</th></tr><tr><td>1.</td><td>A New Entity formed as a result of merger</td><td>New Entity can use previous financial credentials of any</td><td>New Entity can use previous experience of any</td></tr></table>	Sl. no.	Scenario	Financial credentials (Clause 10.3)	Techno-commercial Experience criteria by (Clause 10.2)	1.	A New Entity formed as a result of merger	New Entity can use previous financial credentials of any	New Entity can use previous experience of any
Sl. no.	Scenario	Financial credentials (Clause 10.3)	Techno-commercial Experience criteria by (Clause 10.2)							
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				of two entities and the earlier entity cease to exist	of the merged companies or of its own.	of the merged companies or of its own.
			2(i)	An entity (A) takes over another entity (B) and B ceases to exist	Bidder can use previous financial credentials of company taken over by bidder or of its own.	Bidder can use previous experience of company taken over by bidder.
			2(ii)	An entity (A) takes over another entity (B) partially and the said part of entity (B) vertical specific business vertical of B ceases to exist.	Bidder cannot use previous financial credentials of specific business vertical of company taken over by bidder .	Bidder can use previous experience of the business vertical which has been taken over by bidder (not entire experience of entity B).
			3	Parent company (bidder) using the credentials of its subsidiary	Financial credentials of the bidding entity	Parent company can use the credentials of its subsidiaries. In such case, additional surety to be taken from parent and subsidiary for joint and several responsibility
			4	Indian subsidiary (bidder) using the credentials of its Foreign Principals	Financial credentials of the bidding entity. In case the bidding entity's Audited Balance Sheet (BS) is not yet made, BS of the Parent Company shall be acceptable.	Credentials of the Foreign Principals (holding more than 50% shares in Indian subsidiary) or another subsidiary (called "Group Company") of the Foreign Principal (where the Foreign Principal holding more than 50% shares of Foreign Principal's Holding Company) can be



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						used. The foreign principal (In case Group company) or Foreign Principal's Holding Company is involved, the foreign principal along with the Group company or Foreign Principal's Holding Company shall be required to furnish a legally enforceable undertaking that they shall be jointly and severally liable, along with the bidder, for the successful execution of the order, if awarded.
			5	Demerger of an entity B from another entity A by virtue of Corporate re-structuring exercise	Demerged entity can use the credentials of original/ parent entity (based on the merit and circumstances of the cases like type of procurement, nature of demerger, number of eligible bidders available etc) to satisfy the eligibility criteria in the tender for 5 years from the date of incorporation of the new entity. Government regulations, if any, may be followed.	Demerged entity can use the credentials of original/ parent entity to the extent of demerger scheme as approved by the competent authority and subject to verification (based on the merit and circumstances of the cases like type of procurement, nature of demerger, number of eligible bidders available etc) to satisfy the eligibility criteria in the tender for 5 years from the date of incorporation of



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						the new entity. (However, same experience cannot be used by the original entity).
			6	A new entity formed has taken over all the assets and liabilities of the proprietorship concern or partnership firm wherein one or more of the Directors of the new entity were the proprietor or partners and the erstwhile proprietorship concern/ partnership firm has ceased doing business after taking over of the business by the new entity.	The new entity can use the financial credentials of the erstwhile proprietorship concern/partnership firm.	The new entity can use the experience of the erstwhile
		In case a bidder is a group company of another company, either the Turnover / Experience of the bidder or the Turnover / Experience of the group company shall be considered for the purpose of Pre-Qualification criteria, subject to the following: (a) Either the Holding company or any one of its Subsidiaries or the JV company only can participate in the tender. (b) The arrangement permitting the Bidder to quote and rely upon the Turnover/ Experience of the Group company shall be through an undertaking from the Group company whose Turnover/ Experience is considered, submitted with the tender. Such undertaking must be specific for this Tender. The arrangement must provide for continuous support from the Group Company whose Turnover/ Experience is considered, covering all aspects till such time this contract (including CAMC if applicable) is completed. (c) The Bidder as well as Group Company, whose credentials are being claimed, shall submit an irrevocable undertaking stating therein that both of them i.e. the Bidder as well as its Group Company, shall .be jointly and severally liable for due performance of the Contract and the acts done / not done by them (either individually or collectively) in pursuance thereof. The undertaking must be submitted by the bidder along with the bid.				



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- d) Credentials of group company(s) currently on holiday list by Indian Oil Corporation or its administrative Ministry shall not be accepted.
- (e) Documents as required to establish Group Company (parent / subsidiary / JV) relationship shall be submitted with bid.
- (f) Usage of credentials of Group Company shall be restricted to technical, Commercial Experience Criteria, Financial Criteria, capability and commitment criteria.

10.6.3 For Financial Criteria (Refer 10.3 above):

For fulfilling the financial criteria, any one of the following are to be submitted along-with the un-priced bid as valid proof for meeting the criteria:

- A. Audited Balance Sheet with profit & loss statement / Annual Report with Profit & Loss statement (with UDIN)
- B. Balance sheet with Profit & Loss statement available in public domain
- C. In case of GeM, pre verified turnover of bidder shown on GeM portal can be considered.
- D. Any other documents in case are submitted by vendor in support of ATO (Financial criteria) will be checked by concerned officer, Officer's decision to accept or reject shall stand final.

Note:

- A. In case the tender publication date is within September or last date for filing audited balance sheet as notified by CBDT, the bidder can submit the balance sheets of any of the previous three Financial Years (excluding the immediately preceding year).
- B. The requirement for submission of audited financial statement if sometimes not accepted by some bidders due to their internal / local regulation (particularly in case such bidders are subsidiaries of other foreign company). In such case, CEO / CFO's certificate from the company or from the parent company (in case bidder is a subsidiary) stating the turnover of the bidding entity along with a declaration that the bidding company is not in a position to submit its financial statement as per the local / internal regulation (clearly specifying the applicable regulation) with an endorsement by Chartered Accountant/Statutory Auditor / Certified Public Accountant (not being an employee or a Director or not having any interest in the bidder(s) company /firm) may be accepted. Wherever Chartered Accountant / Statutory Auditor / Certified Public Accountant (not being an employee or a director or not having any interest in the bidder(s) company / firm) is not in a position to endorse such CEO / CFO's certificate due to local regulations, CEO / CFO's certificate without endorsement may be accepted provided a reference of the local regulation restricting this endorsement is given in the CEO / CFO certificate.
- C. Similarly in case where the bidder cites the reasons of Non-Disclosure Agreement (NDA) for its inability to submit necessary documents in



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		support of meeting the experience criteria, a certificate, in original, certifying all the required information, issued by CEO / CFO of the company along with a declaration that the bidding company is not in a position to submit the required documents owing to the NDA with an endorsement by Chartered Accountant / Statutory Auditor / Certified Public Accountant (not being an employee or a Director or not having any interest in the bidder(s) company / firm) may be accepted. Wherever Chartered Accountant / Statutory Auditor / Certified Public Accountant (not being an employee or a Director or not having any interest in the bidder(s) company / firm) is not in a position to endorse such CEO / CFO's certificate due to local regulations, CEO / CFO's certificate without endorsement may be accepted provided a reference of the local regulation restricting this endorsement is given in the CEO / CFO certificate. E. In case the annual audited and published financial statements are available in the public domain like third party repositories (for example, Registrar of companies or equivalent) excluding websites, etc. under bidder's control, the same shall be accepted. F. In case, Audited Financial Statement submitted by the Bidder towards qualification of financial criteria is other than in Indian Currency / specified foreign currency, the value of Bidder's Financials shall be derived to Indian Currency/specified foreign currency by considering the Currency conversion factor specified in the Audited Financial statement for the respective Financial Year if shown in the financial statement. Otherwise, the Bill Selling (foreign exchange) Rate of State Bank of India on the end date of Financial Year, specified in the Financial Statement, shall be considered. G.Submission of Consolidated Audited Financial Statement: H. Bidder is a Parent/Holding Company: Where only consolidated Audited Financial Statements are prepared and audited, which includes the financial details of their wholly owned subsidiaries etc., consolidated audited financial statement shall be considered for establishing the financial criteria subject to Statutory Auditor/ CEO/ CFO/ Company Secretary or any member of the Board of Directors of the bidder, certifying that standalone Financial Statements of bidder (without the financial data of subsidiaries, etc.) is not separately prepared and audited I. Bidder is a Subsidiary Company: In case a Bidder is a Subsidiary Company and separate Financial Statements of the Bidder is not prepared & audited, but only a consolidated audited Financial Statements of their Parent Company/Holding Company are available, consolidated audited Financial Statement shall be considered for establishing the financial criteria subject to Statutory Auditor/ CEO/ CFO/ Company Secretary or any member of the Board of Directors of the Parent/Holding company (whose Audited Financial Statements are submitted for qualification)



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		certifying in their letterhead that Financial Statements of Bidder are not separately prepared and audited. J. Statutory Auditor / practicing Chartered Accountants (as applicable), shall mandatorily mention Unique Document Identification Number (UDIN) on all certificates/reports issued/attested by them.
11.0	Pre-Bid meeting	Applicable. Location: Mathura Refinery, Indian Oil Corporation, Limited. Date: Refer GeM bid documents
12.0	Mode of Submission	Offer must be uploaded in GeM before the last date & time of submission of tender. Offer submitted using any other mode will not be accepted.
13.0	Other requirements (Additional documents to be submitted)	Power of Attorney in the name of authorized signatory who is submitting the bid Any other document required as per MR.
14.0	Integrity Pact Agreement	Applicable. To be submitted as per Attached format.
15.0	Validity of Bids	The offer of the Bidder shall be valid for a period of 06 months from the scheduled unpriced bid opening date (including extensions, if any).
16.0	Purchase preference for (PPLC Policy)	Applicable
17.0	Purchase preference to (MSE) bidders	Applicable
18.0	Reverse Auction	Not Applicable
19.0	Technical & Commercial Loading	Applicable. Note: Bidder to upload Guaranteed Power Consumption Value in required format in price part only. (Refer Special Purchase Conditions Clause B. Loading and Penalty Criteria)
20.0	Non-Disclosure Agreement for issuance of technical bid documents	Applicable.
21.0	Type of items: ODC / NON ODC	NON ODC
22.0	Nature of Work	Critical Note: Since the nature of job is “Critical”, therefore, NO Relaxation on PQC is allowed to Startup-India registered bidders and MSE bidders.



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23.0	PBG Requirement	PBG/ISB is taken separately, one for supply & installation and other for PWCAMC / PWAMC. PBG/ISB will be released after completion of their respective defect liability period+2 months. In absence of a valid PBG/ISB, payment for PWCAMC / PWAMC shall not be released. PBG/ISB for supply & installation shall be taken @5% of Contract value. PBG/ISB for PWCAMC / PWAMC shall be taken @5% of AMC value. PBG/ISB format shall be as per GEM. Defect liability period as per GPC.
24.0	Item Splitable	Individual items shall not be splitable.
25.0	Evaluation Method	Overall lowest (refer to ITB for more details). In case of Tie between the bidders GEM conditions shall be followed. There is total 11 schedules in GeM portal created for submitting the price by the bidders. The price for item schdeule1 to 4 should be on ex-works basis (including packing forwarding, third party inspection charges etc.) inclusive of applicable GST. In schedule 5, bidder must quote lump sum freight charges for all supply items (i.e. schdeule1 to 4) up to IOCL site on door delivery basis inclusive of appliable GST. Freight charges shall be reimbursed extra at actuals based on documentary evidence subject to maximum quoted charges. In schedule 6, bidder must quote Site Supervision, Testing and Commissioning Charges inclusive of applicable GST. In schedule 7-11, bidder to quote PWCAMC charges for 1st to 5th year inclusive of applicable GST. Bidder to note that PWCAMC charges are applicable for schedule 4 only. Evaluation shall be done on overall lowest landed cost basis. CPWAMC price of each year should not be less than 3% of VFD. CPWAMC charges offered for each subsequent year should be same or higher than preceding year. The CPWAMC charges shall be offered within range of 3 to 10% of cost of equipment in line with GeM guidelines. In case bidder quotes for any of the schedule 7 to 11, is less than the prescribed limit, then the offer shall be evaluated and ordering shall be done as below- The corresponding differential amount shall be reduced from supply quoted rate (supply item of schedule 4) and shall be added in the corresponding CPWAMC schedule for evaluation and ordering. Note- Since this tender invokes technical and commercial loading, the evaluated price as per GeM should not be considered as final. The final evaluated cost shall be updated after applying loading factors if any.
26.0	Type of tender Item	Package Item (Non-Bulk)



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27.0	Repeat Order	Not applicable

28. GENERAL NOTES

I. Offer from following types of bidders will not be accepted

a) Who are in the Holiday/ Suspension /Banning List / Negative list of IOCL or MoPNG on due date of submission of bid / during the process of evaluation of the bids, the offers of such bidders shall not be considered for bid opening/evaluation/Award.

b) Who are under liquidation, court receivership or similar proceedings. Bidder shall submit a self-certificate stating that they are not under liquidation, court receivership or similar proceedings. Failure to do so or if the bidder is under liquidation, court receivership or similar proceedings, their bids shall not be considered.

c) Consultant either directly or indirectly. Indirect participation shall include participation through an affiliate or as subcontractor, consultant or supplier with the exception of participation as TPIA for the same job. The expression 'affiliate' for the purpose of this clause will include any person, or company or association (howsoever designated) who/which is a member of the consultant (if the consultant is a joint venture or consortium or who or which directly or indirectly holds 10% (ten percent) or more of the capital or voting capital of consultant (if the consultant or any of its members is a company or a body corporate) or who or which is consultant or sub-contractor of the consultant with regard to the project.

d) Who are undergoing insolvency resolution process or liquidation or bankruptcy proceeding under Insolvency and Bankruptcy Code, 2016 (Code).

e) Whose insolvency resolution process or liquidation or bankruptcy proceeding is initiated under the above Code at any stage of evaluation of the bid.

f) foreign bidders are participating in Domestic /National Enquiry

II. The failure to meet the above Pre-Qualification Criteria(s)(PQC) at clause 10.0 above will render the bid to be summarily rejected.

III. In case, the SBI Bill Selling rate is not available as on the date of conversion as specified above in respective clauses, the currency conversion rate shall be taken from the Internet, such as:

a) <https://www.xe.com/currencyconverter>,

b) <https://www.oanda.com/currency/converter>,

c) <https://economictimes.indiatimes.com/markets/forex/currency-converter>).

IV. Offer from Joint Bidders/JV/ Consortium (Un-incorporated) shall not be acceptable unless explicitly stated otherwise elsewhere in the tender document.



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- V. The offers with incomplete /irrelevant documents or anomalies are liable to be rejected without any communication. Hence, bidders are advised to take utmost care while uploading their prequalification documents.
- VI. Relevant supporting documents towards other requirements specified are also to be uploaded along with Techno-commercial bid failing which bid is liable for rejection.
- VII. IOCL reserves the right to reject any or all of the tenders or any parts of the tender so received and may cancel the tender in part or full, extend the due date of Tender submission etc. without assigning any reason.
- VIII. In case where the Bidder cites the reasons of Non-Disclosure Agreement (NDA) for its inability to submit necessary documents in support of meeting the experience criteria, a certificate, in original, certifying all the required information, issued by CEO / CFO of the company along with a declaration that the bidding company is not in a position to submit the required documents owing to the NDA with an endorsement by Chartered Accountant/ Statutory Auditor/Certified Public Accountant (not being an employee or a Director or not having any interest in the bidder(s) company / firm) may be accepted. Wherever, Chartered Accountant / Statutory Auditor / Certified Public Accountant (not being an employee or a Director or not having any interest in the bidder(s) company / firm) is not in a position to endorse such CEO / CFO's certificate due to local regulations, CEO / CFO's certificate in original without endorsement may be accepted provided a reference to the local regulation restricting this endorsement is given in the CEO / CFO certificate
- IX. Bidder cannot make any claim against IOCL towards its expense incurred in connection with the preparation and delivery of their bids, site visit, participating in the discussion and other expenses incurred during bidding process
- X. Submission of authentic documents is the prime responsibility of the bidder. Wherever IOCL or its representative have concerns or apprehension regarding the authenticity/ correctness of any document, IOCL or its representative reserves the right of getting the document cross verified from issuing authority/any relevant source. If documents (part or full) are found forged, such offers will be summarily rejected, orders if any placed against subject tender will be terminated and may be debarred from future tenders. For the purpose of verification, bidders shall submit complete client details with names, address, phone number, e-mail ID etc.”
- Further, MECON/ IOCL shall get the documents of the lowest bidder verified from respective Client / PMC / Owner.
- XI. Evaluation shall be done on the basis of submitted documents and one opportunity, with a fixed deadline (or extended, as the case may be), shall be given to bidders who have not submitted clear and complete documents in support of meeting the PQC. Such bidders to whom PQC query is sent, shall provide additional supporting documents / clarifications with respect to already submitted documents or reference made in the offer about the PQC related document. If the bidder fails to submit required documents within the given time, the bidder's offer will be rejected. However, no query shall be raised to non- complying bidders who have neither submitted documents towards PQC requirement nor given any reference in their offer, nor the submitted documents are relevant to the PQC requirement of the



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Tender (e.g. PO value less than PQC requirement or PO does not meet the similar item definition etc.).

- XII. Notwithstanding any other condition / provision in the tender documents, bidders are required to submit complete documents pertaining to Pre-Qualification Criteria (PQC) along-with their offer. IOCL reserves the right to complete the evaluation, with or without seeking any additional supporting documents / clarifications.
- XIII. Submission of authentic documents is the prime responsibility of the bidder. However, IOCL reserves the right to verify the PQC documents submitted by the bidder(s). For the purpose of verification, bidders shall submit complete client details with names, address, phone numbers and e-mail id with the understanding that IOCL may contact the bidder's client to verify the PQC documents. Wherever required, bidders may have to submit notarized / verified copy of PQC documents. Non submission of these documents, if asked for, will lead to rejection of offer. Should IOCL decide to place order pending verification of PQC documents, payment shall be made only after completion of order. If at any stage, the PQC documents are found to be forged / false / fake, suitable penal action shall be taken, which may include offer rejection, EMD forfeiture (not by way of penalty or liquidated damages but by way of reimbursement of the pre-estimated costs likely to be incurred by the OWNER towards bidding process and in the scrutiny and evaluation of bids), termination of order (wherever applicable) and holiday listing / suspension (in GeM) of the bidder / vendor.
- XIV. Refer ITB of the tender document /Special Instruction to Bidder (SITB) for more details
- XV. Any Addendum/Corrigendum/Sale date extension in respect of above Tender shall be issued on GEM only and no separate notification shall be issued in the press. Bidders are therefore requested to regularly visit GEM website to keep themselves updated. Failure of Bidder to submit tender without taking cognizance of Corrigendum / Amendment (if any) issued by IOCL shall make bid liable for rejection.
- XVI. IOCL does not take any responsibility for the correctness of tender documents obtained from any other source. Bidders are advised to visit above mentioned website before submitting their offer for official version of the tender document including any corrigendum / amendment if any, which shall be binding to the bidder.
- XVII. Pre-qualification Criteria (PQC) and Bidder Qualification Criteria (BQC) means the same in bidding document.
- XVIII. Offers not meeting statutory requirement are liable for rejection.
- XIX. Provisions/Conditions stipulated in NIT supersedes all of the sections of Tender document.
- XX. The scope of supply covered in this enquiry are indivisible and shall be awarded to single successful bidder unless stated otherwise elsewhere in the tender document.
- XXI. Bidders are to quote their most competitive rates. Negotiations will not be conducted with the bidders as a matter of routine. However, Owner reserves the right to conduct negotiations.



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XXII. Guarantee and Warranty: As per IOCL General Purchase conditions (GPC).

For EMD: Bid Security Declaration (BSD) shall, normally, be taken from bidders in lieu of EMD (Annexure A). BSD shall also be taken from bidders who are otherwise exempt from submission of EMD (e.g. MSE / Start-up / any exempted bidder category bidders).

BSD undertaking shall state that the defaulting bidder may be put on holiday list of Indian Oil / GeM (as the case may be) in case of stated breach. The format for Bid Security Declaration is attached

Offers received without BSD as per tender requirement shall be liable for rejection

Modalities to followed with respect to Bank Guarantee confirmation issued against PBG and EMD for Subject tender:-

"Bidders may get the Bank Guarantee issued from any Bank recognized as Scheduled Bank by Reserve Bank of India. Earlier, upon receipt of the Original Bank Guarantee, IOCL was seeking confirmation of the same directly from the issuer Bank / branch to check the authenticity of instrument. However, for faster confirmation of the Bank Guarantee, henceforth Bidders to ensure that BG issuing bank will send SFMS in IFN 760COV (for any new Bank Guarantee) and IFN 767COV (for any amendment in bank guarantee) through the SFMS Platform as per the mandatory fields given below."

Filed No	Description	Value
7034	Name of the Beneficiary	Indian Oil Corporation limited
7035	Beneficiary IFSC	ICIC0000007
7036	Beneficiary Branch Name and Address	ICICI Bank , 9A , Phelps Building, Connaught Place, New Delhi-110001
7037	Sender to Received Information	IOCL9050

Bidder has to submit Bid Security Declaration on their Company Letterhead as per the attached format (annexure-A) In lieu of Earnest Money Deposit.

Forfeiture of EMD :-

Earnest Money shall be forfeited in the following circumstances:



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- i. In case the bidder tampers the tender document, alters / modifies / withdraws the bid submitted after opening the bids (Technical bids in case of two bid system) within the validity period.
- ii. In case the bidder submits false/fraudulent/fake/ forged documents.
- iii. In case the tender is accepted, and the vendor fails to deposit the PBG or to execute the contract.

In case of (i) and (ii) above the tender submitted by the bidder shall be rejected. In all the above cases suitable penal action may be taken which may include EMD forfeiture and / or holiday listing action as per the discretion of IOCL.

XXIII. For Third party inspection: Applicable for this tender

1. Third-party inspection is required by an IOCL approved TPI agency. Minimum required scope of TPI inspection is given in the attached ITP
2. Successful bidder shall prepare exhaustive quality assurance plan (QAP) covering all details given in the attached ITP and get it endorsed by TPI agency. Such QAP duly endorsed by TPI, shall be submitted for IOCL approval/ comments before start of job.
3. Material test certificates from NABL approved lab duly endorsed by TPI, test records endorsed by TPI & original Inspection release note from TPI to be submitted along with supply of material.
4. Third party inspection shall be carried out from IOCL approved TPIs only and as per attached QAP. The list of the empaneled third party inspection (TPI) Agencies is as under: List of approved TPI agencies is:
 1. M/s APAVE TIV INDIA PRIVATE LIMITED
 2. M/s Bureau Veritas (India) Pvt. Ltd
 3. M/s Certification Engineers International Limited
 4. M/s Edlipse Engineering Global Private Limited
 5. M/s Gulf Lloyds Industrial Services (India) Pvt. Ltd.
 6. M/s International Certification Services Pvt. Ltd.
 7. M/s Intertek India Pvt. Ltd
 8. M/s IR Class Systems and Solutions Private Limited
 9. M/s Meenaar Global Consultants LLP
 10. M/s RITES Limited
 11. M/s SGS India Private Limited
 12. M/s TÜV India Private Limited
 13. M/s TUV Rheinland (India) Pvt. Ltd.
 14. M/s TUV SUD South Asia Pvt Limited
 15. M/s VCS Quality Services Private Limited

28.0 SPECIAL INSTRUCTIONS TO BIDDERS



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1. Bidders to note that the commercial terms shall be as per GeM GTC and additional terms & conditions mentioned in the bid and will supersede any contrary term indicated elsewhere in their quotation / tender documents
2. In the event of an irreconcilable conflict between the provision of GEM GTC and IOCL General Terms and Conditions of Purchase and/or the Special Conditions of Purchase and/or Addendum (a) and/or the Agreed Variations to the Tender Documents and/or the Purchase Order and/or between any of the other said documents so that the conflicting provision(s) cannot co-exist, to the extent of such irreconcilable conflict, the following order of precedence shall apply so that the conflicting provision(s) in the document lower in the order of precedence set out below shall give way to the conflicting provision(s) in the document higher in the order of precedence, namely:
 - i. Purchase Order;
 - ii. Agreed Variations to the Tender Documents;
 - iii. Addendum/Addenda (a) to the Tender Document;
 - iv. a) Special Conditions of Purchase
b) IOCL General Purchase Conditions
 - v. GEM GTC
 - vi. Other Contract Documents.
3. No commercial deviations shall be acceptable. In case bidder indicates any commercial deviation or printed terms/sales conditions in their offer, the same will not be entertained
4. Bidder has to submit scan copy of duly signed and stamped or digitally signed copy of Technical specification of IOCL and scope of supply as a token of acceptance.
5. Bidder has to submit scan copy of duly signed and stamped or digitally signed copy of Technical deviation sheet as “Nil” deviation, in case there is no deviation to our Technical specification.
6. In case of any deviation to IOCL’s Technical specification, Bidder has to submit “Technical deviations” sheet mentioning all the Technical Deviations as per attached format given in special instruction to bidder.
7. Please note that any deviations/ reservations/ notes/ comments etc., given elsewhere in the offer other than the “Technical deviations” shall not be considered.
8. Submit “Formats for submission” [Holiday listing, Undertaking for sharing land boundaries with India, Undertaking for Local Content, Declaration of Insolvency and bankruptcy (Strike out which is not applicable) and Multiple bidder declaration] duly filled, signed and stamped.
9. Cartel formation, bid rigging, collusive bidding are against the basic principle of competitive bidding and defeats the very purpose of open and competitive tendering system. Such practices are severely discouraged. Suitable administrative actions which include but not limited to rejecting the offers, holiday listing action as per policy in vogue for breach of integrity may be initiated in such cases.



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10. The responsibility of downloading the tender documents including corrigendum, if any, and subsequent uploading of offer shall rest with the bidder.
11. Only Biodegradable packing material should be used for supply of materials
12. Negotiations shall not be conducted with bidders as a matter of routine. However, IOCL reserves the right to conduct Negotiations.
13. If a bidder withdraws its bid within validity period for any reason, their bid shall not be further evaluated, and suitable action taken which may include EMD forfeiture (if any) and / or holiday listing action as per the discretion of IOCL
14. IOCL reserves the right to make any changes in the terms and conditions of Enquiry and to accept or reject any or all the bids without assigning any reason and without incurring any liability to the affected bidder(s). Tender can be abandoned without assigning any reason and no compensation shall be paid for the efforts made by the bidder
15. In tenders, either the manufacturer or its authorized dealer can be considered as valid bidders. However, one bidder shall not be allowed to submit multiple bids as authorized agent from different manufacturer. In other than proprietary / branded item tenders, where the manufacturer has submitted the bid, the bids of its authorized dealer will not be considered and EMD, if any, will be returned
16. Tender is liable for rejection in the following circumstances:
 - (i) Does not fulfill minimum qualification criteria prescribed in the tender documents.
 - (ii) In case the bidder misrepresents facts or submits, forged, false or fabricated document.
 - (iii) Bidder is holiday listed as per prevailing holiday listing guidelines.
 - (iv) If insolvency resolution process has commenced (viz. application has been admitted by Adjudicating Authority and moratorium has been imposed and IRP has been appointed) or liquidation or bankruptcy proceedings have commenced in respect of bidder in terms of Insolvency and Bankruptcy Code, 2016 or any other applicable law (in cases where code is not applicable) at any stage of evaluation of bid.
 - (v) Indulges in tampering of document.
 - (vi) Offer from joint bidders / consortium, unless specifically permitted in the tender for such bidding. (vii) Bidder is not eligible to participate
 - (vii) The bidder does not sign the IP Agreement (if applicable)
 - (viii) If the Earnest Money Deposit/ Bid Security Declaration is not deposited or exemption document (if applicable) is not uploaded before closing date and time of tender

Tender is also liable for rejection if the bidder:



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- a) Stipulates the validity period of the bids lesser to what is stated in the tender document.
 - b) Stipulates his own conditions and refuse to withdraw them.
 - c) Does not fill in and sign the tender acceptance formats as specified in the tender.
 - d) If the bids contain unacceptable terms and conditions.
 - e) Any discrepancy done with the BOQ uploaded on the e-tender portal
17. In case of an irreconcilable contradiction in the technical requirements or technical specifications between Indian standards/Applicable Codes & Standards, General Conditions of Contract, Special Conditions of Contract, Specifications, Drawings, Schedule of Lumpsum Price and or Agreed Variations to the extent that the two provisions cannot co-exist or be read together to satisfy both or all, the following order of precedence shall prevail:
- a) Formal Contract
 - b) Detailed Letter of Acceptance
 - c) Statement of Agreed Variations
 - d) Job specifications/ Scope of Work
 - e) Drawings
 - f) Technical/Material Specifications
 - g) Quality Assurance Procedures
 - h) Applicable Codes & Standards
 - i) Special Conditions of Contract
 - j) General Conditions of Contract
 - k) Price Schedule
 - l) Instructions to Bidders
 - m) Other documents
18. In case a bidder submits any of the Bidder Qualification support documents in any language other than English, then it will be the responsibility of such bidder to also provide the English translation copy of the same duly certified, stamped and signed by their Local Chamber of Commerce. Translation by Indian Embassy/ High Commission or authorized/approved translation agencies (by Indian embassy/ high commission or any other authority) shall also be acceptable.
19. The bidder should not be under liquidation, court receivership or similar proceedings, should not be bankrupt. Bidder to upload undertaking to this effect with bid.



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20. Bidders are advised to check applicable GST on their own before quoting. Buyer will not take any responsibility in this regards. GST reimbursement will be as per actuals or as per applicable rates (whichever is lower), subject to the maximum of quoted GST %.
21. IOCL reserves the right to reject any deviation to delivery terms not meeting IOCL's requirement after giving one chance to the bidder to accept IOCL's requirement.
22. As a special initiative to encourage more participation, PBG requirement shall be relaxed by 50% as per tender terms in case of MSEs owned by SC/ST & Women Entrepreneurs.

29.0 INSTRUCTION TO BIDDER FOR TRANSPORTATION OF MATERIALS

Vendor to intimate dispatch details on below email IDs for advance information:

**mr_receiptstore@indianoil.in; jkmishra@indianoil.in;
kharbandas@indianoil.in ; singhpr3@indianoil.in;**

Successful Bidder (Vendor) to dispatch the materials by any bank approved road transporters. Necessary Road Permits/Way Bills is in the scope of supplier. Vendors are advised not to dispatch the materials through Courier agency. Materials should be booked on Freight paid basis and dispatched on door delivery basis to our IOCL Mathura Refinery, Central stores.

Instructions for drivers after dispatch of material :-

वाहन चालकों के लिए दिशा निर्देश, निम्नलिखित दस्तावेजों तथा चीजों का ध्यान रखें

- 1- वाहन की ओरिजनल आर सी किताब /
- 2- ओरिजनल बीमा पत्र |
- 3- ओरिजनल फिटनेस प्रमाण पत्र ।
- 4- ड्राइवर का ओरिजनल लाइसेंस ।
- 5- ओरिजनल पीयूसी प्रमाण पत्र ।
- 6- ओरिजनल प्रमाण पत्र के साथ आग बुझाने वाला यंत्र |
- 7- स्वस्थ स्थिति में स्पार्क अरेस्टर ।
- 8- उचित आई डी के साथ सलासी ।
- 9- चालक और खलासी के हेलमेट और सुरक्षा जूते ।
- 10- स्वस्थ स्थिति में वाहन की स्टेपनी।



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महत्वपूर्ण टेलीफोन नम्बर "

1-स्टोर रिसीप्ट कार्यालय :0565-241-7296 / 7297

2-सामग्री अधिकारी :- 0565-241-7284/7288

3. स्टोर इंचार्ज :- :0565-241-7273

4- अग्नि एवं सुरक्षा विभाग :0565-241-7333 /7777

5- प्रथमोपचार :- : 0565-241-7200

"जानकारी बढ़ायें, सुरक्षा अपनायें "

=====X=====



Design, Engineering, Manufacturing, Packaging, Testing, Supply, Transportation and Supervision of Erection and Commissioning of High-Speed Electric Motor for replacement of HPC Condensing Turbine Along with Accessories, Mandatory Spares, Commissioning Spares, Special Tools & Tackles and Third-Party Inspection at NPRU Unit of IOCL Mathura Refinery.

PROFORMA FOR TECHNICAL DEVIATIONS:-

PROFORMA FOR DEVIATIONS- TECHNICAL																			
<table border="1"> <tr> <td>Tender No.</td> <td colspan="4"></td> </tr> <tr> <td>Vendor's Name</td> <td colspan="4"></td> </tr> <tr> <td>Offer Ref No.</td> <td colspan="4"></td> </tr> </table>					Tender No.					Vendor's Name					Offer Ref No.				
Tender No.																			
Vendor's Name																			
Offer Ref No.																			
Bidder may stipulate here "TECHNICAL" exception(s) and deviation(s) to IOCL Tender Documents, if considered unavoidable.																			
Sl. No.	Referred document name/ Tender document page no.	Clause No.	Description of Clause	Deviation proposed by bidder															
1																			
2																			
3																			
4																			
5				NO DEVIATION															
6																			
7																			
8																			
9																			
10																			

To be filled by bidder (Mandatory for all Bidders)

Offer Reference No. with date.	
Vendor's Name	
Authorized Person's Name (s):	
Email ID (s)	-
Mobile No. (s)	
Address	



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For payment through VIM, Vendor has to upload the invoice on VIM portal or send the original invoice copy to VIM Venter,Noida.

Vendor Invoice Management
Communication to Vendors

Dear Vendors,

Indian Oil has been keeping its systems updated with latest developments and newest technologies to efficiently add to the delight of our partner vendors. Many digitalization steps have been taken in the past and have been successfully implemented with the continuous support of partners.

We are introducing Vendor Invoice Management system for centralized processing of invoices for supply of goods and services with an intent to further expedite the payment process. A centralized query management system including self-help is also being introduced for convenience of the vendors on tracking details related to payments.

A. Invoice Management System

With effect from **04.07.2022**, **original copy of invoice** raised on **this office** against SAP PO shall be submitted to the following address: -

**Indian Oil Corporation Limited
IBM Building, 2nd Floor,
A 26, Rani Ramgarh Road,
Block A, Industrial Area,
Sector 62, NOIDA,
Uttar Pradesh-201309**

Only Original Invoice along with supporting invoices for any reimbursement like freight & inspection bills should be sent to the above address. The documents like **Inspection Release Note, Test Certificate, Bank Guarantee** etc. in original should continue to be submitted to the **Office** of supply or service.

Invoice raised against order **other than SAP PO/GEM Contract** should continue be submitted to the **office** of supply of Goods and services

To achieve the full benefit of the newly introduced system, you are requested to note the following changes in Invoicing and submission of the same: -

1. Invoice Requirement - Physical

Digitally signed invoice uploaded through Vendor Portal is preferred.

However, where vendor submits the physical copy of the invoice, following points may be ensured: -

- It should not be handwritten invoice.
- It should be in English language only.
- It should not be photocopy.
- It should not be carbon copy.
- It should not be Dot Matrix Print copy.



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- Invoice should not be damaged or tampered and should always be preserved in original state.
- Writing of comments, remarks etc. on the Invoice may be avoided.

2. Invoice Requirement - Content

- Mention PO Number on Invoice where invoice is raised against SAP Order
- Where SAP Order not issued, vendor should mention details of IOCL Officer like email on whose order work has been executed
- Invoice should be in line with Order conditions
- Invoice should comply with applicable GST provisions including HSN/SAC Code
- Ensure that the address in Invoice is correctly mentioned as per Order including Company Code & Plant Code available on Order
- In case where Vendor knows its SAP Vendor Code with Indian Oil, the same should also be captured on the body of Invoice

3. Price Reduction on account of Delay

- Raise invoice after effecting Price Reduction on account of Delay in Invoice, wherever applicable.
- In case where request for time extension has been submitted but not approved by EIC, invoice still should be raised by reduced amount.
- Subsequently, Vendor can issue Debit Note when time extension is granted after raising of invoice.
- This process will eliminate the requirement of credit note for GST accounting and consequential delay in processing payment of the entire amount due to complication of GST input credit.

4. Other Requirements

- Ensure that Bank Guarantee, wherever applicable, has been submitted at local office of the place of supply/ service as per required format
- Ensure submission of all the documents at local office of the place of supply/ service in line with conditions of the contract

B. Query Management System

For expeditious resolution of queries from the vendors, Round the clock Self-help tool (BOT), Webform, Dedicated Email and 9 to 5 Helpdesk have been introduced, details of which are as under: -

Email	VIMHelpdesk@indianoil.in
Helpdesk Phone	+91 120 6730555

In order to further enhance the Vendor Experience, a Web-based self-help Chatbot “**Indu**” has been developed.

Key features include status of invoice, payment details including deductions, if any, and the UTR details checked in the below link

<https://apps.indianoil.in/vim/resources/out/index.html>



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A. Interest Prohibition clause shall be applicable as per following relevant cases:

(a) Where arbitration clause is present in GPC/GCC/GTC but is applicable for only notified claims, Interest Prohibition clause shall be as following:

“Arbitration: Parties agree that the Contractor shall not be entitled for any pre-reference and pendente-lite interest, i.e., date of cause of action till date of Award by Arbitral Tribunal. Parties agree that Contractor’s claim for any such interest shall not be considered and shall be void. The Arbitrator or Tribunal shall have no right to award pre-reference or pendent-lite interest in the matter to the Contractor. Where the arbitral award is for the payment of money, no interest shall be payable by owner on whole or any part of the money for any period till the date on which the award is made.

Suit: Parties agree that the Contractor shall not be entitled for any pre-filing interest, i.e., date of cause of action till date of filing of civil suit. Parties agree that Contractor’s claim for any such interest shall not be considered and shall be void. The civil Court/Commercial Court shall have no right to award pre-filing interest in the matter to the Contractor. Where the civil decree is for the payment of money, no interest shall be payable by Owner on whole or any part of the money for any period till the date on which the suit is filed.”

(b) Where the relevant GPC/GCC/GTC contains arbitration clause applicable for all types of dispute/ claims, Interest Prohibition clause shall be as following:

“Parties agree that the Contractor shall not be entitled for any pre-reference and pendente-lite interest, i.e., date of cause of action till date of Award by Arbitral Tribunal. Parties agree that Contractor’s claim for any such interest shall not be considered and shall be void. The Arbitrator or Tribunal shall have no right to award pre-reference or pendent-lite interest in the matter to the Contractor. Where the arbitral award is for the payment of money, no interest shall be payable by owner on whole or any part of the money for any period till the date on which the award is made.”

(c) Where no arbitration clause is present in GPC/GCC/GTC, Interest Prohibition clause shall be as following: “Parties agree that the Contractor shall not be entitled for any pre-filing interest, i.e., date of cause of action till date of filing of civil suit. Parties agree that Contractor’s claim for any such interest shall not be considered and shall be void. The Civil Court/ Commercial Court shall have no right to award pre-filing interest in the matter to the Contractor. Where the civil decree is for the payment of money, no interest shall be payable by Owner on whole or any part of the money for any period till the date on which the suit is filed.”

B. Guideline for Insolvency and Bankruptcy CODE, 2016 (IBC)

Bidders shall submit declaration on proceedings under Insolvency and Bankruptcy Code, 2016. Offer will not be considered of bidder(s) in the following cases:

a) If insolvency resolution process has commenced (viz. application has been admitted by Adjudicating Authority and moratorium has been imposed and IRP



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has been appointed) or liquidation or bankruptcy proceedings have commenced in respect of bidder in terms of Insolvency and Bankruptcy Code, 2016 or any other applicable law (in cases where code is not applicable) at any stage of evaluation of bid.

- b) In case where the bid of the L-1 bidder is rejected on the aforesaid grounds during the period between Price-Bid-Opening and Award of Contract, the bid of the next higher eligible bidder will be considered for further processing. EMD of such bidder shall be returned.
- c) A declaration/undertaking shall be submitted by the bidder in the Format "Declaration on Proceedings Under and Bankruptcy Code, 2016 (IBC)" enclosed in "Tender Documents"

C. TERMS AND CONDITIONS FOR BIDDERS FROM A COUNTRY WHICH SHARES LAND BORDER WITH INDIA [Restrictions Under Rule 144 (XI)]

I. Any bidder from a country which shares a land border with India will be eligible to bid in any procurement whether of goods, services (including consultancy services and non-consultancy services) or works (including turnkey projects) only if the bidder is registered with the Competent Authority. *Further, any bidder (including bidder from India) having specified Transfer of Technology (ToT) arrangement with an entity from a country which shares a land border with India, shall also require to be registered with the same competent authority.*

II. "Bidder" (including the term 'tenderer', 'consultant' or 'service provider' in certain contexts) means any person or firm or company, including any member of a consortium or joint venture (that is an association of several persons, or firms or companies), every artificial juridical person not falling in any of the descriptions of bidders stated hereinbefore, including any agency branch or office controlled by such person, participating in a procurement process.

III. "Bidder (or entity) from a country which shares a land border with India" for the purpose of this Order means: -

- (a) An entity incorporated, established or registered in such a country; or
- (b) A subsidiary of an entity incorporated, established or registered in such a country; or
- (c) An entity substantially controlled through entities incorporated, established or registered in such a country; or
- (d) An entity whose beneficial owner is situated in such a country; or
- (e) An Indian (or other) agent of such an entity; or
- (f) A natural person who is a citizen of such a country; or
- (g) A consortium or joint venture where any member of the consortium or joint venture falls under any of the above

IV. The beneficial owner for the purpose of (iii) above will be as under:

1. In case of a company or Limited Liability Partnership, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person, has a controlling ownership interest or who exercises control through other means.

Explanation—



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a. "Controlling ownership interest" means ownership of or entitlement to more than twenty-five per cent. of shares or capital or profits of the company;

b. "Control" shall include the right to appoint majority of the directors or to control the management or policy decisions including by virtue of their shareholding or management rights or shareholders agreements or voting agreements;

2. In case of a partnership firm, the beneficial owner is the natural person(s) who, whether acting alone or together, or through one or more juridical person, has ownership of entitlement to more than fifteen percent of capital or profits of the partnership;

3. In case of an unincorporated association or body of individuals, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person, has ownership of or entitlement to more than fifteen percent of the property or capital or profits of such association or body of individuals;

4. Where no natural person is identified under (1) or (2) or (3) above, the beneficial owner is the relevant natural person who holds the position of senior managing official;

5. In case of a trust, the identification of beneficial owner(s) shall include identification of the author of the trust, the trustee, the beneficiaries with fifteen percent or more interest in the trust and any other natural person exercising ultimate effective control over the trust through a chain of control or ownership.

V. An Agent is a person employed to do any act for another, or to represent another in dealings with third person.

VI. [To be inserted in tenders for Works contracts, including Turnkey contracts] The successful bidder shall not be allowed to sub-contract works to any contractor from a country which shares a land border with India unless such contractor is registered with the Competent Authority.

VII. The registration shall be valid at the time of submission of bid and at the time of acceptance of bid.

VIII. If the bidder was validly registered at the time of acceptance / placement of order, registration shall not be a relevant consideration during contract execution

Thus, refer to Office Memorandum F/No./7/10/2021-PPD (1) dtd. 23.02.2023 issued by Ministry of Finance Department of Expenditure with subject for restrictions under Rule 144(xi) of the General Financial Rules (GFRs) 2017, bidder to submit their declaration as asked in this Buyer Specific ATC. The Office Memorandum may be referred on the website of Ministry of Finance, Department of Expenditure at [Procurement Policy/O.M/DEPARTMENT OF Expenditure](#) |



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[Ministry of Finance |Government of India \(doe.gov.in\)](#). For the reference purpose, the above referred OM is provided below.

NOTE:-

Any amendment or add-on or update on the above circular may be referred by the bidders from the site itself.



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No.F.7/10/2021-PPD (1)
Government of India
Ministry of Finance
Department of Expenditure
Procurement Policy Division

264-C, North Block, New Delhi.
23.02.2023.

Order (Public Procurement No. 4)

Subject: Restrictions under Rule 144(xi) of the General Financial Rules (GFRs), 2017.

Attention is invited to Order (Public Procurement No. 1) issued vide F.6/18/2019-PPD dated 23.07.2020, Order (Public Procurement No. 2) issued vide F.6/18/2019-PPD dated 23.07.2020, Order (Public Procurement No. 3) issued vide F.6/18/2019-PPD dated 24.07.2020, Office Memorandum (OM) No. F.18/37/2020-PPD dated 08.02.2021, OM No. F.12/1/2021-PPD(Pt.) dated 02.03.2021 and OM No. F.7/10/2021-PPD dated 08.06.2021. In this regard, the following is hereby ordered under Rule 144(xi) (as amended vide OM No. F.7/10/2021-PPD dated 23.02.2023) on the grounds stated therein, in supersession to all of the above mentioned Orders/ clarifications:

Requirement of registration:

2. Any bidder from a country which shares a land border with India will be eligible to bid in any procurement whether of goods, services (including consultancy services and non-consultancy services) or works (including turnkey projects) only if the bidder is registered with the Competent Authority, specified in **Annexure I**.
3. Any bidder (including an Indian bidder) who has a Specified Transfer of Technology (ToT) arrangement with an entity from a country which shares a land border with India will be eligible to bid in any procurement whether of goods, services (including consultancy services and non-consultancy services) or works (including turnkey projects) only if the bidder is registered with the Competent Authority, specified in **Annexure I**.
4. The requirement of registration for cases covered by paragraph 2 above has been applicable since 23.07.2020. The requirement of registration for bidders covered by paragraph 3 above will be applicable for all procurements where tenders are issued/ published after 01.04.2023.
5. In tenders issued after 23.07.2020 or 01.04.2023, as the case may be, the provisions of requirement of registration of bidders and of other relevant provisions of this Order shall be incorporated in the tender conditions.

Applicability:

6. Apart from Ministries/ Departments, attached and subordinate bodies, notwithstanding anything contained in Rule 1 of the GFRs 2017, the Order shall also be applicable



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- a) to all Autonomous Bodies;
 - b) to all public sector banks and public sector financial institutions;
 - c) to all Central Public Sector Enterprises;
 - d) to all procurement in Public Private Partnership projects receiving financial support from the Government or public sector enterprises/ undertakings; and
 - e) Union Territories, National Capital Territory of Delhi and all agencies/ undertakings thereof.
7. This order will not be applicable for cases falling under **Annexure II**.

Definitions:

8. "*Bidder*" for the purpose of the Order (including the term 'tenderer', 'consultant' 'vendor' or 'service provider' in certain contexts) means any person or firm or company, including any member of a consortium or joint venture (that is an association of several persons, or firms or companies), every artificial juridical person not falling in any of the descriptions of bidders stated hereinbefore, including any agency, branch or office controlled by such person, participating in a procurement process.
9. "*Tender*" for the purpose of the Order will include other forms of procurement, except where the context requires otherwise.
10. "*Transfer of Technology*" means dissemination and transfer of all forms of commercially usable knowledge such as transfer of know-how, skills, technical expertise, designs, processes and procedures, trade secrets, which enables the acquirer of such technology to perform activities using the transferred technology independently. (Matters of interpretation of this term shall be referred to the Registration Committee constituted by the Department for Promotion of Industry and Internal Trade, and the interpretation of the Committee shall be final.)
11. "*Specified Transfer of Technology*" means a transfer of technology in the sectors and/ or technologies, specified in paragraph 15, occurring on or after 23.07.2020.
12. "*Bidder (or entity) from a country which shares a land border with India*" for the purpose of the Order means
- (a) An entity incorporated, established or registered in such a country; or
 - (b) A subsidiary of an entity incorporated, established or registered in such a country; or
 - (c) An entity substantially controlled through entities incorporated, established or registered in such a country; or
 - (d) An entity whose beneficial owner is situated in such a country; or
 - (e) An Indian (or other) agent of such an entity; or
 - (f) A natural person who is a citizen of such a country; or



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(g) A consortium or joint venture where any member of the consortium or joint venture falls under any of the above

13. *Beneficial owner* for the purposes of Para 12 (d) will be as under:

(i) In case of a company or Limited Liability Partnership, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person(s), has a controlling ownership interest or who exercises control through other means.

Explanation:-

a. "Controlling ownership interest" means ownership of, or entitlement to, more than twenty-five per cent of shares or capital or profits of the company;

b. "Control" shall include the right to appoint the majority of the directors or to control the management or policy decisions, including by virtue of their shareholding or management rights or shareholders agreements or voting agreements;

(ii) In case of a partnership firm, the beneficial owner is the natural person(s) who, whether acting alone or together, or through one or more juridical person, has ownership or entitlement to more than fifteen percent of capital or profits of the partnership;

(iii) In case of an unincorporated association or body of individuals, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person, has ownership of or entitlement to more than fifteen percent of the property or capital or profits of such association or body of individuals;

(iv) Where no natural person is identified under (i) or (ii) or (iii) above, the beneficial owner is the relevant natural person who holds the position of senior managing official;

(v) In case of a trust, the identification of beneficial owner(s) shall include identification of the author of the trust, the trustee, the beneficiaries with fifteen percent or more interest in the trust and any other natural person exercising ultimate effective control over the trust through a chain of control or ownership.

14. "*Agent*" for the purpose of the Order is a person employed to do any act for another, or to represent another in dealings with third persons.

[Note:

i. A person who procures and supplies finished goods from an entity from a country which shares a land border with India will, regardless of the nature of his legal or commercial relationship with the producer of the goods, be deemed to be an Agent for the purpose of this Order.

ii. However, a bidder who only procures raw material, components etc. from an entity from a country which shares a land border with India and then manufactures or converts them into other goods will not be treated as an Agent.]



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Certificate regarding compliance

18. An undertaking shall be taken from bidders in the tender documents (**Annexure III**) that the extant guidelines for participation in the tenders (which should include conditions for implementation of this Order) have been complied with. If such certificate given by a bidder whose bid is accepted is found to be false, this would be a ground for debarment and further legal action in accordance with law.

Validity of registration

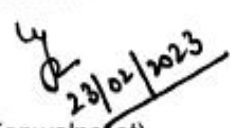
19. In respect of tenders, registration should be valid at the time of submission of bids and at the time of acceptance of bids. In respect of supply otherwise than by tender, registration should be valid at the time of placement of order. If the bidder was validly registered at the time of acceptance / placement of order, registration shall not be a relevant consideration during contract execution.

Government e-Marketplace (GeM)

20. GeM shall remove non-compliant entities from GeM unless/ until they are registered in accordance with this Order.

Model Clauses/ Certificates

21. Model Clauses and Model Certificates which may be inserted in tenders/ obtained from Bidders are given at Annexure-III. While adhering to the substance of the Order, procuring entities are free to appropriately modify the wording of these clauses based on their past experience, local needs etc.


(Kanwalpreet)
Director(PPD)

Tel.No. 2309 3811; email: kanwal.irss@gov.in

To

1. Secretaries of all Ministries/ Departments of Government of India for information and necessary action. They are also requested to inform these provisions to all procuring entities.
2. Secretary, Department of Public Enterprises with a request to immediately reiterate these orders in respect to public enterprises.
3. Secretary, Department of Financial Services with a request to immediately reiterate these orders in respect to public sector and public sector financial institutions.
4. Secretary DPIIT with a request to take action as provided under Annexure I.
5. Chief Secretaries/ Administrators of Union Territories/ National Capital Territory of Delhi.
6. CEO/ GeM with a request to ensure implementation of this order on GeM.



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Schedule I

List of Category-I Sensitive sectors:

Sr.No.	Sector
(i)	Atomic Energy
(ii)	Broadcasting/ Print and Digital Media
(iii)	Defence
(iv)	Space
(v)	Telecommunications

Schedule II

List of Category-II Sensitive sectors:

Sr.No.	Sector
(i)	Power and Energy (including exploration/ generation/ transmission/ distribution/ pipeline)
(ii)	Banking and Finance including Insurance
(iii)	Civil Aviation
(iv)	Construction of ports and dams & river valley projects
(v)	Electronics and Microelectronics
(vi)	Meteorology and Ocean Observation
(vii)	Mining and extraction (including deep sea projects)
(viii)	Railways
(ix)	Pharmaceuticals & Medical Devices
(x)	Agriculture
(xi)	Health
(xii)	Urban Transportation



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Schedule-III

List of Sensitive Technologies:

Sr.No.	Sensitive Technologies
(i)	Additive Manufacturing (e.g. 3D Printing)
(ii)	Any equipment having electronic programmable components or autonomous systems (e.g. SCADA systems)
(iii)	Any technology used for uploading and streaming of data including broadcasting, satellite communication etc.
(iv)	Chemical Technologies
(v)	Biotechnologies including Genetic Engineering and Biological Technologies
(vi)	Information and Communication Technologies
(vii)	Software



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D. POLICY RELATED TO PRICE PREFERENCE TO MICRO & SMALL ENTERPRISES

<https://msme.gov.in/public-procurement-policy>

Please note:

1. In order to avail price- preference, it is mandatory to opt for price preference as available in GeM, otherwise evaluation shall be done as per below table.

Note: 'In adherence to the procurement guidelines on the GeM portal, it is imperative that bidders acknowledge and select their Micro and Small Enterprise (MSE) status on the 'Page for selection by bidders for MSME status'. Failure to actively choose and verify the MSE status, despite the submission of valid documents for purchase preference, will lead to disqualification of the bidder from participating in any purchase preference considerations.

Case	Selection of Preference Category in GeM-portal	Valid Document for Preferential treatment	Modality for preferential treatment in tender evaluation
1	YES	YES	To be considered for preferential treatment, wherever applicable
2	YES	NO	Will not be considered for preferential treatment
3	NO	YES	Will not be considered for preferential treatment. Even if such bidder is lowest, other valid preferential bidders in the margin of preference, shall be allowed price matching per the relevant preference policy.
4	NO	NO	Will not be considered for preferential treatment.

MSE related clauses for ZED (Zero Defect Zero Effect)

"The Government of India envisioned the Zero Defect Zero Effect (ZED) initiative (Bronze/Silver/Gold level) and the Lean Certification initiative (Basic/Intermediate/Advanced level) to enhance MSME competitiveness, ensure sustainability, and transform them into national and international champions. For complete details on registration, required documents, benefits, and other related information, visit the <https://zed.msme.gov.in/> and the link below.

<https://zed.msme.gov.in/>

<https://lean.msme.gov.in/>

Kindly register and take advantage of these GOI initiatives."

E. POLICY RELATED TO PUBLIC PROCUREMENT PREFERENCE TO MAKE IN INDIA (PPP-MII) POLICY



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https://fulfilment.gem.gov.in/contract/slafds?fileDownloadPath=SLA_UPLOAD_PATH/2024/Jan/GEM_2024_B_4429570/CLM0014/MII_e21c80a6-49d0-4e48-956e1704438778496_buycon3 ONGC.delhi.pdf

F. POLICY FOR PROVIDING PREFERENCE TO DOMESTICALLY MANUFACTURED IRON & STEEL PRODUCTS IN GOVERNMENT PROCUREMENT (DMI & SP POLICY) LATST POLICY

<https://steel.gov.in/policy-providing-preference-domestically>



REVISED DMISP
POLICY 2025.pdf

INDIAN OIL EXTRAPOWER FLEET PROGRAM

XTRAPOWER Fleet card program is a complete smart card-based fleet management solution for fleet operators and corporate for cashless purchase of fuels & lubricants from designated retail outlets (petrol pumps) of Indian Oil through flexible prepaid and credit facilities. The fleet card also offer exciting rewards along with benefits like personal accident insurance cover and vehicle tracking facility. Any business entity owning or operating a vehicle fleet can become a member of the XTRAPOWER fleet card program. Each fleet owner is issued a fleet control card and vehicle- specific fleet cards for every vehicle enrolled under the program. For enhanced security, the fleet card transactions are authorized through a unique Personal Identification Number (PIN). Moreover, the card can help track each vehicle's movement across remote corners of the country. Leading to improvement and vehicle utilization route compliance. XTRAPOWER is also backed by Indian Oil's vast infrastructure network and web based support services.

For detailed terms and conditions, you may visit our website <https://www.iocxtrapower.com/>. You can also call our XTRAPOWER customer service Toll Free Help line(24 x7) 1800 200 1214 or 022 3636 6066 or may write to us at cutserv@iocxtrapower.com. For any further queries kindly visit the FAQ section on our site <https://www.iocxtrapower.com/>



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**DECLARATIONS AND CERTIFICATIONS
(TO BE SUBMITTED ON COMPANY'S LETTER HEAD)**

SI No.	Clause	Bidder's Confirmation
1	Bid Security Declaration from bidders in lieu of Earnest Money I /We, the authorized signatory, participating in the subject Tender do hereby declare that in the event: I / We withdraw / modify our bid during the period of bid validity OR I/We commit any other breach of tender conditions/ contract which would have otherwise attracted forfeiture of EMD OR I / We fail to / refuse to initiate the execution of the awarded Contract as per the terms of the Contract then I / We could be suspended from being eligible for bidding / award of all future tender(s) for a period as applicable per the Incident Management Policy of GeM.	Noted & Confirmed
2	DECLARATION OF INSOLVENCY & BANKRUPTCY: We declare that we are not undergoing insolvency resolution Process or liquidation or bankruptcy proceeding as on date. It is understood that if this declaration is found to be false, Indian Oil Corporation Ltd. shall have the right to reject my / our bid, and forfeit the EMD, if the bid has resulted in a contract, the contract will be liable for termination without prejudice to any other right or remedy (including holiday listing) available to Indian Oil Corporation Ltd. (Note: Please mention details in commercial deviation sheet if not complied)	Noted & Confirmed
3	DECLARATION OF RELATIONSHIP WITH IOCL DIRECTOR (S): We declare that that we don't have any relationship* with any of IOCL Directors (Note: Please mention details in commercial deviation sheet if not complied)	Noted & Confirmed



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	*relationship is defined as Whether any of the Directors of BIDDER is a relative of any Director of IOCL or the BIDDER is a firm in which any Director of IOCL or their relative is a Partner or the BIDDER is a private company in which any director of IOCL is a member or Director	
4	CERTIFICATE TOWARDS RESTRICTIONS UNDER RULE 144 (xi) OF GFRs I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India and I hereby certify that this bidder is not from such a country. I hereby certify that this bidder fulfills all requirements in this regard and is eligible to be considered. (Note: Please mention one of following details in commercial deviation sheet if above is not complied: This bidder is from such a country and has been registered with the Competent Authority. I hereby certify that this bidder fulfills all requirements in this regard and is eligible to be considered. <i>Evidence of valid registration by the Competent Authority is attached.</i> OR This bidder is from such a country and is having exclusion from Restrictions under Rule 144(xi) of General Financial Rules (GFRs) or Special Cases as defined in Annexure II of O.M. - F/No./7/10/2021-PPD (1) dtd. 23.02.2023. <i>Relevant document for the same is attached.</i> OR This bidder is from such a country and has not been registered with the Competent Authority)	Noted & Confirmed
5	CERTIFICATE TOWARDS RESTRICTIONS UNDER RULE 144 (xi) OF GFRs: I have read the clause regarding restrictions on procurement from a bidder having Transfer of Technology (ToT) arrangement from such country which shares a land border with India and I hereby certify that we do not have any Transfer of Technology (ToT) arrangement requiring registration with the competent authority. (Note: Please mention details in commercial deviation sheet if not complied)	Noted & Confirmed



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6	<u>DECLARATION OF BLACK LISTING / HOLIDAY LISTING</u> <u>In the case of a Proprietary Concern:</u> I hereby declare that neither I, in my personal name nor in the name of my Proprietary concern, participating entity which is submitting the accompanying Bid/Tender nor any other concern in which I am proprietor nor any partnership firm in which I am involved as a Partner are presently on any blacklist or holiday list declared by Indian Oil Corporation Ltd. or by Ministry of Petroleum & Natural Gas (MOPNG), nor any inquiry is pending by Indian Oil Corporation Ltd. or MOPNG, in respect of any corrupt or fraudulent practice(s) against me or any other of my proprietorship concern(s) or against any partnership firm(s) in which I am or was at the relevant time involved as a partner, except as indicated in commercial deviation sheet. <u>In the case of a Partnership Firm:</u> We hereby declare that neither we, participating entity, which is submitting the accompanying Bid/Tender, nor any partner involved in the said firm either in his individual capacity or as proprietor or partner of any other firm or concern presently, are placed on any blacklist or holiday list declared by Indian Oil Corporation Ltd. or by Ministry of Petroleum & Natural Gas (MOPNG), nor any inquiry is pending by Indian Oil Corporation Ltd. or MOPNG, in respect of corrupt or fraudulent practice(s) against us or any partner or any other concern or firm of which he is proprietor or partner, except as indicated in commercial deviation sheet. <u>In the case of Company:</u> We hereby declare that we are presently neither placed on any holiday list or blacklist declared by Indian Oil Corporation Ltd. Or by Ministry of Petroleum & Natural Gas (MOPNG), nor any inquiry is pending by Indian Oil Corporation Ltd. or MOPNG, in respect of corrupt or fraudulent practice(s), except as indicated in commercial deviation sheet. <u>In the case of Consortium:</u> We hereby declare that none of the members of the Consortium are presently placed on any holiday list or blacklist declared by Indian Oil Corporation Ltd. Or by	Noted & Confirmed (In case, bidder does not mention details in commercial deviation sheet, the same shall be considered as NIL)



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	Ministry of Petroleum & Natural Gas (MOPNG), nor any inquiry is pending by Indian Oil Corporation Ltd. or MOPNG, in respect of corrupt or fraudulent practice(s), except as indicated in commercial deviation sheet. It is understood that if this declaration is found to be false in any particular, Indian Oil Corporation Ltd. shall have the right to reject my/our bid, and if the bid has resulted in a contract, the contract is liable to be terminated without prejudice to any other right or remedy (including blacklisting or holiday listing) available to Indian Oil Corporation Ltd. participating entity shall be Bidder Name (Name of Company) as per Annexure-I Legal status will as per Company's Legal Status as per Annexure-I	



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On Bidder's Letterhead

Format of Bid Security Declaration from bidders in lieu of Earnest Money Deposit / Bid Security

I /We, the authorized signatory of M/s participating in the subject Tender No:....., for the job of, do hereby declare that in the event:

I / We withdraw / modify our bid during the period of bid validity

OR

I/We commit any other breach of tender conditions/ contract which would have otherwise attracted forfeiture of EMD

OR

I / We fail to / refuse to initiate the execution of the awarded Contract as per the terms of the Contract

then I / We could be debarred from being eligible for bidding / award of all future tender(s) of Indian Oil Corporation Limited per the GeM Incident Management Policy / Indian Oil's Holiday Listing Policy.

I/We agree that the above shall be without prejudice to the any other rights /remedies available to Indian Oil Corporation Limited under the Tender and/or law

Signature and seal of authorized signatory of bidder

Name

Date



Design, Engineering, Manufacturing, Packaging, Testing, Supply, Transportation and Supervision of Erection and Commissioning of High-Speed Electric Motor for replacement of HPC Condensing Turbine Along with Accessories, Mandatory Spares, Commissioning Spares, Special Tools & Tackles and Third-Party Inspection at NPRU Unit of IOCL Mathura Refinery.

Format Annexure - B

PEROFORMA FOR DECLARATION ON PROCEEDINGS UNDER INSOLVENCY AND BANKRUPTCY CODE, 2016 {to be submitted in Bid Documents}

GEM Bid No :

Bidder Name:

I/ We hereby declare that I/We /M/s _____, declare that :

- i. I / We am/are not undergoing insolvency resolution process or liquidation or bankruptcy proceeding as on date.

Or,

- ii. I / We am/are undergoing insolvency resolution process or liquidation or bankruptcy proceeding as on date as per details mentioned below. (Attached detail with technical bid)

Note: - Strike out which is not applicable.

It is understood that if this declaration is found to be false, Indian Oil Corporation Ltd. shall have the right to reject my/our bid, and forfeit the EMD. If the bid has resulted in a contract, the contract will be liable for termination without prejudice to any other right or remedy (including black listing or holiday listing) available to Indian Oil Corporation Ltd.

Place:

Seal &Signature of Bidder:

Date:

Name of Signatory:

Format Annexure – C

PROFORMA OF DECLARATION OF BLACK LISTING / HOLIDAY LISTING



Design, Engineering, Manufacturing, Packaging, Testing, Supply, Transportation and Supervision of Erection and Commissioning of High-Speed Electric Motor for replacement of HPC Condensing Turbine Along with Accessories, Mandatory Spares, Commissioning Spares, Special Tools & Tackles and Third-Party Inspection at NPRU Unit of IOCL Mathura Refinery.

In the case of a Proprietary Concern:

I hereby declare that neither I, in my personal name nor in the name of my Proprietary Concern, M/s _____ which is submitting the accompanying Bid/Tender nor any other concern in which I am proprietor nor any partnership firm in which I am involved as a Partner are presently on any blacklist or holiday list declared by Indian Oil Corporation Ltd. or by Ministry of Petroleum & Natural Gas (MOPNG), nor any inquiry is pending by Indian Oil Corporation Ltd. or MOPNG, in respect of any corrupt or fraudulent practice(s) against me or any other of my proprietorship concern(s) or against any partnership firm(s) in which I am or was at the relevant time involved as a partner, except as indicated below:

(Here give particulars of blacklisting or holiday listing, and /or inquiry and in absence thereof state "NIL")

Particulars – “NIL”

In the case of a Partnership Firm:

We hereby declare that neither we, M/s _____, which is submitting the accompanying Bid/Tender, nor any partner involved in the said firm either in his individual capacity or as proprietor or partner of any other firm or concern presently, are placed on any blacklist or holiday list declared by Indian Oil Corporation Ltd. or by Ministry of Petroleum & Natural Gas (MOPNG), nor any inquiry is pending by Indian Oil Corporation Ltd. or MOPNG, in respect of corrupt or fraudulent practice(s) against us or any partner or any other concern or firm of which he is proprietor or partner, except as indicated below:

(Here give particulars of blacklisting or holiday listing and/or inquiry and in the absence thereof state "NIL")

Particulars – “NIL”

In the case of Company:

We hereby declare that we are presently neither placed on any holiday list or blacklist declared by Indian Oil Corporation Ltd. Or by Ministry of Petroleum & Natural Gas (MOPNG), nor any inquiry is pending by Indian Oil Corporation Ltd. or MOPNG, in respect of corrupt or fraudulent practice(s), except as indicated below:

(Here give particulars of black listing or holiday listing and/or inquiry and in the absence thereof state "NIL")

Particulars – “NIL”

(Page 1 of 2)

In the case of Consortium:

We hereby declare that none of the members of the Consortium are presently placed on any holiday list or blacklist declared by Indian Oil Corporation Ltd. Or by Ministry of Petroleum



Design, Engineering, Manufacturing, Packaging, Testing, Supply, Transportation and Supervision of Erection and Commissioning of High-Speed Electric Motor for replacement of HPC Condensing Turbine Along with Accessories, Mandatory Spares, Commissioning Spares, Special Tools & Tackles and Third-Party Inspection at NPRU Unit of IOCL Mathura Refinery.

& Natural Gas (MOPNG), nor any inquiry is pending by Indian Oil Corporation Ltd. or MOPNG, in respect of corrupt or fraudulent practice(s), except as indicated below:

(Here give particulars of black listing or holiday listing and/or inquiry and in the absence thereof state "NIL")
Particulars – “NIL”

It is understood that if this declaration is found to be false in any particular, Indian Oil Corporation Ltd. shall have the right to reject my/our bid, and if the bid has resulted in a contract, the contract is liable to be terminated without prejudice to any other right or remedy (including black listing or holiday listing) available to Indian Oil Corporation Ltd.

Place:

Signature of Bidder:

Date:

Name of Signatory:

NOTE: Default declaration has been kept as “NIL”. The same to be replaced with “Particulars of black listing or holiday listing and/or inquiry”, If applicable.

(Page 2 of 2)

Format Annexure – D



Design, Engineering, Manufacturing, Packaging, Testing, Supply, Transportation and Supervision of Erection and Commissioning of High-Speed Electric Motor for replacement of HPC Condensing Turbine Along with Accessories, Mandatory Spares, Commissioning Spares, Special Tools & Tackles and Third-Party Inspection at NPRU Unit of IOCL Mathura Refinery.

DECLARATION OF RELATIONSHIP WITH IOCL DIRECTOR (S)

(TO BE SUBMITTED ON COMPANY'S LETTER HEAD)

We, M/s. _____ declare that that we don't have any relationship with any of IOCL Directors

OR

We, M/s. _____ declare that that we have relationship with IOCL Director (s), and the same is mentioned below

Place:

Signature of Bidder

Date:

Name of Signatory



Design, Engineering, Manufacturing, Packaging, Testing, Supply, Transportation and Supervision of Erection and Commissioning of High-Speed Electric Motor for replacement of HPC Condensing Turbine Along with Accessories, Mandatory Spares, Commissioning Spares, Special Tools & Tackles and Third-Party Inspection at NPRU Unit of IOCL Mathura Refinery.

Format Annexure – E

CERTIFICATE TOWARDS RESTRICTIONS UNDER RULE 144 (xi) OF GFRs

(TO BE SUBMITTED ON COMPANY'S LETTER HEAD)

I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India and I hereby certify that

(A). This bidder is not from such a country. I hereby certify that this bidder fulfills all requirements in this regard and is eligible to be considered.

OR

(B). This bidder is from such a country and has been registered with the Competent Authority. I hereby certify that this bidder fulfills all requirements in this regard and is eligible to be considered. *Evidence of valid registration by the Competent Authority is attached.*

OR

(C). This bidder is from such a country and has not been registered with the Competent Authority.

OR

(D). This bidder is from such a country and is having exclusion from Restrictions under Rule 144(xi) of General Financial Rules (GFRs) or Special Cases as defined in Annexure II of O.M. - F/No./7/10/2021-PPD (1) dtd. 23.02.2023. *Relevant document for the same is attached.*

Place:

Signature of Bidder

Date:

Name of Signatory

Format Annexure – F



Design, Engineering, Manufacturing, Packaging, Testing, Supply, Transportation and Supervision of Erection and Commissioning of High-Speed Electric Motor for replacement of HPC Condensing Turbine Along with Accessories, Mandatory Spares, Commissioning Spares, Special Tools & Tackles and Third-Party Inspection at NPRU Unit of IOCL Mathura Refinery.

CERTIFICATE TOWARDS RESTRICTIONS UNDER RULE 144 (xi) OF GFRs

(TO BE SUBMITTED ON COMPANY'S LETTER HEAD)

I have read the clause regarding restrictions on procurement from a bidder having Transfer of Technology (ToT) arrangement from such country which shares a land border with India and I hereby certify that

(A). This bidder does not have any Transfer of Technology (ToT) arrangement requiring registration with the competent authority.

OR

(B). This bidder has valid registration for Transfer of Technology (ToT) arrangement to participate in this procurement.

Place:

Signature of Bidder

Date:

Name of Signatory

Format Annexure – G



Design, Engineering, Manufacturing, Packaging, Testing, Supply, Transportation and Supervision of Erection and Commissioning of High-Speed Electric Motor for replacement of HPC Condensing Turbine Along with Accessories, Mandatory Spares, Commissioning Spares, Special Tools & Tackles and Third-Party Inspection at NPRU Unit of IOCL Mathura Refinery.

UNDERTAKING (to be submitted on Company's Letterhead)
(Applicable & to be filled for tender value above & equal 10 crore)

E-tender ID-

.....

Certification by the bidder

I _____ Son/ Daughter of _____ do
solemnly affirm and state as under:

1. I am the _____ <<Designation of the authorized signatory >> of
_____ and I am duly authorized to furnish this undertaking declaration on behalf of

2. That _____ has submitted its bid on _____ dated _____ against
bidding document no _____ dated for _____ item/ works for _____
Project/ Refinery of IOCL.

3. That the Company is fully aware of the provisions of policy to provide purchase Preference (linked with local content) (PP-LC) dated 17.11.2020 and amendments thereof, enclosed in the above bidding document.

4. We hereby confirm that our offer is achieving the local content (LC) of

a. minimum 50% ☐

b. 20% <=LC < 50% ☐

c. LC < 20% ☐

(Tick whichever is applicable)

5. I Confirm that I am aware of the implication of the above undertaking and our liability on account of wrong declaration.

(Authorized signatory of Supplier)

Certification by the statutory auditor/ chartered Accountant of the bidder

We, _____ a CA firm having our registered office address
_____ and certificate number _____ certify that we are
statutory auditor of the company M/s _____ having its registered office
at _____.

OR



Design, Engineering, Manufacturing, Packaging, Testing, Supply, Transportation and Supervision of Erection and Commissioning of High-Speed Electric Motor for replacement of HPC Condensing Turbine Along with Accessories, Mandatory Spares, Commissioning Spares, Special Tools & Tackles and Third-Party Inspection at NPRU Unit of IOCL Mathura Refinery.

We, _____ a CA firm having our registered office address _____ and certificate number _____ certify that statutory auditor is not mandatory for the company M/S _____ having its registered office at _____ as per prevailing law and we are practicing chartered Accountant, not being an employee/ Director and not having any interest in the company.

We have understood the provisions of policy to Provide Purchase P[reference (linked with local content) (PP-LC) dated 17.11.2020, enclosed in the above bidding document.

We hereby confirm that our offer is achieving the local content of

- a. minimum 50%
- b. 20% <=LC < 50%
- c. LC < 20%

(Tick whichever is applicable)

(Statutory auditor/ Chartered Accountant of the bidder)

Note: This undertaking shall be certified by the authorized signatory of the bidder, signing the bid . Preference is applicable only for suppliers claiming minimum 50% local content.

I. The Proprietor and an independent Chartered Accountant, not being an employee of the firm, in case of a proprietorship firm.

II. Any one of the partners and an independent chartered Accountant, not being an employee of the firm, in case of a partnership firm.

III. Statutory auditors in case of a company (as stated in said Policy in this Tender Document)



Design, Engineering, Manufacturing, Packaging, Testing, Supply, Transportation and Supervision of Erection and Commissioning of High-Speed Electric Motor for replacement of HPC Condensing Turbine Along with Accessories, Mandatory Spares, Commissioning Spares, Special Tools & Tackles and Third-Party Inspection at NPRU Unit of IOCL Mathura Refinery.

Format Annexure – H

DECLARATION REGARDING SUBMISSION OF ONE BID

I _____ (Name of authorized person) declare hereby in the capacity of _____ (State designation) that Bidder M/s _____ is submitting only one bid for this tender and has not made any other bid or multiple bid.

Note: As per following, the submitted bids shall be considered as multiple bids.

- i. A person shall be deemed to have submitted more than one bid if a person bids in an individual or proprietorship format at and/or in a partnership or association of persons format and/or in a company format.
- ii. A company shall for this purpose include any artificial person whether constituted under the laws of Indian or of any other country.
- iii. A person shall be deemed to have bid in a partnership format or in association of persons format if he is a partner of the firm which has submitted the bid or is a member of any association of persons which has submitted a bid.
- iv. A person shall be deemed to have bid in a company format if the person holds more than 10% (ten percent) of the voting share capital of the company which has submitted a bid, or is a director of the company which has submitted a bid, or holds more than 10% (ten percent) of voting share capital in and/or is a director of a holding company of that company which has submitted the bid.

In case it is found that bidder has submitted more than one bid, all the bids shall be rejected and the Earnest Money Deposit (if applicable) for all such bids shall be forfeited, not by way of penalty or liquidated damages but by way of reimbursement of the pre-estimated costs likely to be incurred by the OWNER towards bidding process and in the scrutiny and evaluation of bids.

Signature and seal of authorized signatory of bidder

Name
Date



Design, Engineering, Manufacturing, Packaging, Testing, Supply, Transportation and Supervision of Erection and Commissioning of High-Speed Electric Motor for replacement of HPC Condensing Turbine Along with Accessories, Mandatory Spares, Commissioning Spares, Special Tools & Tackles and Third-Party Inspection at NPRU Unit of IOCL Mathura Refinery.

Format Annexure – I

Bidder to confirm below, whether they are participating in this bid as Manufacturer OR Trader for the Quoted Item

Schedule No.	Whether Manufacturer OR Trader of the Quoted Item

NOTE:

Bidder to upload the above declaration duly signed and stamped on their Letter head along with the offer. Also bidder to upload their updated latest Udyam Certificate

Signature and seal of authorized signatory of bidder

Name

Date



Design, Engineering, Manufacturing, Packaging, Testing, Supply, Transportation and Supervision of Erection and Commissioning of High-Speed Electric Motor for replacement of HPC Condensing Turbine Along with Accessories, Mandatory Spares, Commissioning Spares, Special Tools & Tackles and Third-Party Inspection at NPRU Unit of IOCL Mathura Refinery.

Format Annexure – J

Bidder to confirm below, applicable GST rate for the Quoted Item. Please note that in GeM Price are inclusive of GST rates

Schedule No.	Applicable GST rate

Signature and seal of authorized signatory of bidder

Name

Date



Design, Engineering, Manufacturing, Packaging, Testing, Supply, Transportation and Supervision of Erection and Commissioning of High-Speed Electric Motor for replacement of HPC Condensing Turbine Along with Accessories, Mandatory Spares, Commissioning Spares, Special Tools & Tackles and Third-Party Inspection at NPRU Unit of IOCL Mathura Refinery.

Format Annexure – K

NON-DISCLOSURE and NON-USE AGREEMENT

THIS AGREEMENT is made and entered into as of the date day of month year (the “**Effective Date**”), by and between

Indian Oil Corporation Limited (CIN: L23201MH1959GOI011388), a company incorporated under the Companies Act, 1956 in India having its registered office at Indian Oil Bhawan, G-9, Ali Yavar Jung Marg, Bandra (East), Mumbai 400051 and having its Refineries Headquarters at Core-2, SCOPE Complex, 7, Institutional Road, Lodhi Road, New Delhi – 110 003 (hereinafter referred to as “**IOCL**”).

and

Vendor Name, a corporation registered in Vendor’s City having its registered office at Vendor’s address (hereinafter referred to as “**Vendor**”).

IOCL and Vendor may also be referred to jointly as "Parties" or individually as a "Party".

WITNESSETH:

WHEREAS, IOCL presently operates **Mathura Refinery**, one of its refineries unit, located at Mathura 281005, Mathura district of Uttar Pradesh, India (hereinafter called as “**IOCL-MR**”).

WHEREAS, IOCL and Vendor desires to do HPC steam turbine replacement with high speed motor job at IOCL-MR (“**Purpose**”).

WHEREAS, in order to accomplish the said Purpose, Vendor must have access to IOCL-MR's complex, its operation and analysis which may comprise of proprietary and confidential information due to license agreements with the providers of process units and that IOCL-MR is authorized by IOCL to share the Confidential Information with Vendor.

NOW, THEREFORE, pursuant to the premises and mutual covenants herein contained, IOCL and Vendor hereby agree as follows:



Design, Engineering, Manufacturing, Packaging, Testing, Supply, Transportation and Supervision of Erection and Commissioning of High-Speed Electric Motor for replacement of HPC Condensing Turbine Along with Accessories, Mandatory Spares, Commissioning Spares, Special Tools & Tackles and Third-Party Inspection at NPRU Unit of IOCL Mathura Refinery.

1. As used herein, "Confidential Information" as it applies to IOCL's proprietary information shall mean all information, drawings, documentation, ideas, concepts, methods of operation, process designs, operating conditions, equipment designs, technical information, studies, plans, programs, blueprints, sketches, photographs, research, analysis, compilations, pricing information, terms and conditions regarding equipment, sales, licensing and engineering services, as well as information received by IOCL or IOCL-MR from its technology partners, vendors, licensees, or representative related to IOCL or IOCL-MR, which IOCL or IOCL-MR may disclose directly or indirectly to Vendor.
2. The foregoing provisions shall not apply to Confidential Information which:
 - 2.1 Vendor can show was in the public knowledge or literature at the time of disclosure, or after such disclosure, becomes part of the public knowledge or literature through no breach of this Agreement by Vendor, or
 - 2.2 Vendor can show was already in its possession at the time of disclosure, and was not previously obtained by Vendor from IOCL or IOCL-MR under a continuing obligation of Confidentiality; or
 - 2.3 Is disclosed to Vendor by a third party having a legal right to so disclose.
 - 2.4 For the purposes of this provision, specific disclosures made hereunder shall not be deemed to be within the above exceptions merely because they are embraced by general disclosures in the public domain or in the possession of Vendor. In addition, any combination of features disclosed hereunder shall not be deemed within the above exceptions merely because individual features and in the public domain or in the possession of Vendor in accordance with 2.1 through 2.3 above.
3. Vendor agrees to limit access of Confidential Information to those employees and employees of its Affiliates who may reasonably require such Confidential Information for the Purpose. Vendor shall be responsible to ensure that its representatives and employees observe all non-disclosure and non-use obligations in accordance with this Agreement.
4. Vendor agrees to maintain confidential and not to sell, make available or disclose to any third party any Confidential Information, without the express written consent and agreement of IOCL for such a transaction.
5. Vendor agrees that they and their employees and representatives will keep all documents, items of work in process, and work product of or relating to any Confidential Information in secure files and areas, providing restricted access to prevent its unauthorized disclosure. Vendor shall maintain adequate procedures to prevent the loss or theft of documents that constitute or relate to Confidential Information. In the event of any such loss or theft, Vendor shall notify IOCL and/or IOCL-MR immediately.
6. All documents, drawings, and writings provided to Vendor by IOCL or IOCL-MR under this Agreement and all copies thereof (including information prepared or reduced to written form by IOCL or IOCL-MR, or their employees which includes Confidential Information) shall be returned IOCL or IOCL-MR, as the case may



Design, Engineering, Manufacturing, Packaging, Testing, Supply, Transportation and Supervision Of Erection And Commissioning of High Speed Electric Motor for replacement of HPC Condensing Turbine Along With Accessories, Mandatory Spares, Commissioning Spares, Special Tools & Tackles And Third Party Inspection at NPRU Unit of IOCL Mathura Refinery.

be, upon written request by IOCL or IOCL-MR following completion or termination of the evaluation, except for one (1) legal file copy which may be retained solely for the determination of Vendor's legal obligations under this Agreement.

7. Both Parties agree that a breach of this Agreement would result in irreparable harm to IOCL which would not be compensable by monetary damages. IOCL's waiver of confidentiality with respect to any specific item of Confidential Information disclosed hereunder shall neither substitute nor be construed as a general waiver of confidentiality with respect to any other Confidential Information disclosed hereunder.
8. Nothing in this Agreement shall be deemed to convey any license, sub-license, right, title, or interest or to Confidential Information of IOCL hereto.
9. This Agreement may not be modified or amended except by an instrument in writing and signed by both Parties hereto.
10. This Agreement shall be construed and enforced in accordance with Indian laws applicable to contracts made and to be performed within such state and without regard to its conflict of law's provisions.

The Parties, INTENDING TO BE LEGALLY BOUND, the Parties have caused this Agreement to be executed, as of the Effective Date, by their duly authorized representatives as indicated by their signatures below.

AGREED AND ACCEPTED:

Indian Oil Corporation Limited

Vendor Name

By:

By:

Title:

Title:



Design, Engineering, Manufacturing, Packaging, Testing, Supply, Transportation and Supervision Of Erection And Commissioning of High Speed Electric Motor for replacement of HPC Condensing Turbine Along With Accessories, Mandatory Spares, Commissioning Spares, Special Tools & Tackles And Third Party Inspection at NPRU Unit of IOCL Mathura Refinery.

INTEGRITY PACT

Bidder to submit the 'Integrity Agreement' in the format enclosed below, duly signed and stamped along with the un-priced offer. Scanned copy with duly authorized signature should be uploaded in the bidding. Price bids of bidder(s) refusing to submit the duly signed and stamped Integrity Pact may not be opened.

Submission of duly filled, signed & stamped Integrity Pact (IP) as per format given below is a mandatory prerequisite for Bids to be eligible for further evaluation. However, bidders are requested to please refer the latest Integrity Pact (IP) as per format and submit accordingly. The same shall be available at URL <https://iocl.com/integrity-pact>. The signed IP should be complete in all respect and is required to be uploaded in the along with the Bid. Bid not having the duly signed IP attached with it will be rejected. Partial submission of IP document will also not be considered.

The details of IndianOil's Nodal Officer & Independent External Monitors (IEMs) are available on iocl.com and the URL for the same is given below: <https://iocl.com/integrity-pact>.



Revised IP
Agreement.pdf



Design, Engineering, Manufacturing, Packaging, Testing, Supply, Transportation and Supervision Of Erection And Commissioning of High Speed Electric Motor for replacement of HPC Condensing Turbine Along With Accessories, Mandatory Spares, Commissioning Spares, Special Tools & Tackles And Third Party Inspection at NPRU Unit of IOCL Mathura Refinery.

Net-worth requirement

- Bidder shall have positive Net worth. To establish the same, the bidder shall furnish the latest Audited Financial Statement including Auditors reports, Audited Balance Sheet, Profit & Loss Account, Notes, Annexures (if any) etc. In case the NIT publication date is within September or last date for filing audited balance sheet as notified by CBDT, the bidder can submit the audited financial statements of the immediate previous Financial Year of the preceding year after giving a self-certification stating that the audited balance sheet of preceding year is not yet available.
- The net worth means paid up share capital, share application money pending allotment* and reserves # less accumulate losses and deferred expenditure to the extent not written off.

Reserves to be considered for the purpose of net-worth shall be all reserves created out of the profits and securities premium account but shall not include reserves created out of revaluation of assets, write back of depreciation and amalgamation.

*Share application money pending allotment will be considered only in respect of share to be allotted.

Accordingly, the definition of net-worth shall be as follows:

Paid up share capital XXXX

Add: Share application money pending allotment XXXX

Add: Reserves (as defined above) XXXX

Less: Accumulate Losses XX

Less: Deferred revenue expenditure to the extent not written off XX

Net-worth XXX

- All documents furnished by the bidder in support of Net Worth Compliance above shall be:
 - a.) Duly audited by Statutory Auditor of the bidder or a practicing Chartered Accountant (not being an employee or a Director and not having any interest in the bidder's company) where audited accounts are not mandatory as per law.

OR



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b.) Duly notarized by any notary public in the bidder's country or certified true copies duly signed, dated and stamped by an official authorized for this purpose in Indian Embassy/ High Commission in Bidder's country."

OR

c.) Self-certification in original from CEO or CFO or Company Secretary of the bidder (Limited company only). This option shall not be applicable to Proprietorship/ Partnership firms.

The failure to meet Net-Worth Criteria as mentioned above will render the bid to be summarily rejected.



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BANK DETAILS FOR OPENING IOCL VENDOR CODE

On the Letterhead of the Vendor/Contractor/Supplier

Date:

To
Indian Oil Corporation Ltd
(Refineries Divn) Mathura Refinery
UP
Dear Sir,

We hereby give our consent to accept the related payments of our claims/bills on IOCL through Cheques or Internet based online E-payments system at the sole discretion of IOCL. Our Bank account details for the said purpose is as under: -

S.No.	Particulars	Details
1	Name and address of the Beneficiary	
2	Account Number of Beneficiary	
3	Account Classification (CA/CC-11 or 29) & SB-10 as per Cheque leaf	
4	Name and address of the Bank Branch (where payments are to be sent by IOC)	
5	Branch Name/Code	
6	The 9 Digit MICR code of the Branch (as appearing on the MICR cheque)	
7	IFSC Code of the Bank Branch for RTGS mode	
8	IFSC Code of the Bank Branch for NEFT mode	
9	E-mail ID of Beneficiary	
10	Any other particulars (to be advised by Beneficiary for the E-payments purposes)	
11	Vendor Code (to be filled by IOC's Deptt only)	
12	PERMANENT ACCOUNT NUMBER	
13	MOBILE NUMBER (FOR SMS ALERTS)	

A blank copy of a cancelled cheque/photocopy of a cancelled cheque relating to the above account Number for verifying the accuracy of the bank account details is enclosed.

A copy of PAN Card duly attested by authorized signatory for verifying the accuracy of the PAN is enclosed. I/We hereby declare that the particulars given above are correct and complete.

Date: Signature of Account Holder
Place: with Company Stamp (if a Company)

Encl: one cheque/photocopy of cheque duly cancelled & copy of PAN Card.

***We hereby confirm that the above bank account details of beneficiary are correct in all respects and the account of Beneficiary (IOCL Vendor) is maintained at our bank branch.

(Name of the Bank & Branch)
Authorized Signatory



**Design, Engineering, Manufacturing, Packaging, Testing, Supply, Transportation and Supervision Of
Erection And Commissioning of High Speed Electric Motor for replacement of HPC Condensing
Turbine Along With Accessories, Mandatory Spares, Commissioning Spares, Special Tools & Tackles
And Third Party Inspection at NPRU Unit of IOCL Mathura Refinery.**

***Verification required only in case(a) vendors not providing a cancelled cheque leaf or if vendors name is not printed/appearing on the cancelled cheque leaf submitted to IOCL Office.

Special Purchase Conditions

These Special Purchase Conditions (SPC) shall be read in conjunction with the General Purchase Conditions (GPC), Material Requisition and any other document forming part of this RFQ wherever the context so requires.

Where any portion of the GPC is repugnant to or at variance with any provisions of the SPC then unless a different intention appears, the provision(s) of the SPC shall be deemed to override the provision(s) of GPC only to the extent that such repugnancy of variations in the SPC are not possible of being reconciled with the provisions of GPC.

A. PAYMENT TERMS

In partial modification to the payment terms as mentioned in the General Purchase Conditions, the following payment terms shall be applicable.

Applicable payment terms shall be as per SPC

Table 1: Payment Terms		
SL	Line Item Description	Payment Terms
1	1.1 Complete high speed motor package along with hot stand-by VFD, Input Transformers, Power Cables and Accessories.	a) 5% of total PO value of respective line items against approval of drawings (Equipment Layout, Electrical SLD, P&ID's (Lube Oil P&ID, Cooling water P&ID)) and motor data sheets at least in Code-2 against submission of Advance Bank Guarantee (ABG) for an equivalent amount valid till contractual delivery date (CDD) plus 3 months.
	1.2 Spare High Speed Motor.	b) 10% of total PO value of respective line items against identification of raw materials (raw material for stator & rotor cores and copper for windings) at Supplier's works against certification by IOCL/CONSULTANT/TPI agency and submission of advance bank Guarantee (ABG) for equivalent amount valid till contractual delivery date (CDD) plus 3 Months. c) 70% of total PO value of respective line items against dispatch documents (along with copy of LR/GR and IRN) through Bank or directly to IOCL/ CONSULTANT together with full taxes, duties. d) 05% of total PO value of respective line items on receipt of Final/As built Drawings/Documents/Data/Manual in requisite number of copies/sets/CDs as per VDR specified in Purchase Requisition.

		e) 5% of total PO value of respective line items on receipt & acceptance of all material at site. f) 5% of total PO value of respective line items on successful commissioning and Performance Run test at site.
2	Mandatory Spares	1. 90% payment of total PO value of respective line item on receipt of spares at site after dispatch of main equipment. 2. 10% payment of total PO value respective line item on receipt & acceptance of materials at site.
3	Site Supervision Services on per diem basis	100% prorata against monthly bills to be submitted by Supplier duly certified by Engineer-in-Charge.
4	CAMC charges	100% prorata against monthly bills to be submitted by Supplier duly certified by Engineer-in-Charge.
5	Note to Payment Terms	
5.1	5% & 10% advance against ABG (as mentioned in Point No 1(a) & 1(b) above) shall be released only after receipt & acceptance of PBG as per tender terms.	
5.2	If bidder does not take the advances mentioned in the Point No 1(a) & 1(b) above and supplies the material, then 85% payment shall be released to the bidder as per terms and conditions mentioned in clause Point No 1(c).	
5.3	1 st Milestone payment shall be released only after receipt of PBG (wherever applicable) and manufacturing schedule. Performance Bank Assurance shall be submitted within 45 days of Letter of Acceptance.	
5.4	Prorata payments shall be applicable on dispatch of equipment. In case of equipment, prorata shall not be on part of equipment.	
5.5	In case of indigenous SUPPLIERS, wherever taxes/duties are separately indicated, the order value shall be exclusive of taxes/duties. 100% payment of taxes/duties shall be paid along with the payment released against dispatch documents on receipt of Cenvatable/Duplicate Copy of Invoice / vatable documents (wherever applicable).	
5.6	Certification for identification of major raw material, in the above payment terms, shall be carried out by IOCL/ CONSULTANT/TPI agency, as applicable.	
5.7	Payment against Billing Breakup shall be made upto 90% of the payment due against dispatch. Beyond that, payment shall be made only after completion of the entire supply. Maximum number of invoice, for payment purpose, against a billing breakup shall be fixed	
5.8	Wherever in MR tenders payment terms, one of payment milestone has payment linked to receipt of all Final/As built Drawings/Documents/Data/Manual in requisite number of copies/sets/CDs as per VDR specified in Purchase Requisition, following	

	clause to be made part of payment terms: “In case final/As-built Drawings /Documents / Data / manual in requisite number of copies/sets/CD as per VDR are not submitted within 12 months from the date of supply of last item of the Initial order, for reasons not attributable to bidder ; then the supply payment on hold on this account shall be released against invoicing and submission of Bank Guarantee of equivalent amount valid for a period of 6 months initially and shall be extended till commissioning of the system.”
5.9	Successful commissioning and Performance Run test (PRT) at site as mentioned in Point No 1(f) shall mean the PRT of the High speed Motor package at Site, coupled with the existing compressor as defined in the Technical Documents of the Contract. In case, Successful commissioning and PRT at site (as per the applicability) is not completed within 12 months from the date of supply of last item of the Purchase Order, for reasons not attributable to Vendor; then the payment on hold on this account against supply shall be released against invoicing and submission of Bank Guarantee of equivalent amount valid for a period of 6 months initially and shall be extended till commissioning of the system.

B. LOADING AND PENALTY CRITERIA

The Bidder shall furnish the guaranteed values for KW of item including all losses with zero per cent positive tolerance including errors in instruments and measurement, at the rated operating (i.e. guarantee) point. Refer Technical specification for Loading & Penalty Criteria mentioned below. Bidders are requested to provide GUARANTEED POWER CONSUMPTION VALUE in the price bid.

The proposed technical loading criteria and penalty is as follows:

01. Performance Guarantees

Loading and penalty criteria shall be based on the guaranteed performance of the item. The parameter for loading shall be the KW of the item at the guaranteed (certified) rated operating point specified in the process data sheets unless otherwise specified.

- 02.** Bidder shall furnish the guaranteed values for KW of item including all losses with zero per cent positive tolerance in eluding errors in instruments and measurement, at the rated operating (I,e. guarantee) point along with bid submission.

Loading Criteria:

1.1 Total cost

The total cost of item(s) (including all working and standby units) (i.e. Tag-wise) for evaluation purposes shall be computed as under.

$$\text{Total cost} = C1 + C2 + C3 + C4 + C5$$

Where,

C1 = Capital cost of all items (both operating as well as Standby) and auxiliaries including commissioning spares and Special tool & tackles.

C2 = Cost of spare High Speed Motor

C3 = Cost of mandatory spares

C4 = Differential operating cost as defined here under,

C5 = Cost toward Site supervision plus any Services cost (as applicable)

1.2 Differential operating cost (C4)

Differential operating cost (C4) is defined as under:

$$C4 \text{ (in Rupees)} = \text{Nop} \times (\text{BKWE} - \text{BKWR}) \times \text{CF} \times 8000 \times \text{DF}$$

Where,

BKWE = Power rating (KW) at rated speed for the high-speed motor quoted by the bidder

BKWR = Lowest Power rating (KW) at rated speed for the high-speed motor amongst the technically acceptable bidders.

Nop = Number of operating units i.e 1 Nos.

CF = Cost of electrical energy per KWH (i.e Rs 10.81 per KWH)

DF = Discounting factor to arrive at Net Present Value (NPV) based on number of operating years for which loading is to be done as specified i.e. 05 years.

8000 = Number of operating hours for one year,

$$n = k+1$$

$$\text{DF} = \sum_{n=2} [1 \div \{1 + (R/100)\}^n]$$

$$D_F = 3.4944$$

where,

k = Number of operating years for which loading is to be done as specified i.e. 5 years

R = prevailing annual interest rate @ 9.60%

Note

- The maximum loading to be applied however shall not exceed 10% of the total capital cost i.e. cost of all items (C1) plus cost of spare high speed motor (C2) plus cost of mandatory spares (C3) as defined earlier

2 Penalty Criteria:

During the performance test at the vendors works, in case the item fail to meet the guaranteed values, the following procedure shall be followed.

2.1 In case during shop performance tests, the KW consumed by the equipment (high-speed motor) exceeds the stipulated guaranteed value by more than 4% the subject item gets rejected.

2.2 However for excess power (Kw) consumed over and above the rated KW upto a maximum of 4% the bidder shall be penalised for extra energy consumption for each item having tested KW greater than the guaranteed value, as define earlier.

Penalty Computation

The penalty shall be worked out on the basis of differential operating cost as under:

PC (in Rs.) = MF X (BKWT – BKWG) X CF X 8000 X DF

Where,

BKWT = item KW as obtained from the shop test results.

BKWG = Guaranteed item KW

MF = Multiplying Factor = $\frac{\text{Number of operating/working units (Nop) i.e. equal to 1}}{\text{Total number of Units(N) i.e. equal to 2}}$

2.3 TPI inspection agency shall record and clarify the rated power (KW) of the high speed motor in Inspection Release Note (IRN) as consumed/obtained during the shop floor performance test.

2.4 The maximum penalty to be charged for non-conformance to guaranteed values during the shop performance test of all items of an item number put together (i.e. all working & standby units) shall not exceed 10% of the total capital cost i.e. cost of all items (C1) plus cost of spare high speed motor (C2) plus cost of mandatory spares (C3) as defined earlier. This penalty shall be on & above and independent of any other penalties specified elsewhere in the bid/inquiry documents.

C. Contract Value and Total order value:

- a. Total Order Value for Price Discount and loading clause(s) as per IOCL GPC shall mean supply price including P&F, TPI, site work (wherever applicable) etc. but excluding Freight, Transit Insurance, GST, supervision services, 3D modelling, PWCAMC (If applicable), Hazop charges and Training charges.
- b. Total contract Value shall mean the total order value mentioned in the GEM contract.
- c. Transit Insurance shall be in the scope of IOCL.
- d. Unloading of material at Mathura Refinery site shall be in IOCL scope.

INSTRUCTIONS TO BIDDERS (ITB)

A) SALIENT POINTS

1. Bidder should submit their bids strictly as per the requirements outlined hereunder and as specified in the Material Requisition/Technical Specifications/Scope of Tender or equivalent term /Technical Specifications/Scope of Tender or equivalent term.
2. Tender document (Non-Transferable) can be downloaded from GEM website during the period, as specified under “Critical Dates” stated in the GEM portal. Offer shall have to be submitted ONLY through online mode on above mentioned GEM website during the period, as specified under “Critical Dates” and the bids shall be opened on the date & time, as specified under “Critical Dates”.
3. Tender Opening:

The Un-priced offers shall be opened on the due date (appearing in under “Critical Dates” stated in the GEM portal) and in subsequent corrigendum, if any) and price bid of techno-commercially acceptable bidders shall be opened on a suitable date, which will be communicated to bidders, through GEM interface.

Tender opening can be witnessed by bidders by logging into the GEM website.
4. The bidders are required to submit their bids electronically on the **GEM Portal** only (URL: <https://gem.gov.in/>) using valid Digital Signature Certificates, on or before the bid submission date and time. Bidders are required to register themselves at <https://gem.gov.in/>
5. In the event of an irreconcilable conflict between the provision of GEM GTC and IOCL General Terms and Conditions of Purchase and/or the Special Conditions of Purchase and/or Addendum and/or the Agreed Variations to the Tender Documents and/or the Purchase Order and/or between any of the other said documents so that the conflicting provision(s) cannot co-exist, to the extent of such irreconcilable conflict, the following order of precedence shall apply so that the conflicting provision(s) in the document lower in the order of precedence set out below shall give way to the conflicting provision(s) in the document higher in the order of precedence, namely:
 - i. Purchase Order;
 - ii. Agreed Variations to the Tender Documents;
 - iii. Addendum/Addenda to the Tender Document;
 - iv. Special Conditions of Purchase
 - v. IOCL General Purchase Conditions
 - vi. GEM GTC
 - vii. Other Contract Documents.
6. **Payment Terms**

In partial modification to the payment terms as mentioned in the General Purchase Conditions, the following payment terms shall be applicable.

Payment terms shall be as mentioned in Special Conditions of Purchase (SPC).

7. Type of Tendered Item:

- **High Speed Motor Package.**

8. **For Price Reduction due to delay in supply (PRS) purpose: Date of Receipt of material at Mathura Refinery site shall be considered as the date of delivery.**

9. **The offer should be valid for 6 (Six) months from the scheduled unpriced bid opening date (including extensions, if any).**

10. **PAYMENT INSTRUCTIONS**

10.1 All dispatches shall be made only after receipt of Despatch Clearance from IOCL. Unless otherwise specified / required by IOCL, part dispatches will not be allowed and vendor has to supply materials in one lot.

10.2 For indigenous vendors, in case of direct negotiation of despatch documents payment shall be released only after receipt of materials at site.

10.3 CGST & SGST or IGST shall be released only on receipt of GST Invoice containing the following details:-

- (a) Name, address and GSTIN of the supplier.
- (b) A serial number of the invoice.
- (c) Date of issue.
- (d) Name, address and GSTIN or UIN, if registered of the recipient.
- (e) Name and address of the recipient and the address of the delivery, along with the State and its code,
- (f) HSN Codes or Accounting Code of services.
- (g) Description of goods or services.
- (h) Total value of supply of goods or services.
- (i) Taxable value of supply of goods or services taking into discount or abatement if any
- (j) Rate of tax (Central Tax, State Tax, Integrated Tax (for inter-state supply), Union Territory Tax or cess)
- (k) Amount of tax charged in respect of taxable services (Central Tax, State Tax, Integrated Tax (for inter-state supply), Union Territory Tax or cess);
- (l) Place of supply along with the name of State, in case of supply in the course of inter-state trade or commerce
- (m) Address of the dispatch point where the same is different from the place of supplier

- (n) Signature or digital signature of the supplier or his authorised representative.
- (o) It's the obligation on the part of Bidder / Vendor / Contractor / Consultant to discharge their liability by payment of GST to Government of India in cash OR utilisation of Input Tax credit in respect of such supply of services through GST Invoice under this Contract, so that Owner will avail Input Tax credit on such supply. Also it shall be the obligation on the part of the bidder / vendor to include the tax invoices in the return ensuring matching of the tax amount and to ensure timely filing of the return in the GSTN portal. In the event that the input tax credit of the GST charged by the Bidder / Vendor/ Contractor / Consultant is denied by the tax authorities to Owner due to reasons attributable to Bidder / Vendor, Owner shall be entitled to recover such amount from the Bidder / Vendor/ Contractor / Consultant by way of adjustment from the next invoice or from Bank Guarantee. In addition to the amount of GST, Owner shall also be entitled to recover interest and penalty, in case same is imposed by the tax authorities on Owner.
- (p) Any deductions in lieu of deviations to the terms and conditions of the purchase order shall be suitably incorporated by the vendor in the invoice presented, else the vendor shall have to necessarily provide a credit note upon intimation by IOCL within a stipulated time period and any delay in payment due to the delay in providing credit note shall be to the vendor's account.

- 10.4 No initial advance payment along with order shall be made by IOCL against supplies as well as services (i.e. transportation, erection, site work etc.).
- 10.5 Total progressive payments shall be limited to maximum as specified in SPC, against receipt of advance bank guarantee for equivalent amount. No progressive payments at any stage other than those milestones specifically mentioned above shall be payable by IOCL.
- 10.6 All Bank guarantee will be issued directly to IOCL by the Bank and Vendor shall enclose copy of the same along with invoice. Banks shall be informed to send a separate confirmation immediately on request to IOCL to expedite processing at IOCL's end.
- 10.7 All payments shall be released within 30 days of receipt of invoice and all requisite documents, complete in all respects.
- 10.8 Billing schedule shall be submitted to IOCL by the vendor for approval within 45 days from the date of Letter of Acceptance / Purchase Order (whichever is earlier) wherever specified in the Purchase Order. No pro-rata dispatch shall be made without the approval of billing schedule.
- 10.9 IOCL shall establish the Letter of Credit only on receipt of vendor's acceptance to IOCL's Letter of Acceptance and on submission of PBG by Vendor to IOCL.
- 10.10 Format for Advance Bank Guarantee (ABG) shall be as enclosed with the tender.
- 10.11 All Bank Guarantees (ABG, PBG for Foreign & Indigenous Suppliers) should be submitted to IOCL Office as detailed in tender.

11. EVALUATION CRITERIA FOR COMPARISON OF BIDS:

Following costs, taxes, duties etc., as applicable, shall be used for evaluation of bids:

- Basic ex-works cost (including special tools and ackles),
- Cost of mandatory and commissioning spares, if any
- Third party inspection (TPI) and Other Inspection charges, if extra
- Packing & Forwarding charges [P&F], if extra {Biodegradable packing material should preferably be used for supply of materials}
- All taxes and duties applicable in India for both Indian and foreign bidders, Port handling charges (for foreign vendors),
- Freight (including inland freight charges in case of foreign bidders)
- Transit Insurance @ 0.5%,
- Testing charges,
- Site work charges, if applicable
- Site supervision services charges (for number of days as informed in tender), training charges, if applicable
- AMC charges, if applicable
- Technical and commercial loadings, as defined in the Tender document. Loading for cylinder rental charges, if applicable
- Any other charges indicated by the bidder

For Purchase Delivery terms, only prevailing current INCOTERMS (2020) shall be used. Bid evaluation will be done considering GST rates and HSN quoted by the bidder. GST rates and HSN quoted by the bidder shall be treated final and bids shall be evaluated on Gross tax basis i.e. after including amount of GST.

Bidder to note that any higher rate of tax actually invoiced shall be adjusted in price.

Testing and Inspection charges: Goods and Services shall be subject to stage wise and final inspection by any of the Third-Party Inspection (TPI) agencies (listed in the Instructions to Bidders), and TPI charges are included in quoted prices, and no additional charges shall be paid by Owner.

Similarly, all built in import content (if applicable) shall also be subject to inspection by TPI agencies listed in the Instructions to Bidders, in the country of origin of the import content, and charges for the same are included in quoted prices, and no additional charges shall be paid by Owner.

It will be bidder's responsibility to arrange for third party inspection (if applicable for tender) and submit third party inspection release note on time. No time extension shall be allowed by IOCL for any delay/lapse in this regard

Third party inspection charges for equipment / material / goods shall be included by the Supplier(s) in their quoted prices, from any one of the Third-Party Inspection Agencies as per the tender.

11.1 Bids shall be evaluated after considering prices quoted for the components relevant to indigenous supplies as indicated above and the SGST & CGST or IGST quoted by the Bidder in ATC.

11.2 Site supervision services for required number of days shall be used for evaluation.

11.3 Bidders shall have to quote their prices in GEM inclusive of freight charges upto Refinery (Stores) / Project site.

11.4 It shall be assumed that the price quoted by the bidder in GEM is inclusive of TPI charges, , P&F, Freight charges, Insurance and all taxes and duties.

11.5 Technical loading shall be applied on the bidders after opening of the price bid on GEM portal. L1 bidder shall be decided based on the overall lowest evaluated price i.e prices quoted in GEM portal plus technical and commercial loading values.

12. COMMERCIAL LOADING OF OFFERS IN CASE OF DEVIATIONS

It may be noted that deviation to commercial terms indicated in this tender document may not be allowed even though loading has been indicated in this section. This loading shall be applicable only if Owner allows the deviation to any of the indicated commercial terms.

12.1. BASIS OF LOADING

12.1.1. The Bids shall be loaded on total order value.

12.1.2. Bidders are requested to submit the offer in line with terms and conditions provided in Tender document.

12.2. PAYMENT TERMS

12.2.1. The payment terms applicable should be clearly indicated. Loading shall be done on the differential amounts at a rate of 9.6% per annum simple interest or otherwise as defined in the tender for the following periods:

- (a) Drawing approval – 80% of the delivery period.
- (b) Receipt of raw materials at Supplier's works – 50% of the delivery period.
- (c) Final 10% against dispatch document - one month.

12.3. PERFORMANCE BANK GUARANTEE (PBG)

12.3.1. Wherever applicable for equipment's and packages, Performance Bank Guarantee (PBG) shall be furnished as per tender unless otherwise specified in the tender documents. PBG shall be as per GEM format, if the tender is in GEM & **valid till full defect liability period plus three (2) months claim period.**

In case bidder does not agree to submit PBG/ISB as per tender requirement, equivalent percentage loading shall be done.

In case a bidder offers to give a PBG for less than 05% of order value, loading shall be done for the differential amount.

In case of Differential Amount

Amount Offered by Bidder		Loading
a)	05%	Nil
b)	Less than 05%	Differential between the offered percentage and 05%

12.4. DELAYED DELIVERIES (CONSIDERING GPC CLAUSE OF 0.5% DELAYED ~ 5% TOTAL)

This clause shall be as per Cl. 12 of IOCL's GPC.

The difference between the quantum as per GPC and that offered by the bidder shall be loaded. For non-acceptance of this clause or for accepting Liquidated Damage, loading of 5% shall be done. In case the clause as per IOCL GPC is accepted but with maximum limit indicated as 5% of undelivered order value (not applicable for package items), loading of 2.5% shall be done.

In case there are different delivery dates for supply and for site job, PRS at applicable rate shall be applicable, if the vendor has delayed the supply beyond CDD, irrespective of actual date of completion of contract (Site work).

If subject tendered item is a package item (ordered as a complete system), the price adjustment shall be applicable on the total contract value of the package and not on the value of the undelivered portions (even if a billing breakup is approved for the package).

13. PRICE VARIATION

Prices mentioned in the Bid shall remain firm and fixed and valid until contractual completion except in the specific cases where Price Variation Clause with Price Variation Formula has been incorporated in the Bidding Document.

However if a bidder on his own gives a price variation formula without ceiling or gives a different Price Variation Formula other than the one given in the Bidding Document, offers of such bidders shall be rejected. Ceiling shall be loaded for evaluation purpose.

14. TAXES/DUTIES:

However, if a supplier states that taxes/duties are not applicable at present and will be charged as applicable at the time of delivery then his bid shall be loaded by the maximum rate of taxes/duties applicable as on the date of bid opening.

Cost loading in respect of utilities etc. will be considered as per respective MR/Technical Specification stipulation.

15. DELIVERY

In case a supplier quotes delivery longer than required in enquiry, the bid may get rejected and IOCL reserves the right to accept or reject the bid as per its discretion.

16. VALIDITY OF OFFER

In case a bidder offers shorter validity than required in Tender and seeks to revise prices on being asked to meet validity requirement as per Tender, the offer shall be rejected.

16.0 SUO MOTO CHANGES IN PRICES

Suo moto price change: In case of any suo moto change in price, following shall apply:

Stage	Price Increase	Price Decrease
After opening of un-priced bid	Not Acceptable. Bid shall be liable for rejection. Action regarding Holiday Listing may be taken. EMD shall be forfeited. In case of GeM, IM Policy of GeM shall be applicable	Tender evaluation shall be done without considering suo moto price decrease. Ordering shall be done considering suo moto price decrease.

17.0 SPARES

17.1 Prices of Mandatory Spares, Commissioning spares and special tools and tackles, wherever required and as specified in the tender documents shall be included / quoted extra (as specified in Price Format).

17.2 All spares quoted (as specified in Price Format) by suppliers against the specified MR / Technical Specification requirement will be evaluated and recommended for ordering with the main equipment except recommended two years operation and maintenance spares. It is the prime responsibility of the bidder to quote spares prices as asked in the price format / tender documents (may be included in the main item or asked to specifically quote spares prices as extra). In case a supplier does not quote for spares as extra wherever asked to specifically quote as extra (in the price format), their spares price shall be considered as included in the main item price. Evaluation and ordering shall be done considering spares price as included / nil.

17.3 Commissioning spares and special tools and tackles, if required and mentioned in MR/Technical Specification, will be considered for price evaluation and recommended for ordering as quoted by Suppliers. They need to be quoted extra only when asked in the price format. However, Supplier shall be fully responsible, and no additional cost shall be paid by IOCL in case commissioning spares/ special tools & tackles over & above those quoted by supplier are required.

17.4 Bidders are requested to quote for their recommended two years operation and maintenance spares wherever asked for but the same will not be considered for price evaluation. The prices quoted for recommended two years operation and maintenance spares shall remain valid up to the contractual completion/delivery period of Order. Order of recommended two years operation and maintenance spares may be placed by IOCL separately, if required. Spares and its quantity shall be decided by IOCL at the time of Order for two years operation and maintenance spares.

Bidder to refer tender documents for Break-Up (%) of Two Years Operation and Maintenance Spares Charges. The same to be submitted duly signed & stamped along with unpriced Bids.

18.0 CURRENCY OF BID

18.1 Bidding currency shall be Indian Rupees (INR) for Indian bidders

19.0 CONTACTING IOCL REPRESENTATIVE

19.1 From the time of the bid opening to the time of the award, if any bidder wishes to contact IOCL for any matter relating to the bid, it should be done in writing.

19.2 Any effort by a bidder to influence IOCL in any manner in respect of bid evaluation or award will result in the rejection of that bid.

19.3 Advise IOCL of any questions as quickly as possible and in any event no later than five working days prior to the Closing Date for submission of Bids.

20.0 EXAMINATION OF BIDS AND DETERMINATION OF RESPONSIVENESS

20.1 IOCL will examine the bids to determine whether they are complete, whether any computational errors have been made, , and whether the bids are generally in order.

20.2 Prior to the detailed evaluation, IOCL will determine whether each bid is of acceptable quality, is generally complete and is responsive to the Tender Documents. For the purposes of this determination, a responsive bid is one that conforms to all the terms, conditions and specifications of the Tender Documents without deviations, objections, Conditionality or reservations.

20.3 Bidder shall not be allowed to submit any Price Implication or Revised Price after submission of Bid, unless there is change in the stipulations of the Tender Document and such changes are incorporated through an Amendment. In case Exceptions and Deviations submitted by Bidder along with Bid are not considered as acceptable and no Amendment is issued, then in such a case the Bidders would be required to withdraw such Exceptions/Deviations in favour of stipulations of the TENDER document and Bidders would not be eligible for submission of Price Implication/Revised Price, failing which such Bid(s) shall be considered as non responsive and rejected.

- 20.4 IOCL's determination of a bid's responsiveness shall be based on the contents of the bid itself without recourse to extrinsic evidence. If a bid is not responsive, it will be rejected by IOCL and may not be subsequently made responsive by the bidder by correction of the nonconformity.

21.0 SPLITTING OF ORDERS

Order for supply and site work shall not be split and only single order covering the entire scope of work on each supplier shall be placed. However, IOCL reserves the right to place multiple orders interlinked with each other for ease of execution.

22.0 NEGOTIATION

Negotiations will not be conducted with the bidders as a matter of routine. However, IOCL reserves the right to conduct negotiations. Bidders should quote competitive prices considering the fact that price negotiations, if required, to be held with the lowest bidder only.

23.0 AWARD OF WORK

- 23.1 IOCL will award the order to the bidder who has been determined as a lowest evaluated bidder.

24.0 IOCL'S RIGHT TO ACCEPT ANY BID AND TO REJECT ANY BID

- 24.1 IOCL reserves the right to accept or reject any bid, and to annul the bidding process and reject all bids at any time prior to award of the order without thereby incurring any liability to the affected bidder or bidders or any obligations to inform the affected bidder or bidders of the ground for IOCL's action. IOCL reserves the right to award to any bidder (other than the lowest bidder) without assigning any reason.

25.0 NOTIFICATION OF AWARD—As per GEM

26.0 LANGUAGE OF BID

- 26.1 The Bid prepared by the bidder, all correspondence/drawings and documents relating to the bid exchanged by the bidder with IOCL shall be in English Language alone provided that any document furnished by the bidder may be written in another language so long as accompanied by an English translation, in which case, for the purpose of interpretation of the bid, the English translation shall govern.
- 26.2 In the event of submission of any document/ certificate by the Bidder in a language other than English, the English translation of the same duly authenticated by Chamber of Commerce of Bidder's country shall be submitted by the Bidder. Translation by Indian Embassy / High Commission or authorized / approved translation agencies (by Indian Embassy / High Commission) or any other independent authority shall also be acceptable apart from the Local Chamber of Commerce of country of origin.

27.0 REQUIREMENT OF EMPLOYMENT VISA FOR FOREIGN NATIONALS

27.1 All Foreign nationals coming to India for execution of Projects/ Contracts will have to apply for Employment Visa only and that grant of Employment Visa would be subject to strict adherence of following norms:

- a. Employment Visa is granted only for the skilled and qualified professionals or to a person who is being engaged or appointed by a Company, Organization, Industry or Undertaking etc. in India on contract or employment basis at a senior level, skilled position such as technical expert, senior executive or in managerial position etc.
- b. Request for Employment Visa for jobs for which large number of qualified Indians are available, is not considered.
- c. Under no circumstances an Employment Visa is granted for routine, ordinary jobs.

27.2 Bidders are advised in their own interest to check latest Visa rules from Indian Embassy/ High Commission in their country in case foreign nationals are required to be deputed to India during execution of the Contract.

28.0 ARBITRATION & CONCILIATION

Arbitration & Conciliation shall be as per clause 34 of GPC and its amendment.

In case the bidder is a PSU/CPSU, guidelines from Govt of India shall be followed.

29.0 PRE PRICE BID MEETING

IOCL reserves the right to conduct Pre Price Bid Meeting.

No technical issues shall be raised / discussed by either side during Pre Price Bid meeting. Based on discussions in the pre-price bid conference, deviations, if any, from tender terms and conditions shall be communicated in writing to all the bidders and they shall be asked to submit price implication when substantial changes are made after taking into account the modified terms and conditions including deviations, within stipulated period.

If a bidder takes any further deviations other than those agreed, while submitting the revised price bids, its bid shall be rejected outright without any reference. In case it is found after opening that any deviation is incorporated in the revised price bid, bidder is also liable to be placed on holiday for a period of one year for future tenders in IOC after following the laid down policy in this regard.

Price implications received after the stipulated date are not to be considered. Bidders unable to comply with IOCL's terms and conditions including proposed deviations will be allowed to withdraw their bids.

30.0 ROYALTY INFLOW

Bidders should declare if the offered product is based on IOCL Research & Development (R&D) formulation, and if yes, whether the agreement for royalty payment with IOCL is valid.

The vendor should also enclose an undertaking for the applicable royalty rate payable to IOCL (R&D), while submitting the offer. IOCL shall cross check the applicable royalty from R&D centre, while evaluating the bids. Incentive will be considered while evaluating the bids by applying negative loading to the rates quoted by manufacturers using IOCL (R&D formulations, to the extent of royalty inflow to IOCL (R&D), after adjustment of taxes and surcharges, if any.

31.0 SAFETY PRACTICES IN MATERIAL DISPATCH & TRANSPORTATION

Refinery being sensitive establishment from fire and safety point of view, therefore there are certain rule and regulation while entering the vehicle and personnel in Central Stores, Mathura Refinery.

Vendor to ensure availability of required original and valid documents for entry of Vehicle carrying Consignment / Material inside the Refinery Premises like RC Book, Insurance Papers, Fitness certificate of Vehicle (Tanker/Truck/Container), Driving License and Cleaner's photo pass etc. at the time of dispatch of Materials & delivery at Mathura Refinery. Vendor to also ensure that the materials / supplies under the PO are transported through registered common carrier only as per relevant provisions of the updated Road Act (Motor vehicle act 1988 & its latest updated revision). This shall enable CISF at Mathura Refinery to allow them smoothly inside Refinery due to security reasons and avoiding any hassles at Refinery Gate.

Truck / Tanker should report at IOCL gate by 8.30 am (excluding Sundays or holidays as per Refinery norms) in order to facilitate unloading at the earliest and release of trucks.

For Entry in Refinery Premises, Vehicle should be fitted with Spark Arrestor, Fire Extinguisher & back horn. Driver and Cleaner should wear PPE i.e. Shoes, Apron and Safety Helmets.

CNG / Two Stroke engine Vehicles are not allowed to enter the refinery premises. Please ensure to send the material in Non-CNG / Non-Two Stroke Engine Vehicles only.

- i) Motor vehicle act: Vehicles shall follow motor vehicle act 1988 & its latest updated revision and all other applicable laws of land during transportation of the material from bidder's works to Mathura Refinery.
- ii) Successful Vendor to indicate the name of driver/khalasis on the lorry receipt/challan etc. so that the same can be verified at the entry gate while allowing entry by CISF. khalasis (Cleaner) should have at least one ID card such

as Aadhar Card, Bank Passbook, Driving License etc. This is required for enhancing security measures for incoming material.

- iii) Successful Vendor to also ensure availability of required original and valid documents like RC Book, Insurance Papers, Fitness certificate of Vehicle (Tanker/Truck/Container), Driving License and Cleaner's photo pass etc. at the time of dispatch of Materials & delivery at Mathura Refinery. This shall enable CISF at Mathura Refinery to allow them smoothly inside Refinery due to security reasons and avoiding any hassles at Refinery Gate. In case of non availability of original RC Book in the vehicle, Notarised (True Copy) of RC Book will also be accepted. Vehicle propelled by CNG/LPG or vehicles having less than 4 wheels viz. 3 wheelers etc. are not allowed in Refinery
- iv) Invoice "Duplicate for Transporter" shall be submitted at Store.
- v) Following precautions should be taken care during packing-
 - a. Mathura Refinery is heading towards "Plastic neutrality" hence vendors are advised to preferably use biodegradable material for packaging.
 - b. End Cap should be provided at Pipe, Tubes and Valves. For Pipe and Pipe Fittings color code should be used as per Standards, like Red Color for IBR etc.
 - c. For small rotary spares packing cartons should be sound enough to hold the material and material code no., Material description and Purchase Order No. should be clearly mentioned on it.
 - d. For Instrument Cards, separated card packing with foam and good quality cartoon should be used.
 - e. Small size Spares should be packed in mouth closing packing.
 - f. Cable should be packed preferably in metal drums and should be end closed.
 - g. Material Code should be painted on big size spares, such as Heat Exchangers, Pipe Fittings etc.
 - h. For Materials like Chemicals, Refractory, Battery having shelf life, expiry date should be clearly mentioned on packing.
 - i. All Type of Gas Cylinder should be supplied with end caps.
 - j. For Chemicals Batch No. should clearly mention on drums and different colour drum should be used for different chemicals.
 - k. Gasket should be packed with proper cardboard support.
 - l. Rotors should be preferably with vertical stand and Nitrogen Filling provision.
- vi) Penalties for Violation / Non-adherence of safety procedures and practices (Applicable for Tenders/Purchase Orders involving site work):
 - a) Violation of applicable Safety, Health and Environment related norm a penalty of
Rs.5,000.00 per occasion
 - b) Violation as above resulting in any physical injury, a penalty of 0.5% of the contract value (maximum of Rs.2,00,000.00) per injury in addition to Rs.5,000.00 per occasion as in item a.
 - c) Fatal accident, a penalty of 1% of the contract value (maximum of Rs.10,00,000.00) per injury in addition to Rs.5,000.00 per occasion as in item a.

The vendor is advised to take appropriate insurance policy for the effective implementation of the above penalty provision.

In case of accidents depending on the seriousness of injury etc. in addition to the hospitalization / treatment charges and group insurance amount, compensation shall be paid by the vendor to the affected person / his family members in presence of Engineer-in-charge as per Workmen Compensation Act.

32.0 INSTRUCTIONS FOR ENSURING QUALITY IN SUPPLY OF EQUIPMENT& MATERIAL:

- No supply to be made unless drawings (wherever required to be approved as per the technical specifications) are approved in Code 1 by Owner / CONSULTANT
- Where required, Inspection & Test Plan (ITP) must be approved by Owner /CONSULTANT.
- Third Party inspection release note shall clearly stipulate that material/equipment have been inspected as per Code 1 approved drawings and approved ITP.
- No clearance shall be given to the contractor for erection works / installation of the equipment without receipt of third party inspection release note.
- Pre-commissioning/commissioning of plant/equipment shall be undertaken only after complete satisfaction/verification that supplies are in accordance with final approved drawings (Code 1) and ITP
- Materials shall be dispatched only after issue of Inspection Release Note by TPI agency and despatch clearance given by CONSULTANT.
- Approval Code / Level definition shall be as under

Status Code / Level	Explanation
3	Revise and resubmit
2	To be issued as final after incorporating the comments
1	No Comment- Final issue.

33.0 SITE SUPERVISION SERVICES AND TRAINING

(1) Terms & conditions for Site Supervision & Training services. Bidder shall quote per diem charges considering the following:

- Owner shall reimburse economy class airfare to and from the nearest Airport to New Delhi Airport against documentary evidence.

- Transportation charges to and from New Delhi Airport to refinery / Project Site at MATHURA Refinery, shall also be reimbursed against submission of documentary evidence (limited to maximum First AC Railway Fare between New Delhi station and Mathura Station).
- The per diem rates shall **include** lodging, boarding, local transport, medical, all insurance including third party, income tax, all taxes & all other incidental charges.
- The per diem rates shall exclude GST which shall be payable extra
- Per diem rates shall apply from the date the supervisory personnel reach site and upto the day they leave site. No payment shall be made for the transit period.
- Working hours as those prevailing at site – **upto** eight hours a day(excluding lunch time of 1 hour), Monday through Saturday and holidays as applicable to site personnel shall apply.
- Vendor's supervisory personnel shall observe / abide by site working conditions prevailing in the existing refinery, safety codes and Indian laws.
- A notice period of 15 days will be given for site supervision services.
- For evaluation purpose site **supervision of erection, testing and commissioning at site 60 (sixty) man-days** shall be considered for Evaluation for Supervision Services.
- However, payment shall be made as per actual number of man-days.
- Bidder to ensure compliance to guidelines on PPE (Personal Protective Equipment) & Other Safety Norms

(2) Charges for Site Supervision of erection, testing and commissioning:

S. NO	Description	Man Day rates in INR
1	Per diem charges for upto 8 hours work on normal working days.	Applicable
2	Overtime rate / hour beyond normal 8 hours work on normal working days	
3	Overtime rate / hour for work on weekly off days / holidays(as applicable to Refinery site).	

ANNEXURE-A - BREAK-UP OF LUMP SUM PRICE FOR MANDATORY SPARES

(AS QUOTED IN PRICED BOQ)

Name of Work: Supply of High speed motor package at IOCL Mathura Refinery

Tender Reference No:

Tender ID:

Bidder Name:

Notes:

Bidder to furnish breakup **IN % (percentage)** of the amount quoted line item wise in Priced BOQ duly signed & stamped along with their Unpriced Techno-Commercial Offer.

PRICE SCHEDULE MANDATORY SPARES

SL. NO.	DESCRIPTION	High Speed Motor Package
		(in %)
	Bidder to Mention Item Description in this Column	
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
	TOTAL MANDATORY SPARES CHARGES	100%

<u>ANNEXURE-B - BREAK-UP OF LUMP SUM PRICE FOR TWO YEARS OPERATION AND MAINTENANCE SPARES CHARGES</u> <u>(AS QUOTED IN PRICED BOQ)</u>		
<u>Name of Work:</u> Supply of High Speed Motor Package at IOCL Mathura Refinery		
<u>Tender Reference No:</u>		
<u>Tender ID:</u>		
<u>Bidder Name:</u>		
<u>Notes:</u>		
Bidder to furnish breakup IN % (percentage) of the amount quoted line item wise in Priced BOQ duly signed & stamped along with their Unpriced Techno-Commercial Offer.		
<u>PRICE SCHEDULE TWO YEARS OPERATION AND MAINTENANCE SPARES</u>		
SL. NO.	DESCRIPTION	High Speed Motor Package
		(in %)
	Bidder to Mention Item Description in this Column	
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
	TOTAL TWO YEARS OPERATION AND MAINTENANCE SPARES	100%

Special Conditions of Contract for CPWAMC

TERMS AND CONDITIONS FOR COMPREHENSIVE POST WARRANTY ANNUAL MAINTENANCE CONTRACT (CPWAMC) for Supply of Hot stand by VFDs, Input Transformers, PLC (schedule 4).

- 1.1 The Bidder shall provide a separate price for the 5 (five) years Comprehensive Post Warranty Annual Maintenance Contract (CPWAMC) i.e. in schedule 7 to 11 inclusive of GST.
- 1.2 CPWAMC price of each year should not be less than 3% of VFD. CPWAMC charges offered for each subsequent year should be same or higher than preceding year. The CMC charges shall be offered within range of 3 to 10% of cost of equipment in line with GeM guidelines.
- 1.3 CPWAMC Charges are inclusive of all the charges for Transportation, Lodging, Boarding, all insurances including third party insurance and all other incidental charges. The same shall include CGST & SGST / IGST. The prices also include cost of spares and damaged parts (in case of **comprehensive maintenance contract**). The CPWAMC charges also include arranging hand tools & tackles, special tools etc. required to carry out the work. The payment terms for the CPWAMC shall be on quarterly basis on completion of each quarter against submission of Bills duly certified by the Engineer-in-charge. IOCL GCC & SCC shall be applicable, and this should be provided along with the tender document.
- 1.4 Bidder shall provide a % breakup of the cost for each item/system for which CPWAMC services have been sought as per tender conditions and the % break up of each item/system shall not be clubbed with other item/system.
- 1.5 After detail engineering, at the time of finalization of the supplier for the listed items, CONTRACTOR will enter into a 5 (five) years Comprehensive Annual Maintenance Contract (CPWAMC) (with the required spares and consumables) with the Original equipment manufacturer and thereafter transfer this contract to Owner. The CPWAMC shall be valid for a period of five years from the date of expiry of the defects liability period. The contract shall clearly indicate the scope of CPWAMC as indicated below along with the rates as quoted by contractor. No change in rates or terms and conditions shall be accepted during placement of order by IOCL.
- 1.6 Owner does not have any liability, whatsoever, over and above the prices of CPWAMC quoted. Owner shall place a separate order for this CPWAMC directly to the Supplier/Original equipment manufacturer after the expiry of defect liability period.

Within Ten days of placement of Order for CPWAMC, Supplier/Original equipment manufacturer shall submit PBG for 5% of complete CPWAMC order value valid for complete CPWAMC period + 3 months claim period. In case Supplier/Original equipment manufacturer finds it difficult to get BG with complete CPWAMC period, they can submit BG with interim validity of minimum 2 years & subsequently the same to be renewed before expiry. In absence of a valid PBG, payment for CPWAMC shall not be released.

Special Conditions of Contract for CPWAMC

It will be the obligation of the contractor to ensure that the Supplier/Original equipment manufacturer of the items honour the CPWAMC contract. Any cost increase for execution of CPWAMC by the Supplier/Original equipment manufacturer beyond the quoted rates shall be adjusted from the amount payables to the contractor as elaborated above.

1.7 List of Items for CPWAMC

A. Electrical items (As applicable):

1. UPS
2. Battery Charger
3. VFD
4. HVAC/Pressurization system/Soft Starter
5. ECS

B. Instrumentation (As applicable):

1. DCS all associated systems supplied by OEM
2. PLC including all associated systems supplied by OEM
3. Analysers of all types (including Gas Chromatographs)
4. Machine Monitoring System (MMS)
5. Condition Monitoring System (CMS)
6. CCTV
7. Paging System
8. Fire Alarm System
9. Gas detection system
10. Anti surge Controller

1.8 The following are the minimum terms and conditions for each of the listed item under CPWAMC which the Bidder shall include in its price bid. If any item has multiple vendors, then CPWAMC shall be placed with individual OEM. The services have to be provided by OEM; for foreign vendors it has to be provided by the authorized service provider in INDIA. In event of lack of resources or capability the same has to be provided from foreign source at no extra cost.

The CPWAMC includes complete servicing, regular & preventive maintenance and breakdown / Emergency / shutdown maintenance as per the service frequency outlined below for above listed item. This also includes supply of spares and Consumables for continuous availability including its replacement of the as required.

A. Preventive Maintenance

Once in a year the Owner shall inform the CPWAMC Supplier/Agency, one month in advance, the planned shutdown dates. The CPWAMC Supplier/Agency shall mobilize during this period to carry out the preventive maintenance. This Includes cleaning, inspection of all hardware and software, Checking of all ground connections, ground voltages etc., Checking & recording of all settings & parameters, fault prediction, inspection of power supply quality, checks on environmental operating conditions, calibration checks, major repairs and replacements, replacement

Special Conditions of Contract for CPWAMC

of electronics modules or any other parts likely to fail due to aging, cleaning of each component like electronic modules connectors, etc. flushing of sampling lines, cleaning of all filters, valves, Overall checking of the system performance, Checking of breakdown logbooks to analyse problems and suggesting long-term solutions for reliability improvements and preparing detailed reports. This visit shall be in addition to those required for periodic maintenance and shall be part of CPWAMC.

B. Periodic Maintenance

Site visits, minimum 4 times a year (no. of days shall be as per the size of the system).

Schedule of visits shall be discussed and finalized with Owner. Preventive maintenance shall include inspection of general healthiness of the systems, study and advice on daily maintenance, inspection of all hardware and software, running of test programs, on-line servicing and solving reported problems. Checks shall be conducted on running systems / sub-systems like:

- a. Checks on power supplies
- b. Cleaning of cabinet filters
- c. Cleaning / replacing all filters, checking and rectifying leaks, etc.
- d. Diagnose alarms history.
- e. Running diagnostic routines, software debugging,
- f. Checking & recording of all settings & parameters
- g. Checking the performance of the main and sub systems.
- h. Taking back-up copies of last updated software as applicable
- i. Trouble shooting of minor problems and general performance check-up
- j. Anti-virus patch update / upgrade (continuous during the contract period)
- k. Prepare site visit report.

C. Software Maintenance and Support

This shall include maintenance of operating and application software to improve upon system performance. This includes application and operating software modification & debugging, supply and fixing of patches released by licensors / manufacturers to remove bugs or upgrading the running version, etc. Anti-virus and cyber protection patch upgrade and updates.

D. Emergency Services

- a. In the event of any malfunction of any of the systems/ items for which the CPWAMC is in force, the CPWAMC Supplier/Agency shall depute the concerned experts to Site so as to trouble shoot the problem & rectify the failed system items within 24 hours after receipt of a written intimation or Telephone call from IOCL.
- b. The CPWAMC Supplier/Agency shall maintain at his premises or of the other agencies / vendor charged with the maintenance, a stock of necessary spares required. In an event of breakdown, repairing or replacement should be possible within 24 hours maximum without any lead time for procurement of spares. The CPWAMC shall include not only the supply of spares for maintenance but shall also include Labour and materials at no additional cost to repair the system and any devices applicable. In the event of any malfunction of the hardware / software, the experienced service engineer shall be made available at Site so as to rectify and put back in service the defective system / item within 24 hours.

Special Conditions of Contract for CPWAMC

- c. The CPWAMC Supplier/Agency's liability to provide maintenance spares shall not, however, be confined in any manner to be requirement of maintenance spares estimated by the CPWAMC Supplier/Agency. The CPWAMC Supplier/Agency, shall, within the scope of the Maintenance Contract, be required to fulfill or replenish any shortfall in the maintenance spares without additional cost to OWNER.
- d. Owner's personnel shall work on the system on a day to day basis and wherever possible, inform the CPWAMC Supplier/Agency about the type of failure of hardware/software, based on diagnostics or other information available. However CPWAMC Supplier/Agency shall be fully responsible to attend, Identify the root cause and rectify the failure in the shortest possible time.

1.9 Other Terms & Conditions of CPWAMC

Maintenance engineer shall Report to IOCL site engineer for necessary job clearances before start of the job.

- 1. Maintenance engineer shall Observe / abide by site working conditions prevailing in the existing refinery, safety codes and Indian laws.
- 2. Maintenance engineer shall ensure compliance to guidelines on PPE (Personal Protective Equipment) & Other Safety Norms.
- 3. Maintenance engineer shall carry proper tools and tackles wherever required for the job execution and completion as advised by Engineer - in- Charge/Site Engineer.
- 4. The service shall be provided by qualified and experienced engineer and not be temporary or trainees.
- 5. Any failure on account of lapses by the service personnel shall borne by the contractor.
- 6. The CPWAMC agency shall submit an undertaking for compliance of all laws, as applicable along with requisite documents (i.e. Third-Party Insurance, Employees' Compensation Insurance, PF & ESI challans along with ECRs/declaration, Para 36B PF statement for recoveries of contribution, Wages Slips, etc.)
- 7. Payments shall be made on due certification of work on a quarterly basis.

- 1.10 Scope of work for comprehensive post warranty annual maintenance contract (CPWAMC) 1.7 & 1.8 shall be read in conjugation with Scope of work mentioned in technical part of this tender (if any). Any conflict between the documents shall be brought to the owner's notice and more stringent clauses shall be applicable subject to the owner's approval.

IOCL, MATHURA REFINERY

ANNEXURE-8

ADDITIONAL TECHNICAL SPECIFICATIONS FOR VFDs
FOR HPC HIGH-SPEED MOTOR PACKAGE

Additional Technical Specifications of VFDs

Additional Technical Specifications of VFDs

1.1 Scope of Supply:

Preface:

Presently NPRU unit is provided with turbo driven HPC Compressor. The Heat Pump compressor (18N-K-201) is driven by a condensing type steam turbine which delivers ~5 MW power to the compressor using ~24 T/hr MP steam. It is envisaged to convert steam turbine driven HPC Compressor to equivalent motor driven by redundant VFD in hot standby mode. Typical SLD is attached as Annexure.

This document covers the technical specifications of VFDs over and above the general specifications to be complied by the Vendor.

2. Site Data

2.1 Environmental conditions:

- a) Site location: Mathura, Uttar Pradesh.
- b) Ambient temperature : Max: 50 Deg C, Min 5 Deg C
- c) Design Ambient Temperature: 45 Deg C.
- d) Relative humidity : Avg 90%
- e) Altitude : < 1000 M above MSL
- f) Atmosphere : Corrosive (Sulfur)
- g) Seismic zone: Zone IV as per IS-1893

2.2 Input power system data:

- a) Power Supply : 6.6KV, 3phase,
- b) Voltage variation : +/-10%
- c) Rated frequency : 50 Hz
- d) Frequency variation : +/-3%
- e) Combined voltage & Frequency variation: 10%
- f) Fault level : 40KA for 1sec
- g) Control Voltage: Single phase, 110V AC from UPS (Two nos. redundant), Current rating (to be provided by vendor)

2.3 Motor Parameter (expected): As below (Table-A)

Sl. No.	Attributes	High Speed Motor
a	Type	Squirrel Cage Induction Motor
b	Service	Compressor
c	No. of Phases	3
d	Rated Voltage	As per vendor
e	Rated Frequency	As per vendor
f	Rated Output	As per vendor
g	Rated RPM	5460
h	Ingress Protection	IP - 55
i	Temp. Class	T3
j	Gas Group	IIB
k	Duty Cycle	S1

Additional Technical Specifications of VFDs

I	Hazardous class	Zone II

2.3 Load parameters:

The details of Compressor parameters are attached.

2.4 VFD Parameters as per following table- B.

Sl. No.	Attributes	<u>HPC VFD</u>
a	Type of VFD	Capable of supplying required motor
b	VFD rating	Continuous rating shall be 110% of Motor FLC at 45 deg C

Additional Technical Specifications of VFDs

c	Motor Service	Centrifugal Compressor
d	No. of Phases	3
e	Rated Voltage	6.6 kV with tolerance as per IS/IEC
f	Rated Frequency	As per Vendor
g	Rated Output	As per Vendor
h	RPM	As per Vendor
i	Duty Cycle	S1

3.1 Specifications for VFD: Each for 2 VFDs shall have following features:

Sr no	VFD Technical Parameters	Required values
1	Rating of the drive	As per table-B (mentioned under clause-2.4)
2	Motor(Induction motor) service	As per table-B (mentioned under clause-2.4)
3	VFD transformer	Dry Type
	Input voltage to VFD	From integrated dry type transformer (separate transformer for each drive.
4	No. of Phases	Three
5	Rated Input Voltage	6.6 KV with tolerance as per IS/IEC
6	Input Frequency	50 Hz with tolerance as per IS/IEC
7	Input Power Factor	>0.9, under rated load
8	Power/Torque vs Speed	Torque $\propto$ Speed ² ; Constant Torque over specified speed range; constant power over specified speed range
9	Output Voltage of VFD	0 to 6.6kV (V/f = Constant)
10	Output Current of VFD	As per Table-B
11	Braking Operation	Not Applicable
12	Output LC Sinusoidal Filter	To be design suitable to Motor with limiting parameters as defined elsewhere in tender for PWM operation. Distance between VFD and Motor is ~500 meters. Vendor to clarify and offer output filter/ sine filter, if required.
13	VFD Panel Construction	a) Protection Class: IP42 or better b) Panel: i) Free standing, floor mounting type, comprising of rigid welded structural frames with Cold Rolled Sheet Steel enclosure. The panel should be fully type tested designed enclosure as per relevant IS/IEC standard. ii) All doors and removable covers shall have neoprene gaskets. Ventilating louvers shall have easily removable and washable dust filter. In addition to installed quantity, one set air filters to be provided along with each drive panel as mentioned in mandatory spare section. iii) Air Cooled. Cooling system shall include well dimensioned panel, adequate cooling air flow path and module cooling fan. Vendor shall ensure that the panel dimensions and flow paths have been designed for continuous running at the specified ambient without overheating.

Additional Technical Specifications of VFDs

		iv) Each VFD shall have local input isolation VCB type breaker. Breaker shall have DC control supply with diode or ring-based control supply scheme with provision of dual source. v) To facilitate speed search by standby VFD, motor shall have encoder which will provide independent speed feedback to each VFD. vi) VFD speed control shall have provision of minimum two skip frequency to facilitate critical speed crossover of load system. vii) Low noise, redundant (N+1) Cooling fans at the top of each cubicle are required for air cooling. (loose spare fan is not acceptable). Transformer and converter should have its individual cooling fan, monitoring and protection circuit. viii) VFD shall have facility to monitor all power cell or heat sink temperature of IGCT/IGBT temperature OR panel temperature OR exit air temperature monitoring with local display. ix) All the cooling fan should be individually controlled and protected. And proper fuse/MCB coordination should be available in source MCB and Fan protection. x) Status monitoring of all fans should be available. xi) Power supply for cooling fans shall be derived from input of VFD's. No external supply shall be used. xii) Monitoring of MCB/relay should be available in VFD HMI. xiii) Standby start and individual fan tripping events should be available in the event log of VFD HMI. c) Busbar Material – Electrolytic grade Copper, colour coded. Sleeving and shrouding for safety purposes shall be done. d) Earth Bus – Suitable as per system design. Vendor to provide the calculation details for verification. e) Door Interlock: The VFD shall have a door interlock for safety. This shall include electrical interlocks from the main circuit breaker (external). This interlock system should ensure that none of the power cabinets can be opened until the main source of power is disconnected. Additionally, the same interlock system should ensure that power cannot be initialized to the drive unless the doors are closed. The alarm should be available for any door is open. f) Painting: Painting shall be done as per applicable IS standard. Paint shall be Epoxy Based with Powder Coated Finish. Paint Thickness: 60 Microns (minimum). Exact paint shade will be confirmed during drawing approval stage. g) Power and Control Wiring shall be done with FRLS cables. h) Double compression type Nickel plated brass flame proof cable glands shall be used by IOCL and same shall be in IOCL scope. Height of the terminal from cable gland plate shall be adequate to take care of the cable sizes and quantity mentioned. Minimum space for the power cable termination shall be 450 mm or bottom clear from the cable gland plate.

Additional Technical Specifications of VFDs

		Cable entry will be from bottom only. Gland Plates shall be blank (undrilled) – to be drilled at site. Gland Plates shall be minimum 5 mm thick Aluminum or suitable for cables as per system requirement (steel not allowed). i) VFD Transformer Input and VFD Output power termination arrangement shall be suitable for AL, 1 Run, 3C x240 sq.mm, XLPE INS, ARM, FRLSH. The distance from motor to VFD shall be around 600 meter. Vendor may site visit for proper assessment and design accordingly. Input & output Cable & Cable termination shall be in IOCL's scope including laying and connections. j) All electronic modules and components shall be accessible from front of panel only. k) All low voltage compartment and cabling shall be electrically and physically separated from the high voltage compartment l) Since the VFD shall be installed in a room having false floor, base frame of required height to be provided along with each panel for installation. The base frame height details shall be provided during detailed engineering.
14	Noise Level	Shall be less than 85dB at a distance of 1 meter from the outline of VFD Panels at a height of 1.5 meters from the floor with all the fans running in the VFD Panels.
15	Storage Temperature	0 deg C to +50 deg C
16	Vibration	According to IEC68-2-6
17	Interference	According to IEC801 parts 2,3,4 Immunity: The panels shall be designed so as to have low Radio Frequency Interference (RFI) and Electromagnetic Interference (EMI).
18	Duty Cycle	Continuous Duty Class I Duty Cycle as per IEC 146-1
19	VFD Requirements	a) Input Choke: Input chokes to be provided if necessary. b) Local/Remote: Selector switch shall be provided for operator to select mode of operation: Local – Operation from VFD Panel for Speed Control on door mounted interface; Remote – Operation from DCS/LCS. c) If VFD is set for speed reference from Remote, it shall be possible to program the VFD to continue operation

Additional Technical Specifications of VFDs

		at its last known speed reference point whenever a loss of speed reference is detected. d) Door Mounted Local Start/Stop Push Button to be provided e) <u>Door Mounted Stop put with Mushroom type Push-Button to be provided with 2NO + 2 NC contact or suitable as per system requirement for Emergency Stop.</u> Emergency Stop to be provided along with protective cover. One normally open contact to be wired to Terminal Block for external Interlocking / Annunciation to remote. f) Every Panel shall be provided with CFL/ LED illumination Lamp with limit switch and MCB. Lamp shall not be common domestic type. g) Space heater shall be provided in panel with switch fuse and variable setting thermostat. h) 230V utility power socket with MCB & ON/OFF switch shall be provided.
20	VFD features	a) Soft Start and Auto Restart b) Auto Speed Search Facility (Catch on Fly) shall be available for starting into rotating loads. c) Power loss ride through (Kinetic Buffering) Power interruption upto 2 secs. d) Automatic VFD tuning during start-up. e) Flux optimization function shall be provided to reduce the total energy consumption and noise level in case drive is operated below nominal load. f) Selectable reverse run prohibition g) Adjustable motor overload feature h) Settable minimum and maximum operating frequency i) VFD shall produce not greater than 1% torque pulsation to the shaft of driven equipment. j) Field adjustable Torque limits and acceleration and deceleration ramps k) Accelerate / Decelerate Times shall be adjustable as per motor requirement. l) User programmable preset speeds. m) The equipment may be stored outdoors for long periods

Additional Technical Specifications of VFDs

		before installation. The packing should be suitable for outdoor storage areas with heavy rains / high ambient temperatures without. n) Vendor shall certify readiness of system fit for commissioning. <u>Vendor's scope shall also include supply one set of all specialized tools and tackles required.</u> o) VFDs shall be installed in Air-conditioned area but it shall be suitable for operation in non-air-conditioned area also. p) PLC / VFD panel earthing requirement shall be designed by VFD OEM only and to be submitted during detail engineering. q) <u>All electronic PCBs/Modules must have conformal coating to take care of site conditions for corrosive working environment (Gx).</u>
21	Controls and monitoring	a) VFD shall have provision to take two separate pulse type of start & stop command. b) VFD shall be provided with an interactive and user-friendly door mounted digital operator interface with LCD display and sealed membrane type keypad/touch screen. c) The operator interface shall be used for drive programming, drive monitoring and drive trouble shooting. The operator interface must also be able to start and stop the drive, reset VFD faults and manually adjust the VFD's speed reference. d) The operator interface shall have LED indicators for drive fault, drive run, Drive OFF, Drive Ready and drive Alarm. e) The operator interface shall allow monitoring of inverter operating conditions including speed, current, voltage, torque, power etc. f) Messages shall be alphanumeric in nature. All the fault messages shall be in English. g) For each VFD a dual ATS based control supply scheme to be provided. Power supply scheme to be submitted for approval. h) Provision shall be made available for remote operation. i) The operator interface shall be able to display all real time operating variables and all drive programming parameters. j) The operator interface shall be capable of displaying a specific

Additional Technical Specifications of VFDs

		user selected parameter on power-up. This power-up parameter would typically be a parameter that is important to the operator such as motor speed or motor load. k)VFD shall have facility to monitor all power cell or heat sink temperature of IGCT/IGBT temperature OR panel temperature OR exit air temperature monitoring with local display. l) All VFD operating parameter shall be stored in nonvolatile memory. m) Drive monitoring system shall have facilities of • all event logs for any digital or analogue IO set limit variation, • minimum 6 programable AI channel-based drive continuous parameter monitoring / trending and historization facility for minimum 30 days • Disturbance records of minimum 3 seconds pre/post window with minimum 6 Ai channel and 8 DI configurable channels. n) The drive shall have built in monitoring of following parameters as minimum on its digital operator interface and these parameter shall also be displayed at Plant ECS through Modbus/IEC61850 link: • Output Frequency • Output Current • Motor Speed • Output Voltage • DC Bus Voltage • Hour run • Output Power (It shall be possible to display power output of the drive in kW) • Digital Input Status • Digital Output Status • Analog Input Status • Motor energy meter o)Two transducer with dual 4-20 mA output to be provided for each of following signals • Motor Actual Speed • Motor Current Transducers shall be capable of driving 500 ohms load. p) The following indications shall be provided on the VFD Panel Door: i) Motor Running ii) Motor Stopped/Tripped iii) AC Mains ON

Additional Technical Specifications of VFDs

		iv) Auxiliary Control Supply ON The VFD shall have facility to store fault logs of minimum Last 10 faults in memory
22	Protection	Following protections shall be built in within the inverter and any other protection as required: a) Motor Overload / Over Torque b) Instantaneous Over current (This device shall monitor the peak output current continuously and shall provide instantaneous shutdown without component failure whenever its trip point is surpassed. c) Ground Fault Protection d) Output Short Circuit e) Output Phase Loss/Fuse Failure f) Phase Sequence Protection

Additional Technical Specifications of VFDs

		g) Input Phase Loss/Single Phasing Preventer h) Over Speed/Over frequency of motor i) Heat sink over temperature j) High Stall prevention (During acceleration, deceleration and constant speed operation) k) External faults like Motor Temperature Fault (including motor winding temperature fault/ alarm) l) Transformer Fault m) Incoming Line surge protection n) Inverter fault o) If the motor load exceeds the limit, the drive shall automatically reduce the frequency and voltage to the motor to guard against overload. If load demands exceed the current limit for more than 1 min, the drive shall shut down to prevent over heating of the motor and damage to the drive. p) The drive shall have facility to limit the speed in defined range only. The drive shall trip in case the speed exceeds 105% of the maximum operational limit of driven equipment. q) If VFD is set for speed reference from Remote, it shall be possible to program the VFD to its last known speed reference point whenever a loss of speed reference is detected. r) Fault diagnostic shall be built into the system to supervise the operation and failure of the system. The information regarding failure of any of the system including shut down of the system shall be available after a shut down even though no supply available.
23	Dry type Transformer	Input VFD transformer and their power electronics shall be in separate adjacent cabinet (side by side) to ensure longer life. Transformer and converter should have its individual cooling fan, monitoring and protection circuit. The detail specification of each drive shall be as below: a. Dry type Transformer b. HV voltage: 6.6kV c. Type & Specification (to be provided by Vendor along with bid) d. LV voltage: Number of secondary's and secondary voltage to be indicated by the vendor in technical offer. e. Class of insulation: H f. System maximum Voltage- 6.6 kV (rms) g. Rated Capacity(in KVA): As per VFD system design (to be provided during detailed engineering) h. Input No of Phases: three i. Number of secondary windings – As per VFD design j. Impedance Voltage- as per system design k. Neutral Point grounding mode- ungrounded

Additional Technical Specifications of VFDs

		l. Cooling mode-AN or AF m. High Voltage side insulation level- suitable for VFD application as per applicable IS/IEC n. Rated short-time power frequency withstand voltage (RMS)-suitable for VFD application as per applicable IS/IEC o. Rated Lightning Impulse voltage (full crest value)- suitable for VFD application as per applicable IS/IEC p. Equipment maximum voltage (RMS value)- 7.2 kV (rms) q. Fault level at HV side suitable for VFD application as per applicable IS/IEC r. RTD Protection: The suitably designed of RTD protection as per OEM recommendations to be provided. s. Construction: The dry type transformer shall be mounted in a panel which will be mounted in side by side cubicle along with the VFD panel. t. VFD input transformer shall be independent for each VFD. Transformer design shall take care of additional harmonics loading of VFD. Design detail shall include harmonics loading calculations also. u. Connection: v. Primary Incomer: Termination arrangement to be provided for power cables. Double compression type Nickel plated brass flame proof cable glands shall be used by IOCL and same shall be in IOCL scope. Height of the terminal from cable gland plate shall be adequate to take care of the cable sizes and quantity mentioned. Minimum space for the power cable termination shall be 450mm or better as clear space from the cable gland plate. Cable entry will be from bottom only. Gland Plates shall be blank (undrilled) – to be drilled at site. w. Gland Plates minimum 5 mm thick Aluminum or suitable for cables as per system requirement (steel not allowed). x. Secondary Connections: Cables for connections between transformer secondary and VFD to be supplied by the Vendor. This shall be used for testing of the VFD and later bunched in the panel during dispatch and the same shall be connected at site. Necessary connection and routing arrangements to be made at Vendor's works. y. Exact cabling details shall be provided in detailed engineering.
24	Type of Control:	Completely programmable by the user as: a) Flux vector control with speed feedback b) Flux vector control without speed feedback c) Scalar V/F. VFD shall be capable of maintain motor speed within 0.5% without the use of a motor mounted encoder or tachometer. The drive shall have programmable V/F patterns along with user definable custom V/F patterns.

Additional Technical Specifications of VFDs

25	Harmonic Limitations – Source	Shall be as per IEEE – 519 Voltage harmonics: Vendor to inform the values with calculations/reports during detailed engineering stage.
26	Harmonics at VFD Output /	The output of VFD shall comply following parameter
	Motor Input	Voltage Peak Phase-to-Ground : <= 6000 V Voltage Peak Phase-Phase : <= 10300 V dV/dt: : <= 2700 V/us THD maximum : < 5% Also, it shall be as per IEC 61800-4. Vendor to specify the maximum amount of voltage and current harmonics at the VFD Output / Motor Input terminals.
27	Switching frequency	To be specified by the vendor
28	Auxiliary Supply	a) The 110V UPS power supply shall be provided by IOCL. Power supply for electronic modules & control section has to be derived from the UPS supply. (suitable sets of fuses/MCB to provided for necessary segregation of control/ electronics/ indication circuits) b) DC Supply (220 VDC) shall be provided by IOCL c) 230V AC non UPS supply shall be provided by IOCL. kVA Rating is to be given by the Vendor. Power supply only for motor space heater, cubicle heater & CFL Lamps has to be derived from this supply. d) Auxiliary Supply –for fans, if any. This power shall be derived from input of VFD's. Any other supplies required by the VFD system to be generated internally within the VFD system. For pre-charging circuit only, 3 Phase power shall be provided to vendor. The details shall be approved during drawing approval stage.
29	Semiconductor fuses in input side	Semiconductor fuses shall be provided on AC side of power electronics devices/components
30	Testing and Quality Plan	a) Routine Tests shall be carried out on all Panels as per relevant standards. b) Type Test Certificates for similar equipment supplied by the Vendor shall be submitted during bid submissions as per applicable IS/IEC standard.
31	Efficiency (including transformer)	95%, under rated load, exact to be specified by vendor (the efficiency shall be the ratio of output power with respect to total input power including aux. supply at rated load.
32	Overload capability	150% for 60 sec.
33	Operating mode	2 quadrants possible
34	Analog input/PID input	0-20mA/4-20mA Minimum : 2nos
35	Analog output	0-20mA/4-20mA@ 0-500 ohm; stability 5% Qty- 4 nos Minimum (exact shall be finalized in detail engineering)
36	Motor Temp. monitoring	Not Required
37	Control Outputs	To be provided as per the scheme requirement

Additional Technical Specifications of VFDs

38	Binary input & Binary Output	Relay provided shall have minimum 20% spare Digital Inputs and Digital Outputs after the implementation of complete scheme.
39	Space available for single VFD	Actual needs to be confirmed with IOC after site visit by vendor before supply

Additional Technical Specifications of VFDs

40	Additional requirements	All analog signals mentioned above should be visible on VFD HMI. VFD should have the facility of storing last five alarm/ fault details with date/ time stamping which could later be retrieved via the VFD main display unit itself. VFD should have auto record facility for all critical parameters including above in case of disturbance/ alarm/ trip generated which can be extracted later. Sampling rate for disturbance recording should be 2ms or better.
41	LCS Panel	• Flameproof type LCS panel to be provided with following specification: • Ex-d, IIC, IP-65, CMRI & CCE approved. a) Motor start / Stop command b) Motor Current & Speed display (class-0.5, input -4-20mA, 360 degree Display) (separate for both c) Motor ON & OFF status d) all terminal block shall be suitable for ring type connections only. Terminal block shall be supplied along with suitable lug for terminations. e) Emergency trip along with protective cover (Stay put type) f) Have canopy over LCS panel station and can be easily mounted over base. g) FLP type Gland & blinding plugs as per LCS design type. h) No of control cable entry and its size shall be provided in detailed engineering. The details shall be approved during the detailed engineering during drawing approval.

Further to the above specifications, general requirements for VFD are attached as annexure. Specifications mentioned in SCC-T of VFDs above shall over rule the general requirement in case of any contradiction.

3.3 I) Specifications for Relay/PLC based changeover panel:

- a) In order to facilitate changeover from one VFD to the other, a relay/PLC controller panel shall be supplied by the vendor. This shall consist of 2 redundant relays/PLC system required for AUTO/MANUAL changeover between the VFDs. The changeover logic shall be built into the relay/PLC. All DI/DO & AI/AO between the VFD and DCS, VFD and field LCS, VFD and input/output breaker panels shall be routed through the controller panel.
- b) Auto changeover panel shall be independent hot standby PLC/ Numerical relay based control panel. In case of failure of one PLC/relays, system shall transfer on standby PLC/ Relay without any disturbance.
- c) In order to route the analog and digital signals between VFD & DCS, VFD and field LCS, VFD and input/output breaker, necessary multipliers in case of digital signals and signal splitters in case of analog signals shall be provided in the changeover panel.
- d) The two relays/ PLC systems responsible for changeover will remain in redundancy. All DI/DO shall be pre-wired up-to TB for ready use. Minimum 20% spare DI/DO shall be available for user after the implementation of complete logic scheme.
- e) Redundancy at all levels i.e power supply/ processor/ IO level/ Communication network/ relay. No common point of failure to be designed in PLC system. In case of loss of communication of VFD with PLC, system shall work in stay put condition. One emergency shall be available in each VFD for direct trip from remote.

Additional Technical Specifications of VFDs

- f) Input power scheme for changeover panel shall be dual ATS based scheme with independent power network for each PLC/ relay.
- g) IO termination arrangement of both VFD in PLC panel shall be independent and physically separate to ensure due physical isolation during any maintenance work inside panel.
- h) In any operating condition loading of processor shall not be more than 50% of capacity. One HMI / PC shall be provided for interfacing with Autochanger PLC system. PLC / HMI system shall be capable of all event logs for a digital or analogue IO deviation from limit. It shall also be capable of disturbance record facility in window of 3 seconds with pre/ post settable window and sampling rate in the range of 1 ms. Sufficient storage capacity shall be provided in HMI/ PLC system for storing minimum 5 last trip data.
- i) PLC programs shall be stored in such memory that loss of control supply and loss of internal battery does not lead to erasing of PLC program.
- j) Standby drive shall be ready with all readiness and as per running reference with only firing pulse to IGBT in blocked condition. In case of failure of running VFD, the system should initiate automatic and uninterrupted transfer of the Load on Hot standby VFD system. The total standby drive transfer time including drive re-acceleration, breaker changeover, speed search etc. (as applicable) should not be more than 1 seconds. The relay/PLC logic for hot standby transfer shall be finalized and programmed in consultation with IOCL during the detailed engineering stage.
- k) All the relays, auxiliary relays, transducers, splitter etc. are being made redundant. The scheme shall be developed in such a way that, there should not be any single components which can be the reason for any failures.
- l) The entire terminal block shall be suitable for ring type connections only.
- m) The PLC shall be supplied along with CD of licensed software for enabling programming through PCs and Laptops in future.
- n) The auxiliary control supply shall be provided from external source (scope of IOCL) and shall be Dual 110VAC UPS supply. (The panel shall have proper monitoring of failure of both the supply/trip of control MCB/diode failure). The power supply to both the relays/PLCs shall be separated by fuse/MCB.
- o) The relay/PLC logic shall be designed such that both the relays/PLCs shall act as redundant. Failure of any relay/PLC should not hamper VFD operation. Also, with suitable switching off auxiliary supply of one relay/PLC, the problem can be attended without compromising the hot standby feature of VFD operation. Any other component required for building the changeover scheme to be provided by vendor.
- p) Also, with Change in Auto/Manual position switch position, running drive should not trip.
- q) This relay/PLC panel shall be provided with required nos (atleast two nos) cooling fan (230 V AC supply) for proper ventilation. The supply shall be separately provided.
- r) Relay/PLC engineer shall be required at site for programming and any troubleshooting.
- s) There shall be provision of following switches in Changeover panel:

1. Main/ standby drive selection switch: for selection of drive-1 or drive-2. The switch shall have minimum four number's contact in each position with heavy duty contact rating.

2. Auto/ manual/ selection switch: for selection of drive operation in manual / auto mode. The switch shall have minimum four number's contact in each position with heavy duty contact rating. For each position, there shall be indication lamp

Additional Technical Specifications of VFDs

3.7 Detailed Bill of materials

Sr No		Description of the components	Qty (nos.)
3.7	A.1	VFD with panel along with complete set of accessories as per specification	02 nos
		Mandatory spares to be supplied along with two sets of VFDs (as per A.2 to A.8)	01 set as mentioned below
	A.2	Power components i.e., Power cells/IGBT/IGCTs/Thyristors/Diode for CSI etc depending upon Technology used.	For each type-20 % or minimum 4 (whichever is higher)
	A.3	All type of electronic card such as VFD Power converter cards; Firing card, processor, IO card, Driver board, Power supply cards, Power fuses, VFD Control cards, VFD Display cards/ VFD Display unit, communication card etc.	For each type-20 % or minimum 2 (whichever is higher)
	A.4	VFD / Panel Cooling fans	For each type-20 % or minimum 4 (whichever is higher)
	A.5	Semiconductor fuses	For each type & make-20 % or minimum 6 (whichever is higher)
	A.6	Communication cables/ ribbon cables/FO cables used for internal circuitry	1 sets
	A.7	Capacitor AC/DC	For each type & make-20 % or minimum 4 (whichever is higher)
	A.8	complete set of removable air filter installed in one drive panel (other than installed in drive)	2 sets
	C.1	Relay/ PLC based changeover panel as per specification	01
		Mandatory spares to be supplied along with Relay based changeover panel	01 set as mentioned below
	C.2	Multilin M60 (or equivalent)/PLC System	1 no
	C.3	Splitters/Transducers	For each type & make -20 % or minimum 2 (whichever is higher)
	C.4	Switches	For each type & make-20 % or minimum 2 (whichever is higher)
	C.5	Auxiliary relays/contactors/Fuse/MCBs/ power supply/	For each type & make-20 % or minimum 2 (whichever is higher)
	C.6	All type of electronic card such as processor/ IO / power supply/ Communication network hardware/ one main numerical relay/ PLC internal battery 2 nos and any other card as available in system.	For each type-20 % or minimum 2 (whichever is higher)

Additional Technical Specifications of VFDs

3.8 Other general requirements:

	Conditions	Compliance (Y/N)	Remarks
1	The scope of work as mentioned above is indicative only. Vendors are advised to make a site visit for thorough assessment of the specific requirements for the VFD System to be supplied.		
2	The party shall submit brochure containing description and drawing of their VFD systems along with the offer . After commissioning, party has to submit three sets of detailed drawing of VFD and relay/PLC changeover panel along with CD containing software of VFD.		
3	The party has to submit following documents along with bid for verification. Non-submission of any document may lead to technically rejection of bid. 1. Single Line diagram of offered system 2. Data Sheet of VFD system 3. Type test reports of similar design VFD System witness by any government approved agency/IOCL TPI agencies/Reputed international agencies as per applicable IS/IEC standard. 4. Output voltage & current harmonics calculations/test report of similar drive for verification of Output choke/ sine filter requirement/ adequacy		
4	The party shall conduct a online training through virtual platform for familiarization and detailed description of offered VFD model within two weeks of issue of LOA.		
5	The party shall submit drawings for approval before starting VFD manufacturing after issue of LOA.		
6	Delivery schedule (tentative for guiding purpose): Delivery Period shall be 20 Weeks from the date of LOA/PO, whichever is earlier. Wherein, a) Vendor must submit drawings within four weeks of PO award. b) IOCL shall approve the drawings within two weeks, given that the submitted drawings are in line with IOCL technical specifications. For Site Work:- Vendor has to report at site within one week of intimation from IOCL.		
7	Packing- The supplier shall provide faultless, waterproof packing of the goods as is required to prevent their damage or deterioration during transit to their final destination, Mathura Refinery, Mathura. The packing shall be sufficient to withstand, without limitation, rough handling during transit and exposure to extreme temperature, rain and precipitation during transit and open storage.		
8	The routine & quality tests shall be witnessed by IOCL's Engineer at manufacturer's works. The testing location should be properly equipped with all testing facilities. Vendor has to provide the complete testing & inspection plan in advance with complete schedule & list of tests to be witnessed. The tests shall be carried out as per agreed criteria based on standard procedures.		

Additional Technical Specifications of VFDs

9	The ranges & features mentioned in the specifications are the minimum required. The vendor offering equipment of better ranges covering the range mentioned in the specification shall be acceptable, if other specifications are in order.		
10	Pre-dispatch inspection will be done at vendor works prior to dispatch. Vendor has to submit QAP to IOCL before inspection call. OEM Engineer must be available during inspection if the inspection is not being conducted at OEM's location. All type test report shall be submitted for VFD of same/ similar design for verification during factory inspection. No type test needs to be performed on supplied item.		
12	Vendor has to arrange for at least three training session at site to IOCL team at site after installation & successful commissioning. Further, hands on training at IOCL site is to be given by vendor to all concerned people for at least two days.		
13	Vendor has to arrange for a two day training session at factory for three people from IOCL. Further, hands on training at IOCL site is to be given by vendor to all concerned people for at least two days.		

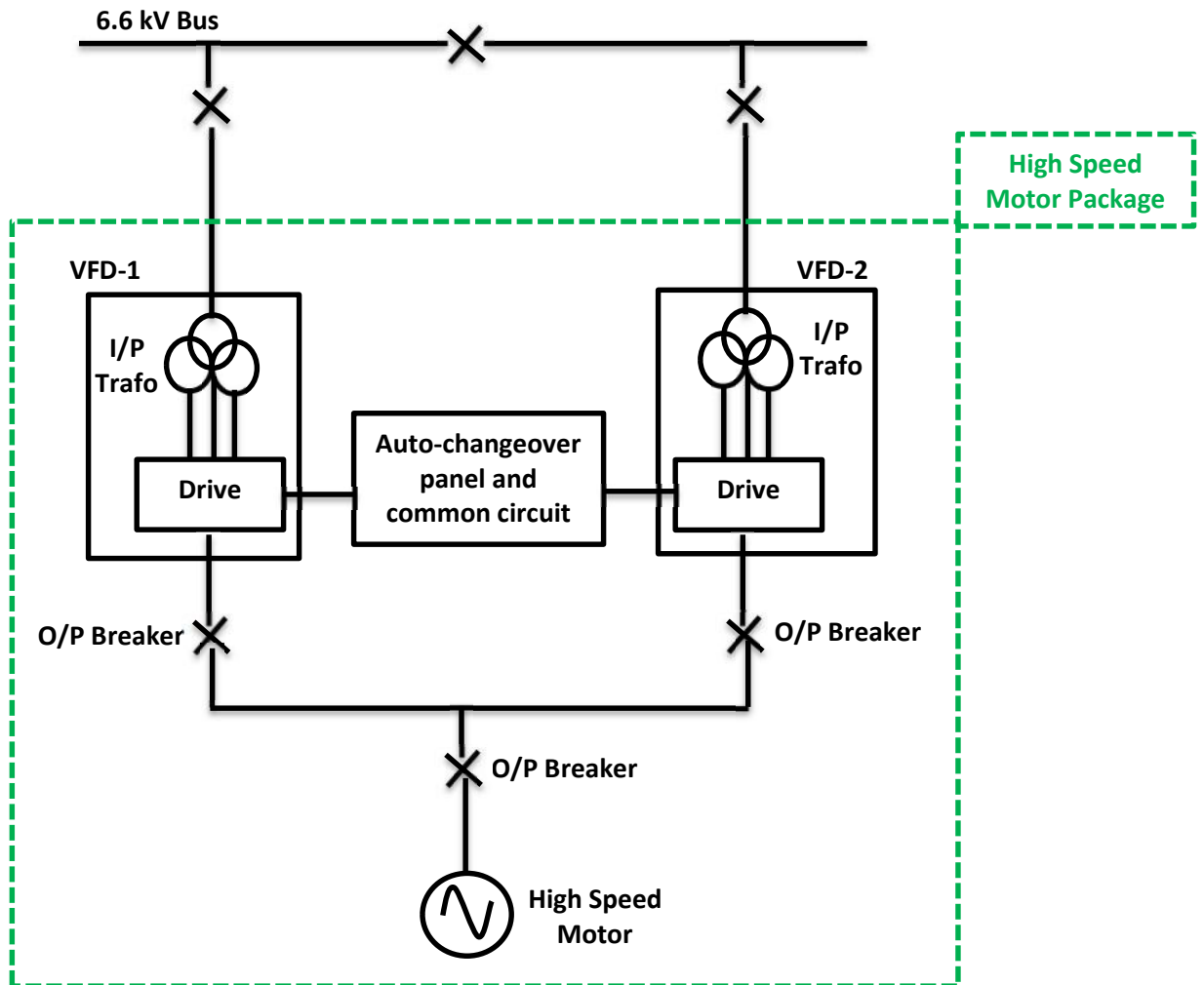
5.0 Special Conditions of Contract for supervision of installation & commissioning part - Technical:

- a) The vendor shall submit a detailed execution plan in consultation with IOCL for the supervision of installation, testing and commissioning of the said system.
- b) All to and fro fares, local conveyance, boarding and lodging shall be borne by the vendor.
- c) Supervision of commissioning of VFD along with integration of PLC/relay changeover will be in scope of vendor. Vendor will carry out testing activities like checking of power cells/ VFD components, functional checking of VFD, changeover panel checking etc. after installation of VFD panel at site when intimated by IOCL. 3 ph 415 V AC, 220 V DC and 1 ph 110 V UPS power shall be provided by IOCL for pre-commissioning checks. **The VFD at site shall be commissioned in presence of OEM engineer.**
- d) **For commissioning of the relay/PLC panel, an OEM engineer must be available to program the relay/PLC as well as to provide the hands -on training to IOCL team at site.**
- e) Vendor to assess requirement of DI/ DO, AI/ AO, input power, etc for hook up. Handshaking of two nos of VFD and relay panel, LCP, DCS and switchgear will be in scope of the vendor. Vendor should make a detailed study of the required system so that the same is possible.
- f) Shifting of VFD from store to sub-station, installation of new VFD, shifting of power cables from old VFD to new VFD, termination of power cables at new VFD shall be in scope of IOCL under supervision of vendor.
- g) Complete control cable schedule termination & inter-panel wiring, loop checking, functional checks of VFD shall be in scope of vendor.
- h) **Schedule preparation for control & power cable termination between VFD/input switchgear and output switchgear/ existing switchgear/LCS/DCS etc. shall be in vendor's scope.** Control cable ferruling & termination between **VFD/input switchgear and output switchgear/ existing switchgear/LCS/DCS etc. shall be in vendor's scope.** However, glanding of all power & control cable is in scope of IOCL.

Additional Technical Specifications of VFDs

- i) Vendor to give detailed requirement of control cable to be laid between VFDs to relay panel, VFDs to switchgear (input and output breakers) at both end, VFDs to motor LCS(at both end), VFDs to DCS room(at VFD end only), power requirements of VFD within 2 weeks of finalization of drawing.
- j) Vendor to quote considering required commissioning spares and hence during supervision of commissioning, vendor has to carry required set of commissioning spares so that failure/ mal-operation of any equipment is taken care of.

Typical SLD



Annexure-8

GENERAL SPECIFICATION FOR NUMERICAL RELAYS

Abbreviations:

AC	: Alternating Current	LCD	: Liquid Crystal Display
BS	: British Standard	LED	: Light Emitting Diode
BTD	: Bearing Temperature Detector	MMI	: Man Machine Interface
CBCT	: Core Balance Current Transformer	TCP-IP	: Transmission Control Protocol-Internet Protocol
CPU	: Central Processing Unit	MOG	: Magnetic Oil Gauge
CT	: Current Transformer	NEMA	: National Electrical Manufacturers Association
DC	: Direct Current	NO	: Normally Open
DCS	: Distributed Control System	OTI	: Oil Temperature Indicator
ECS	: Electrical Control Station	PC	: Personal Computer
EMI	: Electromagnetic Interference	PCB	: Printed Circuit Boards
FIFO	: First in first out	PEM	: Printed Engineering Management
FO	: Fibre Optic	PLC	: Programmable Logic Controller
GPS	: Global Positioning System	PT	: Potential Transformer
HV	: High Voltage	PVC	: Poly Vinyl Chloride
I/O	: Input/ Output	REF	: Restricted Earth Fault
ICT	: Intermediate Current Transformer	RTD	: Resistance Temperature Detector
IDMTL	: Inverse Definite Minimum Time Lag	RTU	: Remote Terminal Unit
IEC	: International Electro-technical Commission	SNTP	: Simple Network Time Protocol
IEEE	: Institute of Electrical and Electronics Engineers	SOE	: Sequence of Event
IP	: Ingress Protection	UPS	: Uninterrupted Power Supply
IRIG-B	: Inter-Range Instrumentation Group Subcarrier Channel-B	VDE	: Verband Deutscher Elektrotechniker
KEMA	: Keuring Electro-technisch Material Arnhem	WTI	: Winding Temperature Indicator
LAN	: Local Area Network		

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1.0 SCOPE

The intent of this specification is to define the minimum requirement of design, manufacture, testing, packing and despatch of numerical relays. The specification also defines the requirement of communication and integration with data concentrator, substation Man Machine Interface and upper level control system

2.0 CODES AND STANDARDS

- 2.1 The equipment shall comply with the requirements of latest revision of following IEC standards I equivalent Indian Standards, unless otherwise specified:

IEC 60068	:	Environmental Testing
IEC 60073	:	Basic safety principles for man machine interface, marking & identification
IEC 60529	:	Degree of protection provided by enclosure (IP Code)
IEC 60255	:	Electrical relays
IEC 61000	:	Electromagnetic compatibility (EMC)
IEC 61850	:	Communication networks & systems in substations

- 2.2 In case of imported equipment, standards of the country of origin shall be applicable, if these standards are equivalent or more stringent than the applicable IEC/ Indian standards.
- 2.3 The equipment shall also conform to the provisions of Indian Electricity rules and other statutory regulations currently in force in the country.
- 2.4 In case Indian standards are not available for any equipment, standards issued by IEC/ BS/ VDE/ IEEE/ NEMA or equivalent agency shall be applicable.
- 2.5 In case of any contradiction between various referred standards/ specifications/ data sheet and statutory regulations the following order of priority shall govern:
- Statutory regulations
 - Data sheets
 - Job specification
 - This specification
 - Codes and standards

All conflicts between the requirements of this specification & other relevant documents shall be referred to principal for resolution.

3.0 SITE CONDITIONS

- 3.1 The relays shall be suitable for satisfactory operation when installed in a panel located in a pressurized substation with restricted natural air ventilation, in tropical humid and corrosive atmosphere. Relay shall be designed to perform all its functions and operate under site conditions specified in switchboard data sheet. If not specifically mentioned there in, a design ambient temperature of 50°C and an altitude not exceeding 1000M above the mean sea level shall be considered

4.0 GENERAL REQUIREMENTS

- 4.1 The offered equipment shall be brand new with state of the art technology and proven field track record. No prototype equipment shall be offered.
- 4.2 Vendor shall ensure availability of spare parts and maintenance support services for the offered equipment at least for 15 years from the date of supply.
- 4.3 Vendor shall give a notice of at least one year to the end user of equipment and PMC before phasing out the product/spares to enable the end user for placement of order for spares and services.
- 4.4 In case of relays manufactured outside India, the relay manufacturer through his Indian establishment or associate in India shall provide application, testing, commissioning, after sales service and other necessary support for minimum of 15 years to customer. Their Indian establishment or associate company in India shall also maintain adequate inventory of each type of relay or spares to meet the requirement arising during project execution and plant operation. Relay manufacturer shall possess a signed Memorandum of Understanding with their Indian associate for providing customer support

5.0 SPECIFICATION & DATA

5.1 NUMERICAL BUS BAR DIFFERENTIAL PROTECTION RELAY

SL NO	SPECIFICATION	VENDOR TO CONFIRM
1.	The relays shall be suitable for protection of HT switchgear bus bar protection. The relay should be with stabilizing resistors.	
2.	Protections : The relay shall be suitable for providing the following protections	
a)	High impedance bus bar protection.	
3.	CT requirements : The relay shall be suitable for CT secondary of 1A and 5A , site selectable in the same relay, for overcurrent protections CT connection: The relay shall be suitable for both 2 CT and 3 CT connection.	
4.	Type : The relay shall be of single unit type	
5.	Settings : It shall be possible to carry out/change all the relay setting from the front keypad	
6.	Display : - LCD display - measured values for all three phase currents shall be displayed in terms of the primary - On line monitoring of spill currents, zero sequence current, relay healthiness .	
7.	Control supply: The relay shall be suitable for both 110VDC (+/- 10%) to 220 VDC (+/- 10%)	
8.	Mounting : Flush	
9.	Memory: The Relay shall be equipped with backup power, either backup battery or otherwise such that data like parameter settings, programming, status, events and fault data information shall not be lost on failure of Relay auxiliary power supply. The backup power system as mentioned above shall be part of the Relay and shall be supplied as a part of the Relay.	
10.	Communication The relay shall have two separate communication ports - Rear port for remote communication with ECS/DCS/PLC - Front port for local communication through	
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SL NO	SPECIFICATION	VENDOR TO CONFIRM
	laptop computer The communication protocol shall be clearly specified in the offer. Uncommon/proprietary protocols shall not be acceptable.	
11.	The relay shall be provided with programmable digital input(s) .	
12.	The Relay shall have a local HMI and shall be possible to carry out the settings, configuration, extract & view fault records, view measurement information of the Relay dynamically online through the local HMI without disturbing or tripping the feeder. It shall also be possible to download the information from the Relay and interrogate the Relay from remote. If the offered Relay is provided with control function, it should be possible to operate from the local HMI. However, the Relay shall also have the feature to disable this control function.	
13.	Relay earthing requirement : No separate earth bus shall be required for the relays. It shall be possible to connect the relay earth to the common earth bus in the substation.	
14.	Output Relays The Relay shall have minimum four (04) freely configurable binary output Relays for alarm, trip and monitoring functions for all protection features as well as the supervision of the protection signaling channel with at least one (01) Relay having changeover contacts and one additional watchdog output Relay with changeover contact for generating alarm contact in case of Internal Relay Fault. Provision shall be available in the Relay to program the output Relays for hand/manual reset application. All the output Relay contacts shall be rated for at least 5A continuous at 220 V AC/DC.	
15.	The Relay shall have at least two (02) independent freely selectable setting groups for all protection features of the Relay.	
16.	Relay terminals : Screw type suitable for ring type lug connections	
17.	Trip coil supervision : The relay shall have the feature of Trip circuit supervision	
18.	Diagnostics: The relay shall have self diagnostic feature . The relay shall have provision for alarm indication in	

SL NO	SPECIFICATION	VENDOR TO CONFIRM
	case of any internal software or hardware problem.	
19.	Fault records: The relay shall be able to provide the following information 1. Pretrip values 2. Event records with real time stamping & fault current values. 3. Oscillographic disturbance records with real time stamping	
20.	Electromagnetic interference : The relay shall have immunity against electrical and electromagnetic interferences.	
21.	Warranty : One year from the date of commissioning	
22.	List of installations : The list of installations for the relay model being offered shall be supplied along with the offer.	
23.	Software : Software for viewing and downloading event logs, disturbance records shall be supplied along with the relays . Minimum of 3 sets on CD shall be supplied.	
24.	Environmental : Shall be suitable for operation in ambient temperatures of 0 to 55 deg C.	
25.	Manuals : Party shall submit a total of at least 10 sets of O&M manual and commissioning manual along with the relays.	
26.	Accessories : All the relays shall be provided with standard accessories e.g. mounting channels, screws, Terminal Blocks etc.	
27.	Factory test certificates : The vendor shall provide the test certificate individually for each relay	
28.	The relay should conform to the relevant IEC standards with respect to features / construction / design , etc.	
29.	The vendor should have sufficient service /repairing facilities for the relay model offered .The vendor shall give an undertaking for the same along with the offer.	

5.2 NUMERIC PROTECTION RELAY FOR LT INCOMER & BUS COUPLER

S. No.	Relay Feature	Relay Feature Description	Confirm	Deviations, if any
			Yes / No	
1	Application	The Numeric Feeder Protection Relay (hereafter referred to as the Relay) shall be suitable for use as a single comprehensive protective relay for LT PMCC Incoming Feeders & Bus-Couplers with at least the following protective function & features: Three-phase Instantaneous/ Definite Time Phase Over-current protection (50 - 50/2), three-phase IDMT Over-current protection (51), Instantaneous/ Definite-Time Earth Fault protection (50N – 50N/2), IDMT Earth Fault Protection (51N), Under voltage (27), Over voltage (59), Under frequency (81U), Over frequency (81O), Voltage dependent Over current (51V), Trip Circuit Supervision (95), Measurement & recording facilities		
2	Auxiliary Voltage	The offered Relay shall be suitable for working with auxiliary power supply for both 110V DC $\pm$ 20% & 220 VDC ($\pm$ 20%)		
3	Phase Current Input	1. The Relay shall be suitable for 1A & 5A CT secondary inputs selectable at site. 2. The Relay shall be suitable for 2 CT as well as 3 CT configurations.		
4	Ground Current Input	1. The Relay shall be suitable for 1A & 5A CT secondary inputs selectable at site. 2. The Relay shall be suitable for residual as well as CBCT inputs.		
5	Binary Inputs	1. The Relay shall have minimum sixteen (16) freely configurable binary inputs other than inputs used for Trip Circuit Supervision. 2. All Binary Inputs shall have galvanic isolation. Analog inputs shall be protected against switching surges, harmonics etc.		

		3. All Binary Inputs including that for TCS shall work on the same voltage level as that of the relay auxiliary power supply. The Binary Inputs shall work only in the voltage range of the auxiliary power supply i.e., 110V DC $\pm$ 10% or 220 VDC $\pm$ 10% and shall not work in any other AC or DC Voltage range due to accidental occurrence of any voltage mixing, voltage superimposition or induced voltages in addition to the rated auxiliary supply mentioned above.		
6	Binary Output Relay Contacts	The Relay shall have atleast seven (07) freely configurable binary output relays for alarm and trip functions with at least two (02) relays having changeover contacts and an additional watchdog relay with changeover contacts for generating alarm contact in case of Internal Relay Fault. Provision shall be available in the relay to program the output relays for hand/ manual reset application. The output relay contacts shall be rated for at least 5A continuously at 220 V AC/DC.		
7	Programming	The relay shall have facility of programming the total control scheme in soft through logic blocks (Programmable soft logic) inside the relay through communication software. The software should have necessary building blocks for the control scheme which can be used freely for implementation of desired scheme. Vendor shall develop the logics & drawing as per the IOCL requirement.		
8	Protection Functions	1. The Relay shall have minimum four (04) poles, which can be used in the configuration of three (03) Over-current & One (01) Residual/ Standby/ Restricted Earth Fault. The Relay shall have at least the following protective elements:		
		a. Instantaneous/ Definite Time Over-Current: The relay shall possess an instantaneous/ definite time over-current feature for short circuit protection in case of phase faults. The time delay in the definite time setting shall be settable to a minimum of 0.00 sec.		

		b. IDMT Over-Current: The relay shall possess at least two stages of IDMT over-current feature and shall be selectable to any of the IEC characteristic curves. c. Instantaneous/ Definite Time Earth Fault: The relay shall possess an instantaneous/ definite time Earth Fault protection feature for protection in case of earth faults in residual, Neutral CT or CBCT connection. The time delay in the definite time setting shall be settable for a minimum of 0.00 sec. d. IDMT Earth Fault: The relay shall possess at least two stages of IDMT Earth Fault feature and shall be selectable to any of the IEC characteristic curves.		
9	Setting Groups	The Relay shall have at least two (02) independent selectable setting groups for all protection features of the relay.		
10	Trip Circuit Supervision	The Relay shall possess Trip Circuit Supervision (TCS) feature to monitor the trip circuit both in ON & OFF conditions of Circuit Breaker. All necessary hardware and components required for hook up of Trip Circuit Supervision (TCS) to the relay shall be supplied as a part of the relay with each relay. The TCS connection diagram shall be submitted along with the offer. The TCS feature shall work on the same voltage as the relay auxiliary power supply level.		
11	Online monitoring / Measurements	The Relay shall monitor at least the following parameters online:		
		1. The true primary and secondary RMS currents of all three phases & neutral (earth)		
		2. Positive sequence current, Negative sequence current & Zero sequence current		
		3. Peak Current values		
		4. Status of Trip Circuit Supervision		
		5. Relay healthiness status		
12	Diagnostic Features	6. In-built hour run meter		
		The Relay shall have following diagnostic features:		

	a) Fault Records	Relay shall be able to record minimum 5 fault records containing the details such as the nature of fault, fault current & faulted phase with date and time stamping.		
	b) Event Records	Relay shall be able to record minimum 50 events with date and time stamping. Events shall be time-stamped at a resolution of a maximum of 3 milliseconds.		
	c) Disturbance Records	1. The relay shall be capable of capturing fault waveforms for at least three (03) seconds. The relay shall be provided with at least 8 channels consisting of minimum 4 analog and 4 digital inputs for disturbance recording. The date and time stamping shall be available for each disturbance fault record.		
		2. All disturbances/ events shall be displayed with time stamp. Relay time shall be synchronized with plant clock through serial communication from data concentrator, from substation MMI or from SCADA RTU. The relay shall have the feature of capturing at least the following parameters at the instant of tripping inclusive of I0, IL1, IL2, IL3, I1 & I2, without the need of any external trigger in case of protection trips.		
13	Memory	The Relay shall be equipped with backup power, either backup battery or otherwise such that data like parameter settings, programming, status, events and fault data information shall not be lost on failure of Relay auxiliary power supply. The backup power system as mentioned above shall be part of the Relay and shall be supplied as a part of the Relay.		
14	Relay Front Display	The Relay shall have a backlit alphanumeric LCD display and shall be able to provide key information like settings, measurement, fault data and records. Side-lit LCD screens are not acceptable.		
15	LED Display	The Relay shall be provided with LEDs for indicating at least the Protection Trip and Relay Healthy indications. Additional LEDs, if provided, shall be freely programmable separately at least for protection trips, status of Digital Inputs & status of Trip Circuit Supervision.		

16	Human Machine Interface (HMI)	The Relay shall have a local HMI and shall be possible to carry out the complete settings and configuration of the relay online through the local HMI without disturbing or tripping the feeder. It shall also be possible to download the information from the relay and interrogate the relay from remote.		
17	Watchdog & Self Monitoring	The Relay shall monitor the healthiness of its circuits and components by a continuous self-monitoring system. In case of any problem, alarm shall be generated without tripping the feeder. An output relay with changeover contact shall be provided for remote annunciation of the Relay fault. This alarm shall also be communicable through the RS-485 port to the connected SCADA system.		
18	Other Relay Features and requirements	1. The Relay terminals shall not be plug-in type. The wires to the relay shall be able to be connected with the help of screws. Relay terminals shall be suitable for termination of 2.5/4 sq. mm. wires. All necessary hardware required for connection of the wires to all the relay terminals shall be supplied along with each relay as part of the relay.		
		2. The relevant software & hardware for relay setting, data downloading and waveform analysis shall be supplied along with the relay as a part of the relay. The licensed copy of software supplied shall be licensed in the name of IOCL. All future upgrades from time to time shall be provided immediately to IOCL free of cost.		
		3. At least five (05) sets of necessary tool kits for installation, connection and commissioning of the relay at site shall be supplied along with this lot as part of the relays.		

	4. The Relay shall be flush mounting type and shall be draw-out type. The enclosure shall be dust tight having degree of protection minimum as IP5X. Relay shall have draw-out feature with plug-in type PCBs for easy replacement. All the PCBs in the Relay shall be provided with a transparent epoxy (conformal) coating for environment protection and tropicalisation. The relay terminals shall be easily accessible for testing and commissioning. It shall be possible to draw-out the relay from its casing and place the relay back in casing online without disturbing or tripping the feeder.		
	5. CT shorting link shall be provided at terminal block as required. The CTs shall get shorted on draw-out of the relay from the casing. No ICT shall be provided either for ratio error correction or otherwise. The necessary correction, if required, shall be programmable in the numerical relay itself.		
	6. It shall be possible to program the relay or change the settings and configuration of the relay on-line when the feeder is ON and in service without disturbing or tripping the feeder.		
	7. A suitably designed Stabilising Resistor shall be supplied with each relay for Earth Fault protection in residual connection of CTs as part of the Relay.		
	8. Relay shall be made immune to capacitance effect due to long length of cables. Any external hardware, if required for avoiding mal-operation of relay due to cable capacitance shall be included as a standard feature.		
	9. The closing and tripping of the feeder breaker shall be independent of the relay during normal operation other than fault tripping.		
	10. The setting and configuration of the relay shall have the feature to directly set from the menu of each feature in alphanumeric format and not indirectly through a set of binary digits and summation codes. The setting and configuration of the relay shall be user-friendly.		
	11. The warnings, alarms, faults & trips in the relay shall be displayed directly in alphanumeric format on the backlit LCD screen and not indirectly in the form of summation codes.		

19	Communication & Protocol	1. The Relay shall be provided with fixed port - RS-485 / Fibre Optic / RS-232 port to connect to the network for remote communication and to interrogate the relay with a local laptop PC simultaneously without any affect of one operation on the other. All hardware connectors and ports as well as port converters & associated power supply units required, if any, for this purpose shall be supplied with each relay as a part of the relay.		
		2. The Relay shall be able to work on open protocol IEC 60870-5-103 and shall be fully communicable type on IEC 60870-5-103 protocol.		
		3. The Relay shall be able to communicate with any type of SCADA or ECS. Vendor shall confirm it at the time of quoting. The vendor shall provide the inter operability table / memory map and all other details and data of the relay required for network communication along with the supply of relay for facilitating communication of the relay through any network.		
		4. It shall also be possible to synchronise the relay time with the network clock by connecting to the network through open protocol. The real time clock shall be settable through the network as governed by the connected SCADA or ECS system.		
		5. All three phase currents, fault currents of each phase and earth, fault alarms, status of binary inputs and output relays, event records & fault records in the relay with date and time stamping shall be accessible through the network in open protocol.		
19A	Conformity Standards to	1. The equipment shall comply with the requirements of latest revision of following standards, unless otherwise specified.		
		• IEC 60068-2-1/2 Temperature range in service, during transport and storage		
		• IEC 60068-2-3 Damp heat recycle test		
		• IEC 60255 DC and AC power interruption and short circuit test		
		• IEC 60255 Class 3 General performance requirement		

		• IEC 60255-5 Voltage withstand test, insulation resistance test, Dielectric impulse test, Impulse voltage withstand test		
		• IEC 60255-6 Measurement of accuracy, rated burden, thermal requirement		
		• IEC 60255-11 Auxiliary DC Power supply requirement		
		• IEC 60255-21-1/2/3 Mechanical performance requirement; vibration, shock, bump and Seismic test		
		• IEC 60255-22-1 High frequency disturbance test		
		• IEC 60255-22-2 Electrostatic discharge test		
		• IEC 60255-22-3 Radiated, radio frequency and electromagnetic field immunity test		
		• IEC 60255-22-4 Fast transient disturbance test		
		• IEC 60255-22-25 Conducted and radiated radio frequency emission tests		
		• IEC 60255-23 Contact performance requirement		
		• IEC 60529 Degree of protection by enclosure		
		• IEC 61000-4-5 Surge immunity test		
		• IEC 61000-4-6 Immunity to conducted disturbance induced by radio frequency field		
		• IEC 61000-4-8 Power frequency magnetic field immunity test		
		• IEC 61000-4-9 Pulse magnetic field immunity test		
		• IEC 61000-4-10 Damped oscillatory magnetic field immunity test		
		• IEC 61000-4-11 AC auxiliary supply requirement		
		• IEC 61000-4-16 Immunity to conducted, common mode disturbances		
		• ENV 50204 Radiated electromagnetic field disturbance test		
		• EN 55022 class A Radio interference test		
		2. In case of imported equipment, standards of the country of origin shall be applicable, if these standards are equivalent or stringent than the applicable Indian standards.		

		3. The equipment shall also conform to the provisions of Indian Electricity rules and other statutory regulations currently in force in the country.		
		4. In case Indian standards are not available for any equipment, standards issued by IEC/BS/VDE/IEEE/NEMA or equivalent agency shall be applicable.		
		5. In case of any contradiction between various referred standards/ specifications/ data sheet and statutory regulations the following order of priority shall govern:		
		• Statutory regulations		
		• Data sheets		
		• This specification		
		• Codes and standards		
20	Password Protection	The relays shall be provided with suitable security (password protection) against unauthorized WRITE ACCESS for change in relay setting. However it shall be possible to view metering, protection settings, and status and event data as READ ONLY without password protection. It shall also be possible to disable the password function.		
21	Operating Climatic conditions	The relays shall be suitable for satisfactory operation when installed in a panel located in a pressurized substation with restricted natural air ventilation, in tropical humid and corrosive atmosphere. The Relay shall be suitable for operation at a maximum ambient temperature of 55 degrees Celsius and at a relative humidity of 75% continuous and 93% intermittent.		
22	General Requirement	1. The offered equipment shall be brand new with state of art technology and proven field track record. No prototype equipment shall be offered.		
		2. Vendor shall ensure availability of spare parts and maintenance support services for the offered equipment for at least 15 years from the date of supply.		

		3. After at least fifteen (15) years from the date of supply, Vendor shall give a notice of at least one (01) year to IOCL before phasing out the product/ spares to enable IOCL to take action for placement of order for spares and services.		
		4. Any foreign Relay manufacturer through his Indian partner or subsidiary company in India shall provide application, testing, commissioning and other necessary support for minimum of 15 years to customer. They shall also maintain adequate inventory of each type of relay or spares to meet the requirement arising during project execution and plant operation. Relay manufacturer shall possess a signed MOU with their Indian partner/ subsidiary company for providing customer support and this shall be produced even if not specifically asked for.		
23	Relay Earthing	The relay shall work reliably with connection of switchgear earthing to the relay only.		
24	Interface with PC	It shall be possible to carry out and retrieve settings and configuration of the relay through Laptop PC. It shall also be possible to retrieve all fault disturbance records & oscillographic waveforms from the relay through Laptop PC. The software used for PC Interface shall be user-friendly and menu based and shall be supplied as a part of the relay. Five (05) nos. of communication cables with port converter sets, for communication of relay with Laptop PC, shall be supplied with this lot of relays.		
25	Testing and Acceptance	1. The Relay shall have been type tested as per relevant Indian/ international standards and witnessed by independent test authority/ agency of country of origin. Type tests shall include as minimum but not be limited to the following:		
		a. Temperature withstand		
		b. Disturbance immunity		
		c. Electromagnetic compatibility (EMC)		
		d. HV withstands test for insulation		

		e. Impulse voltage test		
		f. Functional tests and Communication integrity		
		g. Relay characteristics verification		
		h. Degree of protection		
		i. Mechanical stress/ vibration test		
		2. During assembly, owner or his authorized representative shall be permitted to assess the progress of work as well as to ascertain that quality of raw material is used for the same. All assistance as required during inspection shall be given to inspector.		
		3. Final acceptance tests shall be carried out at manufacturer/ assembler's works under his care and expense. Manufacturer shall also arrange instruments and equipment as required for testing. Owner's representative shall be given minimum 2 weeks prior notice for witnessing the tests. Manufacturer shall furnish test certificates indicating test results. Acceptance tests shall include visual checks, insulation checks, heat run tests and functional tests as a minimum or as per the manufacturer's quality plan.		
		4. In case of fully assembled and tested relays from abroad, manufacturer shall furnish type, routine and acceptance test certificates along with the supply of numerical relays for owner's perusal.		
26	Other Requirements	1. The Vendor shall quote with complete technical literature, Operating Manual and Laptop interface software. Specific Model meeting the above requirements shall be mentioned.		
		2. The vendor shall specify the warranty period of the relay for free service / replacement.		
		3. The Vendor shall quote with point-wise confirmation of the above specifications and mention the deviation if any.		
		4. The Vendor shall give the details of after sale/service facilities available in India and approximate time for repair jobs.		

		5. The Vendor shall provide at least three (03) original complete O&M Manual as well as Application Guide of the offered Relay printed at the origin of manufacture of the relay and at least one (01) soft copy of the O&M Manual and Application Guide.		
		6. The Vendor shall submit, along with the offer, a third party test certificate from reputed Indian Testing Laboratory either from CPRI or ERDA for the offered model and type of relay, mentioning the test results with complete conformity to all the features, characteristics and specifications of the relay.		
		7. The vendor shall submit the list of locations where such relays have been supplied and installed in India.		
		8. The Numerical Relay being procured shall replace an already installed Relay, which is having a programmable control, Protection & Bus coupler Auto Changeover Scheme based on Digital Inputs and using logic gates of the Relay. In the event of an order, the complete control scheme of the relay & panel drawing shall be furnished to the VENDOR by IOCL. Vendor shall develop the logics & drawing as per the IOCL requirement. The vendor shall completely program the new relay as per the logics of the existing Relay. The Relay shall be pre-programmed in all respect as per the approved control drawings. The VENDOR shall subsequently extend free of cost site supervision support required in this regard for the commissioning of at least one relay each for incomer & bus coupler.		

Note: Vendor shall provide point-wise confirmation to all the points given above in the Specification for required Numeric Feeder Protection Relay failing which the offer will not be evaluated and is liable to be rejected.

5.3 COMPREHENSIVE NUMERIC GENERATOR PROTECTION RELAYS

Sr. No.	Relay Feature	Relay Feature Description	Confirm	Deviations if any
			Yes / No	
1	Application	Comprehensive Numeric Generator Protection Relay operating in redundant configuration mode.		
2	Auxiliary Voltage	The offered Relay shall be suitable for working with auxiliary power supply of 220VDC to 110 V DC $\pm$ 20%		
3	Phase Current Input	Relay shall be suitable for 1A & 5A CT secondary inputs selectable at site.		
4	Voltage Input	The offered relay shall be suitable for 3-Phase 110 V AC, 50 Hz PT secondary voltage input .		
5	Ground Current Input	Relay shall be suitable for 1A & 5A CT secondary inputs selectable at site.		
6	Binary Inputs	1. The Relay shall have minimum Twenty Four (24) freely configurable binary inputs.		
		2. All Binary Inputs shall have galvanic isolation. Analog inputs shall be protected against switching surges, harmonics etc.		
		3. All Binary Inputs shall work on the same voltage level as that of the relay auxiliary power supply		
7	Binary Output Relay Contacts	The Relay shall have minimum twenty four (24) freely configurable binary output relays for alarm and trip functions with at least Four (04) relays having changeover contacts and an additional watchdog relay with changeover contacts for generating alarm contact in case of Internal Relay Fault. Provision shall be available in the relay to program the output relays for hand/ manual reset application. The output relay contacts shall be rated for at least 5A continuous.		
8	Protection Functions	Main Protection Functions		

	Generator Differential	87G		
	Inter turn/split phase	50DT		
	Pole Slipping	78		
	Directional Power	32/37 L/O/R		
	Under impedance	21		
	Field Failure	40		
	Restricted Earth Fault	64		
	100% Stator earth fault(3rd harmonic)	27TN		
	Over fluxing	24		
	Inadvertent energization at standstill / Dead Machine	50/27		
	Voltage dependent Overcurrent	51V		
	Ancillary Protection Functions			
	Phase over current	50/50P		
	Phase directional overcurrent	67P		
	Sensitive directional earth fault	67N		
	Ground fault	50N/51N		
	Watt metric earth fault	64N/32N		
	Negative sequence over current	46		
	Thermal overload	38/49		
	Under/over voltage	27/49		
	Residual over voltage	59N		
	Under frequency	81U		
	Over frequency	81O		
	Circuit breaker failure	50BF		
	Circuit breaker monitoring			
	Post fault analysis tools inclusive of:	1. Fault records		
		2. Event records		
		3. Disturbance		

9	Setting Groups	The Relay shall have at least two (02) independent selectable setting groups for all protection features of the relay.		
10	Timers	Relay shall have internal timers of following types		
		Pick-up timers		
		Drop-off timers		
		Pulse timers		
		Straight through timers		
11	Trip Circuit Supervision	The Relay shall possess Trip Circuit Supervision feature to monitor the trip circuit both in ON & OFF conditions of Circuit Breaker. All necessary hardware required for hook up of Trip Circuit Supervision to the relay shall be supplied with each relay. The TCS connection diagram shall be submitted along with the offer. The TCS feature shall work on the same voltage as the relay auxiliary power supply level.		
12	Online monitoring / Measurements	The Relay shall monitor at least the following parameters online:		
		• the true primary and secondary RMS currents of all three phases & neutral (earth)		
		• The primary and secondary phase, line & neutral voltages		
		• Positive sequence current, negative sequence current & zero sequence current		
		• Frequency		
		• Status of Trip Circuit Supervision, VT Supervision & CT Supervision		
		• Relay healthiness status		
13	Diagnostic Features	The Relay shall have following diagnostic features:		
	a) Fault Records	Relay shall be able to record minimum 5 fault records containing the details such as the nature of fault, fault current, fault voltage, fault frequency & faulted phase with date and time stamping.		

	b) Event Records	Relay shall be able to record minimum 250 events with date and time stamping. Events shall be time-stamped at a resolution of a maximum of 3 milliseconds.		
	c) Disturbance Records	1. The relay shall be capable of capturing fault waveforms for at least three (03) seconds. The relay shall be provided with at least 8 channels consisting of minimum 4 analog and 4 digital inputs for disturbance recording. The date and time stamping shall be available for each disturbance fault record.		
		2. All disturbances/ events shall be displayed with time stamp. Time shall be synchronized with plant clock through serial communication from data concentrator or from substation MMI. The relay shall have the feature of capturing at least the parameters at the instant of tripping inclusive of I_0 , I_{L1} , I_{L2} , I_{L3} , I_1 & I_2 , V_a , V_b , V_c , V_{ab} , V_{bc} , V_{ca} , V_n , f without the need of any external trigger in case of protection trips.		
14	Memory	The Relay shall be equipped with backup power, either backup battery or otherwise such that data like parameter settings, programming, status, events and fault data information shall not be lost on failure of Relay auxiliary power supply. The backup power system as mentioned above shall be part of the Relay and shall be supplied as a part of the Relay.		
15	Relay Front Display	The Relay shall have a backlit alphanumeric LCD display and shall be able to provide key information like settings, measurement, fault data and records. Side-lit LCD screens are not acceptable.		
16	LED Display	The Relay shall be provided with LEDs for indicating at least the Protection Trip and Relay Healthy indications. Additional LEDs (8 user defined) shall be freely programmable separately at least for protection trips, status of Digital Inputs & status of Trip Circuit Supervision.		

17	Human Machine Interface (HMI)	The Relay shall have a local HMI and shall be possible to carry out the complete settings and configuration of the relay online through the local HMI without disturbing or tripping the feeder. It shall also be possible to download the information from the relay and interrogate the relay from remote.		
18	Watchdog & Self Monitoring	The Relay shall monitor the healthiness of its circuits and components by a continuous self-monitoring system. In case of any problem, alarm shall be generated without tripping the feeder. An output relay with changeover contact shall be provided for remote annunciation of the Relay fault.		
19	Other Relay Features and requirements	1. The Relay terminals shall not be plug-in type. The wires to the relay shall be able to be connected with the help of screws. Relay terminals shall be suitable for termination of 2.5/4 sq. mm. wires. All necessary hardware required for connection of the wires to all the relay terminals shall be supplied along with each relay as part of the relay.		
		2. The relevant software & hardware for relay setting, data downloading and waveform analysis shall be supplied along with the relay as a part of the relay.		
		3. At least one set of necessary tool kits for installation, connection and commissioning of the relay at site shall be supplied along with this lot as part of the relays.		
		4. The Relay shall be flush mounting type and shall be draw-out type. The enclosure shall be dust tight having degree of protection minimum as IP5X. Relay shall have draw-out feature with plug-in type PCBs for easy replacement. The relay terminals shall be easily accessible for testing and commissioning. It shall be possible to draw-out the relay from its casing on-line.		
		5. CT shorting link shall be provided at terminal block as required. The CTs shall get shorted on draw-out of the relay from the casing. No ICT shall be provided either for ratio error correction or otherwise. The necessary correction shall be programmable in the numerical relay itself.		

		6. It shall be possible to program the relay or change the settings and configuration of the relay on-line when the feeder is ON and in service without disturbing or tripping the feeder.		
		7. A suitably designed Stabilising Resistor shall be supplied with each relay for Earth Fault protection in residual connection of CTs.		
		8. Relay shall be made immune to capacitance effect due to long length of cables. Any external hardware, if required for avoiding mal-operation of relay due to cable capacitance shall be included as a standard feature.		
		9. The closing and tripping of the feeder breaker shall be independent of the relay during normal operation other than fault tripping.		
		10. The setting and configuration of the relay shall have the feature to directly set from the menu of each feature in alphanumeric format and not indirectly through a set of binary digits and summation codes. The setting and configuration of the relay shall be user-friendly.		
		11. The warnings, alarms, faults & trips in the relay shall be displayed directly in alphanumeric format on the backlit LCD screen and not indirectly in the form of summation codes.		
20	Communication & Protocol	1. The Relay shall be provided with fixed port – RS-232 at front side and RS-485 port on rear side to connect to the network for remote communication and to interrogate the relay with a local laptop PC simultaneously without any affect of one operation on the other. All hardware connectors and ports as well as port converters & associated power supply units, if any, required for this purpose shall be supplied as a part of the relay.		
		2. The Relay shall be able to work on open protocol IEC 60870-5-103.		
		3. The Relay shall be able to communicate with any type of DCS or SCADA. Vendor shall confirm it at the time of quoting. The vendor shall provide the inter operability table / memory map and all other details and data of the relay required for network communication along with the supply of relay for facilitating communication of the relay through any network.		

		4. It shall also be possible to synchronise the relay time with the network clock by connecting to the network through open protocol. The real time clock shall be settable through the network.		
		5. All three phase currents, fault currents of each phase and earth, fault alarms, status of binary inputs and output relays, event records & fault records in the relay with date and time stamping shall be accessible through the network in open protocol.		
21	Password Protection	The relays shall be provided with suitable security (password protection) against unauthorized WRITE ACCESS for change in relay setting. However it shall be possible to view metering, protection settings, and status and event data as READ ONLY without password protection. It shall also be possible to disable the password function.		
22	Operating Climatic conditions	The relays shall be suitable for satisfactory operation when installed in a panel located in a pressurized substation with restricted natural air ventilation, in tropical humid and corrosive atmosphere. The Relay shall be suitable for operation at a maximum ambient temperature of 55 degrees Celsius and at a relative humidity of 75% continuous and 93% intermittent.		
24	Relay Earthing	The relay shall work reliably with connection of switchgear earthing to the relay only.		
25	Interface with PC	It shall be possible to carry out and retrieve settings and configuration of the relay through Laptop PC. It shall also be possible to retrieve all fault disturbance records & oscillographic waveforms from the relay through Laptop PC. The software used for PC Interface shall be user-friendly and menu based and shall be supplied as a part of the relay. Relay shall not initiate any tripping or change of state of any output contact while uploading/downloading of settings/configuration/logics from relay.		

Note: Vendor shall provide point-wise confirmation to all the points given above in the Specification for required Numeric Protection Relay compulsorily.

5.4 NUMERIC FEEDER PROTECTION RELAY FOR HT FEEDERS & BUS COUPLER

S. No.	Relay Feature	Relay Feature Description	Confirm	Deviations, if any
			Yes / No	
1	Application	The Numeric Relay shall be suitable for use as a single comprehensive protective relay for HT Feeders and Bus-couplers on Power Plant Distribution Bus with at least Instantaneous / Definite Time Phase Over-current protection (50 - 50/2), IDMT Phase Over-current protection (51), Instantaneous / Definite-Time Earth fault protection (50N – 50N/2), IDMT Earth fault Protection (51N), Measurement & recording facilities		
2	Auxiliary Voltage	The offered Relay shall be suitable for working with auxiliary power supply of 110V DC & 220V DC $\pm$ 20 %		
3	Phase Current Input	Relay shall be suitable for 1A & 5A CT secondary inputs selectable at site.		
5	Ground Current Input	Relay shall be suitable for 1A & 5A CT secondary inputs selectable at site.		
6	Binary Inputs	1. The Relay shall have minimum five (05) freely configurable binary inputs other than inputs used for Trip Circuit Supervision.		
		2. All Binary Inputs shall have galvanic isolation. Analog inputs shall be protected against switching surges, harmonics etc.		
		3. All Binary Inputs including that for TCS shall work on the same voltage level as that of the relay auxiliary power supply.		
7	Binary Output Relay Contacts	The Relay shall have minimum four (04) freely configurable binary output relays for alarm and trip functions with at least one (01) relay having changeover contacts and an additional watchdog relay with changeover contacts for generating alarm contact in case of Internal Relay Fault. Provision shall be available in the relay to program the output relays for hand/ manual reset application. The output relay contacts shall be rated for at least 5A continuous at 220 V AC/DC.		

8	Protection Functions	The Relay shall have at least the following protective elements:		
		a. Instantaneous / Definite Time Over-Current: The relay shall possess an instantaneous / definite time over-current feature for short circuit protection in case of phase faults.		
		b. IDMT Over-Current: The relay shall possess at least two stages of IDMT Over-Current feature and shall be selectable to any of the IEC characteristic curves.		
		c. Instantaneous / Definite Time Earth Fault: The relay shall possess an instantaneous / definite time Earth Fault feature for protection in case of earth faults.		
		d. IDMT Earth Fault: The relay shall possess at least two stages of IDMT Earth Fault feature and shall be selectable to any of the IEC characteristic curves.		
9	Setting Groups	The Relay shall have at least two (02) independent selectable setting groups for all protection features of the relay.		
10	Trip Circuit Supervision	The Relay shall possess Trip Circuit Supervision feature to monitor the trip circuit both in ON & OFF conditions of Circuit Breaker. All necessary hardware required for hook up of Trip Circuit Supervision to the relay shall be supplied with each relay. The TCS connection diagram shall be submitted along with the offer. The TCS feature shall work on the same voltage as the relay auxiliary power supply level.		
11	Online monitoring / Measurements	The Relay shall monitor at least the following parameters online:		
		• The true primary and secondary RMS currents of all three phases & neutral (earth)		
		• The primary and secondary phase, line & neutral voltages		
		• Positive sequence current, negative sequence current & zero sequence current		
		• Frequency		
		• Status of Trip Circuit Supervision		

		Relay healthiness status		
12	Diagnostic Features	The Relay shall have following diagnostic features:		
	a) Fault Records	Relay shall be able to record minimum 5 fault records containing the details such as the nature of fault, fault current, fault voltage, fault frequency & faulted phase with date and time stamping.		
	b) Event Records	Relay shall be able to record minimum 50 events with date and time stamping. Events shall be time-stamped at a resolution of a maximum of 3 milliseconds.		
	c) Disturbance Records	1. The relay shall be capable of capturing fault waveforms for at least three (03) seconds. The relay shall be provided with at least 8 channels consisting of minimum 4 analog and 4 digital inputs for disturbance recording. The date and time stamping shall be available for each disturbance fault record. 2. All disturbances/ events shall be displayed with time stamp. Time shall be synchronized with plant clock through serial communication from data concentrator or from substation MMI. The relay shall have the feature of capturing at least the parameters at the instant of tripping inclusive of I_0, I_{L1}, I_{L2}, I_{L3}, I_1 & I_2, V_a, V_b, V_c, V_{ab}, V_{bc}, V_{ca}, V_n, f without the need of any external trigger in case of protection trips.		
13	Memory	The Relay shall be equipped with backup power, either backup battery or otherwise such that data like parameter settings, programming, status, events and fault data information shall not be lost on failure of Relay auxiliary power supply. The backup power system as mentioned above shall be part of the Relay and shall be supplied as a part of the Relay.		
14	Relay Display Front	The Relay shall have a backlit alphanumeric LCD display and shall be able to provide key information like settings, measurement, fault data and records. Side-lit LCD screens are not acceptable.		

15	LED Display	The Relay shall be provided with LEDs for indicating at least the Protection Trip and Relay Healthy indications. Additional LEDs, if provided, shall be freely programmable separately at least for protection trips, status of Digital Inputs & status of Trip Circuit Supervision.		
16	Human Machine Interface (HMI)	The Relay shall have a local HMI and shall be possible to carry out the complete settings and configuration of the relay online through the local HMI without disturbing or tripping the feeder. It shall also be possible to download the information from the relay and interrogate the relay from remote.		
17	Watchdog & Self Monitoring	The Relay shall monitor the healthiness of its circuits and components by a continuous self-monitoring system. In case of any problem, alarm shall be generated without tripping the feeder. An output relay with changeover contact shall be provided for remote annunciation of the Relay fault.		
18	Other Relay Features and requirements	1. The Relay terminals shall not be plug-in type. The wires to the relay shall be able to be connected with the help of screws. Relay terminals shall be suitable for termination of 2.5/4 sq. mm. wires. All necessary hardware required for connection of the wires to all the relay terminals shall be supplied along with each relay as part of the relay.		
		2. The relevant software & hardware for relay setting, data downloading and waveform analysis shall be supplied along with the relay as a part of the relay.		
		3. At least three (03) sets of necessary tool kits for installation, connection and commissioning of the relay at site shall be supplied along with this lot as part of the relays.		

	4. The Relay shall be flush mounting type and shall be draw-out type. The enclosure shall be dust tight having degree of protection minimum as IP5X. Relay shall have draw-out feature with plug-in type PCBs for easy replacement. The relay terminals shall be easily accessible for testing and commissioning. It shall be possible to draw-out the relay from its casing on-line.		
	5. CT shorting link shall be provided at terminal block as required. The CTs shall get shorted on draw-out of the relay from the casing. No ICT shall be provided either for ratio error correction or otherwise. The necessary correction shall be programmable in the numerical relay itself.		
	6. It shall be possible to program the relay or change the settings and configuration of the relay on-line when the feeder is ON and in service without disturbing or tripping the feeder.		
	7. A suitably designed Stabilising Resistor shall be supplied with each relay for Earth Fault protection in residual connection of CTs.		
	8. Relay shall be made immune to capacitance effect due to long length of cables. Any external hardware, if required for avoiding mal-operation of relay due to cable capacitance shall be included as a standard feature.		
	9. The closing and tripping of the feeder breaker shall be independent of the relay during normal operation other than fault tripping.		
	10. The setting and configuration of the relay shall have the feature to directly set from the menu of each feature in alphanumeric format and not indirectly through a set of binary digits and summation codes. The setting and configuration of the relay shall be user-friendly.		
	11. The warnings, alarms, faults & trips in the relay shall be displayed directly in alphanumeric format on the backlit LCD screen and not indirectly in the form of summation codes.		

19	Communication & Protocol	1. The Relay shall be provided with fixed port - RS-485 / Fibre Optic / RS-232 port to connect to the network for remote communication and to interrogate the relay with a local laptop PC simultaneously without any affect of one operation on the other. All hardware connectors and ports as well as port converters & associated power supply units, if any, required for this purpose shall be supplied as a part of the relay.		
		2. The Relay shall be able to work on open protocol IEC 60870-5-103 & MODBUS and shall be fully communicable type on IEC 60870-5-103 & MODBUS protocol. Relay working on high-end open protocol IEC 61850 is also acceptable.		
		3. The Relay shall be able to communicate with any type of DCS or SCADA. Vendor shall confirm it at the time of quoting. The vendor shall provide the inter operability table / memory map and all other details and data of the relay required for network communication along with the supply of relay for facilitating communication of the relay through any network.		
		4. It shall also be possible to synchronise the relay time with the network clock by connecting to the network through open protocol. The real time clock shall be settable through the network.		
		5. All three phase currents, fault currents of each phase and earth, fault alarms, status of binary inputs and output relays, event records & fault records in the relay with date and time stamping shall be accessible through the network in open protocol.		
20	Conformity Standards to	1. The equipment shall comply with the requirements of latest revision of following standards, unless otherwise specified.		
		• IEC 60068-2-1/2 Temperature range in service, during transport and storage		
		• IEC 60068-2-3 Damp heat recycle test		
		• IEC 60255 DC and AC power interruption and short circuit test		

		• IEC 60255 Class 3 General performance requirement		
		• IEC 60255-5 Voltage withstand test, insulation resistance test, Dielectric impulse test, Impulse voltage withstand test		
		• IEC 60255-6 Measurement of accuracy, rated burden, thermal requirement		
		• IEC 60255-11 Auxiliary DC Power supply requirement		
		• IEC 60255-21-1/2/3 Mechanical performance requirement; vibration, shock, bump and Seismic test		
		• IEC 60255-22-1 High frequency disturbance test		
		• IEC 60255-22-2 Electrostatic discharge test		
		• IEC 60255-22-3 Radiated, radio frequency and electromagnetic field immunity test		
		• IEC 60255-22-4 Fast transient disturbance test		
		• IEC 60255-22-25 Conducted and radiated radio frequency emission tests		
		• IEC 60255-23 Contact performance requirement		
		• IEC 60529 Degree of protection by enclosure		
		• IEC 61000-4-5 Surge immunity test		
		• IEC 61000-4-6 Immunity to conducted disturbance induced by radio frequency field		
		• IEC 61000-4-8 Power frequency magnetic field immunity test		
		• IEC 61000-4-9 Pulse magnetic field immunity test		
		• IEC 61000-4-10 Damped oscillatory magnetic field immunity test		
		• IEC 61000-4-11 AC auxiliary supply requirement		
		• IEC 61000-4-16 Immunity to conducted, common mode disturbances		
		• ENV 50204 Radiated electromagnetic field disturbance test		
		• EN 55022 class A Radio interference test		

		2. In case of imported equipment, standards of the country of origin shall be applicable, if these standards are equivalent or stringent than the applicable Indian standards.		
		3. The equipment shall also conform to the provisions of Indian Electricity rules and other statutory regulations currently in force in the country.		
		4. In case Indian standards are not available for any equipment, standards issued by IEC/BS/VDE/IEEE/NEMA or equivalent agency shall be applicable.		
		5. In case of any contradiction between various referred standards/ specifications/ data sheet and statutory regulations the following order of priority shall govern:		
		• Statutory regulations		
		• Data sheets		
		• This specification		
		• Codes and standards		
21	Password Protection	The relays shall be provided with suitable security (password protection) against unauthorized WRITE ACCESS for change in relay setting. However it shall be possible to view metering, protection settings, and status and event data as READ ONLY without password protection. It shall also be possible to disable the password function.		
22	Operating Climatic conditions	The relays shall be suitable for satisfactory operation when installed in a panel located in a pressurized substation with restricted natural air ventilation, in tropical humid and corrosive atmosphere. The Relay shall be suitable for operation at a maximum ambient temperature of 55 degrees Celsius and at a relative humidity of 75% continuous and 93% intermittent.		
23	General Requirement	1. The offered equipment shall be brand new with state of art technology and proven field track record. No prototype equipment shall be offered.		

		2. Vendor shall ensure availability of spare parts and maintenance support services for the offered equipment for at least 15 years from the date of supply.		
		3. Vendor shall give a notice for at least one year to IOCL before phasing out the product/ spares to enable the end user for placement of order for spares and services.		
		4. Any foreign Relay manufacturer through his Indian partner or subsidiary company in India shall provide application, testing, commissioning and other necessary support for minimum of 15 years to customer. They shall also maintain adequate inventory of each type of relay or spares to meet the requirement arising during project execution and plant operation. Relay manufacturer shall possess a signed MOU with their Indian partner/ subsidiary company for providing customer support and this shall be produced even if not specifically asked for.		
24	Relay Earthing	The relay shall work reliably with connection of switchgear earthing to the relay only.		
25	Interface with PC	It shall be possible to carry out and retrieve settings and configuration of the relay through Laptop PC. It shall also be possible to retrieve all fault disturbance records & oscillographic waveforms from the relay through Laptop PC. The software used for PC Interface shall be user-friendly and menu based and shall be supplied as a part of the relay. Five (05) nos. of communication cables with port converter sets for communication of relay with Laptop PC shall be supplied with this lot of relays.		
26	Testing and Acceptance	1. The Relay shall have been type tested as per relevant Indian/ international standards and witnessed by independent test authority/ agency of country of origin. Type tests shall include as minimum but not be limited to the following:		
		a. Temperature withstand		
		b. Disturbance immunity		

		c. Electromagnetic compatibility (EMC)		
		d. HV withstands test for insulation		
		e. Impulse voltage test		
		f. Functional tests and Communication integrity		
		g. Relay characteristics verification		
		h. Degree of protection		
		i. Mechanical stress/ vibration test		
		2. During assembly, owner or his authorized representative shall be permitted to assess the progress of work as well as to ascertain that quality of raw material are used for the same. All assistance as required during inspection shall be given to inspector.		
		3. Final acceptance tests shall be carried out at manufacturer/ assembler's works under his care and expense. Manufacturer shall also arrange instruments and equipment as required for testing. Owner's representative shall be given minimum 2 weeks prior notice for witnessing the tests. Manufacturer shall furnish test certificates indicating test results. Acceptance tests shall include visual checks, insulation checks, heat run tests and functional tests as a minimum or as per the manufacturer's quality plan.		
		4. In case of fully assembled and tested relays from abroad, manufacturer shall furnish type, routine and acceptance test certificates along with the supply of numerical relays for owner's perusal.		
27	Other Requirements	1. The Vendor shall quote with complete technical literature, Operating Manual and Laptop PC interface software. Specific Model meeting the above requirements shall be mentioned.		
		2. The vendor shall specify the warranty period of the relay for free service / replacement.		
		3. The Vendor shall quote with point-wise confirmation of the above specifications and mention the deviation if any.		

		4. The Vendor shall give the details of after sale/service facilities available in India and approximate time for repair jobs.		
		5. The vendor shall submit the list of locations where such relays have been supplied and installed in India.		

Note: Vendor shall provide point-wise confirmation to all the points given above in the Specification for required Numeric Motor Protection Relay failing which the offer is liable to be rejected.

5.5 NUMERIC LT FEEDER PROTECTION RELAY FOR LT OUTGOING FEEDERS

S. No.	Relay Feature	Relay Feature Description	Confirm	Deviations, if any
			Yes / No	
1	Application	The Numeric Feeder Protection Relay (hereafter referred to as the Relay) shall be suitable for use as a single comprehensive protective relay for LT Outgoing Feeders with at least the following protective function & features: Three-phase Instantaneous/ Definite Time Phase Over-current protection (50 - 50/2), three-phase IDMT Over-current protection (51), Instantaneous/ Definite-Time Earth Fault protection (50N – 50N/2), IDMT Earth Fault Protection (51N), Trip Circuit Supervision (95), Measurement & recording facilities		
2	Auxiliary Voltage	The offered Relay shall be suitable for working with auxiliary power supply of 110V DC $\pm$ 20% & 220 VDC $\pm$ 20%		
3	Phase Current Input	1. The Relay shall be suitable for 1A & 5A CT secondary inputs selectable at site. 2. The Relay shall be suitable for 2 CT as well as 3 CT configurations.		
4	Ground Current Input	1. The Relay shall be suitable for 1A & 5A CT secondary inputs selectable at site. 2. The Relay shall be suitable for residual as well as CBCT inputs.		
5	Binary Inputs	1. The Relay shall have minimum four (04) freely configurable binary inputs other than inputs used for Trip Circuit Supervision.		
		2. All Binary Inputs shall have galvanic isolation. Analog inputs shall be protected against switching surges, harmonics etc.		
		3. All Binary Inputs including that for TCS shall work on the same voltage level as that of the relay auxiliary power supply. The Binary Inputs shall work only in the voltage range of the auxiliary power supply i.e., 110V DC $\pm$ 20% or 220 V $\pm$ 20% and shall not work in any other AC or DC Voltage range due to accidental occurrence of any voltage mixing, voltage superimposition or induced voltages in addition to the rated auxiliary supply mentioned above.		
6	Binary Output Relay	The Relay shall have minimum six (06) freely configurable binary output relays for alarm and trip functions with at least two (02) relays having changeover contacts		

	Contacts	and an additional watchdog relay with changeover contacts for generating alarm contact in case of Internal Relay Fault. Provision shall be available in the relay to program the output relays for hand/ manual reset application. The output relay contacts shall be rated for at least 5A continuously at 220 V AC/DC.		
7	Protection Functions	1. The Relay shall have minimum four (04) poles, which can be used in the configuration of three (03) Over-current & One (01) Residual/ Standby/ Restricted Earth Fault. The Relay shall have at least the following protective elements:		
		a. Instantaneous/ Definite Time Over-Current: The relay shall possess an instantaneous/ definite time over-current feature for short circuit protection in case of phase faults. The time delay in the definite time setting shall be settable to a minimum of 0.00 sec.		
		b. IDMT Over-Current: The relay shall possess at least two stages of IDMT over-current feature and shall be selectable to any of the IEC characteristic curves.		
		c. Instantaneous/ Definite Time Earth Fault: The relay shall possess an instantaneous/ definite time Earth Fault protection feature for protection in case of earth faults in residual, Neutral CT or CBCT connection. The time delay in the definite time setting shall be settable for a minimum of 0.00 sec.		
		d. IDMT Earth Fault: The relay shall possess at least two stages of IDMT Earth Fault feature and shall be selectable to any of the IEC characteristic curves.		
8	Setting Groups	The Relay shall have at least two (02) independent selectable setting groups for all protection features of the relay.		

9	Trip Circuit Supervision	The Relay shall possess Trip Circuit Supervision (TCS) feature to monitor the trip circuit both in ON & OFF conditions of Circuit Breaker. All necessary hardware and components required for hook up of Trip Circuit Supervision (TCS) to the relay shall be supplied as a part of the relay with each relay. The TCS connection diagram shall be submitted along with the offer. The TCS feature shall work on the same voltage as the relay auxiliary power supply level.		
10	Online monitoring / Measurements	The Relay shall monitor at least the following parameters online:		
		1. The true primary and secondary RMS currents of all three phases & neutral (earth)		
		2. Positive sequence current, Negative sequence current & Zero sequence current		
		3. Peak Current values		
		4. Status of Trip Circuit Supervision		
		5. Relay healthiness status		
11	Diagnostic Features	The Relay shall have following diagnostic features:		
	a) Fault Records	Relay shall be able to record minimum 5 fault records containing the details such as the nature of fault, fault current & faulted phase with date and time stamping.		
	b) Event Records	Relay shall be able to record minimum 50 events with date and time stamping. Events shall be time-stamped at a resolution of a maximum of 3 milliseconds.		
	c) Disturbance Records	1. The relay shall be capable of capturing fault waveforms for at least three (03) seconds. The relay shall be provided with at least 8 channels consisting of minimum 4 analog and 4 digital inputs for disturbance recording. The date and time stamping shall be available for each disturbance fault record.		

		2. All disturbances/ events shall be displayed with time stamp. Relay time shall be synchronized with plant clock through serial communication from data concentrator, from substation MMI or from SCADA / ECS RTU. The relay shall have the feature of capturing at least the following parameters at the instant of tripping inclusive of I_0 , I_{L1} , I_{L2} , I_{L3} , I_1 & I_2 , without the need of any external trigger in case of protection trips.		
12	Memory	The Relay shall be equipped with backup power, either backup battery or otherwise such that data like parameter settings, programming, status, events and fault data information shall not be lost on failure of Relay auxiliary power supply. The backup power system as mentioned above shall be part of the Relay and shall be supplied as a part of the Relay.		
13	Relay Front Display	The Relay shall have a backlit alphanumeric LCD display and shall be able to provide key information like settings, measurement, fault data and records. Side-lit LCD screens are not acceptable.		
14	LED Display	The Relay shall be provided with LEDs for indicating at least the Protection Trip and Relay Healthy indications. Additional LEDs, if provided, shall be freely programmable separately at least for protection trips, status of Digital Inputs & status of Trip Circuit Supervision.		
15	Human Machine Interface (HMI)	The Relay shall have a local HMI and shall be possible to carry out the complete settings and configuration of the relay online through the local HMI without disturbing or tripping the feeder. It shall also be possible to download the information from the relay and interrogate the relay from remote.		
16	Watchdog & Self Monitoring	The Relay shall monitor the healthiness of its circuits and components by a continuous self-monitoring system. In case of any problem, alarm shall be generated without tripping the feeder. An output relay with changeover contact shall be provided for remote annunciation of the Relay fault. This alarm shall also be communicable through the RS-485 port to the connected SCADA/ ECS system.		

17	Other Relay Features and requirements	1. The Relay terminals shall not be plug-in type. The wires to the relay shall be able to be connected with the help of screws. Relay terminals shall be suitable for termination of 2.5/4 sq. mm. wires. All necessary hardware required for connection of the wires to all the relay terminals shall be supplied along with each relay as part of the relay.		
		2. The relevant software & hardware for relay setting, data downloading and waveform analysis shall be supplied along with the relay as a part of the relay. The licensed copy of software supplied shall be licensed in the name of IOCL. All future upgrades from time to time shall be provided immediately to IOCL, free of cost.		
		3. At least five (05) sets of necessary tool kits for installation, connection and commissioning of the relay at site shall be supplied along with this lot as part of the relays.		
		4. The Relay shall be flush mounting type and shall be draw-out type. The enclosure shall be dust tight having degree of protection minimum as IP5X. Relay shall have draw-out feature with plug-in type PCBs for easy replacement. All the PCBs in the Relay shall be provided with a transparent epoxy (conformal) coating for environment protection and tropicalisation. The relay terminals shall be easily accessible for testing and commissioning. It shall be possible to draw-out the relay from its casing and place the relay back in casing online without disturbing or tripping the feeder.		
		5. CT shorting link shall be provided at terminal block as required. The CTs shall get shorted on draw-out of the relay from the casing. No ICT shall be provided either for ratio error correction or otherwise. The necessary correction, if required, shall be programmable in the numerical relay itself.		
		6. It shall be possible to program the relay or change the settings and configuration of the relay on-line when the feeder is ON and in service without disturbing or tripping the feeder.		

		7. A suitably designed Stabilising Resistor shall be supplied with each relay for Earth Fault protection in residual connection of CTs as part of the Relay.		
		8. Relay shall be made immune to capacitance effect due to long length of cables. Any external hardware, if required for avoiding mal-operation of relay due to cable capacitance shall be included as a standard feature.		
		9. The closing and tripping of the feeder breaker shall be independent of the relay during normal operation other than fault tripping.		
		10. The setting and configuration of the relay shall have the feature to directly set from the menu of each feature in alphanumeric format and not indirectly through a set of binary digits and summation codes. The setting and configuration of the relay shall be user-friendly.		
		11. The warnings, alarms, faults & trips in the relay shall be displayed directly in alphanumeric format on the backlit LCD screen and not indirectly in the form of summation codes.		
18	Communication & Protocol	1. The Relay shall be provided with fixed port - RS-485 / Fibre Optic / RS-232 port to connect to the network for remote communication and to interrogate the relay with a local laptop PC simultaneously without any affect of one operation on the other. All hardware connectors and ports as well as port converters & associated power supply units required, if any, for this purpose shall be supplied with each relay as a part of the relay.		
		2. The Relay shall be able to work on open protocol IEC 60870-5-103 and shall be fully communicable type on IEC 60870-5-103 protocol.		
		3. The Relay shall be able to communicate with any type of SCADA or ECS. Vendor shall confirm it at the time of quoting. The vendor shall provide the inter operability table / memory map and all other details and data of the relay required for network communication along with the supply of relay for facilitating communication of the relay through any network.		

		4. It shall also be possible to synchronise the relay time with the network clock by connecting to the network through open protocol. The real time clock shall be settable through the network as governed by the connected SCADA or ECS system.		
		5. All three phase currents, fault currents of each phase and earth, fault alarms, status of binary inputs and output relays, event records & fault records in the relay with date and time stamping shall be accessible through the network in open protocol.		
19	Conformity to Standards	1. The equipment shall comply with the requirements of latest revision of following standards, unless otherwise specified.		
		• IEC 60068-2-1/2 Temperature range in service, during transport and storage		
		• IEC 60068-2-3 Damp heat recycle test		
		• IEC 60255 DC and AC power interruption and short circuit test		
		• IEC 60255 Class 3 General performance requirement		
		• IEC 60255-5 Voltage withstand test, insulation resistance test, Dielectric impulse test, Impulse voltage withstand test		
		• IEC 60255-6 Measurement of accuracy, rated burden, thermal requirement		
		• IEC 60255-11 Auxiliary DC Power supply requirement		
		• IEC 60255-21-1/2/3 Mechanical performance requirement; vibration, shock, bump and Seismic test		
		• IEC 60255-22-1 High frequency disturbance test		
		• IEC 60255-22-2 Electrostatic discharge test		
		• IEC 60255-22-3 Radiated, radio frequency and electromagnetic field immunity test		
		• IEC 60255-22-4 Fast transient disturbance test		
		• IEC 60255-22-25 Conducted and radiated radio frequency emission tests		
		• IEC 60255-23 Contact performance requirement		

		• IEC 60529 Degree of protection by enclosure		
		• IEC 61000-4-5 Surge immunity test		
		• IEC 61000-4-6 Immunity to conducted disturbance induced by radio frequency field		
		• IEC 61000-4-8 Power frequency magnetic field immunity test		
		• IEC 61000-4-9 Pulse magnetic field immunity test		
		• IEC 61000-4-10 Damped oscillatory magnetic field immunity test		
		• IEC 61000-4-11 AC auxiliary supply requirement		
		• IEC 61000-4-16 Immunity to conducted, common mode disturbances		
		• ENV 50204 Radiated electromagnetic field disturbance test		
		• EN 55022 class A Radio interference test		
		2. In case of imported equipment, standards of the country of origin shall be applicable, if these standards are equivalent or stringent than the applicable Indian standards.		
		3. The equipment shall also conform to the provisions of Indian Electricity rules and other statutory regulations currently in force in the country.		
		4. In case Indian standards are not available for any equipment, standards issued by IEC/BS/VDE/IEEE/NEMA or equivalent agency shall be applicable.		
		5. In case of any contradiction between various referred standards/ specifications/ data sheet and statutory regulations the following order of priority shall govern:		
		• Statutory regulations		
		• Data sheets		
		• This specification		
		• Codes and standards		

20	Password Protection	The relays shall be provided with suitable security (password protection) against unauthorized WRITE ACCESS for change in relay setting. However it shall be possible to view metering, protection settings, and status and event data as READ ONLY without password protection. It shall also be possible to disable the password function.		
21	Operating Climatic conditions	The relays shall be suitable for satisfactory operation when installed in a panel located in a pressurized substation with restricted natural air ventilation, in tropical humid and corrosive atmosphere. The Relay shall be suitable for operation at a maximum ambient temperature of 55 degrees Celsius and at a relative humidity of 75% continuous and 93% intermittent.		
22	General Requirement	1. The offered equipment shall be brand new with state of art technology and proven field track record. No prototype equipment shall be offered.		
		2. Vendor shall ensure availability of spare parts and maintenance support services for the offered equipment for at least 15 years from the date of supply.		
		3. After at least fifteen (15) years from the date of supply, Vendor shall give a notice of at least one (01) year to IOCL before phasing out the product/ spares to enable IOCL to take action for placement of order for spares and services.		
		4. Any foreign Relay manufacturer through his Indian partner or subsidiary company in India shall provide application, testing, commissioning and other necessary support for minimum of 15 years to customer. They shall also maintain adequate inventory of each type of relay or spares to meet the requirement arising during project execution and plant operation. Relay manufacturer shall possess a signed MOU with their Indian partner/ subsidiary company for providing customer support and this shall be produced even if not specifically asked for.		
23	Relay Earthing	The relay shall work reliably with connection of switchgear earthing to the relay only.		

24	Interface with PC	It shall be possible to carry out and retrieve settings and configuration of the relay through Laptop PC. It shall also be possible to retrieve all fault disturbance records & oscillographic waveforms from the relay through Laptop PC. The software used for PC Interface shall be user-friendly and menu based and shall be supplied as a part of the relay. Five (05) nos. of communication cables with port converter sets, for communication of relay with Laptop PC, shall be supplied with this lot of relays.		
25	Testing and Acceptance	1. The Relay shall have been type tested as per relevant Indian/ international standards and witnessed by independent test authority/ agency of country of origin. Type tests shall include as minimum but not be limited to the following:		
		a. Temperature withstand		
		b. Disturbance immunity		
		c. Electromagnetic compatibility (EMC)		
		d. HV withstands test for insulation		
		e. Impulse voltage test		
		f. Functional tests and Communication integrity		
		g. Relay characteristics verification		
		h. Degree of protection		
		i. Mechanical stress/ vibration test		
		2. During assembly, owner or his authorized representative shall be permitted to assess the progress of work as well as to ascertain that quality of raw material are used for the same. All assistance as required during inspection shall be given to inspector.		
		3. Final acceptance tests shall be carried out at manufacturer/ assembler's works under his care and expense. Manufacturer shall also arrange instruments and equipment as required for testing. Owner's representative shall be given minimum 2 weeks prior notice for witnessing the tests. Manufacturer shall furnish test certificates indicating test results. Acceptance tests shall include visual checks, insulation checks, heat run tests and functional tests as a minimum or as per the manufacturer's quality plan.		

		4. In case of fully assembled and tested relays from abroad, manufacturer shall furnish type, routine and acceptance test certificates along with the supply of numerical relays for owner's perusal.		
26	Other Requirements	1. The Vendor shall quote with complete technical literature, Operating Manual and Laptop interface software. Specific Model meeting the above requirements shall be mentioned.		
		2. The vendor shall specify the warranty period of the relay for free service / replacement.		
		3. The Vendor shall quote with point-wise confirmation of the above specifications and mention the deviation if any.		
		4. The Vendor shall give the details of after sale/service facilities available in India and approximate time for repair jobs.		
		5. The Vendor shall provide at least three (03) original complete O&M Manual as well as Application Guide of the offered Relay printed at the origin of manufacture of the relay and at least one (01) soft copy of the O&M Manual and Application Guide.		
		6. The Vendor shall submit, along with the offer, a third party test certificate from reputed Indian Testing Laboratory either from CPRI or ERDA for the offered model and type of relay, mentioning the test results with complete conformity to all the features, characteristics and specifications of the relay.		
		7. The vendor shall submit the list of locations where such relays have been supplied and installed in India.		

Note: Vendor shall provide point-wise confirmation to all the points given above in the Specification for required Numeric Feeder Protection Relay failing which the offer will not be evaluated and is liable to be rejected.

5.6 NUMERIC HT & LT MOTOR PROTECTION RELAY

S. No.	Relay Feature	Relay Feature Description	Confirm	Deviations, if any
			Yes / No	
1	Application	The Numeric Motor Protection Relay (hereafter referred to as the Relay) shall be suitable for use as a single comprehensive protective relay for HT & LT Motor Feeders with at least Thermal Overload protection with negative sequence current conscious feature, Short Circuit protection, Blocked Rotor / Startup Supervision protection, Negative Phase Sequence protection, Single Phasing protection, Earth fault protection & too many starts / thermal restart inhibit functions.		
2	Auxiliary Voltage	The offered Relay shall be suitable for working with auxiliary power supply of 110 V DC $\pm$ 10% to 220 V $\pm$ 10%		
3	Phase Current Input	1. Relay shall be suitable for 1A & 5A CT secondary inputs selectable at site. 2. Relay shall be suitable for 2CT as well as 3CT configurations		
4	Ground Current Input	1. Relay shall be suitable for 1A & 5A CT secondary inputs selectable at site. 2. Relay shall be suitable for residual as well as CBCT inputs		
5	Binary Inputs	1. The Relay shall have minimum five (05) freely configurable binary inputs other than inputs used for Trip Circuit Supervision. 2. All Binary Inputs shall have galvanic isolation. Analog inputs shall be protected against switching surges, harmonics etc. 3. All Binary Inputs including that for TCS shall work on the same voltage level as that of the relay auxiliary power supply. The Binary Inputs shall pick up only in the voltage range of the auxiliary power supply i.e., 110 V DC $\pm$ 20% or 220 V $\pm$ 20% (as specified by IOCL) and shall not work in any other AC or DC Voltage range due to accidental occurrence of any voltage mixing, voltage superimposition or induced voltages in addition to the rated auxiliary supply mentioned above.		
6	Binary Output	The Relay shall have minimum five (05) freely configurable binary output relays		

	Relay Contacts	for alarm and trip functions with at least two (02) relays having changeover contacts and an additional watchdog relay with changeover contacts for generating alarm contact in case of Internal Relay Fault. Provision shall be available in the relay to program the output relays for hand/ manual reset application. The output relay contacts shall be rated for at least 5A continuous at 220 V AC/DC.		
7	Protection Functions	The Relay shall have at least the following protective elements:		
		a. Locked Rotor / Start-up Supervision: The relay shall possess Locked Rotor / Startup Supervision Protection features to detect and trip the motor on stalling during starting or in running condition.		
		b. Thermal Over-load: The relay shall possess a Thermal Overload Protection incorporating the Negative Sequence Current (I ₂) conscious feature and with thermal pre-trip alarm.		
		c. Short Circuit: The relay shall possess an instantaneous over-current feature for short circuit protection in case of phase faults.		
		d. Negative Sequence: The relay shall possess two distinct Negative Sequence Protection features working on Negative Sequence component (I ₂) of the current: 1. IDMT characteristic feature for protection in cases of small amplitude unbalances 2. Definite Time feature for Single Phasing protection.		
		e. Earth Fault: The relay shall possess an Instantaneous / Definite time (with min. setting 0 secs.) Earth Fault protection feature (residual connected and CBCT connected) including Sensitive Earth Fault detection (minimum 1% setting).		
		f. Too many starts / Thermal Restart Inhibit: The relay shall possess this feature to limit the number of start-ups of the motor in a set time period.		
		g. Excessive Start Time: The relay shall possess the feature to monitor the motor starting duration.		
8	Setting Groups	The Relay shall have at least two (02) independent selectable setting groups for all protection features of the relay.		

9	Trip Circuit Supervision	The Relay shall possess Trip Circuit Supervision feature to monitor the trip circuit both in ON & OFF conditions of Circuit Breaker. All necessary hardware required for commissioning of the Relay Trip Circuit Supervision feature to the breaker shall be supplied with each relay as part of the relay. The TCS connection diagram shall be submitted along with the offer.		
10	Online monitoring / Measurements	The Relay shall monitor at least the following parameters online:		
		• The true RMS currents of all three phases		
		• Neutral (earth) current		
		• Positive sequence current, negative sequence current & zero sequence current		
		• Peak current value		
		• Relay healthiness status		
		• Status of Trip Circuit Supervision		
		• Last starting time & last starting current		
		• Thermal capacity and time to trip		
		• In-built hour run meter		
11	Diagnostic Features	The Relay shall have following diagnostic features:		
	a) Fault Records	Relay shall be able to record minimum 5 fault records containing the details such as the nature of fault, fault current & faulted phase with date and time stamping.		
	b) Event Records	Relay shall be able to record minimum 50 events with date and time stamping. Events shall be time-stamped at a resolution of a maximum of 3 milliseconds.		
	c) Disturbance Records	1. The relay shall be capable of capturing fault waveforms for at least three (03) seconds. The relay shall be provided with at least 8 channels consisting of minimum 4 analog and 4 digital inputs for disturbance recording. The date and time stamping shall be available for each disturbance fault record.		

		2. All disturbances/ events shall be displayed with time stamp. Time shall be synchronized with plant clock through serial communication from data concentrator, from substation MMI or from SCADA/ ECS RTU. The relay shall have the feature of capturing the starting characteristic of the motor, the parameters at the instant of tripping inclusive of I_0 , I_{L1} , I_{L2} , I_{L3} , I_1 & I_2 with our the need of any external trigger in case of protection trips.		
12	Memory	The Relay shall be equipped with backup power, either backup battery or otherwise such that data like parameter settings, programming, status, events and fault data information shall not be lost on failure of Relay auxiliary power supply. The backup power system as mentioned above shall be part of the Relay and shall be supplied as a part of the Relay.		
13	Relay Front Display	The Relay shall have a backlit alphanumeric LCD display and shall be able to provide key information like settings, measurement, fault data and records. Side-lit LCD screens are not acceptable.		
14	LED Display	The Relay shall be provided with LEDs for indicating at least the Protection Trip and Relay Healthy indications. Additional LEDs, if provided shall be freely programmable separately at least for protection trips, status of Digital Inputs & status of Trip Circuit Supervision.		
15	Human Machine Interface (HMI)	The Relay shall have a local HMI and shall be possible to carry out the settings and configuration of the relay online through the local HMI without disturbing or tripping the feeder. It shall also be possible to download the information from the relay and interrogate the relay from remote.		
16	Watchdog & Self Monitoring	The Relay shall monitor the healthiness of its circuits and components by a continuous self-monitoring system. In case of any problem, alarm shall be generated without tripping the feeder. An output relay with changeover contact shall be provided for remote annunciation of the Relay fault. This alarm shall also be communicable through the RS-485 port to the connected SCADA system.		

17	Other Relay Features and requirements	1. The Relay terminals shall not be plug-in type. The wires to the relay shall be able to be connected with the help of screws supplied as part of the Relay. Relay terminals shall be suitable for termination of 1.5/2.5 sq. mm. wires.		
		2. The relevant software & hardware for relay setting, data downloading and waveform analysis shall be supplied along with the relay as a part of the relay set. The licensed copy of software supplied shall be licensed in the name of IOCL. All future upgrades from time to time shall be provided immediately to IOCL, free of cost.		
		3. At least five (05) sets of necessary tool kits for installation, connection and commissioning of the relay at site shall be supplied along with this lot as part of the relays.		
		4. The Relay shall be flush mounting type and shall be draw-out type. The enclosure shall be dust tight having degree of protection minimum as IP5X. Relay shall have draw-out feature with plug in type PCBs for easy replacement. All the PCBs in the Relay shall be provided with a transparent epoxy (conformal) coating for environment protection and tropicalisation. The relay terminals shall be easily accessible for testing and commissioning. It shall be possible to draw-out the relay from its casing on-line.		
		5. CT shorting link shall be provided at terminal block as required. The CTs shall get shorted on draw-out of the relay from the casing. No ICT shall be provided either for ratio error correction or otherwise. The necessary correction shall be programmable in the numerical relay itself.		
		6. It shall be possible to program the relay or change the settings and configuration of the relay on-line when the feeder is ON and in service without disturbing or tripping the feeder.		
		7. A suitably designed Stabilising Resistor shall be supplied with each relay for Earth Fault protection in residual connection of CTs as part of the Relay.		

		8. Relay shall be made immune to capacitance effect due to long length of cables. Any external hardware, if required for avoiding mal-operation of relay due to cable capacitance shall be included as a standard feature.		
		9. The closing and tripping of the motor breaker shall be independent of the relay during normal operation other than fault tripping.		
		10. The setting and configuration of the relay shall have the feature to directly set from the menu of each feature in alphanumeric format and not indirectly through a set of binary digits and summation codes. The setting and configuration of the relay shall be user-friendly.		
		11. The warnings, alarms, faults & trips in the relay shall be displayed directly in alphanumeric format on the backlit LCD screen and not indirectly in the form of summation codes.		
18	Communication & Protocol	1. The Relay shall be provided with one front RS-232 to interrogate the relay with a local laptop computer directly and one rear RS-485 port to connect to the network for remote communication. All hardware connectors and ports as well as port converters & associated power supply units required, if any, for this purpose shall be supplied with each relay as a part of the relay.		
		2. The Relay shall be able to work on open protocol IEC 60870-5-103 and shall be fully communicable type on IEC 60870-5-103 protocol to SCADA or ECS.		
		3. The Relay shall be able to communicate with any type of SCADA or ECS. Vendor shall confirm it at the time of quoting. The vendor shall provide the inter operability table / memory map and all other details and data of the relay required for network communication along with the supply of relay for facilitating communication of the relay through any network.		
		4. It shall also be possible to synchronise the relay time with the network clock by connecting to the network through open protocol. The real time clock shall be settable through the network periodically as governed by the connected SCADA or ECS system.		

		5. All three phase currents, fault currents of each phase and earth, fault alarms, status of binary inputs and output relays, event records & fault records in the relay with date and time stamping shall be accessible through the network in open protocol.		
19	Conformity to Standards	1. The equipment shall comply with the requirements of latest revision of following standards, unless otherwise specified.		
		• IEC 60068-2-1/2 Temperature range in service, during transport and storage		
		• IEC 60068-2-3 Damp heat recycle test		
		• IEC 60255 DC and AC power interruption and short circuit test		
		• IEC 60255 Class 3 General performance requirement		
		• IEC 60255-5 Voltage withstand test, insulation resistance test, Dielectric impulse test, Impulse voltage withstand test		
		• IEC 60255-6 Measurement of accuracy, rated burden, thermal requirement		
		• IEC 60255-11 Auxiliary DC Power supply requirement		
		• IEC 60255-21-1/2/3 Mechanical performance requirement; vibration, shock, bump and Seismic test		
		• IEC 60255-22-1 High frequency disturbance test		
		• IEC 60255-22-2 Electrostatic discharge test		
		• IEC 60255-22-3 Radiated, radio frequency and electromagnetic field immunity test		
		• IEC 60255-22-4 Fast transient disturbance test		
		• IEC 60255-22-25 Conducted and radiated radio frequency emission tests		
		• IEC 60255-23 Contact performance requirement		
		• IEC 60529 Degree of protection by enclosure		
		• IEC 61000-4-5 Surge immunity test		

		• IEC 61000-4-6 Immunity to conducted disturbance induced by radio frequency field		
		• IEC 61000-4-8 Power frequency magnetic field immunity test		
		• IEC 61000-4-9 Pulse magnetic field immunity test		
		• IEC 61000-4-10 Damped oscillatory magnetic field immunity test		
		• IEC 61000-4-11 AC auxiliary supply requirement		
		• IEC 61000-4-16 Immunity to conducted, common mode disturbances		
		• ENV 50204 Radiated electromagnetic field disturbance test		
		• EN 55022 class A Radio interference test		
		2. In case of imported equipment, standards of the country of origin shall be applicable, if these standards are equivalent or stringent than the applicable Indian standards.		
		3. The equipment shall also conform to the provisions of Indian Electricity rules and other statutory regulations currently in force in the country.		
		4. In case Indian standards are not available for any equipment, standards issued by IEC/BS/VDE/IEEE/NEMA or equivalent agency shall be applicable.		
		5. 5. In case of any contradiction between various referred standards/ specifications/ data sheet and statutory regulations the following order of priority shall govern:		
		• Statutory regulations		
		• Data sheets		
		• This specification		
		• Codes and standards		
20	Password Protection	The relays shall be provided with suitable security (password protection) against unauthorized WRITE ACCESS for change in relay setting. However it shall be possible to view metering, protection settings, and status and event data as READ ONLY without password protection. It shall also be possible to disable the password function.		

21	Operating Climatic conditions	The relays shall be suitable for satisfactory operation when installed in a panel located in a pressurized substation with restricted natural air ventilation, in tropical humid and corrosive atmosphere. The Relay shall be suitable for operation at a maximum ambient temperature of 55° Celsius and at a relative humidity of 75% continuous and 93% intermittent.		
22	General Requirement	1. The offered equipment shall be brand new with state of art technology and proven field track record. No prototype equipment shall be offered.		
		2. Vendor shall ensure availability of spare parts and maintenance support services for the offered equipment for at least fifteen (15) years from the date of supply.		
		3. After at least 15 years from the date of supply, Vendor shall give a notice of at least one (01) year to IOCL before phasing out the product/ spares to enable IOCL to take action for placement of order for spares and services.		
		4. Any foreign Relay manufacturer through his Indian partner or subsidiary company in India shall provide application, testing, commissioning and other necessary support for minimum of 15 years to customer. They shall also maintain adequate inventory of each type of relay or spares to meet the requirement arising during project execution and plant operation. Relay manufacturer shall possess a signed MOU with their Indian partner/ subsidiary company for providing customer support and this shall be produced even if not specifically asked for.		
23	Relay Earthing	The relay shall work reliably with connection of switchgear earthing to the relay only.		
24	Interface with PC	It shall be possible to carry out and retrieve settings and configuration of the relay through Laptop PC. It shall also be possible to retrieve all fault disturbance records & oscillographic waveforms from the relay through Laptop PC. The software used for PC Interface shall be user-friendly and menu based and shall be supplied as a part of the relay. Five (05) nos. of communication cables for communication of relay with Laptop PC shall be supplied with this lot of relays.		

25	Testing and Acceptance	1. The Relay shall have been type tested as per relevant Indian/ international standards and witnessed by independent test authority/ agency of country of origin. Type tests shall include as minimum but not be limited to the following:		
		a. Temperature withstand		
		b. Disturbance immunity		
		c. Electromagnetic compatibility (EMC)		
		d. HV withstands test for insulation		
		e. Impulse voltage test		
		f. Functional tests and Communication integrity		
		g. Relay characteristics verification		
		h. Degree of protection		
		i. Mechanical stress/ vibration test		
		2. During assembly, owner or his authorized representative shall be permitted to assess the progress of work as well as to ascertain the quality of raw material used for the same. All assistance as required during inspection shall be given to the Inspector.		
		3. Final acceptance tests shall be carried out at manufacturer/ assembler's works under his care and expense. Manufacturer shall also arrange instruments and equipment as required for testing. Owner's representative shall be given minimum 2 weeks prior notice for witnessing the tests. Manufacturer shall furnish test certificates indicating test results. Acceptance tests shall include visual checks, insulation checks, heat run tests and functional tests as a minimum or as per the manufacturer's quality plan.		
		4. In case of fully assembled and tested relays from abroad, manufacturer shall furnish type, routine and acceptance test certificates along with the supply of numerical relays for owner's perusal.		
26	Other Requirements	1. The Vendor shall quote with complete technical literature, Operating Manual and Laptop PC interface software. Specific Model meeting the above requirements shall be mentioned.		

	2. The vendor shall specify the warranty period of the relay for free service / replacement.		
	3. The Vendor shall quote with point-wise confirmation of the above specifications and mention the deviation if any.		
	4. The Vendor shall give the details of after sale/service facilities available in India and approximate time for repair jobs.		
	5. The Vendor shall provide at least three (03) original complete O&M Manual as well as Application Guide of the offered Relay printed at the origin of manufacture of the relay and at least one (01) soft copy of the O&M Manual and Application Guide.		
	6. The Vendor shall submit, along with the offer, a third party test certificate from reputed Indian Testing Laboratory either from CPRI or ERDA for the offered model and type of relay, mentioning the test results with complete conformity to all the features, characteristics and specifications of the relay.		
	7. The vendor shall submit the list of locations where such relays have been supplied and installed in India.		

Note: Vendor shall provide point-wise confirmation to all the points given above in the Specification for required Numeric LT Motor Protection Relay failing which the offer will not be evaluated and is liable to be rejected.

5.7 NUMERIC VOLTAGE & FREQUENCY RELAY

S. No.	Relay Feature	Relay Feature Description	Confirm	Deviations, if any
			Yes / No	
1	Application	The Numeric Relay shall be suitable for use as a single comprehensive relay for Voltage & Frequency protection in HT & LT line & bus-sections on Power Plant, HT & LT Sub-Station Distribution Bus with at least three phase instantaneous & time-delayed Under-Voltage Protection (27) with AND & OR logic, Under-Frequency protection (81U), Measurement & recording facilities with respect to Event, Fault & Disturbance records. The Relay shall be flush mounted and draw-out type. The Relay shall be suitable for use with PTs of different ratings in grounded and ungrounded systems given – 11000/ $\sqrt{3}$ /110/ $\sqrt{3}$ star-star, 6600/110 V-connected, 6600/ $\sqrt{3}$ /110/ $\sqrt{3}$ star-star, 6600/ $\sqrt{3}$ /110/ $\sqrt{3}$ /110/3 star-star-open delta, 415/ $\sqrt{3}$ /110/ $\sqrt{3}$ star-star, 415/110V delta-delta PT connections.		
2	Auxiliary Voltage	The offered Relay shall be suitable for working with auxiliary power supply of 110V DC & 220V DC $\pm$ 20 %.		
3	Voltage Input	1. The Relay shall be suitable for 3 Phase-Phase VTs and 1 Residual VT 2. The Relay VT Inputs shall be suitable for Voltage Inputs from 57V to 130V.		
4	Binary Inputs	1. The Relay shall have minimum four (04) freely configurable binary inputs. 2. All Binary Inputs shall have galvanic isolation. Analog inputs shall be protected against switching surges, harmonics etc. 3. All Binary Inputs shall work on the same voltage level as that of the relay auxiliary power supply.		
5	Binary Output Relay Contacts	The Relay shall have minimum six (06) freely configurable binary output relays for alarm and trip functions with at least one (01) relay having changeover contacts and an additional watchdog relay with changeover contacts for generating alarm contact in case of Internal Relay Fault. Provision shall be available in the relay to program the output relays for hand/ manual reset		

		application. The output relay contacts shall be rated for at least 5A continuously at 220 V AC/DC.		
6	Protection Functions	1. The Relay shall have minimum four (04) poles, which can be used in the configuration of three-phase Under-Voltage protection and Under-frequency protection. The Relay shall have at least the following protective elements:		
		a. Instantaneous / Definite Time Under-Voltage: The relay shall possess an Instantaneous / Definite Time 3 phase Under-Voltage feature with minimum time setting of 0.00 secs. for Under-Voltage protection in case of Under-Voltage on 3 simultaneous phases (absence of voltage with the “AND” logic) or on at least one of the phases (logic “OR”) for this Under-Voltage function. Both these logic functions shall be available in the relay and shall be site selectable. The Under-Voltage Protection Function shall have at least three stages and all three stages shall be site selectable to definite time operation. The under-voltage setting range shall be site selectable from 10% to 100% with steps of 5%. The time delay range shall be selectable from 0.00 secs. – 15 secs. with steps of 0.05 secs.		
		b. Instantaneous / Definite Time Under-Frequency: The relay shall possess an Instantaneous / Definite time Under-Frequency feature with minimum time setting of 0.00 secs. for Under-Frequency protection. The Under-Voltage Protection Function shall have at least three stages of protection and each stage shall be site selectable to definite time operation. The nominal frequency setting shall be site selectable to 50Hz / 60Hz. The under-frequency setting range shall be site selectable from 40Hz to 55Hz for nominal frequency of 50Hz and 50 – 70Hz for nominal frequency of 60Hz with steps of 0.05 Hz. The time delay range shall be selectable from 0.00 secs. – 15 secs. with steps of 0.05 secs.		

		c. Under-Voltage blocking of Frequency Protection: The relay shall be provided with the feature of Under-Voltage Blocking of Frequency Protection.		
		d. Blocking of Frequency Protection through External Digital Input: The Relay shall be provided with the feature of blocking of Frequency Protection through an external Digital Input either directly or through programmable logic equations.		
7	Setting Groups	The Relay shall have at least two (02) independent selectable setting groups for all protection features of the relay.		
8	Online monitoring / Measurements	The Relay shall monitor at least the following parameters online:		
		1. The true RMS voltages of all three phase-phase voltages and residual voltage		
		2. Frequency		
		3. Relay healthiness status		
9	Diagnostic Features	The Relay shall have following diagnostic features:		
	a) Fault Records	Relay shall be able to record minimum 5 fault records containing the details such as the nature of fault, fault values of voltage / frequency & faulted phase with date and time stamping.		
	b) Event Records	Relay shall be able to record minimum 50 events with date and time stamping. Events shall be time-stamped at a resolution of a maximum of 3 milliseconds.		
	c) Disturbance Records	1. The relay shall be capable of capturing fault waveforms for at least three (03) seconds. The relay shall be provided with at least 8 channels consisting of minimum 4 analog and 4 digital inputs for disturbance recording. The sampling rate shall be minimum 24 samples / cycle. The date and time stamping shall be available for each disturbance fault record.		

		2. All disturbances/ events shall be displayed with time stamp. Relay time shall be synchronized with plant clock through serial communication from data concentrator, substation MMI or SCADA/ ECS system. The relay shall have the feature of capturing at least the following parameters at the instant of tripping inclusive of VAB, VBC, VCA & V0 without the need of any external trigger in case of protection trips.		
10	Memory	3. The Relay shall be equipped with backup power, either backup battery or otherwise such that data like parameter settings, programming, status, events and fault data information shall not be lost on failure of Relay auxiliary power supply. The backup power system as mentioned above shall be part of the Relay and shall be supplied as a part of the Relay.		
11	Relay Front Display	The Relay shall have a backlit alphanumeric LCD display and shall be able to provide key information like settings, measurement, fault data and records. Side-lit LCD screens are not acceptable.		
12	LED Display	The Relay shall at least be provided with LEDs for indicating at least the Protection Trip and Relay Healthy indications. Additional LEDs, if provided, shall be freely programmable separately at least for protection trips & status of Digital Inputs.		
13	Human Machine Interface (HMI)	The Relay shall have a local HMI and shall be possible to carry out the complete settings and configuration of the relay online through the local HMI without disturbing or tripping the feeder. It shall also be possible to download the information from the relay and interrogate the relay from remote.		
14	Watchdog & Self Monitoring	The Relay shall monitor the healthiness of its circuits and components by a continuous self-monitoring system. In case of any problem, alarm shall be generated without tripping the feeder. An output relay with changeover contact shall be provided for remote annunciation of the Relay fault.		

15	Other Relay Features and requirements	1. The Relay terminals shall not be plug-in type. The wires to the relay shall be able to be connected with the help of screws. Relay terminals shall be suitable for termination of 2.5/4 sq. mm. wires. All necessary hardware required for connection of the wires to all the relay terminals shall be supplied along with each relay as part of the relay.		
		2. The relevant software & hardware for relay setting, data downloading and waveform analysis shall be supplied along with the relay as a part of the relay.		
		3. At least three (03) sets of necessary tool kits for installation, connection and commissioning of the relay at site shall be supplied along with this lot as part of the relays.		
		4. The Relay shall be flush mounting type and shall be draw-out type. The enclosure shall be dust tight having degree of protection minimum as IP5X. Relay shall have draw-out feature with plug-in type PCBs for easy replacement. The relay terminals shall be easily accessible for testing and commissioning. It shall be possible to draw-out the relay from its casing on-line without disturbing or tripping the feeder.		
		5. It shall be possible to program the relay or change the settings and configuration of the relay on-line when the feeder is ON and in service without disturbing or tripping the feeder.		
		6. Relay shall be made immune to capacitance effect due to long length of cables. Any external hardware, if required for avoiding mal-operation of relay due to cable capacitance shall be included as a standard feature.		
		7. The setting and configuration of the relay shall have the feature to directly set from the menu of each feature in alphanumeric format and not indirectly through a set of binary digits and summation codes. The setting and configuration of the relay shall be user-friendly.		

		8. The warnings, alarms, faults & trips in the relay shall be displayed directly in alphanumeric format on the backlit LCD screen and not indirectly in the form of summation codes.		
16	Communication & Protocol	1. The Relay shall be provided with fixed port - RS-485 / Fibre Optic / RS-232 port to connect to the network for remote communication and to interrogate the relay with a local laptop PC simultaneously without any affect of one operation on the other. All hardware connectors and ports as well as port converters & associated power supply units, if any, required for this purpose shall be supplied as a part of the relay.		
		2. The Relay shall be able to work on open protocol IEC 60870-5-103 and shall be fully communicable type on IEC 60870-5-103 protocol.		
		3. The Relay shall be able to communicate with any type of DCS/ SCADA or ECS. Vendor shall confirm it at the time of quoting. The vendor shall provide the inter operability table / memory map and all other details and data of the relay required for network communication along with the supply of relay for facilitating communication of the relay through any network.		
		4. It shall also be possible to synchronise the relay time with the network clock by connecting to the network through open protocol. The real time clock shall be settable through the network.		
		5. All three phase voltages, residual voltage, frequency, fault voltages of each phase and residual voltage, fault alarms, status of binary inputs and output relays, event records & fault records in the relay with date and time stamping shall be accessible through the network in open protocol.		
17	Conformity to Standards	1. The equipment shall comply with the requirements of latest revision of following standards, unless otherwise specified.		
		• IEC 60068-2-1/2 Temperature range in service, during transport and storage		
		• IEC 60068-2-3 Damp heat recycle test		
		• IEC 60255 DC and AC power interruption and short circuit test		

		• IEC 60255 Class 3 General performance requirement		
		• IEC 60255-5 Voltage withstand test, insulation resistance test, Dielectric impulse test, Impulse voltage withstand test		
		• IEC 60255-6 Measurement of accuracy, rated burden, thermal requirement		
		• IEC 60255-11 Auxiliary DC Power supply requirement		
		• IEC 60255-21-1/2/3 Mechanical performance requirement; vibration, shock, bump and Seismic test		
		• IEC 60255-22-1 High frequency disturbance test		
		• IEC 60255-22-2 Electrostatic discharge test		
		• IEC 60255-22-3 Radiated, radio frequency and electromagnetic field immunity test		
		• IEC 60255-22-4 Fast transient disturbance test		
		• IEC 60255-22-25 Conducted and radiated radio frequency emission tests		
		• IEC 60255-23 Contact performance requirement		
		• IEC 60529 Degree of protection by enclosure		
		• IEC 61000-4-5 Surge immunity test		
		• IEC 61000-4-6 Immunity to conducted disturbance induced by radio frequency field		
		• IEC 61000-4-8 Power frequency magnetic field immunity test		
		• IEC 61000-4-9 Pulse magnetic field immunity test		
		• IEC 61000-4-10 Damped oscillatory magnetic field immunity test		
		• IEC 61000-4-11 AC auxiliary supply requirement		
		• IEC 61000-4-16 Immunity to conducted, common mode disturbances		
		• ENV 50204 Radiated electromagnetic field disturbance test		
		• EN 55022 class A Radio interference test		

		2. In case of imported equipment, standards of the country of origin shall be applicable, if these standards are equivalent or stringent than the applicable Indian standards.		
		3. The equipment shall also conform to the provisions of Indian Electricity rules and other statutory regulations currently in force in the country.		
		4. In case Indian standards are not available for any equipment, standards issued by IEC/BS/VDE/IEEE/NEMA or equivalent agency shall be applicable.		
		5. In case of any contradiction between various referred standards/ specifications/ data sheet and statutory regulations the following order of priority shall govern:		
		• Statutory regulations		
		• Data sheets		
		• This specification		
		• Codes and standards		
18	Password Protection	The relays shall be provided with suitable security (password protection) against unauthorized WRITE ACCESS for change in relay setting. However it shall be possible to view metering, protection settings, status and event data as READ ONLY without password protection. It shall also be possible to disable the password function.		
19	Operating Climatic conditions	The relays shall be suitable for satisfactory operation when installed in a panel located in a pressurized substation with restricted natural air ventilation, in tropical humid and corrosive atmosphere. The Relay shall be suitable for operation at a maximum ambient temperature of 55 degrees Celsius and at a relative humidity of 75% continuous and 93% intermittent.		
20	General Requirement	1. The offered equipment shall be brand new with state of art technology and proven field track record. No prototype equipment shall be offered.		

		2. Vendor shall ensure availability of spare parts and maintenance support services for the offered equipment for at least 15 years from the date of supply.		
		3. Vendor shall give a notice for at least one year to IOCL before phasing out the product/ spares to enable for placement of order for spares and services.		
		4. Any foreign Relay manufacturer through his Indian partner or subsidiary company in India shall provide application, testing, commissioning and other necessary support for minimum of 15 years to customer. They shall also maintain adequate inventory of each type of relay or spares to meet the requirement arising during project execution and plant operation. Relay manufacturer shall possess a signed MOU with their Indian partner/ subsidiary company for providing customer support and this shall be produced even if not specifically asked for.		
21	Relay Earthing	The relay shall work reliably with connection of switchgear earthing to the relay only.		
22	Interface with PC	It shall be possible to carry out and retrieve settings and configuration of the relay through Laptop PC. It shall also be possible to retrieve all fault disturbance records & oscillographic waveforms from the relay through Laptop PC. The software used for PC Interface shall be user-friendly and menu based and shall be supplied as a part of the relay. Five (05) nos. of communication cables with port converter sets for communication of relay with Laptop PC shall be supplied with this lot of relays.		
23	Testing and Acceptance	1. The Relay shall have been type tested as per relevant Indian/ international standards and witnessed by independent test authority/ agency of country of origin. Type tests shall include as minimum but not be limited to the following:		
		a. Temperature withstand		
		b. Disturbance immunity		

		c. Electromagnetic compatibility (EMC)		
		d. HV withstands test for insulation		
		e. Impulse voltage test		
		f. Functional tests and Communication integrity		
		g. Relay characteristics verification		
		h. Degree of protection		
		i. Mechanical stress/ vibration test		
		2. During assembly, owner or his authorized representative shall be permitted to assess the progress of work as well as to ascertain that quality of raw material are used for the same. All assistance as required during inspection shall be given to inspector.		
		3. Final acceptance tests shall be carried out at manufacturer/ assembler's works under his care and expense. Manufacturer shall also arrange instruments and equipment as required for testing. Owner's representative shall be given minimum 2 weeks prior notice for witnessing the tests. Manufacturer shall furnish test certificates indicating test results. Acceptance tests shall include visual checks, insulation checks, heat run tests and functional tests as a minimum or as per the manufacturer's quality plan.		
		4. In case of fully assembled and tested relays from abroad, manufacturer shall furnish type, routine and acceptance test certificates along with the supply of numerical relays for owner's perusal.		
24	Other Requirements	1. The Vendor shall quote with complete technical literature, Operating Manual and Laptop PC interface software. Specific Model meeting the above requirements shall be mentioned.		
		2. The vendor shall specify the warranty period of the relay for free service / replacement.		
		3. The Vendor shall quote with point-wise confirmation of the above specifications and mention the deviation if any.		

		4. The Vendor shall give the details of after sale/service facilities available in India and approximate time for repair jobs.		
		5. The vendor shall submit the list of locations where such relays have been supplied and installed in India.		

Note: Vendor shall provide point-wise confirmation to all the points given above in the Specification for required Numeric Voltage & Frequency Protection Relay failing which the offer is liable to be rejected.

5.8 COMPREHENSIVE NUMERIC FEEDER DIFFERENTIAL PROTECTION RELAY

S. No.	Relay Feature	Relay Feature Description	Confirm	Deviations, if any
			Yes / No	
1	Application	1. The relay set consisting of two Comprehensive Numeric Feeder Differential Relays (hereinafter referred to as the Relay) shall be suitable for high-speed selective two-ended phase-segregated three-phase comprehensive Current Differential Unit Protection of HT Cables in radial feeders of HT (6.6KV – 66KV) system either ungrounded or resistively grounded or solidly grounded systems with at least Phase-segregated current differential protection along with facility of continuous Cable Capacitive Charging current compensation, Current Differential Inter-tripping, Direct & Permissive Inter-tripping, Supervision of protection signalling channel, Three-phase Over-current protection, Earth Fault protection in residual connection or through CBCT connection, Measurement & recording facilities as well as local and remote communication features with protection signalling through Fibre Optic protection signalling interface between the Relays at either end of the cable being protected.		
		2. The relay shall be offered as a set of two relays for differential protection of a single feeder by installation of the two relays at either end of the feeder and data transfer of protective signaling channel between the two relays at either end of the feeder through suitable fibre-optic cable. Please consider the Unit of Measure - EA as a Set of two identical relays for the protection of a single feeder.		
2	System Configuration	The Relay shall be suitable for ungrounded, resistively grounded as well as solidly grounded HT systems of voltage level (6.6KV – 66KV). The Relay shall be suitable for application in Feeder Differential protection of HT		

		cables (6.6KV – 66KV) in ungrounded, resistively grounded and solidly grounded systems for cable lengths and distances up to 25kM.		
3	Auxiliary Voltage	The offered Relay shall be suitable for working with auxiliary power supply of 110 V & 220 V DC $\pm$ 20 %		
4	Current Inputs	The Relay shall be suitable for 1A & 5A CT secondary inputs selectable at site. The CT input connections shall not be plug-in type. The CT terminals on the Relay casing shall get automatically shorted on draw-out of the Relay from its casing.		
5	Binary Inputs	1. The Relay shall have minimum four (04) freely configurable optically isolated binary inputs other than inputs used for Trip Circuit Supervision.		
		2. All Binary Inputs shall have galvanic isolation. Analog inputs shall be protected against switching surges, harmonics etc.		
		3. All Binary Inputs including that for TCS shall work on the same voltage level as that of the Relay auxiliary power supply.		
6	Binary Output Relay Contacts	The Relay shall have minimum four (04) freely configurable binary output Relays for alarm, trip and monitoring functions for all protection features as well as the supervision of the protection signalling channel with at least one (01) Relay having changeover contacts and one additional watchdog output Relay with changeover contact for generating alarm contact in case of Internal Relay Fault. Provision shall be available in the Relay to program the output Relays for hand/ manual reset application. All the output Relay contacts shall be rated for at least 5A continuous at 220 V AC/DC.		
7	Protection	The Relay shall have at least the following protective elements:		

	Functions	a. Current Differential Protection: The Relay shall possess high-speed selective two-ended phase-segregated current differential protection with extremely reliable algorithm, which shall provide fast detection of internal faults and stability for external through faults. The Relay shall work either on the principle of biased differential protection scheme or high-impedance differential protection scheme. The Relay shall have the feature to continuously compensate for Cable Capacitive Charging currents to prevent mal-operation of the Relay. The complete quantity of suitably designed Stabilising resistors and relay protection purpose voltage dependent variable resistors (Metrosils) required for each relay shall be supplied as a part of the Relay for three-phase Feeder Differential protection scheme. The Feeder Differential protection of each phase shall work completely independently of the other two phases and their currents.		
		b. Over-current Protection: The Relay shall possess at least one stage of instantaneous / definite-time three-phase Non-directional Over-Current protection and at least two stages of IDMT Over-Current protections following IEC curves for protection in case of phase faults. The definite-time protection feature shall have a minimum time delay of 0.00 sec. in the absence of the Instantaneous Protection feature. It should be possible to enable / disable this protection in the Relay at site.		
		c. Earth Fault Protection: The Relay shall possess at least one stage of instantaneous / definite-time Earth Fault and at least two stages of IDMT Earth Fault protections following IEC curves for protection in case of earth faults. The Earth Fault protection feature shall be suitable for either residual connection or CBCT connection. The definite-time protection feature shall have a minimum time delay of 0.00 sec. in the absence of the Instantaneous Protection feature. It should be possible to enable / disable this protection in the Relay at site.		

		d. Supervision of protection signalling channel: The Relay shall possess the feature of continuously monitoring the status of the protection signalling channel and shall provide an alarm only on failure of the channel and shall not trip the feeder.		
		e. Propagation Delay compensation: The Relay shall possess the feature of continuously compensating for the time associated in the propagation of the signal between the two Relays at either end of the cable to be protected.		
		f. Cable Capacitive Charging current compensation: The Relay shall have the facility to continuously compensate for Capacitive Charging current of the feeder cable(s).		
		g. Current Differential Inter-tripping: The trip impulse shall additionally also be provided to the breaker of the other end for safety inter-tripping in the event of operation of the Current Differential protection in a relay at one end.		
		h. Direct & Permissive Inter-tripping: The Relay shall possess inter-tripping feature for inter-tripping of the downstream feeder on actuation of any protection at the upstream end. However, the inter-tripping shall be possible to be routed directly to the breaker and shall be independent of the other protection tripping features.		
8	Trip Circuit Supervision	The Relay shall possess Trip Circuit Supervision feature to monitor the trip circuit both in ON & OFF conditions of Circuit Breaker. The Relay shall only provide an alarm on break in the Trip Circuit and shall not trip the feeder in such a case. All necessary hardware required for hook up of Trip Circuit Supervision to the Relay shall be supplied as a part of the Relay. The TCS connection diagram shall be submitted along with the offer.		
9	Setting Groups	The Relay shall have at least two (02) independent freely selectable setting groups for all protection features of the Relay.		

10	Protection Signalling Interface	The Relay Communication mode or protection signalling interface for the offered Relay shall be fibre-optic cable only. The best complete techno-economic solution with respect to the type and technical specification of fibre-optic cable to be used with the offered Relay for reliable, efficient & optimum performance taking into consideration a distance of 1-25 Km between the two Relays at either end of the cable to be protected shall be submitted by the party in their offer with justification for the solution offered with backup documents and papers.		
11	Online monitoring/ Measurements	The Relay shall monitor at least the following parameters online:		
		• The true RMS currents of all three phases of local as well as remote ends		
		• neutral (earth) current of the local end where the Relay is installed		
		• Phase differential currents of all the three phases between the local and remote ends		
		• Phase bias currents of all the three phases between the local and remote ends in case of biased differential protection		
		• Positive sequence current, negative sequence current & zero sequence current		
		• Peak current values of the local end where the Relay is installed		
12	Diagnostic Features	The Relay shall have following diagnostic features:		
	a) Fault Records	The Relay shall be able to record minimum 5 fault records containing at least the details such as the indication of faulted phase, Protection flags, Active setting group, Local three-phase and neutral currents, Differential currents, Maximum bias current in case of biased-differential Relay & protection signalling communication channel status all with date and time stamping.		

	b) Event Records	Relay shall be able to record minimum 50 events with date and time stamping. Events shall be time-stamped to a resolution of a maximum of 3 milliseconds.		
	c) Disturbance Records	1. The Relay shall be capable of capturing fault waveforms for at least three (03) seconds with a sampling time of twenty (20) milliseconds. The Relay shall be provided with at least 8 channels consisting of minimum 4 analog and 4 digital inputs for disturbance recording. The date and time stamping shall be available for each disturbance fault record.		
		2. All disturbances/ events shall be displayed with time stamp. The Relay clock time shall be synchronized with plant clock through serial communication from data concentrator or from substation MMI. The Relay shall have the feature of capturing the parameters at the instant of tripping inclusive of Idiff1, Idiff2, Idiff3, Ibias1, Ibias2, Ibias3, IL1, IL2, IL3, I1, I2 & I0, at local end without the need of any external trigger in case of protection trips.		
13	Memory	The Relay shall be equipped with backup power, either backup battery or otherwise such that data like parameter settings, programming, status, events and fault data information shall not be lost on failure of Relay auxiliary power supply. The backup power system as mentioned above shall be part of the Relay and shall be supplied as a part of the Relay.		
14	Relay Front Display	The Relay shall have a backlit alphanumeric LCD display and shall be able to provide key information like settings, measurement, fault data and records. Side-lit LCD screens are not acceptable.		
15	LED Display	The Relay shall be provided with LEDs for indicating at least the Protection Trip and Relay Healthy indications. Additional LEDs, if provided shall be freely programmable separately for at least the protection trips, status of Digital Inputs & status of Trip Circuit Supervision.		

16	Human Machine Interface (HMI)	The Relay shall have a local HMI and shall be possible to carry out the settings, configuration, extract & view fault records, view measurement information of the Relay dynamically online through the local HMI without disturbing or tripping the feeder. It shall also be possible to download the information from the Relay and interrogate the Relay from remote. If the offered Relay is provided with control function, it should be possible to operate from the local HMI. However, the Relay shall also have the feature to disable this control function.		
17	Watchdog & Self Monitoring	The Relay shall monitor the healthiness of its circuits and components by a continuous self-monitoring system. In case of any problem, alarm shall be generated without tripping the feeder. An output Relay with changeover contact shall be provided for remote annunciation of the Relay fault.		
18	Other Relay Features and requirements	1. The Relay terminals shall not be plug-in type. The wires to the Relay shall be able to be connected with the help of screws. Relay terminals shall be suitable for termination of 2.5/ 4 sq. mm. wires.		
		2. The relevant software & hardware for Relay setting, data downloading and waveform analysis shall be supplied along with the Relay as a part of the Relay.		
		3. At least five (05) sets of necessary tool kits for installation, connection and commissioning of the Relay at site shall be supplied along with this lot as part of the Relays.		
		4. The Relay shall be flush mounting type and shall be draw-out type. The enclosure shall be dust tight having degree of protection minimum as IP5X. Relay shall have draw-out feature with plug in type PCBs for easy replacement. The Relay terminals shall be easily accessible for testing and commissioning. It shall be possible to draw-out the Relay from its casing on-line.		

	5. The CTs shall get shorted on draw-out of the Relay from the casing. No ICT shall be provided either for ratio error correction or otherwise. The necessary correction, if required, shall be programmable in the Relay itself.		
	6. The Relay shall have the facility of ratio correction. The Relay at either end should work, communicate and perform the desired actions reliably if the relay at one end is connected to 5A secondary CT secondary and the relay at the other end is connected to 1A CT secondary.		
	7. The Relay shall work reliably either at the sending end or the receiving end of the Cable to be protected without the need to carry out any major changes in the configuration, setting or program.		
	8. It shall be possible to program the Relay or change the settings and configuration of the Relay on-line when the feeder is ON and in service without disturbing or tripping the feeder.		
	9. Relay shall be made immune to capacitance effect due to long length of cables. Any external hardware, if required for avoiding mal-operation of Relay due to cable capacitance shall be included as a standard feature.		
	10. The closing and tripping of the feeder breaker shall be independent of the Relay during normal operation other than fault tripping.		
	11. The setting and configuration of the Relay shall have the feature to directly set from the menu of each feature in alphanumeric format and not indirectly through a set of binary digits and summation codes. The setting and configuration of the Relay shall be user-friendly.		
	12. The warnings, alarms, faults & trips in the Relay shall be displayed directly in alphanumeric format on the backlit LCD screen and not indirectly in the form of summation codes.		

		13. Each relay of a set of two relays should be easily replaceable at site at a future date without the need of any help of the party / OEM and shall be possible at site with no or minimum minor modifications in the settings / configuration of the relay. It shall be possible to use any relay at either end of the feeder i.e., either sending or receiving end of the feeder with no or minimum minor setting modifications.		
		14. All the PCBs in the Relay shall be provided with a transparent epoxy (conformal) coating for environment protection and tropicalisation.		
19	Communication & Protocol	1. The Relay shall be provided with fixed port - RS-485 / Fibre Optic / RS-232 port to connect to the network for remote communication and to interrogate the Relay with a local laptop PC directly. All hardware connectors and ports as well as port converters & associated power supply units, if any, required for this purpose shall be supplied as a part of the Relay in this lot.		
		2. The Relay shall be able to work on open protocol IEC 60870-5-103 and shall be fully communicable type on IEC 60870-5-103 protocol.		
		3. The Relay shall be able to communicate with any type of DCS/ ECS or SCADA. Vendor shall confirm it at the time of quoting. The vendor shall provide the inter operability table / memory map and all other details and data of the Relay required for network communication along with the supply of Relay for facilitating communication of the Relay through any network.		
		4. It shall also be possible to synchronise the Relay clock with the network clock by connecting to the network through open protocol. The real time clock shall be settable through the network.		

		5. All three phase currents, three phase differential currents, three phase bias currents, earth (neutral) currents, fault currents of phase, differential, bias in each phase & earth, fault alarms, status of binary inputs and output relays, protection signalling channel, event records & fault records in the Relay with date and time stamping shall be accessible through the network in open protocol.		
20	Conformity Standards to	1. The equipment shall comply with the requirements of latest revision of all the relevant international & national standards, including IEC & IS standards.		
		2. In case of imported equipment, standards of the country of origin shall be applicable, if these standards are equivalent or stringent than the applicable Indian standards.		
		3. The equipment shall also conform to the provisions of Indian Electricity rules and other statutory regulations currently in force in the country.		
		4. In case Indian standards are not available for any equipment, standards issued by IEC/BS/VDE/IEEE/NEMA or equivalent agency shall be applicable.		
		5. In case of any contradiction between various referred standards/ specifications/ data sheet and statutory regulations the following order of priority shall govern:		
		• Statutory regulations		
		• Data sheets		
		• This specification		
		• Codes and standards		
21	Password Protection	The Relays shall be provided with suitable security (password protection) against unauthorized WRITE ACCESS for change in Relay setting. However it shall be possible to view metering, protection settings, and status and event data as READ ONLY without password protection. It shall also be possible to disable the password function.		

22	Operating Climatic conditions	The Relays shall be suitable for satisfactory operation when installed in a panel located in a pressurized substation with restricted natural air ventilation, in tropical humid and corrosive atmosphere. The Relay shall be suitable for operation at a maximum ambient temperature of 55 degrees Celsius and at a relative humidity of 75% continuous and 93% intermittent.		
23	General Requirement	1. The offered equipment shall be brand new with state of art technology and proven field track record. No prototype equipment shall be offered.		
		2. Vendor shall ensure availability of spare parts and maintenance support services for the offered equipment for at least 15 years from the date of supply.		
		3. Vendor shall give a notice for at least one year to IOCL before phasing out the product/ spares to enable procurement action for spares and services.		
		4. Any foreign Relay manufacturer through his Indian partner or subsidiary company in India shall provide application, testing, commissioning and other necessary support for minimum of 15 years to customer. They shall also maintain adequate inventory of each type of Relay or spares to meet the requirement arising during project execution and plant operation. Relay manufacturer shall possess a signed MOU with their Indian partner/ subsidiary company for providing customer support and this shall be produced even if not specifically asked for.		
		5. The Vendor shall submit at least six (06) copies of complete comprehensive Operating & Maintenance Manuals (including Relay Application Guide and Relay Primary Injection as well as Secondary Injection Testing Procedures) and three (03) CDs containing the Relay Software. The party to ensure that the Relay Softwares supplied are registered and IOCL shall be given full rights to use all its features.		
24	Relay Earthing	The Relay shall work reliably with connection of switchgear earthing to the Relay. Separate earthing shall not be required for the Relay.		

25	Interface with PC	It shall be possible to carry out and retrieve settings and configuration of the Relay through Laptop PC. It shall also be possible to retrieve all fault disturbance records & oscillographic waveforms from the Relay through Laptop PC. The software used for PC Interface shall be user-friendly and menu based and shall be supplied as a part of the Relay. Five (05) nos. of communication cables along with five (05) sets of hardcopy of relay manual with port converter sets for communication of Relay with Laptop PC shall be supplied with Relays.		
26	Testing and Acceptance	1. The Relay shall have been type tested as per relevant Indian/ international standards and witnessed by independent test authority/ agency of country of origin. Type tests shall include as minimum but not be limited to the following:		
		a. Temperature withstand		
		b. Disturbance immunity		
		c. Electromagnetic compatibility (EMC)		
		d. HV withstands test for insulation		
		e. Impulse voltage test		
		f. Functional tests and Communication integrity		
		g. Relay characteristics verification		
		h. Degree of protection		
		i. Mechanical stress/ vibration test		
		2. Final acceptance tests shall be carried out at manufacturer/ assembler's works under his care and expense. Manufacturer shall also arrange instruments and equipment as required for testing. Our representative shall be given minimum 2 weeks prior notice for witnessing the tests. Manufacturer shall furnish test certificates indicating test results. Acceptance tests shall include visual checks, insulation checks, heat run tests and functional tests as a minimum or as per the manufacturer's quality plan.		

		3. In case of fully assembled and tested Relays from abroad, manufacturer shall furnish type, routine and acceptance test certificates along with the supply of the Numeric Relays for our perusal.		
27	Other Requirements	1. The Vendor shall quote with complete technical literature, Operating Manual and Laptop PC interface software. Specific Model meeting the above requirements shall be mentioned.		
		2. The vendor shall specify the warranty period of the Relay for free service/ replacement.		
		3. The Vendor shall quote with point-wise confirmation of the above specifications and mention the deviation if any failing which their offer is liable to be rejected.		
		4. The Vendor shall give the details of after sale/service facilities available in India and approximate time for repair jobs.		
		5. The vendor shall submit the list of locations where such Relays have been supplied and installed in India.		

Note: Vendor shall submit point-wise confirmation to all the points given above in the Specification for required Numeric Feeder Differential Protection Relay failing which the offer of the party is liable to be rejected.

6.0 DATA SHEET ACTUATOR

PURCHASER'S DATA			
A	Project data	☒	Tick for selection
	1 Project details a. Project : b. Client : c. Location : n d. Unit :		2 Site conditions a. Ambient temperature b. Min 5°C Max 50°C Design 50°C c. Humidity : 90 d. Altitude : < 1000 m e. Atmospheric condition : Tropical, humid, corrosive, sulphur f. Installation : Indoor on panel
B	Relay selection	☒	Tick for selection
	1 Relay functions a. Only protection b. Protection and metering c. Protection and metering and control d. Serial communication e. Password protection a. For write b. For both read and write 2 Construction feature a. Enclosure : IP 5X type b. Terminal size- : 2.5 for control & 4 sqmm for CT/ PT external wires c. Mounting : Flush d. Drawout : With screw feature arrangement e. Display type : Alpha Numeric LCD + LED Indication 3 Special requirement if any a. Applicable standards: IEC b. Distance for cable capacitance upto 1000 m for application where field contacts are directly wired to relay e.g. motor start/ stop	☐ ☐ ☒ ☒ ☐ ☒ ☐	4 Input power supply a. Site selectable ☒ feature b. Input supply : 110/ 220 V DC 5 CT/ PT input to relay a. Current operated relay a1 Main CT input : a2 CT for sensitive : EF or back up EF b. Voltage operated relay b1 PT input : c. Comprehensive relay ☒ c1 Main CT input : 3 CTs, 4 wire c2 PT input : 3phase, 4 wire c3 CT for sensitive : 1 CT, 2 wire EF or back up EF input (Yes for IC& TR FDR) d. CT secondary : 1A for protection CT 1A for Diff. & Ref CT current
C	Relay protection/ metering functions	☒	Tick for selection
(where no check box is shown, the requirement is minimum but not limited, refer SWBD data SHT for FDR wise protection)			
	1 Current operated relay a. 3 phase O/C element (50, 51) ☒ * I> * I>> * I>>> Characteristics as per IEC * Inverse (normal, very, extremely, long) and definite time for I>>> * Definite time for I>>> b. E/F relay (50N, 51N, 51G) ☒		2 Voltage operated relays a. 3 phase O/V element with time delay (59+2) ☒ * OV> * OV>> b. 3 phase U/V element with time delay (27+2) ☒ * OV> * OV>> Characteristics as per IEC
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- * Io> * Io>> * Io>>>
- Characteristics as per IEC
- * Inverse (normal, very, extremely, long) and definite time for Io>, Io>>
- * definite time for Io>>>

- c. Metering/ event recording
- * 3 phase/ line currents
- * Disturbance record
- * Breaker trip/ close status
- * Relay faults
- * Trip values

✓	
✓	✓
✓	
✓	
✓	

- * Inverse (normal, very, extremely, long) and definite time for UV>, UV>>
- c. Under/ Over frequency element with time delay (81U/ 81O)
- * Settable under voltage resistant df/ dt element
- * Number of stages with u/f
- * Number of stages with df/ dt
- d. Synchrocheck function
- e. Metering/ event recording
- * 3 phase/ line voltages
- * Disturbance record
- * Breaker trip/ close status
- * Relay faults
- * Trip Values

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C Relay protection/ metering functions ✓ **Tick for selection**

(where no check box is shown, the requirement is minimum but not limited, refer SWBD data SHT for FDR wise protection)

3 Motor Protection Relay

- a. Protection elements
 - * Thermal overload (49)
 - * OC protection with doubling feature (50)
 - * EF protection (50N)
 - * Locked Rotor protection
 - * Maximum start time
 - * Maximum number of starts
 - * Negative phase sequence
 - * Under voltage delayed trip
 - * EF Through CBCT
 - * Single phasing
- b. Metering/ events
 - * 3 phase/ line current
 - * Hour run
 - * KW, KWH, pf
 - * Disturbance record
 - * Plot start characteristic
 - * Trip values
 - * Start time
 - * Start current
- c. Control
 - * Breaker close in test mode
 - * Reacceleration logic
 - * Breaker trip
 - * RTD/ BTd input

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4 Comprehensive numerical relay

- a. Current op elements (51, 50, 51N, 50N, 51G, 67, 67N)
- b. Voltage op elements (59, 27, 2, 81U, 81O)
- c. Control Function
- * Breaker close/ trip from relay
- * Breaker close/ trip on serial
- * PLC logic function for control scheme
- * Digital I/P Min 4 nos. for I/C & plant FDR min 12 nos. for MTF & TRF, FDR.
- * Motor Feeder control function

✓
✓

5 Special Protection Relays

- * Part of main relay
- * Separate relay
- a. Differential relays
 - * Bus: High/ low Imp, vendor to select
 - * Feeder: High/ low Imp, vendor to select
 - * Transformer: With harmonic restraint
 - * Machine: Biased differential
- b. Distance relays
- c. Restricted EF (64R)
- d. Generator protection
- e. Distance protection
- f. Reverse power relay

✓

6 Other relay features

- a. Analog inputs 4-20 mA
 - * RTD/ BTd-MPR REQD.
 - * WTI/ OTI-Trafo relay REQD.

WTI = Winding temperature indicator
OTI = Oil temperature indicator

- b. Output relays
 - * Number of relays 4 nos.
 - * Contact rating 2A, 110/220 VDC
 - * Reset Hand reset

Functions part of numerical relay

- c. Lock out function (86)
- d. Trip circuit supervision(95)
- e. Watch dog
- f. Time stamp
- g. Modular construction for easy and quick replacement of faulty PCB/ circuit

✓
✓
✓
✓
✓

D Serial communication and relay integration		✓ Tick for selection						
1	Relay integration ☒ a. Communication ports at relay * Relay front : RS 232 * Relay back : RS 485 b. Protocol : Vendor to decide of relay LAN c. Requirement of data concentrator (DC) * Integration through DC ☒ * Directly to MMI ☐ d. Topology: Vendor to decide e. Data concentrators : <table style="margin-left: 20px; border: none;"> <tr> <td style="border: none;">Separate system</td> <td style="border: none;">for</td> <td style="border: none;">HV</td> </tr> <tr> <td style="border: none;">Separate system</td> <td style="border: none;">for</td> <td style="border: none;">MV</td> </tr> </table>	Separate system	for	HV	Separate system	for	MV	
Separate system	for	HV						
Separate system	for	MV						
2	Redundancy a. Relay LAN/ serial * Redundant (serial) ☒ * Non redundant (star) ☒ b. From DC to MMI * Redundant ☒ * Non redundant ☐ c. From DC to ECS-RTU * Redundant ☒ * Non-redundant ☐							
3	Redundancy requirement for DC/ MMI a. Ports at Star coupler * For each relay Non Redundant * For DC Dual Redundant b. Data concentrator (DC) * Power supply card Dual Redundant * Communication port for each relay LAN Dual Redundant * Communication processor Dual Redundant							
4	Serial communication from DC to MMI/ ECS RTU a. DC to MMI * Topology Vendor to decide * Protocol Vendor to decide b. DC to ECS-RTU Modbus c. Scan time As per 6-51-0055							
5	Other requirement a. Time synchronization ☒ Detail during engg b. Remote relay parameterization ☒ c. Annunciation at MMI ☒							

**NUMERICAL RELAY AND DATA CONCENTRATOR
MANUFACTURER'S DATA**

1. Numerical relays Types							
Feeder type		Incomer	Bus PT	Bus TIE	Motor	Transformer	motor
Relay selection	Main relay * Indicate equivalent NEMA no. of element offered in main relay. * Lockout feature 86 * Trip ckt sup 95 * Relay model & extra element for syn mot Differential relay CT circuit supervision REF relay Direction relay Reverse Power Impedance relay * 86 with all special protection relays						
	RS 232 RS 485 RS 422 FO						
	RTD-PT100 BTD-PT100 WTI input OTI input						
	* DI used by MFR * DI available for customer interlock * DI for auto C/O logic						
	* Main relay * Special relays * Protocol for relay setting from remote						
	Any other data						
	Remarks						

2. Data concentrator and relay integration**a. Model no.****Make****b. Input power supply**

* Voltage

220V DC

* Power reqt

c. Redundancy

* Power supply

* Communication processor

* Communication port

* Relay LAN/ Serial communication

* ECS-RTU interface

* MMI interface

d. Serial interface/ Relay LAN

* Topology

* Protocol

* Nos 0*

* Topology

* Type of port

* Cable type

f. Serial interface-MMI

* Topology

* Type of port

* Cable type

g. Serial interface-ECS-RTU

* Topology

* Protocol

* Type of port

* Cable type

h. Number of Digital input/ Aanalogue input (4-20mA)

* DI for substation eqpt

* Spare DI

* AI as per project data sheet

* Spare AI

i. Maximum Scan Time

* Status

* Events

* Data acquisition (analog)

* Disturbance record download time

j. Other features

* Spare capacity for additional device for relay LAN

* Time synchronization options

* Power walk in time

* Restoration time of communication of DC with NR & MMI

* After detecting break in serial loop

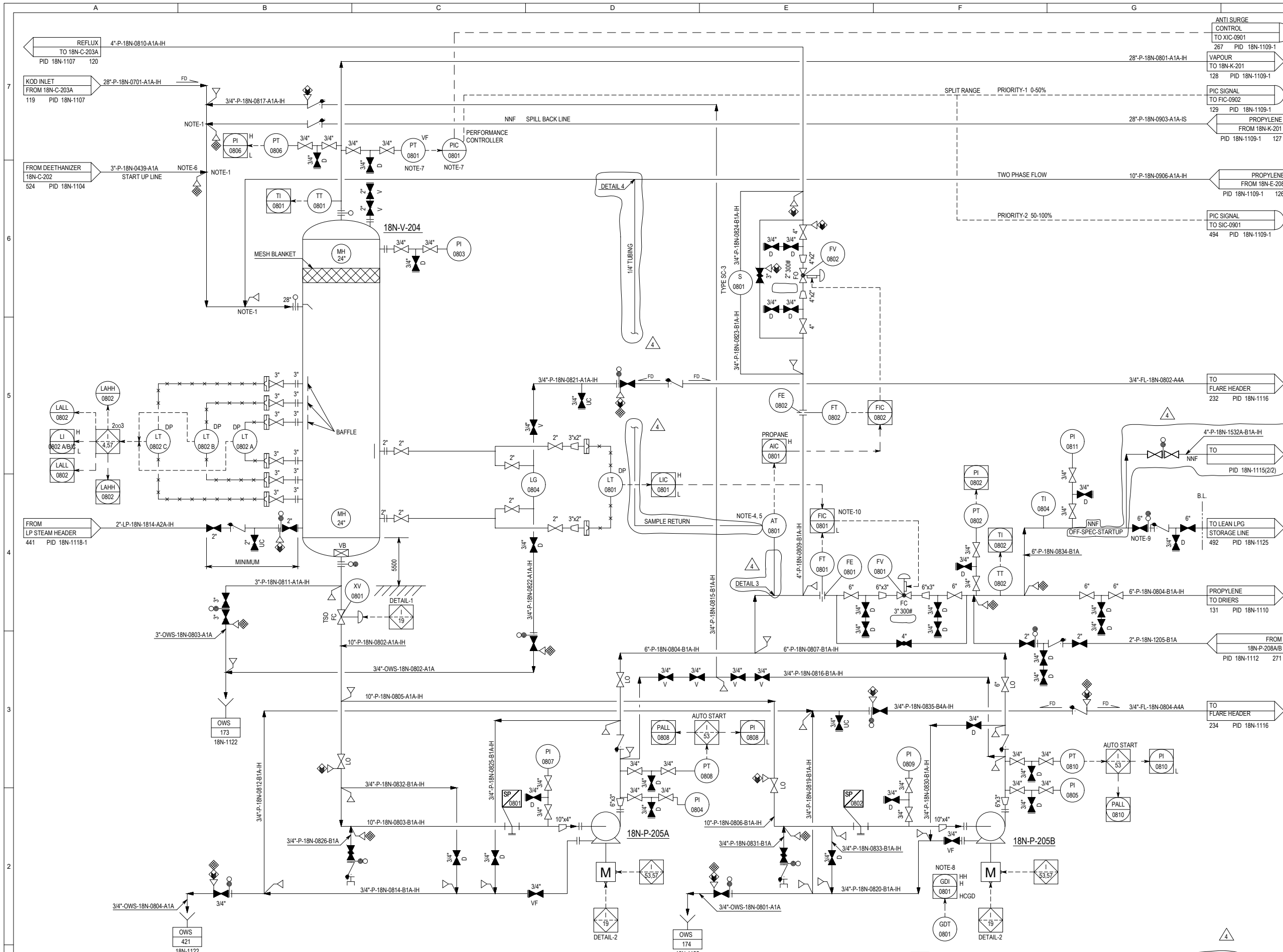
* After switchover of supply from normal to redundant

* After failure of normal & redundant supply & restoration of same

* Time required for synchronization with external clock

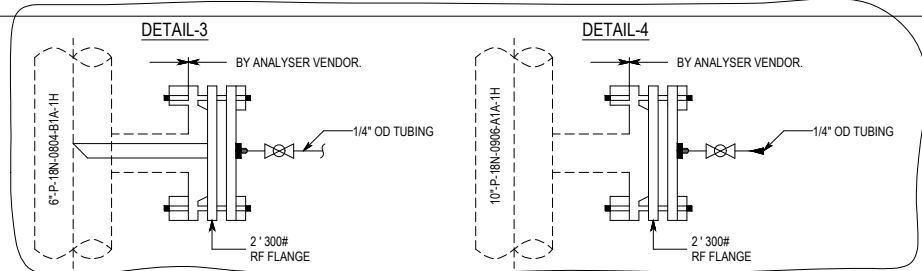
3 Standard features of relay/ system architecture

Vendor to provide data as applicable for the product offered

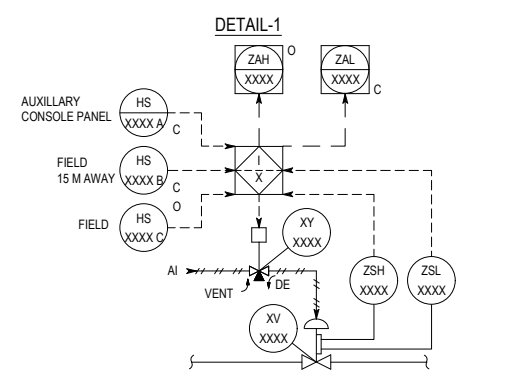


18N-V-204
HEAT PUMP K.O. DRUM
DIA : 4300.0 mm
TL / TL : 6500.0 mm
DP : 15.0 kg/cm2g
DT : 105.0 °C
TRIM : A1A

18N-P-205A / B
C3 SPLITTER OVERHEAD PUMPS
TYPE : CENTRIFUGAL
CAPACITY : 115.0 m³/hr
HEAD : 230.0 m
DIS. PRESSURE : 21.6 kg/cm2g
VF : VENDOR FURNISHED

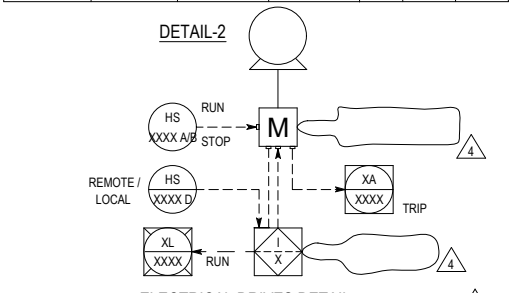


- GENERAL NOTES:**
- A. ALL INSTRUMENT IN THIS P&ID HAS TO BE PREFIXED BY UNIT NUMBER 18N.
 - B. FOR LEGEND AND UNIT SPECIFIC DETAILS REFER DRAWING 00785-18N-PID-00-21-1100 PAGE 2 OF 2
 - C. LT VENT AND DRAINS WILL BE SHOWN ON SEPARATE P&ID.
 - D. ALL PIPING LOW POINT DRAIN AND HIGH POINT VENT SHALL BE DOUBLE BLOCK
- NOTES:**
- 1. MAKE CONNECTION ON TOP OR SIDE OF PIPE PRIOR TO LAST ELBOW.
 - 2. ~~DELETED~~
 - 3. INTERLOCK DESCRIPTION:
 - 1-19 FIRE SHUT DOWN.
 - 1-4 HEAT PUMP K.O. DRUM HIGH HIGH LEVEL - HEAT PUMP COMPRESSOR TRIP.
 - 1-53 18N-P-205A/B DISCHARGE PRESSURE LOW-LOW WILL AUTOSTART STANDBY PUMP.
 - 1-57 HEAT PUMP K.O. DRUM LOW LOW LEVEL 18N-P-205A/B TRIP. LALL-0802 INHIBIT AUTO START OF STANDBY PUMP.
 - 4. PROPANE ANALYZER, TO BE LOCATED IN ANALYZER SHELTER.
 - 5. ANALYZER DETAIL SHOWN AFTER FINALISATION OF ANALYZER TYPE.
 - 6. STARTUP LINE.
 - 7. SHALL BE SUPPLIED BY COMPRESSOR VENDOR.
 - 8. LOCATE CLOSE TO PUMP 18N-P-205A/B.
 - 9. BATTERY LIMIT ISOLATION AND INSTRUMENTATION ASSEMBLY.
 - 10. PROVIDE SET POINT LIMITER ON FIC-0802 AT MINIMUM FLOW OF 18N-P-205A/B.
 - 11. PROVIDE START PERMISSIVE FOR 18N-P-205A/B ON ZAH-0801. LOSS OF ZAH-0801 SHALL TRIP THE PUMPS 18N-P-205A/B.



FIRE SHUT DOWN VALVE DETAIL

PID NUMBER	TAG NUMBER	INTERLOCK NO.	TAG NUMBER	XY	ZAH/ ZSH	ZAL/ ZSL
1108	XV-0801	19	HS-0801A/B/C	0801	0801	0801



ELECTRICAL DRIVES DETAIL

PID NUMBER	MOTOR	INTERLOCK NO.	TAG NUMBER	XL	XA
1108	18N-P-205A	19.53.57	HS-0802A/B/D	0802	0802
1108	18N-P-205B	19.53.57	HS-0803A/B/D	0803	0803

5	01.01.2024	AS BUILT	PK	SG	BBK	ARM
4	20.05.2015	AS BUILT	SRN	DNKS	NSB	SHK
3	18.06.2012	ISSUED FOR CONSTRUCTION	RKD	KRNS	NSB	VJK
2	07.03.2012	HAZOP COMMENTS INCORPORATED	RKD	KRNS	NSB	VJK
1	16.08.2011	CLIENT COMMENTS INCORP. & ISSUED FOR HAZOP	RKD	SMV	NSB	VJK
0	10.05.2011	ISSUED FOR DESIGN	RKD	SMV	NSB	SG
REV.	DATE	REVISION DESCRIPTION	DRN	CHK	APP	PM

PROJECT **FCCU AND PRU REVAMP PROJECT**

OWNER **INDIAN OIL CORPORATION LTD. MATHURA REFINERY, INDIA**

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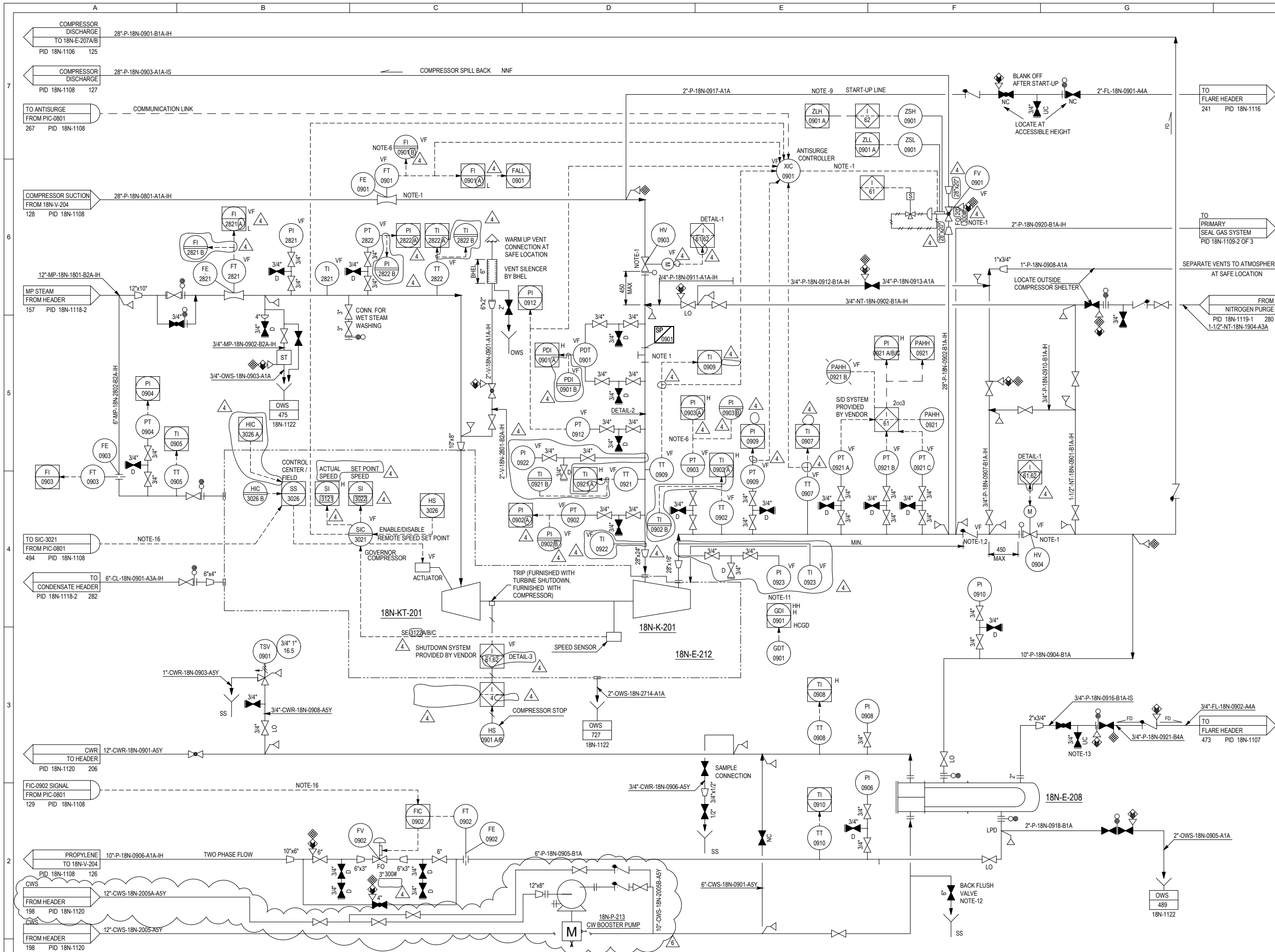
TITLE **PIPING AND INSTRUMENTAION DIAGRAM HEAT PUMP COMPRESSOR K.O. DRUM PROPYLENE RECOVERY UNIT (18N)**

SCALE	00785	18N	PID	00	21	1108	PAGE	REV.
NTS	PROJECT	UNIT	DOC.TYPE	DISC.	SUBJ.	SER.NO.	1 OF 1	5

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18N-KT-201
STEAM TURBINE
TYPE : CONDENSING
RATED POWER : 1000 kW
RATED SPEED : 5885 RPM

18N-K-201
HEAT PUMP COMPRESSOR
TYPE : CENTRIFUGAL
CAPACITY : 257412.0 nm³/hr
HEAD : 2845.0 m
DIS. PRESSURE : 18.5 kg/cm²g
VF : COMPRESSOR VENDOR FURNISHED

18N-E-212
SURFACE CONDENSER (VENDOR SCOPE)
TYPE : SHELL & TUBE
HEAT DUTY :
SHELL :
DIS. PRESSURE : 18.5 kg/cm²g
DT : 100.0 °C
TUBE :
DIS. PRESSURE : 16.5 kg/cm²g
DT : 70.0 °C

18N-E-208
C3 SPLITTER TRIM CONDENSER
TYPE : A E M
HEAT DUTY : 4.5 MMKCAL/HR
SHELL :
DIS. PRESSURE : 21.0 kg/cm²g
DT : 105.0 °C
TUBE :
DIS. PRESSURE : 16.5 kg/cm²g
DT : 65.0 °C

18N-P-209A / B
CONDENSATE TRANSFER PUMPS (VENDOR SCOPE)
TYPE : BARREL
CAPACITY :
HEAD :
DIS. PRESSURE : kg/cm²g

18N-P-213(154-P-002)
CW BOOSTER PUMP
TYPE :
CAPACITY :
HEAD :
DIS. PRESSURE : kg/cm²g

SHUT OFF VALVE DETAIL

PID NUMBER	TAG NUMBER	INTERLOCK NO.	TAG NUMBER	ZAH/ ZSH	ZAL/ ZSL
1109	HV-0903	61.62	HS-0903A/B/C	0903	0903
1109	HV-0904	61.62	HS-0904A/B/C	0904	0904

DETAIL-1
PERMISSIVE FOR COMPRESSOR RUNNING

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A. ALL INSTRUMENT IN THIS P&ID HAS TO BE PREFIXED BY UNIT NUMBER 18N.
B. FOR LEGEND AND UNIT SPECIFIC DETAILS REFER DRAWING 00785-18N-PID-00-21-1100 PAGE 2 OF 2.
C. LT VENT AND DRAINS WILL BE SHOWN ON SEPARATE P&ID.
D. ALL PIPING LOW POINT DRAIN AND HIGH POINT VENT SHALL BE DOUBLE BLOCK

NOTES:
1. SHALL BE SUPPLIED BY COMPRESSOR VENDOR (VF = COMPRESS VENDOR FURNISHED).
2. SPECIAL TYPE OF CHECK VALVE.
3. SURFACE CONDENSER 18N-E-212 & SURFACE CONDENSOR PUMPS 18N-P-209A/B ARE IN VENDOR'S SCOPE.
4. SYMMETRICAL PIPING.
5. ~~DELETED~~ 4
6. FLOW INDICATION SHALL BE LOCATED AT COMPRESSOR LOCAL PANEL.
7. DELETED.
8. INTERLOCK DESCRIPTION
I-4 - HEAT PUM KO DRUM LIQUID LEVEL HIGH HIGH - 18N-K-201 HEAT PUMP COMPRESSOR TRIP.
I-62 START PERMISSIVE WITH SUCTION MOV'S OPEN & DISCHARGE MOV'S ~~CLOSED~~ CONDITION FOR HEAT PUMP COMPRESSOR START. DURING TRIP THE DISCHARGE MOV'S ~~CLOSED~~.
9. START UP LINE FOR INITIAL PURGING.
10. DELETED.
11. LOCATE CLOSE TO HEAT PUMP COMPRESSOR 18N-K-201.
12. BACK FLUSH VALVE TO BE LOCATED CLOSE TO CWS INLET ISOLATION VALVE.
13. ISOLATION ARRANGEMENT PROVIDED ON VENT LINE FROM 18N-E-208 TO BE LOCATED AT ACCESSIBLE HEIGHT NEAR TO EXCHANGER.
14. REFER HEAT PUMP COMPRESSOR VENDOR DRAWING 1-336-00-36801 REV 00.
00785-18N-PID-00-21-1126
00785-18N-PID-00-21-1127
00785-18N-PID-00-21-1128 (PAGE 1 OF 2)
00785-18N-PID-00-21-1129 (PAGE 2 OF 2)
1-11030-00-204 FOR DETAILS
15. LEVEL GAUGE TO BE INSPECTED EVERY START-UP AND PERIODICALLY.
16. LOW PRESSURE SIGNAL REDUCES STEAM TURBINE SPEED FIRST, THEN CLOSES FV-0902 LAST.

DETAIL-2

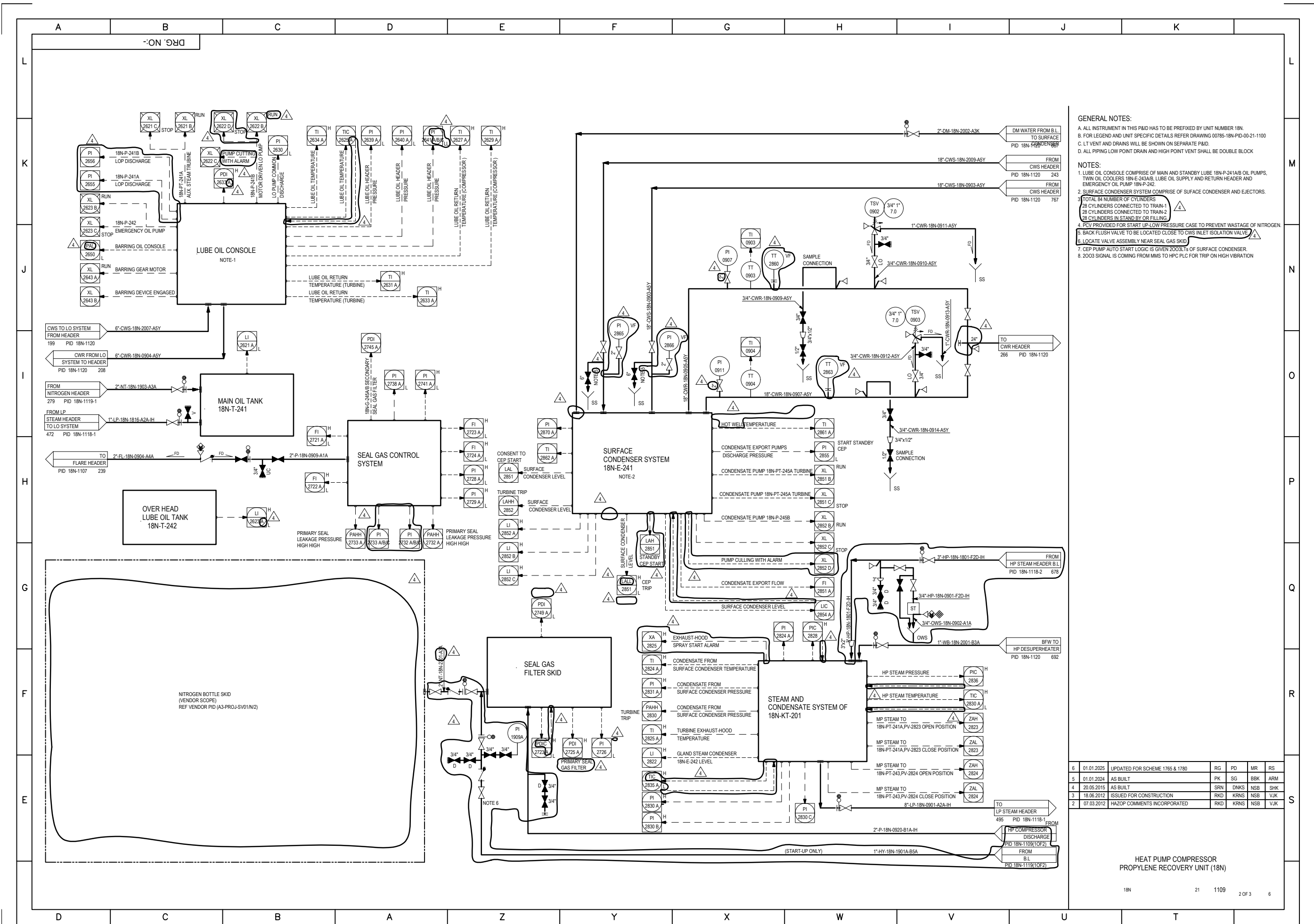
DETAIL-3

6	01.01.2024	AS BUILT		PK	SG	BBK	ARM
5	25.01.21	UPDATED		GSM	MA	JP	ARM
4	20.05.2015	AS BUILT		SRN	DNKS	NSB	SHK
3	18.06.2012	ISSUED FOR CONSTRUCTION		RKD	KRNS	NSB	VJK
2	07.03.2012	HAZOP COMMENTS INCORPORATED		RKD	KRNS	NSB	VJK
1	16.08.2011	CLIENT COMMENTS INCORP. & ISSUED FOR HAZOP		RKD	SMV	NSB	VJK
0	10.05.2011	ISSUED FOR DESIGN		RKD	SMV	NSB	SG
REV.	DATE	REVISION DESCRIPTION		DRN	CHK	APP	PM

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TITLE PIPING AND INSTRUMENTAION DIAGRAM HEAT PUMP COMPRESSOR PROPYLENE RECOVERY UNIT (18N)

SCALE	00785	18N	PID	00	21	1109	PAGE	REV.
NTS	PROJECT	UNIT	DOC.TYPE	DISC.	SUBJ.	SER.NO.	1 OF 3	6

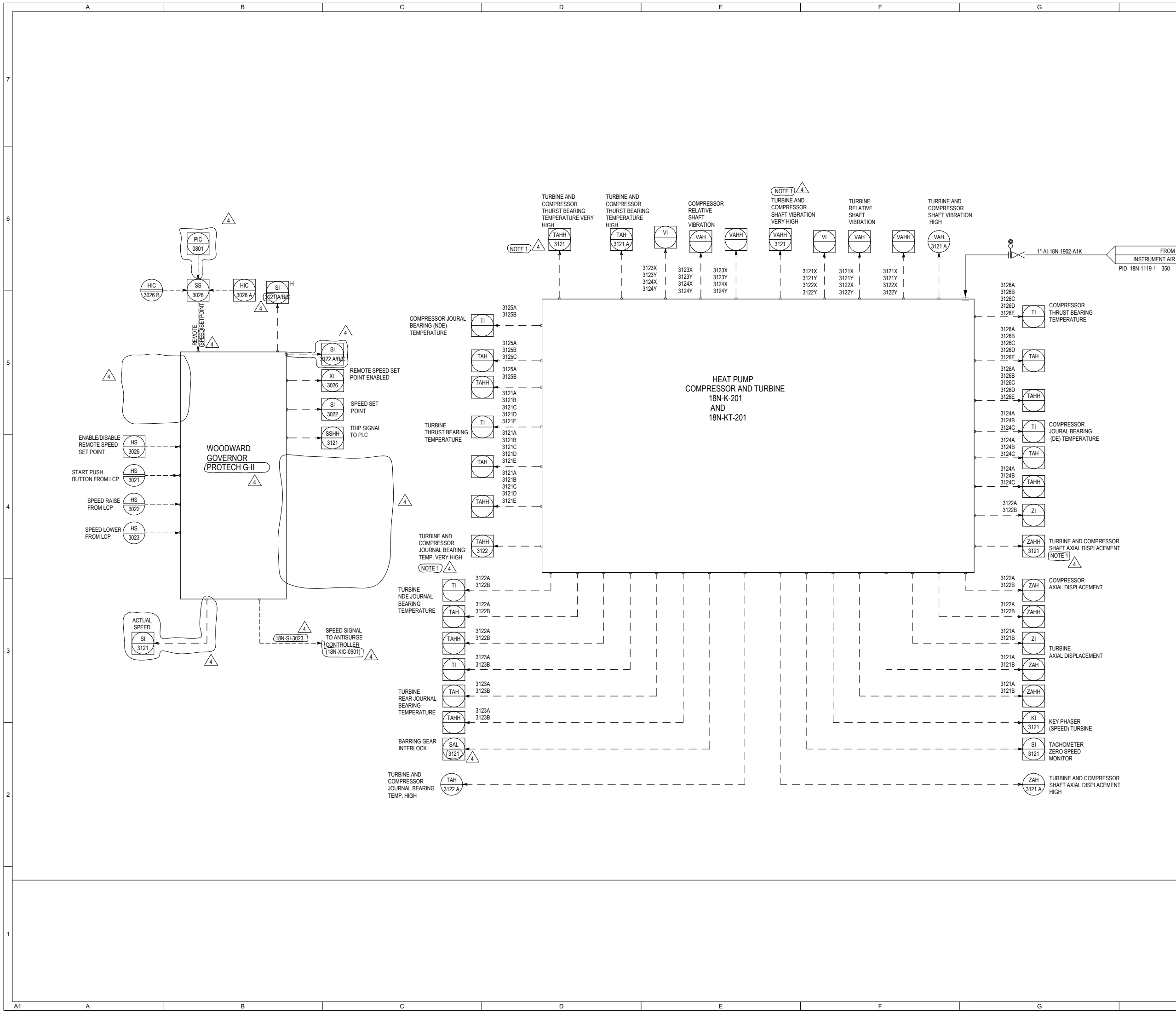
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- GENERAL NOTES:
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 - B. FOR LEGEND AND UNIT SPECIFIC DETAILS REFER DRAWING 00785-18N-PID-00-21-1100
 - C. LT VENT AND DRAINS WILL BE SHOWN ON SEPARATE P&ID.
 - D. ALL PIPING LOW POINT DRAIN AND HIGH POINT VENT SHALL BE DOUBLE BLOCK
- NOTES:
- 1. LUBE OIL CONSOLE COMPRISE OF MAIN AND STANDBY LUBE 18N-P-241A/B OIL PUMPS, TWIN OIL COOLERS 18N-E-243A/B, LUBE OIL SUPPLY AND RETURN HEADER AND EMERGENCY OIL PUMP 18N-P-242.
 - 2. SURFACE CONDENSER SYSTEM COMPRISE OF SURFACE CONDENSER AND EJECTORS.
 - 3. TOTAL 84 NUMBER OF CYLINDERS
 - 28 CYLINDERS CONNECTED TO TRAIN-1
 - 28 CYLINDERS CONNECTED TO TRAIN-2
 - 28 CYLINDERS IN STAND BY OR FILLING
 - 4. PCV PROVIDED FOR START UP-LOW PRESSURE CASE TO PREVENT WASTAGE OF NITROGEN.
 - 5. BACK FLUSH VALVE TO BE LOCATED CLOSE TO CWS INLET ISOLATION VALVE
 - 6. LOCATE VALVE ASSEMBLY NEAR SEAL GAS SKID
 - 7. CEP PUMP AUTO START LOGIC IS GIVEN 2003Lts OF SURFACE CONDENSER.
 - 8. 2003 SIGNAL IS COMING FROM MMS TO HPC PLC FOR TRIP ON HIGH VIBRATION

6	01.01.2025	UPDATED FOR SCHEME 1765 & 1780	RG	PD	MR	RS
5	01.01.2024	AS BUILT	PK	SG	BBK	ARM
4	20.05.2015	AS BUILT	SRN	DNKS	NSB	SHK
3	18.06.2012	ISSUED FOR CONSTRUCTION	RKD	KRNS	NSB	VJK
2	07.03.2012	HAZOP COMMENTS INCORPORATED	RKD	KRNS	NSB	VJK

HEAT PUMP COMPRESSOR
PROPYLENE RECOVERY UNIT (18N)



GENERAL NOTES:
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C. LT VENT AND DRAINS WILL BE SHOWN ON SEPARATE P&ID.
D. ALL PIPING LOW POINT DRAIN AND HIGH POINT VENT SHALL BE DOUBLE BLOCK

NOTES:
1. COMMON ALARM ARISING OUT OF VENDOR PLC.

REV.	DATE	REVISION DESCRIPTION	DRN	CHK	APP	PM
5	01.01.2024	AS BUILT				
4	20.05.2015	AS BUILT	SRN	DNKS	NSB	SHK
3	18.06.2012	ISSUED FOR CONSTRUCTION	RKD	KRNS	NSB	VJK
2	07.03.2012	HAZOP COMMENTS INCORPORATED	RKD	KRNS	NSB	VJK

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TITLE **PIPING AND INSTRUMENTAION DIAGRAM**
HEAT PUMP COMPRESSOR
PROPYLENE RECOVERY UNIT (18N)

DRAWING NO.						PAGE	REV.
SCALE	00785	18N	PID	00	21	1109	
NTS	PROJECT	UNIT	DOC.TYPE	DISC.	SUBJ.	SER.NO.	3 OF 3

5

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DISTR.: I/OCL

**TECHNICAL PART FOR
HPC HIGH SPEED MOTOR PACKAGE**

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Scope of Supply and General Specifications

1.1. Scope of Supply

- 1.1.1. This specification describes the minimum requirements for the supply of the package which involves Design, Engineering, Manufacturing, Packaging, Testing, Supply, Transportation And Supervision Of Erection And Commissioning of High Speed Electric Motor for replacement of HPC Condensing Turbine Along With Accessories, Mandatory Spares, Commissioning Spares, Special Tools & Tackles And Third Party Inspection at NPRU Unit of IOCL Mathura Refinery:

Sr. No.	Item No. (Tag No.)	Service	Equipment Description
1	18N-KM-201	HPC Compressor motor	High Speed Electric Motor Driver with hot stand-by VFDs, along with all Auxiliaries, spares, cables, and instrumentation & controls, and spare high-speed motor.

- 1.1.2. The Heat Pump compressor (18N-K-201) is driven by a condensing type steam turbine which delivers ~5 MW power to the compressor using ~24 T/hr MP steam. The RPM (Revolution per Minute) of the turbine varied by adjustment in steam flow. The normal RPM for the compressor and turbine is 5460. IOCL Mathura Refinery intends replacement of steam turbine with directly coupled High-Speed Motor on existing foundation which will deliver same power & dynamics to the compressor. The supplied high-speed motor shall be placed on existing foundation without any structural modification.
- 1.1.3. The intent of this specification is to supplement, highlight and modify the requirements as given in data sheets, design basis, project specifications and applicable standards as listed under list of attachments and enclosed with the tender.
- 1.1.4. The scope of Supply shall include (but not limited to) the following:-
- 1.1.4.1. Complete High speed motor package:
- 1.1.4.1.1. One High Speed Motor along with all auxiliaries, Power cables from I/P Transformer to VFDs and from VFDs to the motor, Coupling with guard, Commissioning spares, LCS, EPB, instrumentation and controls etc.
- 1.1.4.2. Hot stand by VFDs, Input Transformers, PLC
- 1.1.4.3. Main and hot stand by VFDs along with its Input Transformers, Input and output breakers, Auto change-over panel, PLC, commissioning spares, instrumentation and controls.
- 1.1.4.4. Spare High-Speed Motor.
- 1.1.4.4.1. One nos spare high speed motor (same as main high speed motor) for one to one replacement.

- 1.1.4.4.2. Spare motor to be provided with proper metal stand for keeping the motor. Suitable arrangement for periodic rotation of rotor with bearing lubrication facility to be considered.
- 1.1.4.5. **Mandatory Spares**
 - 1.1.4.5.1. Mandatory spares for high speed motor package and hot stand by VFDs
- 1.1.4.6. **Site Supervision, Testing & Commissioning**
 - 1.1.4.6.1. Site supervision by an Expert Engineer during erection, installation, testing and commissioning of the equipment like VFDs, Transformers, Motor etc. on per man-day rate basis.
 - 1.1.4.6.2. Erection and installation plan of equipment like high speed motor, VFDs etc has to be vetted by the Site Engineer and ensure site supervision of all activities.
 - 1.1.4.6.3. Commissioning of equipment has to be done under the supervision of site engineer.
 - 1.1.4.6.4. Requirement of any special tools and tackles, consumables (excluding the items in Vendor's scope) has to be intimated to the Owner by the Vendor well in advance.
 - 1.1.4.6.5. Vendor to arrange on its own, the lodging, boarding and transportation facility for their personnel without any price implication to IOCL.
- 1.1.4.7. **CPWAMC**
 - 1.1.4.7.1. Composite Post Warranty Annual Maintenance charges for five years for VFDs, PLCs supplied by the Contractor.
 - 1.1.4.7.2. Any supply or/and services which are incidental to complete the scope of supply of the package in totality shall be deemed to be included in the scope of Vendor.
 - 1.1.4.7.3. For detailed conditions of CPWAMC, refer annexure CPWAMC conditions attached with this document.
- 1.1.5. **The scope of work related to design & engineering shall include (but not limited to) the following:**
 - Electrical and mechanical design of high-speed motor (including motor bearing selection)
 - Review and validation of Input data from Owner including dedicated site survey.
 - Determine acceptable tabletop stiffness.
 - Torsional Analysis of combined assembly of compressor and Motor rotors; Coupling design; and base frame rigidity / stiffness analysis of the assembly.
 - Study of existing base plate, frame and foundation for compatibility with proposed motor.
 - Study of existing RCC tabletop foundation of the Compressor – turbine.
 - Existing compressor shaft end checking for startup torque
 - Identification and design specification for suitable mechanical coupling
 - Review of existing lube-oil system based on data sheet and existing P&IDs provided by Owner
 - Motor Lateral analysis according with API541.
 - **Torsional analysis of the compressor-coupling-motor train as per API617.**

- The required data for torsional analysis shall be acquired by Vendor from site/OEM of the Compressor (if not provided by the Owner in tender) & any cost towards the same is deemed to be included in the quoted price.
 - Design & supply of motor surge protection comprising of LA, surge capacitor, if required as per motor design.
 - The complete high speed motor package shall be designed and engineered such that the replacement job of turbine with high speed motor can be completed within 25 (twenty five) days (Gregorian calendar). The bidder shall submit the barchart schedule of the envisaged activities for completion of replacement job. The opinion of IOCL regarding the acceptability of the submitted bar-chart schedule of envisaged activities shall be final and binding upon the bidder.
 - The Vendor to mention in their offer, the weight of the heaviest component of the high-speed motor which needs to be erected at site. The erection weight of this heaviest component should not be more than 10 M ton.
- 1.1.6. Vendor shall study, review and confirm the suitability of the existing RCC foundation (along with the existing base frame) of the Compressor-Turbine assembly where new High-Speed Motor shall be installed. Vendor shall submit the design adequacy report for the existing foundation (and existing base frame) including FEM, static and dynamic design analysis report as per IS codes and available literature of repute. The vendor may recommend nominal modification/strengthening, if required, to be carried out in the existing foundation. However, OWNER envisages and desires that no avoidable modifications should be carried out in the existing foundation to minimize the shutdown time of the plant. The offers requiring modifications in RCC foundation which increases the shutdown duration shall render the offer liable for rejection. The opinion of IOCL regarding the increase in shutdown duration due to proposed modification in RCC foundation shall be final and binding upon the bidder.
- 1.1.7. Any modifications in the RCC foundation, existing combined base frame of compressor-turbine and compressor rotor shall be proposed by the Vendor during bidding stage itself.
- 1.1.8. Any additional/further modification to the above, proposed by the vendor after award of the contract shall render the contract liable for termination as per GPC clause 26.0 and its sub-clauses.
- 1.1.9. Vendor to supply the following measuring and testing equipment along with the high speed motor package (as defined in clause 1.1.4.1) which shall be required for testing and measurement of various parameters during commissioning of the complete package: -

Sr No	Item Description	Make	Qty	Remarks
1	Oil BDV Kit	Baur / Megger/High Voltage Diagnostics	1	For TR oil testing
2	Battery Impedance tester	Megger / Fluke/ AVO	1	For battery bank testing

3	Three Transformer turns ratio kit, 250V excitation voltage with vector group detection and mag balance test	PDIC / Megger / Heafely / Doble/ VANGUARD	1	For VFD transformer testing
4	SFRA kit for Transformer testing. 10Hz to 30Mhz, 24V peak to peak with FRLS measurement	PDIC / Megger / Omicron / Doble/ VANGUARD	1	For VFD transformer testing
5	Intrinsically safe multi-meter	Fluke/ Chauvin Arnoux /Ecom	2	For earth pit testing in hazardous area
6	Intrinsically safe clamp on meter	Metravi / Catest	2	For earth pit testing in hazardous area
7	Vacuum Bottle tester -	PDIC / Crest test system/Vanguard	1	For vacuum bottle testing of VCB of motors
8	Ohm-Meter	Megger / Fluke/ PROGRAMMA	1	Measurement of resistance in VFD panel
9	DC earth fault locator	Megger / Fluke/CSD	1	For location of DC earth fault in control circuit

- 1.1.10. Vendor's scope of supply/work shall include the requirements as specified in the respective Data sheets, Engineering Specification, design basis, Applicable standards & project specifications attached with tender. Vendor scope of supply shall include as a minimum but not limited to the items listed in the scope of supply checklist **(Annexure-1)** attached with this specification.
- 1.1.11. Vendor to note that during detail engineering stage some of the critical documents of the high speed motor package (such as data sheet for motor, P&IDs, and performance curves of the motor) may be sent to M/S BHEL (the OEM of Compressor) for review. Comments, if any, furnished by the Compressor OEM shall have to be incorporated / complied by the vendor without any cost and time impact to Purchaser.
- 1.1.12. Inspection & Testing at manufacturers shop will be witnessed by Third party inspection agency (TPIA) of Owner for all items mentioned in Vendor's scope of supply. TPIA shall be appointed by vendor as per approved TPIA list given elsewhere in this tender. The charges towards Third party inspection shall be included in the supply price for package.
- 1.1.13. Bidder to note that during detail engineering stage, the high speed motor package shall be studied for HAZOP and SIL review. HAZOP and SIL (Safety Integrity Level) study

shall be carried out at Owner's Office. Vendor shall participate in the study at his own cost for a minimum of 2 days. All modifications based on the recommendations on HAZOP & SIL study shall be implemented by vendor without any additional cost and schedule impact to Purchaser.

1.1.14. Exclusions

- 1.1.14.1. LV Power Control Centre, LV Motor Control Centre for auxiliary equipments.
- 1.1.14.2. Construction of Earth Pits
- 1.1.14.3. UPS & Auxiliary supply for VFDs.
- 1.1.14.4. Provision of any cranes during site supervision, testing and commissioning.
- 1.1.14.5. Supply of all external control, instrumentation & earthing cables, supports & Cabling installation.
- 1.1.14.6. All civil works, compressor house building including all the operating platforms (except operating platform within vendor's skid/s) etc. are excluded from the bidder's scope of supply/work.

1.1.15. Basic design

1.1.15.1. Motor & VFD

- 1.1.15.1.1. Motor & VFD shall be in compliance with the requirements specified in design basis, equipment data sheets and project specification attached with this requisition.
- 1.1.15.1.2. The motor and VFDs shall be selected so as to fully meet the requirements specified in data sheets, design basis and project specifications as well as referred codes and standards forming part of the inquiry document.
- 1.1.15.1.3. Motor & VFD shall be designed and selected for all cases as specified in the Compressor data sheet. The Certified (guarantee) case is as marked on the datasheets attached.
- 1.1.15.1.4. The motor shall also be designed for accidental reverse rotation case along with bearings, lube oil & other auxiliaries. Necessary controls and instrumentation shall be included in vendor's scope for the same to avoid any damage to the machine and its auxiliaries because of reverse rotation.
- 1.1.15.1.5. Equipment in the package(s) shall be rated for continuous operation at peak, minimum and normal operating loads.
- 1.1.15.1.6. The vendor shall perform a composite torsional vibration analysis of the complete train and shall be responsible for the satisfactory mechanical performance of the train.
- 1.1.15.1.7. The electric motors shall be energy efficient as per requirements specified in the datasheet & electrical specifications. Motor shall be designed, selected and optimised for the design cases given on the data sheets. Other operating conditions as shown on the data sheet shall also be met. Vendor shall size the Motor driver at 110 % of maximum BKW of compressor required for any of the operating cases specified.
- 1.1.15.1.8. There shall be a minimum of 10 % margin over the maximum BKW, which is sum of the maximum gas BKW and all mechanical losses including at couplings etc. at worst operating condition considering all the operation scenarios.

- 1.1.15.1.9. Compressor capacity control shall be achieved by varying speed. The VFD range shall cover the speed range for all operating scenarios. Vendor to meet the minimum continuous operating speed of the compressor train and indicate in the bid.
 - 1.1.15.1.10. Electric motor offered shall be suitable for starting the compressor under specified loading conditions.
 - 1.1.15.1.11. The compressor along with motor shall be mounted on the existing common base plate/frame.
 - 1.1.15.1.12. No modification to the existing Compressor shall be permitted.
- 1.1.15.2. Coupling and Guard
- 1.1.15.2.1. Couplings shall be provided between compressor & High Speed HV Motor. The Coupling shall be designed as per API STD 671 4th Ed and compressor data sheets. Couplings shall have a continuous torque rating greater than the driver torque at maximum power and speed.
 - 1.1.15.2.2. Unless otherwise specified, couplings shall be of metallic, non-lubricated, flexible element type (i.e. either diaphragm or disc) with spacer for all equipment. All coupling models shall be selected for a minimum service factor of 1.5 over driver rating. DBSE shall be more than the seal cartridge length.
 - 1.1.15.2.3. The coupling guards, shall operate dry and without oil injection for cooling. The guards shall be removable and constructed from non-sparking material and shall be open at bottom to permit manual shaft rotation. Guards shall be sufficiently rigid and capable of withstanding a 100 kg of point load. The individual component weights of the guard shall be easily handled, without the use of a crane. Coupling guard skin temperature shall not exceed 50 °C.
- 1.1.15.3. Lube Oil Systems
- 1.1.15.3.1. Existing Lube oil system may be used (if suitable) or else separate console type Lube oil system shall be designed, built and supplied in accordance with API 614 5th edition, Chapter 1 & 2 and shall also comply the requirements specified in data sheets and project specifications attached with this tender.
 - 1.1.15.3.2. Study of existing lube oil system for suitability is under vendor scope and deemed to be included in their supply price. Details of existing lube oil system is attached. Vendor to specify in their bids if new lube oil skid is being considered.
 - 1.1.15.3.3. The supply of new lube oil skid/modification in existing lube oil skid shall be in vendor scope and deemed to be included in their supply price.
 - 1.1.15.3.4. The Lube oil console shall be located at the grade level within the compressor shelter. The complete area around the machines at the mezzanine floor level under the shelter shall be covered by working platform.
 - 1.1.15.3.5. The lube oil system shall be equipped with Electric motor driven main lube oil pump, Electric motor driven standby lube oil pump, Electric motor

driven emergency lube oil pump (if required) (on emergency AC power supply), accumulators and overhead run down tank. Design shall ensure supply of lube oil to compressor, Gearbox and motor during the compressor train coast down period, in the event of emergency shutdown.

- 1.1.15.3.6. All lube oil piping from oil consoles to the equipment including fittings, valves, instruments and supports shall be included in vendor's scope of supply. Vendor shall engineer the system and furnish detailed P&IDs as well as the piping drawings for the interconnecting piping as for Purchaser's review and approval during detail engineering stage. All lube oil piping shall be of SS316.
- 1.1.15.3.7. Reservoirs, pumps, coolers, filters, oil vapour extractor and control valves shall be provided in an assembled console. Console shall have a steel baseplate with rim and drip lip for drainage.
- 1.1.15.3.8. Flame arrestors, as necessary shall be provided on the oil vent to prevent ignition source from entering the lube oil reservoir.

1.1.15.4. Filter and Coolers

- 1.1.15.4.1. Filters and coolers shall be fitted with valved vents and drains and shall be brought up to the respective skid edge at a convenient location.
- 1.1.15.4.2. A temperature measurement shall be provided on inlet and outlet of cooler.
- 1.1.15.4.3. Filters and coolers shall have valve interconnections to permit filling with oil after maintenance. Vents of the filters and coolers shall be routed to lube oil reservoir with sight flow glasses.
- 1.1.15.4.4. Lube oil cooler design shall be in line with below requirements.
 - Coolers shall be water cooled, shell and tube type as per TEMA-C with oil on shell and water on tube side
 - The oil side operating pressure shall be higher than water side operating pressure
 - For shell and tube exchangers, the low pressure (LP) side shall be preferably specified with a design pressure at least equal to 10/13 of high pressure (HP) side design pressure
 - The material of construction shall be suitable for the specified service and as per governing API specifications. However, as a minimum, MOC shall be as follows
 - Shell: SS316/Duplex SS, Channel / Channel covers:SS316/Duplex Stainless steel
 - Tubes: Inhibited Admiralty brass (Arsenical: C44300)
 - Tube sheet: Brass
 - Fouling factors: shell side (oil)– 0.0002 hr m² OC/kcal; tube side (water)- 0.0004 hr m² OC/kcal

- 1.1.15.4.5. Pressure testing of lube oil coolers after site installation shall be carried out with lube oil only, water should not be used. Supplier to consider the same while designing of coolers
- 1.1.15.4.6. Thermal relief valves shall be provided for components that may be blocked in by isolation valves (like any cooling water circuit). Set pressure for the valve shall be less than or equal to design pressure of the cooling water return header as indicated in Design Basis.
- 1.1.15.4.7. Vendor shall design the lube oil consoles from the point of view of easy accessibility, 800 mm free space around and maintainability of the major pieces of equipments such as coolers, pumps, drivers, control valves, filters etc. Vendor to ensure easy personal movement and no criss-crossing of piping in the consoles. Vendor shall not consider his standard congested consoles but shall design the layout in spread-out manner. The layout shall be furnished for review and approval by the Purchaser during detailed engineering.
- 1.1.15.4.8. One portable (trolley mounted) pump with necessary hose piping, valves, connections etc. shall be provided for emptying/filling the main reservoirs. Pump shall be electric motor driven with a motor cable of 20 m length, hose pipe of 10 m length at suction and discharge and plug to suit the area classification and motor rating.
- 1.1.15.4.9. One portable (trolley mounted) oil purifier/conditioner with necessary hose piping, valves, connections etc. shall be provided. Pump shall be electric motor driven with a motor cable of 20 m length, hose pipe of 10 m length at suction and discharge and plug to suit the area classification and motor rating. The capacity shall be sufficient for conditioning the total requirement in approximately 12 hrs.
- 1.1.15.4.10. All the piping, fittings and valve trims etc. shall be stainless steel for lube oil system. Any tubing required shall be SS 316/316L Stainless Steel with compression type of fittings of like materials. Compression type fittings shall be of Swagelock type or approved equivalent.
- 1.1.15.5. **Dynamic Simulation**
 - 1.1.15.5.1. Vendor shall perform the dynamic simulation of entire compressor train and incorporating the hardware/ software changes (as result of dynamic simulation) is included in vendor scope.
 - 1.1.15.5.2. Dynamic simulation shall include various transient operation cases including start-up(s), shut-down, turn-down and equipment / compressor train failure etc.
- 1.1.15.6. **Noise Control**
 - 1.1.15.6.1. Vendor shall design the package to achieve an overall sound pressure level as stated in tender.
 - 1.1.15.6.2. Equipment noise level (Driver + Driven Equipment train + auxiliaries) shall not exceed 85 dBA when measured at 1 m distance from the equipment skid in any direction.

- 1.1.15.6.3. Where the standard design exceeds the specified limits, the Vendor shall recommend and provide the options for low noise equipment, in addition to attenuation devices (cladding etc.) to meet the noise criteria. Acoustic hoods shall not be used for any equipment.
- 1.1.15.6.4. A Noise Control Data Sheet is included in the Technical Requisition, and this shall be completed by the Vendor and provided along with the offer.
- 1.1.15.7. Utility Piping
 - 1.1.15.7.1. Owner will provide single termination of each utility type (Supply /Return) near to the motor package battery limit for all utilities namely Nitrogen, instrument air, cooling water etc.
 - 1.1.15.7.2. All interconnecting piping, distribution piping to various consumption points within vendor's battery limit, tubing, supports including isolation valves at the tie-up points of vendor's battery limit shall be engineered, designed and supplied by the vendor. Pipes and tubes shall be supplied prefabricated where feasible and as a commercial length, where prefabrication is not possible due to general erection constraints.
 - 1.1.15.7.3. In case requirement of vents to safe location, complete piping with valves, fittings etc. within the package battery limit (manifolded for individual skid) shall be terminated by the vendor for further routing to safe elevation outside the compressor house by others.
 - 1.1.15.7.4. Vendor shall terminate all the drains at the grade level with isolation valves for further connection to Owner CBD system/OWS system. Vendor shall manifold all the drains (to be connected to same UG point) of each skid and terminate the same at grade level with isolation valve for further connection to Owner CBD system/OWS system.
 - 1.1.15.7.5. Vendor shall manifold all the flare vent connection (with necessary individual isolation valves, individual check valves, flow orifice etc.) to a single header and terminate as an interface connection at compressor package battery limit.
 - 1.1.15.7.6. Lube oil piping between motor & Lube oil console and overhead lube oil run down tank is in vendor's scope including supports within the package. Lube oil piping shall be SS316/SS316L, as per API 614 and attached LOS data sheet.
 - 1.1.15.7.7. The space considered for the high speed motor package is indicated in the layout attached with tender. The auxiliary equipment shall be so arranged within this area such that enough space is available around each equipment for ease of operation and routine maintenance. The lube oil system shall be common for the compressor and HV Motor. Vendor is required to review the layout attached with this material requisition and furnish specific confirmation of acceptance of the proposed layout including the compressor shed sizing, span of columns, deck elevation, span for crane movement, crane hook height and crane capacity etc.
 - 1.1.15.7.8. All piping inside the vendor supplied LO console shall be as per relevant API standards. Balance piping i.e. interconnecting piping within the vendor's scope of supply shall conform to the Piping specifications and referenced codes and standards.

- 1.1.15.7.9. All interconnecting piping between the consoles and motor shall be engineered, designed, prefabricated, painted, tested and supplied by the vendor. Erection by Owner at site. 3D modelling shall be done by vendor for entire package in E3D version 2.1. Details related to database range, standard project naming convention shall be provided by Owner to successful bidder.
 - 1.1.15.7.10. Piping supplied by Vendor shall comply with the PMS requirements attached with tender. In case of non- standard size of terminal flange the mating piping flanges, gasket and connecting bolts & nuts shall be supplied by vendor along with reducer / expander to standard pipe size.
 - 1.1.15.7.11. All piping in vendor's scope shall be prefabricated (to maximum extend and left with minimum welding work at site), painted, tested and shipped to site, requiring the minimum erection activities facilitating just the hook up as per vendor's isometrics. 10% pipe length for site adjustment to be provided by vendor.
 - 1.1.15.7.12. For small piping sizes (1.5" & below) shall be supplied in commercial lengths along with all required pipe fittings & flanges. The relevant isometrics, G.A drawing, piping layout drawing, fabrication procedures, and testing requirement required at site shall be furnished by vendor during detailed engineering stage.
- 1.1.15.8. **Instrumentation and Control System**
- 1.1.15.8.1. All instrumentation shall conform to various specifications listed in tender. Vendor shall furnish all instrumentation and controls as specified in the instrument specifications, P&IDs, data sheets and project specifications attached with Tender.
 - 1.1.15.8.2. Compressor Control Systems
 - 1.1.15.8.2.1. The existing Compressor is provided with anti-surge and performance controllers. Vendor to align with existing compressor control system with the proposed VFD.
 - 1.1.15.8.2.2. Vendor shall be totally responsible for any coordination with controller supplier in realizing the compressor controls and anti- surge for safe and reliable operation of the compressor.
 - 1.1.15.8.3. Use of switches is restricted for the project.
 - 1.1.15.8.4. All TRIP interlocks shall be implemented in ESD and control/ monitoring loops connected to DCS.
 - 1.1.15.8.5. Vibration, Axial displacement, Key Phasor, bearing temperature, winding temperature & other critical parameters of lube oil system and process parameters etc. shall be provided as DCS input in control room through serial interface / hardwired.
 - 1.1.15.8.6. The machine monitoring system shall be provided with online monitoring system with fault diagnostic capabilities and continuous recording of vibrations. The system and accessories shall comply with safety and code requirement for area classification of the designated unit.
- 1.1.15.9. Electrical

1.1.15.9.1. Compressor shall be driven by high speed HV main induction motor through variable frequency drive.

1.1.15.9.2. All electrical items supplied by Vendor for this package shall confirm to the following technical requirements attached with Tender :-

- Technical Specifications for Motor
- Additional Technical specifications for VFD (Specifications mentioned in this document for VFD shall super-seed the general specifications for VFD in case of any contradiction.)
- General specifications for VFD.
- General Specifications for Cables
- General Specifications of HV Switchboard.
- General specifications of Numerical Relays
- Design philosophy for electrical system

1.1.15.9.3. Re-acceleration requirement shall be considered by vendor for LT Motors such as:

- Small Lube Oil pumps, Cooling water pumps, air blowers etc.
- Any other critical drive motors, which can damage the equipment.

1.1.15.10. Safety

1.1.15.10.1. Equipment design and engineering shall incorporate adequate safety features (as per applicable specifications of respective equipment as well as environment codes (if any) and standards applicable for the subject project) to provide protection to equipment and environment.

1.1.15.10.2. Thermal relief valve shall be provided for components that may be blocked in by isolation valves (including any cooling water return circuit piping of cooler or jacket). Set pressure for thermal relief valve shall be less than or equal to design pressure of cooling water return header as indicated in relevant documents attached.

1.1.15.10.3. All controls shall operate in a fail-safe mode.

1.1.15.10.4. All Electrical Devices shall meet the requirement for the specified area classification in which they are installed.

1.1.15.10.5. All machine/Process related trips shall be based on 2 out of 3 (2oo3) voting logic as specified in data sheet for control and instrumentation, PID and instrument specifications.

1.1.16. Testing and Inspection

1.1.16.1. Inspection and Test requirements have been detailed out in data sheets, specifications / ITPs for various equipment and shall be in accordance with the reference codes and standards. Vendor shall prepare detail ITP during detail engineering in compliance with the requirements specified in tender. The same will be reviewed / Approved by the Owner, during detail engineering.

1.1.16.2. Vendor shall submit details of all test procedures for approval by Owner. Rejections made by Owner's inspector, based on inspection or tests shall be final. Acceptance by the inspector in no way release the vendor from

guarantees as to materials, workman-ship and performance of the equipment inspected.

- 1.1.16.3. The Owner reserves the right to inspect every component or item, which will form part of the high-speed motor package. Inspection will be performed by Owner and / or his nominated representative.
- 1.1.16.4. Vendor (and all sub vendors) shall give the Owner and / or its nominated representative, without charge, all reasonable facilities and access for the purpose of inspecting the equipment to ensure that it is manufactured in accordance with the requisition, drawings, technical specification and QA / QC procedures and practices.
- 1.1.16.5. The Inspection & Testing at package vendor shop and their sub-supplier shop shall be witnessed by IOCL Approved TPIA. The TPIA charges for the same shall be considered by Vendor in their basic scope of supply and cost for the same shall be provided separately in the commercial bid.
- 1.1.16.6. List of Owner approved Third party inspection agencies are specified in tender. Vendor to verify with the Owner on latest list of TPIA empanelled with IOCL prior to engaging their services.
- 1.1.16.7. The following major tests shall be witnessed by Owner/ IOCL approved TPIA inspector as a minimum:
 - Mechanical run test of motor & VFD at manufacturer's works with main and spare motor
 - Performance test of VFD at manufacturer's works
 - Unitisation of all components in the drive train.
 - Functional/Simulation test of control panel at control panel manufacturer's works.
 - Functional test of lube oil console.
- 1.1.16.8. Inspection and tests: Respective inspection test plans indicated in the technical specification attached with tender. Vendor/Manufacturer may add additional test/inspection as per their own experience to those ITPs with red mark-ups and furnish to owner for the purpose of review.
- 1.1.16.9. Further, for the instrument which is not included in technical specifications, Manufacturer shall furnish standard and proven ITP from Vendor/Manufacturer to Owner for information. For all such cases, Vendor/Manufacturer shall ensure safe and efficient functionality of supplied instrument after being tested and inspected as per standard and proven ITP. Any new ITP/Format for instrument item shall not be reviewed by Owner. Manufacturer shall update the same ITP for any new addition/requirement for instrument items.
- 1.1.16.10. Rotor insensitivity in accordance with relevant Clause of API 617 shall be demonstrated on either main rotor or spare rotor irrespective of the separation margin between critical and operating speeds. All actual critical speeds below the trip speed shall be verified during shop test.

1.1.17. Project Co-ordination Meetings

- 1.1.17.1. Pre-bid technical clarification meeting
 - 1.1.17.1.1. IOCL may consider hosting a Pre-bid meeting at their own discretion.
 - 1.1.17.1.2. The pre-bid meeting shall be limited to clarify vendor 's understanding with respect to the requirements specified in tender.

1.1.17.1.3. Vendor shall furnish their clarification in advance for review & consolidation before the pre-bid meeting

1.1.17.2. Post Award Meetings

1.1.17.2.1. Vendor shall include in his scope the costs to participate in multiple post award meetings such as kick- off meeting, HAZOP / SIL study, Model Review, Design / progress review meetings etc. as necessary in Owner / Site offices. These costs shall be all inclusive of travel, room, board, meeting preparation, attending meetings, responding to clarification requests and performing equipment or software modifications necessary to implement the mutual agreements made in the meeting. Vendor and Subcontractor's specialists shall attend as required.

1.1.17.3. Pre-Inspection Meeting

1.1.17.3.1. A Pre-Inspection Meeting will be scheduled as soon as the Vendor has completed selection of the major Sub-Suppliers and fabrication methods.

1.1.17.3.2. The meeting will be attended by the Owner's designated representatives, (including Engineering, Inspection, Expediting, and Quality Management).

1.1.18. Performance Guarantee

1.1.18.1. The guaranteed point shall be as specified in the equipment data sheet.

1.1.18.2. Power shall be guaranteed with ZERO positive tolerance including instrumentation and measuring tolerances and losses. The same shall be demonstrated during performance test at vendor shop. Also refer Power Loading and Penalty Criteria for Rotating Equipment attached with tender for more details.

1.1.18.3. Vendor shall also guarantee all other utilities consumption like water, nitrogen, air etc. Same shall be specified in his offer on not to exceed basis.

1.1.19. Field Trial Test (Performance Run Test)

1.1.19.1. The Field trial test (Performance Run Test) must satisfactorily demonstrate that the equipment performs at site in a fully satisfactory manner. Test procedure shall be submitted for Owner review/comments well in advance. The Vendor shall witness the performance run test.

1.1.19.2. Field trial test at site shall be done under the supervision of the vendor. This test shall be done to ensure satisfactory performance, safe, smooth, reliable operation, mechanical integrity of the complete package.

1.1.19.3. Modifications/additions/changes as required to resolve/correct any fault in the package, detected during field trial test shall be in vendor's scope without any time/cost implications to the Purchaser.

1.1.19.4. Duration of field trial test for package shall be 72 hours. The duration of 72 hours shall be on sustained basis i.e. process interruptions shall be allowed to cumulate, however machine related interruptions shall not be counted.

- 1.1.19.5. If any additional equipment/instruments are necessary in addition to those in vendor's scope of supply for the purpose of testing & measurement during field trial test, vendor shall bring them to site duly calibrated and shall take them back after successful completion of the field trial test. All utility and safety systems shall be operating during the test.
- 1.1.19.6. The high speed motor along with VFDs shall be integrated with existing compressor and existing DCS/PLC panel, hence site performance run test (PRT) shall be performed to observe proper operation of VFD & motor along with existing compressor.
- 1.1.19.7. Following minimum tests shall be performed in PRT
- Visual Inspection
 - Testing of Control / signals
 - Alarm/ fault diagnostic
 - Speed / frequency regulation
 - Rated Voltage/current / Power operation
 - Integration of External signals and indication/alarm signals on converter
 - Earthing of cubicles and cubicle doors of VFDs
 - Insulation Test
 - Polarisation Index test
 - Motor Load and Functional Test
 - Configuration of Protective Devices
 - Performance of motor along with compressor without any trouble and issue.
 - Integrated operation and simulation with DCS panel
 - Following parameters (but not limited to) shall be observed/recorded during PRT
 - Bearing & shaft vibration of motor & compressor.
 - Vibration on base frame, foot & body of motor & compressor.
 - Bearing temperature motor & compressor
 - Body temperature of motor & compressor.
 - Winding temperature of motor.
 - Electrical parameters of motor & VFD.
 - Process parameters of Compressor.

1.1.20. Spare Parts

- 1.1.20.1. Following Purchase Order Placement, the Vendor shall provide the information required for all spares and special tools into a project specific format. This information shall be entered and transmitted to IOCL within an agreed period after Purchase Order Placement.
- 1.1.20.2. For instrument items, Vendor shall follow minimum requirement as specified in main package specification, licensor requirement and shall also meet instrument spare philosophy.
- 1.1.20.3. Commissioning Spare Parts
- 1.1.20.3.1. Vendor's scope of supply shall include all commissioning spares (mechanical, electrical and instrumentation) for the high-speed motor

package as deemed necessary by vendor. Vendor shall include the list of such spares in his proposal. Vendor to note that in case any of the spare is consumed over and above the quoted commissioning spares, the same shall have to be replaced/supplied free of cost by the vendor. All commissioning spares not consumed are property of IOCL.

1.1.20.3.2. The cost of the commissioning spares shall be included in base price.

1.1.20.4. Mandatory Spare Parts

1.1.20.4.1. As a minimum, vendor shall quote for the mandatory spare parts for the complete package including all auxiliaries as defined in the tender. Cost of these mandatory spares shall be added to the total cost for evaluation purposes.

1.1.20.4.2. The list of mandatory spares is attached.

1.1.20.5. 2 Years Operation & Maintenance Spare Parts

1.1.20.5.1. Vendor shall furnish an itemised list of recommended spare parts with unit prices for two years normal and continuous operation of the complete high-speed motor package (including mechanical, electrical and instrumentation spares), required over and above the mandatory spares. Two year spares shall be ordered by the IOCL separately and will not be considered for evaluation.

1.1.20.6. Special tools & Tackles

1.1.20.6.1. Vendor's scope of supply shall include supply of all special tools and tackles required for transportation, erection, complete and easy maintenance of the complete package including lifting attachments, tools and tackle, rotor stand, shaft extension system, Spader beams, stator tray, spreader bars and frames, transport cradles and containers as applicable as well as power tools required for all bolts greater than 32 mm diameter. The cost of the same shall be included in base price.

1.1.21. Consumables

1.1.21.1. First Fill

1.1.21.1.1. First fill of lubricant is not included in vendor scope of supply, the same will be procured by Purchaser separately.

1.1.21.1.2. Vendor shall provide lubricants summary for recommended lubricants for all equipment within their package and prepare a consolidated Lubricants list, post award, indicating the grade, quantity and schedule.

1.1.21.1.3. Vendor shall recommend the IOCL (SERVO) equivalent grade of lube oil. The flushing of the motor bearing housing during commissioning shall be with fresh oil. The lube oil used for flushing shall be base lube oil only (Oil without special additives).

1.1.22. Supervision during erection, testing and commissioning

- 1.1.22.1. The Vendor shall provide his services for supervision during erection, testing and commissioning. During erection, testing and commissioning of the motor and VFD, representatives of motor and VFD manufacturer shall also be present along with the electrical and instrumentation engineers (as required). The Supervisory cost of 60 man-days shall be considered (Vendor may decide between days for Indian / Foreign Supervisors and also discipline wise for total of man-days for this package) for the purpose of commercial comparison. The Vendor shall indicate in his proposal the cost of providing above services on per diem basis. However, the payment shall be done on the basis of actual man-days consumed at site. Presence of bought out component OEM / Vendor at site will be on need basis and criticality of equipment as decided by IOCL, based on site requirement.
- 1.1.22.2. Vendor shall submit bio-data of Key Supervisory Personnel, who shall have prior experience of commissioning such systems will be reviewed and approved by Owner.
- 1.1.22.3. All key personnel employed at the site by the Vendor shall be considered essential to the performance of the work, and all key staff shall be subjected to approval of Owner. However, such approval shall not relieve the Vendor of any of his contractual obligations. The Owner shall have the authority to order the removal of personnel from site, the replacement of such personnel shall be carried out by the Vendor within 3 (three) days from the notification from OWNER. If key personnel becomes unavailable for assignment to the work for reasons beyond the Vendor's control, the Vendor shall immediately notify the OWNER to evaluate the impact on the project. Prior to substitution or addition of any key personnel, the Vendor shall obtain OWNER's written consent as to the acceptability of replacements or additions to such personnel. The Vendor shall at all times be fully responsible for the acts, omissions, defaults and neglect of all his representatives, agents, servants, workmen and suppliers and this of his Sub-Contractors.

1.1.23. Customer Training

- 1.1.23.1. Training at site – The training program will comprise of classroom training and explanation of details of main equipment along with associated auxiliaries including MMS (Vibration monitoring) and VFD system etc. The group to be trained will comprise of persons from various disciplines such as Operation, Mechanical, Electrical & Instrumentation etc. All required facilities for classroom training at site shall be provided by Owner. Training is to be provided to Owner at no extra cost.

1.1.24. Drawings and Other Data Required

- 1.1.24.1. Vendor shall provide drawings and documents as stated in Vendor Drawings and Documents List included in this tender.
- 1.1.24.2. During engineering approval, the drawings / documents shall be submitted the collaboration tool. In addition, hard-copies (paper prints) shall be submitted according to the details indicated below:-

Documentation Type	Number of Sets
Draft Construction Documentation (for approval)	Electronic Submission
Construction Documentation (after approval)	6 Hard + 2 Soft Copies Sets to Owner
Draft Final Documentation (for approval)	Electronic Submission
Final Documentation (after approval)	6 Hard + 2 Soft Copies Sets to Owner

1.1.24.3. Structure of documentation binders

1.1.24.3.1. The documentation binders shall be structured in sections A, B and C as described in the following table (CON = Construction Documentation / FIN = Final Documentation)

Section A, Design documents

Group No.	Examples for the documents which are part of the defined group no.	Part of Documentation	
01	Block diagrams, flow diagrams, piping and instrumentation diagrams (PIDs), process flow diagrams (PFDs), overview diagrams (as applicable)	CON	FIN
02	Foundation data, fixing plate details, anchoring data, mounting details (as applicable)	CON	FIN
03	Overall arrangement diagrams, general arrangement drawings, overall layout, plot plan etc. (as applicable)	CON	FIN
04	Detailed drawings, part lists, detailed assembly drawings, sectional views, calculations (as applicable)	CON	FIN
05	Fabrication instructions / procedures, welding instructions, heat treatment instructions and other fabrication instructions (as applicable)	CON	FIN
06	Packing / transportation, storage and preservation instructions (as applicable)	CON	FIN
07	Electrical and instrumentation documents, switching and control diagrams, interlocking diagrams, wiring / circuit and terminal diagram, hook-ups (as applicable)	CON	FIN
08	Special documents / product catalogues, catalogues of installed single components, hydraulic diagrams (as applicable)	CON	FIN

Section B, Operating and maintenance instructions

Group No.	Examples for the documents which are part of the defined group no.	Part of Documentation	
09	Installation and erection instructions, sequence of assembly and erection, installation drawings	CON	FIN

10	Operating and maintenance instructions or user manuals incl. recommended spare parts and lubricants	-	FIN
11	Spare Parts List (unpriced)	-	FIN
12	List of Lubricants / Feedstock's	-	FIN

Section C, Fabrication verification and inspection documents

Group No.	Examples for the documents which are part of the defined group no.	Part of Documentation	
13	Test certificates and inspection reports, fabrication and inspection documents manufacturer's declaration, declaration of conformity, evidence of origin, test reports and material test certificates, tkIS non-conformance report	-	FIN

- 1.1.24.4. Vendor shall complete the Equipment datasheets listed in tender for all equipment being supplied.
- 1.1.24.5. Specific project philosophy regarding equipment tag numbering, instrument tag numbering, P&ID numbering, standard symbols and nomenclature (lines numbering, service designations, insulations, general abbreviations, instrument symbols and legend), instrumentation requirement, PSV sparing and isolation philosophy, typical cooling water piping and instrumentation for coolers, minimum nozzle ratings and size requirements for equipment such as vessels, exchangers etc. shall be provided to successful bidder. Vendor to comply these requirements.
- 1.1.24.6. Equipment General arrangement drawings shall have the following minimum information available on it –
 - Compressor unit outline dimension and train arrangement of the package, location and dimension of compressor, driver and all related auxiliary system
 - Clearance / space for maintenance and disassemble of compressor package like compressor casing, Compressor rotor, Motor and related auxiliaries, Gearbox and Dry gas seal etc.
 - Location of auxiliary skids with respect to main compressor, relative distance between them and Consoles (if common) w.r.t Plot plan
 - Weight of each component such as motor, auxiliary skids, control panels etc.
 - All battery limit tie in connections, including auxiliary connections for the utilities for cooling systems, pressurization system shall be shown on the equipment GA drawing and a list of all battery limit connections to be furnished for the complete package, indicating size, rating, material specification, location and elevation on the equipment GA drawing.
 - Maintenance space requirement, list of maintenance components, heaviest maintenance part to be lifted by E.O.T. crane, minimum hook height of crane, platform cut-out opening details etc.
- 1.1.24.7. Equipment Foundation drawing shall have the following minimum information available on it –

- Overall Foundation Dimensions Length, Width, Height and location of each foundation with respect to reference for all package foundations like Main motor, lube oil consoles, etc.
 - Location of all anchor bolt pockets from known reference.
 - Static weight of all equipment mounted on foundation
 - Dynamic loads generated by rotating machinery (Compressor, Driver etc.) in X, Y and Z direction frequency of dynamic load for foundation design and allowable foundation vibration level
 - Dynamic load (Normal & transient) for each Anchor bolt points in x, y & z direction
 - Static and Dynamic pad loads for foundation design also dimension of baseplate with anchor bolts holes' location, specification and numbers.
 - A composite diagram or data on expected thermal growth / nozzle displacement in X, Y & Z direction for normal and maximum operating temperature, including transient effects for foundation design.
 - Location of centre of Gravity for all equipment like Motor, VFD and Lube Oil Console
 - Dimensional details of each anchor bolt pocket like depth, length and width.
 - Grout details like type, quantity and extent
- 1.1.24.8. Over and above what is specified elsewhere, the following performance characteristics shall be furnished for motor with the bid:
- Speed-Torque curve
 - Efficiency Curve
 - Current curve
 - Output Power Curve
 - Torque-slip curve
- These characteristic curves shall be furnished from the min. speed up to 105% of rated speed (with the increment of 5%).
- These curves shall also be furnished for various cases of operation specified in the data sheet including start up cases.
- 1.1.24.9. Following Piping and instrumentation diagrams (P&ID) shall be submitted as a minimum
- P&ID shall be provided oil, water, nitrogen, air systems etc.
 - Separate P&ID shall be provided indicating all controls & instrumentation required for safe operation of the equipment.
 - Vendor 's piping and instrumentation diagrams for the compressor and auxiliary systems shall include the following as a minimum
 - Process information showing flow rates, pressures and temperatures.
 - All instrumentation requirements for operation showing functions range, set points etc.
 - All piping sizes and equipment sizes.
 - Equipment specifications e.g. exchanger duties, pump capacity and pressure etc.

- All normal operating levels and maximum high or low levels in tanks or vessels.

1.1.25. Proposals

- 1.1.25.1. Duly filled-in offer completeness checklist in complete compliance with requirements.
- 1.1.25.2. Proposal shall also include completely filled vendor experience record proforma complying to the qualification criteria along with all required documents.
- 1.1.25.3. P&ID's furnished along with the offer for motor and auxiliary systems shall be retained for information only and shall be subject to review during detail engineering.
- 1.1.25.4. The following data sheets pertaining to rotating equipment shall be subject to review during detail engineering:
 - Lube oil system data sheet
 - Lube oil pump data sheet
 - Lube oil cooler data sheet
 - Coupling data sheet

However, deviations if any to basic requirements specified in the datasheets and applicable API standards shall be highlighted in the bid and shall be subject to approval of IOCL.

1.1.26. Surface Preparation, Coating and Insulation

- 1.1.26.1. Surface preparation of equipment like Motor and other auxiliary skids, exposed steelwork and fabricated items including baseplates, supports, vessels, external piping and valves shall be in accordance with relevant standards.
- 1.1.26.2. Any equipment, vessels and piping that require insulation shall be insulated in accordance with the standards for Insulation. Equipment shall be coated prior to the installation of insulation. Insulation shall be suitably protected to prevent transport related damage.

1.1.27. Preparation of Shipment

- 1.1.27.1. The Vendor shall prepare equipment for packing, preservation, shipment and long term storage suitable for the transportation and site conditions.
- 1.1.27.2. Export seaworthy packing shall provide maximum mechanical protection. Packing shall be designed to protect equipment from rough handling, deterioration and damage, from the Vendor's point(s) of issue, during transit (via sea, river, air or road transport), stowage and storage, to final delivery at site.
- 1.1.27.3. The Equipment shall be packed for an outdoor storage period of 12 months.
- 1.1.27.4. Vendor shall obtain necessary dispatch clearance from Owner before dispatching any material to site.
- 1.1.27.5. Equipment Vendor shall ensure the below before dispatch.
 - All the openings shall be plugged and sealed condition during dispatch

- Instruments like gauges, speed indicators, probes, oiler, etc. shall be removed from the main equipment and dispatched separately (with due identification tags attached to each such items) to avoid the damage of these components during transportation, handling and erection
- In addition to normal packing, skids shall be separately covered with transparent polythene cover with opening for piping

1.2. Standards

- 1.2.1. All Equipment / items included within the HPC High Speed Motor package shall be designed, manufactured, tested and supplied strictly in accordance to the applicable standards, data sheets, Licensors specifications, this job specification, P&IDs, design basis and all specifications as listed in tender as well as other referenced codes, standards and recommended practices.

1.3. Order of Precedence

- 1.3.1. Any conflicts or ambiguities among the Referenced Documents and this Material Requisition shall be notified immediately to Purchaser / Consultant and a written decision shall be obtained prior to starting the related work. Purchaser / Consultant decision in this regard shall be final and binding on Vendor without any cost and schedule implication to the Purchaser.
- 1.3.2. In general, following order of priority shall be followed:
 - i. Local regulatory and statutory requirement
 - ii. Licensor Requirements (Datasheet, P&ID)
 - iii. Datasheets and Job/Technical specifications
 - iv. Design basis
 - v. Project specifications & General Engineering Specifications
 - vi. Codes and standard

1.4. Deviations / Exceptions

- 1.4.1. Vendor shall make all possible efforts to comply strictly with the requirements of this requisition. Deviations, if any, required by vendor shall be separately consolidated under "List of Bidder's Exception/ Deviations " with specific references to Document no., Page no., Clause no./Para no.,Line no. etc. of the applicable document to which deviation applies, along with adequate reasons / justification for each deviation. Deviations which can be withdrawn with additional cost and time shall not be considered and treated as withdrawn. Further, vendor shall furnish a statement, that except for the deviations furnished by him in the Annexure-3, his offer is in total conformity with all requirements of this enquiry documents. No deviation shall be entertained after the award of contract.

- 1.4.2. Any comment, deletion, correction on the body of the data sheets/specifications will not be taken cognizance of and all such deviations shall be deemed to have been withdrawn.

1.5. Operation Philosophy (High Speed Motor Package)

- 1.5.1. The complete High-Speed Electric Motor package shall be started manually from field using the local control panel (LCP) located near the main equipment.
- 1.5.2. The LCP shall be provided with all indications, which are required for start-up and health monitoring of the machine. Only start-up and shutdown shall be done from local panel. The LCP shall have provision for normal stopping of the compressor. The LCP will be provided with Local display for viewing the MMS.
- 1.5.3. Emergency stopping shall also be possible from main control room (MCR). Further there shall be separate Emergency STOP push button in the field, wired to ESD.
- 1.5.4. The existing Anti-surge control and Performance control for the compressor shall be integrated with the motor package by the Vendor (Bidder). The other signals shall be wired to DCS for indication/control as applicable. The present instrumentation and controls are shown in attached P&ID and only to be used as reference. Detailed P&ID with necessary instrumentation and control as required for safety and efficient operation of the compressor-motor system shall be provided by the Vendor.
- 1.5.5. All safety related interlocks shall be implemented in the main plant ESD. All transmitters involved in tripping of high-speed motor shall be in 2oo3 configuration.
- 1.5.6. Anti-surge controller, Performance Controller, MMS system, Overspeed protection system, vibration / axial displacement and temperature monitoring system, etc. shall be located in separate dedicated cabinet (UCP) and installed in SRR.
- 1.5.7. Communication between the above controllers and DCS shall be via redundant MODBUS TCP/IP/RS485, which shall be confirmed during engineering. Signals from MMS to ESD for tripping of motor shall be in 2oo3 configuration. Any signals from DCS to ASC/Capacity/Performance controller for control purposes shall be hardwired.
- 1.5.8. Lube oil system shall be started manually from local control station by selecting "AUTO/MANUAL" stay put selector switch in manual position. The auto start of lube oil pump is implemented in main plant ESD. The pump Run / Stop indication are provided at LCP and DCS.

1.6. Site and utility data

1.6.1. Site Conditions

Site Conditions	
Installation	Mathura Refinery, Mathura
Altitude	<1000m above sea level
Relative humidity	<95%
Indoor operating temperature	+5°C to +45°C
Outdoor air temperature range	-20 to +50°C
Ignition temperature class / Gas group	Zone 2, Group IIA, IIB, T3
Seismic Zone	Zone IV as per IS 1893
Atmosphere	Corrosive (Sulfur)

2. Acceptance Criteria for Equipment

2.1. Acceptance criteria for High-Speed Motor

- 2.1.1. The high speed motor model offered shall be from the existing high speed motor model series and shall be from the regular manufacturing range of the Bidder and shall meet the tender specifications.
- 2.2. Vendor to note that the offer submitted by them shall be evaluated on the basis of offers meeting the qualification requirements of the main equipment (i.e. high speed motor, VFDs etc.). The information required to satisfy the qualification requirements for auxiliary/bought out items shall be submitted post order after finalising the details of such bought out equipment, however no deviations to the specification requirements shall be acceptable.
- 2.3. The Bidder shall also be the packager of the complete system proposed and shall have single point responsibility for the entire package.
- 2.4. The supervisor for erection, commissioning & field testing activities of the high-speed motor package shall have the experience of having installed/erected, pre-commissioning and commissioning of similar machinery packages.

3. Schedule of Delivery

Refer NIT.

4. Loading and penalty criteria

- 4.1. Loading & Penalty Criteria shall be applicable as per Annexure attached with Job Specification.
- 4.2. The parameter for loading shall be the guaranteed BkW (with 0% positive tolerance) of high speed motor at guaranteed (certified) operating case specified in the data sheet.
- 4.3. The guaranteed power given by the vendor in his offer shall be the value taken for loading purpose. Vendor will not be allowed to change guaranteed power consumption value specified in his offer for any reason during offer evaluation or detail engineering stage. However, in case, during offer evaluation stage, power calculations are found to be incorrect by the Purchaser only increase in the guaranteed power shall be permitted and reduction in guaranteed power in any case shall not be allowed. In case, the power is found lower than quoted value in the bid, the value quoted in the bid shall be considered for evaluation.

5. Make of equipment / component / materials

- 5.1. The Vendor shall procure and supply the items covered in their scope from the approved vendors. Wherever an item is specified or described by a particular brand name, manufacturer or vendor, the specific item mentioned shall be for establishing type, function and quality desired. Other manufacturer's products will be considered, provided sufficient information are furnished to the Owner to assess the products proposed as equivalent and acceptable. Vendor shall take prior approval from Owner for procuring such items, which are not covered under Master Vendor list included in the tender.
- 5.2. Original equipment manufacturer (OEM) of the existing HPC Compressor is BHEL (Bharat Heavy Electricals Limited).
- 5.3. Original equipment manufacturer (OEM) of the existing HPC Steam Turbine is BHEL (Bharat Heavy Electricals Limited).

6. Requirement of NDA

- 6.1. Any other technical documents of compressor & Turbine OEM (if required) by the bidder, shall be provided by IOCL (as available with IOCL Mathura Refinery) upon submission of Non-Disclosure Agreement (on Rs 100 stamp paper) to the tendering department of IOCL as per the NDA format annexed with the tender.

7. Annexures

7.1. **Annexure-1** : Scope of Supply & Services for HPC High-speed Motor Package- Check List

7.2. **Annexure-2** : Vendor Drawings and Documents List (VDDL)

7.3. **Annexure -3** : List of Mandatory Spare Parts

7.4. **Annexure-4** : Loading and Penalty Criteria

7.5. **Annexure-5**: Format for Lubrication Schedule

7.6. **Annexure-6** : Vendor List (CPMSL)

7.7. **Annexure-7** : CPWAMC Conditions

7.8. **Annexure-8** : Detailed Specification

- General specifications for HV VFD
- General Specifications for HV_MV Cables
- General Specifications for HV Switchboard
- General Specifications for Numerical Relays
- General specification for LV_MV Motors
- Additional Technical specifications for VFDs
- Technical specifications for HV motors
- Electrical Design Basis

7.9. **Annexure-9** : List of technical documents, drawings attached

- HPC Equipment Layout
- Foundation drawings
- Existing HPC PFD & P&I
- HPC Compressor Details

7.10. **Annexure 10** : Experience Record Proforma

IOCL, MATHURA REFINERY

ANNEXURE-2

VENDORS DRAWINGS AND DOCUMENTS LIST FOR HPC HIGH-SPEED MOTOR
PACKAGE

VENDORS DRAWINGS AND DOCUMENTS LIST FOR HPC HIGH-SPEED MOTOR PACKAGE

Vendor shall include the supply of all Drawings and Documents to define the Equipment supplied for the purposes of:

- Integration into the Plant Design
- Code Compliance
- Regulatory Authority Approval
- Installation, Operation and Maintenance

The Scope of the Drawings and Documents shall include, but shall not be limited to, the drawings and documents listed in the following table, which also defines the due dates and the inclusion in the Manufacturing Data Book and Installation, Operation & Maintenance Manual requirements.

(For due dates of drawing submission vendor to refer to remark column. e.g. LOI (Letter of Intent) + 4 weeks indicates that document shall be submitted latest by 4 weeks after LOI).

The Vendor Drawings and Documents List (VDDL) shall be further developed jointly by Owner and Vendor after order placement. The schedule of document submission shall be further discussed and mutually agreed during kick off meeting.

VENDORS DRAWINGS AND DOCUMENTS LIST FOR HPC HIGH-SPEED MOTOR PACKAGE

The following drawings and documents marked “✓” shall be furnished by the vendor.

SR. NO.	DESCRIPTION	WITH BID	POST ORDER			REMARKS
			FOR REVIEW	FOR RECORD	WITH DATA BOOK (FINAL)	
A	General					
1	Document Control Index		✓		✓	First document to be submitted by the vendor post order (Refer Note-11)
2	Production schedule / bar chart for the project execution	✓	✓			
3	Experience Record Proforma (duly filled in) of High Speed motor driven by VFD	✓				
4	List of similar installations	✓				
5	Leaflet/Catalogues	✓				
6	List of Deviations to applicable standards, data sheets and project specifications in format attached with tender	✓	✓			
7	Fortnight Progress Report		✓			Every 2 weeks
8	Unpriced PO copies for major bought-out Items		✓		✓	LOI + 8 weeks and progressively there after
B	Completed Package Data Sheets and Performance Curves					

**VENDORS DRAWINGS AND DOCUMENTS LIST
FOR HPC HIGH-SPEED MOTOR PACKAGE**

SR. NO.	DESCRIPTION	WITH BID	POST ORDER			REMARKS
			FOR REVIEW	FOR RECORD	WITH DATA BOOK (FINAL)	
9	High Speed Motor datasheet along with performance curves (for all Operating cases).	✓	✓	✓	✓	LOI + 4 weeks
10	Data sheets for VFDs with I/P Transformers and I/P & O/P breaker panels	✓	✓	✓	✓	LOI + 6 weeks
11	Completed datasheets for all auxiliary equipment (lube oil system, lube oil pump/motor, lube oil cooler, coupling, noise etc.)		✓		✓	LOI + 8 weeks
12	Auxiliary equipment (Such as oil pump etc.) performance curve		✓		✓	LOI + 6 weeks
C	List					
13	List of Mandatory Spares (indicating exact name of the part, part no. and material of construction)	✓	✓		✓	LOI + 12 weeks
14	List of recommended commissioning spares	✓		✓	✓	LOI + 12 weeks
15	List of recommended Special Tools and Tackles (indicating exact name of the part and part no.)	✓		✓	✓	LOI + 12 weeks
16	List of recommended spare parts for 2 (two) years normal operation and maintenance (with itemized price)	✓		✓		LOI + 12 weeks
17	List of Deviations to specifications / datasheets / standards of tender	✓				Along with Bid

**VENDORS DRAWINGS AND DOCUMENTS LIST
FOR HPC HIGH-SPEED MOTOR PACKAGE**

SR. NO.	DESCRIPTION	WITH BID	POST ORDER			REMARKS
			FOR REVIEW	FOR RECORD	WITH DATA BOOK (FINAL)	
18	Duly filled in checklist scope of supply	✓				
19	Loose supply items in vendor's scope, to be installed in Owner's piping		✓		✓	LOI + 6 weeks
D	Drawings and Documents					
20	Layout and General Arrangement showing high speed motor including all associated auxiliary systems (lube oil system, local control panel, purging system, Overhead / rundown tank etc. along with interface connections / terminal point details including their location coordinates, maintenance space, erection and maintenance weights, capacity and hook height of maintenance crane etc.)	✓	✓		✓	LOI + 6 weeks; Preliminary during bid
21	Foundation drawing of compressor train [i.e. for compressor, high speed Motor, Lube oil console etc.] including details of load points location and their details, foundation load data (static and dynamic), foundation bolts, their location, foundation bolt pocket dimensions and recommended type of grout, grout thickness, make, grade and quantity.	✓	✓		✓	LOI + 6 weeks; Preliminary during bid
22	Foundation drawing of auxiliaries to be installed at grade or at mezzanine floor such as lube oil console, local control panel, run down tank, lube oil accumulators etc.		✓		✓	LOI + 6 weeks

**VENDORS DRAWINGS AND DOCUMENTS LIST
FOR HPC HIGH-SPEED MOTOR PACKAGE**

SR. NO.	DESCRIPTION	WITH BID	POST ORDER			REMARKS
			FOR REVIEW	FOR RECORD	WITH DATA BOOK (FINAL)	
23	P&ID for Utility and Cooling Water Distribution System	✓	✓		✓	LOI + 6 weeks; Preliminary during bid
24	P&ID for temperature & Vibrations monitoring Instruments / system	✓	✓		✓	LOI + 6 weeks; Preliminary during bid
25	Piping & Instrumentation diagrams (P&IDs) for LO System	✓	✓		✓	LOI + 6 weeks; Preliminary during bid
26	List of Owner's interface points with their connection details		✓		✓	LOI + 6 weeks
27	General Arrangement Drawings (certified dimensional outline drawing) for high speed motor			✓	✓	LOI + 8 weeks
28	General Arrangement Drawings (certified dimensional outline drawing) for Coupling			✓	✓	LOI + 8 weeks
29	General Arrangement Drawings (certified dimensional outline drawing) for LO System		✓		✓	LOI + 8 weeks
30	General Arrangement Drawings (certified dimensional outline drawing) for Loose supply piping items, strainer, ASV, PSVs etc. in vendor's scope, to be installed in Owner's piping		✓		✓	LOI + 8 weeks
31	General Arrangement Drawings (certified dimensional outline drawing) for LO Rundown Tank			✓	✓	LOI + 8 weeks
32	Rotor assembly drawing			✓	✓	LOI + 16 weeks

**VENDORS DRAWINGS AND DOCUMENTS LIST
FOR HPC HIGH-SPEED MOTOR PACKAGE**

SR. NO.	DESCRIPTION	WITH BID	POST ORDER			REMARKS
			FOR REVIEW	FOR RECORD	WITH DATA BOOK (FINAL)	
33	Equipment's Nameplate drawing			✓	✓	LOI + 20 weeks
34	Cross Sectional Drawings (with Bill of Materials & Part No's) for High Speed motor			✓	✓	LOI + 10 weeks
35	Cross Sectional Drawings (with Bill of Materials & Part No's) for bearing assembly for high speed motor.			✓	✓	LOI + 10 weeks
36	Cross Sectional Drawings (with Bill of Materials & Part No's) for MOP/AOP, EOP along with their seal assembly.			✓	✓	LOI + 10 weeks
37	Design calculation for any pressure vessel, heat exchanger in the package			✓	✓	LOI + 20 weeks
38	Piping drawings and calculations: '-Piping Layout drawing(s) '-Piping isometrics (all interconnecting lines in vendor scope) '-Pipe support drawing(s)		✓		✓	LOI + 12 weeks
39	Lube oil fill / drain pump documentation			✓	✓	LOI + 16 weeks
40	Lube oil purifier skid documentation			✓	✓	LOI + 16 weeks
41	Utility consumption data including electric load data	✓		✓	✓	LOI + 4 weeks

**VENDORS DRAWINGS AND DOCUMENTS LIST
FOR HPC HIGH-SPEED MOTOR PACKAGE**

SR. NO.	DESCRIPTION	WITH BID	POST ORDER			REMARKS
			FOR REVIEW	FOR RECORD	WITH DATA BOOK (FINAL)	
42	Schedule of lubricants, chemicals and consumables with their specifications.			✓	✓	LOI + 16 weeks
43	Lateral Analysis Reports of high speed motor			✓	✓	LOI + 20 weeks
44	Train Torsional and Lateral Analysis Report (as applicable)			✓	✓	LOI + 20 weeks
45	Dynamic simulation report		✓		✓	LOI + 10 weeks
46	Equipment Noise Report		✓		✓	2 Week After Testing
47	Cause and effect diagram		✓		✓	LOI + 10 weeks
48	Control Narrative including Functional description of package control (including surge control, normal start/stop, alarms, emergency shut-down, sequencing)		✓		✓	LOI + 10 weeks
49	Refer technical specifications attached with the tender - for other vendor data / documents requirements pertaining to Electrical items included in the vendor's scope of supply		✓		✓	
50	Quality Control Plan for the complete package		✓		✓	LOI + 6 weeks
51	Test Procedure(s): Witness tests as specified in data sheets/ other specifications enclosed in the tender or as required by approved ITP/QAP		✓		✓	LOI + 24 weeks
52	Performance Test procedure for High Speed motor		✓		✓	LOI + 24 weeks

**VENDORS DRAWINGS AND DOCUMENTS LIST
FOR HPC HIGH-SPEED MOTOR PACKAGE**

SR. NO.	DESCRIPTION	WITH BID	POST ORDER			REMARKS
			FOR REVIEW	FOR RECORD	WITH DATA BOOK (FINAL)	
53	Mechanical Run Test procedure for High Speed motor		✓		✓	LOI + 24 weeks
54	Painting Procedure		✓		✓	LOI + 16 weeks
55	Rust Prevention Procedure at Supplier's Shop & Shop			✓	✓	LOI + 16 weeks
56	NDT Procedure (Mag. Particle, Ultrasonic, Liquid Penetrant, Radiographic, PMI, etc.)		✓		✓	LOI + 12 weeks
57	Lubricants / Chemicals disposal procedure			✓	✓	LOI + 16 weeks
58	Statutory certificates (e.g. IBR, PESO (CCoE), etc.)		✓		✓	4 week before delivery
59	Pre-commissioning and commissioning procedure for complete system			✓	✓	LOI + 24 weeks
60	Field trial run test procedure		✓		✓	LOI + 24 weeks
61	Test Certificates – Mechanical, Performance Test Reports			✓	✓	
62	Test Certificates – Material Test Certificates			✓	✓	At the time of inspection
63	Test Certificates – Non-destructive test reports			✓	✓	
64	Welder Qualification Certificates			✓	✓	LOI + 12 weeks

**VENDORS DRAWINGS AND DOCUMENTS LIST
FOR HPC HIGH-SPEED MOTOR PACKAGE**

SR. NO.	DESCRIPTION	WITH BID	POST ORDER			REMARKS
			FOR REVIEW	FOR RECORD	WITH DATA BOOK (FINAL)	
65	Welding Book (Weld Procedures, Weld Maps, Procedure Qualification Report)		✓		✓	4 week before delivery
66	Any other Test Report, as required			✓	✓	
67	Test Certificates – Certificate from weights & measure authority of India			✓	✓	
68	Packing List		✓		✓	1 week before delivery
69	Documents for Shipping & Transport (as applicable)		✓		✓	1 week before delivery
85	QC Manufacturing Inspection Dossier		✓		✓	4 week before delivery
86	Installation, Operation and Maintenance manuals for complete high speed motor package containing all certified drawings & documents including prolonged storage procedure			✓	✓	

Notes:

- 1) All drawings, document submission shall be soft copy (thru electronic submission)
- 2) Requirements of drawings, documents submission with final data book shall be as specified in attached tender documents.
- 3) Review of the vendor drawings by Owner would be only to check compatibility with the basic designs and concepts and would in no way absolve the manufacturer /fabricator of his responsibility to meet the applicable codes, specifications and statutory rules /regulations.
- 4) Each drawing /document shall be submitted in project specific standard template only.

VENDORS DRAWINGS AND DOCUMENTS LIST FOR HPC HIGH-SPEED MOTOR PACKAGE

- 5) All drawings shall be clear, legible, in Metric units and in English language only.
- 6) Scope of supply of vendor data/documents for electrical items shall be as per the technical specification. However, schedule of submission of the same shall be in line with vendor data & drawings as listed in this document.
- 7) Scope of supply of vendor data/documents for instrument items shall be as per the Instrumentation specification. However, schedule of submission of the same shall be in line with vendor data & drawings as listed in this document.
- 8) If required by the Owner, during detailed engineering, the vendor may be requested to furnish any of the vendor data /documents (specified under 'For Records' category) earlier than the specified submission schedule. Such requests (if any) shall be complied with by the vendor without any time /cost implications to the Owner.
- 9) While submitting vendor data /documents, the vendor shall ensure that the vendor data /documents pertaining to disciplines such as MECHANICAL, ELECTRICAL and INSTRUMENTATION, shall be submitted through separate transmittals. (clubbing of vendor data /documents of different disciplines in one transmittal is not permitted.)
- 10) In case, the vendor needs to submit his sub-vendor's documents, the cover sheet of such documents /drawing shall be generated by the main vendor and shall have main vendor's unique document number. The main vendor shall also indicate the document number of the sub-vendor's document on the same. Similarly, the sub-vendor's document shall also indicate the corresponding document number assigned by the main vendor for reference. Main vendor shall review all such sub-vendor documents before submitting to Purchaser.
- 11) Vendor shall submit the "Document Control Index (Vendor drawing submission schedule) for each TON /Item No. to Purchaser immediately after the order is placed /LOI.
- 12) It is possible that some of the drawings mentioned above are combined in some other drawings /documents, the same is also acceptable.
- 13) Vendor to note that, documents which are in information /for record category shall be retained for information /records only. It is vendor's responsibility to ensure compliance to all requirements of the specifications. However, Owner reserves the right to comment on the document in case of any ambiguity observed. In such cases vendor shall revise & resubmit the document accordingly.
- 14) Each subsequent revision of document submission shall have Comment Resolution Sheet (CRS) as a mandatory. Only CRS or only revised document submission by vendor will not be considered for review by Owner and will be returned to vendor with rejection stamp.
- 15) Any other information/data as required & necessary by the Owner to carryout engineering, erection and commissioning of the package shall be provided by the vendor during detailed engineering stage.

IOCL, MATHURA REFINERY

ANNEXURE-1

SCOPE OF SUPPLY & SERVICES (CHECK-LIST)
FOR HPC HIGH SPEED MOTOR PACKAGE

SCOPE OF SUPPLY & SERVICES FOR HPC COMPRESSOR HIGH SPEED MOTOR PACKAGE (Check list)					
High Speed Induction Motor with Variable Speed Drive					
Tag Nos: HPC Compressor Motor (18N-KM-201)					
Vendor is requested to fill checklist in this manner only and not to furnish his scope of supply separately. Vendor to sign and stamp this checklist and specifically confirm for the items quoted by them. However, if vendor is unable to provide any specific item, the same shall be highlighted by the vendor in this checklist with proper justification. Vendor shall furnish all equipment, drivers, auxiliary systems, instruments and controls and safety devices as per the enquiry document. Anything required over and above that is specified, for safe and satisfactory operation of the Compressor package shall be included by the vendor in his scope and mentioned in additional sheets attached to this list in the vendor's proposal. Vendor's scope of supply shall include but not be limited to the following.					
Sl. No.	Item	Required by Purchaser	Confirmed by Vendor	Remarks	Revision
	High Speed Motor and associated system (Refer data sheets , P&IDs and specifications for full details)				
1.0	HPC Compressor Motor: 18N-KM-201				
1.1	HPC Compressor High Speed motor with auxiliaries as per Project Data sheets, P&ID and applicable project Specifications.	Yes		Complete system shall be Designed, Engineered, Manufactured, Packaged, Tested, Supplied, Transported And Supervise Erection And Commissioning	
1.2	Loose supply of instrumentation on Owner's piping consisting of suction PG, TG, PT, TT etc (2oo3 logic)	Yes		Refer technical part.	
2.0	High-speed Main Induction Motor with Hot stand-by Variable Frequency Drives	Yes		Refer Technical Specification attached with tender	
3.0	Power Cables: Power cables from VFD I/P Transformers to Main motor through VFDs	Yes			
4.0	Couplings and Guards: Dry, metallic flexible spacer type special purpose coupling (As per API 671) : a) Coupling between Motor and Compressor b) Non-sparking type coupling guard for coupling	Yes		Coupling guard shall have an oil drain disposal provision for oil leaking into the guard from the bearings	
5.0	COMMON BASEPLATE	Yes			
5.1	Modification of existing common Steel Base Plate for Compressor and high-speed motor including supply of steel frames/accessories required. (If common baseplate is not feasible due to transportation; separate baseplate for compressor and high-speed motor can be offered. However, the same shall be designed to be integrated (i.e. bolted / dowelled) at site.)	Yes			
5.2	Baseplate to have Drip rim with drain holes	Yes			
6.0	LUBE OIL SYSTEM:	Yes		As per Chapter 1 & 2 of API 614, 5th Edition and Project Specifications / Data sheet	
6.1	A combined forced feed lubrication system for compressor and electric motor. Modification of existing lube oil system including components and accessories.	Yes		Separate Console mounted at Grade level	
6.2	Lube oil Console complete with the following:	Yes			
6.2.1	Stainless Steel Oil reservoir shall be with - Level Transmitter - Electric heater with thermostat - Level Gauge with block valve - Reservoir drain shall have double isolation valves - Temperature Indicator - Oil Vapour Extraction / Mist Eliminator Fan with drive motor (1 Number) - Loose supply - Flame arrestor (Loose supply) - Two separate nozzles with isolation valve shall be provided on oil reservoir for online cleaning of oil	Yes			
6.2.2	Electric motor driven main oil pump	Yes			
6.2.3	Electric motor driven (AC) standby oil pump	Yes			
6.2.4	Electric motor driven (AC) emergency oil pump	Yes		(if required)	
6.2.5	Twin Oil Filters	Yes			
6.2.6	Twin oil coolers	Yes		As per TEMA C	
6.2.7	Continuous Flow Transfer valves for Lube oil Coolers and Lube oil Filters	Yes		2 Way 6 ported or 2 Nos of 2 Way 3 ported	
6.2.8	All instruments & controls duly mounted	Yes			
6.2.9	Skid mounted Local Gauge Board with all instruments mounted on it	Yes			
6.2.10	All Stainless-Steel interconnecting, prefabricated piping duly installed	Yes			
6.3	All Stainless-Steel supply & return piping between LO console & Main Motor	Yes			
6.4	Necessary Instrumentation & Controls.	Yes			

6.5	Lube oil Rundown tank (sized for equipment coast down) along with all necessary piping, instrumentation and controls	Yes			
6.6	Ladder with Handrails for lube oil reservoir, non-skid decking, oversized flanged vent, siphon breaker & handrails on top	Yes		as per API-614, 5th Edition & project Data sheet / specifications	
6.7	Portable trolley mounted lube oil purifier complete with driver, flexible hose piping (15 m each at suction & discharge), hose storage wheel, valves, motor cable of approximately 20m length, plug & socket to suit the area classification.	Yes		Sized for purifying of complete quantity of reservoir lube oil in 12 hrs.	
6.8	Portable trolley mounted emptying/fill oil pumps for Lube Oil Reservoir complete with driver, flexible hose piping (10 m each at suction & discharge), hose storage wheel, valves, motor cable of approximately 20 m length, plug & socket to suit the area classification.	Yes			
7.0	Input power cables from 6.6 kV switchgears to VFD I/P Transformers	No		Will be procured by Purchaser, Vendor to provide engineering input data.	
8.0	PIPING				
8.1	Complete interconnecting piping within and between various skids (i.e. Main equipment skids and various auxiliary skids such as lube oil console, Run down tank etc.)	Yes			
8.2	All Utility piping (i.e. instrument Air, N2, and cooling water etc.) within the package battery limit as detailed in Tender.	Yes		Manifolded headers for all utilities within the boundary of the Battery Limit . The Purchaser will supply only one point of connection for each utility (instrument air, flare etc.).	
8.3	All nozzles at terminal points shall be terminated at the skid edge /Battery Limits with valve & flange, with ANSI standard flanges, for all connections	Yes			
8.4	Drain & Vent piping within package battery limit with isolation valve and blind flange to the skids edge.	Yes			
8.5	Matching companion Flanges with gaskets, Nuts & Bolts etc. at all terminating point requiring Purchaser interface connection for all Non-Standard Flanges.	Yes			
8.6	Primary & secondary supports for the piping within vendor scope of supply	Yes			
8.7	For all lines (loose supplied piping) coming in vendor's scope of supply: a) Engineering isometrics b) Small bore 1 1/2" and below Piping line wise MTO along with fabrication isometric (interconnecting piping between skid) c) Prefabricated supports for all piping in vendor scope of supply). d) Information for all small bore 1 1/2" and below auxiliary piping line list along with test medium, test pressure, painting system, insulation requirement, NDT requirements for site erection during detail engg.	Yes			
8.8	For all secondary support, vendor to provide below details during detail engg with editable copy. a) Support location drawing b) Detailed fabrication drawing of secondary support along with steel MTO. c) Complete bill of material for secondary support. d) Painting MTO for secondary support.	Yes			
8.9	a. 3D model for entire package by vendor in E3D Version 2.1 b. Participation by vendor during Model review.	Yes		3D model shall be submitted at 30%, 60% and 90% stages. Comments by IOCL shall be incorporated without cost / schedule implications.	
8.10	Stress analysis for entire piping network within vendors package battery limit.	Yes			
9.0	Spare High-Speed Motor	Yes			
10.0	Instrumentation and controls				
10.1	Scope of supply as per Instrumentation Specifications attached with tender.	Yes		Also Refer following documents attached with tender 1. Process P&ID	
10.2	Machine monitoring System with all associated auxiliaries	Yes		Vendor to supply as per API 670 5th Edition, and datasheets listed	
10.3	Integration of Performance Control and Anti-surge control system with existing DCS/PLC as per requirements.	Yes			
10.4	Participation in Control System FAT & IFAT	No			
11.0	Spares and Special Tools and Tackles				
11.1	Mandatory spare parts as specified in Tender	Yes		Refer Annexure-3 of technical part for HPC high speed motor package	
11.2	Commissioning spares for complete package as recommended by vendor (list to be submitted with offer)	Yes		Refer Note 1 (Additional 5 extra sets of Lube oil filter cartridges shall be included over & above the recommended commissioning spares by Vendor).	
11.3	2 years normal operating spare parts recommended by Vendor including all Mechanical, Electrical and instrumentation items (separate quote to be submitted with offer)	Yes			

11.4	Special tools & Tackles for high-speed motor, VFD & other auxiliaries required, (if any) for transportation, erection, site assembly and maintenance of each equipment of the package as recommended by respective equipment manufacturers including hydraulic assembly /Disassembly device for coupling (List to be submitted with offer)	Yes		Refer Note-2	
11.5	Spreader bars / Slings / shackles / frame for transportation / erection	Yes			
11.6	Torque wrenches / Hydraulic bolt tensioner	Yes			
11.7	Electrical Spares as per technical part.	Yes			
11.8	Instrumentation Spares as per technical part.	Yes			
12.0	Inspection and Testing	Yes			
12.1	Major Shop inspection and testing:	Yes			
12.1.1	Mechanical run test of motor & VFD at manufacturer's works with main and spare motor	Yes			
12.1.2	Performance test of VFD at manufacturer's works	Yes			
12.1.4	Functional test of assembled Lube oil unit at Manufacturer's shop	Yes			
12.2	Shop Inspection and Testing for HV Main Drive Motor & spare Motor & VFDs in accordance with Electrical specification attached with Tender.	Yes			
12.3	For instrument items, testing shall be as technical part.	Yes			
12.4	Other shop inspection and testing for all other items under vendor scope of supply, as specified in this Material Requisition	Yes			
12.5	Shop inspection activity by approved third party inspection agency (TPIA)	Yes		Separate price shall be quoted for charges towards the TPIA on lump-sum basis, based on the scope identified for Inspection and testing requirements.	
12.6	Field Trial Test at site	Yes			
13.0	Training to Client Personnel			Refer Note-7	
13.1	Training at site for operations and maintenance personnel.	Yes		Refer technical part.	

14.0	Site Supervision during Erection, Commissioning and Testing	Yes			
14.1	Supervision of Erection, Commissioning, Start-up and site testing (Per diem rate)	Yes		Refer Note-3	
14.2	Participation during performance run test	Yes			
15.0	Participation in post award meetings			Refer Note-6	
15.1	Participation in Kick-off meeting	Yes			
15.2	Participation in HAZOP and SIL study	Yes			
15.3	Participation in 3-D model review	Yes			
15.4	Participation in design/progress review meetings etc. as necessary	Yes			
16.0	Miscellaneous				
16.1	Baseplate / Levelling Plate / Mounting Plate, Sole Plate for compressor, Gearbox and Driver, Vertical and horizontal alignment with levelling screws	Yes			
16.2	All foundation bolts, anchor bolts, Chock blocks, Liners & Shim plates	Yes		For all console/skids and any miscellaneous supports, Equipment supplied by vendor	
16.3	Lifting lugs, tailing lugs and earthing lugs as required	Yes			
16.4	Torsional analysis of complete train	Yes			
16.5	Lateral analysis for each rotor	Yes			
16.6	Review and Approval of Owner's piping drawing for Consistency Check	Yes		As per API 617, 8th Edition	
16.7	Review of Owner's foundation layout plan	Yes		Dimensional Conformity Check.	
16.8	Review of Owner's instrumentation	Yes			
16.9	Detail engineering of interconnecting piping in vendor's scope including preparation of piping plans, piping isometrics	Yes			
16.10	Chemical cleaning, Pickling and passivation etc. (for SS pipings)	Yes			
16.11	Painting, Preservation, preparation of shipment and export quality packaging	Yes			
16.12	Lube oil for flushing, commissioning & first fill for the entire package	No		Vendor shall furnish only details in lubrication schedule format during detail engineering	
16.13	Dynamic simulation of entire compressor train and Incorporating all hardware / software changes as a result of dynamic simulation. Dynamic simulation shall include various transient operating cases including start-up, shut-down, trip, turn-down failure etc.	Yes			
16.14	Static and dynamic analysis of existing RCC foundation of compressor-turbine assembly for suitability for compressor-high speed motor assembly as per IS codes and recommendations/ design for proposed modifications (if any)	Yes			
16.15	Matching the high-speed motor base frame/support within existing foundation/base frame of compressor-turbine assembly.	Yes			
16.16	All civil works, compressor house building including all the operating platforms, etc.	No		Will be provided by Purchaser/Client	
16.17	Supply of measuring and testing equipments.	Yes		Refer technical part clause 1.1.9 for detailed list.	
17.0	Vendor Drawings and Documents	Yes		Refer Note-5	
17.1	All drawings, documents and data required as per data sheet, specifications, reference code & standards and Vendor Data Deliverable List (VDDL) as specified in this MR	Yes			
18.0	Relevant statutory approvals for items, wherever applicable	Yes		All statutory certifications shall be provided	
19.0	Additional items (including mechanical, electrical and instrumentation and controls) based on the recommendation of HAZOP/SIL study.	Yes		Refer Note-6	
20.0	Additional items (including mechanical, electrical and instrumentation and controls) not specified in this requisition but recommended by vendor for safe, reliable, smooth and efficient operation of complete compressor Train (Vendor to include list of such items in his proposal)	Yes			
Note:					
1) Vendor is required to submit a list of commissioning spares (as recommended by them) along with the offer, which shall be supplied along with the high-speed motor package. Any spares consumed over and above the spares supplied along with the compressor package, shall be furnished by the vendor at the time of commissioning without any time/cost implication to the Owner. Any un-used spare(s) shall be retained by Owner. The price for commissioning spare parts shall be included in the base price of the high-speed motor package.					
2) Vendor is required to submit a list of special tools and tackles (as recommended by them) along with the offer which shall be supplied along with the high-speed motor package. If no special tools/tackles are required for normal operation and maintenance of high-speed motor package, the same shall be categorically indicated in the bid. The price for special tools and tackles shall be included in the base price of the high-speed motor package.					
3) The vendor shall provide his services for supervision during erection, commissioning & site testing of the high-speed motor package, Sub-supplier's specialist engineer for Electrical & Instrumentation shall also be present along with vendor's erection, commissioning & testing engineers, as required. The supervisory cost of 60 man-days shall be considered for the purpose of commercial comparison. The vendor shall indicate the cost of providing the above services on per diem basis. Per-diem rates, as quoted by the vendor, shall be the basis of payment, however the actual payment for supervision services shall be based on actual man-days consumed at site. The supervisor provided shall have the experience of having erected and commissioned similar package.					
4) Vendor to indicate the recommended type, make & estimated qty (litres/m3) of epoxy grout in their proposal for the erection & installation of the package. Also, the same shall be indicated by the vendor in the foundation drawing during detail engineering.					
5) Vendor to note that during detail engineering stage some of the critical documents of the high-speed motor package (such as data sheets, performance details and P&IDs etc.) may be sent to Compressor OEM for their review/information. Comments furnished by them needs to be incorporated/complied by the vendor without any cost/time implication to Owner.					
6) The vendor shall participate in all post award meetings as required. The cost of the same shall be included in the base price of the high-speed motor package. Any suggestions/modifications raised during the HAZOP/SIL review shall be implemented by vendor without any time/cost implication to the Owner.					

7) The vendor shall share the best maintenance practices with the Customer and shall conduct classroom training to the Customer team at Site, to familiarize on operation and maintenance aspects of the complete high speed motor package.	

**FOUNDATION PLAN
SHOWING R/F ONLY**

**PLAN AT EL. +107.300
SHOWING R/F ONLY FOR TOP DECK ONLY**

**SECTION 1-1
SHOWING R/F ONLY**

**SECTION 3-3
SHOWING R/F ONLY**

**SECTION 8-8
(SCALE 1:20)**

**SECTION 9-9
(SCALE 1:20)**

**SECTION 10-10
(SCALE 1:20)**

**SECTION 11-11
(SCALE 1:20)**

**SECTION 12-12
(SCALE 1:20)**

**SECTION 4-4
SHOWING R/F ONLY**

**SECTION 13-13
(SCALE 1:20)**

**SECTION 14-14
(SCALE 1:20)**

**SECTION 15-15
(SCALE 1:20)**

**SECTION 16-16
(SCALE 1:20)**

NOTES:-

- THIS DWGS SHALL BE READ IN CONJUNCTION WITH DWG. NO. 00785-18N-DW-1743-25 SHT.1 OF 4, SHT.2 OF 4 & SHT. 4 OF 4

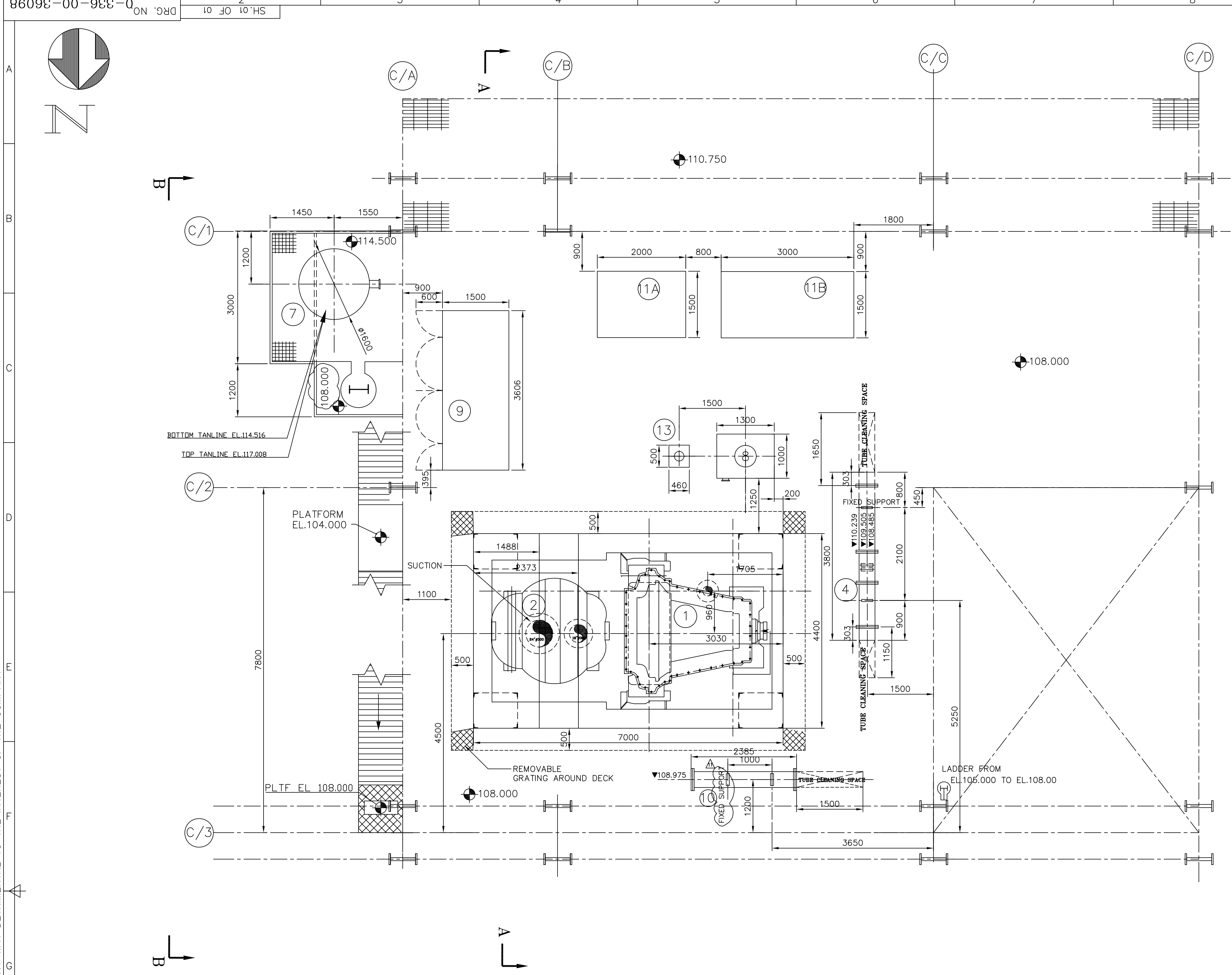
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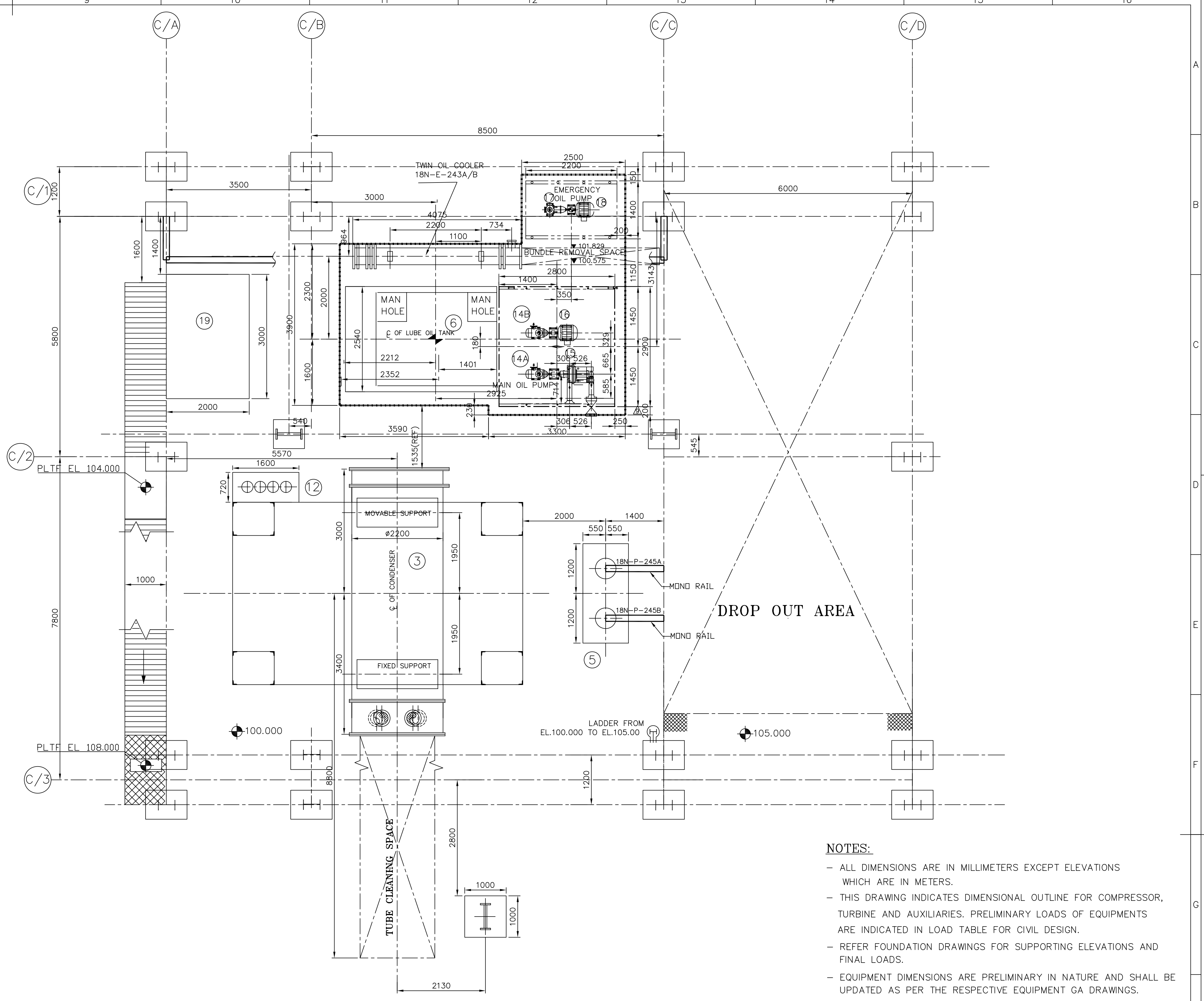
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GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261

INVENTORY NO. _____
SIGN. AND DATE _____
REF. DES. NO. _____
COMPUTER FILE NAME _____



PLAN ABOVE WORKING FLOOR 108.000



PLAN BELOW WORKING FLOOR 108.000

- NOTES:**
- ALL DIMENSIONS ARE IN MILLIMETERS EXCEPT ELEVATIONS WHICH ARE IN METERS.
 - THIS DRAWING INDICATES DIMENSIONAL OUTLINE FOR COMPRESSOR, TURBINE AND AUXILIARIES. PRELIMINARY LOADS OF EQUIPMENTS ARE INDICATED IN LOAD TABLE FOR CIVIL DESIGN.
 - REFER FOUNDATION DRAWINGS FOR SUPPORTING ELEVATIONS AND FINAL LOADS.
 - EQUIPMENT DIMENSIONS ARE PRELIMINARY IN NATURE AND SHALL BE UPDATED AS PER THE RESPECTIVE EQUIPMENT GA DRAWINGS.
- SYMBOLS USED:**
- ▽ ELEVATION
 - CENTRE OF EQUIPMENT
 - CENTRE LINE OF EQUIPMENT
 - ELEVATION OF PLATFORMS
 - ▨ GRATING
 - ▩ CHEQUERED PLATE
 - CONCRETE

LOAD TABLE

S.NO.	DESCRIPTION OF EQUIPMENT	APPLICABLE TAG NO.S	ERECTION Wt.in (Kgs.)	OPERATING Wt.in (Kgs.)	MAINT. Wt.in (Kgs.)
1	STEAM TURBINE	18N-KT-201	43851	22520	7280
2	HEAT PUMP COMPRESSOR	18N-K-201	(INCLUDING BASE PLATE)	13500	6000
3	SURFACE CONDENSER	18N-E-241	56000	76000	-----
4	STEAM JET AIR EJECTORS	18N-J-241/2/3	-----	-----	-----
5	CONDENSATE EXTRACTION PUMPS	18N-P-245 A/B	-----	-----	-----
6	LUBE OIL CONSOLE	---	-----	-----	-----
7	LUBE OIL OVERHEAD TANK	18N-T-242	-----	-----	-----
8	GOVERNING OIL CONSOLE	---	-----	-----	-----
9	CONTROL PANEL	---	-----	-----	-----
10	GLAND STEAM CONDENSER	18N-E-242	-----	-----	-----
11A	DRY GAS SEALCONTROL SKID	18N-G-245A	2000	2000	2000
11B	DRY GAS SEAL FILTER SKID	18N-G-245B	2000	2000	2000
12	LUBE OIL ACCUMULATOR	18N-V-241A/B/C/D	-----	-----	-----
13	GOVERNING OIL ACCUMULATOR	18N-V-242	-----	-----	-----
14A	MAIN OIL PUMP	18N-P-241A	-----	-----	-----
14B	STAND BY OIL PUMP	18N-P-241B	-----	-----	-----
15	LOP DRIVE TURBINE	18N-PT-241A	-----	-----	-----
16	STAND BY OIL PUMP DRIVE MOTOR	18N-PM-241B	-----	-----	-----
17	EMERGENCY OIL PUMP	18N-P-242	-----	-----	-----
18	EMERGENCY OIL PUMP DRIVE MOTOR	18N-PM-242	-----	-----	-----
19	N2 BOTTLES	-----	-----	-----	-----
20	BASEPLATE	-----	-----	7831	7831
21	EJECTOR CONDENSER	18N-E-244A/B	-----	-----	-----

11	05.09.12	UPDATED AS PER TECHNIP COMMENTS	CHANDU	MAH	MAH	AK
10	05.09.12	UPDATED AS PER TECHNIP COMMENTS	CHANDU	MAH	MAH	AK
09	21-06-12	TUBE REMOVAL SPACE OF TWIN OIL COOLER CHANGED AND ALL DIMENSIONS MADE FINAL	CHANDU	MAH	MAH	AK
08	07.05.12	LUBE OIL CONSOLE UPDATED AS PER LOC GA	CHANDU	MAH	MAH	AK
07	24.03.12	REVISED AS MARKED	CHANDU	MAH	MAH	AK
06	06.01.12	UPDATED AS PER TECHNIP COMMENTS	CHANDU	MAH	MAH	AK
05	29.10.11	UPDATED AS PER TECHNIP COMMENTS	CHANDU	MAH	MAH	AK
04	20.09.11	UPDATED AS PER TECHNIP COMMENTS	CHANDU	MAH	MAH	AK
03	14.07.11	UPDATED AS PER TECHNIP COMMENTS	CHANDU	MAH	MAH	AK
02	14.06.11	UPDATED AS PER TECHNIP COMMENTS	CHANDU	MAH	MAH	AK
01	23.05.11	UPDATED AS PER TECHNIP COMMENTS	VG	VG	MAH	AK
00	08.05.11	FIRST ISSUE	FA	PKS	MAH	AK
REV.	DATE	REVISION DESCRIPTION	DRN	CHK	APP	PM

UNIT:PRU REVAMP UNIT
TAG NO:-18N-K-201
EQUIPMENT TITLE:HEAT PUMP COMPRESSOR

OWNER
 INDIAN OIL CORPORATION LTD.
MATHURA REFINERY, INDIA

EPCM
 Technip
Confidential Property of
TECHNIP KT INDIA LTD.
Hyderabad-501301 (U.P), India

BHARAT HEAVY ELECTRICALS LTD.
HYDERABAD

TITLE
EQUIPMENT LAYOUT

DRAWING NO.	0-336-00-36098	PAGE	REV.
SCALE	00785	PLOT PLAN	00
NTS	PROJECT	UNIT	15
	DISC.	SUBJ.	SER.NO.
			16

STATUS: FINAL

Annexure-8

GENERAL SPECIFICATION FOR HIGH VOLTAGE SWITCHBOARD

Abbreviations:

BIS	:	Bureau of Indian Standard
CT	:	Current Transformer
CRCA	:	Cold Rolled Cold Annealed
FRP	:	Fiber Reinforced Polyster
HV	:	High Voltage
LED	:	Light Emitting Diode
MCC	:	Motor Control Center
MCCB	:	Moulded Case Circuit Breaker
NO	:	Normally Open Contact
NC	:	Normally Close Contact
PT	:	Potential Transformer
PVC	:	Poly Vinyl Chloride
SWG	:	Standard Wire Gauge
VCB	:	Vacuum Circuit Breaker
VT	:	Voltage Transformer
XLPE	:	Cross linked Poly Ethylene

CONTENTS

SL. NO.	DESCRIPTION	PAGE NO.
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4.0	GENERAL REQUIREMENTS	5
5.0	SWITCHBOARD COMPONENTS	15
6.0	INSPECTION, TESTING AND ACCEPTANCE	21
7.0	SCHEMES	22
8.0	PACKING AND DESPATCH	22
9.0	DOCUMENTATION & DRAWING	22
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1.0 SCOPE

This specification covers the design, manufacture, testing, packing and supply of indoor, drawout type High Voltage Switchboards up to and including 33 kV, incorporating Vacuum circuit breakers.

2.0 CODES AND STANDARDS

2.1 The equipment shall comply with the requirements of latest revision of following standards issued by BIS (Bureau of Indian Standards), unless otherwise specified:

IS: 5	:	Colours for ready mixed paints and enamels
IS: 694	:	PVC-insulated cables for working voltages up to and including 1100 V
IS: 1248	:	Direct acting indicating analogue electrical measuring instruments and their accessories
IS: 2071	:	High Voltage Test Technique
IS: 2544	:	Porcelain post-insulators for systems with nominal voltage greater than 1000V
IS: 2705	:	Current transformers
IS: 3156	:	Voltage transformers
IS: 3231	:	Electrical relays for power system protection
IS: 3427	:	AC Metal enclosed switchgear and control gear for rated voltages above 1kV up to and including 52 kV
IS: 3618	:	Phosphate treatment of iron and steel for protection against corrosion
TS: 5082	:	Material data for aluminium bus bars
IS: 5578	:	Guide for marking of insulated conductors
IS: 6005	:	Code of practice of phosphating of iron and steel
IS: 9920	:	Switches and switch isolators for voltages above 1000 V
IS: 9921	:	AC disconnectors (isolators) and earthing switches for voltage above 1000V
IS: 10601	:	Dimensions of terminals of high voltage switchgear and control gear
IS: 11353	:	Guide for uniform system of marking and identification of conductors & apparatus terminals
IS: 12661	:	HV motor starters
IS: 12729	:	General requirements for switchgear and control gear for voltages exceeding 1000V
IS: 13118	:	General requirements for circuit breakers for voltages above 1000 V
IS: 13703	:	Low voltage fuses for voltages not exceeding 1000V ac or 1500V dc.

- 2.2 In case of imported equipment, standards of the country of origin shall be applicable, if these standards are equivalent or stringent than the applicable Indian standards.
- 2.3 The equipment shall also conform to the provisions of Indian Electricity rules and other statutory regulations currently in force in the country.
- 2.4 In case Indian standards are not available for any equipment, standards issued by IEC/ BS/ VDE/ IEEE/ NEMA or equivalent agency shall be applicable.
- 2.5 In case of any contradiction between various referred standards/ specifications/ data sheet and statutory regulations the following order of priority shall govern:
- Statutory regulations
 - Data sheets
 - Job specification
 - This specification
 - Codes and standards

All conflicts between the requirements of this specification & other relevant documents shall be referred to principal for resolution.

3.0 SITE CONDITIONS

- 3.1 The switchboards shall be suitable for installation and satisfactory operation in a pressurised sub-station or in a substation with restricted natural air ventilation in a tropical, humid and corrosive atmosphere. The switchboards shall be designed to operate under site conditions as specified in the data sheets. If not specifically mentioned therein, a design ambient temperature of 50°C and an altitude not exceeding 1000 metres above mean sea level shall be considered.
- 3.2 All equipment is intended for continuous duty operation, as per nameplate rating under the specified ambient conditions.

4.0 GENERAL REQUIREMENTS

- 4.1 The offered equipment shall be brand new with state of art technology and proven field track record. No prototype equipment shall be offered.
- 4.2 Vendor shall ensure availability of spare parts and maintenance support services for the offered equipment for at least for 15 years from the date of supply.

- 4.3 Vendor shall give a notice for at least one year to the end user of equipment and PMC before phasing out the product/spares to enable the end user for placement of order for spares and services.
- 4.4 The equipment offered by the Bidder shall be complete in all respects. Any material and component not specifically stated in this specification but which are necessary for trouble free operation of the equipment and accessories specified in this specification shall be deemed to be included unless specifically excluded. All such equipment/ accessories shall be supplied without any extra cost. Also all similar components shall be interchangeable and shall be of same type and rating for easy maintenance and low spare inventory.
- 4.5 Specific reference in this specification and documents to any material by trade name, make or catalogue number shall be construed as establishing quality and performance requirements.
- 4.6 Equipment shall be installed in a neat workman-like-manner so that it is leveled, plumbed, squared and properly aligned and oriented. Tolerances shall be as established on contractor's drawings or as stipulated by owner. No equipment shall be permanently bolted down/ tag welded to foundation until the alignment has been checked and found acceptable by the engineer. Supervision of installation, testing and commissioning of switchgear will be under vendor's scope.
- 4.7 Manufacturer's and owner's instructions and recommendations shall be correctly followed in handling, erection, testing and commissioning of all equipment.
- 4.8 Switchgear shall be installed on finished surfaces, concrete or steel sills. Contractor shall be required to install and align any channel sills which form part of foundations. Power bus enclosure, ground and control splices of conventional nature shall be cleaned and bolted together with torque wrench of proper size or by other approved means. Tape of compound shall be applied where called for in drawings. Contractor shall take utmost care in handling instruments, relays and other delicate mechanisms. Wherever the instruments and relays are supplied loose along with switchgear, they shall be mounted only after the associated switchgear panels have been erected and aligned. The blocking materials, employed for safe transit of instrument and relays shall be removed after ensuring that panels have been completely installed and no further movement of the same would be necessary. Any damage shall be immediately reported to engineer.

4.9 Enclosure and protection

- 4.9.1 The Switchgear boards shall have a single front, single tier, fully compartmentalized, metal clad construction complying with clause no. 3.102.1 of IEC-60298, comprising of a row of free standing floor

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mounted panels. Each circuit shall have a separate vertical panel with distinct compartments for circuit breaker/ contractor truck, cable termination, main busbars and auxiliary control devices. The adjacent panels shall be completely separated by steel sheets except in busbar compartments where insulated barriers shall be provided to segregate adjacent panels. However, manufacturer's standard switchgear designs without inter panel barriers in busbar compartment may also be considered.

- 4.9.2 Vertical panels shall be assembled to form a continuous line-up of uniform height. Rear extension panels shall also be of full height.
- 4.9.3 The switchboards shall be totally enclosed and vermin-proof. If necessary, openings for natural ventilation shall be provided. These shall be louvered and provided with wire mesh having opening less than 10 mm. The enclosure shall have complete protection against approach to live parts or contact with internal moving parts (IPX 6) as per IS: 3427.
- 4.9.4 All openings, covers and doors shall be provided with suitable neoprene gaskets.
- 4.9.5 Each unit of the switchgear shall have necessary internal sheet metal barriers to form separate compartments for circuit breaker, busbars, instruments and relays, cable connections etc. Compartments for cable connections shall allow cable termination and connection work with the switchgear energised. The cable compartment shall have non hydroscopic phase separator.
- 4.9.6 The switchgear construction shall be such that the operating personnel are not endangered by breaker operation and internal explosions, and the front of the panels shall be provided in each high voltage compartment of a panel, so that in case of a fault in a compartment, the gases produced are safely vented out, thereby minimizing the possibility of its spreading to other compartments and panels. The pressure relief device shall not however reduce the degree of protection of panels under normal working conditions. To demonstrate that the pressure relief device operates satisfactorily the contractor shall carryout the test in line with IEC 298-1981 Appendix AA, as a type test. However, such test at reduced prospective fault currents shall also be acceptable provided the satisfactory operation of pressure relief device can be demonstrated.
- 4.9.7 Offered panel shall be type tested as per IEC 62271-200. The panel shall be internal arc tested as per IEC 62271-200 requirements for full short circuit current 25 kA and for a duration of 1.0 second

- 4.9.8 All identical equipment and corresponding parts shall be fully interchangeable.
- 4.9.9 Safety barriers/ shutters shall be provided to permit personnel to work safely within an empty compartment with the bus bars energised.
- 4.9.10 It shall be possible to extend switchgear in either direction at a later date. Ends of bus bars shall be suitably drilled for this purpose. Panels at extreme ends shall have openings, which shall be covered with plates screwed to the panel. Details of drilled holes in bus bar and openings in the panels, provided for future extension shall be clearly shown in the vendor drawings.
- 4.9.11 The drawout carriage on the switchboard shall have three positions: "Service", "Test" and "Drawout" viz:
- "Full in" or "Service" position- In this position both power and control circuits shall be connected. This shall be the normal operating position of the circuit breaker.
 - "Test" position - The power contacts shall be disconnected in this position but the control connections shall not be disturbed, it shall be possible to close and trip the breakers in this position.
 - "Draw out" Position - Both power and control circuits shall be disconnected in this position.

The circuit breaker shall be lockable in "service" and "test" positions. Automatic non-metallic safety shutters shall be provided to ensure the inaccessibility of all live parts after the carriage is drawn out.

There shall be a distinct overall door for the breaker compartment, which can be closed with the carriage in drawout position and it shall be lockable type.

- 4.9.12 All circuit breaker modules of the same rating shall be interchangeable. Suitable interlocks shall be provided to prevent the following operations:
- "Plugging in" or "drawing out" of a closed breaker.
 - "Plugging in" a breaker with the earthing isolator closed.
 - "Closing" of the earthing isolator with the breaker "plugged in".
 - Pulling out the auxiliary circuit plug with the breaker in the service position.
 - Pushing in the breaker to the service position, with the auxiliary circuit plug not in position.
 - LOTO is to be provided in the breaker in racked out condition.
- 4.9.13 All hardware shall be corrosion-resistant. All joints and connections of the panel members shall be made by zinc-passivated, or cadmium-

plated, high-quality steel bolts, nuts and washers, secured against loosening.

4.9.14 Suitable removable type eyebolts shall be provided for the lifting of the panel/shipping section. These bolts, when removed shall not leave any opening in the panels.

4.9.15 All panels shall have IR thermographic imager window/ IR site glass for temperature monitoring.

4.9.16 All rear panel doors shall be provided with handles for ease of maintenance.

4.9.17 Switchgear shall be provided with an online wireless temperature monitoring facility with local HMI display mounted on the panel. The passive sensor shall be wireless, battery less, dielectrically safe, robust to high voltage, high electromagnetic field, and using in harsh environment. It shall take direct measurement of temperature from critical points. This facility shall be interfaced with Substation Automation System/ ECS.

4.9.18 Online Temperature Monitoring System (OTMS) for HV Switchboards at all critical points mentioned below shall be provided.
In each vertical, wireless sensors shall be located as per the following:

Each cable /bus duct connection points in cable compartment.

Each breaker incoming & outgoing nearby points (total six) in breaker chamber.

One sensor per phase of cable connection points or as specified in the data sheet shall be considered irrespective of number of runs of cable.

The temperature sensors installed shall be suitable for wireless, with direct contact to hot point, operating range from -25°C to 125 °C. The accuracy shall be as per the following

± 3°C accuracy for 0°C to 80 °C range.

± 4°C accuracy for full range (-25°C to 0°C and 80°C to 125 °C)

The system shall allow at least 1 configurable threshold (alarm).

4.9.19 OTMS system shall have the provision to send complete data to both Owners' SAS/ECS for temperature monitoring and investigation. The system shall be online to immediately provide an abnormal temperature alarm (with identification/location of the abnormal temperature) to the owner's operator system.

4.9.20 Complete data of OTMS shall be accessible in the SAS (through switchboard level Ethernet switches) & associated SAS Laptop/

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HMI. The protocol for communication shall be either IEC 61850 or MODBUS TCP/IP or other open protocol and shall be decided by vendor. Accordingly, protocol converters/gateways at suitable locations as required shall be provided by vendor for data integration on IEC 61850 protocol from Master Ethernet switch to Owner's ECS system.

4.9.21 The following shall be complied for OTMS:

- No annual re-calibration by the owner shall be required to maintain accuracy.
- Sensors shall not interfere with the electrical performance of the component and the installation.
- The thermal (bus bar mounted) sensors shall be battery-less and self-powered with no auxiliary power supply.
- System shall be suitable to provide the information and capabilities as per the following:
 - Temperature
 - Time of measurement
 - Provision for location and unique identification of each sensor in the SAS/ Owner's ECS

4.9.22 Anti-condensation heaters with thermostat control shall be provided in HV switchgears in cable chamber and breaker chamber.

4.9.23 LOTO at rear end is required for HV switchboard panels in addition to LOTO at front panel of HV switchboards with Breaker in service & Breaker ON/OFF indication lamps on rear side. Locking arrangement shall be in bidder scope however locks, padlocks hasp etc shall be in IOCL scope.

4.10 Accessibility

4.10.1 All relays, metering, and control components shall be mounted on the panel front only.

4.10.2 Checking and removal of components shall be possible without disturbing adjacent equipment. All equipment shall be easily accessible. It shall be possible to set all measuring relays and instruments in situ without de-energizing the switchboard. All mounted equipment shall have identification tags of self-sticking PVC tapes at the rear also. In addition, identifications numbers shall be painted on the panel to give a permanent identification mark. Mounting of relays for a particular breaker feeder panel shall be limited to that particular feeder only.

4.10.3 All terminals shall be shrouded with plastic covers to prevent accidental contact.

4.11 Bus bar

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- 4.11.1 The switchboard shall comprise of 3-phase bus bars which shall extend through all units of the switchgear line-up. The main bus bars shall have uniform cross-section throughout their length, and shall be sized to carry continuously the rated current and shall not be rated lower than the current rating of the incoming, sectionalizer and bus coupler breakers.
- 4.11.2 Bus bars shall be of high conductivity electrolytic aluminium or copper supported on insulators made of non-hygroscopic, non-inflammable material with tracking index equal to or more than that defined in Indian standards.
- 4.11.3 Bus bars shall be housed in a separate chamber and shall be accessible for inspection. Wire guards or mesh shall be provided inside the enclosure to allow visual inspection of bus bars, to avoid accidental contact when the cover is removed.
- 4.11.4 Both bus bars and the supports shall be adequately sized and braced to withstand the specified short-circuit current for 1 second unless otherwise specified in data sheet. Dynamic stresses shall be calculated on the basis of the specified peak short-circuit current. All bus supports shall be of non-carbonising material, resistant to acids and alkalies.
- 4.11.5 Bus bars shall be insulated by using heat-shrinkable PVC sleeves. The sleeves shall be rated to withstand the system line-to-line voltage for 1 minute. This shall be verified by a type test in which the line voltage will be applied between the sleeved main bus bar and an aluminium foil wrapped closely around the insulation over a length of at least 5.00mm.
- 4.11.6 All bus bar joints and all tap-off connections from the main horizontal bus bars shall be provided with removable FRP shrouds.
- 4.11.7 Bus bars shall be prominently marked with Red, Yellow and Blue colour rings for easy phase identification at regular interval and at every power tap off point.
- 4.11.8 The thermal design of the bus bars shall be based on installation of the switchgear in poorly ventilated conditions. The cooling air volume shall take into account only the bus bar enclosure. Care should be taken for thermal expansion of bus bar during full load/ short circuit condition.
- 4.11.9 The hot spot temperature for busbars including joints at design ambient temperature shall not exceed 95°C for normal operating conditions.

- 4.11.10 Only zinc passivated or cadmium plated high tensile strength steel bolts, nuts and washers shall be used for all bus bar joints and supports.
- 4.11.11 The current rating as defined for switchboard and components in data sheet/job specification are for design ambient temperature at site conditions and for being inside the cubicle at fully loaded condition. The vendor shall suitably derate the nominal rating to suit the above condition.
- 4.11.12 The clearance between live bus bar and earth shall be minimum 90 mm.

4.12 HV power connection

- 4.12.1 The incoming power connection shall be through XLPE cables/ busduct and outgoing power connection shall be through XLPE cables, as indicated in the data sheet. Ample space for connection for these cables shall be provided at the rear of the switchboards. In order to avoid accidental contact in the cable compartment while carrying out inspection by opening the rear cover, a removable expanded metal barrier shall be provided in the cable compartment. Unless otherwise specified, the power cable shall enter the switchboard from the bottom. Non-magnetic cable gland plates shall be provided for feeders wherever single core cables are used.
- 4.12.2 The switchboard shall be supplied complete with supports for clamping outgoing and incoming cables. The head-room available between cable gland plate and terminal lugs shall not be less than 600 mm for switchgear up to 11 kV, and 900 mm for 22 and 33 kV cables.
- 4.12.3 In case the standard panel depth cannot accommodate the specified no. of cables, a rear extension panel of full height shall be provided. An earth strip shall also be brought to this extension panel.
- 4.12.4 Unless otherwise specified, all power cables shall enter the switchgear from the bottom.

4.13 Auxiliary wiring and terminals

- 4.13.1 Inside the cubicles, the wiring for control, signalling, protection and instrument circuits shall be done with BIS approved, PVC insulated, flame retardant type, copper conductor wire. The insulation grade shall be 660 V. The wiring shall preferably be enclosed in plastic channels or neatly bunched together. Wiring between HV breakers or cable compartments to relay and metering compartments shall be routed through flexible conduits. The conduits shall be clamped properly. No adhesives shall be used.

- 4.13.2 A minimum of 10% spare terminals shall be provided on each terminal block. Conductors shall be terminated with adequately sized compression-type lugs for connection to equipment terminals and strips. Stranded conductors shall be soldered at the ends before connections are made to the terminals. Sufficient terminals shall be provided on each terminal block to ensure that not more than one outgoing wire is connected per terminal. Terminal strips shall preferably be separated from power circuits by metal barriers or enclosures. All spare contacts of auxiliary relays, timers, etc shall be wired up to the terminals. CT wires shall be color coded and shall have ring type lugs. Terminal blocks shall be suitable for ring type lugs.
- 4.13.3 Each wire shall be identified at both ends by correctly sized PVC ferrules. Shorting links shall be provided for all CT terminals.
- 4.13.4 PVC insulated copper conductor of cross section 1.5 mm² may normally be used provided the control fuse rating is 10 amps or less. For 16 amps control fuse circuit 2.5 mm² copper conductors shall be used. Each wire shall be terminated at a separate terminal. CT Circuit wiring shall be done with 2.5 mm² copper conductors. Shorting links/suitable shorting arrangement for shorting CT secondary shall be provided.
- 4.13.5 Unless otherwise specified, all control cables shall enter the switchgear from the-bottom.
- 4.13.6 Supporting facilities shall be provided for clamping the control cables.
- 4.13.7 All inter-panel control wiring within each shipping section shall be by switchgear vendor. The inter-panel wiring shall be taken through PVC sleeves or suitable grommets. For inter-panel wiring between the shipping sections, wires in rolls of the required length, connected at one point, shall be supplied with the panel for connection at site.
- 4.13.8 The bus differential CT wiring shall be colour coded i.e. Red/Yellow/Blue.

4.14 Control and indication

- 4.14.1 Breaker tripping, closing and spring charging devices shall be fed with DC control power supply. The rated DC voltage shall be as specified in the data sheet. The power supply for breaker opening, closing and indication devices shall be arranged as follows:
- a. One DC feeder shall be provided for each bus section. The bus coupler panel may be fed from any of the two supplies. There will be manual changeover switch to interconnect both the control supplies.

- b. One separate, single-phase power supply shall be provided for each bus section for feeding space heaters, compartment light etc. Supply voltage shall be 240 V AC, unless otherwise specified.
 - c. Dedicated DC control supply is to be provided for all numeric relays.
 - d. A Provision to receive DC and AC control supply shall preferably be provided in bus-coupler panel/ bus PT panel.
- 4.14.2 Breaker positions (CLOSE, OPEN, spring-charged, test position, service position) shall be indicated mechanically. Electrical indications, with colours as given below, shall also be provided:
- | | | |
|----------------------------------|---|------------|
| Breaker 'CLOSE' | : | Red lamp |
| Breaker 'OPEN' | : | Green lamp |
| Breaker auto-trip | : | Amber lamp |
| Trip circuit healthy | : | White lamp |
| Spring charging | : | Blue lamp |
| Rear indicating lamps (optional) | : | R-Y-B |
- 4.14.3 A common DC control supply fail indication shall be provided for each bus section with a blue coloured lamp. One alarm contact for remote indication is to be provided.
- 4.14.4 All lamps will be LED type indicating lamp.
- 4.14.5 Indication and alarm provision to be available for differential protection circuit control supply healthiness & failure.
- 4.14.6 The auxiliary power supply of the numerical relays should be drawn separately and not from a common control supply switch of the breaker panel.
- 4.14.7 Provision of control supply failure alarm to be provided in the panel. Same shall be hooked up by the IOCL for providing alarm at manned locations for prompt remedial action.
- 4.14.8 The ratings of each fuse shall be marked on the panel above the fuse base.
- 4.14.9 Failure/fluctuation of the DC control supply should not trip any breaker/process equipment. The contacts used for providing interlocks in the breakers mainly for the tripping logics or inter-tripping should not be taken from the multiplying contactors / auxiliary relays. In case sufficient number of breaker hard contacts are not available then latched type relay is to be used.

- 4.14.10 It is recommended to trip the breaker directly on Emergency PB trip, other than the protections in numerical relay without using any intermediate numerical / auxiliary relay for ensuring reliability / integrity of tripping the circuit breaker in the event of numerical relay failure.
- 4.14.11 The breaker service position contact should not be included in the tripping logic of breakers.
- 4.14.12 Control / CT wiring shall not be routed through the main HT bus chamber. In case it is not feasible, then proper dressing & clamping of the wiring shall be ensured.
- 4.14.13 HV switchgear rear door limit switch shall be provided for alarm to avoid nuisance tripping.
- 4.14.14 Breaker compartment shall be provided with safety shutters.
- 4.14.15 In each VCB panel, vendor shall ensure that two separate shutters have been provided, one for bus-side and one for cable side.

4.15 Earthing connections

All cubicles shall be connected to an earth bus bar running throughout the length of the switchboard. The minimum earth bus bar size shall be minimum 30 x 6 mm² copper, up to short-circuit withstand capacity of 31.5 kA, and 50 x 6 mm² copper, for a short-circuit withstand capacity above 31.5 kA. All doors and movable parts shall be connected to the earth bus with flexible copper connections. Provision shall be made to connect the earthing bus bar to the plant earthing grid at two ends. All non-current-carrying metallic parts of the equipment and components shall be earthed. The earth bus shall be brought back to the cable compartment, and earthing bolts shall be provided to ground cable armour. The mating surfaces of all bolted parts shall be zinc passivated to ensure continuity between them.

4.16 Space heaters

The panels shall be provided with space heaters to prevent moisture condensation, and maintain cubicle temperature 5°C above the ambient. The space heaters shall be located at the bottom of the panel, and shall be controlled through a MCB and a thermostat with an adjustable setting. The thermostat shall preferably be located in the metering or relay chamber.

4.17 Panel supporting frame

The panels shall be suitable for installation on panel supporting frame, to be supplied by others. The panels shall be suitable for tack welding, directly to this frame.

4.18 Nameplates

- 4.18.1 A nameplate with the switchboard designation shall be fixed at the top of the central panel. A separate nameplate giving details for each feeder compartment of all panels shall be provided. Danger plate (Red) shall be provided at the front and rear for each panel.
- 4.18.2 The nameplates for feeder compartments shall be in two parts. One part shall have necessary details pertaining to the compartments number of vertical panel of the switchboards. The other parts shall be removable and shall contain all details regarding the feeder number for drives/equipment controlled by the particular module as per approved single line diagram.
- 4.18.3 Blank nameplates shall be provided for all spare and vacant modules.
- 4.18.4 Nameplate or polyester adhesive stickers shall be provided for each equipment mounted inside the switchboard. Special warning plates shall be provided on removable covers or doors giving access to cable terminals and bus bars.
- 4.18.5 Special warning labels shall be provided inside the switchboards also, wherever considered necessary. Identification tags shall be provided inside the panels matching with those shown on the circuit diagram.
- 4.18.6 Engraved nameplates shall preferably be of 3- ply (Black-White Black) lamicaid sheets or anodised aluminium. However back engraved perspex sheet nameplates may also be acceptable. Nameplates shall be fastened by screws and not by adhesives.
- 4.18.7 Non removable labels are to be provided below the fuse base for control fuse rating in control panel compartment. The labels shall be of metallic strip permanently fixed below the fuse base.

4.19 Painting

- 4.19.1 All metal surfaces shall be thoroughly cleaned and degreased to remove mill scale, rust, grease and dirt. Fabricated structures shall be pickled and then rinsed to remove any trace of acid. The under surface shall be prepared by applying a coat of phosphate paint and coat of yellow zinc chromate primer. The under surface shall be made free from all imperfections before undertaking the finishing coat.
- 4.19.2 After preparation of the under surface, the switchboard shall be spray painted with two coats of epoxy based final paint or shall be powder coated.

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- 4.19.3 Colour shade of final paint shall be as 631 of IS: 5 unless specified otherwise.
- 4.19.4 The finished panels shall be dried in staving ovens in dust free atmosphere. Panel finish shall be free from imperfections like pinholes, orange peels, runoff paint etc. Vendor shall supply final paint (1 litre per switchboard) in non-returnable container for final touch up at site.
- 4.19.5 All unpainted steel parts shall be cadmium plated or suitably treated to prevent rust formation. If these parts are moving elements then they shall be greased

5.0 SWITCHBOARD COMPONENTS

5.1 Circuit Breakers

- 5.1.1 Vacuum circuit breakers shall be used in the switchboard. The exact type and rating of breakers shall be as indicated in the data sheet. Breaker transport trolleys required for cassette- mounted breakers shall be provided for each switchboard. No. of trolleys to be provided shall be as per data sheet. The breaker shall have phase separators (non-hygroscopic)
- 5.1.2 Non-hygroscopic phase barriers should be used between Phase to Phase and Phase to Earth in the breaker trolley and outgoing box of HV switchgears. Additionally, the exposed bus bars in the cable box should also be provided with HT tapes/sleeves.
- 5.1.3 Vacuum circuit breakers shall be designed to have low switching-over voltage levels and with a long switching life. The interrupter shall be leak-free.
- 5.1.4 The breakers shall have at least 4 normally open (NO) and 4 normally closed (NC) spare auxiliary contacts for purchaser's use. Incomers, bus couplers shall have 6 NO, 6 NC spare auxiliary contacts.
- 5.1.5 The breakers shall have a motor-operated, spring-charged mechanism. It shall also be possible to charge the springs manually. The closing spring shall get re-charged (for subsequent closing) soon after a closing shot and prior to breaker tripping. In case the limit switch fails to cut out the spring-charging motor with the springs fully charged, the motor shall be automatically de-coupled. The control circuit shall be suitable for local as well as remote control. Breakers shall be trip-free and shall have an anti-pumping device. The breaker operating duty shall be 0-3"-C0-3"- CO, unless otherwise agreed.

5.1.6 Operating Mechanism

- a. Electric power operating mechanism shall be motor wound spring charged stored energy type. However, manual-operating mechanism may be of the spring charging stored energy type or the spring assisted type. For circuit breakers with electrical power operating mechanism, provision shall also be made for manual spring charging. Closing time of circuit breakers with manual operating mechanism shall be independent of the speed of the operating handle.
- b. All stored energy operating mechanism shall be equipped with following features.
 - i) Failure of springs, vibrations or shocks shall not cause unintended operation of breaker or prevent intended tripping operation.
 - ii) Closing of circuit breakers shall be prevented unless the spring is fully charged.
- c. All electrical power operating mechanisms shall be suitable for remote operation and shall be equipped with following features.
 - i) Provided with universal motor operable on AC or DC control supplies.
 - ii) Provided with emergency manual charging facility. The motor shall be automatically, decoupled (mechanically) once the manual-charging handle is inserted.
 - iii) Closing operation of circuit breaker shall automatically initiate charging of the spring for the next closing operation without waiting for tripping of circuit breaker.
 - iv) Closing operation shall be completed once the closing impulse is given and the first device in the control scheme has responded even though the control switch/ Push Button is released provided no counter trip impulse is present.

5.1.7 Circuit breaker trip and closing coils in case of electrically operated breakers and trip coil in case of mechanically operated breakers and circuit breaker indication shall be suitable for satisfactory operation on a control supply system indicated in data sheets/job specification

5.1.8 All circuit breakers shall be provided with mechanically operated emergency trip device. This device shall be available on the front of the panel. Mechanically operated 'closing' device shall be provided

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for all breakers. However mechanical closing shall be inhibited for all circuit breakers in service position.

- 5.1.9 The breakers shall be provided with anti pumping & trip free provision. Each breaker shall be also provided with an operation counter.
- 5.1.10 Metal Oxide surge suppressors shall be provided on all outgoing vacuum circuit breakers to limit the over voltage to a maximum of 2.2 p.u. rated peak line to earth voltage.
- 5.1.11 Line PT shall be mounted in a separate drawout carriage. In case of truck mounted breaker, line PT shall be provided in a separate panel.
- 5.1.12 The complete breaker assembly should have inter-changeability with breakers of identical ratings.
- 5.1.13 An integral earthing system, or a separate earthing carriage/truck, shall be provided. In case of a separate earthing carriage, the necessary trolleys for bus-side and cable-side earthing shall be supplied. After withdrawing the circuit breaker, this can be inserted to facilitate earthing of cables and bus bars. Earthing truck shall be complete with the PT and voltmeter, giving audio-visual indication and solenoid interlock to prevent closing of bus side earthing truck on live busbars. Earthing truck operation with door open is acceptable.
- 5.1.14 No. and type of earthing trucks shall be as per data sheet.

5.2 Instrument Transformers

Current and voltage transformers shall be cast-resin insulated. The primary and secondary terminals shall be marked indelibly and easily approachable for termination and testing etc.

5.2.1 Current transformer (CT)

- i. Current transformers shall conform to IS: 2705. The short-time rating shall be equal to that of the switchboard. They shall be mounted on the stationary part of the switchboard. The CT ratings shall be as shown in the data sheet. Protective CTs shall have an accuracy class of 5P and an accuracy limit factor greater than 10. CTs for instruments shall have an accuracy class of 1.0 and an accuracy limit factor less than 5.0. One leg of the CTs shall be earthed. Separate CTs shall be provided for Differential and Restricted Earth fault protection.
- ii. All CTs shall be star connected.

- iii. Proper access to each set of CTs shall be provided for repair/maintenance.
- iv. Prominent marking shall be done for differential CTs.
- v. Bus differential & cable differential CTs shall be window type CT. The partial discharge shall be less than 20 Pico columbs

5.2.2 Voltage transformer (VT)

- i. The voltage transformers shall conform to IS: 3156. The voltage transformers shall be of drawout-type, and shall be provided with 4 pole miniature circuit breakers with auxiliary contacts on the secondary side.
- ii. The drawout mechanism shall disconnect the V.T. from the bus bars. The primary connection shall be disconnected before the VT become accessible. Neutral point of the star connected VTs both on the primary and secondary sides shall be earthed.
- iii. The VTs shall have an over-voltage factor of 1.9 for 30 seconds, and an accuracy class of 1.0 from 10% to 120% of normal voltage. VT selected shall be compatible with system grounding. For ungrounded system, O/V factor of 1.8 for 8 hrs is to be mounted.
- iv. The primary rated voltage shall be equal to the rated voltage V of the system, or $V/\sqrt{3}$, if the VT is connected between phase and neutral.
- v. If not otherwise specified, the secondary voltage shall be 110 V, or $110/\sqrt{3}$ V. The burden and class of accuracy shall be as specified in data sheets. For directional relays, either a 3-phase 5-limb VT, or 3 single-phase VTs with secondary windings connected in open delta shall be provided.

5.3 Measuring instruments

All analogue instruments shall be of square pattern, 96 x 96 mm, flush-mounted type. Measuring instruments shall be provided, as specified in the data sheet. All required auxiliary equipment such as shunts, transducers, CTs, VTs, etc, shall be included in the scope of the switchboard supplier. The accuracy class for all instruments shall be 1.0 as per IS: 1248.

Digital instruments shall also be acceptable, provided specific approval of PMC/Owner for make and model is obtained before placement of switchboard order.

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5.3.1 Ammeters and voltmeters

Analogue meters shall be of moving-iron type. The range shall be as indicated on the drawings. Ammeters for motor feeders shall have a non-linear compressed scale above rated current to indicate motor starting current.

5.3.2 kW/ kWh meters

The kW/ kWh meters shall be suitable to measure unbalanced loads on a 3-phase, 3-wire system. The kW meters shall operate on a VT secondary voltage of 110 V.

5.3.3 Frequency meters

These shall be of direct-reading or digital type, and shall operate on a VT secondary voltage of 110 V. The standard range shall be 45-50-55 Hz.

5.3.4 Power factor meters

Power factor meters shall operate on a VT secondary voltage of 110 V. The CT secondary current shall be as shown 11 on the relevant drawings. The standard range shall be 0.5 lead-1.0-0.5 lag.

5.4 Surge Arrestor

The surge arrestors shall be provided for all motor feeders and shall be metal oxide, gapped or gap less type generally in accordance with IEC 60099-1 and suitable for indoor duty. These shall be mounted within the switchgear cubicle between line and earth, preferably in the cable compartment. Surge arrestor selected shall be suitable for non-effectively earthed system and rating shall be in such a way that the value of steep fronted switching over voltage generated at the switchgear terminals shall be limited to the requirements of switchgear. Bidder shall furnish temporary over voltage capability curve along with the bid.

- 5.4.1 The location of the surge arrestors shall be such that in the event of its failure bus differential protection shall not be operated i.e. the individual feeder protection shall clear the fault.

5.5 Relays

- 5.5.1 Type of relay will be latest state of art numerical relays.
- 5.5.2 All numeric protective relays shall be back-connected, of drawout type, suitable for flush mounting, and fitted with dust-tight covers. Auxiliary relays are acceptable in fixed execution.

- 5.5.3 All tripping relays shall be of lockout type with hand-reset contacts, and shall be suitable to operate on the specified voltage. These relays shall have self coil cut off contacts, and shall be provided with hand-reset operation indicators. Tripping relays will be acceptable in non-drawout cases. Trip relay shall be VAJHM type relays. Tripping relays (86) shall be conventional electromechanical VAJHM high burden type only.
- 5.5.4 The tripping relay shall be suitable for satisfactory operation from 50% to 110% of the specified control supply voltage.
- 5.5.5 For numeric relays, refer to specification attached.
- 5.5.6 Proper installation of numerical relays in the HT panels to be ensured and all fastening screws to be in position to prevent the draw out portion of the relays coming out from its operating position during breaker operation / panel door operation.
- 5.5.7 All numerical relays shall be communicable on IEC 61850 type protocol of latest advanced version and shall comply with enclosed standard specification for numerical relays. All numerical relays shall be comprehensive units including all protection, metering & control functions. Controls and logic shall be through numerical relays i.e. all logics shall be built inside numerical relay and not externally. Provision of adequate I/O count in the relays shall be ensured.
- 5.5.8 Relay logic shall be designed such that it is ensured that no trip will be generated in case of DC failure & restoration.
- 5.5.9 All numerical relay shall have facility of building the user customized control logics consisting of different timers/OR/AND blocks/SR Flip flop etc. through laptop.
- 5.5.10 Conformal coating shall be done for all electronic equipments as per grade 3C3 (Harsh environment) of IEC 60721-3-3. Alternatively, it shall comply with ANSI/ ISA S71.04 class G3 or IEC 60068-2-60 for mixed flow gas test or ASTM B845.

5.6 Auxiliary equipment

5.6.1 Auxiliary relays and contactors

Auxiliary relays and contactors shall generally be used for interlocking and multiplying contacts. Auxiliary contacts shall be capable of carrying the maximum anticipated current. Multiplying relays used for logic shall be latch type/ VAJC type relays.

All the conventional auxiliary relays (VAA, VAJHM, VAJC etc.) shall be high burden type relays.

5.6.2 Control switches

All control switches shall be rotary type, having a cam-operated contact mechanism. Unless otherwise stated, circuit breaker control switches shall be 3-position CNT, spring return to neutral from both Close and Trip positions. They shall have pistol-grip handles.

Ammeter selector switches shall have a make-before-break feature on its contacts. The selector switch shall generally have four positions: three for reading 3-phase currents and the fourth for the OFF position. The voltmeter selector switch shall also have four positions: three shall be used to measure phase-to-phase voltages, and the fourth shall be for the OFF position.

5.6.3 Timers

For re-acceleration duty, timers unless otherwise stated, shall be pneumatic type and shall have adjustable time setting of 0-60 seconds. Alternatively static timer may be considered. The time settings, where specified, shall be accurately set before despatch of the switchboard. Timer provided for control of capacitor feeder shall have minimum setting of 0-5 minutes.

5.6.4 Indicating Lamps

Clustered LED type indicating light with minimum 8mm diameter size shall be provided for indications.

5.6.5 Test Facilities

- i) Switching devices shall have the facility to be test-operated when isolated.
- ii) Withdrawable switching devices shall be supplied with a test link to allow testing in the withdrawn position.
- iii) Facilities shall be provided for primary injection testing.
- iv) Each switchgear assembly shall incorporate pressure test facilities for busbars and all incoming and outgoing circuits. One set of any test plugs required for this purpose shall be supplied by the manufacturer.
- v) Additional test equipment which may be required (e.g. test block).

5.6.6 Special Tools and Equipment

Requirements for special tools and equipment (including HV test probes) necessary for the erection, operation, testing and maintenance of the switchgear should be discussed with the manufacturer.

6.0 INSPECTION, TESTING AND ACCEPTANCE

- 6.1 During fabrication, the switchboard shall be subject to inspection by PMC/ Owner, or by an agency authorised by the Owner, to assess the progress of work, as well as to ascertain that only quality raw material is used. The manufacturer shall furnish all necessary information concerning the supply to PMC/ Owner's inspectors.
- 6.2 All routine tests shall be carried out as per IS: 12729 at the manufacturer's works under his care and expense.
- 6.3 Type tests, if specified shall be performed. Short circuit and internal arc test shall be performed at CPRI or equivalent independent testing lab. Impulse withstands and Heat run test may be performed at manufacturer's works.
- 6.4 Type and shop tests shall be witnessed by an inspector of PMC/ Owner, or of an agency authorised by Owner. Prior notice of minimum 4 weeks shall be given to the inspector for witnessing the tests.

6.5 Acceptance tests

The following acceptance tests shall be carried out at the manufacturer's works under his care and expense.

- 6.5.1 A general visual check shall be carried out. This shall cover measurement of overall dimensions, location, number and type of devices, location and connection of terminals, etc.
- 6.5.2 Manual and electrical operation of circuit breakers and relays shall be checked under the worst conditions of auxiliary supply voltage.
- 6.5.3 Dry insulation test with power-frequency voltage shall be conducted for the main and auxiliary circuits.
- 6.5.4 Insulation resistance of the main and auxiliary circuits shall be checked before and after power frequency voltage withstand test.
- 6.5.5 Operation check shall be carried out for every control function as per the approved schematic diagrams by manually simulating fault conditions and operation of control switches, relays, etc.
- 6.5.6 For equipment bought from other sub-suppliers, certified test reports of the tests carried out at the manufacturer's works shall be submitted. Normally, all routine tests as specified in the relevant standards shall be conducted by the sub-supplier at his works.

7.0 SCHEMES

The control scheme for incomer, buscoupler, feeders, auto changeover shall be as per attached scheme. The points attached as Annexure shall be incorporated in scheme.

8.0 PACKING AND DESPATCH

The switchboard shall be divided into several shipping sections for protection and ease of handling during transportation. All outgoing feeders shall be packed as separate shipping sections. The equipment shall be properly packed for selected mode of transportation i.e. ship/rail or trailer. The panels shall be wrapped in polyethylene sheets before being placed in wooden crates/cases to prevent damage to the finish. Crates/cases shall have skid bottoms for handling. Special notations such as 'Fragile', 'This side up', 'Weight', 'Owner's particulars\ 'PO nos.' etc., shall be clearly marked on the package together with other details as per purchase order.

The equipment may be stored outdoors for long periods before installation. The packing should also be suitable for outdoor storage areas with heavy rains/high ambient temperature unless otherwise agreed.

9.0 DOCUMENTATION & DRAWING

The Manufacturer shall provide technical manual(s) and drawings in accordance with the purchase order requirements, which shall include at least the following documents (preferably on a CD-ROM):

- Single line diagram of the unit;
- General arrangement drawings;
- Main and control circuit schematic diagrams;
- Equipment lists;
- Recommended spare parts lists;
- Test reports and performance curves, including oscillograms;
- Operating manuals which incorporate installation, commissioning, operating and maintenance instructions & fault-finding procedures

CD-ROMs shall incorporate all viewer software necessary to access the information provided.

9.1 Each drawing supplied by the manufacturer shall incorporate the following information:

- Manufacturer's name and address
- Drawing title (including location)
- Name of the project
- Manufacturer's order or contract number

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- Purchaser's order number
- Manufacturer's drawing number and revision number
- Date of original issue and dates of any revisions with details

The following drawings with associated time schedule to be provided:

- a. To be provided by the manufacturer with his quotation:
 - i) Outline drawing of the complete switchgear with its certified maximum dimensions and weight
 - ii) Typical schematic or circuit diagram for the control and protection circuits.
- b. To be submitted by the manufacturer for approval at least 4 weeks before manufacture is started:
 - i) Certified outline drawings showing dimensions and weight of each transportable unit, cable termination position, fixing details, withdrawal space and door swings where applicable and floor impact loadings for circuit breakers.
 - ii) Circuit wiring diagrams showing all connections and details (including cable sizes) with wiring identification numbers to enable all testing, calibration and fault tracing to be carried out.
 - iii) Interconnection diagrams or schedules.
- c. To be submitted by the manufacturer as soon as possible after the order is placed:
 - i) Protection current transformer magnetization curves.

A separate circuit diagram shall be prepared for each different type of functional unit with space on each drawing for external circuitry to be shown.

10.0 DATA SHEET

TECHNICAL PARAMETERS

a. System Parameters

1	Normal System voltage	6.6 kV	11 kV
2	Highest System voltage	7.2 kV	12 kV
3	Rated Frequency	50 Hz	50 Hz
4	Number of phases/ poles	Three	Three
5	System Neutral earthing *	As per site	
6	One minute power frequency withstand voltage		
	- For type tests	20	28
	- For routine tests	20	28
7	1.2/ 50 microsecond impulse withstand voltage	60 kV (peak)	75 kV (peak)
8	Maximum system fault level including initial motor contribution	40 kA (rms)	40 kA (rms)
9	Short time rating for bus bars, ckt. Breakers, current transformers and switchgear assembly	To mention by indenter	40 kA (rms) for one (1) sec/ 40 kA (rms) for three (3) sec in generation bus.
10	Dynamic withstand rating	100 kA (peak)	100 kA (peak)
11	Control supply voltage *		
	- Trip and closing coils	Indenter to specify	220 V DC
	- Spring charging motor	Indenter to specify	220 V DC
	- Space heaters	240 V AC single phase with	240 V AC single phase with neutral solidly earthed

12	Maximum ambient air temperature	50°C	50°C

b. BUS BARS

1	Continuous current rating at 50°C ambient	As per BOQ	
2	Temper rise allowed above ambient	40°C for plain joints 55°C for silver plated joints	40°C for plain joints 55°C for silver plated joints

c. Switchgear cubicle constructional requirements

1	Colour finish exterior & interior	As mentioned elsewhere	
2	Cable entry	a) Power cables b) Control cables	Bottom Bottom
3	busduct entry	Top	Top
4	Owner's earthing conductor	Galvanized steel strip	Galvanized steel strip

d. Circuit breakers

1	The circuit breakers current rating shall be selected from the load current given in SLD which is at an ambient of 50°C		
2	Short circuit breaker current	6.6 kV	11kV
	a. A.C. component	As per IS: 13118 or IEC-60056	As per IS: 13118 or IEC-62271
3	Short ckt. making current	100 kA (peak)	100 kA (peak)
4	Operating duty	B-3 Min-MB-3 Min-MB	B-3 Min-MB-3 Min-MB
5	Total break time	Not more than 4 cycles	Not more than 4 cycles
6	Total make time	Note more than 5 cycles	Not more than 5 cycles
7	Operating mechanism	Motor wound spring charged stored energy type as per IEC-	Motor wound spring charged stored energy type as per IEC-62271

		62271	

e. Relays

	One minute frequency	2.0 kV (rms)	2.0 kV (rms)

f. Meters

1	Accuracy class	2.0	2.0
2	One minute power frequency	2.0 kV (rms)	2.0 kV (rms)

g. Current transformer

1	Class of insulation	Class B or better	Class B or better
2	Rated output of each core	Adequate for the relays and devices connected, but not less than fifteen (15) VA.	Adequate for the relays and devices connected, but not less than fifteen (15) VA
3	Accuracy class - Protection core	Class PS for differential and core balance CTs; 5P20 for other protection CT's	Class PS for differential and core balance CTs; 5P20 for other protection CT's
	- Measurement core	1.0 For DC1 & DC2, accuracy shall be 0.2	1.0 For DC1 & DC2, accuracy shall be 0.2
4	Minimum primary earth fault current to be detected by core balance current transformer	3 Amperes	3 Amperes

h. Voltage transformers

1	Rated voltage factor	1.8 for 8 hrs for underground system.	1.2 continuous for all VTs, 1.9 for 30 seconds for star connected VTs
2	Class of insulation	Class B or better	Class B or better
3	Other parameters	As specified elsewhere	

i. H.V. Fuses

1	Voltage class	6.6 kV	11 kV
2	Rupturing capacity	Adequate for 100 kA (peak)	Adequate for 100 kA (peak)
3	Rated current	As per applicable	As per applicable

j. Surge arresters (for motor feeders)

1	Nominal discharge current (8X 20 microsec.)	6.6 kV 500 Amp	11 kV 500 Amp
2	Max. system voltage (rms)	7.2 kV	12 kV
3	Max. standard impulse spark over voltage (peak)	25 kV (without any positive tolerance)	25 kV (without any positive tolerance)
4	Residual voltage at nominal discharge current	12 kV	25 kV
5	Temporary over voltage capability (rms)		
	a. For 10,000 seconds	6.2 kV	12 kV
	b. For 5 seconds	8.6 kV	14.3 kV
6	Installation	Inside the switchgear panel	Inside the switchgear panel
	MCOV	Minimum 7.2 KV for ungrounded system	Minimum 12 KV for ungrounded system.

k. Contactors

1	Nominal system voltage	6.6 kV	
2	Highest system voltage	7.2 kV	
3	Rated frequency	50 Hz	
4	Rated continuous current at 50°C	Current rating shall be selected from the load current indicated in BOQ	
5	Control supply voltage	220 V DC/ 110 V DC unearthed	
6	Utilization category	AC-3	

l. Transducers

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1	Current transducers		
	a. Input	0-1 A (CT secondary)	
	b. Rated frequency	50 HZ	
	c. Output	4-20 mA (2 nos. decoupled)	
	d. Over current	Transducer for motor current ammeters shall be capable of withstanding min. 6 times CT sec. current of 1A for a min period of 30 seconds	
	e. Accuracy	0.5%	
2	Voltage transducer		
	a. Input	110 V (VT secondary) 50 HZ (for AC)/ 220 V dc (for DC)	
	b. Output	4-20 mA (2 nos. decoupled)	
	c. Accuracy	0.5%	
3	VAR transducers		
	a. Input	3 phase, 3-wire 1 A (CT secondary) 110 V (VT secondary)	
	b. Rated frequency	50 HZ	
	c. Output	4-20 mA (2 nos. decoupled)	
	d. Accuracy	0.5%	
4	Watt Transducers		
	a. Input	3 phase, 3-wire 1 A (CT secondary) 110 V (VT secondary)	
	b. Rated frequency	50 HZ	
	c. Output	4-20 mA (2 nos. decoupled)	
	d. Accuracy	0.5%	
5	Frequency Transducers		
	a. Input	110 V (VT secondary)	
	b. Rated frequency	50 Hz	
	c. Output	45 to 55 Hz	
	d. Accuracy	4-20 mA 2 nos. decoupled)	
	e. Accuracy * shall be finalized during detailed engineering	0.5%	

DATA SHEET HV SWITCHBOARD

	Project			Location	
	Client			Unit	Sub-station
A	Site conditions				
1	Maximum temperature ambient	50°C	3	System breaking capacity	@ kA
2	Minimum temperature ambient	5°C	3.1	% D.C. component	As per IEC
3	Design temperature ambient	50°C	4	System making capacity	@ kA (peak)
4	Relative humidity	90%	5	Type of circuit breaker	VCB
5	Altitude above MSL	<1000m	6	Duty cycle of C.B.	0-3min-CO-3 min-CO
6	Environment	Humid, corrosive, with sulphur	7	Suitability for Cap. Switching	Yes
B	Operating conditions		8	Surge suppressor for Motor Feeder	Yes
1	Voltage	---- kV + 6%	9	IDMTL Relay type	3 sec
2	Frequency	50 Hz + 3%	10	Provision of earthing	
3	Number of phases	TPN		Switch/ truck	Required
4	System fault level	* kA	D	Miscellaneous	
5	System Earthing	Resistance earthing/ unearth system	1	Interface with ECS	Required / Not required
6	Auxiliary Supply		2	Incoming Power Entry	Cable/ Bus Duct
a.	AC	240 V + 6%, 1-phase, 50 Hz	3	Cable Entry	Bottom
b.	DC(For Control & prot'n)	220/ 110V + 10%,-15%	4	Separate bolted removable gland plate for cable entry	Required (Gland plate drilled at site)
C	Electrical Data				
1	Busbar current rating inside panel at design temp.	@	5	Cable glands and lugs for cable termination	Required
2	1 sec. short circuit withstand or 3 sec	@	6	Painting/ paint shade	Epoxy & shade ----
	Capacity	kA at kV			

@ To be decided by bidder as per design basis/ bid document/ IS/ IEC

Note:

1. All protection relays shall be numerical type.
2. Electrical components/ devices used in the switchboard shall be selected out of the enclosed list of approved makes listed in the vendor list for electrical components attached with MR. For makes of items not covered in the list, prior written approval of PMC/ Owner is mandatory.

MANUFACTURER'S DATA

A	Switchboards				
1	Make	As per VL attached	9	Recommended clearances	
2	Type designation			Front	mm
3	Degree of protection			Rear	mm
4	Max. overall weight of C.B. panel	Kg		Above	mm
5	Overall dimensions of C.B. panel		10	Shock loading on foundation	
a.	Width	mm	11	Max. size/ no of cables that can be	
b.	Depth	mm		Terminated inside the panel	
c.	Height	mm	a.	Without rear extension panel	
6	Overall dimensions of dummy/ Adaptor panel of each type		b.	With rear extension panel	
a.	Width		c.	Size of rear extension panel	
b.	Depth		12	Clearance in air	
c.	Height		a.	Phase to phase (min.)	mm
			b.	Phase to earth (min.)	mm
7	Overall weight and dimensions of largest shipping section		13	Busbar current rating at design ambient temperature	A
a.	Weight	Kg	14	Busbar (separately for each swbd)	
b.	Width	mm	a.	Horizontal main busbar size	

c.	Depth	mm		(No. of flats X size of each flat)	
d.	Height	mm	b.	Horizontal main busbar size as tested at CPRI for full short ckt. withstand as per specification requirement (no. of flats X size of each flat)	
8	Overall dimensions of each swbd including all dummy/ adaptor/ rear Extension panels		c.	Vertical dropper size (no. of flats X size of each flat)	
a.	Width				
b.	Depth				
c.	Height				
15	Horizontal main busbar/ vertical busbar material	Al/ Cu	b.	Removable FRP shrouds for all busbar joints and tap-off connections provided	Yes
16	Insulating material (Busbar supports)		c.	Arc propagation barrier in busbar compartment provided	Yes
17	Earth busbar size	mm ²	d.	Breaker service, test and drawnout position provided	Yes
18	Earth busbar material	Copper	e.	Distinct overall lockable door for breaker compartment provided	Yes/ No
19	1 min. power frequency withstand voltage (rms)	kV	f.	Automatic safety shutter provided	Yes/ No
19.1	Over voltage factor for PTs	1.9 for 30 sec	g.	Independent pressure release Flaps provided for all HV compartments	Yes/ No
20	Impuse withstand voltage (peak)	kV	h.	Wire mesh for all louvered openings provided	Yes/ No
20.1	Wave shape of impulse voitage		i.	Suitable interlocks to prevent faulty operation as per Cl. 4.4.10 of spec. 6-51-0001 provided	Yes/ No
21	1sec. short ckt. Withstand capacity	kA	j.	Infrared windows for thermography	Yes/ No
22	Peak dynamic withstand capacity	kA			
23	Safety Features				
a.	Heat shrinkable sleeves, rated to withstand the system line to line voltage for one min., provided on busbar	Yes/ No			
B	Circuit Breaker				
1	Type	VCB/SF ₆	16	Power required for closing	W/VA
2	Make		17	Power required for spring Charging motor	W/VA
3	Type designation		18	Breaker is trip free	Yes/ No
4	Circuit breaker mounting in panel	Truck/ cassette	19	Closing mechanism	
5	No. of poles/ phase		20	Provision of manual spring charging provided	Yes/ No
6	Current rating (in free air)	A at °C	21	Mechanical trip PB provided	Yes/ No
7	Current rating inside the panel at Specified design temperature	A	22	Mech. On/ Off indicator provided	Yes/ No
8	Short time rating (1 sec.)	kA	23	Operation counter provided	Yes/ No
9	Symmetrical breaking capacity	kA	24	Time taken for spring charging	Sec.
9.1	% D.C. Component		25	No. of aux. contacts and their Current ratings	No + NC, A
10	Peak making current	kA	26	Interrupter	
			a.	Make	
11	1 min. dry withstand voltage power frequency)	kA	b.	Pressure switch for monitoring of SF ₆ gas pressure provided	Yes/ No
			c.	Re-filling arrangement of SF ₆	
12	Duty Cycle				
13	Total closing time	m sec			
14	Total closing time	m sec.			
15	Power required for opening	W/ VA			

DATA SHEET SWITCHBOARD

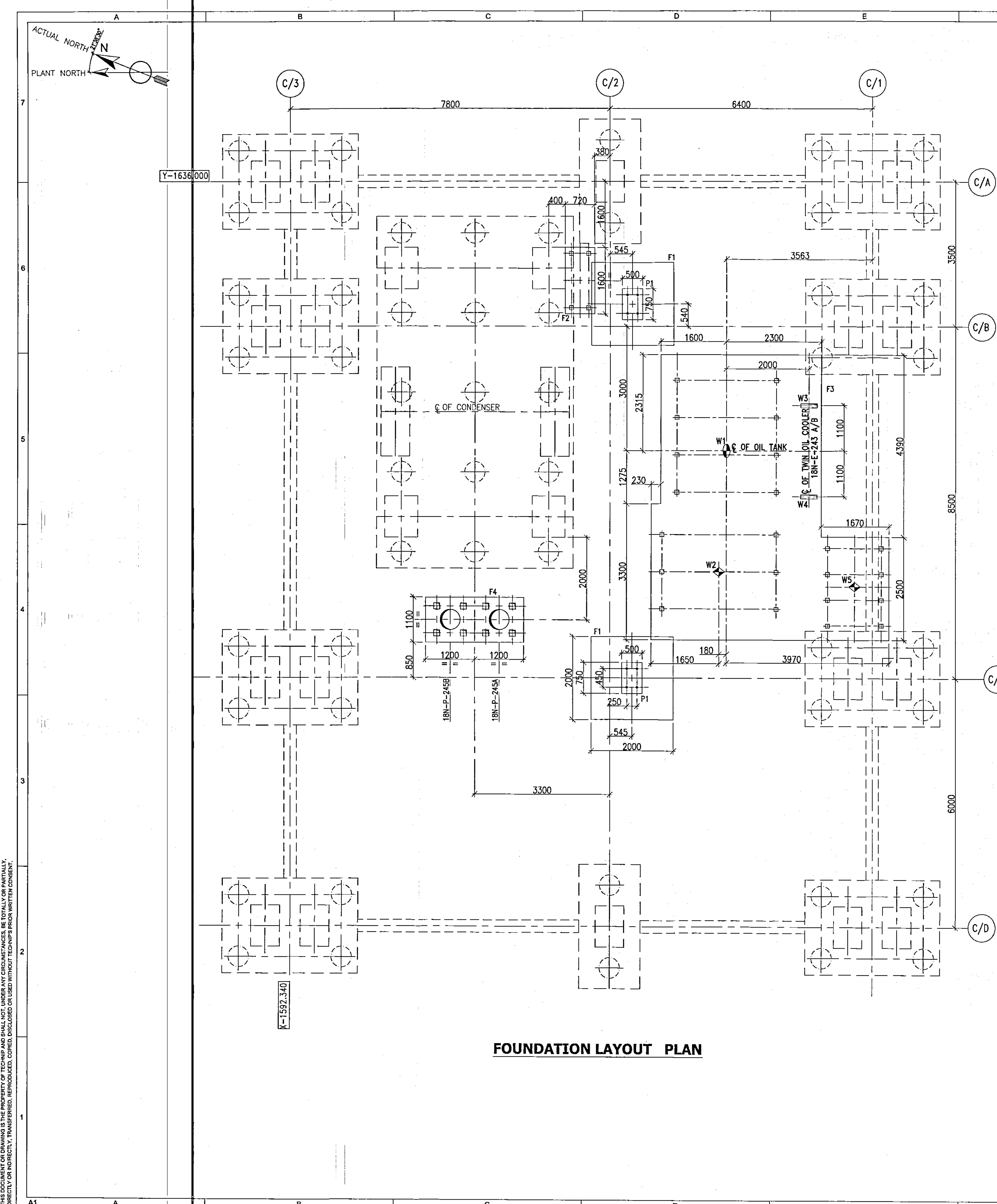
27	Suppressor				
a.	Type designation				
b.	Make				
28	Derating reqd. for Cap. Switching	%			
29	Earthing system	Integral earthing/ separate earthing carriage			
30	Copies of following test certificates enclosed	Yes/ No			
30. 1	For each type of offered circuit breaker panel with breaker				
a.	Short circuit tests (peak and 1 sec. withstand)				
b.	Heat run test				
c.	Internal arc test				
d.	Impulse and power freq. withstand				
30. 2	For each type of offered circuit breaker (in panel)				
a.	Short circuit test duties				

- * Switchboard offered shall be of proven design and shall have been successfully type tested. Type test certificates for an exactly identical design of offered switchboard shall be furnished by bidders. These test reports shall not be more than 5 years old, as on the final bid opening date. In case these type tests have not been conducted during the last 5 years, bidder shall conduct these type tests on the offered design of switchboard before dispatch without any cost and delivery impact.

PROTECTION RELAYING

TO BE COMPLETED BY		PURCHASER			MANUFACTURER TYPE/ SPEC'N	
1	IDMTL over current	Yes	No			
2	Inst. over current	Yes	No			
3	Under voltage	Yes	No			
4	Bucholz trip	Yes	No			
5	Restricted earth fault	Yes	No			
6	Unrestricted earth fault	Yes	No			
7	Bus differential protection	Yes	No			
8	Cable differential protection	Yes	No			
9						
10						
11						
12						
13	Current transformers					
	• For items	No	Ratio	VA		
	• For items	No	Ratio	VA		
Instrumentation and metering						
14	Local ammeter	Yes	No			
	• With pointer	Yes	No	A		Scale
15	Remote ammeter	Yes	No			
16	Voltmeter	Yes	No			
	• With pointer	Yes	No	V		Scale
17	Power factor meter	Yes	No			
18	Integrating wattmeter	Yes	No			
19	Bucholz Alarm	Yes	No			
20	Hours run	Yes	No			
21	Operations counter	Yes	No			
22	Healthy trip supply	Yes	No			
23						
24						
25						
26	Current transformers					
	• For Items	No.	: Ratio	VA		
	• For items	No.	: Ratio	VA		
Purchase remarks		None	Attached	Manufacturer remarks		None Attached

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FOUNDATION LAYOUT PLAN

MARK		SHAPE CODE (*)	STR. ELEMENT	REBAR QTY.		DIA. (mm)	BAR BENDING SCHEDULE (mm)						CUTTING LENGTH (mm)	TOTAL W.T. (kg)
		TYPE	NOS.	UNIT NOS.	TOTAL NOS.		A	B	C	D	E	H	L	
01	13	F1	2	44	88	16	-	275	-	275	1900	2400	2400	331.58
02	11	P1	2	16	32	20	-	500	-	-	-	2745	3225	254.90
03	17	P1	2	14	28	8	400	-	-	-	650	-	2275	25.48
04	17	P1	2	14	28	8	650	-	-	220	-	-	1900	21.28
05	17	P1	2	14	28	8	345	-	-	400	-	-	1650	18.48
06	18	P1	2	14	28	8	-	-	-	-	-	400	600	6.72
07	18	P1	2	14	28	8	-	-	-	-	-	650	850	9.52
08	13	F2	1	8	8	12	-	500	-	-	500	1500	2475	17.62
09	13	F2	1	18	18	12	-	500	-	-	500	620	1575	25.23
10	13	F2	1	8	8	12	-	550	-	-	550	1500	2575	18.33
11	13	F4	1	38	38	16	-	300	-	-	300	2480	3000	178.98
12	13	F4	1	26	26	16	-	700	-	-	700	2400	3750	153.07
13	13	F3	1	40	40	16	-	325	-	-	325	6790	7400	464.72
14	13	F3	1	16	16	16	-	325	-	-	325	2400	3090	75.36
15	13	F3	1	44	44	16	-	325	-	-	325	3800	4400	303.85
16	13	F3	1	10	10	16	-	325	-	-	325	4030	4625	72.61
17	13	F3	1	26	26	16	-	325	-	-	325	5700	6300	257.16
18	11	F3	1	4	4	16	-	2300	-	-	-	4340	6625	41.60
19	11	F3	1	4	4	16	-	2300	-	-	-	5140	7425	46.62
20	13	F3	1	4	4	16	-	3250	-	-	980	3200	7375	46.31
21	13	F3	1	4	4	16	-	3250	-	-	2420	2400	8025	50.39
TOTAL														2419.91

*NOTE: FOR SHAPE CODE REFER GENERAL NOTE FOR CONCRETE WORKS
DOC. NO. 00785-000-STC-1702-01.

MARK	STR. ELEMENT	TYPE	NO.S	CONC.(Cum)		TOTAL(Cum)	
				M25	LEAN MIX 1:4:8	M25	LEAN MIX 1:4:8
F1	FOUNDATION		2	2.00	0.33	4.00	0.66
F2	FOUNDATION		1	0.80	0.10	0.80	0.10
F3	FOUNDATION		1	22.26	2.48	22.26	2.48
F4	FOUNDATION		1	6.75	0.22	6.75	0.22
P1	PEDESTAL		2	0.89	-	1.78	-
TOTAL				35.59	3.46		

SUMMARY OF TMT REBARS		
S.NO.	BAR DIA.	TOTAL QUANTITY (IN K.G.)
1	8	116.48
2	10	-
3	12	78.19
4	16	2022.35
5	20	254.90
6	25	-
7	28	-
8	32	-
TOTAL		2471.92

REFERENCE DOCUMENTS/DRAWINGS			
DRAWINGS/DOCUMENT NO.	TITLE		
00785-18N-DW-0051-003	EQUIPMENT LAYOUT - PROPYLENE RECOVERY UNIT		
00785-000-LD-1790-01	CONSTRUCTION STANDARD FOR CONCRETE WORKS		
00785-18N-DW-2041-01	HEAT PUMP COMPRESSOR HOUSE - GA & R/F DETAIL OF FOUNDATION		
00785-18N-DW-1743-25	PROPYLENE RECOVERY UNIT - GA & R/F DETAIL OF FOUNDATION FOR HP COMPRESSOR (18N-K-201)		

NOTES:-

- ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN MM, UNO.
- EL. +100.000 CORRESPONDS TO +174.500M ABOVE MSL.
- ONLY FIGURED DIMENSIONS SHALL BE FOLLOWED AND THE SAME SHALL BE CHECKED & VERIFIED BEFORE EXECUTION OF THE WORK AT SITE.
- CONCRETE GRADE SHALL BE M25.
- REINFORCEMENT BARS SHALL BE HYSD/TMT STEEL BARS OF GRADE Fe415 CONFORMING TO IS : 1786.
- ANY DISCREPANCY IN THE DRAWING SHALL BE BROUGHT IN THE NOTICE OF ENGINEER-IN-CHARGE BEFORE EXECUTION.
- FOR GENERAL NOTES ON CONCRETE WORK REFER DRAWING NO 00785-000-STC-1702-01
- FOR ANCHOR BOLT DETAIL REFER CONSTRUCTION STANDARD FOR CONCRETE WORKS (00785-000-LD-1790-01).
- GROUT SHALL BE NON SHRINK (PREMIX TYPE) CEMENT BASED WITH A MINIMUM CRUSHING STRENGTH OF 40N/mm²
- REINFORCEMENT SHALL BE CALLED UP AS FOLLOW:-
(i) SLAB, FOOTING PILE CAP, BEAM STIRRUPS, COLUMN/PEDESTAL TIES :-
Y-12-13-150-01
HYSD BAR
BAR DIA
BAR MARK
SPACING
BAR SHAPE
(ii) COLUMN/PEDESTAL VERTICAL BARS, BEAM (T&B) MAIN BARS, SIDE FACE BARS :-
30-Y-25-14-01
NOS. OF BAR
HYSD BAR
BAR MARK
BAR SHAPE
BAR DIA
- THIS DRAWING SHALL BE READ IN CONJUNCTION WITH DRAWING NO 00785-18N-DW-1743-26 (SHT 2 OF 2)

LEGENDS					
TOP REINFORCEMENT					
BOTTOM REINFORCEMENT					
BOF	-	BOTTOM OF FOOTING	TB	-	TIE BEAM
TOG	-	TOP OF GROUTING	PC	-	PILE CAP
TOC	-	TOP OF CONCRETE	T/B	-	TOP & BOTTOM

BILL OF QUANTITIES			
SL.NO.	ITEM DESCRIPTION	UNIT	QTY.
1	EARTH WORK IN EXCAVATION	M ³	86.00
2	BLINDING CONCRETE (1:4:8)	M ³	3.46
3	FORMWORK	M ²	60.00
4	FOUNDATION CONCRETE (M25)	M ³	35.59
5	REINFORCEMENT STEEL	MT	2.47
6	NON-SHRINKING GROUT	M ³	2.125
7	ANCHOR BOLT	MT	-

HP COMPRESSOR HOUSE

KEY PLAN

REV.	DATE	REVISION DESCRIPTION	DRN	CHK	APP	PM
01	10.08.15	AS BUILT	LIK	ASNS	DLC	VJK
00	28.08.12	ISSUED FOR CONSTRUCTION	SVKS	DLC	PGR	VJK

PROJECT FCCU AND PRU REVAMP PROJECT

OWNER INDIAN OIL CORPORATION LTD. MATHURA REFINERY, INDIA

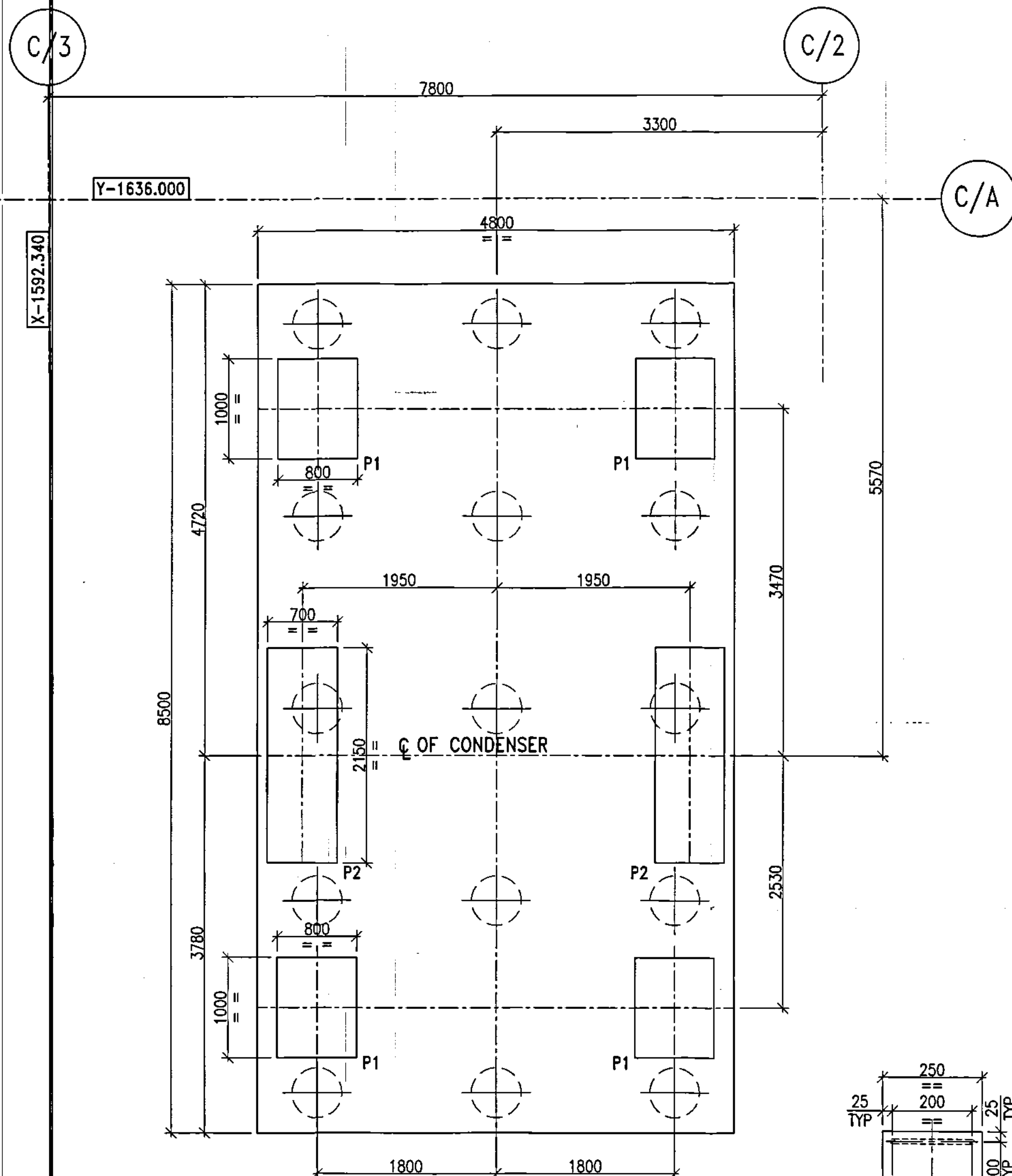
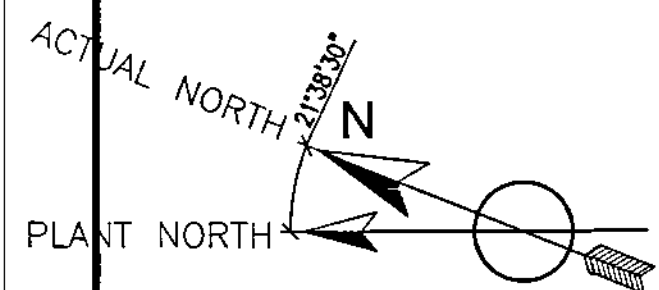
EPCM Technip

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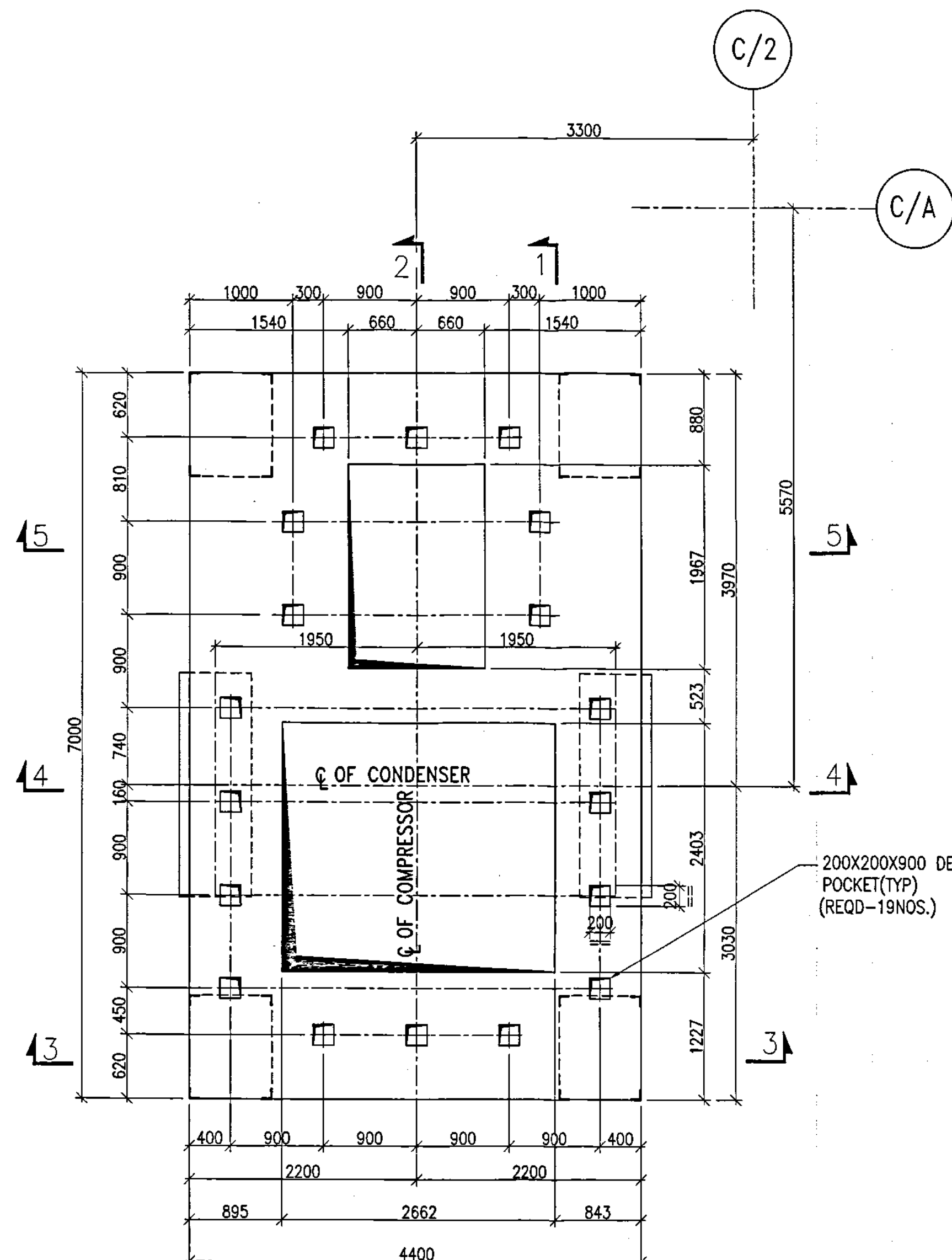
TITLE HEAT PUMP COMPRESSOR HOUSE GA & R/F DETAIL FOR AUXILIARY FOUNDATION

DRAWING NO.						PAGE	REV.
SCALE	PROJECT	UNIT	DOC. TYPE	DISC.	SUBJ.	SER. NO.	
1:50	00785	18N	DW	17	43	26	1 OF 2

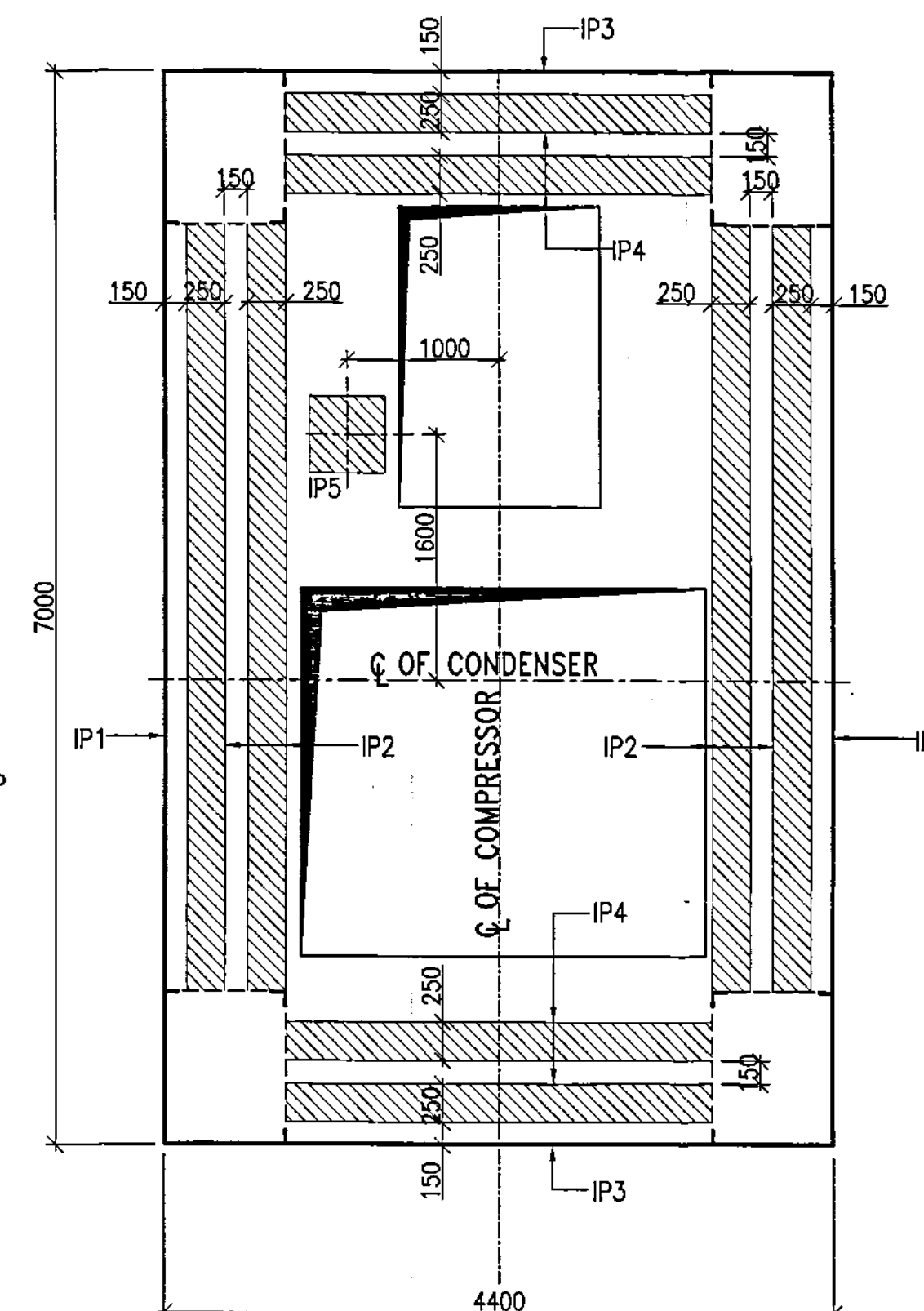
AS BUILT



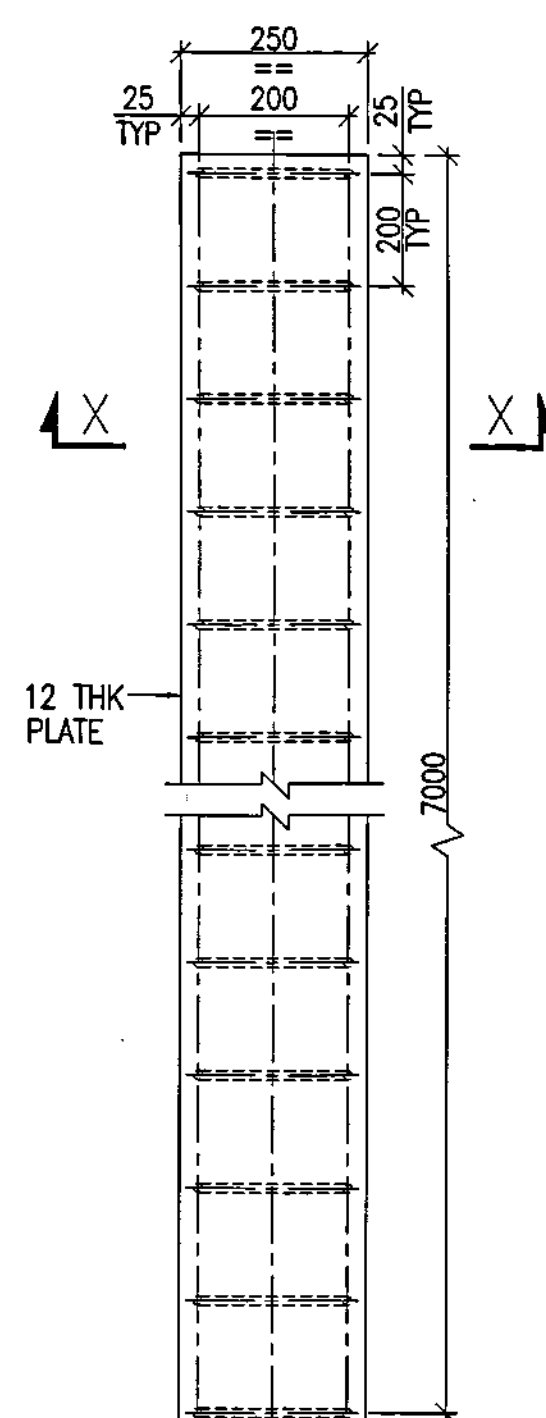
**FOUNDATION LAYOUT PLAN
(SHOWING GA ONLY)
(PILE CAP = 1000mm. THICK)**



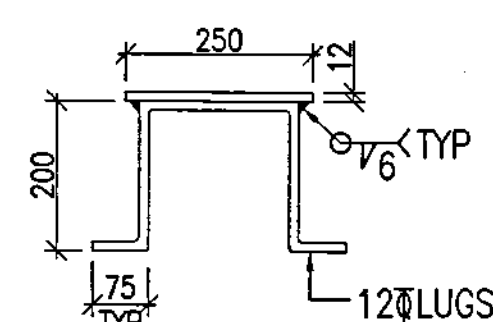
**PLAN AT EL. +107.300
(SHOWING GA ONLY)
(TOP DECK SLAB = 1000 mm.)**



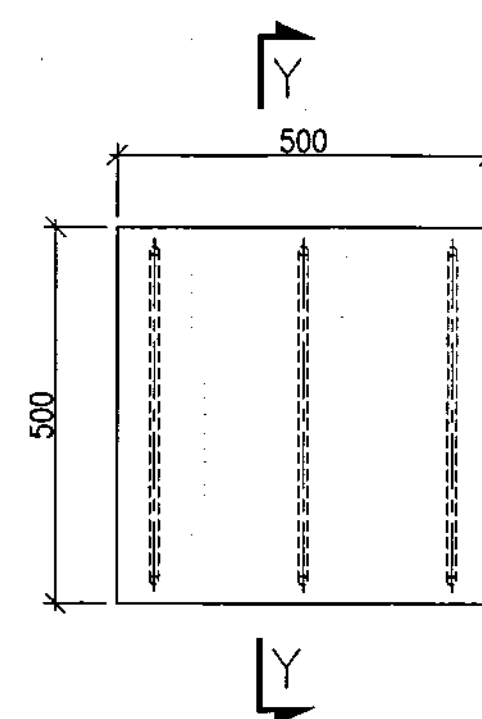
PLAN LOCATION OF EMBEDDED PLATES (IP)



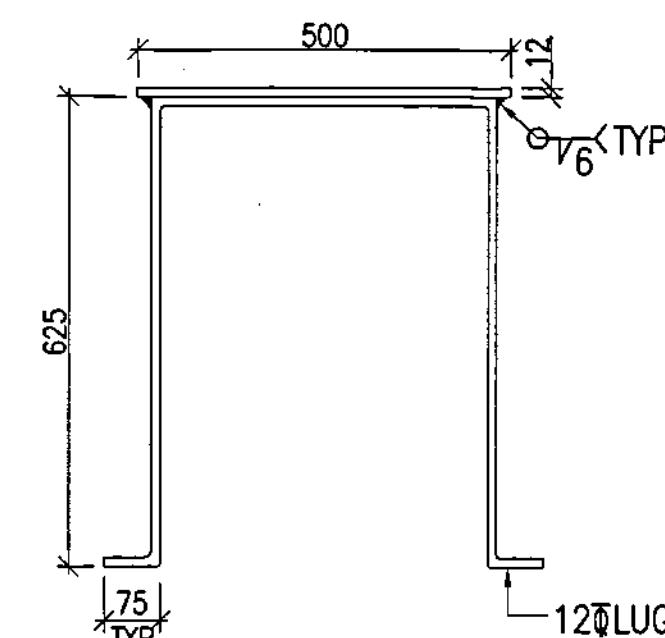
**TYP. DETAIL OF IP1-AS DRAWN
(7000X250X12 THK.)
DETAIL OF IP2-SIMILAR
(5000X250X12 THK.)
DETAIL OF IP3-SIMILAR
(4400X250X12 THK.)
DETAIL OF IP4-SIMILAR
(2800X250X12 THK.)**



SECTION X-X



**TYP. DETAIL OF IP5-AS DRAWN
(500X500X12 THK.)**



SECTION Y-Y

REFERENCE DOCUMENTS/DRAWINGS

DRAWINGS/DOCUMENT NO	TITLE
00785-18N-DW-0051-003	EQUIPMENT LAYOUT - PROPYLENE RECOVERY UNIT
00785-18N-DW-1432-01	PILE LAYOUT & DETAILS
00785-18N-CN-1733-25	FDN CALCULATION NOTE FOR COMPRESSOR HPC (18N-K-201)
00785-000-LD-1790-01	CONSTRUCTION STANDARD FOR CONCRETE WORKS

NOTES:-

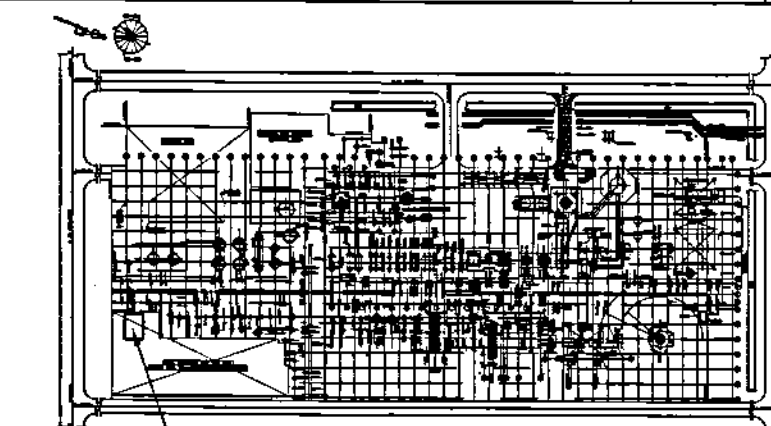
- ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M. UNO.
- EL +100.000 CORRESPONDS TO +174.500M ABOVE MSL.
- ONLY FIGURED DIMENSIONS SHALL BE FOLLOWED AND THE SAME SHALL BE CHECKED & VERIFIED BEFORE EXECUTION OF THE WORK AT SITE.
- CONCRETE GRADE SHALL BE M25.
- REINFORCEMENT BARS SHALL BE HYSD/TMT STEEL BARS OF GRADE Fe415 CONFORMING TO IS : 1786.
- ANY DISCREPANCY IN THE DRAWING SHALL BE BROUGHT IN THE NOTICE OF ENGINEER-IN-CHARGE BEFORE EXECUTION.
- FOR GENERAL NOTES ON CONCRETE WORK REFER DRAWING NO 00785-000-STC-1702-01
- FOR ANCHOR BOLT DETAIL REFER CONSTRUCTION STANDARD FOR CONCRETE WORKS (00785-000-LD-1790-01).
- GROUT SHALL BE NON SHRINK (PREMIUM TYPE) CEMENT BASED WITH A MINIMUM CRUSHING STRENGTH OF 40N/mm²
- TOP DECK SLAB SHALL BE CAST IN A SINGLE POUR.
- REINFORCEMENT SHALL BE CALLED UP AS FOLLOW:-
(i) SLAB, FOOTING PILE CAP, BEAM STIRRUPS, COLUMN/PEDESTAL TIES :-
Y-12-13-150-01
HYSD BAR
BAR DIA
BAR MARK
SPACING
BAR SHAPE
(ii) COLUMN/PEDESTAL VERTICAL BARS, BEAM (T&B) MAIN BARS, SIDE FACE BARS :-
30-Y-25-14-01
NOS. OF BAR
HYSD BAR
BAR MARK
BAR SHAPE
BAR DIA
- THIS DWG. SHALL BE READ IN CONJUNCTION WITH DWG. NO.- 00785-020-DW-17-43-02 SHT.2 OF 4 TO SHT.4 OF 4

LEGENDS

TOP REINFORCEMENT	---
BOTTOM REINFORCEMENT	---
BOF - BOTTOM OF FOOTING	T/B - TOP & BOTTOM
TOG - TOP OF GROUTING	
TOC - TOP OF CONCRETE	
FDN - FOUNDATION	

BILL OF QUANTITIES

SL.NO.	ITEM DESCRIPTION	UNIT	QTY.
1	EARTH WORK IN EXCAVATION	M ³	113.00
2	BLINDING CONCRETE (1:5:10)	M ³	3.16
3	FORMWORK	M ²	220.00
4	FOUNDATION CONCRETE (M25)	M ³	97.66
5	REINFORCEMENT STEEL	MT	11.67
6	NON-SHRINKING GROUT	M ³	2.40
7	ANCHOR BOLT	MT	-



**COMPRESSOR HPC (18N-K-201)
FCCU KEY PLAN**

AS BUILT

REV.	DATE	REVISION DESCRIPTION	DRN	CHK	APP	PM
01	10.08.15	AS BUILT	UK	ASNS	DLA	VJK
00	08.12.11	ISSUED FOR CONSTRUCTION	SVKS	DLC	PGR	VJK
B	30.08.11	ISSUED FOR REVIEW	SVKS	DLC	PGR	VJK

PROJECT **FCCU AND PRU REVAMP PROJECT**

OWNER **INDIAN OIL CORPORATION LTD.
MATHURA REFINERY, INDIA**

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TITLE **PROPYLENE RECOVERY UNIT
G.A & R/F DETAIL OF FOUNDATION FOR
HP COMPRESSOR (18N-K-201)**

SCALE	00785	18N	DW	17	43	25	PAGE	REV.
1:40	PROJECT	UNIT	DOC.TYPE	DISC.	SUBJ.	SER.NO.	1 OF 4	01

IOCL, MATHURA REFINERY

ANNEXURE-3

LIST OF MANDATORY SPARE PARTS FOR HPC HIGH-
SPEED MOTOR PACKAGE

List of Mandatory Spare Parts

Mandatory spares shall be procured along with the main equipment. Such spares for each equipment item shall be as per below table. These spares include only those spares, which are critical for equipment and require longer delivery periods. Unit price of each of the listed spares shall be indicated separately in the proposal.

Mandatory spares to be supplied along with VFDs

Description	Description of Mandatory spares (Qty per item tag no.)
Power components i.e., Power cells/ IGBT/ IGCTs /Thyristors / Diode for CSI etc depending upon Technology used.	For each type-20 % or minimum 4 (whichever is higher)
All type of electronic card such as VFD Power converter cards; Firing card, processor, IO card, Driver board, Power supply cards, Power fuses, VFD Control cards, VFD Display cards/ VFD Display unit, communication card etc.	For each type-20 % or minimum 2 (whichever is higher)
VFD / Panel Cooling fans	For each type-20 % or minimum 4 (whichever is higher)
Semiconductor fuses	For each type & make-20 % or minimum 6 (whichever is higher)
Communication cables/ ribbon cables/FO cables used for internal circuitry	1 sets
Capacitor AC/DC	For each type & make-20 % or minimum 4 (whichever is higher)
complete set of removable air filter installed in one drive panel (other than installed in drive)	2 sets
Contactors	10% of each type OR 1 no. (min.) of each type, (whichever is more)
Indicating lamps	20% OR 1 no. (min.), (whichever is more)
Indicating lamp covers	2 nos. of each color.

Mandatory spares to be supplied along Relay/ PLC based changeover panel as per specification

Description	Description of Mandatory spares (Qty per item tag no.)
Multilin M60 (or equivalent)/PLC System	1 no
Splitters/Transducers	For each type & make -20 % or minimum 2 (whichever is higher)
Switches	For each type & make-20 % or minimum 2 (whichever is higher)
Auxiliary relays/contactors/Fuse/MCBs/ power supply	For each type & make-20 % or minimum 2 (whichever is higher)
All type of electronic card such as processor/ IO / power supply/ Communication network hardware/ one main numerical relay/ PLC internal battery 2 nos and any other card as available in system.	For each type-20 % or minimum 2 (whichever is higher)

List of Mandatory Spare Parts

Mandatory spares to be supplied along with High-Speed Motor

Description	Description of Mandatory spares (Qty per item tag no.)
Bearings (DE and NDE side)	1 set
External Cooler fans	1 nos
Terminal studs / Bushing Assembly	1 set
Temperature indicator assembly	1 nos
Supports insulators if applicable	one set
motor cable end termination kit	1 set
Motor differential CT	1 set (for installation at panel end) + 1 spare motor differential CT
LA and surge capacitor (if included in design)	1 nos

Any other recommended mandatory spares required, shall be specified by the Vendor.

IOCL, MATHURA REFINERY

ANNEXURE-9

HPC COMPRESSOR DATA

HPC Compressor Data

Item : HEAT PUMP COMPRESSOR (18N-K-201)

Service : HEAT PUMP COMPRESSOR

Manufacturer : BHEL

Model : MCL 522

Driver type : MP STEAM CONDENSING TURBINE

Operating Conditions:

Process Control : Speed Variation from 93 % to 105 %

Speed (rpm) : 5460 (Normal) : 5605 (Design) : 5247 (Turn Down)

Construction Features:

Speeds: Max Cont. 5885 rpm : Trip 6474 rpm

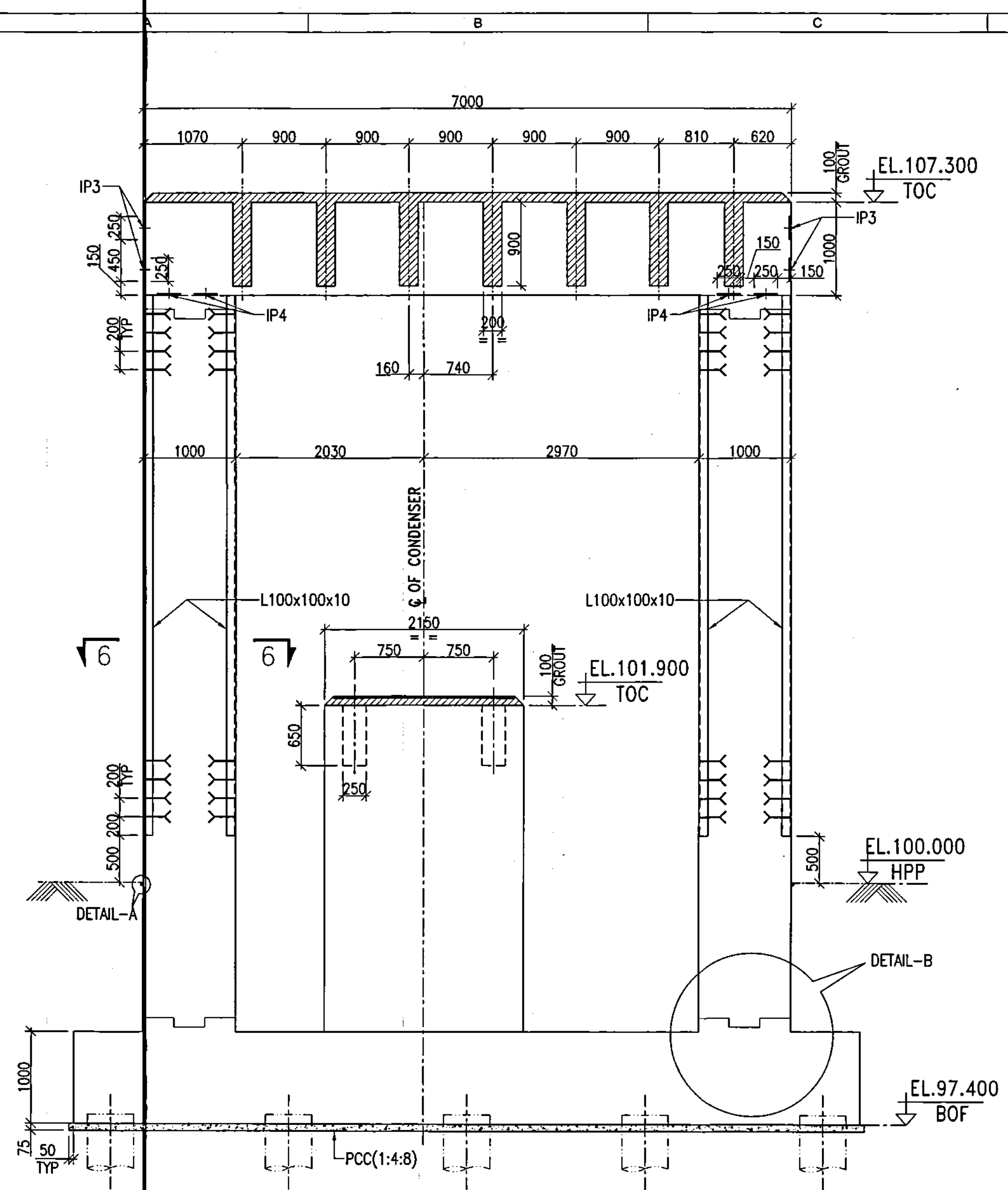
Lateral Critical Speeds (Damped) : First Critical ~4200 rpm : Second Critical ~17500 rpm

Shaft: One Piece

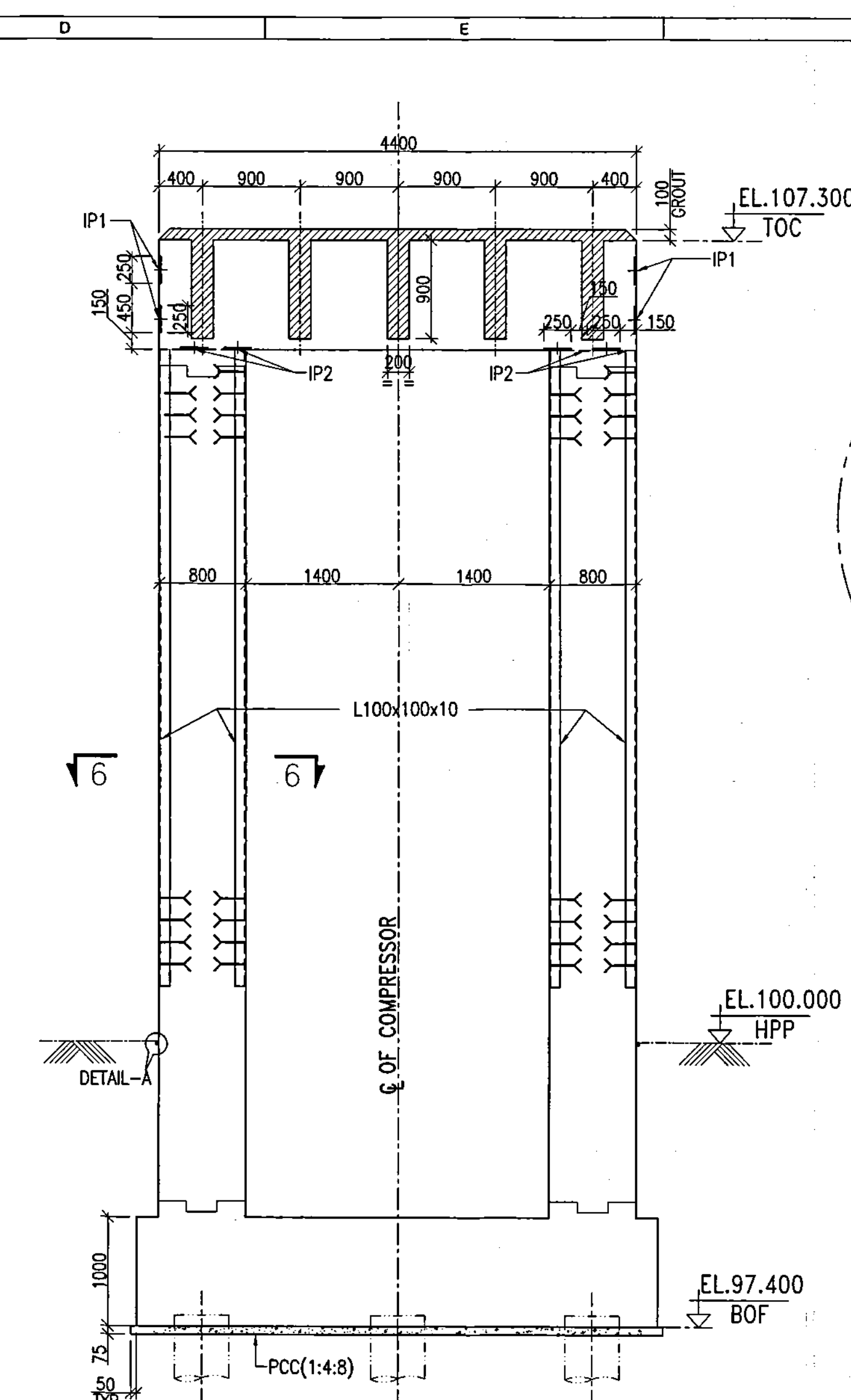
Rotation, Viewed from Driven End : Clockwise.

Coupling Manufacturer: M/s Euroflex

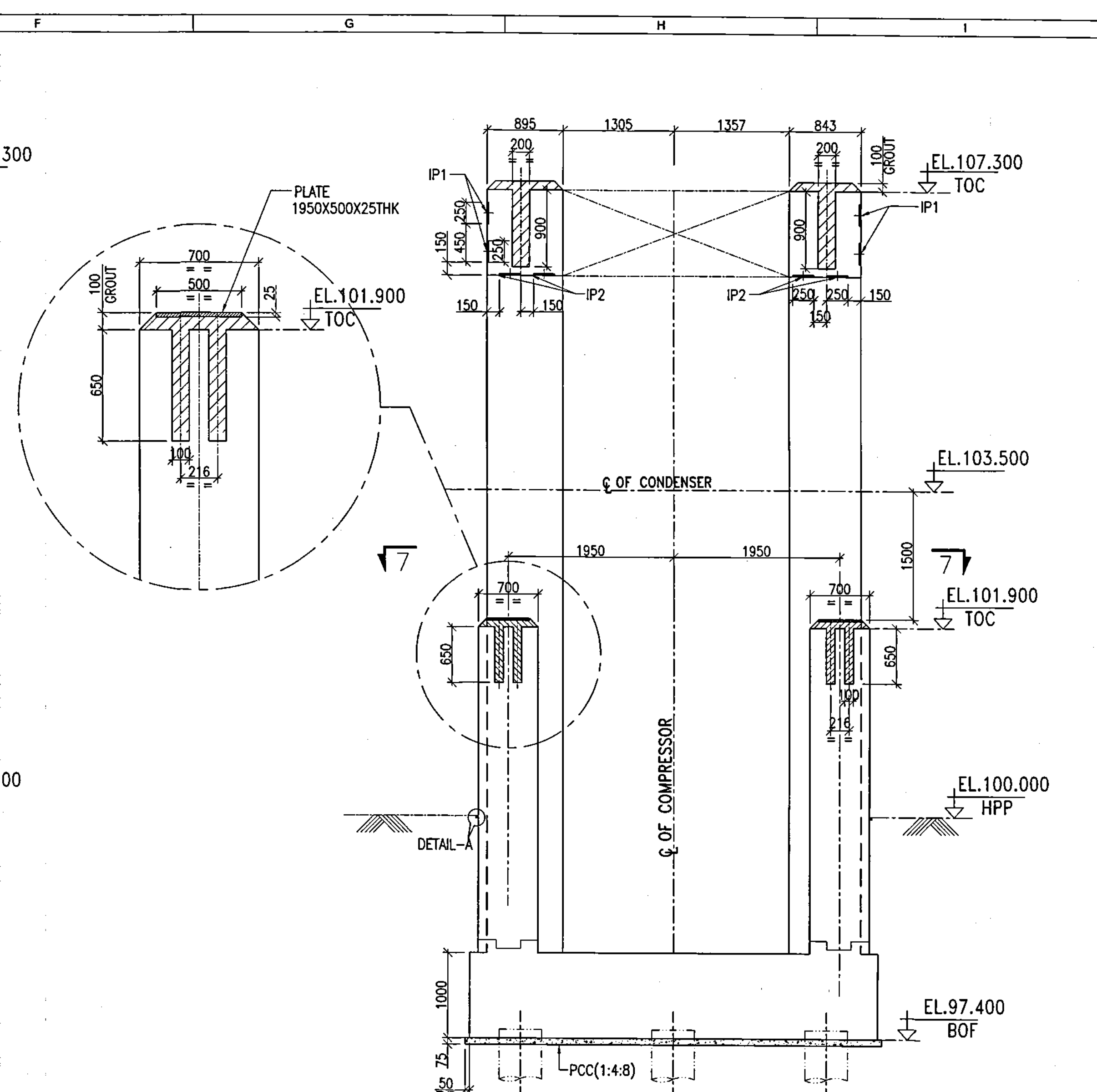
Coupling Type: Flexible Metallic disc



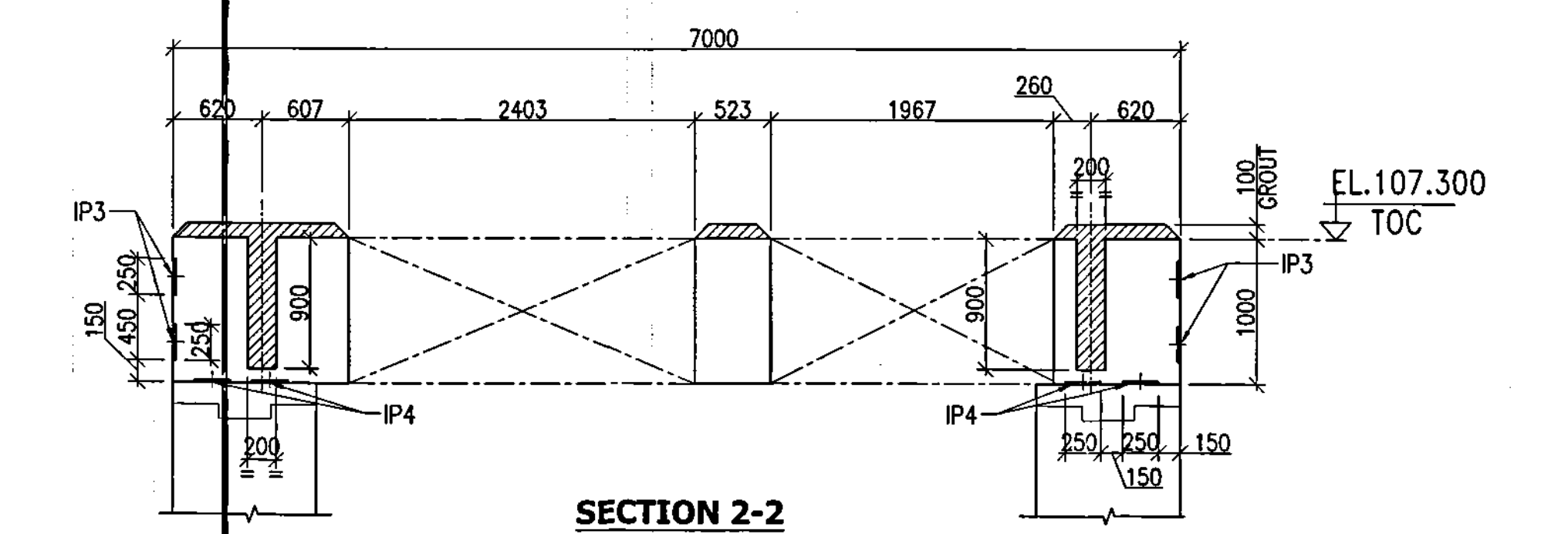
SECTION 1-1



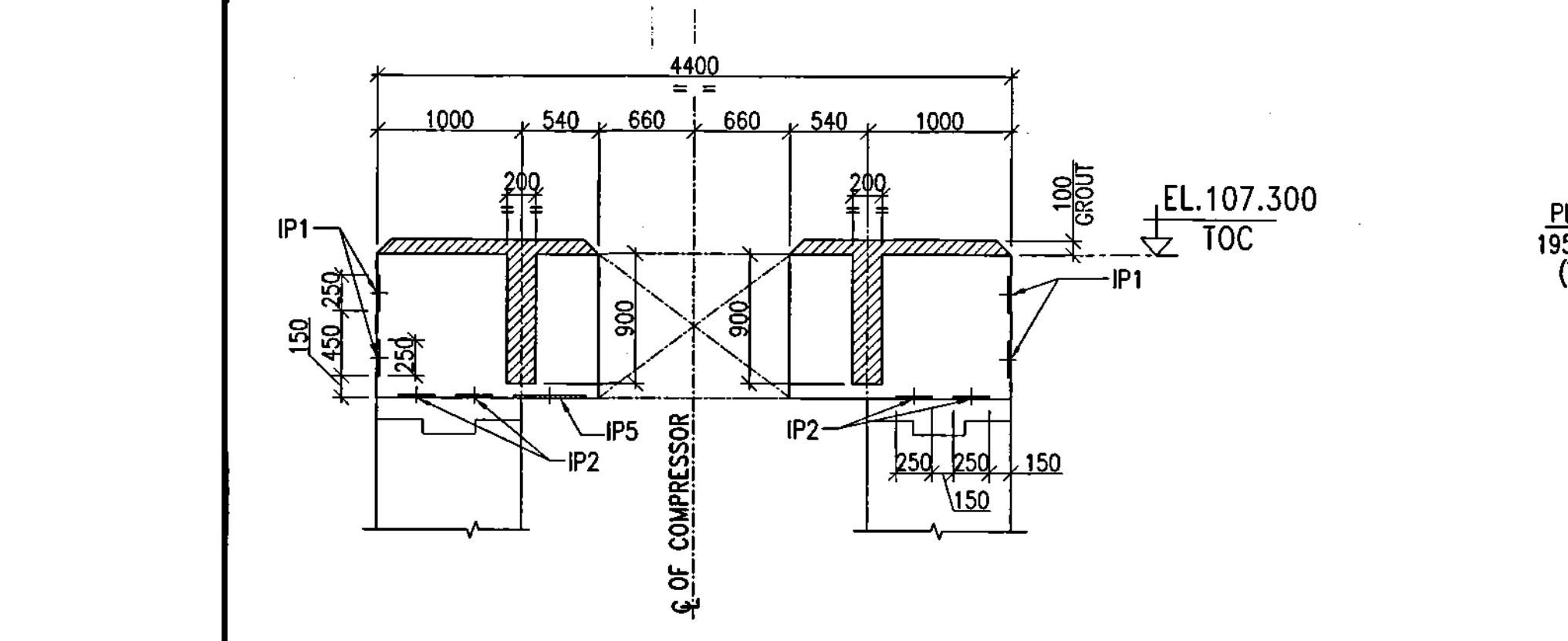
SECTION 3-3



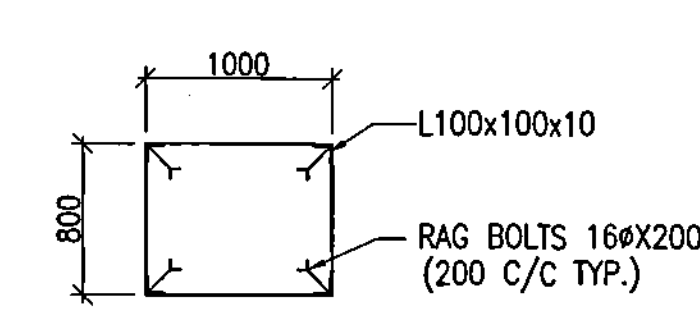
SECTION 4-4



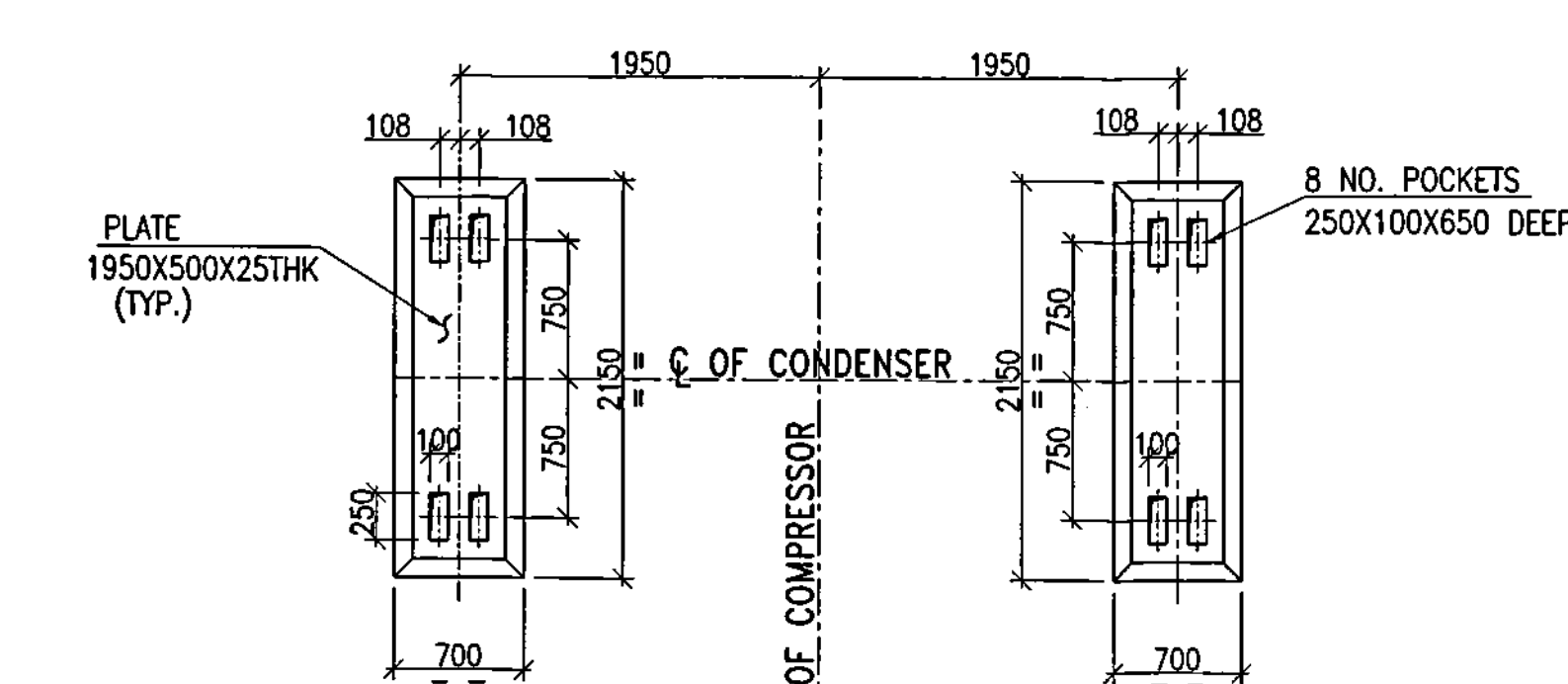
SECTION 2-2



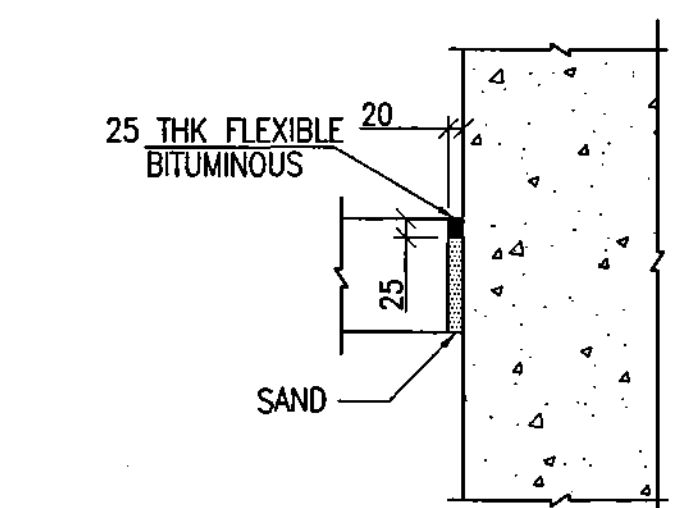
SECTION 5-5



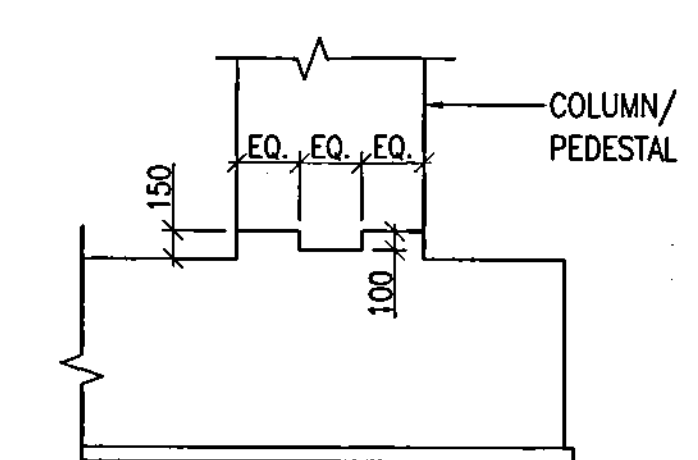
SECTION 6-6
(SHOWING PEDESTAL MKD P1)



VIEW 7-7



DETAIL-A
ISOLATION JOINT ALL AROUND
(SCALE 1:10)



DETAIL-B
TYP. DETAIL OF CONSTRUCTION JOINT

AS BUILT

NOTES:-
1. THIS DWG. SHALL BE READ IN CONJUNCTION WITH DWG. NO.-00785-18N-DW-1743-25 SHT.1 OF 4, SHT.3 OF 4 & SHT.4 OF 4

REV.	DATE	REVISION DESCRIPTION	DRN	CHK	APP	PM
01	10.08.15	AS BUILT	SVKS	DLC	PGR	VJK
00	08.12.11	ISSUED FOR CONSTRUCTION	SVKS	DLC	PGR	VJK
B	30.08.11	ISSUED FOR REVIEW	SVKS	DLC	PGR	VJK

PROJECT FCCU AND PRU REVAMP PROJECT

OWNER INDIAN OIL CORPORATION LTD.
MATHURA REFINERY, INDIA

EPCM Technip
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TITLE PROPYLENE RECOVERY UNIT
G.A & R/F DETAIL OF FOUNDATION FOR HP COMPRESSOR (18N-K-201)

SCALE	00785	18N	DW	17	43	25	PAGE	REV.
1:40	PROJECT	UNIT	DOC.TYPE	DISC.	SUBJ.	SER.NO.	2 OF 4	01

DISTR: TOCL

Annexure-8

**GENERAL SPECIFICATION
FOR
MEDIUM AND HIGH VOLTAGE
CABLES & ACCESSORIES**

Abbreviations:

ASTM	:	American Society for Testing and Materials
BIS	:	Bureau of Indian Standards
BS	:	British Standard
DGMS	:	Director General of Mines and Safety
EPR	:	Ethylene Propylene Rubber
FR	:	Flame Retardant
HR PVC	:	Heat Resistant Polyvinyl Chloride
ICEA	:	Insulated Cable Engineers Association
IEC	:	International Electrotechnical Commission
IS	:	Indian Standards
NEMA	:	National Electrical Manufacturers Association
PEM	:	Project Engineering Management
PVC	:	Polyvinyl Chloride
UV	:	Ultra Violet
XLPE	:	Crosslinked Polyethylene

CONTENTS

SL. NO.	DESCRIPTION	PAGE NO.
1.0	SCOPE	4
2.0	STANDARDS	4
3.0	GENERAL CONSTRUCTION	5
4.0	CABLE ACCESSORIES	9
5.0	INSPECTION, TESTING AND ACCEPTANCE	10
6.0	PACKING AND DESPATCH	12
7.0	DOCUMENTATION	13
8.0	QAP ANNEXURE	14
9.0	DATA SHEET	15

1.0 SCOPE

This specification along with data sheets covers requirements for design, manufacture, testing at works and supply of Flame Retardant Medium & High Voltage cables and cable jointing/ terminating accessories for medium and high voltage systems.

2.0 STANDARDS

2.1 The cables and cables jointing & terminating accessories shall comply with the latest edition of the following standards as applicable:

IS: 209	:	Specification for zinc.
IS: 1554	:	PVC insulated (heavy duty) electric cables.
IS: 3961(Pt-2)	:	Recommended current ratings for cables: Part - 2 PVC Insulated and PVC sheathed heavy-duty cables.
IS: 3975	:	Mild steel wires, strips and tapes for armouring of cables.
IS: 5831	:	PVC insulation and sheath of electric cables.
IS: 6380	:	Specification for Elastomeric Insulation and Sheath of Electric cables
IS: 7098	:	Cross-linked polyethylene insulated PVC sheathed
IS: 8130	:	Conductors for insulated electric cables and flexible cords.
IS: 10418	:	Drums for electric cables.
IS: 10462 (Pt-1)	:	Fictitious calculation method for determination of Dimensions of protective coverings of cables: Part -1 Electrometric and thermo- plastic insulated cables.
IS: 10810	:	Methods of test for cables: Part 41: Mass of zinc coating on steel armour Part 58: Oxygen Index test Part-61: Flame Retardant test Part-62:Fire resistance test for bunched cables
IS: 13573	:	Joints and terminations for polymeric cables for working Voltages from 6.6KV up to and including 33KV
IEC: 60331-21:	:	Tests for electric cables under Fire conditions Circuit integrity - Procedures and requirements - Cables of rated voltage up and including 0.6/1.0 kV
IEC: 60332-3	:	Tests on electric cables under fire conditions.
NEMA-WC70	:	Standard for Non Shielded Power cables rated 2000 Volts or less for the distribution of electrical energy.
NEMA-WC53	:	Standard test methods for Extruded Dielectric Power, control,Instrumentation and Portable cables for test

DIN-53387	:	Artificial weathering and ageing of plastics and elastomers by exposure to Filtered xenon arc radiation
ASTM-G-154	:	Standard practice for Operating Fluorescent Light Apparatus for UV Exposure of non metallic materials
BS: 7846	:	Electric cables- 600/1 OOOV armoured fire resistant cables having thermosetting insulation and low emission of smoke and corrosive gases when affected by fire

2.2 The cables and accessories shall also conform to the provisions of Indian Electricity Rules and other statutory regulations, as applicable.

2.3 In case of any contradiction between various referred standard/ specification/data sheet and statutory regulations, the following order of priority shall govern:

Statutory Regulations
Data Sheets
Job Specifications
This Specification
Codes and Standards

All conflicts between the requirements of this specification & other relevant documents shall be referred to principal for resolution.

3.0 GENERAL CONSTRUCTION

3.1 The cables shall be suitable for laying in trays, trenches, ducts, and conduits and for underground-buried installation with uncontrolled backfill and possibility of flooding by water and chemicals.

3.2 Outer sheath of all cables shall be black in colour and the minimum value of oxygen index shall be 29 ± 2 at 27 ± 2 °C. In addition suitable chemicals shall be added into the PVC compound of the outer sheath to protect the cable against rodent and termite attack.

3.3 All power cables covered in this specification shall be flame retardant (FR). All control cables shall be flame retardant low smoke (FRLS) type. The outer sheath of cables shall possess flame propagation properties meeting requirements as per IS-10810 (Part-62) category AF.

3.4 Sequential marking of the length of the cable in metres shall be provided on the outer sheath at every one metre. The embossing /engraving shall be legible and indelible.

- 3.5 The overall diameter of the cables shall be strictly as per the values declared by the manufacturer in the technical information subject to a maximum tolerance of ± 2 mm up to overall diameter of 60mm and ± 3 mm for beyond 60mm.
- 3.6 PVC/ Rubber end caps shall be supplied free of cost for each drum with a minimum of eight per thousand metre length. In addition, ends of the cables shall be properly sealed with caps to avoid ingress of water during transportation and storage.

3.7 Medium Voltage Cables

- 3.7.1 All power/control cables for use on medium voltage systems shall be heavy-duty type, 650/1100 V grade with aluminium/copper conductor, PVC insulated, inner-sheathed, armoured/ unarmoured and overall PVC sheathed unless specified otherwise in data sheet
- 3.7.2 The conductors shall be solid for conductor of nominal area up to and including 6mm^2 and stranded beyond 6mm^2 . Conductors of nominal area less than 16mm^2 shall be circular only. Conductors of nominal area 16mm^2 and above may be circular or shaped as per IS 8130. Cables with reduced neutral conductor shall have sizes as per Table 1 of IS 1554 (Part-1).
- 3.7.3 The core insulation shall be with PVC compound applied over the conductor by extrusion and shall conform to the requirements of type 'A' compound as per IS: 5831. The thickness of insulation and the tolerance on thickness of insulation shall be as per Table 2 of IS: 1554(Part-1). Control cables having 6 cores and above shall be identified with prominent and indelible Arabic numerals on the outer surface of the insulation. Colour of the numbers shall contrast with the colour of insulation with a spacing of maximum 50 mm between two consecutive numbers. Colour coding for cables up to 5 cores shall be as per Indian standard.
- 3.7.4 The inner sheath shall be applied over the laid-up cores by extrusion and shall be of PVC conforming to the requirements of Type ST-1 PVC compound as per IS: 5831. The minimum thickness of inner sheath shall be as per IS: 1554 (Part-1). Single core cables shall have no inner sheath.
- 3.7.5 Unless otherwise specified all cables shall be provided with armour. For multicore cables, the armour shall be by single round galvanised steel wires where the calculated diameter below armouring does not exceed 13 mm and by galvanised steel strips where this dimension is greater than 13 mm. Requirement and methods of tests for armour material and uniformity of galvanisation shall be as per IS - 3975 and IS -10810 (Part 41). The dimensions of armour shall be as per method (b) of IS-1554 (Part -1). For single core cables, the armour shall be with H4 grade hard drawn aluminium round wire of 2.5 mm diameter.

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3.7.6 The outer sheath for the cables shall be applied by extrusion and shall be of PVC compound conforming to the requirements of type ST-1 compound as per IS: 5831. The minimum and average thickness of outer sheath for unarmoured cables and minimum thickness of outer sheath for armoured cables shall be as per IS: 1554 (Part -1).

3.7.7 If heat resisting PVC cables are specified in the data sheet, the following shall be the requirements:

It shall be possible to continuously operate the cable at a maximum conductor temperature of 85°C. PVC compounds used for HR PVC cables shall be as follows:

- a. Conductor insulation - Type C
- b. Inner sheath - Type ST-2
- c. Outer sheath - Type ST-2

3.7.8 The fire survival cables shall meet the following additional requirements:

- i. The insulation shall be of EPR or equivalent material with glass mica tape below or above insulation.
- ii. Unless otherwise specified the cables shall meet requirement of circuit integrity test for a minimum period of 3 hours at max. Temperature of 950°C.

3.8 High Voltage Cables

3.8.1 Power cables for 3.3 KV up to and including 33 KV systems shall be Aluminium/ copper conductor, XLPE insulated, armoured/ unarmoured and overall PVC sheathed.

3.8.2 The conductors shall be stranded and compacted circular for all cables.

3.8.3 All cables rated 3.8 / 6.6KV and above shall be provided with both conductor screening and insulation screening. The conductors shall be provided with non-metallic extruded semi conducting screen.

3.8.4 The core insulation shall be with cross linked polyethylene insulating compound dry cured, applied by extrusion. It shall be free from voids and shall withstand all mechanical and thermal stresses under steady state and transient operating conditions. It shall conform to the properties given in Table-1 of IS: 7098 (Part -2).

3.8.5 The insulation screen shall consist of non-metallic extruded semi-conducting compound in combination with a non-magnetic metallic copper screen. Unless specified otherwise, the copper screen for all the three cores together shall be capable of carrying the single line to ground fault current value and the duration specified in the data sheet.

- 3.8.6 The conductor screen, XLPE insulation and insulation screen shall all be extruded in one operation by 'Triple Extrusion' process to ensure perfect bonding between the layers. The core identification shall be by coloured strips.
- 3.8.7 The inner sheath shall be applied over the laid up cores by extrusion and shall conform to the requirements of type ST 2 compound of IS: 5831. The extruded inner sheath shall be of uniform thickness. In case of single core cables, there shall be extruded inner sheath between insulation metallic screen and armouring.
- 3.8.8 Unless otherwise specified all cables shall be provided with armour. For multicore cables, the armour shall be by galvanised steel strips Requirement and methods of tests for armour material and uniformity of galvanisation shall be as per IS-3975 and IS -10810 (Part 41). The dimensions of armour shall be as per method (b) of IS - 7098 (Part -2). For single core cables, the armour shall be with H4 grade hard drawn aluminium round wire of 2.5 mm diameter.
- 3.8.9 The outer sheath of the cables shall be applied by extrusion over the armouring and shall be of PVC compound conforming to the requirements of Type ST 2 compound of IS: 5831. The minimum and average thickness of outer sheath for unarmoured cables and minimum thickness of outer sheath for armoured cables shall be as per IS: 7098 (Part-2)
- 3.8.10 The thickness of the insulation, inner sheath shall be governed by values given in IS: 7098 (Part -2).
- 3.8.11 Where specified, 1100 V grade power cables shall also be XLPE insulated and shall meet the requirement specified in IS-7098 (Part-1). The voltage grade of the XLPE insulated cables shall be either earthed/ un-earthed grade as per data sheet.
- 3.8.12 Continuous conductor temperature and short circuit conductor temperature of XLPE insulated cable shall be as per IS : 7098 (Part-2).
- 3.8.13 Vendor shall offer cables with water swellable tape of semi conducting material for XLPE HT cables to avoid longitudinal moisture propagation and penetration.
- 3.8.14 The semi conducting water swellable tapes shall be applied bellow copper screen on individual core with at least 25% overlap.
- 3.8.15 The vendor shall enclose a brief description on the method of application of water swellable tape on the cable cores.
- 3.8.16 The vendor shall submit cross sectional drawing of the cable to clearly show the location of such a tapes.

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- 3.8.17 The eccentricity of the core shall not exceed 15% and ovality not to exceed 5%. Method of curing for cables shall be "dry curing". The eccentricity of the insulation shall be calculated as:

$$\frac{t_{\max} - t_{\min}}{t_{\max}} \times 100 \text{ and}$$

Ovality shall be calculated as

$$\frac{d_{\max} - d_{\min}}{d_{\max}} \times 100$$

Where $t_{\max}$ / $t_{\min}$ is the maximum/ minimum thickness of the insulation and $d_{\max}$ / $d_{\min}$ is the maximum/ minimum diameter of the core.

4.0 CABLE ACCESSORIES

- 4.1 The termination and straight through jointing kits for use on the systems shall be suitable for the type of cables offered as per this specification and shall meet requirements of IS 13573.
- 4.2 The accessories shall be supplied in kit form. Each component of the kit shall carry the manufacturer's mark of origin.
- 4.3 The kit shall include all stress grading, insulating and sealing materials apart from conductor fittings and consumable items. An installation instruction sheet shall also be included in each kit.
- 4.4 The contents of the accessories kit including all consumable shall be suitable for storage without deterioration at a temperature of 45°C, with shelf life extending to more than 5 years.
- 4.5 Only heat shrinkable/ push on type jointing kits are to be considered.

4.6 Terminating Kits

The terminating kits shall be suitable for termination of the cables to an indoor switchgear or to a weatherproof cable box of an outdoor mounted transformer/ motor. For outdoor terminations, weather shields/ sealing ends and any other accessories required shall also form part of the kit. The terminating kits shall be from one of the makes / types mentioned in the data sheet.

4.7 Jointing Kits

The straight through jointing kits shall be suitable for installation on overhead trays, concrete lined trenches, and ducts and for underground burial with uncontrolled backfill and possibility of flooding by water and chemicals. These shall have protection against any

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mechanical damage and suitably designed to be protected against rodent and termite attack. The inner sheath similar to that provided for cables shall be provided as part of straight through joint. The jointing kits shall be heat shrinkable/ push on type, from one of the makes/ types mentioned in the data sheet.

5.0 INSPECTION, TESTING AND ACCEPTANCE

The cables shall be tested and inspected at the manufacturer's works. All the materials employed in the manufacture of the cable shall be subjected, both before and after manufacture, to examination, testing and approval by PMC/ owner. Manufacturer shall furnish all necessary information concerning the supply to PMC/ owner's inspectors. The inspector shall have free access to the manufacturer's works for the purpose of inspecting the process of manufacture in all its stages and he will have the power to reject any material, which appears to him to be of unsuitable description or of unsatisfactory quality. The vendor shall give at least 2 weeks advance notice to the purchaser, regarding the date of testing to enable him or his representative to witness the tests. All the tests must be done as per the approved (PMC/ Owner) QAP.

5.1 Cables

- 5.1.1 After completion of manufacture of cables and prior to despatch, the cables shall be subjected to type, routine, acceptance and special tests as detailed below. PMC/ Owner reserve the right to witness all tests with sufficient advance notice from vendor. The test reports for all cables shall be got approved from the Engineer before despatch of the cables.
- 5.1.2 All routine tests, acceptance tests, type tests and additional type tests for improved fire performance shall be carried out as listed in IS: 1554 (Part-1), and IS: 7098 (Part-2) on PVC and XLPE insulated cables respectively.
- 5.1.3 The test requirements for PVC insulation and sheath of cables shall be as per latest revision of IS: 5831.
- 5.1.4 Test for Resistance to Ultra Violet Radiation: This test shall be carried out as per DIN 53387 or ASTM-G-154 on outer sheath. The retention value of tensile strength and ultimate elongation after the test shall be minimum 60% of tensile strength and ultimate elongation before the test. Test certificates with respect to this test (not older than one year) from recognized testing laboratory to be furnished for review by PMC before despatch clearance of cables. In case test certificates are not available, test is to be conducted by vendor at his own cost in any recognised test laboratory or in house testing laboratory, before despatch clearance of cables. Sampling for this test is to be done randomly once for each order, provided outer sheath remains same.

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5.1.5 Acceptance tests as per IS-1554 (Part-I) and IS-7098 (Part-2) and the following special tests to be performed on the cables as per sampling plan. These tests are required to be witnessed by PMC/ owner before despatch of cables as per QAP requirements.

- a. Accelerated water absorption test for insulation as per NEMA-WC-70 (For PVC insulated cables) and as per NEMA-WC-53 (for XLPE/ EPR insulated cables). Test certificates with respect to this test (not older than one year) from recognised testing laboratory to be furnished for review by PMC/ owner before despatch clearance of cables. In case test certificates are not available, test is to be conducted by vendor at his own cost in any recognized test laboratory or in house testing laboratory, before despatch clearance of cables. Sampling for this test is to be done randomly once for each order, provided type of insulation remains same.
- b. Dielectric Retention Test: The dielectric strength of the cable insulation tested in accordance with NEMA-WC-70 at $75 \pm 1^{\circ}\text{C}$ shall not be less than 50 % of the original dielectric strength. (For PVC insulated cables). Test certificates with respect to this test (not older than one year) from recognised testing laboratory to be furnished for review by PMC/ owner before despatch clearance of cables. In case test certificates are not available, test is to be conducted by vendor at his own cost in any recognized test laboratory or in house testing laboratory, before despatch clearance of cables. Sampling for this test is to be done randomly and once for each order.
- c. Oxygen Index Test: The test shall be carried out as per IS-10810 (Part 58). Sampling to be done for every offered lot/size as per sampling plan.
- d. Flammability Test: The test shall be carried out on finished cable as per IS-10810 (part 61 & 62). Sampling for these tests is to be done randomly once for each order, provided outer sheath remains same. The acceptance criteria for tests conducted shall be as under:

Part-61-The cable meets the requirement if there is no visible damage on the test specimen within 300 mm from its upper end

Part-62-The maximum extent of the charred portion measured on the test sample should not have reached a height exceeding 2.5 m above the bottom edge of the burner at the front of the ladder.

- e. Test for rodent and termite repulsion property shall be done by analysing the property by chemical method. Sampling to be done for every offered lot/ size as per sampling plan.

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- 5.1.6 The test for circuit integrity for fire survival cables shall be carried out as per IEC-60331 (Part-2).

5.2 Cable Accessories

Type tests should have been carried out to prove the general qualities and design of a given type of termination / jointing system as per IS-13573. The type test certificates from independent testing laboratory shall be submitted before despatch.

6.0 PACKING AND DESPATCH

- 6.1 Cables shall be despatched in non-returnable wooden or steel drums of suitable barrel diameter, securely battened, with the take-off end fully protected against mechanical damage. The wood used for construction of the drum shall be properly seasoned, sound and free from defects. Wood preservatives shall be applied to the entire drum. Ferrous parts used shall be treated with a suitable rust preventive finish or coating to avoid rusting during transit or storage.
- 6.2 On the flange of the drum, necessary information such as project title & PO no., manufacturer's name, type size, voltage grade of cable, length of cable in metres, drum no., cable code, BIS certification mark, gross weight etc. shall be printed. An arrow shall be printed on the drum with suitable instructions to show the direction of rotation of the drum.

A weather proof tag suitable for 2 years of outdoor, storage shall be affixed to each reel, visible without removal of packing material with the information above.

- 6.3 Unless otherwise specified, Cables shall be supplied in drum lengths as follows:

6.3.1 MV Cables

- Multicore power cables upto 6 mm² : 1000 m
- Multicore power cables from 10mm² upto 300 mm² : 500 m
- Single core power cables upto 630 mm² : 1000 m
- Control cables upto 61 cores : 1000 m

6.3.2 HV power cables upto 11 KV(E) Grade

- Three core cables upto 400mm² : 500 m
- Single core cables upto 400 mm² : 1000 m
- Single core cables above 400 mm² and upto 630 mm² : 750 m

6.3.3 HV power cables above 11 KV(E) Grade and upto 33 KV(E) Grade

- Three core cables upto 300 mm² grade : 350 m
- Single core cables upto 400 mm² : 1000 m
- Single core cables above 400 mm² and upto 1000 mm² : 500 m

A tolerance of $\pm 3\%$ shall be permissible for each drum. However overall tolerance on each size of cable shall be limited to $\pm 2\%$. Offers with short/ non-standard lengths are liable for rejection. If non-standard drum lengths are specified in the data sheet, the same shall be supplied.

6.4 The finished cable shall be identified by embossing the following identification on cable external surface at less than 1 m intervals longitudinally:

1. Manufacturer's name or trademark
2. Year of manufacturer
3. Cable size
4. Cable rating
5. Cable code as per IS 1554 (Part-1) for PVC insulated or IS 7098 (Part-2) for XLPE insulated cables.
6. Type of special category, if any.

7.0 DOCUMENTATION

The following documentation shall be submitted for record:

1. Complete test report
2. As manufactured cross sectional drawings showing cable construction, dimensions, cable catalogue indicating DC resistance, reactance, capacitance, de-rating factor charts, screen resistance etc.

8.0 QAP ANNEXURE

QUALITY ASSURANCE & INSPECTION (HT CABLES) (6.35/11KV & 11/11KV XLPE CABLES)

Attributes / Characteristics	Item / Components / Sub System Assembly	Make, Type, Rating & T.C.	Dimension/Surface finish	Mechanical properties	Chemical Composition	Curing Properties	Electrical Properties	Triple Extrusion & Curing of Set Test/Eccentricity & Ovality	Lay length & Sequence	Armour coverage, cross over, looseness, gap between two wire	Sequential marking / surface finish / cable length	T.S. & elongation before & after ageing on sheath & insulation. Outer sheath thickness test	Thermal stability on sheath	Anti Termite Test	Constructional requirements feature as per IOCL specification	Routine & Acceptance Test as per relevant standard & IOCL specification	FRLS Test / HR Tests
Aluminium/Copper (IS-8130)		Y	Y	Y	Y		Y										
Semiconducting Compound		Y		Y		Y	Y										
XLPE Compound (IS-7098 Part-II)		Y		Y		Y	Y					Y					
FRLS PVC Compound (IS-5831, ASTM-D2843, ASTM-2863, IEC-754 Part-1)		Y		Y								Y	Y	Y			Y
Manufacturing of Core								Y	Y	Y							
Copper Tape		Y	Y	Y			Y										
Polyester tape		Y	Y														
Armour wire/strip		Y	Y	Y													
PVC compound (IS-5831)		Y		Y			Y										
Triple extruding & curing																	
Copper tapping/Screen							Y										
Inner sheath																	
Armouring										Y							
Outer Sheathing											Y	Y	Y	Y	Y		Y
Water swellable tape			Y						Y						Y	Y	
Power Cable (Finished) (IS:7098 Part-II, IEC:332, IS-5831, ASTM-D2843, ASTM-2863, IEC-754 Part-1)		Y							Y	Y	Y	Y	Y	Y	Y	Y	Y
Wooden drum (IS-10418) / Steel Drums			Y											Y			

Notes :

1. This is an indicative list of test/checks. The manufacturer is to furnish a detailed Quality Plan indicating the practice and procedure along with relevant supporting documents.
2. Routine tests including metal screen continuity test shall be generally based on IS: 7098 Part-2
3. Acceptance tests (including that of armored wire/strip) shall be based on relevant IS along with sampling plan of 7098 (Part-2)
4. Additional Acceptance tests like FRLS, Thermal stability, Tensile strength & elongation after ageing shall be done on one sample/lot.
5. Length measurement / Surface finish eccentricity / ovality shall be checked on one length / size / lot.

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9.0 DATA SHEET

PURCHASER'S DATA

A Site Conditions					
1	Maximum ambient temperature	50°C	4	Relative humidity	90%
2	Minimum ambient temperature	5°C	5	Altitude	<1000 m
3	Ground temperature	30°C	6	Environment	Humid & corrosive
B Technical particulars					
1	System voltage			4	Single line to ground fault current For HV cables
	Nominal	Highest	Voltage grade		Current value(as per system 1 kA(min) requirement)
	415 V	500 V	650/ 1100V		Duration 1 Sec.
	3.3 kV(E)	3.6 kV	1.9/ 3.3 kV	5	Conductor material @
	3.3 kV(UE)	3.6 kV	3.3/ 3.3 kV		HV power cable @
	6.6 kV(E)	7.2 kV	3.8/ 6.6 kV		MV power cable @
	6.6 kV(UE)	7.2 kV	6.6/ 6.6 kV		MV control cable Copper
	11 kV(E)	12 kV	6.35/ 11kV	6	Cables to be flame retardant Yes
	11 kV(UE)	12 kV	11/ 11kV	7	Cables to be heat resistant Yes
	33 kV(E)	36 kV	19/33 kV	8	Armouring requirement Yes
	33 kV (UE)	36 kV	33/33 kV	9	Type of armour bonding Bonded at both ends
				10	Semi-conducting water swellable tape Yes/ No
2	Frequency	50 Hz +3%	11	Installation under DGMS jurisdiction	Yes/ No
3	Make of accessories (if applicable)	As per vendor list	12	Type of cable accessories (if applicable)	Heat shrinkable
MANUFACTURER'S DATA					
1	Name of manufacturer	As per vendor list		Thickness	mm
2	Cable type/ code		9	Nominal dia under armour	mm
3	Conductor material		10	Calculated dia under armour	mm
4	Conductor semiconducting screen (HV cables)		11	Armour	
	Material			Material	
	Thickness	mm		Type	
5	Insulation			Size	
	Type of compound		12	Nominal dia under outersheath	mm
	Thickness	mm	13	Calculated dia under outersheath	mm
6	Insulation semiconducting screen (HV Cables)		14	Outersheath	
	Material			Type of compound	
	Thickness	mm		Thickness	mm
7	Copper tape		15	Nominal outer dia of cable	mm
	Thickness	mm	16	Tolerance on outer dia	%
8	Inner sheath		17	Maximum drum length	mtr.
	Type of compound		18	Continuous current carrying capacity In ground at 30°C In Air at 50°C	Amps

Note

1. Single line to ground fault current is applicable for HV cables for sizing of insulation screening.
2. E-Earthed system
UE-Un Earthed system
3. In case the installation falls under the jurisdiction of Directorate General of Mines Safety, only those cable manufacturers may quote, who have valid DGMS approval. copy of DGMS approval certificates to be furnished along with the offer.

@ Cable conductor material shall be as follows:

i)	HV Power Cables	Aluminium/ copper
ii)	MV Power Cables	Al (25 mm ² & above) and Copper (upto 16mm ²)

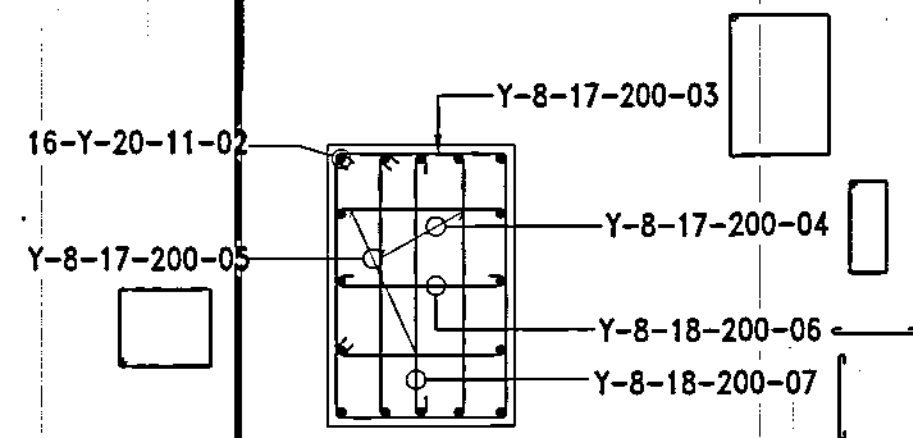
* Length of cable drum shall be so as to minimise the number of joints.

NOTES:-

1. ALL DIMENSIONS ARE IN MM & LEVELS ARE IN M, UNO.
2. HPP EL.100.00M CORRESPONDS TO RL 174.500
3. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH DRG. NO. 00785-020-DW-1743-06 SHT.1 OF 2

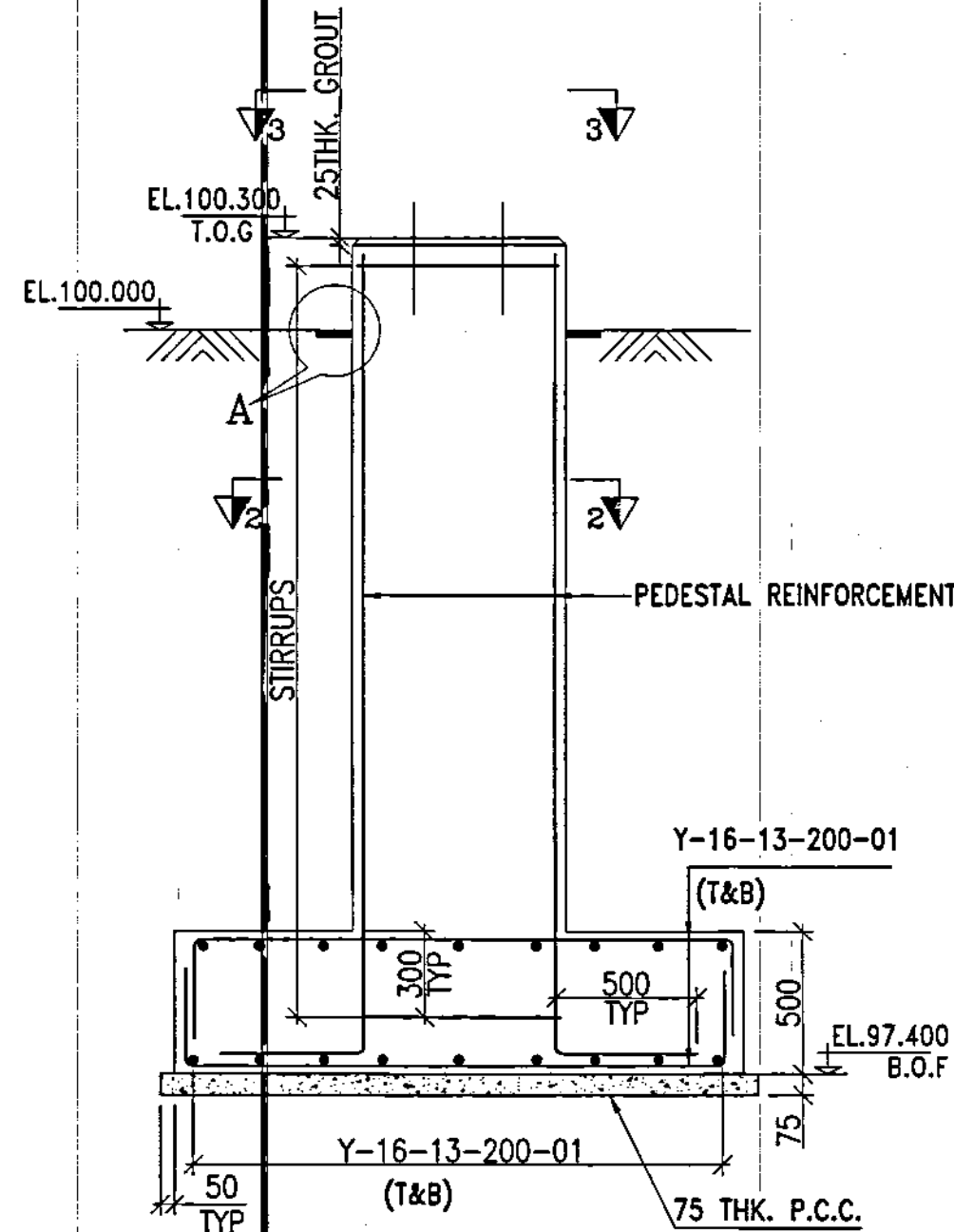
SECTION 2-2

PEDESTAL R/F DETAIL
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(REQD.NO. 2)



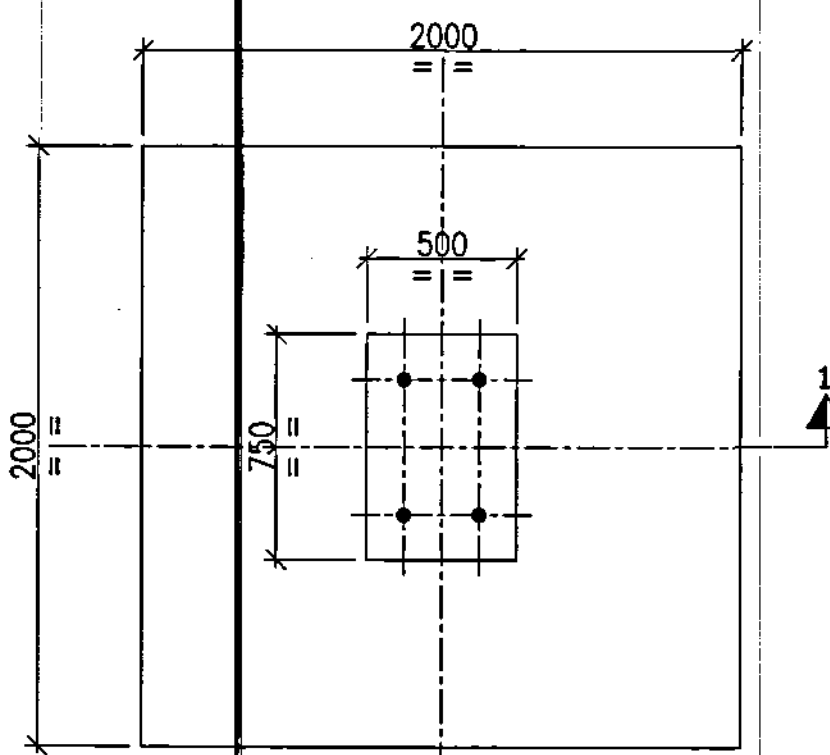
SECTION 3-3

TYP. GA DETAIL OF PEDESTAL
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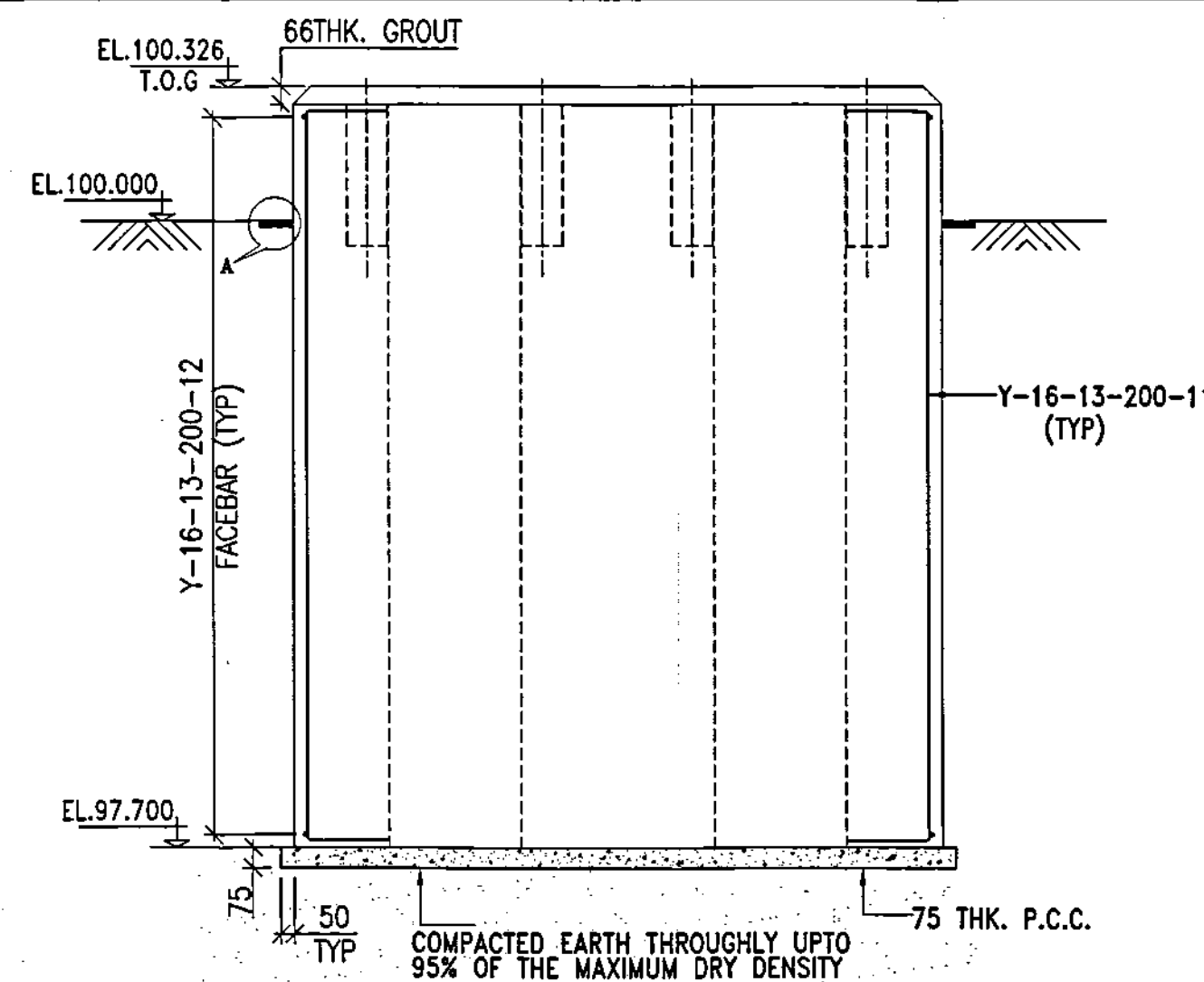
SECTION 1-1

(SHOWING GA & R/F ONLY)
(SCALE 1:25)



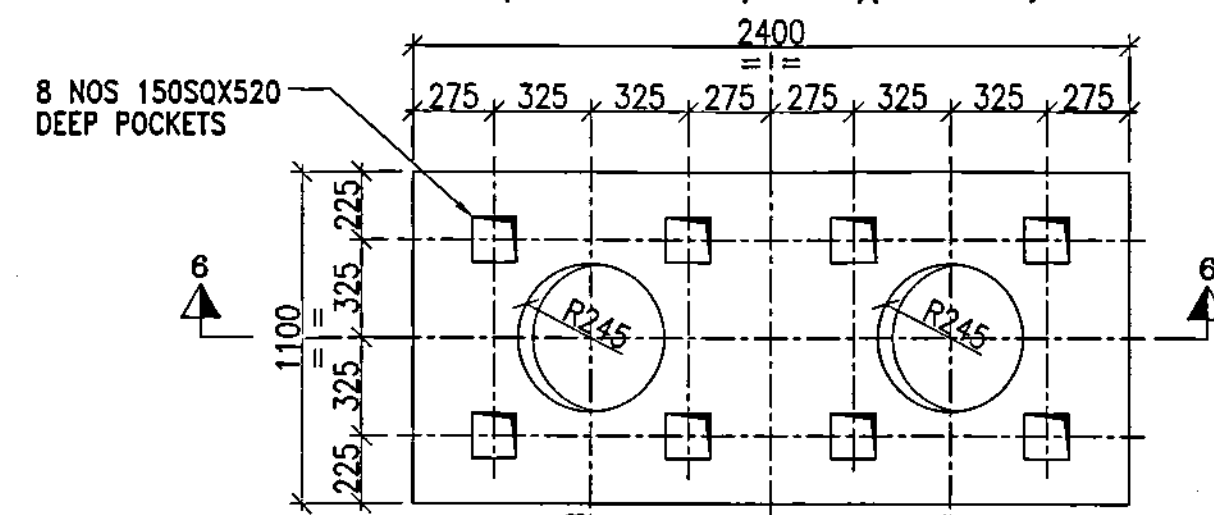
FOOTING MKD F1

(SHOWING GA ONLY)
(SCALE 1:25) (2 NOS REQD)



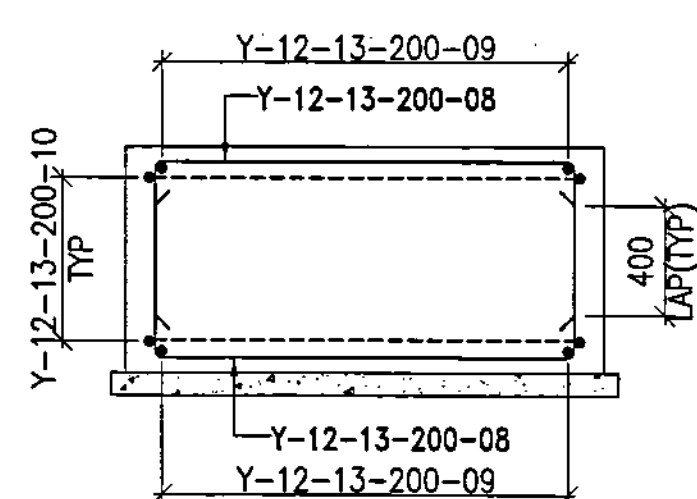
SECTION 6-6

(SHOWING GA & R/F ONLY)(SCALE 1:25)



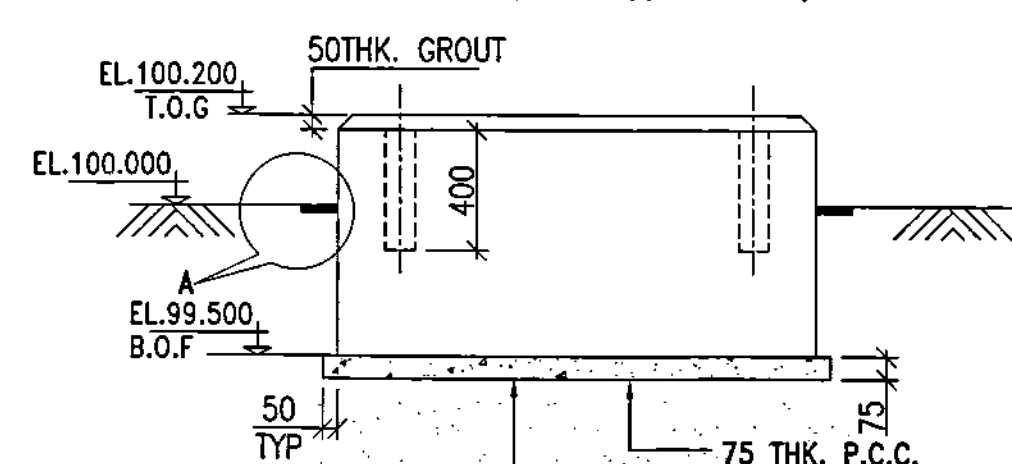
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(SHOWING GA ONLY)
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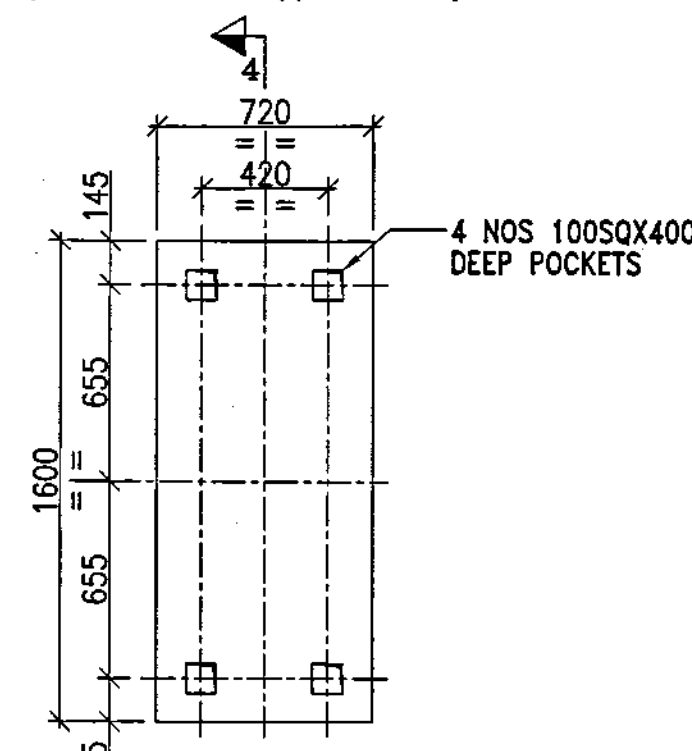
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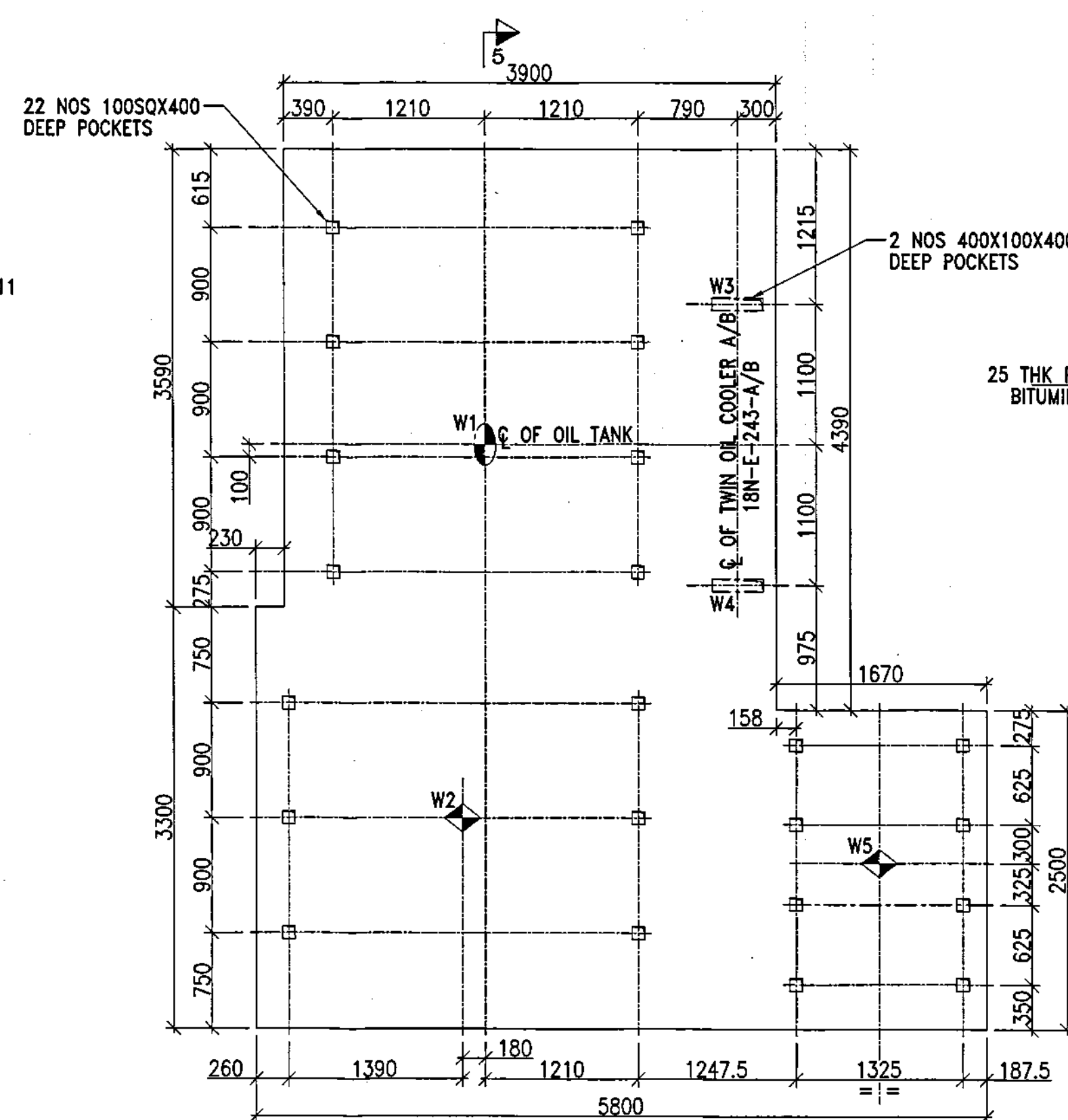
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(SHOWING GA ONLY)(SCALE 1:25)



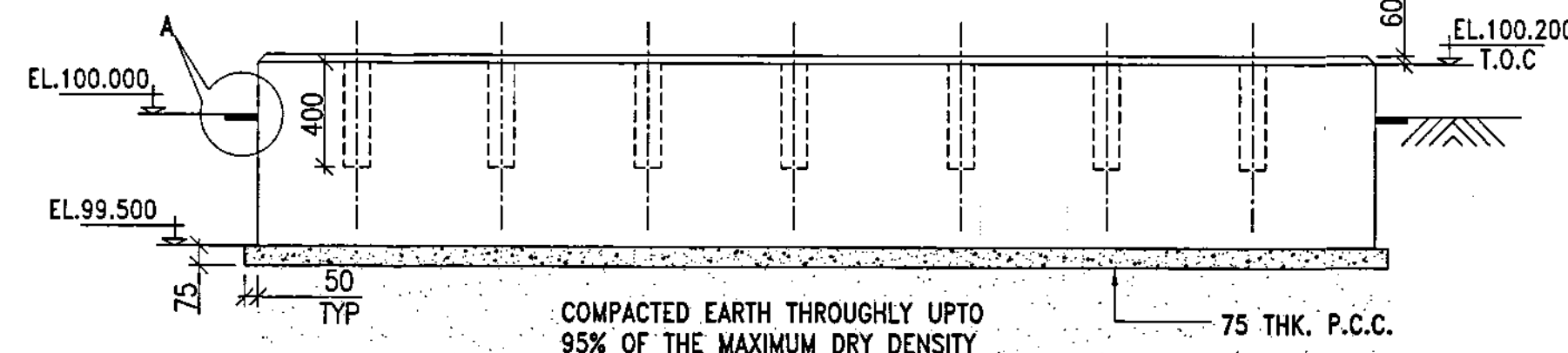
FOOTING MKD F2

(SHOWING GA ONLY)
(SCALE 1:25)



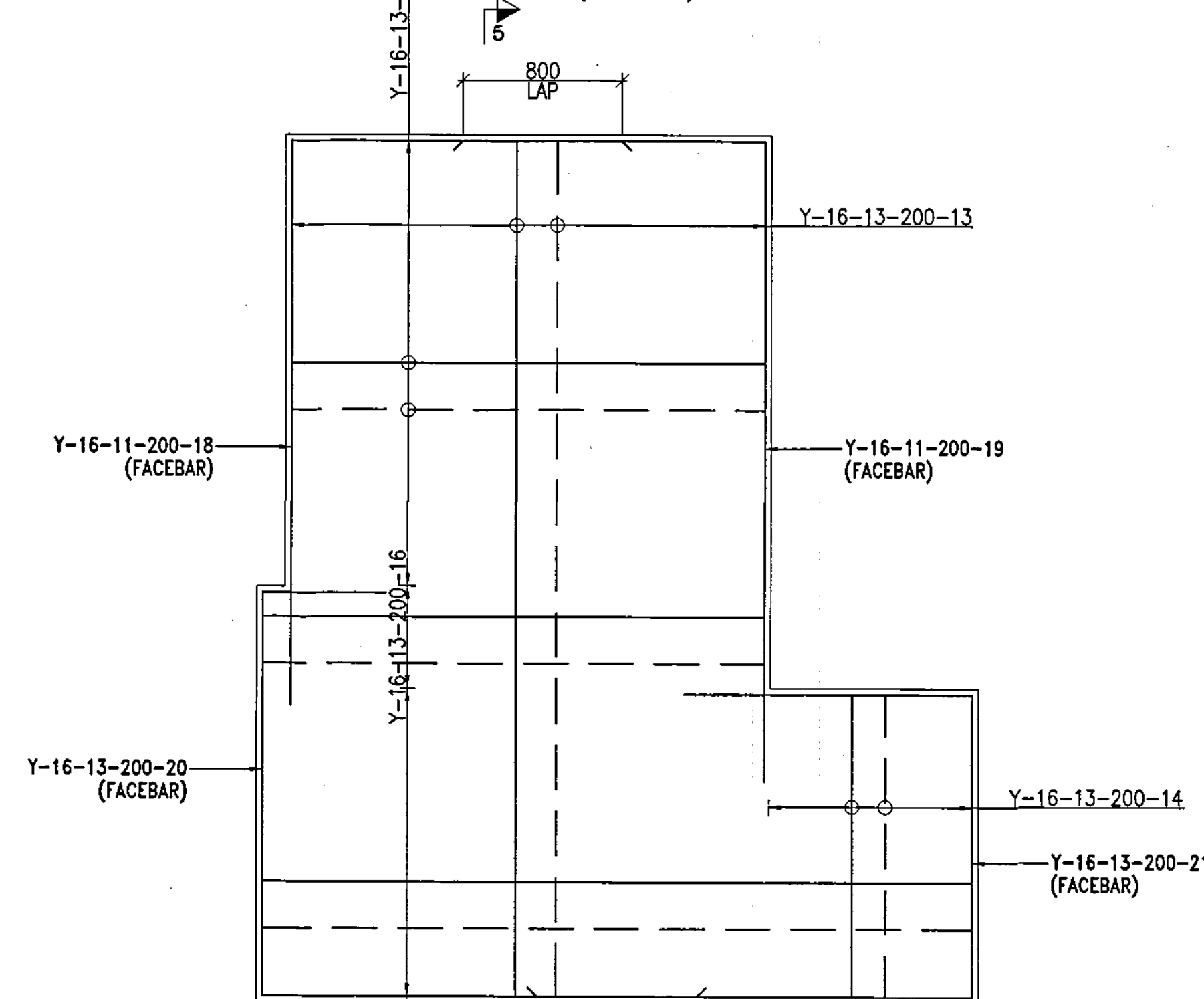
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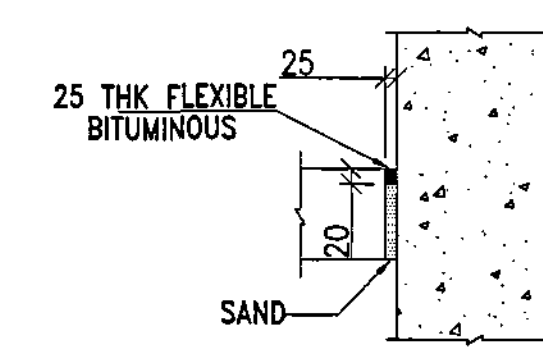
SECTION 5-5

(SHOWING GA ONLY)
(SCALE 1:40)



FOOTING MKD F3

(SHOWING R/F ONLY)(SCALE 1:25)

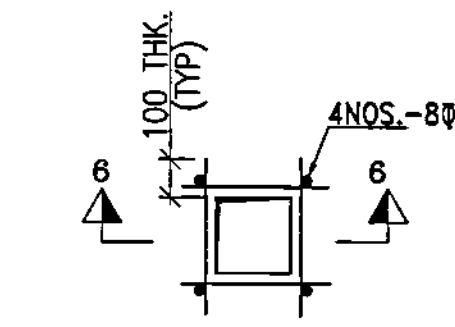


DETAIL-A

ISOLATION JOINT ALL AROUND
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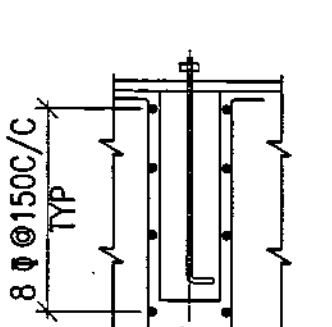
TYP. DETAIL OF POCKET R/F

SCALE (1:10)



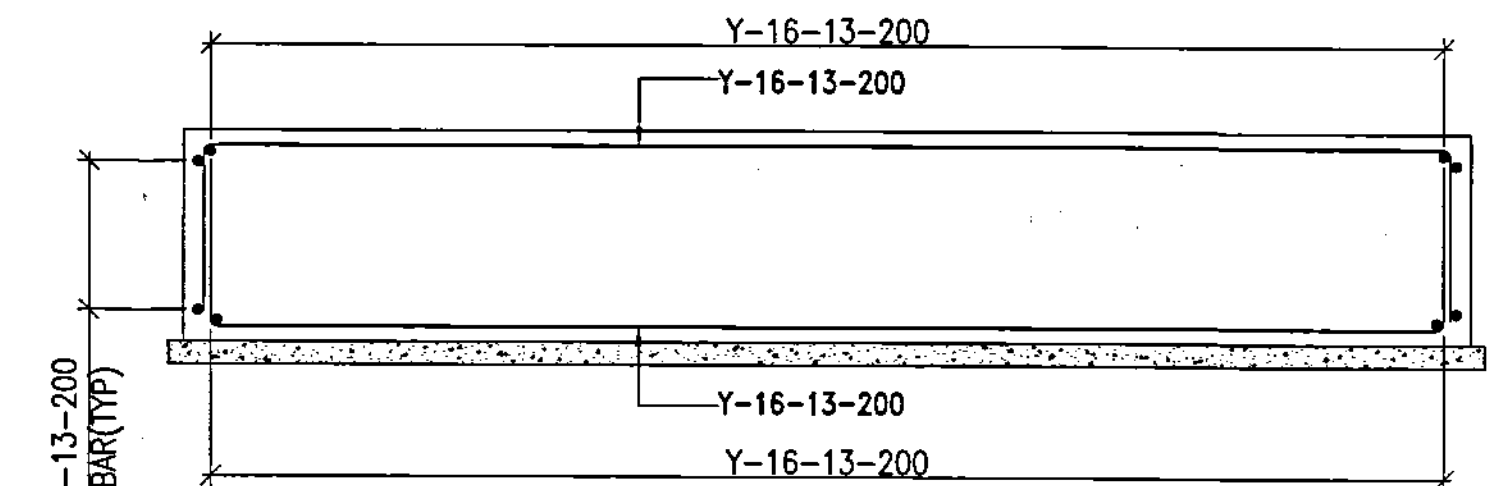
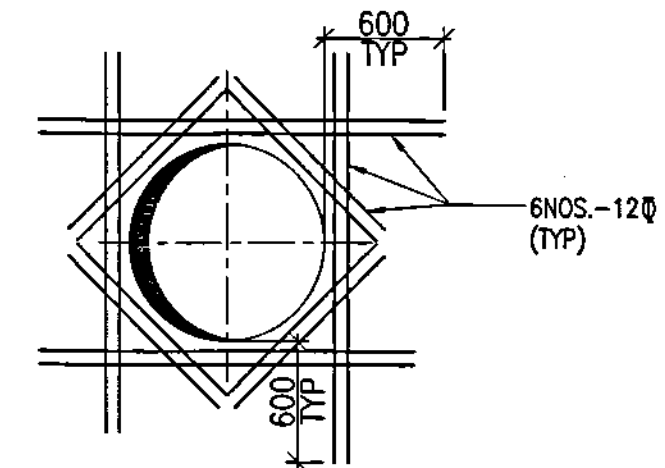
SECTION 6-6

SCALE (1:10)



TYP. DETAIL OF R/F AROUND OPENING

SCALE (1:20)



SECTION 5-5

(SHOWING R/F ONLY)
(SCALE 1:40)

AS BUILT

REV.	DATE	REVISION DESCRIPTION	SVKS	DLC	PCR	VJK
01	10.08.15	AS BUILT	VJK	ASNS	DLC	VJK
00	28.08.12	ISSUED FOR CONSTRUCTION	SVKS	DLC	PCR	VJK
REV.	DATE	REVISION DESCRIPTION	DRN	CHK	APP	PM
PROJECT FCCU AND PRU REVAMP PROJECT						
OWNER INDIAN OIL CORPORATION LTD. MATHURA REFINERY, INDIA						
EPCM Technip						
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TITLE HEAT PUMP COMPRESSOR HOUSE GA & R/F DETAIL FOR AUXILIARY FOUNDATION						
DRAWING NO. 00785 18N DW 17 43 26 PAGE 2 OF 2						
SCALE 1:50	PROJECT	UNIT	DOC. TYPE	DISC.	SUBJ.	SER. NO.
00785	18N	DW	17	43	26	01

		B				C		D						E	
MARK	SHAPE CODE (*)	STR. ELEMENT		REBAR QTY.		DIA. (mm)	BAR BENDING SCHEDULE(mm)						CUTTING LENGTH (mm)	TOTAL W.T.(kg.)	
		TYPE	NOS.	UNIT NOS.	TOTAL NOS.		A	B	C	D	E	H			L
01	13	FDN.	01	64	64	20	-	-	525	-	-	525	8400	9375	1482.00
02	13	FDN.	01	114	114	20	-	-	525	-	-	525	4700	5675	1596.55
03	13	FDN.	01	6	6	16	-	-	2670	-	-	2670	8400	13700	129.05
04	14	P1	04	19	76	20	-	525	600	-	-	-	9700	10750	2017.99
05	13	P1	04	5	20	20	-	-	600	-	-	525	9700	10750	531.05
06	17	P1	04	34	136	10	700	-	-	-	900	-	-	3400	286.68
07	17	P1	04	102	408	10	700	-	-	-	600	-	-	2800	708.28
08	18	P1	04	34	136	10	-	-	-	-	-	-	700	950	80.10
09	17	P1	04	34	136	10	470	-	-	-	900	-	-	2925	246.63
10	17	P1	04	34	136	10	235	-	-	-	900	-	-	2450	206.58
11	18	P1	04	34	136	10	-	-	-	-	-	-	900	1150	96.96
12	14	P2	02	20	40	25	-	375	600	-	-	-	4300	5175	796.95
13	13	P2	02	10	20	25	-	-	600	-	-	375	4300	5175	398.09
14	17	P2	02	16	32	10	2050	-	-	-	600	-	-	5500	109.12
15	17	P2	02	96	192	10	1150	-	-	-	600	-	-	3700	440.44
16	17	P2	02	16	32	10	2050	-	-	-	325	-	-	4950	98.20
17	18	P2	02	16	32	10	-	-	-	-	-	-	2050	2300	45.63
18	13	SLAB	01	28	28	20	-	-	525	-	-	525	6900	7875	544.63
19	13	SLAB	01	6	6	16	-	-	475	-	-	475	6900	7800	73.47
20	13	SLAB	01	6	6	16	-	-	475	-	-	475	2800	3700	34.85
21	17	SLAB	01	75	75	12	900	-	-	-	550	-	-	3075	205.25
22	17	SLAB	01	75	75	12	900	-	-	-	500	-	-	2975	198.58
23	13	SLAB	01	20	20	20	-	-	525	-	-	525	3270	4250	209.95
24	13	SLAB	01	6	6	16	-	-	375	-	-	375	2500	3200	30.14
25	17	SLAB	01	22	22	12	900	-	-	-	430	-	-	2850	55.80
26	17	SLAB	01	22	22	12	900	-	-	-	470	-	-	2925	57.27
27	13	SLAB	01	44	44	20	-	-	525	-	-	525	4300	5275	573.28
28	13	SLAB	01	18	18	16	-	-	290	-	-	290	4300	4825	136.35
29	17	SLAB	01	39	39	12	900	-	-	-	650	-	-	3275	113.67
30	17	SLAB	01	39	39	12	900	-	-	-	550	-	-	3075	106.73
31	17	SLAB	01	26	26	12	900	-	-	-	350	-	-	2675	61.89
* NOTE: FOR SHAPE CODE REFER GENERAL NOTE FOR CONCRETE WORKS DOC. NO. 00785-000-STC-1702-01.														TOTAL	11672.16

MARK	STR. ELEMENT		CONC.(Cum)		TOTAL(Cum)	
	TYPE	NO.S	M25	LEAN MIX 1:4:8	M25	LEAN MIX 1:4:8
—	FOUNDATION	1	40.80	3.16	40.80	3.16
P1	COLUMN	4	6.32	—	25.28	—
P2	PEDESTAL	2	5.26	—	10.52	—
—	DECK SLAB	1	21.06	—	21.06	—
				TOTAL	97.66	3.16

SUMMARY OF TMT REBARS		
S.NO.	BAR DIA.	TOTAL QUANTITY (IN K.G.)
1	8	-
2	10	2318.62
3	12	799.19
4	16	403.86
5	20	6955.45
6	25	1195.04
7	28	-
8	32	-
TOTAL		11672.16

NOTES:-

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH
00785-18N-DW-1743-25 SHT.1 OF 4 TO SHT.3 OF 4

AS BUILT

01	10.08.15	AS BUILT	UK	ASNS	DLC	VJK	
00	08.12.11	ISSUED FOR CONSTRUCTION	SVKS	DLC	PGR	VJK	
B	30.08.11	ISSUED FOR REVIEW	SVKS	DLC	PGR	VJK	
REV.	DATE	REVISION DESCRIPTION	DRN	CHK	APP	PM	
PROJECT FCCU AND PRU REVAMP PROJECT							
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EPCM				Confidential Property of TECHNIP KT INDIA LTD. Made 201301 (UP), India			
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TITLE		PROPYLENE RECOVERY UNIT G.A & R/F DETAIL OF FOUNDATION FOR HP COMPRESSOR (18N-K-201)					
DRAWING NO.						PAGE	REV.
SCALE	00785	18N	DW	17	43	25	
1:40	PROJECT	UNIT	DOC.TYPE	DISC.	SUBJ.	SER.NO.	
4 OF 4							01

DISTR.: DCL

Annexure-8

GENERAL SPECIFICATION FOR HV VARIABLE FREQUENCY DRIVE SYSTEM

1.0 SCOPE

- 1.1 The scope of this specification is to define the minimum technical requirements for the design, manufacture, testing and supply of high voltage, AC variable frequency drive system. The VFD system shall be complete with squirrel cage induction motor/ synchronous motor as specified in data sheet, Converter, converter input transformer (if required), drive output transformer (unless specifically agreed drive output transformer shall not be provided), DC link reactor with associated auxiliaries, harmonic filters (if required) and field mounted local motor control panel.
- 1.2 The vendor shall be responsible for engineering and functioning of the complete system, meeting the intent and requirement of this specification and data sheets. This shall include but not be limited to inverter sizing, transformer sizing, transformer impedance selection, vector group, input and output harmonic filter design and sizing, output dv/ dt filter sizing, motor cable selection and motor sizing/ selection.
- 1.3 This specification applies to drive systems having converter input voltage above 100 V AC and up to and including 11000 AC.

2.0 CODES AND STANDARDS

- 2.1 The equipment shall comply with the requirements of latest revision of following standards issued by BIS (Bureau of Indian Standards), unless otherwise specified:

IS-5	:	Colors for ready mixed paints and enamels
IS-325	:	Three phase induction motors
IS-2026	:	Specifications for Power Transformers
IS-3700	:	Essential ratings and characteristic of semi-conductor device
IS-3715	:	Letter symbols for semi-conducting
IS-4411	:	Code of designation of semi-conducting devices
IS-5001	:	Guide for preparation of drawings for semi-conductor devices
IS-5469	:	Code of practice for the use of semi-conductor junction devices
IS-6297	:	Transformers and indicators for electronic equipment
IS-8789	:	Performance parameters for motors
IS12729	:	Switchgear and control gear for voltages exceeding 1000 V – General requirements
IS-13408	:	Code of practice for the selection, installation and maintenance of electrical apparatus for use in potentially explosive atmospheres.

- 2.2 In case of imported equipment, standards of the country of origin shall be applicable, if these standards are equivalent or stringent than the applicable Indian Standards.
- 2.3 The equipment shall also conform to the provisions of Indian Electricity rules and other statutory regulations currently in force in the country.
- 2.4 In case Indian Standards are not available for any equipment, standards issued by IEC/BS/VDE/IEEE/NEMA or equivalent agency shall be applicable.
- 2.5 In case of any contradiction between various referred standards/ specifications/ data sheet and statutory regulations of the following order of priority shall govern:
- Statutory regulations
 - Data sheets
 - Job specification
 - This specification
 - Codes and standards

3.0 SITE CONDITIONS

- 3.1 The drive system shall be designed to operate under specified site conditions as specified in the data sheets. If not specifically mentioned therein, a design ambient temperature of 45°C and an altitude not exceeding 1000 metres above mean sea level shall be considered.
- 3.2 The AC drive shall be installed indoors in a non-hazardous, air conditioned or pressurized room, as specified in data sheet. Transformer installation (outdoor/ indoor) shall be as indicated in datasheet. Motor shall be installed outdoors in safe or hazardous area as specified.
- 3.3 All the equipment shall be designed for continuous duty as per nameplate rating under the specified ambient conditions.

4.0 GENERAL REQUIREMENTS

- 4.1 The offered equipment shall be brand new with state of art technology and proven field track record. No prototype equipment shall be offered.
- 4.2 Vendor shall ensure availability of spare parts and maintenance support services for the offered equipment for at least for 15 years from the date of supply.
- 4.3 Vendor shall give a notice of at least one year to the end user of equipment and IOCL before phasing out the product/ spares to enable the end user for placement of order for spares and services.

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- 4.4 Vendor shall proper coordination with the driven equipment supplier in selection/ sizing of offered variable frequency drive system.

5.0 TECHNICAL REQUIREMENT

5.1 Performance requirement

- 5.1.1 The system shall be energy efficient, designed as standard product and shall provide very high reliability, high power factor, low harmonic distortion and low vibration/ wear/ noise. It shall be easy to install in minimum time and expense and no special tools shall be required for routine maintenance.
- 5.1.2 The system shall be designed to deliver the motor input current and torque for the complete speed torque characteristics of the driven equipment, with input supply variation of $\pm 10\%$ and frequency variation of $\pm 3\%$. The system shall be suitable for the load characteristics and the operational duty of the driven equipment. It shall be capable of withstanding the thermal and dynamic stresses and the transient mechanical torque, resulting from short-circuit.
- 5.1.3 The drive system shall be designed to operate in one or more of the following operating modes as to suit characteristics of the driven equipment or specified:
- Variable torque changing as a function of speed i.e. speed squared
 - Constant torque over a specific speed range
 - Constant power over a specific speed range where the torque decreases when speed increases.
 - Any other as specified.
- 5.1.4 The drive controller shall be equipped with microprocessor based digital regulator with programmable functions. The power control regulator logic shall provide for an acceleration/ deceleration current limit curve and shall be capable for field adjustments without shutting the system down. Linear acceleration and deceleration shall be separately programmable from 0.1 to 20 seconds.
- 5.1.5 The system shall be suitable for single quadrant operation and the speed variation shall be with range 10-100% unless otherwise specified in data sheet with speed set accuracy of $\pm 1\%$ of rated maximum speed and steady state regulation of $\pm 0.5\%$ of rated speed.
- 5.1.6 The total harmonic distortion (THD) of the voltage and current at investor output shall be as per IEC 61800-4 and it shall be considered in the design of the motor.
- 5.1.7 Harmonics at the supply side of the drive system at primary of the main input transformer shall be restricted within the maximum allowable levels of current and voltage distortion as per recommendations in the

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latest edition of IEEE-519. The vendor shall perform design calculation for harmonic filter system considering VFD connected to the power system and including the supply of harmonic filters along with all accessories with which shall be instead at owner's power system unless otherwise specified. These harmonic studies shall be conducted with maximum and minimum system fault level, cable capacitance, system equipment reactance etc. The studies shall highlight but not be limited to maximum load current, expected resonant frequencies, need of harmonic filters, sequence of switching of filters, voltage wave form etc.

- 5.1.8 Unless otherwise specified, the overload capacity of the controller shall be 150% of rated current of motor for one minute for constant torque applications, and 110% of rated current for one minute for variable torque applications at rated voltage. If the motor load exceeds the limit, the drive shall automatically reduce the frequency and voltage to the motor to guard against overload. If load demands exceed the current limit for more than 1 minute, the drive shall shutdown to prevent over heating of the motor and damage to the drive.
- 5.1.9 During operation, the system shall be capable of developing sufficient torque under all load conditions to respond to a 20% alteration in speed set point within a time limit upto 60 seconds.
- 5.1.10 The integrator action of the speed set point alteration shall be independently adjustable for both an upward and a downward alteration. The minimum time interval between set point adjustments by the distributed control system shall be considered as 10 seconds.
- 5.1.11 The drive shall trip in case the speed exceeds 105% of the maximum operational speed or reduces to 95% of the minimum operational speed for more than 10 seconds.
- 5.1.12 Maximum noise level from the drive at 1 meter distance, under rated load with all normal cooling fans operating shall not exceed 85 dBA.
- 5.1.13 Variable frequency drive shall be arranged so that it can be operated in an open circuit mode, disconnected from the motor for start up adjustments and troubleshooting/ maintenance.
- 5.1.14 Voltage at motor neutral shall be maintained at ground potential for the total operating condition.

5.2 Control Requirement

- 5.2.1 The system shall operate on constant V/f supply with required voltage boost capability in low frequency mode of operation.
- 5.2.2 Short time voltage dips upto 20% of nominal voltage (e.g. in case of a large motor start up connected to the same bus as VFD) shall not

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cause the control system to stop functioning and shall not trip the drive system.

- 5.2.3 The system shall also be equipped with a facility which will restart the system in case of voltage dip over 20% or power interruptions for upto 2 seconds, with recovery of the voltage to its nominal value. The drive shall have the facility to block this feature, if required by the operator. Upon restart the converter shall be capable of synchronizing onto a rotating motor and develop full acceleration torque within 10 seconds.
- 5.2.4 The system shall be suitable for number of starts as per IOCL specification for high voltage motors.
- 5.2.5 The power controller shall be controlled to always start the motor in the forward direction. Logic shall be provided to prevent the motor from being started in the reverse direction.
- 5.2.6 The drive motor shall be speed controller corresponding to 4-20 mA or 0-10 V reference input signal. Unless otherwise specified, upon complete loss of the user's speed reference signal, the drive shall automatically run at constant speed and torque as at 80-100% of the last speed reference available prior to the loss of signal.
- 5.2.7 It shall be possible to vary the speed of the drive in either manual or auto mode. Auto/manual selection shall be from VFD panel unless otherwise specified:
- a. With the selector switch in "manual" mode, the operator shall be able to set the speed through keypad, mounted on front of the drive panel or from speed increase/ decrease push buttons from the field, motor operated potentiometer shall be provided as a speed set point device.
 - b. With the selector switch in "auto" mode, speed of the motor shall be controlled from a 4-20 mA signal, from owner's PLC/ DCS (Process Control) system. Necessary equipment required for interfacing with PLC/ DCS shall also be provided in the drive panel.
- 5.2.8 The required provision for the interface with remote PLC/ DCS located at control room shall be either through hardwired connection (with potential free contacts and transducers as described elsewhere in this specification) or through serial communication link as defined.
- 5.2.9 Drive system shall have provision for interface with upper level automation such as SCADA. Substation monitoring system or electrical control system in case specified in the data sheet/ job specification.
- 5.2.10 The closed loop control feed back for the drive system having output transformer shall be tapped from the secondary side of the output transformer.

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- 5.2.11 The VFD system shall be capable of receiving a hand-wired fast acting load shedding signal such that the VFD can tripped quickly and safely. Vendor shall supply details of turndown time for semiconductors and the total time for safe shutdown upon receiving the load shedding command.

5.3 Panel Construction

- 5.3.1 The panel shall include suitable semi conducting power devices (Diodes/ IGBT/IGCT/SGCT) modules with protective devices, reactors (if required), filters (if required), control circuit, control accessories, indication and annunciation etc. The construction of the panel shall provide effective protection against electromagnetic emissions and shall meet the design requirement of integrated standards.
- 5.3.2 Upstream breaker 'ON/OFF/TRIP' indications and remote breaker closing and trip push button shall be provided on the front door.
- 5.3.3 Safety interlock shall be provided so that power cabinet can't be opened unless the upstream breaker is disconnected, safety-grounding switch is closed and DC link capacitor is discharged. Power source breaker can only be closed once the earthing switch is open and panel door is closed with lock defeat facility.
- 5.3.4 The drive shall be suitably housed in sheet steel panels fabricated with 2 mm thick cold rolled sheet steel. The panel shall be suitable for indoor installation, if not otherwise specified. The panel shall be free standing with degree of enclosure protection as IP-31. The maximum and minimum operating height shall be 1900 mm and 300 mm respectively.
- 5.3.5 Bolted un-drilled gland plate shall be provided at bottom. Clamp type terminals shall be used for connection of all wires upto 10 mm² and terminal for higher sizes shall be bolted type suitable for cable lugs. Minimum space for power cable termination shall be 600 mm clear from bottom of the cable gland plate.
- 5.3.6 Bus bars shall be of electrolytic copper/ aluminium, sleeved, color coded separately for AC and DC system. All the live parts shall be sleeved/ shrouded to ensure complete safety to personnel intending to carryout routine inspection by opening the panel doors. All the equipment inside the panel and on the doors shall be provided with suitable nameplate.
- 5.3.7 All the switches, component and accessories which are essential for normal and emergency operation shall preferably be mounted on the door and shall be operable externally. All the analogue instruments, where provided, shall be switchboard type, back connected, 96X96mm.

Scale shall have red mark indicating maximum permissible operating rating.

- 5.3.8 Each panel shall be provided with illuminating lamp/ 11 W CFL with switch and fuse 5/15A, 240 V power socket with switch and fuse shall be provided. Each panel shall have space heater with switch fuse and variable setting thermostat.
- 5.3.9 Copper earth bus of min. 30X6 sq.mm. upto short circuit withstand capacity of 31.5kA and 50X6 sq.mm. for a short circuit withstand capacity above 31.5 kA shall be provided in the panel with provision for connection to purchaser's plant earth grid. All the non-metallic components/ parts shall be connected to the main earth bus bar. Separate earth bus bar and stud for electronic control system is required shall be provided.
- 5.3.10 All panels shall be of same height so as to form a uniform line-up, to give good aesthetic appearance.
- 5.3.11 All the control wiring shall be enclosed in plastic/ metal channel. Each wire shall be identified at both ends by self-sticking wire marker tapes or PVC ferrules. Power and control wiring inside the panel shall be done with BIS approved, PVC insulated, fire retardant, copper conductor wire. 1.5 mm² size wire shall normally be used provided the control fuse rating is 10 Amps or less and 2.5 mm² size for control fuse rating above 16 A for electrical circuits and 0.5 mm² for electronic circuits. All wires shall be ferruled and terminals shall be properly numbered, minimum 20% spare terminal shall be provided.
- 5.3.12 All electronic modules and components shall be accessible from front of panel only. Modular assemblies for both the system control electronic equipment and power electronic equipments shall be used.
- 5.3.13 All low voltage compartment and cabling shall be electrically and physically separated from the high voltage compartment.
- 5.3.14 DC link capacitor and pre charging and discharging circuit shall be preferably mounted in the rear of the panel.
- 5.3.15 Suitable removable type hooks shall be provided for lifting the panel.
- 5.3.16 Perspex type transparent insulating material shall be used for covering live components.
- 5.3.17 Drive keypad, operator control panel required for control, monitoring and measurement shall be supplied and installed outside the panel on the front door. It shall be accessible for operation without opening the front door and shall be non-removable type.
- 5.3.18 All equipment shall be complete with cable glands, lugs etc. and cable glands shall be single or double compression type for indoor and

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outdoor equipment respectively. Cable glands shall also be suitable for the hazardous area application if specified in data sheet.

5.4 Cooling

- 5.4.1 The drive panel shall be naturally cooled or water cooled type as per manufacturer's standards. However it is preferred to have natural air cooled system. If unavoidable, forced type-cooling system shall be provided. Cooling system shall include well-dimensioned panel, adequate cooling airflow path, module cooling fan and if necessary, panel cooling fan or water-cooling system shall be considered. Vendor shall ensure that the panel dimensions and flow paths have been designed for continuous running at the specified ambient without overheating. For fan cooled drives, redundant ventilating fans (N+1) shall be provided. In case redundant cooling fan is not possible to be mounted, same shall be supplied loose.
- 5.4.2 For water-cooled drives, entire cooling system including but not limited to heat exchanger, flow and pressure meters and pumps shall be in vendor's scope. The system shall be provided with closed circuit water cooling system requiring only make up water required for topping up. The cooling water pumps in case provided shall have 100% redundancy. Water quality/ characteristics shall be as defined in the data sheet and selected cooling water system components/ material shall be suitable for the same. Adequate safety measures shall be incorporated in water cooled drives such that no leakage is there which results in malfunctioning of electronic devices. Proper segregation between water cooling system and other equipment shall be provided. It is preferred that cooling cabinet panel shall be separated from the main panels.
- 5.4.3 Necessary starters shall be provided with in the VFD panels for the Ventilation fans CW circulation pumps, any other auxiliary motor etc. The system provided shall be interfaced with drive starting and shutdown such that safety interlocks such as start permit from cooling system to drive and trip signal from cooling system to drive in case of cooling system failure etc., shall be incorporated in the overall sequence logic.
- 5.4.4 MCB for motor space heater, auxiliary power supply if required for local panel, drive panel space etc. shall be included and mounted in easy accessible location.

5.5 Equipment/ Component Specification

5.5.1 Motor

The motor shall be designed, constructed and tested in accordance with the latest revision of IOCL's specification/ data sheet for high voltage induction/ synchronous motor, in addition to the following equipments:

- a. The motor shall be suitable for operation with a solid-state power supply consisting of an adjustable frequency inverter for speed control.
- b. The motor shall be suitable for the current waveforms produced by the power supply including the harmonics generated by the drive.
- c. The motor shall be designed to operate continuously at any speed over the range (10-100%) of rated speed unless otherwise specified.
- d. The permitted voltage variation should take into account the steady state voltage drop across the AC drive and all other system components upstream of the motor.
- e. Motors required to be transferred to DOL by-pass mode shall be rated for specified variations in system line voltage and frequency. Starting current of motor in DOL bypass mode shall be limited to value specified in motor specifications, unless otherwise specified.
- f. The motor shall be constructed to withstand torque pulsations resulting from harmonics generated by the solid-state power supply.
- g. The motor insulation shall be designed to accept applied voltage waveform, within the V_{peak} and dv/dt limits as per IEC-61800-4.
- h. The drive manufacturer shall be solely responsible for proper selection of the motor for the given load application and the output characteristics of the drive.
- i. Motors shall be provided with Resistance Temperature Detectors (RTD's).
- j. Motor shall have bearing current filter.

5.5.2 Converter Transformer/ output transformer (if specifically agreed by purchaser)

The converter transformer shall be dry type or oil filled type as specified. In case of the dry type transformer, it shall be mounted in the drive system panel unless other specified, and the offered transformer shall be as per enclosed IOCL specifications. The impedances of converter input transformers with more than one secondary windings for 12/18/24/36 pulse systems shall be selected to ensure equal load/ current sharing between the secondary windings, the converters and the motor windings under all operational conditions including starting and restarting.

Drive out put transformer considered only for the purpose of meeting standard rated motor voltage i.e. 3300, 6600V, 11000V shall not be

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provided unless otherwise agreed between purchaser and the manufacturer.

5.5.3 Power Converter

- a. The static power converter shall consist of a line side power converter for operation as a rectifier and a load side power converter for operation as a fully controlled inverter. Power converter shall be fast switching, most efficient and low loss type.
- b. Adequate short circuit and over voltage protection shall be provided for the converter and inverter system.
- c. All power converter devices shall include protective devices, snubber networks and dv/dt networks as required.
- d. The current rating of the converter's semi-conductor components shall not be less than 120% of the nominal current flowing through the elements at full load of the VFD through the whole speed range.
- e. All power diodes shall be of silicon type with minimum V_{BO} rating as 2.5 times the rated operating voltage.
- f. The power converter circuit shall be designed so that motor can be powered at its full nameplate rating continuously without exceeding its rated temperature rise due to harmonic currents generated by the inverter operation.
- g. The conversion devices and associated heat sinks shall be assembled such that individual devices can be replaced without requiring the use of any special precautions/ tools.
- h. The cooling system of the electronic components, if provided, shall be monitored and necessary alarms shall be provided to prevent any consequential damage to the power control devices.
- i. Offered system shall also take in account the distance between drive panel and motor and system shall include all material and accessories to make system suitable for a distance of 350 m unless otherwise specified.
- j. Earthing switches at both input and output HV connectors

5.5.4 DC Link reactor

- a. Smoothing reactors for the DC link shall be designed to sufficiently decouple the rectifier and inverter portion of the converter and to limit fault currents in this circuit.
- b. Unless otherwise specified, the reactor shall be air-cooled or fan cooled type located within the panel.
- c. Reactor shall be suitable for operation with the non-sinusoidal current wave shapes and DC components under all operational conditions of the system without exceeding its temperature limits.

5.5.5 Output filter

VFD output current waveform should be inherently sinusoidal at all speeds, with harmonic limits as specified in this specification. Output filter shall be provided if required. Output filter capacitors shall be

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provided with discharge circuits to ensure that all residual stored charge is reduced to less than 50 V DC within 300 seconds after a loss of AC voltage. All capacitor shall be maintenance free and self-healing type.

The VFD system shall inherently protect motor from high voltage dv/ dt stress, independent of cable length to motor. Output filter shall be an integral part of the VFD system and included within the VFD enclosure.

5.5.6 Bypass feature

- a. Bypass feature along with motor protection relay and output side isolator/ breaker shall be provided by purchaser unless otherwise specified in the data sheet. All necessary interlocks as required for safe and reliable operation of VFD system along with bypass feeder and output side isolator/ breaker provided by purchaser shall be provided in VFD system.
- b. Switching scheme shall be such that in case of drive mal-operation, the motor could be taken on bypass control manually, while the drive could be attended independently.

5.5.7 Local motor control station

- a. The local motor control station to be installed in the field near the motor shall conform to the attached IOCL specifications. Components and accessories that are required in the local motor control station may be mounted on the local field mounted panel envisaged for the driven equipment.
- b. Meters in the local control station shall be suitable for 4-20 mA transducer outputs and shall be calibrated for the actual motor current. Further, for drives with bypass facility, the meters shall be capable of reading bypass full load and starting currents, as well as the drive current.

5.6 Protection, Control, Metering, Indication and Annunciation

- 5.6.1 The system vendor shall provide all the necessary system control, protection; alarm equipment and metering for the entire drive system and its auxiliary equipment.
- 5.6.2 Automatic sequence control shall include start-up of cooling system, auxiliary system of the motor, interlock checking, automatic start and run-up of drive, planned and emergency shutdown. The same shall be processed through microprocessor-based system.

5.6.3 Operator Control Panel

- a. Each drive shall be equipped with a front mounted operator control console consisting of a backlit alphanumeric display and a keypad with keys for parameterization and adjusting parameter which shall

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not be limited to start/stop, local/remote, auto/ manual, increase/decrease, menu navigation and protection and measurement parameter selection, etc.

- b. All parameter names, fault messages, warnings and other information shall be displayed in complete English words or standard English abbreviations to allow the user to understand what is being displayed without the use of a manual or cross-reference table. This shall also be used for the modification of all electrical values, configuration parameters, drive menu parameters, application and activity function access, fault, local control, adjustment storage, self test and diagnostics. Keypad shall be operable with password for changing the protection setting, safety interlock etc. However the parameters such as measurements, setting, mode of drive etc. shall be allowed to be viewed without any password.
- c. Operator console shall have facility/ port to connect external hardware such as laptop etc. Console shall have facility for upload and download of all parameter settings from one drive to another identical drive for start up and operation.
- d. Drive system control shall also have facility to receive tripping signal from up stream breaker for tripping and also provision for closing up stream breaker after all required process parameters are achieved.
- e. User-friendly software for operation and fault diagnostic shall be loaded in the drive system panel before commissioning.

5.6.4 Protective features

The system offered shall incorporate adequate protective features, properly coordinated for the drive control and for motor but not limited to the following:

- i. Incoming line surge protection
- ii. Under/ over voltage protection
- iii. Phase loss protection
- iv. Programmable over current protection and under load protection.
- v. Inverter fault.
- vi. Over frequency/ over speed of motor
- vii. Ventilation loss (in case same is not provided, drive shall generate a over temperature fault alarm and suitable sensors as required for same shall be provided).
- viii. Over temperature of equipment (converter & motor)
- ix. Specific motor protection, including motor winding, bearing temperatures, over-current, overload, negative phase sequence and earth fault protections etc.
- x. System earth fault protection.
- xi. Excitation system protection for synchronous motor
- xii. Over and under frequency, rotor earth fault (if applicable), field failure protection for synchronous motor, interface to DCS system

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- xiii. Additional protection, if any for drive system

5.6.5 Control

The following controls shall be provided as a part of the operator control panel or through separate switches:

- i. Start/ stop
- ii. Speed control (Raise/ lower)
- iii. Forward/ Reverse (if specified)
- iv. Auto/ manual/ test mode
- v. Local/ remote
- vi. Emergency stop
- vii. Start/stop for by pass starter (where specified)
- viii. Trip-remote breaker
- ix. Excitation control system for synchronous motors
- x. Sequential switching of filters

5.6.6 Indications

- i. Motor running
- ii. Motor stopped
- iii. VFD system fault
- iv. System ready to start
- v. AC mains ON
- vi. Motor over speed
- vii. Rectifier output 'ON'
- viii. Motor zero speed
- ix. Remote breaker trip
- x. Excitation system healthy for synchronous motors
- xi. Process trip with hand reset type relay to identify process related trippings.

Above indications may be provided as a part of the operator control panel, i.e., door mounted keypad or through hardwired LEDs. LEDs provided for indication shall be cluster type with adequate brightness and minimum 2 nos. LEDs chips per light. LEDs shall be connected in parallel and each LED chip having diameter not less than 3 mm.

Potential free contacts of items i-iv shall be wired separately for remote indications in DCS system.

5.6.7 Metering

Digital display of the following parameters shall be as a part of the operator control panel, selectable by the operator:

- i. Output voltage
- ii. Output current VFD/ bypass
- iii. Output frequency

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- iv. Drive thermal state
- v. Motor speed
- vi. Motor energy meter
- vii. Hour run
- viii. Voltage and current meter for excitation system for synchronous motor
- ix. KVAR, power factor meter for synchronous motors
- x. Necessary transducer shall be provided with 4-20mA output for indicating motor speed and motor current in DCS unless otherwise specified for other parameters.

5.6.8 Audio-visual Annunciations

- a. The system shall incorporate audio-visual annunciations for protection, for various fault conditions, for the drive motor, supply cables, DC reactor and the converter, output transformer etc.
- b. Alarms shall also be included for the failure of various auxiliaries together with identification of the failure unit, loss of cooling system, various protection devices provided for converter transformer etc.
- c. Audio-visual window annunciations shall be provided on the front of the panel. All annunciations as required for normal and satisfactorily operation of the drive system shall be included as per vendor standards. These annunciations can be part of operator console panel or separately mounted type.
- d. Vendor shall include audio-visual alarm as required for normal operation and maintenance of the system but not be limited to the following:
 - i. Rectifier fuse failure/ drive fault
 - ii. Main AC failure
 - iii. Inverter fuse failure/ Drive fault
 - iv. Inverter overload
 - v. Inverter high temperature/ drive fault
 - vi. Cooling system failure
 - vii. Motor failed to start/ drive fault
 - viii. Transformer failure
 - ix. Excitation system failure for synchronous motor
 - x. Battery monitoring healthiness
 - xi. Communication and measurement system unhealthy
 - xii. Motor temperature high
 - xiii. Harmonic filters monitoring

All drive internal faults will be annunciated as drive fault.

Common potential free contacts shall be provided for above annunciations and these shall be wired up to terminal block for owner's use for remote alarm and monitoring.

5.7 Fault Diagnostic

Fault diagnostic shall be built into the system to supervise the operation and failure of the system. The information regarding failure of any of the system including shutdown of the system shall be available for a period of minimum 4 days (96 hours) after a shutdown even though no supply would be available to the system. The system may be totally de-energized for maintenance or otherwise. It shall be possible to retrieve the record of events prior to tripping of the system or de-energisation. Auxiliary supply to the system components or to the electronics (firmware) for the diagnostics/ display shall be taken care by the manufacturer for this purpose.

5.8 External power supply for auxiliary and control circuit

Auxiliary power supply for devices external to VFD modules, space heater supply for motor, VFD panel space heater, auxiliary power supply for transformers, cubicle 11 W CFL lamps etc. shall operate on 240 volts single phase AC provided by purchaser.

All control circuit shall operate at maximum voltage of 240 V AC or 220 V DC unless otherwise defined in the data sheet.

Vendor shall include supply of all control transformers, protective devices, required accessories etc. and any other control supply voltage as required for the system shall be derived from the power supply mode available by other.

5.9 Reliability features

The expected lifetime of the drive system shall be 20 years. The system including all individual components forming part of the system shall have an availability of minimum 0.997 and a minimum MTBF of 4 years.

5.10 Maintenance features

The controller design shall incorporate the following maintenance features:

- Modular construction
- All components shall be easily accessible.
- Standard diagnostics to aid maintenance personnel. These shall include LED or alphanumeric displays, test or measurement points.

5.11 Painting

5.11.1 All metal surfaces shall be thoroughly cleaned and de-greased to remove mill scale, rust, grease and dirt. Fabricated structures shall be

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pickled and then rinsed to remove any trace of acid. The under-surface shall be prepared by applying a coat of phosphate paint and a coat of yellow zinc chromate primer. The under-surface shall be made free from all imperfections before undertaking the finishing coat.

5.11.2 After preparation of the under surface, the panel shall be provided with epoxy based powder coating. The color shade of the final paint shall be as per manufacturer's standard, unless otherwise specified. Panel finish shall be free from imperfections like pinholes, orange peels, runoff paint, etc.

5.11.3 All unpainted steel parts shall be zinc passivated, cadmium plated or suitably treated to prevent rust and corrosion. If these parts are moving elements, then these shall be greased.

5.11.4 Final paint shade shall be light gray and dove gray 631 and 632 as per IS-5 for indoor and outdoor equipment respectively unless otherwise specified.

6.0 INSPECTION, TESTING AND ACCEPTANCE

6.1 During fabrication, the drive shall be subject to inspection by IOCL or by an agency authorized by the owner, to assess the progress of work, as well as to ascertain that only quality raw material is used. The manufacturer shall furnish all necessary information concerning the supply to IOCL inspectors.

6.2 All tests shall be carried out at the manufacturer's works under his care and expense. The tests shall be witnessed by an inspector of IOCL or of an agency authorized by the owner. Prior notice of minimum 4 weeks shall be given to the inspector for witnessing the tests.

6.3 The routine test shall be conducted on all the drive system. However, type test shall be performed on one system of each rating and type unless otherwise agreed between purchaser and manufacturer VFD drive. For the purpose of testing, VFD drive system as defined in Cl. 1.1 shall be considered.

6.4 The routine and type tests to be performed on the drive system shall be as follows:

6.4.1 Routine Test

a. Visual Inspection

It involves checking of the various equipments/ components fault diagnostic unit, wiring, terminals, earthing ratings etc. in line with the approved drawings and visual inspection shall not be limited to the following:

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- i. Dimensions and door layout vis-à-vis the approved drawings.
 - ii. Degree of protection of cubicles
 - iii. Simulation facility of control signals for testing purposes.
 - iv. Memory function of fault diagnostic
 - v. Voltage/ current rating power semiconductor elements
 - vi. Cable termination size and number of terminals, cable-supporting etc.
 - vii. Accessibility of components
 - viii. External signals and indication/ alarm signals on converter.
 - ix. Earthing of cubicles and cubicle doors.
- b. Insulation test
 - c. Light load and functional test
 - d. Load characteristics test
 - e. Load duty test
 - f. Checking of auxiliary devices
 - g. Checking the properties of the control equipment
 - h. Checking the protective devices
 - i. Checking of control and functional requirements
 - j. High voltage test
 - k. Leakage and pressure test for cooling water system where provided
 - l. Shaft current/ bearing insulation
 - m. Automatic restart/ re-acceleration
 - n. Test capability to ride through voltage dips upto 20%.
 - o. Test capability to restart the system and resynchronize converter onto running motor after a voltage interruption.

6.4.2 Type tests

- a. Allowable full load current versus speed
- b. Efficiency
- c. Temperature rise
- d. EM immunity
- e. EM emission
- f. Current sharing
- g. Voltage division
- h. Line side current distortion content
- i. Power factor
- j. Audible noise
- k. Torque pulsation
- l. Motor vibration
- m. Dynamic performance
- n. Current limit and current loop test

Type test certificate from independent testing agency for similar equipment can be accepted for d, e, f, j, k, and i.

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6.4.3 Additional tests on switchgears and transformers shall be carried out based on the requirement defined in the IOCL's specification of respective equipment.

6.4.4 Staring test with driven equipment

If a string test with driven equipment is specified in the data sheet of the driven equipment, it shall be carried out with the job equipment.

7.0 CERTIFICATION

The motors and associated variable frequency drive system equipment shall have test certificates issued by recognized independent test house (CMRI/ BASEEFA/ LCIE/ UL/FM or equivalent). All indigenous motors shall conform to Indian Standards and shall be certified by Indian testing agencies. All motors (indigenous and imported) shall also have valid statutory approvals as applicable for the specified hazardous location. All indigenous flameproof motors shall have valid BIS license and marking as required by statutory authorities.

Also the motor nameplate shall clearly indicate that the motor is suitable for operation with variable frequency drive along with VFD make and model number.

8.0 PACKING AND DISPATCH

The equipment shall be divided into several shipping sections for protection and ease of handling during transportation. The equipment shall be properly packed for transportation by ship/ rail or trailer. The equipment shall be wrapped in polyethylene sheets before being placed in wooden crates/ cases to prevent damage to the finish. Crates/ cases shall have skid bottoms for handling. Special notations such as 'Fragile', 'This side up', 'Weight', 'Owner's particulars', 'PO nos.' shall be clearly marked on the package together with other details as per purchase order.

The equipment may be stored outdoors for long periods before installation. The packing should also be suitable for outdoor storage areas with heavy rains/ high ambient temperature unless otherwise agreed.

9.0 DOCUMENTATION

The following documents shall be submitted:-

- (a) General arrangement drawings showing main dimensions, weights, arrangement of components and the minimum space required for correct installation, operation and maintenance.

- (b) Foundation plan showing location and details of foundation bolts.
- (c) Cable entry and termination arrangements.
- (d) Electrical schematic and wiring diagrams.
- (e) Completed Data Sheets.
- (f) Installation, operation and maintenance instructions.
- (g) All software documentation associated with plc or other microprocessor equipment provided.
- (h) Test reports and test certificates.
- (i) Overall MTBF and MTTR calculations.

PART 1 TO BE COMPLETED BY PURCHASER				
A	CONTRACTUAL INFORMATION			
1	Delivery Site			
2	Job Name/Job No.			
3	Equipment Name			
4	Order No.			
5	Item No./Tag No.			
B	INCOMING SUPPLY DETAILS			
6	Frequency	50 Hz		
7	Mains Power Supply	V ph Wire	V ph Wire	Neutral Earthed
8	Aux. Power Supply	V ph Wire	V ph Wire	Neutral Earthed
9	Voltage Tolerance	+/- 6%		+ % - %
10	Frequency Tolerance	+/- 1%		+ % - %
11	Cables	Power		Control
	Function			
	Type			
	No. of Cores			
	Conductor Cu/Al			
	Core Size mm ²			
	Entry From			
	From			
	To			
	Remarks			
C	ENVIRONMENT			
12	VSD Location	Indoor (AC/ Non-AC)		
	Temperature Max. Min.	40°C 5°C		
	Max. Relative Humidity	% at °C		
13	Ambient Condition	Outdoor		
	Temperature Max. Min.	40°C -5°C		
	Max. Relative Humidity	% at °C		
	Altitude	Under 1000m		
	Atmospheric Contaminants	Salt/ Sulfur		
14	Hazardous Area Certification Responsibility Of	Vendor		Purchaser
15	Number of Cooling Fans	1	2	
D	CONTROLS, SELECTORS AND INDICATIONS			
16	Controls	On Front Panel of VSD	Remote	S-Shrouded L-Lockable

	Power On/Off (Controls remote circuit breaker)	Yes/	No/	S			
	Start/Stop	Yes/	Yes/	S			
	Speed Setting	Yes/	Yes/	L			
17	Selectors-Located	On VSD		Remote			
	Loc/Rem for Start/Stop	Yes/		No/			
	Loc/Rem for Speed Control	Yes/		No/			
	Hand/Auto for Start/Stop	No/		Yes/			
	Hand/Auto for Speed Control	No/		Yes/			
18	Indications	Power On					
	Required	Running/Stopped					
		System Healthy/Faulty					
E	DRIVEN EQUIPMENT						
19	Type (Description)						
	Contractual Relationship						
F	SYSTEM DIAGRAM (Cable route lengths should be specified where appropriate)						
PART 2 TO BE COMPLETED BY PURCHASER/MANUFACTURER (delete as appropriate)							
G	MOTOR DETAILS						
20	Type	Induction		Synchronous			
	Voltage						
21	Location	Outdoor					
	Hazardous Area (BS 5345)	Zone 1	Zone 2	Non-Hazardous			
	Group	IIB					
	Temperature	T3					
	Enclosure	IP 55					

	Dust Hazards	None	
22	Operating Parameters	Speed Range	rpm
		Starting Torque (Full Volts)	Nm
		Full Load Torque	Nm at pu Slip
		Power Rating (Full Load Max. Ambient Conditions)	kw at p.f.
		Torque Characteristic	
23	Input Power Factor 100%; 75%; 50% FI		
24	Heat Generated	kw at 100% load kw at 75% load kw at 50% load	
25	Special Requirements	None	

INSTRUCTIONS TO BIDDERS (ITB)

A) SALIENT POINTS

1. Bidder should submit their bids strictly as per the requirements outlined hereunder and as specified in the Material Requisition/Technical Specifications/Scope of Tender or equivalent term /Technical Specifications/Scope of Tender or equivalent term.
2. Tender document (Non-Transferable) can be downloaded from GEM website during the period, as specified under “Critical Dates” stated in the GEM portal. Offer shall have to be submitted ONLY through online mode on above mentioned GEM website during the period, as specified under “Critical Dates” and the bids shall be opened on the date & time, as specified under “Critical Dates”.
3. Tender Opening:

The Un-priced offers shall be opened on the due date (appearing in under “Critical Dates” stated in the GEM portal) and in subsequent corrigendum, if any) and price bid of techno-commercially acceptable bidders shall be opened on a suitable date, which will be communicated to bidders, through GEM interface.

Tender opening can be witnessed by bidders by logging into the GEM website.
4. The bidders are required to submit their bids electronically on the **GEM Portal** only (URL: <https://gem.gov.in/>) using valid Digital Signature Certificates, on or before the bid submission date and time. Bidders are required to register themselves at <https://gem.gov.in/>
5. In the event of an irreconcilable conflict between the provision of GEM GTC and IOCL General Terms and Conditions of Purchase and/or the Special Conditions of Purchase and/or Addendum and/or the Agreed Variations to the Tender Documents and/or the Purchase Order and/or between any of the other said documents so that the conflicting provision(s) cannot co-exist, to the extent of such irreconcilable conflict, the following order of precedence shall apply so that the conflicting provision(s) in the document lower in the order of precedence set out below shall give way to the conflicting provision(s) in the document higher in the order of precedence, namely:
 - i. Purchase Order;
 - ii. Agreed Variations to the Tender Documents;
 - iii. Addendum/Addenda to the Tender Document;
 - iv. Special Conditions of Purchase
 - v. IOCL General Purchase Conditions
 - vi. GEM GTC
 - vii. Other Contract Documents.
6. **Payment Terms**

In partial modification to the payment terms as mentioned in the General Purchase Conditions, the following payment terms shall be applicable.

Payment terms shall be as mentioned in Special Conditions of Purchase (SPC).

7. Type of Tendered Item:
 - **High Speed Motor Package.**
8. **For Price Reduction due to delay in supply (PRS) purpose: Date of Receipt of material at Mathura Refinery site shall be considered as the date of delivery.**
9. **The offer should be valid for 6 (Six) months from the scheduled unpriced bid opening date (including extensions, if any).**

10. **PAYMENT INSTRUCTIONS**

10.1 All dispatches shall be made only after receipt of Despatch Clearance from IOCL. Unless otherwise specified / required by IOCL, part dispatches will not be allowed and vendor has to supply materials in one lot.

10.2 For indigenous vendors, in case of direct negotiation of despatch documents payment shall be released only after receipt of materials at site.

10.3 CGST & SGST or IGST shall be released only on receipt of GST Invoice containing the following details:-

- (a) Name, address and GSTIN of the supplier.
- (b) A serial number of the invoice.
- (c) Date of issue.
- (d) Name, address and GSTIN or UIN, if registered of the recipient.
- (e) Name and address of the recipient and the address of the delivery, along with the State and its code,
- (f) HSN Codes or Accounting Code of services.
- (g) Description of goods or services.
- (h) Total value of supply of goods or services.
- (i) Taxable value of supply of goods or services taking into discount or abatement if any
- (j) Rate of tax (Central Tax, State Tax, Integrated Tax (for inter-state supply), Union Territory Tax or cess)
- (k) Amount of tax charged in respect of taxable services (Central Tax, State Tax, Integrated Tax (for inter-state supply), Union Territory Tax or cess);
- (l) Place of supply along with the name of State, in case of supply in the course of inter-state trade or commerce
- (m) Address of the dispatch point where the same is different from the place of supplier

- (n) Signature or digital signature of the supplier or his authorised representative.
- (o) It's the obligation on the part of Bidder / Vendor / Contractor / Consultant to discharge their liability by payment of GST to Government of India in cash OR utilisation of Input Tax credit in respect of such supply of services through GST Invoice under this Contract, so that Owner will avail Input Tax credit on such supply. Also it shall be the obligation on the part of the bidder / vendor to include the tax invoices in the return ensuring matching of the tax amount and to ensure timely filing of the return in the GSTN portal. In the event that the input tax credit of the GST charged by the Bidder / Vendor/ Contractor / Consultant is denied by the tax authorities to Owner due to reasons attributable to Bidder / Vendor, Owner shall be entitled to recover such amount from the Bidder / Vendor/ Contractor / Consultant by way of adjustment from the next invoice or from Bank Guarantee. In addition to the amount of GST, Owner shall also be entitled to recover interest and penalty, in case same is imposed by the tax authorities on Owner.
- (p) Any deductions in lieu of deviations to the terms and conditions of the purchase order shall be suitably incorporated by the vendor in the invoice presented, else the vendor shall have to necessarily provide a credit note upon intimation by IOCL within a stipulated time period and any delay in payment due to the delay in providing credit note shall be to the vendor's account.

- 10.4 No initial advance payment along with order shall be made by IOCL against supplies as well as services (i.e. transportation, erection, site work etc.).
- 10.5 Total progressive payments shall be limited to maximum as specified in SPC, against receipt of advance bank guarantee for equivalent amount. No progressive payments at any stage other than those milestones specifically mentioned above shall be payable by IOCL.
- 10.6 All Bank guarantee will be issued directly to IOCL by the Bank and Vendor shall enclose copy of the same along with invoice. Banks shall be informed to send a separate confirmation immediately on request to IOCL to expedite processing at IOCL's end.
- 10.7 All payments shall be released within 30 days of receipt of invoice and all requisite documents, complete in all respects.
- 10.8 Billing schedule shall be submitted to IOCL by the vendor for approval within 45 days from the date of Letter of Acceptance / Purchase Order (whichever is earlier) wherever specified in the Purchase Order. No pro-rata dispatch shall be made without the approval of billing schedule.
- 10.9 IOCL shall establish the Letter of Credit only on receipt of vendor's acceptance to IOCL's Letter of Acceptance and on submission of PBG by Vendor to IOCL.
- 10.10 Format for Advance Bank Guarantee (ABG) shall be as enclosed with the tender.
- 10.11 All Bank Guarantees (ABG, PBG for Foreign & Indigenous Suppliers) should be submitted to IOCL Office as detailed in tender.

11. EVALUATION CRITERIA FOR COMPARISON OF BIDS:

Following costs, taxes, duties etc., as applicable, shall be used for evaluation of bids:

- Basic ex-works cost (including special tools and ackles),
- Cost of mandatory and commissioning spares, if any
- Third party inspection (TPI) and Other Inspection charges, if extra
- Packing & Forwarding charges [P&F], if extra {Biodegradable packing material should preferably be used for supply of materials}
- All taxes and duties applicable in India for both Indian and foreign bidders, Port handling charges (for foreign vendors),
- Freight (including inland freight charges in case of foreign bidders)
- Transit Insurance @ 0.5%,
- Testing charges,
- Site work charges, if applicable
- Site supervision services charges (for number of days as informed in tender), training charges, if applicable
- AMC charges, if applicable
- Technical and commercial loadings, as defined in the Tender document. Loading for cylinder rental charges, if applicable
- Any other charges indicated by the bidder

For Purchase Delivery terms, only prevailing current INCOTERMS (2020) shall be used. Bid evaluation will be done considering GST rates and HSN quoted by the bidder. GST rates and HSN quoted by the bidder shall be treated final and bids shall be evaluated on Gross tax basis i.e. after including amount of GST.

Bidder to note that any higher rate of tax actually invoiced shall be adjusted in price.

Testing and Inspection charges: Goods and Services shall be subject to stage wise and final inspection by any of the Third-Party Inspection (TPI) agencies (listed in the Instructions to Bidders), and TPI charges are included in quoted prices, and no additional charges shall be paid by Owner.

Similarly, all built in import content (if applicable) shall also be subject to inspection by TPI agencies listed in the Instructions to Bidders, in the country of origin of the import content, and charges for the same are included in quoted prices, and no additional charges shall be paid by Owner.

It will be bidder's responsibility to arrange for third party inspection (if applicable for tender) and submit third party inspection release note on time. No time extension shall be allowed by IOCL for any delay/lapse in this regard

Third party inspection charges for equipment / material / goods shall be included by the Supplier(s) in their quoted prices, from any one of the Third-Party Inspection Agencies as per the tender.

11.1 Bids shall be evaluated after considering prices quoted for the components relevant to indigenous supplies as indicated above and the SGST & CGST or IGST quoted by the Bidder in ATC.

11.2 Site supervision services for required number of days shall be used for evaluation.

11.3 Bidders shall have to quote their prices in GEM inclusive of freight charges upto Refinery (Stores) / Project site.

11.4 It shall be assumed that the price quoted by the bidder in GEM is inclusive of TPI charges, , P&F, Freight charges, Insurance and all taxes and duties.

11.5 Technical loading shall be applied on the bidders after opening of the price bid on GEM portal. L1 bidder shall be decided based on the overall lowest evaluated price i.e prices quoted in GEM portal plus technical and commercial loading values.

12. COMMERCIAL LOADING OF OFFERS IN CASE OF DEVIATIONS

It may be noted that deviation to commercial terms indicated in this tender document may not be allowed even though loading has been indicated in this section. This loading shall be applicable only if Owner allows the deviation to any of the indicated commercial terms.

12.1. BASIS OF LOADING

12.1.1. The Bids shall be loaded on total order value.

12.1.2. Bidders are requested to submit the offer in line with terms and conditions provided in Tender document.

12.2. PAYMENT TERMS

12.2.1. The payment terms applicable should be clearly indicated. Loading shall be done on the differential amounts at a rate of 9.6% per annum simple interest or otherwise as defined in the tender for the following periods:

(a) Drawing approval – 80% of the delivery period.

(b) Receipt of raw materials at Supplier's works – 50% of the delivery period.

(c) Final 10% against dispatch document - one month.

12.3. PERFORMANCE BANK GUARANTEE (PBG)

12.3.1. Wherever applicable for equipment's and packages, Performance Bank Guarantee (PBG) shall be furnished as per tender unless otherwise specified in the tender documents. PBG shall be as per GEM format, if the tender is in GEM & **valid till full defect liability period plus three (2) months claim period.**

In case bidder does not agree to submit PBG/ISB as per tender requirement, equivalent percentage loading shall be done.

In case a bidder offers to give a PBG for less than 05% of order value, loading shall be done for the differential amount.

In case of Differential Amount

Amount Offered by Bidder		Loading
a)	05%	Nil
b)	Less than 05%	Differential between the offered percentage and 05%

12.4. DELAYED DELIVERIES (CONSIDERING GPC CLAUSE OF 0.5% DELAYED ~ 5% TOTAL)

This clause shall be as per Cl. 12 of IOCL's GPC.

The difference between the quantum as per GPC and that offered by the bidder shall be loaded. For non-acceptance of this clause or for accepting Liquidated Damage, loading of 5% shall be done. In case the clause as per IOCL GPC is accepted but with maximum limit indicated as 5% of undelivered order value (not applicable for package items), loading of 2.5% shall be done.

In case there are different delivery dates for supply and for site job, PRS at applicable rate shall be applicable, if the vendor has delayed the supply beyond CDD, irrespective of actual date of completion of contract (Site work).

If subject tendered item is a package item (ordered as a complete system), the price adjustment shall be applicable on the total contract value of the package and not on the value of the undelivered portions (even if a billing breakup is approved for the package).

13. PRICE VARIATION

Prices mentioned in the Bid shall remain firm and fixed and valid until contractual completion except in the specific cases where Price Variation Clause with Price Variation Formula has been incorporated in the Bidding Document.

However if a bidder on his own gives a price variation formula without ceiling or gives a different Price Variation Formula other than the one given in the Bidding Document, offers of such bidders shall be rejected. Ceiling shall be loaded for evaluation purpose.

14. TAXES/DUTIES:

However, if a supplier states that taxes/duties are not applicable at present and will be charged as applicable at the time of delivery then his bid shall be loaded by the maximum rate of taxes/duties applicable as on the date of bid opening.

Cost loading in respect of utilities etc. will be considered as per respective MR/Technical Specification stipulation.

15. DELIVERY

In case a supplier quotes delivery longer than required in enquiry, the bid may get rejected and IOCL reserves the right to accept or reject the bid as per its discretion.

16. VALIDITY OF OFFER

In case a bidder offers shorter validity than required in Tender and seeks to revise prices on being asked to meet validity requirement as per Tender, the offer shall be rejected.

16.0 SUO MOTO CHANGES IN PRICES

Suo moto price change: In case of any suo moto change in price, following shall apply:

Stage	Price Increase	Price Decrease
After opening of un-priced bid	Not Acceptable. Bid shall be liable for rejection. Action regarding Holiday Listing may be taken. EMD shall be forfeited. In case of GeM, IM Policy of GeM shall be applicable	Tender evaluation shall be done without considering suo moto price decrease. Ordering shall be done considering suo moto price decrease.

17.0 SPARES

17.1 Prices of Mandatory Spares, Commissioning spares and special tools and tackles, wherever required and as specified in the tender documents shall be included / quoted extra (as specified in Price Format).

17.2 All spares quoted (as specified in Price Format) by suppliers against the specified MR / Technical Specification requirement will be evaluated and recommended for ordering with the main equipment except recommended two years operation and maintenance spares. It is the prime responsibility of the bidder to quote spares prices as asked in the price format / tender documents (may be included in the main item or asked to specifically quote spares prices as extra). In case a supplier does not quote for spares as extra wherever asked to specifically quote as extra (in the price format), their spares price shall be considered as included in the main item price. Evaluation and ordering shall be done considering spares price as included / nil.

17.3 Commissioning spares and special tools and tackles, if required and mentioned in MR/Technical Specification, will be considered for price evaluation and recommended for ordering as quoted by Suppliers. They need to be quoted extra only when asked in the price format. However, Supplier shall be fully responsible, and no additional cost shall be paid by IOCL in case commissioning spares/ special tools & tackles over & above those quoted by supplier are required.

17.4 Bidders are requested to quote for their recommended two years operation and maintenance spares wherever asked for but the same will not be considered for price evaluation. The prices quoted for recommended two years operation and maintenance spares shall remain valid up to the contractual completion/delivery period of Order. Order of recommended two years operation and maintenance spares may be placed by IOCL separately, if required. Spares and its quantity shall be decided by IOCL at the time of Order for two years operation and maintenance spares.

Bidder to refer tender documents for Break-Up (%) of Two Years Operation and Maintenance Spares Charges. The same to be submitted duly signed & stamped along with unpriced Bids.

18.0 CURRENCY OF BID

18.1 Bidding currency shall be Indian Rupees (INR) for Indian bidders

19.0 CONTACTING IOCL REPRESENTATIVE

19.1 From the time of the bid opening to the time of the award, if any bidder wishes to contact IOCL for any matter relating to the bid, it should be done in writing.

19.2 Any effort by a bidder to influence IOCL in any manner in respect of bid evaluation or award will result in the rejection of that bid.

19.3 Advise IOCL of any questions as quickly as possible and in any event no later than five working days prior to the Closing Date for submission of Bids.

20.0 EXAMINATION OF BIDS AND DETERMINATION OF RESPONSIVENESS

20.1 IOCL will examine the bids to determine whether they are complete, whether any computational errors have been made, , and whether the bids are generally in order.

20.2 Prior to the detailed evaluation, IOCL will determine whether each bid is of acceptable quality, is generally complete and is responsive to the Tender Documents. For the purposes of this determination, a responsive bid is one that conforms to all the terms, conditions and specifications of the Tender Documents without deviations, objections, Conditionality or reservations.

20.3 Bidder shall not be allowed to submit any Price Implication or Revised Price after submission of Bid, unless there is change in the stipulations of the Tender Document and such changes are incorporated through an Amendment. In case Exceptions and Deviations submitted by Bidder along with Bid are not considered as acceptable and no Amendment is issued, then in such a case the Bidders would be required to withdraw such Exceptions/Deviations in favour of stipulations of the TENDER document and Bidders would not be eligible for submission of Price Implication/Revised Price, failing which such Bid(s) shall be considered as non responsive and rejected.

- 20.4 IOCL's determination of a bid's responsiveness shall be based on the contents of the bid itself without recourse to extrinsic evidence. If a bid is not responsive, it will be rejected by IOCL and may not be subsequently made responsive by the bidder by correction of the nonconformity.

21.0 SPLITTING OF ORDERS

Order for supply and site work shall not be split and only single order covering the entire scope of work on each supplier shall be placed. However, IOCL reserves the right to place multiple orders interlinked with each other for ease of execution.

22.0 NEGOTIATION

Negotiations will not be conducted with the bidders as a matter of routine. However, IOCL reserves the right to conduct negotiations. Bidders should quote competitive prices considering the fact that price negotiations, if required, to be held with the lowest bidder only.

23.0 AWARD OF WORK

- 23.1 IOCL will award the order to the bidder who has been determined as a lowest evaluated bidder.

24.0 IOCL'S RIGHT TO ACCEPT ANY BID AND TO REJECT ANY BID

- 24.1 IOCL reserves the right to accept or reject any bid, and to annul the bidding process and reject all bids at any time prior to award of the order without thereby incurring any liability to the affected bidder or bidders or any obligations to inform the affected bidder or bidders of the ground for IOCL's action. IOCL reserves the right to award to any bidder (other than the lowest bidder) without assigning any reason.

25.0 NOTIFICATION OF AWARD—As per GEM

26.0 LANGUAGE OF BID

- 26.1 The Bid prepared by the bidder, all correspondence/drawings and documents relating to the bid exchanged by the bidder with IOCL shall be in English Language alone provided that any document furnished by the bidder may be written in another language so long as accompanied by an English translation, in which case, for the purpose of interpretation of the bid, the English translation shall govern.
- 26.2 In the event of submission of any document/ certificate by the Bidder in a language other than English, the English translation of the same duly authenticated by Chamber of Commerce of Bidder's country shall be submitted by the Bidder. Translation by Indian Embassy / High Commission or authorized / approved translation agencies (by Indian Embassy / High Commission) or any other independent authority shall also be acceptable apart from the Local Chamber of Commerce of country of origin.

27.0 REQUIREMENT OF EMPLOYMENT VISA FOR FOREIGN NATIONALS

27.1 All Foreign nationals coming to India for execution of Projects/ Contracts will have to apply for Employment Visa only and that grant of Employment Visa would be subject to strict adherence of following norms:

- a. Employment Visa is granted only for the skilled and qualified professionals or to a person who is being engaged or appointed by a Company, Organization, Industry or Undertaking etc. in India on contract or employment basis at a senior level, skilled position such as technical expert, senior executive or in managerial position etc.
- b. Request for Employment Visa for jobs for which large number of qualified Indians are available, is not considered.
- c. Under no circumstances an Employment Visa is granted for routine, ordinary jobs.

27.2 Bidders are advised in their own interest to check latest Visa rules from Indian Embassy/ High Commission in their country in case foreign nationals are required to be deputed to India during execution of the Contract.

28.0 ARBITRATION & CONCILIATION

Arbitration & Conciliation shall be as per clause 34 of GPC and its amendment.

In case the bidder is a PSU/CPSU, guidelines from Govt of India shall be followed.

29.0 PRE PRICE BID MEETING

IOCL reserves the right to conduct Pre Price Bid Meeting.

No technical issues shall be raised / discussed by either side during Pre Price Bid meeting. Based on discussions in the pre-price bid conference, deviations, if any, from tender terms and conditions shall be communicated in writing to all the bidders and they shall be asked to submit price implication when substantial changes are made after taking into account the modified terms and conditions including deviations, within stipulated period.

If a bidder takes any further deviations other than those agreed, while submitting the revised price bids, its bid shall be rejected outright without any reference. In case it is found after opening that any deviation is incorporated in the revised price bid, bidder is also liable to be placed on holiday for a period of one year for future tenders in IOC after following the laid down policy in this regard.

Price implications received after the stipulated date are not to be considered. Bidders unable to comply with IOCL's terms and conditions including proposed deviations will be allowed to withdraw their bids.

30.0 ROYALTY INFLOW

Bidders should declare if the offered product is based on IOCL Research & Development (R&D) formulation, and if yes, whether the agreement for royalty payment with IOCL is valid.

The vendor should also enclose an undertaking for the applicable royalty rate payable to IOCL (R&D), while submitting the offer. IOCL shall cross check the applicable royalty from R&D centre, while evaluating the bids. Incentive will be considered while evaluating the bids by applying negative loading to the rates quoted by manufacturers using IOCL (R&D) formulations, to the extent of royalty inflow to IOCL (R&D), after adjustment of taxes and surcharges, if any.

31.0 SAFETY PRACTICES IN MATERIAL DISPATCH & TRANSPORTATION

Refinery being sensitive establishment from fire and safety point of view, therefore there are certain rule and regulation while entering the vehicle and personnel in Central Stores, Mathura Refinery.

Vendor to ensure availability of required original and valid documents for entry of Vehicle carrying Consignment / Material inside the Refinery Premises like RC Book, Insurance Papers, Fitness certificate of Vehicle (Tanker/Truck/Container), Driving License and Cleaner's photo pass etc. at the time of dispatch of Materials & delivery at Mathura Refinery. Vendor to also ensure that the materials / supplies under the PO are transported through registered common carrier only as per relevant provisions of the updated Road Act (Motor vehicle act 1988 & its latest updated revision). This shall enable CISF at Mathura Refinery to allow them smoothly inside Refinery due to security reasons and avoiding any hassles at Refinery Gate.

Truck / Tanker should report at IOCL gate by 8.30 am (excluding Sundays or holidays as per Refinery norms) in order to facilitate unloading at the earliest and release of trucks.

For Entry in Refinery Premises, Vehicle should be fitted with Spark Arrestor, Fire Extinguisher & back horn. Driver and Cleaner should wear PPE i.e. Shoes, Apron and Safety Helmets.

CNG / Two Stroke engine Vehicles are not allowed to enter the refinery premises. Please ensure to send the material in Non-CNG / Non-Two Stroke Engine Vehicles only.

- i) Motor vehicle act: Vehicles shall follow motor vehicle act 1988 & its latest updated revision and all other applicable laws of land during transportation of the material from bidder's works to Mathura Refinery.
- ii) Successful Vendor to indicate the name of driver/khalasis on the lorry receipt/challan etc. so that the same can be verified at the entry gate while allowing entry by CISF. khalasis (Cleaner) should have at least one ID card such

as Aadhar Card, Bank Passbook, Driving License etc. This is required for enhancing security measures for incoming material.

iii) Successful Vendor to also ensure availability of required original and valid documents like RC Book, Insurance Papers, Fitness certificate of Vehicle (Tanker/Truck/Container), Driving License and Cleaner's photo pass etc. at the time of dispatch of Materials & delivery at Mathura Refinery. This shall enable CISF at Mathura Refinery to allow them smoothly inside Refinery due to security reasons and avoiding any hassles at Refinery Gate. In case of non availability of original RC Book in the vehicle, Notarised (True Copy) of RC Book will also be accepted. Vehicle propelled by CNG/LPG or vehicles having less than 4 wheels viz. 3 wheelers etc. are not allowed in Refinery

iv) Invoice "Duplicate for Transporter" shall be submitted at Store.

v) Following precautions should be taken care during packing-

- a. Mathura Refinery is heading towards "Plastic neutrality" hence vendors are advised to preferably use biodegradable material for packaging.
- b. End Cap should be provided at Pipe, Tubes and Valves. For Pipe and Pipe Fittings color code should be used as per Standards, like Red Color for IBR etc.
- c. For small rotary spares packing cartons should be sound enough to hold the material and material code no., Material description and Purchase Order No. should be clearly mentioned on it.
- d. For Instrument Cards, separated card packing with foam and good quality cartoon should be used.
- e. Small size Spares should be packed in mouth closing packing.
- f. Cable should be packed preferably in metal drums and should be end closed.
- g. Material Code should be painted on big size spares, such as Heat Exchangers, Pipe Fittings etc.
- h. For Materials like Chemicals, Refractory, Battery having shelf life, expiry date should be clearly mentioned on packing.
- i. All Type of Gas Cylinder should be supplied with end caps.
- j. For Chemicals Batch No. should clearly mention on drums and different colour drum should be used for different chemicals.
- k. Gasket should be packed with proper cardboard support.
- l. Rotors should be preferably with vertical stand and Nitrogen Filling provision.

vi) Penalties for Violation / Non-adherence of safety procedures and practices (Applicable for Tenders/Purchase Orders involving site work):

a) Violation of applicable Safety, Health and Environment related norm a penalty of

Rs.5,000.00 per occasion

b) Violation as above resulting in any physical injury, a penalty of 0.5% of the contract value (maximum of Rs.2,00,000.00) per injury in addition to Rs.5,000.00 per occasion as in item a.

c) Fatal accident, a penalty of 1% of the contract value (maximum of Rs.10,00,000.00) per injury in addition to Rs.5,000.00 per occasion as in item a.

The vendor is advised to take appropriate insurance policy for the effective implementation of the above penalty provision.

In case of accidents depending on the seriousness of injury etc. in addition to the hospitalization / treatment charges and group insurance amount, compensation shall be paid by the vendor to the affected person / his family members in presence of Engineer-in-charge as per Workmen Compensation Act.

32.0 INSTRUCTIONS FOR ENSURING QUALITY IN SUPPLY OF EQUIPMENT& MATERIAL:

- No supply to be made unless drawings (wherever required to be approved as per the technical specifications) are approved in Code 1 by Owner / CONSULTANT
- Where required, Inspection & Test Plan (ITP) must be approved by Owner /CONSULTANT.
- Third Party inspection release note shall clearly stipulate that material/equipment have been inspected as per Code 1 approved drawings and approved ITP.
- No clearance shall be given to the contractor for erection works / installation of the equipment without receipt of third party inspection release note.
- Pre-commissioning/commissioning of plant/equipment shall be undertaken only after complete satisfaction/verification that supplies are in accordance with final approved drawings (Code 1) and ITP
- Materials shall be dispatched only after issue of Inspection Release Note by TPI agency and despatch clearance given by CONSULTANT.
- Approval Code / Level definition shall be as under

Status Code / Level	Explanation
3	Revise and resubmit
2	To be issued as final after incorporating the comments
1	No Comment- Final issue.

33.0 SITE SUPERVISION SERVICES AND TRAINING

(1) Terms & conditions for Site Supervision & Training services. Bidder shall quote per diem charges considering the following:

- Owner shall reimburse economy class airfare to and from the nearest Airport to New Delhi Airport against documentary evidence.

- Transportation charges to and from New Delhi Airport to refinery / Project Site at MATHURA Refinery, shall also be reimbursed against submission of documentary evidence (limited to maximum First AC Railway Fare between New Delhi station and Mathura Station).
- The per diem rates shall **include** lodging, boarding, local transport, medical, all insurance including third party, income tax, all taxes & all other incidental charges.
- The per diem rates shall exclude GST which shall be payable extra
- Per diem rates shall apply from the date the supervisory personnel reach site and upto the day they leave site. No payment shall be made for the transit period.
- Working hours as those prevailing at site – **upto** eight hours a day(excluding lunch time of 1 hour), Monday through Saturday and holidays as applicable to site personnel shall apply.
- Vendor's supervisory personnel shall observe / abide by site working conditions prevailing in the existing refinery, safety codes and Indian laws.
- A notice period of 15 days will be given for site supervision services.
- For evaluation purpose site **supervision of erection, testing and commissioning at site 60 (sixty) man-days** shall be considered for Evaluation for Supervision Services.
- However, payment shall be made as per actual number of man-days.
- Bidder to ensure compliance to guidelines on PPE (Personal Protective Equipment) & Other Safety Norms

(2) Charges for Site Supervision of erection, testing and commissioning:

S. NO	Description	Man Day rates in INR
1	Per diem charges for upto 8 hours work on normal working days.	Applicable
2	Overtime rate / hour beyond normal 8 hours work on normal working days	
3	Overtime rate / hour for work on weekly off days / holidays(as applicable to Refinery site).	

ANNEXURE-A - BREAK-UP OF LUMP SUM PRICE FOR MANDATORY SPARES

(AS QUOTED IN PRICED BOQ)

Name of Work: Supply of High speed motor package at IOCL Mathura Refinery

Tender Reference No:

Tender ID:

Bidder Name:

Notes:

Bidder to furnish breakup **IN % (percentage)** of the amount quoted line item wise in Priced BOQ duly signed & stamped along with their Unpriced Techno-Commercial Offer.

PRICE SCHEDULE MANDATORY SPARES

SL. NO.	DESCRIPTION	High Speed Motor Package
		(in %)
	Bidder to Mention Item Description in this Column	
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
	TOTAL MANDATORY SPARES CHARGES	100%

<u>ANNEXURE-B - BREAK-UP OF LUMP SUM PRICE FOR TWO YEARS OPERATION AND MAINTENANCE SPARES CHARGES</u> <u>(AS QUOTED IN PRICED BOQ)</u>		
Name of Work: Supply of High Speed Motor Package at IOCL Mathura Refinery		
Tender Reference No:		
Tender ID:		
Bidder Name:		
Notes:		
Bidder to furnish breakup IN % (percentage) of the amount quoted line item wise in Priced BOQ duly signed & stamped along with their Unpriced Techno-Commercial Offer.		
<u>PRICE SCHEDULE TWO YEARS OPERATION AND MAINTENANCE SPARES</u>		
SL. NO.	DESCRIPTION	High Speed Motor Package
		(in %)
	Bidder to Mention Item Description in this Column	
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
	TOTAL TWO YEARS OPERATION AND MAINTENANCE SPARES	100%

Annexure-8

TECHNICAL SPECIFICATION FOR HIGH VOLTAGE INDUCTION MOTOR- HPC High speed Motor for NPRU unit of Mathura Refinery

Abbreviations:

BIS	:	Bureau of Indian Standard
BS	:	British Standards
CIMFR	:	Central Institute of Mines and Fuel Research
CT	:	Current Transformer
EIL	:	Engineers India Limited
FM	:	Factory Mutual
FRP	:	Fiber Reinforced Polyester
IEC	:	International Electro-technical Commission
IEEE	:	Institute of Electrical & Electronics Engineers
IS	:	Indian Standard
JEC	:	Japanese Electro-technical Committee
LCIE	:	Laboratoire Central des Industries Electriques
LRWT	:	Locked Rotor Withstand Time
NEMA	:	National Electrical Manufacturers Association
PO	:	Purchase Order
PVC	:	Poly Vinyl Chloride
p.u.	:	per unit
r.m.s	:	Root Mean Square
RPM	:	Revolutions per Minute
TETV	:	Totally enclosed Tube Ventilated
UL	:	Underwriter's Laboratories
VDE	:	Verband Deutscher Elektrotechniker

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1.0 SCOPE

This specification covers the design, manufacture, testing, packing and supply of high voltage squirrel cage induction motors.

2.0 CODES AND STANDARDS

The squirrel cage induction motors and their components shall comply with the latest editions of following standards issued by BIS (Bureau of Indian Standards) unless otherwise specified:

IS-5	:	Colours for ready mixed paints and enamels
IS-325	:	Three phase induction motors
IS-1271	:	Thermal evaluation and classification of electrical insulation
IS-2071	:	Methods of high voltage testing
IS-2148	:	Flameproof enclosures of electrical apparatus
IS-2253	:	Designation for type & construction and mounting arrangement of rotating electrical machines
IS-2968	:	Dimensions of slide rails for electrical motors
IS-4029	:	Guide for testing of three phase induction motors
IS-4691	:	Degree of protection provided by enclosure for rotating electrical machinery
IS-4722	:	Rotating electrical machines
IS-4728	:	Terminal marking and direction of rotation for rotating electrical machinery
IS-4889	:	Method of determination of efficiency of rotating electrical machines
IS-6362	:	Designation of methods of cooling of rotating electrical machines
IS-6381	:	Construction and testing of electrical apparatus with type of protection e
IS-7389	:	Pressurized enclosure of electrical equipment for use in hazardous areas
IS-7816	:	Guide for testing insulation resistance of rotating machines
IS-8223	:	Dimensions and output series for rotating electrical machines
IS-8289	:	Electrical equipment with type of protection n
IS-8789	:	Values of performance characteristics for three phase induction motors
IS-9628	:	Three phase induction motors with type of protection n
IS-12065	:	Permissible limits of noise level for rotating Electrical Machines
IS-12075	:	Mechanical vibration of Rotating Electrical Machines with shaft heights 56 mm and higher measurement, evaluation and limits of vibration severity

IS-12802	:	Temperature rise measurement of Rotating Electrical Machines
IS-12824	:	Type of duty and classes of rating assigned to rotating electrical machines
IS-13529	:	Guide on effects of unbalanced voltages on the performance of three phase induction motors
IS-13555	:	Guide for selection and application of three phase induction motors for different types of driven equipments
IS-14222	:	Impulse voltage withstands levels of rotating electrical machines with form-wound stator coils
IS-14568	:	Dimension and output series for rotating electrical machines, frame numbers 355 to 1000 and flange numbers 1180 to 2360

- 2.1 In case of imported motors, standards of the country of origin shall be applicable if these standards are equivalent or stringent than the applicable Indian Standards.
- 2.2 The motors shall also conform to the provisions of Indian Electricity rules and other statutory regulations currently in force in the country.
- 2.3 In case Indian Standards are not available, standards issued by IEC/BS/VDE/IEEE/ NEMA or equivalent agency shall be applicable.
- 2.4 In case of any contradiction between various referred standards/ specification/ data sheets and statutory regulations, the following order of priority shall govern.
 - Statutory regulations
 - Data Sheets
 - Job specifications
 - This specification
 - Codes and standards

All conflicts between the requirements of this specification & other relevant documents shall be referred to principal for resolution.

3.0 GENERAL REQUIREMENTS

- 3.1 The offered equipment shall be brand new with state of the art technology and proven field track record. No prototype equipment shall be offered.
- 3.2 Vendor shall ensure availability of spare parts and maintenance support services for the offered equipment at least for 15 years from the date of supply.

- 3.3 Vendor shall give a notice of at least one year to the end user of equipment and PMC before phasing out the product/spares to enable the end user for placement of order for spares and services.

4.0 OPERATING CONDITIONS

4.1 Ambient Conditions

Motors shall be suitable for operating satisfactorily in humid and corrosive atmospheres found in refineries, fertilizer, petrochemical and metallurgical plants. Service conditions shall be as specified in the data sheet. If not specifically mentioned therein, a design ambient temperature of 45°C and an altitude not exceeding 1000 meters above mean sea level shall be taken into consideration.

4.2 Frequency and Voltage variations.

Unless otherwise agreed, motors shall be designed for continuous operation at rated output under the following conditions:

- a. The terminal voltage differing from its rated value by not more than $\pm 6\%$ or
- b. The frequency differing from its rated value by not more than $\pm 3\%$.
- c. Any combination of (a) and (b)

4.3 Starting

- a. Motor shall be VFD operated.
- b. Motors shall be designed for re-acceleration with full load after a momentary loss of voltage with the possibility of application of 100% of the rated voltage when the residual voltage has dropped down to 50% and is in phase opposition to the applied voltage.
- c. Motors shall be designed to allow the minimum number of starts on full load indicated in Table below :

Min. Number of starts	500 to 1000 KW (DOL mode)	Above 1000 KW(DOL mode)
No. of consecutive start-ups with initial temperature of the motor at ambient level (cold)	3	2
No. of consecutive start-ups with initial temperature of the motor at full load operating level (hot)	2	1

- d. The motor above 1000kW shall be designed for 2 nos. equally spaced hot start-ups in an hour with initial temperature of the motor at full load operating level.
- e. Unless otherwise specified, the locked rotor withstand time under hot condition at 80% voltage (time t_E for increased safety i.e. Ex e motor) shall be minimum 5 seconds more than the starting time at 80% voltage, under specified load conditions.

4.4 Unless otherwise stated in the data sheet, motors shall be suitable for starting at 80% of the rated voltage against the torque speed characteristics of the driven equipment.

- a. Starting torque and minimum torque of the motor shall be compatible with the speed torque characteristics of the driven equipment under specified starting and operating conditions.
- b. For heavy duty drives such as blowers, crushers, compressors etc., high starting torque motors shall be provided.

This shall be checked against the speed torque characteristics of the load and the thermal withstand characteristics of the motors.

4.5 The pull out torque at rated voltage shall be not less than 175 percent of the rated load torque with no negative tolerance. In case of motors driving equipment with pulsating loads (e.g. reciprocating compressors), the minimum value of the pull out torque at 80% of rated voltage shall be more than the peak value of the pulsating torque and the current pulsation shall be limited to 40%.

Unless otherwise agreed, the pull out torque shall not exceed 300% of the rated load torque.

4.6 Direction of rotation

Motors shall preferably be suitable for either direction of rotation. In case unidirectional fan is provided for motors, direction of rotation for which the motor is designed shall be permanently indicated by means of an arrow. Any alteration required for obtaining a change in the direction of rotation such as reversal of the fan, must be clearly specified. Motors which are suitable for only one direction of rotation shall have this direction of rotation clearly indicated on the motor together with the phase sequence of the terminals associated with this rotation in indelible marking. Motors suitable for bi-directional rotation shall be provided with a double headed arrow. Directional arrow should be manufactured from corrosion resistant material.

Normally, clockwise rotation is desired as observed from the driving (coupling) end, when the terminals ABC are connected to a supply giving a terminal phase sequence in the order ABC. Counter clockwise rotation of the motor shall be obtained by connecting the supply to terminals

so that the phase sequence corresponds to the reversed alphabetical sequence of the terminal letters. Ample space shall be provided at the terminal box for interchanging external leads C and A for this purpose.

The direction of rotation of motor shall be in accordance with the driven equipment i.e. fan.

5.0 PERFORMANCE

- 5.1 Motors shall be rated for continuous duty (S1), unless otherwise specified in the data sheet.
- 5.2 Motors shall have at least 95% maximum efficiency at rated load.
- 5.3 Motors shall have adequate torque to accelerate the load from zero to full speed under the specified starting and operating conditions.
- 5.4 Starting current in DOL shall be 500% subject to IS/IEC tolerance for motors up to 1000 kW. For motors above 1000 kW, it shall be agreed with purchaser for each case.
- 5.5 In particular cases, when the starting current is to be limited, care shall be taken such that the design values of torque meets the load requirement while at the same time complying with clause 4.3 above of this specification.
- 5.6 In particular cases, when the starting with reduced voltage is specified, care shall be taken such that the design values of torque meets the load requirement while at the same time complying with clause 4.4 and 4.5 above of this specification.
- 5.7 Motors fed by variable frequency drive shall additionally meet the following requirements:
 - 5.7.1 The motors shall be suitable for the current wave forms produced by the power supply including harmonics generated by the drive.
 - 5.7.2 The motor insulation shall be designed to accept applied voltage waveform, within the V peak and dv/dt limits as follows and as per IEC-61800-4, whichever is more stringent.
 - Voltage Peak Phase-to-Ground : ≤ 6000 V
 - Voltage Peak Phase-Phase : ≤ 10300 V
 - dV/dt : ≤ 2700 V/us
 - THD maximum : $< 5\%$

- 5.7.3 The motors shall be designed to operate continuously at any speed over the range (20-100%) of rated speed or as specified in data sheet. The characteristics shall be based on the application — in terms of constant torque / variable torque as per the driven equipment.
- 5.7.4 The motors shall withstand torque pulsation resulting from harmonics generated by the solid state power supply.

6.0 CONSTRUCTION DETAILS

6.1 Windings

- 6.1.1 Motors shall be provided with class-F insulation. The permissible temperature rise above the specified ambient temperature shall be limited to those specified in the applicable Indian Standards for class-B insulation.
- 6.1.2 The windings, along with the stator, shall be tropicalised and shall be vacuum impregnated.

Winding shall be adequately braced to prevent any relative movement during operation. In this respect, special care shall be taken for the stator windings of direct-on-line starting squirrel cage motors. Insulation shall be provided between coils of different phases which lie together.

- 6.1.3 Core laminations must be capable of withstanding burnout for rewind at 400°C without damage or loosening.

In case of motors driving equipment with pulsating loads, special attention shall be paid to the joints of rotor bars and end rings to avoid premature failures due to induced fatigue stresses.

For Ex n motors, the conductor insulation must be carried right up to the terminal clamp.

- 6.1.4 Windings shall be designed to withstand a coil surge voltage of 2.4 p.u. rated peak to line voltage.
- 6.1.5 Motors shall be designed to withstand impulse voltages specified in applicable Indian Standards. The wave shape shall be as per IS.
- 6.1.6 Windings of motors shall be star connected. For VFD fed motors, the main winding connected in 'Delta' can also be considered acceptable subject to motor manufacturer having adequate proven track record.

6.2 Terminals, terminal boxes and cable entries

- 6.2.1 The ends of the winding shall be brought out into a terminal box. The terminations shall be by means of bushings with adequately sized bolted terminals. Line terminals shall be properly insulated from the frame with material resistant to tracking.
- 6.2.2 The terminal box shall be located on the right hand side viewed from the driving (coupling) end. Unless otherwise specified in the data sheet, the terminal box shall be suitable for bottom cable entry. The size of the cable end boxes shall be large enough to provide a minimum distance of 600 mm between cable gland plate and terminal lug. However, the location shall be finalized upon detailed engineering.
- 6.2.3 The neutral point of the star windings shall also be brought out to a separate terminal box. This shall house the current transformers for differential protection of motors wherever required and shall be located on the opposite side of main terminal box.
- 6.2.4 The main and neutral terminal box shall be of fabricated sheet steel. The main terminal box shall be phase segregated type, unless otherwise agreed.

Motors can have elastimold phase insulated terminals in a common box.

- 6.2.5 The terminal box must be of robust construction, with necessary clearance, creepage distances between live parts and between live parts to earth considering air insulation and without any compound filling.
- 6.2.6 The terminal box shall be capable of withstanding the fault current for a period of 0.25 seconds specified in the data sheet.
- 6.2.7 Appropriate phase markings as per IS shall be provided inside the terminal box. The markings shall be non-removable and indelible.
- 6.2.8 The terminal box shall be provided with entries for suitable cable glands corresponding to the size of the specified cables. Terminal box shall have facility to terminate at least 2 run cable of 185 sqmm. The same shall be finalized during detailed engineering.

Equipment and accessories provided shall conform to the hazardous area classification and the environmental conditions as specified in the data sheet.

- 6.2.9 An adequately sized earth terminal shall be provided for cable armour termination. It is essential that all metal parts (mounting rail and cable glands) are bonded and connected to the earth system. Bonding straps are also required across joints on non-active parts.
- 6.2.10 Separate terminal boxes shall be provided for space heaters, resistance temperature detectors and vibration probes.

6.2.11 Main and neutral terminal box covers must be provided with handles to facilitate easy removal.

6.3 Motor casing and type of enclosure

6.3.1 Motors for use in hazardous areas (Zone-2, Group IIA/B) shall have type of protection specified in the data sheet and shall meet the requirements of applicable Indian Standards.

6.3.2 If motor pressurization system is considered in design, following shall be considered :-

- The motor pressurization system shall be designed wrt the plant instrument header and complete with all instrument controls, DCS interface, 3 nos of pressure transmitters for 2 out of 3 scheme and gas detectors in adequate number to ensure alarm in case of ingress of hazardous gas in motor pressurization system.

6.3.3 Local LCP/ LCS shall also be Ex-D or Ex-P type. In case of Ex-P design above points as applicable for motor shall also be ensured for LCP. Also, all EPB in LCS shall be in 2 out of 3 modes with protective cover.

6.3.4 A separate EPB station shall be provided at a safe distance from motor which will be directly routed to motor breaker. This EPB shall be in 2 out of 3 mode with protective cover(s). Supply of EPB is under the scope of Vendor.

6.3.5 All Motors shall be suitable for installation directly outdoor and must have degree of protection corresponding to IP-55 as per IS.

6.3.6 All internal and external metallic parts, which can come into contact with cooling air (Piping, air supply and discharge conduits, protective grills air deflectors, filters and supports etc.) shall be of corrosion resistant material or appropriately treated to resist corrosive agents which may be present in the atmosphere. Screws and bolts shall be of rust proof material or protected against corrosion.

6.3.7 Effective equipotential bonding straps to guard against the occurrence of sparks due to presence of circulating currents shall be provided in type Ex n motors.

6.4 Bearing and lubrication

6.4.1 Motors shall have grease lubricated ball or roller type bearings or of the manufacturer's standard type.

6.4.2 The bearings shall be chosen to give a minimum L- 10 rating life of 5 yrs. (40,000 hrs) at rated operating conditions.

(The L -10 rating life is the number of hours at constant speed that 90 % of a group of identical bearings will complete or exceed before the first evidence of the failure).

6.4.3 Where bearing supports are attached to the motor casing adequate bracing shall be provided on these supports to reduce vibrations and ensure long life of the bearings. Bearings shall be adequate to absorb axial thrust in either direction produced by the motor itself or due to shaft expansion.

6.4.4 Motors shall be designed to permit removing/replacement of bearings.

6.4.5 Grease lubricated bearings

Bearings shall be capable of grease injection from outside without removal of covers. The bearing boxes shall be provided with labyrinth seals, to prevent loss of grease or entry of dust or moisture. When grease nipples are provided, these shall be associated, where necessary, with appropriately located relief devices, which ensure passage of grease through the bearings.

The motors shall have facility for on-line greasing. The grease to be used should be Servogem-3 (IOCL make) or equivalent grade.

6.4.6 Bearing Insulation-Shaft Voltage

Induced voltage at the shaft end of the motor at no load shall not exceed 250 mV r.m.s. for roller and ball bearings and 400 mV r.m.s. for sleeve bearings. The non-driving end bearing shall be insulated from the motor frame to avoid circulating current.

The insulated bearing end shield or pedestal shall bear a prominent warning and manufacturer shall provide detailed drawings showing insulation arrangement.

6.5 Cooling System

All motors shall preferably be self-ventilated. In case the Motor is forced cooled, the cooling system shall be designed with 1 Running + 1 standby or 2 running + 1 standby configurations with auto changeover facility.

6.5.1 Self-Ventilated Motors

All motors shall be fan cooled. The fans shall be of corrosion resistant material and appropriately protected. The material of fan for motors to be used in hazardous areas shall be anti-static and non-sparking type.

Motors for installation in dusty atmospheres or in the presence of sand, fuels or other suspended solid particles in the air shall be fitted with filters for the cooling air. The filters shall be easily accessible for inspection and removable for cleaning and re-use. The material of the filters and

supports trays shall be rust proof or protected against oxidation or corrosion.

6.6 Rotor

The rotor shall be of squirrel cage type, dynamically balanced to provide a low vibration level and a long service life to the bearings. The accepted values of vibrations for a motor at rated voltage and speed shall not exceed those given in the IS. The shaft ends shall be provided with suitably threaded hole or holes to facilitate the assembly or removal of couplings and bearing races.

6.7 Shaft extension

Motors shall be provided with a single, bare shaft extension with key way and key. Motor shaft shall be sized to withstand 10 times the rated design torque.

6.8 Lifting hooks

All motors shall be provided with lifting facility (i.e. hooks etc.) of adequate capacity. For motors provided with heat exchangers, lifting facility shall also be provided for the heat exchanger.

6.9 Earth terminals

Two earth terminals shall be provided on the frame of each motor at diametrically opposite points. Minimum size of the stud shall be 12 mm. Necessary nuts and spring washers shall be provided for earth connection. These earth terminals shall be in addition to the earth terminals provided in the terminal box for earthing of the armour.

7.0 CONTROL, ALARM AND TRIP DEVICES

Motor shall have shaft mounted encoder with dual independent output for VFD speed search option.

All electrical contacts for the devices described below shall have a current carrying capacity not lower than 5 A and a minimum interrupting capacity of 1 A at 220 V DC or 5 A at 240 V AC.

The contacts shall be located in explosion proof or totally sealed housing according to the type of motor enclosure. The cable ends shall be brought together to the terminal box. Any external connections between the housing containing the relay contacts and the terminal box shall be carried out by insulated copper wires in steel conduits or by PVC insulated, armoured, copper conductor cables with cable entries through double compression type cable glands.

7.1 Measurement of winding temperature

Motors with outputs greater than 750 KW or those provided with filters for cooling air irrespective of output shall be provided with platinum resistance temperature measuring devices of 100 ohms resistance at 0°C and a temperature co-efficient of 3.85×10^{-2} located in suitable positions to measure the winding temperature. A minimum of six (two per phase, duplex type) and six spare detectors shall be provided between the coil sides to measure the winding temperature and six (two per phase), preferably at the base of the slots, to measure core temperature, each placed 120° apart. TETV motors may not be provided with core temperature detectors.

A separate terminal box shall be provided for the temperature detectors for hook up with a remote located control & monitoring unit. All temperature detectors shall be wired up to JB.

7.2 Measurement of bearing temperature

Motors with sleeve type self-lubricated bearing shall be provided with :

- a. Two mercury bulb type, indicating dial thermometers for checking of bearing temperatures.
- b. For motors with output greater than 750 KW, platinum resistance type of temperature measuring device shall be provided for bearings (for DE and NDE side) with connections terminating in the terminal box. Motor bearing RTD shall be 3 numbers in each bearing for building 2 out of 3 logic. One spare RTD to be provided in each bearing wired upto RTD JB of motor

8.0 MISCELLANEOUS ACCESSORIES

8.1 Anti-condensation heaters

All motors shall be provided with 240 V anti-condensation heaters, sized and located so as to prevent condensation of moisture during shut down periods. The heaters shall remain 'ON' when the motor is not in service and shall not cause damage to the windings.

Motors with heaters installed in hazardous atmospheres (Zone-1 or Zone-2), shall conform to the provisions of applicable Indian standards and temperature classification specified in the data sheet.

The heater leads shall be brought out to a separate terminal box of the same specification and grade of protection as the main power terminal box.

A warning label with indelible red inscription shall be provided on the motor to indicate that the heater supply shall be isolated before carrying out any work on the motor.

8.2 Special tools and spanners

Motors with special features (e.g. motors with single bearing, explosion proof and increased safety motors) shall be provided with a set of spanners and special tools, required for dismantling and maintenance of the motor.

8.3 Motors shall be supplied complete with double compression Nickel plated brass (or Aluminum, if specifically required) cable glands, crimp type tinned Cu cable lugs for all power, space heater and auxiliary cables (for the specified cable sizes) and first filling of lube oil for forced lubricated bearings.

8.4 Auxiliary motors, if any, shall be as per relevant Indian/ International standards and shall be suitable for the hazardous classification as specified in the data sheet.

8.5 Name Plates

A stainless steel name plate manufactured from series 300 stainless steel and having information as per IS shall be embossed provided on each motor. In addition to the motor rating plate, a separate number plate for motor tag number shall be fixed in a readily visible position. This number shall be as per the data sheets.

Additional information as stipulated in applicable Standards shall be included in the name plate for motors meant for use in hazardous atmospheres.

9.0 NOISE LEVEL

The permissible noise level shall not exceed the stipulations laid down in IS.

10.0 MOTOR VIBRATION

Motor vibrations at bearing housing shall be within the limits of IS, unless otherwise specified for the driven equipment. Limits of shaft vibration for motors with sleeve bearings shall be as per IEC-60034-14.

11.0 CRITICAL SPEEDS

The first actual critical speed of stiff rotors shall not be lower than 125% of the synchronous speed. For flexible rotors, this shall be between

60% and 80% of the synchronous speed. The second actual synchronous speed shall be above 125% of the synchronous speed.

12.0 AUTO CHANGEOVER REQUIREMENT

- i) When power supply to the group of Motors connected to a particular bus is disconnected, the bus voltage starts decaying in magnitude and the angular displacement with respect to the standby (Incoming) bus voltage starts increasing. The decay and angular displacement is dependent on the combined behavior of all the motors and their inertias. Some motors having a higher inertia (fans) tend to behave as generators and supply power to those having lower inertia (pumps). It can be seen that, the faster the changeover, the lesser would be the magnitude decay and angular displacement. Consequently the voltage appearing on motor terminals at the instant changeover is effected would be less.
- ii) From this point, it would be desirable to have a fast auto changeover. The time interval with this scheme will be the difference between the closing and tripping times of the breakers (around 3 to 4 cycles).
- iii) It should be specified that motors should withstand the forces arising out of changeover. It has been observed that 150% voltage can be considered for the purpose.

13.0 PAINTING

Internal and external parts of the casing and all metal parts likely to come in contact with the surrounding air shall be protected with anti-acid paint that shall resist the particular ambient condition.
All external surfaces shall be given a coat of epoxy based paint. Paint shade shall be 632 as per Indian Standard IS-5.

14.0 INSPECTION AND TESTING

- 14.1 During manufacturing of motors, the motors shall be subject to inspection by Owner's Inspector or by an agency authorized by the Owner (TPI). The manufacturer shall provide all necessary information concerning the supply to Owner's Inspector.
- 14.2 PESO approval of motor for VFD as well as DOL operation shall be required and same has to be provided by Motor manufacturer. All the test as required for PESO approval of motor (VFD operated) to be performed by motor manufacturer without any price implication to IOCL.

14.3 All the type, routine and other acceptance tests shall be witnessed by the TPI Inspector. The manufacturer shall give prior notice of minimum 4 weeks to the Inspector for witnessing the tests.

14.4 All the type tests, routine tests and acceptance tests shall be carried out at manufacturer's shop.

All these tests shall be carried out under manufacturer's care and at his expense.

14.5 Tests certificates duly signed by the Owner's Inspector/TPI shall be a part of final documentation.

14.6 The manufacturer shall submit all internal test records of the tests carried out by him on the bought-out items, motor sub-assembly and complete motor assembly to the Inspector before offering the motors for final inspection and testing.

14.7 Type tests shall be carried out on one motor of each rating and frame size.

The following type tests shall be carried out as per applicable Indian Standards and shall form part of acceptance testing :

- a. Full load test and measurement of voltage, current, power & slip
- b. Measurement of starting torque, starting current, full load torque and pull out torque
- c. Measurement of efficiency and p.f. at 100%, 75% and 50% load
- d. Temperature rise test
- e. Momentary overload test
- f. Tan delta test
- g. Measurement of noise level
- h. Measurement of vibration
- i. Over speed test
- j. Measurement of radial & axial clearance between fan & stationary parts
- k. Measurement of radial air gap
- l. Measurement of resistance of space heater, RTDs & BTDS
- m. Polarization index test
- n. Measurement of surface temperature of frame & space heater

14.8 Routine tests shall be carried out on all motors.

The manufacturer shall carry out routine tests as per applicable Indian Standards. Routine tests not limited to the following shall form part of acceptance testing:

- a. General visual checks, name plate details, mounting, terminal box location and cable gland sizes
- b. Measurement of shaft centre height dimensions

- c. Measurement of clearances in the terminal box
- d. Verification of type of terminals (for Ex n motors)
- e. Verification of direction of rotation
- f. Verification of cooling system & lubrication system
- g. Measurement of winding resistance
- h. Insulation resistance test (before & after high voltage test)
- i. High voltage test
- j. No load test and measurement of voltage, speed, current & power input
- k. Locked rotor test at reduced voltage and measurement of voltage, current & power input
- l. Reduced voltage starting & running
- m. Measurement of shaft voltages

14.9 The manufacturer shall submit the following certificates for verification by the PMC/Owner's Inspector:

- a. Test certificate for degree of protection of enclosure
- b. Short circuit test for terminal box
- c. Impulse test certificate
- d. Test certificates issued by the recognized independent test house for hazardous area motors
- e. Approval certificates issued by Statutory Authorities for hazardous area motors
- f. Hydraulic test certificate for coolers

14.10 For VFD fed motors, all tests as specified in the VFD specification shall be followed in addition to the above.

14.11 In case any of the Type & Routine tests mentioned above cannot be carried out due to manufacturer's test bed limitations etc., alternatively calculations to establish the required parameters as per International codes eg IEC, JEC etc. may be accepted which shall be furnished to attending inspector.

14.12 Though the motors shall be accepted on the basis of the satisfactory result of the testing at the shop, it shall not absolve the Vendor from liability regarding the proper functioning of the motors coupled to the driven equipment at site.

15.0 CERTIFICATION

The motors and associated equipment shall have test certificates issued by recognized independent test house (CIMFR/ Baseefa/ LCIE/ ULIFM or equivalent). All indigenous motors shall conform to Indian Standards and shall be certified by Indian testing agencies. All motors (indigenous and imported) shall also have valid statutory approvals as applicable for the specified location.

Ex n motors shall be supplied with manufacturer's certificate of conformity to IS-9628 or equivalent international standard and Indian statutory approval.

16.0 PACKING AND DESPATCH

All the equipment shall be divided into several sections for protection and ease of handling during transportation. The equipment shall be properly packed for transportation by ship/rail or trailer. The equipment shall be wrapped in polythene sheets before being placed in crates/ cases to prevent damage to finish. Crates/cases shall have skid bottom for handling. Special notations such as 'Fragile', 'This side up', 'Centre of gravity' , 'Weight', 'Owner's particulars', 'PO Nos.' etc. shall be clearly marked on the package together with other details as per purchaser order.

The equipment may be stored outdoors for long periods before installation. The packing shall be completely suitable for outdoor storage in areas with heavy rains/high ambient temperature, unless otherwise agreed.

17.0 DOCUMENTATION & DRAWINGS

The following drawings and data shall be submitted for all machines.

- Outline drawings showing main dimensions, arrangement of components, terminal boxes, foundation loading.
- Schematic and connection diagrams covering all equipment pertaining to the motor.
- Additional information shall be provided for HV motors over 250 KW as follows:
 - Torque-speed curves.
 - Bearing arrangement/ alignment drawing with data outlining bearing/ bearing shell replacement procedure.

18.0 TEST REPORT

The manufacturer shall provide test reports giving the results of all tests carried out on the machines supplied. These reports shall also include the manufacturer type tests and routine/ production tests, if applicable.

19.0 SUPPLY OF MANDATORY SPARES

The manufacturer shall provide atleast following mandatory spares along with the supply of each motor.

- a) One set of Bearings (DE and NDE side)
- b) Cooler fans
- c) Terminal studs / Bushing Assembly
- d) Temperature indicator assembly.

- e) Supports insulators (one set for each motor), if applicable
- f) One set of motor differential CT for installation at panel end for similarity of design + 1 spare motor differential CT
- g) One set (3 nos) of motor cable end termination kit
- h) One number LA and surge capacitor if included in design

20.0 DATA SHEET FOR HIGH SPEED MOTOR – Purchase Requisition Item no.10

A	Site Conditions					
1	Ambient temperature	Minimum	5°C	3	Atmospheric condition: Humid & highly corrosive	
		Maximum	50°C	4	Altitude	
		design	40°C	5	Location	
2.	Relative Humidity		90%			
B	Technical particulars					
1	Motor tag no.	By bidder		16	Hazardous area classification	
2	Driven equipment name	HPC compressor		17	Gas group	
3	Voltage			18	Type of explosion protection	
4	Phase	Three		19	Type of ingress protection	
5	Frequency	50 Hz ± 3%		20	Reacceleration	
6	Fault level	25 kA		21	Diff protection CTs	
7	Fault duration	0.25 sec			CT specs	
8	System earthing	Resistance		22	Color shade	
9	Duty	Continuous		23	Thermistors	
10	Method of starting	D.O.L/ Electronic soft starter/ Electro-mechanical soft starter		24	RTD	
11	Cable size	2R*3C*300 sqmm or as per detailed engg by Vendor		25	BTD	
12	Cable type	Al. cond. XLPE insulated		26	RTD/BTD monitoring device	
13	Temperature rise	75°C				
14	Cooling	CACA/ TETV		27	Applicable specification	
15	Insulation class:	Class F with temp. rise limited to class B		28	Partial measurement couplers	
					discharge capacitive	
					Not Required	
DRIVEN EQUIPMENT MANUFACTURER'S DATA						
Please find below the driven equipment manufacturer's data:						
1	Driven equipment data sheet (if required) shall be provided by IOCL (as available) upon submission of NDA.					
2	Existing turbine data sheet (if required) shall be provided by IOCL (as available) upon submission of NDA.					
3	The supplied motor should be sufficient to drive HPC Compressor of above specifications.					
MOTOR MANUFACTURER'S DATA						
1	Rating	kW				
2	Manufacturer	As per vendor list attached		19	DE/NDE bearing type & no.	
3	Frame designation			20	Type of lubrication	
4	No of poles			21	Type of main terminal box	
5	Full load speed	RPM		22	Type of neutral terminal box	
6	Mounting			23	No. of terminals	
7	Full load torque (FLT)	Mkg		24	Type of gland	
8	Starting torque	% of FLT		25	Size of gland	
9	Break down of pull out torque	% of FLT		26	Weight of motor	
10	Full load current (FLC)	A		27	Thermistors quantity	
11	Starting current at 100% voltage	500% of FLC			Make type	
12	Rotation viewed from coupling end			28	RTD quantity	
13	Starting time at 80%/ 100% voltage	Sec			Make type	
14	Locked rotor withstand time (cold/hot) at 80% voltage	Sec		29	BTD quantity	
	100% voltage	Sec		30	Shaft voltage	
15	Efficiency at 75%/ 100% load	%		31	Critical speed, 1 st / 2 nd stage	
16	Power factor at 75%/ 100% load			32	Pressurization panel	
					Applicable	
					Not applicable	

17	Heating/ cooling time const. (min)	Min		Make	Type	
18	Space heater - voltage & power		33	Canopy	Required	Not required
19	Moment of inertia, GT ²	kgm ²	34	Fan rotation design	Universal/ changed	fixed/ can be

Annexure-8

GENERAL SPECIFICATION FOR MEDIUM VOLTAGE INDUCTION MOTOR

Abbreviations:

BIS	:	Bureau of Indian Standard
BS	:	British Standards
CIMFR	:	Central Institute of Mines and Fuel Research
CT	:	Current Transformer
EIL	:	Engineers India Limited
FM	:	Factory Mutual
FRP	:	Fiber Reinforced Polyester
IEEE	:	Institute of Electrical & Electronics Engineers
IS	:	Indian Standard
LCIE	:	Laboratoire Central des Industries Electriques
NEMA	:	National Electrical Manufacturers Association
PO	:	Purchase Order
PVC	:	Poly Vinyl Chloride
RPM	:	Revolutions per Minute
UL	:	Underwriter's Laboratories
VDE	:	Verband Deutscher Elektrotechniker

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1.0 SCOPE

This specification covers the design, manufacture, testing, packing and supply of three phase medium voltage squirrel cage induction motors.

2.0 CODES AND STANDARDS

- 2.1 The squirrel cage induction motors and their components shall comply with the latest editions of following standards issued by BIS (Bureau of Indian Standards) unless otherwise specified:

IS-5	:	Colours for ready mixed paints and enamels
IS-325	:	Three phase induction motors
IS-1076	:	Preferred number
IS-1231	:	Dimensions of three phase foot mounted induction motors
IS-1271	:	Thermal evaluation and classification of electrical insulation
IS-2148	:	Flameproof enclosures of electrical apparatus
IS-2223	:	Dimensions of flange mounted AC Induction motors
IS-2253	:	Designation for type & construction and mounting arrangement of rotating electrical machines
IS-2254	:	Dimensions of vertical shaft motors for pumps
IS-2968	:	Dimensions of slide rails for electrical motors
IS-4029	:	Guide for testing of three phase induction motors
IS-4691	:	Degree of protection provided by enclosure for rotating electrical machinery
IS-4722	:	Rotating electrical machines
IS-4728	:	Terminal marking and direction of rotation for rotating electrical machinery
IS-4889	:	Method of determination of efficiency of rotating electrical machines
IS-6362	:	Designation of methods of cooling of rotating electrical machines
IS-6381	:	Construction and testing of electrical apparatus with type of protection e
IS-7389	:	Pressurized enclosure of electrical equipment for use in hazardous areas
IS-7816	:	Guide for testing insulation resistance of rotating machines
IS-8223	:	Dimensions and output series for rotating electrical machines
IS-8289	:	Electrical equipment with type of protection n
IS-8789	:	Values of performance characteristics for three phase induction motors
IS-9283	:	Motors for submersible pump sets
IS-9628	:	Three phase induction motors with type of

		protection n
IS-12065	:	Permissible limits of noise level for rotating Electrical Machines
IS-12075	:	Mechanical vibration of Rotating Electrical Machines with shaft heights 56 mm and higher measurement, evaluation and limits of vibration severity
IS-12802	:	Temperature rise measurement of Rotating Electrical Machines
IS-12824	:	Type of duty and classes of rating assigned to rotating electrical machines
IS-13529	:	Guide on effects of unbalanced voltages on the performance of three phase induction motors
IS-13555	:	Guide for selection and application of three phase induction motors for different types of driven equipments
IS-14568	:	Dimension and output series for rotating electrical machines, frame numbers 355 to 1000 and flange numbers 1180 to 2360

- 2.2 In case of imported motors, standards of the country of origin shall be applicable if these standards are equivalent or stringent than the applicable Indian Standards.
- 2.3 The motors shall also conform to the provisions of Indian Electricity rules and other statutory regulations currently in force in the country.
- 2.4 In case Indian Standards are not available, standards issued by IEC/ BS/ VDE/ IEEE/ NEMA or equivalent agency shall be applicable.
- 2.5 In case of any contradiction between various referred standards/ specifications/ data sheets and statutory regulations, the following order of priority shall govern:
- Statutory regulations
 - Data sheets
 - Job specifications
 - This specification
 - Codes and standards

All conflicts between the requirements of this specification & other relevant documents shall be referred to principal for resolution.

3.0 GENERAL REQUIREMENTS

- 3.1 The offered equipment shall be brand new with state of the art technology and proven field track record. No prototype equipment shall be offered.

- 3.2 Vendor shall ensure availability of spare parts and maintenance support services for the offered equipment at least for 15 years from the date of supply.
- 3.3 Vendor shall give a notice of at least one year to the end user of equipment and PMC before phasing out the product/spares to ensure the end user for placement of order for spares and services.

4.0 OPERATING CONDITIONS

4.1 Ambient Conditions

Motors shall be suitable for operating satisfactorily in humid and corrosive atmosphere found in refineries, petrochemical, fertilizer and metallurgical plants. Service conditions shall be as specified in the motor data sheet. If not specifically mentioned therein, a design ambient temperature of 50°C and an altitude not exceeding 1000 meters above mean sea level shall be taken into consideration.

4.2 Frequency and Voltage Variations

Unless otherwise agreed, motors shall be designed for continuous operation at rated output under the following conditions:

- a. The terminal voltage differing from its rated value by not more than $\pm 6\%$ or
- b. The frequency differing from its rated value by not more than $\pm 3\%$ or
- c. Any combination of (a) and (b)

4.3 Starting

- a. Unless otherwise specified, motors shall be designed for direct-on-line starting.
- b. Motors shall be designed for re-acceleration under full load after a momentary loss of voltage with the residual voltage being 100% and is in phase opposition to the applied voltage.
- c. Minimum locked rotor thermal withstand time at rated voltage shall be 10 seconds under cold conditions and 8 seconds under hot conditions. The starting time of the motor shall be less than the hot thermal withstand time (time t_E in case of increased safety i.e. Ex-e motors) to permit application of conventional bimetal relays or thermal release against locked rotor and overload conditions.
- d. Unless otherwise specified, all motors shall be suitable for starting under specified load conditions with 75% of the rated voltage at the motor terminals.
- e. Motors shall be designed to allow the minimum number of consecutive starts indicated in Table below:

IOC/M&I/ELECT/E/6/2012	Medium Voltage Induction Motor	Rev.-0	Page 6 of 20

Starts	Minimum number of consecutive starts
No. of consecutive start-ups with initial temp. of the motor at ambient level (cold)	3
No. of consecutive start-ups with initial temp. of the motor at full load operating level (hot).	2

4.4 Direction of Rotation

Motors shall be suitable for either direction of rotation. In case unidirectional fan is provided for motors, direction of rotation for which the motor is designed shall be permanently indicated by means of an arrow. Directional arrow should be manufactured from corrosion resistant material. When a motor is provided with bi-directional fans, a double-headed arrow should be provided.

Normally, clockwise rotation is desired as observed from the driving (coupling) end, when the terminals ABC are connected to a power supply giving a terminal phase sequence in the order ABC. Counter-clockwise rotation of the motor shall be obtained by connecting the power supply to terminals so that the phase sequence corresponds to the reversed alphabetical sequence of the terminal letters. Ample space shall be provided at the terminal box for interchanging any two external leads for obtaining the reverse phase sequence.

5.0 PERFORMANCE

- 5.1 Motors shall be rated for continuous duty (S 1), unless otherwise specified in the data sheet.
- 5.2 Unless otherwise specified, the starting current (as % rated current) shall not exceed 600% subject to tolerance.
- 5.3 In particular cases, when the starting current is to be limited, care shall be taken such that the design values of torque meets the load requirement while at the same time complying to clause 4.3 above of this specification.
- 5.4 In particular cases, when the starting with reduced voltage is specified, care shall be taken such that the design values of torque meets the load requirement while at the same time complying to clause 4.3 above of this specification.
- 5.5 Starting torque and minimum torque of the motor shall be compatible with the speed torque curve of the driven equipment under specified starting and operating conditions.

For heavy duty drives such as blowers, crushers etc. high starting torque motors shall be provided.

In case where characteristics of driven equipment are not available while selecting the motor, minimum starting torque shall be 110% of rated value for motors up to 75 kW and shall be 90% of rated value for motors above 75 kW.

- 5.6 The pull out torque at the rated voltage shall be not less than 175 percent of the rated load torque with no negative tolerance. Unless otherwise agreed, the pull out torque shall not exceed 300 percent of the rated load torque.

In case of motors driving equipment with pulsating loads (e.g. reciprocating compressors) the minimum value of pull out torque at 75 percent of the rated voltage shall be more than the peak value of pulsating torque and the current pulsation shall be limited to 40%.

- 5.7 The minimum values for performance characteristics of motors rated up to and including 37 kW shall be as per IS-8789 TABLE-I to TABLE-8.

The minimum value for product of efficiency and power factors of 2 pole, 4-pole, and 6-pole motors rated above 37 kW shall be as given in Table below.

Rated output	Product of efficiency & power factor at rated load (minimum)		
	2-pole	4-pole	6-pole
45kW	0.82	0.80	0.79
55kW	0.82	0.80	0.79
75kW	0.82	0.80	0.80
90kW	0.82	0.80	0.80
110kW	0.86	0.80	0.80
125kW	0.86	0.80	0.80
160kW	0.86	0.81	0.80
180kW	0.86	0.83	0.80
200kW	0.86	0.83	0.80

Efficiency and power-factor figures for motors having synchronous speeds of 750 RPM and below, shall be as agreed between the purchaser and the manufacturer.

- 5.8 Input to be provided for high energy efficient motors as per IEC 60034-30:2008.

6.0 CONSTRUCTIONAL DETAILS

6.1 Windings

- 6.1.1 Unless otherwise specified in the motor data sheet, motors shall be provided with class 'B' insulation as a minimum. In case of motors with class 'F' insulation, the permissible temperature rise above the specified ambient temperature shall be limited to those specified in the applicable Indian standards for class 'B' insulation.
- 6.1.2 The winding shall be tropicalised. The windings shall preferably be vacuum impregnated. Alternately the windings shall be suitably varnished, baked and treated with epoxy gel for operating satisfactorily in humid and corrosive atmospheres.
- 6.1.3 Windings shall be adequately braced to prevent any relative movement during operation. In this respect, particular care shall be taken for the stator windings for direct-on-line starting squirrel cage motors. Insulation shall be provided between coils of different phases that lie together. Core laminations must be capable of withstanding burnout for rewind at 400°C without damage or loosening.
- 6.1.4 In case of motors driving equipment with pulsating loads, special care shall be taken for the joints of rotor bars and end rings to avoid premature failures due to induced fatigue stresses.
- 6.1.5 The windings shall be connected in delta. However, for motors rated 2.2 kW and below, star connection may be accepted.
- In case of motors with star-delta starting, the motor windings shall be fully insulated for delta connection.
- 6.1.6 The ends of the windings shall be brought out into a terminal box. These shall be terminated by means of terminals mounted on an insulating base made of non-hygroscopic and non- flammable material.
- 6.1.7 All motors shall be with six terminals and suitable links to connect them in star or in delta except for motors rated up to and including 2.2 kW which may be accepted with three terminals.
- 6.1.8 All terminals shall be thoroughly insulated from the frame with material resistant to tracking.
- 6.1.9 Anti-loosening, anti-vibration type of terminals shall be provided in case of increased safety (Type Ex e) and non-sparking (Type Ex n) motors.

6.2 Terminal Box and Cable Entries

- 6.2.1 Unless otherwise agreed, the terminal box shall be located on the right hand side as viewed from the driving (coupling) end. However, as a

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special case as specified in data sheet, terminal box located on top may also be accepted, particularly for hazardous area motors, in case manufacturer has only TOP mounted terminal box design which is duly tested/certified by CIMFR and approved by PESO/CCE for installation in hazardous area.. The terminal box design shall allow rotation in steps of 90° to facilitate cable entry from any direction.

- 6.2.2 The terminal box shall be of robust construction and large enough to facilitate easy connection of the cables. The terminal box shall be with necessary clearances, creepage distances between live parts and between live parts to earth considering air insulation and without any compound filling. Terminal box cover shall be provided with handles to facilitate easy removal. However, for terminal box covers weighing less than 5 kg., terminal box covers without handles can be accepted.
- 6.2.3 An adequately sized earth terminal shall be provided in the motor terminal box for termination of the fourth core of specified cables.
- 6.2.4 The terminal box shall be provided entries for suitable cable glands corresponding to the size of the specified cable. Crimp type tinned Cu lugs and nickel-plated brass (or aluminum if specifically mentioned in data sheet), double compression type cable glands shall be supplied along with the motors for the specified cable sizes for power and space heater cables.
- 6.2.5 Equipment and accessories provided shall conform to the hazardous area classification and the environmental conditions as specified in the motor data sheet.
- 6.2.6 Unless otherwise specified, the terminals, cable lugs, terminal box, cable entries and cable glands shall be suitable for the cables sizes as specified below in Table for 2 pole, 4 pole or 6 pole motors :

Motor rating upto & including	Size of phase conductor (mm ²)
2.2 kW and below	4Al./ 2.5 cu
3.7kW	6Al./ 4 cu
5.5kW	10 Al./ 6 cu
7.5kW	16 Al./ 6 cu
9.3 kW	25 Al./ 10 cu
11.0 kW	25 Al./ 16 cu
15.0kW	35 Al.
18.5 kW	50Al
22.0kW	50 Al
30.0kW	70Al
37.0 kW	95 Al
45.0kW	95 Al
55.0kW	120Al
75.0kW	185 Al

90.0kW	2x95 Al
110.0kW	2x120Al
125.0 kW/132.0 kW	2x150Al
150.0 kW	2x185 Al
160.0 kW	2x185 Al
180.0 kW	2x240Al
200.0kW	2x300Al

6.2.7 Cable sizes for motors having synchronous speeds 750 RPM and below shall be as agreed between the purchaser and manufacturer.

6.2.8 Cables used are of 650/1100 V grade aluminum conductor, PVC insulated, PVC extruded inner sheath, armoured with overall PVC sheath. However for cables up to & including 16 mm² cross-section, cables used may be with copper or aluminum conductor as indicated in the motor data sheet.

6.2.9 The terminal box shall be capable of withstanding internal short circuit conditions without danger to personnel or plant from the emission of hot gases or flame or due to excessive distortion or damage to the terminal enclosure.

6.2.10 Appropriate phase markings as per IS shall be provided inside the terminal box. The marking shall be non-removable and indelible.

6.3 Motor Casing and Type of Enclosure

6.3.1 Motors for use in safe areas shall be industrial type meeting the specified ambient conditions, starting and operating requirements.

6.3.2 Motors for use in hazardous areas (Zone-1 or Zone-2) shall have type of protection Ex d or Ex e or Ex n as specified in the motor data sheet and shall meet the requirements of applicable Indian standards.

6.3.3 The minimum degree of motor enclosures including terminal boxes and bearing housing shall be IP-55 as per IS.

6.3.4 Motors for outdoor use shall be suitable for installation and satisfactory operation without any protective shelter or canopy. Motor casing shall be provided with a suitable drain for removal of condensed moisture except in case of flameproof motors (Type Ex d).

6.3.5 Vertical motors with downward shaft shall be provided with suitable canopies covering the motor fully. Vertical motors with upward shaft e.g. on fin-fan coolers, shall be adequately protected, (such as cowls/canopies) against ingress of water into the enclosure or the bearing housing even when standing still for long periods of time. Motors designed to handle external thrust from the driven equipment shall be supplied with a thrust bearing at the non-driving end.

- 6.3.6 All internal and external metallic parts, which may come into contact with cooling air, shall be of corrosion resistant material or appropriately treated to resist the corrosive agents, which may be present in the atmosphere. Screws and bolts shall be of rust proof material or protected against corrosion.

Unless otherwise agreed, motors shall have standard frame sizes for various output ratings as stipulated in IS.

6.4 Bearing and Lubrication

- 6.4.1 Motors shall have grease lubricated ball or roller bearings. In all cases, the bearings shall be chosen to provide a minimum L-10 rating life of 5 years, (40, 000 hours) at rated operating conditions

(The L-10 rating life is the number of hours at constant speed that 90% of a group of identical bearings will complete or exceed before the first evidence of failure).

- 6.4.2 Unless otherwise specified, the bearings shall be adequate to absorb axial thrust produced by the motor itself or due to shaft expansion.

- 6.4.3 Vertical motors shall be provided with thrust bearings suitable for the load imposed by the driven equipment.

- 6.4.4 In cases such as pumps for hot liquids where the driven equipment operates at high temperatures, bearings shall be cooled by a shaft-mounted fan. This shall ensure efficient ventilation of the bearing and disperse the heat transmitted from the driven equipment by conduction or convection.

- 6.4.5 Bearings shall be capable of grease injection from outside without removal of covers with motors in the running conditions. The bearing boxes shall be provided with necessary features to prevent loss of grease or entry of dust I moisture e.g. labyrinth seal. Where grease nipples are provided, these shall be associated, where necessary, with appropriately located relief devices, which ensure passage of grease through the bearings.

- 6.4.6 Pre-lubricated sealed bearings may be considered provided a full guarantee is given for 4 to 5 years of trouble-free service without the necessity of re-lubrication.

6.5 Cooling System

All motors shall be self ventilated, fan cooled. Fans shall be corrosion resistant or appropriately protected. They shall be suitable for motor rotation in either direction without affecting the performance of the motor. If this is not possible for large outputs, it shall be possible to reverse the fan without affecting the balancing of the motor.

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For motors operating in hazardous area, the fans shall be of an anti-static non-sparking material.

6.6 Rotor

The rotor shall be of squirrel cage type, dynamically balanced to provide a low vibration level and long service life for the bearings. The accepted values of peak to peak vibration amplitudes for a motor at rated voltage and speed on a machined surface bedplate with the motor leveled and with a half-key or coupling fitted shall not exceed those given in IS. Die cast aluminum rotors for motors in hazardous areas may be accepted provided the same are type tested and approved by competent authorities.

6.7 Shaft Extension

Motors shall be provided with a single shaft extension with key-way and full key. Motor shaft shall be sized to withstand 10 times the rated design torque.

6.8 Lifting Hooks

All motors weighing more than 30 kg. shall be provided with lifting hooks of adequate capacity.

6.9 Earth Terminals

Two earth terminals located preferably on diametrically opposite sides shall be provided for each motor. The size of each earth stud shall be as given below in Table:

Motor rating	Stud size
Up to and including 7.5 kW	6mm
11 kW to 30kW	10mm
Above 37 kW	12mm

Necessary nuts and spring washers shall be provided for earth connection.

An additional earth terminal shall be provided inside the terminal box as stated in 6.2.3.

7.0 MISCELLANEOUS ACCESSORIES

7.1 Anti-Condensation Heaters

Unless otherwise stated, all motors rated above 22 kW shall be provided with 240 V anti- condensation heaters, sized and located so as to prevent condensation of moisture during shutdown periods. The heaters shall permanently remain 'ON' when the motor is not in service and as such shall not cause damage to the windings.

For motors installed in hazardous atmospheres (Zone - 1 or Zone - 2), such heaters shall conform to the provisions of applicable Indian Standards and temperature classification specified in the motor data sheet.

The heater leads shall be brought out, preferably, to a separate terminal box which shall be of the same specification and grade of protection as the main terminal box.

A warning label with indelible red inscription shall be provided on the motor to indicate that the heater supply shall be isolated before carrying out any work on the motor.

7.2 Name Plates

A stainless steel name plate manufactured from series 300 stainless steel and having information as per IS shall be provided on each motor.

In addition to the motor rating plate, a separate number plate for motor tag number shall be fixed in a readily visible position. This number shall be as per the motor data sheets.

Additional information as stipulated in applicable standards shall be included in the nameplate for motors meant for use in hazardous atmospheres.

8.0 NOISE LEVEL

The permissible noise level shall not exceed the stipulations laid down in IS, unless otherwise specified in the motor data sheet.

9.0 MOTOR VIBRATIONS

Motor vibrations shall be with-in the limits of IS, unless otherwise specified for the driven equipment.

10.0 CRITICAL SPEEDS

The first actual critical speed of stiff rotors shall not be lower than 125 % of the synchronous speed. For flexible rotors this shall be between

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60 % and 80 % of the synchronous speed; the second actual critical speed shall be above 125% of the synchronous speed.

11.0 PAINTING

Internal and external parts of the casing and all metal parts including the canopy likely to come in contact with the surrounding air shall be protected with anti-acid paint that will resist the specified environment conditions.

All external surfaces of the motor and its canopy shall be given a coat of epoxy-based paint. Paint shade shall be 632 as per Indian Standard-IS-S.

12.0 INSPECTION AND TESTING

12.1 During manufacturing of motors, the motors shall be subject to inspection by PMC/ Owner's Inspector or by an agency authorised by the Owner. The manufacturer shall provide all necessary information concerning the supply to PMC/Owner's Inspector.

12.2 Type tests, if specified, all the routine tests and other acceptance tests shall be witnessed by the PMC/ Owner's Inspector. The manufacturer shall give prior notice of minimum 4 weeks to the Inspector for witnessing the tests.

Witness of acceptance test shall be applicable for motors rated above 11 kW. In case of motors rated up to 11 kW, routine test records shall be provided as part of final documentation.

12.3 All tests shall be carried out at manufacturer's shop under his care and expense.

12.4 Tests certificates duly signed by the PMC/ Owner's Inspector shall be a part of final documentation.

12.5 The manufacturer shall submit all internal test records of the tests carried out by him on the bought-out items, motor sub-assembly and complete motor assembly to the Inspector before offering the motors for final inspection and testing.

12.6 The manufacturer shall periodically carry out the following type tests as per applicable Indian Standards for all the frame sizes and ratings of motors :

- a. Full load test and measurement of voltage, current, power & slip
- b. Measurement of starting torque, starting current, full load torque and pull out torque
- c. Measurement of efficiency and p.f. at 100%, 75% and 50% load
- d. Temperature rise test

- e. Momentary overload test
- f. Measurement of vibration
- g. Measurement of noise level
- h. Over speed test

The above tests must be witnessed and approved by reputed inspection agencies. The manufacturer shall maintain test records and submit to the PMC /Owners Inspector at the time of final inspection & testing. In no case, the test records shall be more than 5 year old.

In special cases where the type tests are asked to be carried out, PMC /Owner's Inspector shall witness these.

12.7 The manufacturer shall carry out routine tests as per applicable Indian Standards on all the motors. Routine tests not limited to the following shall form part of acceptance testing:

- a. General visual checks, nameplate details, mounting, terminal box location and cable gland sizes
- b. Measurement of shaft center height dimensions
- c. Measurement of clearances in the terminal box
- d. Verification of type of terminals (for Ex-e & Ex-n motors)
- e. Verification of direction of rotation
- f. Measurement of winding resistance
- g. Insulation resistance test (before & after high voltage test)
- h. High voltage test
- i. No load test and measurement of voltage, speed, current & power input
- j. Locked rotor test at reduced voltage and measurement of voltage, current & power input
- k. Reduced voltage starting & running
- l. Tests on the Ex d enclosures as per IS

12.8 The manufacturer shall submit the following certificates for verification by the PMC/Owner's

Inspector:

- a. Test certificate for degree of protection of enclosure
- b. Test certificates issued by the recognised independent test house for hazardous area motors
- c. Approval certificates issued by Statutory Authorities for hazardous area motors
- d. BIS license and marking as required by Statutory Authorities for Ex d motors

12.9 Though the motors shall be accepted on the basis of the satisfactory result of the testing at the shop, it shall not absolve the Vendor from liability regarding the proper functioning of the motors coupled to the driven equipment at site.

13.0 CERTIFICATION

The hazardous area motors and associated equipment shall have test certificates issued by recognized independent test house (CIMFR/ Bassefa/ LCIE/ UL/ FM or equivalent). All indigenous motors shall conform to Indian Standards and shall be certified by Indian testing agencies. All motors (indigenous & imported) shall also have valid statutory approvals as applicable for the specified location. All indigenous flameproof motors shall have valid BIS license & marking as required by statutory authorities.

Ex n motors shall be supplied with manufacturer's certificate of conformity to IS 9628 or equivalent international standard and Indian statutory approval.

14.0 PACKING AND DESPATCH

All the equipment shall be divided into several sections for protection and ease of handling during transportation. The equipment shall be properly packed for transportation by ship/rail or trailer. The equipment shall be wrapped in polythene sheets before being placed in crates/cases to prevent damage to the finish. Crates/cases shall have skid bottom for handling. Special notations such as 'Fragile', 'This side up', 'Center of gravity', 'Weight', 'Owner's particulars', 'PO Nos.' etc. shall be clearly marked on the package together with other details as per purchaser order.

The equipment may be stored outdoors for long periods before installation. The packing shall be completely suitable for outdoor storage in areas with heavy rains/high ambient temperature, unless otherwise agreed.

15.0 DOCUMENTS & DRAWINGS

The following drawings and data shall be submitted for all machines.

- Outline drawings showing main dimensions, arrangement of components, terminal boxes, foundation loading.
- Schematic and connection diagrams covering all equipment pertaining to the motor.
- Additional information shall be provided for MV motors over 250 KW as follows:
 - Torque-speed curves.
 - Bearing arrangement/ alignment drawing with data outlining bearing/ bearing shell replacement procedure.

16.0 TEST REPORT

The manufacturer shall provide test reports giving the results of all tests carried out on the machines supplied. These reports shall also include the manufacturers type tests and routine/ production tests, if applicable.

17.0 ADDITIONAL PARTICULAR REQUIREMENT

17.1 Motors for vertical installation

- i) Motors shall be capable of withstanding all normal forces, which may be imposed upon them during the course of normal operation, including starting and normal stops.
- ii) Motors to be installed in locations where moisture may collect shall be furnished with drain openings and plugs. Suitable sealing arrangement to be provided to prevent entry of rainwater through the shaft. In the case of explosion-proof motors, drains and breathers shall be furnished and shall be of the approved type.
- iii) Bearings supplied shall be of type and size sufficient to satisfy thrust-loading requirements for each motor in accordance with manufacturer's standard design.

17.2 Motors for Inverter Duty

- i) The motor design shall be suitable to withstand harmonic and higher voltages and with proper cooling to run at lower speed.
- ii) While specifying induction motors for use with variable frequency drives, the following items should be taken into consideration. Where practical these may be included in the specification as requirements for the motor vendor:
 - Driven load
 - Driven load speed and torque requirements
 - Speed range for motor
 - Gear or coupling type between the motor and load.
 - Conditions where the motor will be installed
 - Hazardous area classification of the area where the motor will be installed.
 - Nominal voltage, frequency and phases for the motor.
 - Motor HP and service factor. This shall be provided by the vendor supplying the driven load (pump, blower etc.). This vendor shall also be required to supply speed torque curve for the load.

- iii) It is desirable to buy the motor and variable frequency drive as a package from a single vendor.
- iv) The specifications should require the vendor to ensure that the motor and the variable frequency drive match with each other and are suitable for the driven load.

18.0 DATA SHEET

A	Site Conditions					
1	Ambient temperature	Minimum	5°C	3	Atmospheric condition:	Humid & highly corrosive
		Maximum	50°C	4	Altitude	<1000 m
		design	50°C	5	Location	Outdoor
2.	Relative Humidity		90%			
B	Technical particulars					
1	Motor tag no.	By bidder				
2	Driven equipment name					
3	Voltage	415 V+ 6%		15	Hazardous area classification	*
4	Phase	Three		16	Gas group	*
5	Frequency	50 Hz ± 3%		17	Type of explosion protection	*
6	Fault level	50 kA		18	Type of ingress protection	IP 55
7	Method of starting	D.O.L		19	Color shade	632 as per IS 5
8	Winding connection	Delta		20	Thermistors	Required
9	No of terminals	6		21	RTD	Required
10	Cable size	As per design basis		22	BTD	Required
11	Cable type	AYWY		23	RTD/BTD monitoring device	Required
12	Temperature rise	75°C				Not required
13	Cooling	TEFC				
14	Insulation class:	Class F with temp. rise limited to class B		24	Applicable specification	IOC/M&I/ ELECT/ E/6/2011
				25	Additional requirement	Vertical mounting
						Inverter duty
						Not applicable
DRIVEN EQUIPMENT MANUFACTURER'S DATA						
1	Suggested motor rating	kW		9	Torque required, starting	mkg
2	Manufacturer				Maximum	mkg
3	BkW at full load	kW		10	GD ² of eqpt., including flywheel	Kgm ²
4	kW at end of curve	kW			Excluding flywheel	Kgm ²
5	Speed	RPM		11	Thrust up	Kg
6	Rotation viewed from coupling end				Down	Kg
7	Driven equipment			12	Starting condition	
8	Coupling type					
MOTOR MANUFACTURER'S DATA						
1	Rating			16	Space heater – voltage & power	
2	Manufacturer	As per vendor list attached		17	Efficiency at 75% load	%
3	No of poles				100% load	%
4	Frame designation			18	Power factor at 75% load	
5	Full load speed	RPM			100% load	
6	Mounting			19	Moment of inertia, GD ²	Kgm ²
7	Full load torque (FLT)	Mkg		20	NDE bearing type & no.	
8	Starting torque	% of FLT		21	DE bearing type & no.	
9	Break down of pullout torque	%		22	Type of lubrication	
10	Full load current (FLC)	A		23	Weight of motor	Kg
11	Starting current at 100% voltage	600% of FLC		24	Thermistors quantity	No.
12	Rotation viewed from coupling end				Make type	
13	Starting time at 75% voltage	Sec		25	RTD quantity	No.
	100% voltage	Sec			Make type	
14	Locked rotor withstand time (cold/hot at 75% voltage)	Sec		26	BTD quantity	No.
	100% voltage	Sec			Make type	
15	Time (Te) for Increased Safety motors	Sec		27	Shaft voltage	V
	At 100% voltage			28	Critical speed, 1 st / 2 nd stage	RPM
				29	Canopy	Required
						Not required

Note: * To be decided by bidder in line with Engineering design basis/ bid document.

Special Purchase Conditions

These Special Purchase Conditions (SPC) shall be read in conjunction with the General Purchase Conditions (GPC), Material Requisition and any other document forming part of this RFQ wherever the context so requires.

Where any portion of the GPC is repugnant to or at variance with any provisions of the SPC then unless a different intention appears, the provision(s) of the SPC shall be deemed to override the provision(s) of GPC only to the extent that such repugnancy of variations in the SPC are not possible of being reconciled with the provisions of GPC.

A. PAYMENT TERMS

In partial modification to the payment terms as mentioned in the General Purchase Conditions, the following payment terms shall be applicable.

Applicable payment terms shall be as per SPC

Table 1: Payment Terms		
SL	Line Item Description	Payment Terms
1	1.1 Complete high speed motor package along with hot stand-by VFD, Input Transformers, Power Cables and Accessories. 1.2 Spare High Speed Motor.	a) 5% of total PO value of respective line items against approval of drawings (Equipment Layout, Electrical SLD, P&ID's (Lube Oil P&ID, Cooling water P&ID)) and motor data sheets at least in Code-2 against submission of Advance Bank Guarantee (ABG) for an equivalent amount valid till contractual delivery date (CDD) plus 3 months. b) 10% of total PO value of respective line items against identification of raw materials (raw material for stator & rotor cores and copper for windings) at Supplier's works against certification by IOCL/CONSULTANT/TPI agency and submission of advance bank Guarantee (ABG) for equivalent amount valid till contractual delivery date (CDD) plus 3 Months. c) 70% of total PO value of respective line items against dispatch documents (along with copy of LR/GR and IRN) through Bank or directly to IOCL/CONSULTANT together with full taxes, duties. d) 05% of total PO value of respective line items on receipt of Final/As built Drawings/Documents/Data/Manual in requisite number of copies/sets/CDs as per VDR specified in Purchase Requisition.

		e) 5% of total PO value of respective line items on receipt & acceptance of all material at site. f) 5% of total PO value of respective line items on successful commissioning and Performance Run test at site.
2	Mandatory Spares	1. 90% payment of total PO value of respective line item on receipt of spares at site after dispatch of main equipment. 2. 10% payment of total PO value respective line item on receipt & acceptance of materials at site.
3	Site Supervision Services on per diem basis	100% prorata against monthly bills to be submitted by Supplier duly certified by Engineer-in-Charge.
4	CAMC charges	100% prorata against monthly bills to be submitted by Supplier duly certified by Engineer-in-Charge.
5	Note to Payment Terms	
5.1	5% & 10% advance against ABG (as mentioned in Point No 1(a) & 1(b) above) shall be released only after receipt & acceptance of PBG as per tender terms.	
5.2	If bidder does not take the advances mentioned in the Point No 1(a) & 1(b) above and supplies the material, then 85% payment shall be released to the bidder as per terms and conditions mentioned in clause Point No 1(c).	
5.3	1 st Milestone payment shall be released only after receipt of PBG (wherever applicable) and manufacturing schedule. Performance Bank Assurance shall be submitted within 45 days of Letter of Acceptance. In case of Bulks PBG shall be submitted at the time of dispatch.	
5.4	Prorata payments shall be applicable on dispatch of equipment. In case of equipment, prorata shall not be on part of equipment.	
5.5	In case of indigenous SUPPLIERS, wherever taxes/duties are separately indicated, the order value shall be exclusive of taxes/duties. 100% payment of taxes/duties shall be paid along with the payment released against dispatch documents on receipt of Cenvatable/Duplicate Copy of Invoice / vatable documents (wherever applicable).	
5.6	Certification for identification of major raw material, in the above payment terms, shall be carried out by IOCL/ CONSULTANT/TPI agency, as applicable.	
5.7	Payment against Billing Breakup shall be made upto 90% of the payment due against dispatch. Beyond that, payment shall be made only after completion of the entire supply. Maximum number of invoice, for payment purpose, against a billing breakup shall be fixed	
5.8	Wherever in MR tenders payment terms, one of payment milestone has payment linked to receipt of all Final/As built Drawings/Documents/Data/Manual in requisite	

	number of copies/sets/CDs as per VDR specified in Purchase Requisition, following clause to be made part of payment terms: “In case final/As-built Drawings /Documents / Data / manual in requisite number of copies/sets/CD as per VDR are not submitted within 12 months from the date of supply of last item of the Initial order, for reasons not attributable to bidder ; then the supply payment on hold on this account shall be released against invoicing and submission of Bank Guarantee of equivalent amount valid for a period of 6 months initially and shall be extended till commissioning of the system.”
5.9	Successful commissioning and Performance Run test (PRT) at site as mentioned in Point No 1(f) shall mean the PRT of the High speed Motor package at Site, coupled with the existing compressor as defined in the Technical Documents of the Contract. In case, Successful commissioning and PRT at site (as per the applicability) is not completed within 12 months from the date of supply of last item of the Purchase Order, for reasons not attributable to Vendor; then the payment on hold on this account against supply shall be released against invoicing and submission of Bank Guarantee of equivalent amount valid for a period of 6 months initially and shall be extended till commissioning of the system.

B. LOADING AND PENALTY CRITERIA

The Bidder shall furnish the guaranteed values for KW of item including all losses with zero per cent positive tolerance including errors in instruments and measurement, at the rated operating (i.e. guarantee) point. Refer Technical specification for Loading & Penalty Criteria mentioned below. Bidders are requested to provide GUARANTEED POWER CONSUMPTION VALUE in the price bid.

The proposed technical loading criteria and penalty is as follows:

01. Performance Guarantees

Loading and penalty criteria shall be based on the guaranteed performance of the item. The parameter for loading shall be the KW of the item at the guaranteed (certified) rated operating point specified in the process data sheets unless otherwise specified.

- 02.** Bidder shall furnish the guaranteed values for KW of item including all losses with zero per cent positive tolerance including errors in instruments and measurement, at the rated operating (i.e. guarantee) point along with bid submission.

Loading Criteria:

1.1 Total cost

The total cost of item(s) (including all working and standby units) (i.e. Tag-wise) for evaluation purposes shall be computed as under.

$$\text{Total cost} = C1 + C2 + C3 + C4 + C5$$

Where,

C1 = Capital cost of all items (both operating as well as Standby) and auxiliaries including commissioning spares and Special tool & tackles.

C2 = Cost of spare High Speed Motor

C3 = Cost of mandatory spares

C4 = Differential operating cost as defined here under,

C5 = Cost toward Site supervision plus any Services cost (as applicable)

1.2 Differential operating cost (C4)

Differential operating cost (C4) is defined as under:

$$C4 \text{ (in Rupees)} = \text{Nop} \times (\text{BKWE} - \text{BKWR}) \times \text{CF} \times 8000 \times \text{DF}$$

Where,

BKWE = Power rating (KW) at rated speed for the high-speed motor quoted by the bidder

BKWR = Lowest Power rating (KW) at rated speed for the high-speed motor amongst the technically acceptable bidders.

Nop = Number of operating units i.e 1 Nos.

CF = Cost of electrical energy per KWH (i.e Rs 10.81 per KWH)

DF = Discounting factor to arrive at Net Present Value (NPV) based on number of operating years for which loading is to be done as specified i.e. 05 years.

8000 = Number of operating hours for one year,

$$n = k+1$$

$$\text{DF} = \sum_{n=2} [1 + \{1 + (R/100)\}^n]$$

$$D_F = 3.4944$$

where,

k = Number of operating years for which loading is to be done as specified i.e. 5 years

R = prevailing annual interest rate @ 9.60%

Note

- The maximum loading to be applied however shall not exceed 10% of the total capital cost i.e. cost of all items (C1) plus cost of spare high speed motor (C2) plus cost of mandatory spares (C3) as defined earlier

2 Penalty Criteria:

During the performance test at the vendors works, in case the item fail to meet the guaranteed values, the following procedure shall be followed.

2.1 In case during shop performance tests, the KW consumed by the equipment (high-speed motor) exceeds the stipulated guaranteed value by more than 4% the subject item gets rejected.

2.2 However for excess power (Kw) consumed over and above the rated KW upto a maximum of 4% the bidder shall be penalised for extra energy consumption for each item having tested KW greater than the guaranteed value, as define earlier.

Penalty Computation

The penalty shall be worked out on the basis of differential operating cost as under:

$$PC \text{ (in Rs.)} = MF \times (BKWT - BKWG) \times CF \times 8000 \times DF$$

Where,

BKWT = item KW as obtained from the shop test results.

BKWG = Guaranteed item KW

MF = Multiplying Factor = $\frac{\text{Number of operating/working units (Nop) i.e. equal to 1}}{\text{Total number of Units(N) i.e. equal to 2}}$

2.3 TPI inspection agency shall record and clarify the rated power (KW) of the high speed motor in Inspection Release Note (IRN) as consumed/obtained during the shop floor performance test.

2.4 The maximum penalty to be charged for non-conformance to guaranteed values during the shop performance test of all items of an item number put together (i.e. all working & standby units) shall not exceed 10% of the total capital cost i.e. cost of all items (C1) plus cost of spare high speed motor (C2) plus cost of mandatory spares (C3) as defined earlier. This penalty shall be on & above and independent of any other penalties specified elsewhere in the bid/inquiry documents.

C. Contract Value and Total order value:

- a. Total Order Value for Price Discount and loading clause(s) as per IOCL GPC shall mean supply price including P&F, TPI, site work (wherever applicable) etc. but excluding Freight, Transit Insurance, GST, supervision services, 3D modelling, PWCAMC (If applicable), Hazop charges and Training charges.
- b. Total contract Value shall mean the total order value mentioned in the GEM contract.
- c. Transit Insurance shall be in the scope of IOCL.
- d. Unloading of material at Mathura Refinery site shall be in IOCL scope.

IOCL, MATHURA REFINERY

ANNEXURE-5

FORMAT FOR LUBRICATION SCHEDULE FOR HPC HIGH-SPEED MOTOR PACKAGE

LUBRICATION SCHEDULE FORMAT

IOCL, MATHURA REFINERY																							
LUBRICATION SCHEDULE																							
Pos.	Type of Equipment	Equipment Name	Kind of Lubricant (specified by supplier)	Lubricant Producer	Type - Grease (G) or Oil (O)	Equivalent "ISO VG" Grade for Oil and "NLGI" Grade for Grease of the specified lubricant	Number of lubrication points	Lubrication points	Lubricant Characteristics						Total quantity for first fill	Unit (Ltr. for Oils / kg. for Grease)	First fill delivered with equipment (yes or no)	Frequency to check / grease (days)	1st replace (operating hours)	Subsequent frequency to replace (operating hours)	yearly consumption (without first fill)	Unit (Ltr. for Oils / kg. for Grease)	Remarks/Comments
									Oil				Grease										
									Velocity CPS	Velocity index	Pour point °C	Flash Point °C	Density kg/dm3	Droppin g point °C									
1																				#DIV/0!			
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Annexure-10

EXPERIENCE RECORD PROFORMA

EXPERIENCE RECORD PROFORMA FOR COMPLETE HIGH-SPEED MOTOR PACKAGE

VENDOR:

INSTRUCTIONS TO BIDDERS:

1. This Performa duly filled in shall be submitted along with the Clarifications. Separate Performa to be filled and submitted for each package.
2. Since the information requested in this Proforma will be utilised to assess provenness of offered package, it is in the interest of the package vendor to pick up those cases out of total list of references which most closely match with the offered package. The package vendor shall also ensure that each & every information asked for is furnished and the same is correct and complete in all respects. Incorrect information furnished in this proforma shall render the bid liable for rejection.
3. While furnishing the materials, where asked for, the equipment manufacturer shall furnish ASTM equivalents also.
4. For the referred installations, the vendor shall indicate the name of the person (along with his address, telephone no., fax no. /email-id etc.) Who may be contacted by the Purchaser / his representative, if felt necessary.
5. The vendor shall clarify the meaning of each letter / digit used in the model designation below:

Description of High Speed Motor Model designation system

NOTE: Vendor shall define below, the meaning of various symbols /letters/numbers used in the Model designation

SL. NO.	PARAMETER	INFORMATION ON PROPOSED MODEL	INFORMATION ON REFERRED EXISTING INSTALLATIONS			REMARKS
			Ref.- 1	Ref.-2	Ref.-3	
1.	2.	3.	4.	5.	6.	7.
1.0	GENERAL					
1.1	Cross reference to manufacturer's Standard Reference list					
1.2	Model Number					
1.3	Number of units supplied					
1.4	Power (kW) rating of the main motor					
1.5	Type of High-Speed Motor					
1.6	Operating speed (rpm)					
1.7	Voltage rating of the high-speed motor					
1.8	Package engineered and designed by					
1.9	Shop where high-speed motor is manufactured & tested with address					
1.10	Shop where the whole unit is packaged with address					
1.11	Shop where the string (complete unit) test is carried out with address					
1.10	Driver with / without VFD Control					
1.12	VFD Unit	Rated Overall BkW / Driver Rating				
1.13	Model of VFD					
1.14	Make of VFD					
1.15	Rating of VFD (kW)					
1.16	Type of VFD (Water cooled/Air Cooled)					
1.17	Shop where VFD is manufactured & tested with address					
1.18	Common L/O system or separate	Common				
1.19	Manufacturer of L/O system					
1.20	Coupling(type /make):					
1.21	Compressor to Main Motor Driver					
1.22	Base Plate					
1.23	- Size (LXW , mm X mm)					
1.24	- Single piece/Bolted & Dowelled					
1.25	- No. of support points					
1.26	- No. of lifting points					
2.0	OPERATING CONDITIONS					
2.1	Gas handled					
2.2	Process application					

SL. NO.	PARAMETER	INFORMATION ON PROPOSED MODEL	INFORMATION ON REFERRED EXISTING INSTALLATIONS			REMARKS
			Ref.- 1	Ref.-2	Ref.-3	
1.	2.	3.	4.	5.	6.	7.
2.3	Driven Equipment (Compressor) BKW					
3	OTHER INFORMATION ON INSTALLATIONS					
3.1	Date of supply of entire unit					
3.2	Date of commissioning of entire unit					
3.3	Completed ONE year of satisfactory operation at site, as on bid due date					
3.4	Major Problems encountered					
3.5	Name of plant					
3.6	Purchaser's Name and Address					
	Name (Company / Organization)					
	Name of Contact Person					
	Address					
	Telephone No.					
	Fax No.					
	email-id					

18N-C-203A
C3 SPLITTER I

18N-E-207A/B
C3 SPLITTER
REBOILERS
DUTY : 24.54 M³kcal/hr

18N-C-203B
C3 SPLITTER II

18N-V-204
HEAT PUMP
COMPRESSOR K.O DRUM

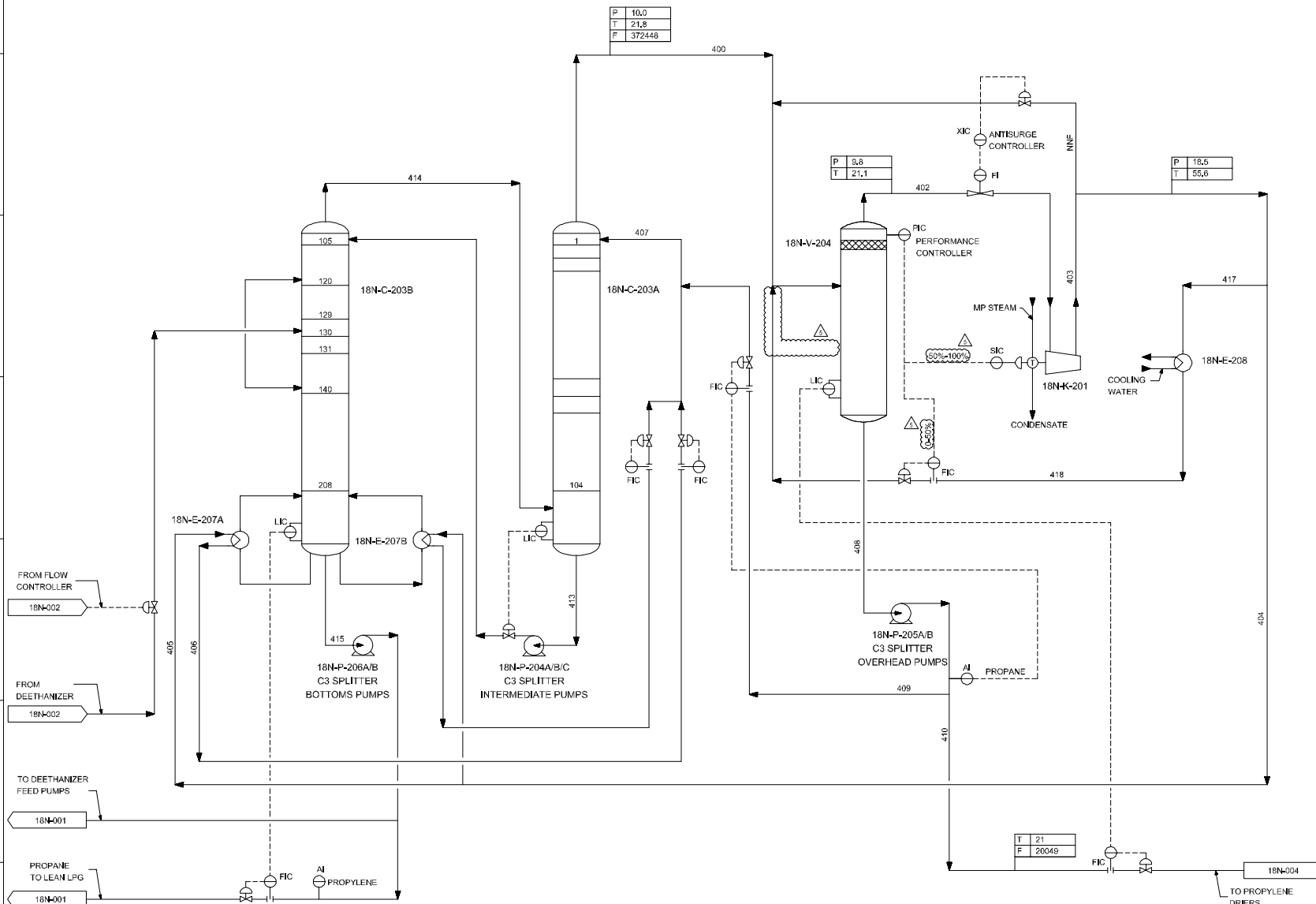
18NH-K-201
HEAT PUMP
COMPRESSOR

18N-E-208
C3 SPLITTER
TRIM CONDENSER
DUTY : 4.00 M³kcal/hr

NOTES:

1. DELETED.

P	kg/cm ² (g)
T	°C
F	kg/hr



STREAM SUMMARY													
STREAM NOS.	UNITS	400	402	403	404	405	406	407	408	409	410	413	414
TEMPERATURE	°C	21.8	21.1	55.6	55.6	55.6	44.8	21.8	21.1	21.1	25.9	25.9	36
PRESSURE	kg/cm ² (g)	10.0	9.8	18.5	-	-	-	-	-	-	-	-	-
WEIGHT FLOW	kg/hr	372448	382704	382704	329548	164773	184773	352398	42901	22852	20049	299401	319541
ENTHALPY	M ³ kcal/hr	34.80	35.71	39.05	33.62	16.81	4.45	9.17	0.51	0.27	0.24	4.46	30.08

05	30/4/12	ISSUED FOR DESIGN	JR	IRNS	NSB	VIR
04	23/6/11	ISSUED FOR DESIGN	JRS	IRNS	NSB	SOVA
03	14/2/11	ISSUED FOR APPROVAL	RBD	IRNS	NSB	CSA
02	10/12/10	COMMENTS INCORPORATED	RBD	IRNS	NSB	CSA
01	30/11/10	ISSUED FOR COMMENTS	VMH	IRNS	NSB	CSA
REV.	DATE	REVISION DESCRIPTION	DRN	CHK	APP	PM

PROJECT FCCU AND PRU REVAMP PROJECT

OWNER
 INDIAN OIL CORPORATION LTD.
MATHURA REFINERY, INDIA

EPCM
 Technip
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TITLE
PROCESS FLOW DIAGRAM
C3 SPLITTER SECTION AND
HEAT PUMP COMPRESSOR

DRAWING NO.										PAGE	REV.
SCALE	00786	104	PFD	00	10	01				3 OF 6	05
NTS	PROJECT	UNIT	DOC. TYPE	DESC.	SUBJ.	SERIAL					

 IndianOil	GENERAL PURCHASE CONDITIONS	RHQ-MC-GPC REV 01
	MATERIAL & CONTRACT DEPTT- RHQ	

GENERAL PURCHASE CONDITIONS

This document is developed by INDIAN OIL CORPORATION and the information it contains is property of Indian Oil Corporation Ltd. It shall not be used for any purpose other than that for which it is supplied.

GENERAL PURCHASE CONDITIONS

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GENERAL TERMS AND CONDITIONS OF PURCHASE

1.0 **DEFINITIONS**

1.1 Unless repugnant to the subject or context thereof, the following expressions herein used shall carry the meaning hereunder respectively assigned to each, namely:

(a) “Bulk Consumables” mean items specifically defined in the Contract Documents to constitute bulk consumables.

(b) “Contract” shall mean the contract as derived from:

- i. The Tender Documents;
- ii. Agreed Variations to the Tender Documents;
- iii. Vendor’s Priced bid; and
- iv. The Purchase Order.

(c) “Contract Document(s)” shall mean individually and collectively the documents constituting the contract.

(d) “Defect Liability Period” in respect of:

- i. Bulk Consumables shall be the date of delivery plus 6 (six) months;
- ii. In the case of other Material(s) shall be 18 (eighteen) months from the date of delivery or 12 (twelve) months after the same have been put in service or commissioned, whichever is earlier;
- iii. In the case of altered or replaced Material(s):

i. For bulk consumables:

In case of repair / replacement, Vendor shall extend the warranty of such part further for a period of 6 (six) months from the date of supply of repaired/replaced material. However, in no case the warranty of repaired/ replaced part shall exceed 12 (twelve) months from last supply.

ii. In case of other materials:

In case of repair/ replacement, Vendor shall extend the warranty of such part further for a period of 12 (twelve) months for other materials from the date of repair/ replacement. However, in no case the warranty of repaired / replaced part shall exceed 24 (twenty four) months from the date of commissioning or 30 (thirty) months from last supply, whichever is earlier.

In case of extended Warranty period, extension of Performance Bank Guarantee shall not be required.

“Delivery”

- iv. with respect to Imported Material(s) means the date of completing shipment of the Material(s) on board the designated vessel or aircraft at the designated port or place of shipment, securely packed and unless

otherwise determined, shall be deemed to be the date of the relative Bill of Lading or Airway Bill; and

- v. with respect to Indigenous Material(s) means the date of completing shipment of Material(s) F.O.R./F.O.T. securely packed and loaded and unless otherwise determined, shall be deemed to be the date of the relative Truck/lorry Receipt or Railway Receipt.
- (e) **"Earnest Money Deposit (EMD)"** means the bank guarantee furnished in lieu of EMD {where the amount of EMD is more than Rs 100,000/- (Rupees One hundred thousand only)} or online EMD submission on IOCL's e-tendering portal by the Vendor in support of his/ its bid as required by the Bid Documents.
- (f) **"Equipment"** means plant, machinery, equipment, instruments, computer, control and other electronic and electrical systems, and shall include parts, components, assemblies and sub-assemblies thereof.
- (g) **"Free Issue Material(s)"** means any equipment, parts or components or spares to be supplied by IOCL to the Vendor which are to be incorporated in any supply of Indigenous Material(s).
- (h) **"IOCL"** means Indian Oil Corporation Ltd., a company incorporated in India and having its registered office at G-9, Ali Yavar Jung Marg, Bandra (East) Mumbai – 400 051 and having the Head Office of its Refineries Division at Scope Complex, Core 2, 7 Institutional Area, Lodhi Road, New Delhi-110 003 and includes its successors and assigns and all persons through whom it acts in any matter for the purpose of the Tender or the Contract.
- (i) **"Imported Material(s)"** mean(s) the materials to be fabricated, manufactured or procured by the Vendor outside India for shipment to India under the Contract.
- (j) **"Indigenous Material(s)"** mean(s) materials to be fabricated, manufactured or procured by the Vendor within India for supply under the Contract.
- (k) **"Inspectors"** means Inspectors nominated, appointed, approved or deputed by IOCL for inspection of the Material(s) prior to Delivery.
- (l) **"Material(s)"** means any and all raw materials, manufactured articles, equipment, spares and other goods and supplies whatsoever and includes wherever applicable drawings, data, specifications and intellectual property rights and all services (including but not limited to design, fabrication, inspection, delivery and testing) required to be supplied, done, performed, prepared or undertaken to meet the requirements of the Contract
- (m) **"Procurement Coordinator"** means the representative or agency appointed by IOCL for managing, expediting and/or coordinating the supply of Material(s).
- (n) **"Project"** means the Project or Refinery for which the Material(s) is/are required.
- (o) **"Project Site"** means the site of the Refinery unit or site of the Project for which the Material(s) is/are required.

- (p) **“Purchase Order”** means IOCL’s acceptance of the Vendors’ offer/bid and includes any formal or detailed Purchase Order issued by IOCL pursuant to the acceptance of the bid.
- (q) **“Stipulated Delivery Period”** means the date(s) for delivery of the Material(s) as stipulated in the Contract and failing such stipulation, shall mean the date(s) for such delivery(ies) as agreed between the Vendor and IOCL.
- (r) **“Tender Documents”** with reference to the Purchase Order mean:
- i. Material Requisition/Request for Quote;
 - ii. General Terms and Conditions of Purchase;
 - iii. Technical Specifications;
 - iv. Special Conditions of Purchase (if any);
 - v. Addendum (a) (if any) to the Tender Documents.
- (s) **“Total Contract Value”** means total value of the Material(s) and services to be supplied as specified in the Purchase Order, exclusive of reimbursable taxes and duties.
- (t) **“Vendor”** means the successful bidder on whom the Purchase Order is placed.

1.2 Interpretation of Contract Documents

- 1.2.1 The several Contract Documents forming the Contract are to be read together as a whole and are to be taken as mutually explanatory.
- 1.2.2 Should there be any doubt or ambiguity in the interpretation of the Contract Documents or in any of them, the Vendor shall prior to commencing the relative supply or work for supply under the Contract apply in writing to IOCL for resolution of the doubt or ambiguity. Should the Vendor fail to apply to IOCL within 7 days from the date of receipt of the Order for its clarification as aforesaid, the Vendor shall perform the relative work and/or make the relative supply at his own risk.
- 1.2.3 Any item of supply or service relative thereto shown, indicated or included by expression or implication in any document forming part of the Contract shall be deemed to form part of the Scope of Supply with the intent that the indication or inclusion of the supply or service within any of the said documents shall be a sufficient indication of the Scope of Supply or service covered by the Contract.
- 1.2.4 No verbal agreement or assurance, representation or understanding given by any employee or officer of IOCL or so understood by the Vendor shall anyway bind IOCL or alter the Contract Documents unless specifically given in writing and signed by or on behalf of IOCL as an Agreed Variation to the relative term(s) in the Contract Document(s).
- 1.2.5 Clause headings given in this or any other Contract Documents are intended only as a general guide for convenience in reading and segregating the general subject of the various clauses, but shall not govern the meaning or import of the clauses there under appearing or confine or otherwise affect the interpretation thereof.

1.3 Irreconcilable Conflicts

Subject to the provisions of Clause 1.2 hereof, in the event of an irreconcilable conflict between the provision of these General Terms and Conditions of Purchase and/or the Special Conditions of Purchase and/or Addendum (a) and/or the Agreed Variations to the Tender Documents and/or the Purchase Order and/or between any of the other said documents so that the conflicting provision(s) cannot co-exist, to the extent of such irreconcilable conflict, the following order of precedence shall apply so that the conflicting provision(s) in the document lower in the order of precedence set out below shall give way to the conflicting provision(s) in the document higher in the order of precedence, namely:

- i. Purchase Order;
- ii. Agreed Variations to the Tender Documents;
- iii. Addendum/Addenda (a) to the Tender Document;
- iv. Special Conditions of Purchase;
- v. General Terms and Conditions of Purchase;
- vi. Other Contract Documents.

2.0 CONFIRMATION OF ORDER

2.1 Wherever applicable, signed Letter of Acceptance (also named as Fax of Acceptance in some cases) shall, normally, be issued through e-mail (scan of the signed document). SAP Purchase Order shall, normally, be issued as an unsigned, system generated document through e-mail.

Without prejudice to the formation of contract by acceptance of bid, the Vendor shall acknowledge the receipt of the Letter of Acceptance (wherever applicable) and SAP Purchase Order within 7 (seven) days following receipt of the Letter of Acceptance or SAP Purchase Order.

3.0 PRICE

3.1 Unless otherwise specifically stipulated, the price shall be firm and shall not be subject to escalation for any reason.

3.2 Unless otherwise specifically stipulated, the price for Indigenous Material(s):

- i. shall be inclusive of road/rail worthy water-proof packing and forwarding charges upto effecting delivery at F.O.T./F.O.R despatch point and shall also be inclusive of inland freight and local taxes (if any) as leviable on the transportation or entry of goods into any local area or limits pursuant to the Contract; and
- ii. shall be exclusive of transit insurance, CGST or SGST/IGST and/or such other imposts which are leviable by law on the supply of goods or their sale to IOCL pursuant to the Contract.

3.3 (a) If it is stipulated that local taxes (if any) are to be borne by IOCL, the Vendor shall arrange for the transporter to pay the same, if any leviable and claim reimbursement thereof from IOCL against proof of payment.

(b) If it is stipulated that dispatch shall be on "freight to pay basis", the Vendor shall advise the transporter to collect the freight from IOCL after the full

quantity of the Material(s) has/have been delivered in good condition to the Project Site.

- 3.4 Unless otherwise stipulated, the price of Imported Material(s) shall be the FOB/ FCA (as per prevailing ICC INCOTERMS at the time of ordering) price of Material(s) and shall be inclusive of sea/ air worthy water-proof packing and forwarding charges (as the case may be).

4.0 **EARNEST MONEY**

- 4.1 A bid is liable to be rejected unless it is supported by earnest money of a value as provided in the Purchase Requisition/ Request for Quote.
- 4.2 Earnest Money by the tenderers shall be accepted only in the form of online EMD payment on IOCL's e-tender portal or a Bank Guarantee. Bank Guarantee in the format set forth in Annexure "A" hereto may be furnished in lieu thereof if the amount of Earnest Money Deposit exceeds Rs. 100,000/- (Rupees One hundred thousand only).
- 4.3 If the Earnest Money is in the form of a Bank Guarantee, the validity of the Bank Guarantee shall be extended by the Vendor at the Vendor's cost and initiative for a period of 3 (three) months beyond the date of the acceptance of bid by IOCL, failing which the Bank Guarantee may be encashed by IOCL and the proceeds held as security for the performance of Vendor's obligation and the due discharge of Vendor's liability under the resultant Contract until the Vendor acknowledges the acceptance of the Purchase Order and furnishes the Performance Guarantee. Should the Vendor fail to accept the Purchase Order and/or furnish the Performance Guarantee within the time specified in this behalf, or specifically permitted by IOCL for the purpose, IOCL may encash the Bank Guarantee furnished by the Vendor by way of Earnest Money Deposit and/or forfeit such proceeds or other encashable Earnest Money Deposit held by it in cash without prejudice to any other right or remedy available to it.
- 4.4 EMD of bidders whose price bids are not opened/ disqualified during techno-commercial bid evaluation (i.e. unsuccessful Bidder) shall be released after price bid opening.
EMD of bidders qualified in the techno-commercial bid but unsuccessful for placement of Purchase Order shall be released after placement of Purchase Order on successful Bidder.
EMD of the successful bidder shall be released on receipt of acceptable Performance Bank Guarantee (PBG), wherever applicable. Wherever PBG is not applicable, EMD of successful bidder shall be returned after order acceptance.
- 4.5 Earnest Money furnished by a tenderer may also be forfeited in the following circumstances:
- a) If the tenderer alters or modifies or withdraws their bid prior to opening of the price bid and within the specified validity period of the Tender; or
 - b) If the tenderer withdraws their bid after the Tender is opened.
 - c) In case of submission of false/ fraudulent / forged documents.

5.0 TERMS OF PAYMENT

5.1 For Imported Material(s):

- a) The price of Imported Material(s) shall be paid in the currency specified in the Contract.
- b) 100% (one hundred percent) of the price of the relative Imported Material(s) (after considering price reduction for delay, if any, as per clause 12.0) will be paid under an irrevocable Letter of Credit against submission of documents specified in the Letter of Credit. The Letter of Credit shall be substantially in the format set forth in the Annexure "B" hereto and shall be established either by the State Bank of India or other bankers of IOCL in India.
- c) Unless otherwise specified, the Vendor may draw against the Letter of Credit on presentation of all the following documents:
 - i) Invoice
 - ii) Clear Bill of Lading/Airway Bill covering the Material(s) invoiced
 - iii) Packing list for the consignment
 - iv) Third party Inspector's Certificate covering the invoiced Material(s) wherever applicable
 - v) Test/Composition Certificate
 - vi) Certificate of origin
 - vii) Drawing(s)/Catalogue(s) covering the Material(s), wherever applicable.
 - viii) Export Certificate, wherever applicable
 - ix) Invoice of Inspector's charges, wherever applicable
 - x) IOCL's acknowledgement of Performance Bank Guarantee wherever applicable.
- d) Bank charges payable to IOCL's banker for opening of the Letter of Credit shall be borne by IOCL and bank charges payable to the Vendors' banker shall be borne by the Vendor.
- e) Should the Vendor desire to get the Letter of Credit confirmed by any other banker, confirmation charges will be borne by the Vendor.
- f) Unless otherwise agreed, the Letter of Credit shall not permit drawing in more than 3 (three) tranches.
- g) Unless otherwise specified, the Vendor shall furnish a Bank Guarantee towards performance favoring IOCL within 15-days of the Purchase Order for an amount equivalent to 10% (ten) of the Price of Material(s) from a Scheduled bank in India (including an Indian branch of a foreign bank) acceptable to IOCL in the format set forth in Annexure "C" hereto valid (in the first instance) for the period specified in Clause 16.12
- h) In the event that IOCL requests the Vendor to hold or to warehouse the Material(s) for any period after the Material(s) are ready for shipment, the storage charges as agreed, shall be borne by IOCL in addition to the Price.

5.2 For Indigenous Supply:

- a) Unless otherwise specified in the Contract, where the total contract value does not exceed Rs.50,000/- (Rupees fifty thousand only), IOCL shall release 100 % of the relative Price of Material(s) within 30 days of receipt of the Material(s) at Project Site and their acceptance.

- b) Unless otherwise specified in the Contract, where the total contract value exceeds Rs. 50,000/- (Rupees fifty thousand only) but is less than Rs. 1,00,000/- (Rupees one hundred thousand only), IOCL shall release 90% of the relative Price of Material(s) on delivery of the documents specified in (c) hereof below relative hereto, and will release the balance 10% of the Vendor's invoice within 30 (thirty) days of receipt of Material(s) at Project Site and their acceptance.
- c) Unless otherwise specified, where the total contract value of the Material(s) is Rs. 1,00,000/- (Rupees one hundred thousand only) and above, IOCL shall release 90% of the relative price against the documents specified here below relative hereto through IOCL's bankers and will release the balance 10% on the Vendor's invoice within 30 (thirty) days of receipt of Material(s) at the Project Site and its/their acceptance. Unless otherwise mentioned, the specified documents are:
 - i) Invoice
 - ii) Clear Railway Receipt/Truck Receipt/Goods Receipt covering the Material(s) invoiced
 - iii) Packing list for the consignment
 - iv) Third Party Inspector's Certificate covering the invoiced Material(s)/ Release Note, wherever applicable
 - v) Test/Composition Certificate, wherever applicable
 - vi) IBR Certificate/CMRS Certificate, wherever applicable
 - vii) Drawing(s)/Catalogue(s) covering the Material(s) , wherever applicable
 - viii) Guarantee/Warranty Certificate(s), wherever applicable
 - ix) Invoice of Inspector's charges, wherever applicable
 - x) Freight Memo(s) if freight is not included in the Price and the RR/TR/GR does not give the freight particulars.
 - xi) Acknowledgement by IOCL of receipt of Performance Bank Guarantee (wherever applicable)
- d) The financial settlement of the Vendor's invoice is liable to be withheld in the event the Vendor fails to submit the drawings, data and all other documents as called for in the Purchase Order.
- e) Unless otherwise specified, the Vendor shall furnish a Bank Guarantee towards performance favoring IOCL within 15-days of the Purchase Order for an amount equivalent to 10% (ten) of the Price of Material(s) from a Scheduled bank in India (including an Indian branch of a foreign bank) acceptable to IOCL in the format set forth in Annexure "C" hereto valid (in the first instance) for the period specified in Clause 16.12.

6.0 VENDORS' DRAWINGS AND DATA REQUIREMENT

The Vendor shall submit drawings, data and documentation in accordance with (but not limited to) what is specified in the Purchase Requisition/Tender documents and/or Vendor's drawing and data form attached to the Purchase Order, within 30 (thirty) days of the Purchase Order. The types, quantities and time limits for submitting these must be respected by the Vendor and the Material(s) shall be deemed not to have been delivered for all purposes (including payment) until completion of the said submissions to the satisfaction of IOCL.

7.0 FREE ISSUE MATERIALS (for incorporation in the Indigenous supply)

If the Purchase Order involves the incorporation of any Free Issue Material(s):

- a) The Vendor shall prior to taking delivery of the Free Issue Material(s) arrange for a Bank Guarantee for the full value of the Free Issue Material in the format set forth in Annexure "D" hereto valid from the date of the receipt of the Free Issue Material(s) until delivery of the Material(s) in which the Free Issue Material(s) has/have been incorporated.
- b) The Vendor shall inspect the Free Issue Material(s) at the time of taking delivery thereof and satisfy itself of the quality, quantity and condition of the Free Issue Material(s). IOCL shall not be liable for any claims or complaints whatsoever in respect of the quality, quantity or condition of the Free Issue Material(s) once the Vendor has taken delivery thereof.
- c) All Free Issue Material(s) shall be taken delivery of, transported, held, stored and utilized by the Vendor as trustee of IOCL, and delivery of the Free Issue Material to the Vendor shall constitute an entrustment thereof by IOCL to the Vendor with the intent that any transportation, utilization, application or disposal thereof by the Vendor otherwise than for incorporation in the Indigenous Material(s) shall constitute a breach by the Vendor.
- d) The Vendor shall transport the Free Issue Material(s) only by such transportation as is suitable and shall hold and store the Free Issue Material(s) only at such place and/or premises that are air and water tight and otherwise suitable for the storage of the Free Issue Material(s) so as to prevent damage or deterioration or theft or other loss, and shall arrange such watch and ward as shall be necessary to ensure the safety thereof.
- e) Notwithstanding the Bank Guarantee mentioned in sub-paragraph (a) above, the Vendor shall replace any Free Issue Material(s) which is/are lost, damaged, misused, stolen or deteriorated with other Material(s) of equivalent quantity and quality and condition, and the same shall be deemed to constitute Free Issue Material(s) and the provisions of sub paragraphs (a) to (f) hereof shall apply thereto in the same manner as to the originally supplied Free Issue Material(s).
- f) Unused Material(s) from the Free Issue Material(s) shall be returned by the Vendor to IOCL and if IOCL so directs, the Vendor shall dispose of the same by sale or otherwise on such terms and conditions as IOCL may stipulate or approve and the Vendor shall pay to IOCL the sale proceeds of the Material(s) so disposed of by sale.

8.0 THE BILL OF MATERIAL(S)

8.1 Where the price of Material(s) is a lumpsum price and pro-rata payment is envisaged in the Purchase Order, the Vendor shall within 60 (sixty) days of the issue of the Purchase Order furnish to IOCL for approval, a priced and detailed Bill of Material(s)/ Billing Schedule as required covering all Material(s), which shall conform to the price break-up and Total Contract Value given in the Purchase Order. The Bill of Material(s) shall operate as the Billing Schedule for payment of the price of the Material(s). In preparing the Bill of Material(s), the Vendor shall ensure that all contracted Material(s) are included in the Bill of Material(s) so as to ensure that IOCL is not required, due to any oversight or omission, to pay any taxes and duties

on a value in excess of the total Value indicated in the Contract. Should IOCL be required to pay taxes or customs duties on account of such oversight or omission, the Vendor shall reimburse such excess payments to IOCL.

8.2 The Material Safety Data Sheets in the case of catalysts and chemicals and other items where ever applicable shall also be submitted within 30 days after receipt of the Purchase Order.

9.0 **MODIFICATION**

9.1 IOCL shall have the right to request changes or modifications in the technical documents and/or specifications comprised in the Contract, subject to the Vendor's approval thereto. IOCL shall bear any additional cost and shall be entitled to the benefit of any reduced cost resultant upon any such change or modification.

9.2 As soon as possible after receipt of a written request from IOCL for change(s), the Vendor shall furnish in writing to IOCL an estimate of the additional cost or benefit for the change(s) and/or modification(s) requested and its effect on the delivery date. On agreement with respect to the enhanced/reduced cost and modified delivery time, which shall be finalized within 10 (ten) days of the request for the modification, IOCL shall issue an amendment to the Purchase Order, and the Vendor shall promptly proceed with the change(s)/modification(s) contemplated by the amended Purchase Order.

10.0 **SUB-CONTRACTS / ASSIGNMENT**

10.1 The Vendor shall not assign the Contract in whole or part without obtaining the prior written consent of IOCL.

10.2 The Vendor shall not sub-contract the Contract in whole or part to any entity without obtaining the prior written consent of IOCL.

10.3 The Vendor shall, notwithstanding the consent and assignment/sub-contract, remain jointly and severally liable and responsible to IOCL together with the assignee/ sub-contractor, for and in respect of the due performance of the Contract and the Vendor's obligations there under.

11.0 **EXPEDITING**

11.1 IOCL may appoint a Procurement Coordinator to manage, expedite and coordinate the manufacture, shipment and/or despatch of Material(s) covered by the Contract.

11.2 The Vendor shall furnish to the Procurement Coordinator within 30 (thirty) days of receiving the Purchase Order, the required number of copies of documents including but not limited to Schedule of manufacture/PERT chart, unpriced copies of sub-orders, phased programme of item-wise manufacture, testing and delivery and any other information and/or documents as may be called for by the Procurement Coordinator.

11.3 The Procurement Coordinator shall have free access to the Vendor's shop and sub-suppliers' shop during normal working hours and shall be provided all the necessary assistance and information to help him perform his job.

12.0 **RESPECT FOR DELIVERY DATES AND PRICE DISCOUNT**

- 12.1 The time and date of Delivery of Material(s) as stipulated in the Contract shall be adhered to on the clear understanding that the Price(s) of the Material(s) has/have been fixed with reference to the said Delivery date(s).
- 12.2 If any delay is anticipated by the Vendor in the delivery of the Material(s) or any of them beyond the stipulated date(s) of Delivery, the Vendor shall forthwith inform IOCL in writing of such anticipated delay and of the steps being taken by the Vendor to remove or reduce the anticipated delay, and shall promptly keep IOCL informed of all subsequent developments.
- 12.3 **(A) In case scope includes only supply**

If any Material(s) is/are not delivered within the Delivery date(s) stipulated in respect thereof, IOCL shall be entitled to a discount by way of price adjustment in a sum equivalent to 0.5% (one half percent) of the price of such Material(s) per week or part thereof that the Material(s) remain(s) undelivered beyond the stipulated Delivery period in respect thereof, subject to a **maximum discount of 5% (five percent)** of the Total Contract Value. Such discount shall be given by the Vendor by equivalent reduction in the invoice value before presentation of documents to the Bank/IOCL for payment. Should the Vendor fail to deliver the Material(s) or to make such adjustment, the discount may be recovered by any other means.

(B) In case scope of work includes supply and site work

For delay in supply:

The price adjustment shall be applicable @ 0.5% of Total Supply Order Value (excluding site work) per week of delay or part thereof subject to maximum of 5% of Total Supply Order Value (excluding site work).

For Delay in site work:

The price adjustment shall be applicable @ 0.5% of Total Order Value (supply + site work value) per week of delay or part thereof subject to maximum 5% of Total Order Value (supply + site work value).

In no case total price adjustment shall exceed 5% of Total Order Value (Supply + site work).

Note:

In case of package items (ordered as a complete system), the price adjustment shall be applicable on the entire order value of that package and not on the value of the undelivered portions (even though a billing breakup has been approved).

In case of purchase of bulk items where tolerance limit is specified (e.g. pipes, cables etc.), price adjustment clause shall be applicable on the actual quantity supplied, within the tolerance limit, instead of Purchase Order quantity.

- 12.4 Without prejudice to its rights under Clause 12.3 hereof and to entitlement to discount(s) accrued in terms thereof and in addition thereto, IOCL may at any time after the expiry of the stipulated date(s) of Delivery in respect of any

Material(s), at its discretion terminate in whole or part the Contract in respect of the undelivered Material(s) or any of them and either purchase such Material(s) from any other available source at the risks and costs of the Vendor and recover from the Vendor any additional cost incurred by it on such purchase or recover from the Vendor without such purchase the difference between the market and contract price of such Material(s) on the date of termination of Contract relative thereto.

The maximum liability against risk & cost sourcing shall not be beyond the total Contract Value for the undelivered material. Provided, this shall not restrict IOCL's claim for damages or compensation, as the case may be, for acts of fraud, deliberate default, negligence or misconduct by the vendor.

13.0 DELAYS DUE TO FORCE MAJEURE

13.1 If a force majeure event as defined below, affecting the Vendor, arises prior to the expiry of the stipulated Delivery period in respect of any Material(s) and the Vendor intends to claim extension of the stipulated date of delivery in respect of such Material(s) or any of them, the Vendor must advise IOCL by notice in writing of such event by means of communication which secures undisputed service of the notice not later than 10 (ten) days of the occurrence of the event. Such occurrence shall be duly certified by a local Chamber of Commerce or statutory authority. The Vendor shall within 10 (ten) days of the end of the Force Majeure event similarly notify IOCL of such cessation, and of the period and Material(s) for which an extension of Delivery date(s) is consequently claimed. Such notification shall be a mandatory pre-condition to a claim for such extension.

13.2 No failure, delay or omission by Vendor to fulfill any of its obligations under Contract (other than the obligation to make payments when due) shall give rise to any claim against Vendor or IOCL or be deemed to be a breach of a Contract if and to the extent such failure, delay or omission arises from any of the following events not within the reasonable control of Vendor and not attributable to Vendor's fault, negligence or misconduct (each an event of "Force Majeure"):

- a) Act of terrorism
- b) Riot, war, invasion, act of foreign enemies, hostilities (whether war declared or not), civil war, rebellion, revolution, insurrection of military or usurped power;
- c) Ionizing radiation or contamination, radioactivity from any nuclear fuel/ nuclear waste from reaction of nuclear fuel or any other hazardous radioactivity.
- d) Epidemics, tsunamis, earthquakes, flood, fire, hurricanes/typhoons or other natural disaster.
- e) Freight embargoes, strikes at national/ state wide level (for more than 7 consecutive days) where the supplier's works is located.

13.3 For the avoidance of doubt, inclement weather, third party breach, delay in supply of materials (other than due to a nationwide transporters' strike), commercial hardship, strike, shutdown or lockout other than as specified above shall not constitute a Force Majeure event.

13.4 In the event of Force Majeure, Vendor shall bear any costs incurred by it resulting there from. The Vendor affected by Force Majeure shall use all reasonable efforts to prevent and reduce to a minimum and mitigate the effect of delays occasioned by such Force Majeure.

13.5 If the Vendor is prevented from fulfilling its contractual obligations for a continuous period of three (3) months because of Force Majeure, then the Vendor and IOCL shall consult with each other with a view to agreeing on the action to be taken under the circumstances, and failing such agreement, IOCL shall be entitled to terminate the contract in whole or to the extent that its performance is prevented by Force Majeure.

14.0 **WARRANTY OF TITLE**

14.1 The Vendor warrants that the Material(s) sold and supplied by it to IOCL pursuant to the Contract shall be free from any and all defects in title including but not limited to any charge, third party claim, mortgage, hypothecation, foreclosure, lien, restriction, injunction, attachment or encumbrance whatsoever and shall hold and keep IOCL indemnified from and against any and all contrary claims, demands, actions and proceedings and all costs (including legal costs), charges, expenses and losses suffered or incurred by IOCL as a consequence thereof and/or to defend any such claim, demand, action or proceeding.

14.2 The Vendor shall be understood to have represented to IOCL that the use by IOCL of the Material(s) supplied by the Vendor will not infringe any third party patent rights or pending patent applications or other intellectual property rights. Accordingly, the Vendor will hold harmless and indemnify IOCL against all costs (including legal costs), charges and expenses incurred or any damages or other sums that may be assessed or become payable under any decree or judgment of any court or under any settlement resulting from any suit, claim or action for infringement of third party patents or other third party intellectual property.

15.0 **INSPECTION AND TESTING**

15.1 In addition to any tests to be conducted by the Vendor under the Contract or any applicable codes or standards, the Material(s) shall be subject to inspection and/or testing by Inspector(s) (including Third Party Inspector(s)) at any time prior to shipment and/or despatch and to final inspection within a reasonable time after arrival at the Project Site. The Inspector(s) shall have the right to carry out the inspection or testing, which will include inspection and testing of the raw materials at manufacturers shop, at fabricators shop and at the time of actual despatch before and/or after completion of packing.

15.2 In addition to testing and inspection by Inspectors, IOCL may nominate an institutional agency like Boiler-Inspectorate for official testing of coded equipment. The Vendor shall ensure that all procedures for preparation and performance of tests prescribed by such institution shall be scrupulously complied and observed.

15.3 Unless otherwise specified in the Contract, the inspection shall be carried out as per the relevant standards/scope of inspection provided alongwith the Tender Enquiry/Purchase Order.

All charges for Third Party Inspectors shall be paid by the Vendor. IOCL shall pay these charges against vendor's invoice, unless agreed otherwise. However, no charges will be payable by IOCL in the event the inspection has become infructuous for any cause.

- 15.4 All manufacturers' mill test certificates and analytical reports from material laboratories in respect of raw materials employed and components incorporated shall have to be presented by the Vendor.
- 15.5 Before shipping or despatch, the Material(s) will have to be checked and stamped by the Inspector(s) who may forbid the use and dispatch of any equipment and/or Material(s) which during tests and inspection fail(s) to comply with the specifications, codes and testing or other contractual requirements applicable thereto, and the Vendor shall not tender such rejected Material(s) for supply to IOCL nor shall incorporate the same in any Material(s) to be tendered for supply to IOCL.
- 15.6 The Vendor will inform IOCL at least eight (8) days in advance of the exact place, date and time of tendering the Material(s) for required inspection and provide free access to the Inspector(s) during normal working hours at Vendor's or his/its sub-Suppliers' works, and place at the disposal of the Inspector(s) all useful means for undertaking the Inspection, checking the results of tests performed, marking the Material(s), getting additional tests conducted and final stamping of the Material(s).
- 15.7 All tests will be performed at the Vendors' expense and if required by the Inspector(s), shall be conducted in accordance with the Inspector's instructions. The Vendor shall also bear the expense for the preparation and rendering of tests required by the Boiler Inspectorate or other statutory testing or certifying agencies/institutions.
- 15.8 Unless otherwise specified, all charges for the Inspection shall be borne by the Vendor.
- 15.9 IOCL may, at its own expense, have its representative(s) witness any test or inspection. In order to enable IOCL's representative(s) to witness the tests/inspections, the Vendor shall notify IOCL at least 30 (thirty) days in advance, of the schedule of all inspection hold points prior to the initiation of equipment fabrication. IOCL shall be notified eight (8) calendar days in advance of any changes in the schedule of inspection. IOCL will advise the Vendor in advance whether it intends to have its representative(s) be present at any of the inspections.
- 15.10 Even if the inspection and tests are fully carried out, the Vendor shall not be absolved from its responsibilities to ensure that the Material(s), raw materials, components and other inputs are supplied strictly to conform and comply with all the requirements of the Contract at all stages, whether during manufacture and fabrication, or at the time of Delivery as on arrival at site and after its erection or start up or consumption, and during the defect liability period. The inspections and tests are merely intended to prima facie satisfy IOCL that the Material(s) and the parts and components comply with the requirements of the Contract.
- 15.11 The Vendor's responsibility shall also not be anywise reduced or discharged because IOCL or IOCL's representative(s) or Inspector(s) shall have examined or commented on the Vendor's drawings or specifications or shall have witnessed the tests or required any chemical or physical or other tests or shall have stamped or approved or certified any Material(s).

- 15.12 Unless otherwise specifically permitted by the Contract, no Material(s) shall be dispatched for delivery or delivered under the Contract without being stamped or otherwise approved for delivery by the Inspector(s).
- 15.13 Notwithstanding approval by the Inspector(s), if on testing and/or inspection after receipt of the Material(s) at Project Site, any Material(s) is/are found not to be in strict conformity with the contractual requirements or specifications, IOCL shall have the right to reject the same and hold the Vendor liable for non- performance of the Contract. The provision of Clause 16.5 to 16.11 shall mutatis mutandis apply to such rejected Materials.

16.0 **ACCEPTANCE OF MATERIALS & GUARANTEES**

- 16.1 The Vendor acknowledges that notwithstanding the provision or approval of any drawings, designs, specifications, source of supply or other data relative thereto by IOCL and/or the testing of Material(s) in accordance with the requirements of the Contract or any applicable code or specification and/or any inspection of the input or Material(s) by the Inspector(s) or issue of an Inspection Certificate relative thereto and/or any other act, matter or thing done or required by IOCL to satisfy itself of the quality, quantity, sufficiency or efficiency of the Material(s) prior to delivery thereof and/or the transfer of title and/or risks in relation to the Material(s), shall not be deemed or understood to constitute acceptance of the Material(s) by IOCL nor shall IOCL be understood to have accepted any Material(s) other than plant, machinery, equipment and parts and components unless such Material(s) have been received at the Project Site of IOCL and found to be acceptable as evidenced by a Certificate of Acceptance issued by IOCL, and in case of plant, machinery, equipment and parts and components, unless they have been incorporated into the relative Project Unit and the said Unit has been tested and the relative plant, machine, equipment, part or component has successfully functioned without patent defect.
- 16.2 To this end, the Vendor guarantees that:
- i) All materials used in the execution of the Contract and all Material(s) used in performance thereof shall be in strict compliance and conformity to the characteristics, requirements and specifications of the Contract and suitable for the purpose for which such Material(s) are intended to be used if such purpose has been disclosed or is/are suitable for use to which such Material(s) are ordinarily put to use, if such purpose has not been disclosed.
 - ii) In the case of machinery, plant or equipment with rated capacities, outputs or other characteristics, that the machinery, plant or equipment as the case may be, shall function to such capacities and/or outputs and shall meet the other characteristics required in respect thereof.
- 16.3 The Vendor further undertakes to replace any Material(s) if found not to conform to the guarantees aforesaid at any time during the defect liability period applicable thereto. IOCL shall give written notice of the defect to the Vendor and of the rejection of the defective Material(s).
- 16.4 If the defect can be rectified or repaired without diminishing the quality, utility, efficiency or life of the Material(s), instead of outright rejection of the Material(s), IOCL may at its discretion permit the Vendor to rectify the

defect(s) within a period to be specified by IOCL in this behalf in the notice. In case Vendor fails to take action to rectify the defect(s) within the period specified to the satisfaction of IOCL, IOCL may at its discretion, at the risk and cost of the Vendor in all respects, rectify or repair or cause to be rectified or repaired the defect(s) either by itself or through any other source or agency, or reject the defective Material(s).

- 16.5 Should IOCL, notwithstanding the endeavour to do so, be unable to rectify or repair or get rectified or repaired the defect(s) within a reasonable time, IOCL may, notwithstanding such endeavour reject the defective Material(s).
- 16.6 The Vendor shall repair, rectify and/or replace, as the case may be, the defective and rejected Material(s) without entitlement to any extra payment. Prevailing DDP INCOTERMS (as per ICC) or **any other Incoterm which may replace DDP** shall apply for such replacement parts or components or Material(s) at Project Site with respect to imported parts or components or materials.
- 16.7 The Vendor shall at its own risk and cost remove any rejected Material(s) from the Project Site, and in case of plant, machinery, equipment, parts or components which have been installed, cause the same to be dismantled and removed from the Project Site subject to the Vendor in all cases prior to the removal of the rejected Material(s) from the Project site:
- i) furnishing a bank guarantee to IOCL from a Scheduled bank in India (including an Indian branch of a foreign bank acceptable to IOCL) and in a format set forth in Annexure "E" hereto for the value paid by IOCL on the Material(s) rejected; and
 - ii) undertaking to replace the rejected Material(s) with other Material(s) conforming to the Vendor's guarantees aforesaid applicable thereto.

IOCL shall be responsible for providing any on-site access to the vendor to perform warranty related work.

- 16.8 The Vendor shall not without the prior written consent of IOCL utilize any rejected Material(s) in the re-supply.
- 16.9 The Defect Liability Period with respect to any Material(s) replaced, repaired, altered and/or rectified shall be reckoned in accordance with Clause No. 1.1(d) (iii).
- 16.10 Should the Vendor fail to dismantle and/or remove any rejected Material(s) from the Project Site within the time specified in the notice of rejection, IOCL may without prejudice to any other right or remedy, at the risk and cost of the Vendor cause the rejected Material(s) to be dismantled and sold by public auction or private treaty as it deems fit and hold or adjust the sale proceeds for the recovery of the cost of dismantling, sale and removal of the rejected Material(s) and any amount paid by IOCL towards the price of the rejected Material(s). In so doing, IOCL shall not act as a trustee or constructive trustee of the Vendor and shall be entitled to act solely on the basis of its best judgment without being accountable or liable to the Vendor in any manner except for the proceeds of the sale.

- 16.11 The time taken for the repair, rectification or replacement of Material(s) will not be added to the stipulated Delivery date for the purpose of calculating price discount, and delivery of such Material(s) shall be the date of Delivery of the repaired, rectified or replaced Material(s).
- 16.12 As security for the due performance of its obligations and the due discharge of its liabilities under the Contract, the Vendor shall within 15 (fifteen) days of the issue of the Purchase Order furnish to IOCL a Bank Guarantee issued by a Scheduled Bank in India acceptable to IOCL, in the format set forth hereto and marked Annexure "C" hereinbefore. The Bank guarantee shall remain in force for the entire period required for the performance of the contract and the defect liability period plus a 3 (three) months claim period thereafter. Any shortfall in the value of the Bank Guarantee, as a result of encashment by IOCL either in full or in part, shall be made good by the Vendor within 7 (seven) days of notice by IOCL to the Vendor in this behalf. Any failure by the Vendor to furnish the Bank Guarantee or to enhance the Value of the Bank guarantee as stated above shall constitute a default by the Vendor for which IOCL shall, without prejudice to any other right or remedy available to it, be entitled to terminate the Contract with consequences as indicated in clause 12.4, the provisions whereof shall mutatis mutandis apply.

17.0 FREIGHT, TAXES AND DUTIES

- 17.1 Subject to the provision of Clause 17.2 hereunder, C G S T & S G S T / I G S T payable on the supply and delivery of Material(s) pursuant to the contract will be paid at actual within the contractual delivery date. Any increase in the rates of the CGST & SGST/ IGST within the contractual completion date or approved extended contractual completion date will be borne by IOCL but not beyond the contractual delivery date or extended contractual delivery date. However, the benefit of any reduction must be passed on to IOCL.
- 17.2 Central GST (CGST) & State GST (SGST) / Integrated GST (IGST) payable or reimbursable by IOCL to the vendor on supply of indigenous Materials shall be included in and shown separately in the vendor's Tax invoice for the Material(s). The vendor shall prior to despatch of the Material(s) obtain from IOCL a list of the documents required by IOCL to enable it to avail of the relative benefits. Payment or reimbursement of CGST & SGST/IGST to IOCL shall be made upon the vendor furnishing the relevant documents.
- 17.3 Freight, if any, along with CGST & SGST/IGST thereon payable or reimbursable by IOCL shall be invoiced and shall be paid/reimbursed by IOCL after receipt of the material(s) at the project site.
- 17.4 Taxes and duties are not intended to operate as a profit centre but are intended only to meet the relevant costs incurred on this account. If any reimbursement or collection of the taxes or duties by the vendor from the IOCL is in excess of the taxes and/or duties actually paid by the vendor, the vendor shall forthwith refund such excess to IOCL together with interest thereon at 1% (one percent) per annum above the MCLR rate (or rate that replaces it) of SBI from the date of collection until the date of refund.

18.0 WEIGHTS AND MEASUREMENTS

- 18.1 The shipping documents, invoices, packing lists and all other relevant documents shall contain the same units of weights and measurements as given in the Contract Documents, in respect to the following data:
- a. Unit net weight
 - b. Unit gross weight (including packing)
 - c. Dimensions of packing
- 18.2 All weights and measurements recorded by the Procurement Co-ordinator or Inspector(s) on receipt of the Material(s) at the Project site will be treated as final.

19.0 PACKING & MARKING

- 19.1 All Material(s) shall be suitably packed in weatherproof seaworthy/airworthy packing for ocean/air transport under tropical conditions and/or for rail and road or other appropriate transport within India. The Vendor shall ensure that the packing is strong enough to ensure safety and preservation of the Material(s) upto the Project Site or other point of final destination.
- 19.2 Material(s) shall be protected by a suitable coat of paint and all bright parts shall be protected from rust by application of rust preventives as may be necessary. All machinery surfaces shall be suitably protected.
- 19.3 For uniform Material(s) when packed in several cases/crates, progressive serial numbers shall be indicated on each end. In case of bundles, the shipping marks shall be embossed on metal or tag and wired securely on each end.
- 19.4 A distinct colour splash in say red-black around each package/crate/bundle shall be given for identification.
- 19.5 All nozzle holes and openings as also all delicate surfaces shall be carefully protected against damage and bad weather. Flange faces of all nozzles shall be protected by blanks. All manufactured surfaces shall be painted with rust proof paint or as specified in the specification.
- 19.6 All threaded fittings shall be greased and provided with a plastic cap. All pipes and sheets shall be marked with strips bearing progressive numbers.
- 19.7 All small pieces shall be packed in cases. All fragile and exposed parts will be packed with care and packages will bear the words "HANDLE WITH CARE" in English and in the case of Indigenous Supply, in Hindi also.
- 19.8 The Vendor shall be held liable for all damages or breakages to the Material(s) due to defective or insufficient packing as well as for corrosion due to insufficient greasing/protection.
- 19.9 On three sides of the packages, the Vendor shall affix or cause to be affixed the following marks clearly visible in indelible paint

FROM: VENDOR

TO: INDIAN OIL CORPORATION LTD.
[Address]INDIA

PURCHASE ORDER NO.: [] Rev. No.: []
10 DIGIT ITEM CODE : []
EQUIPMENT NOMENCLATURE: []
NET WEIGHT: []kg/lb
GROSS WEIGHT: []kg/lb
CASE NO.: [] OF [] TOTAL CASES
DIMENSIONS: [] IMPORT LICENCE NO.[]

NOTE: Marking shall be bold with a minimum letter height of 5 cm.

19.10 a) For every shipment, packages must be marked with serial progressive numbering. The numbering will be progressively continued for each subsequent shipment covering the Contract.

- b. All packages will bear warning signs on the outside denoting the center of gravity and sling marks. Packages that require special handling and transport shall have their centers of gravity and points at which they may be gripped clearly indicated and marked "Attention Special Load - Handle With Care" in English Language. Any other direction for handling shall also be clearly indicated on the package.
- c. Top heavy containers will be marked either "TOP HEAVY" or "HEAVY ENDS".
- d. When packing is clean and light colored, a dark black stencil paint shall be acceptable. However, where packing is soiled or dark, a coat of flat Zinc white paint shall be applied and allowed to dry before applying the specific marking(s).
- e. Colour codification shall be used to identify different items e.g, IBR, NACE, Fire Safety Items etc.

19.11 In case of large equipments like vessels, heat exchangers etc., documents contained in a waterproof envelope shall be fastened inside a shell connection with an identifying arrow sign "DOCUMENTS" applied with indelible paint.

20.0 **DESPATCH INSTRUCTIONS**

For Indigenous Material(s)

20.1 Unless otherwise advised by IOCL or the Procurement Co-ordinator in writing, Material(s) shall not be despatched without prior inspection and/or testing and Release Order/Material(s) Acceptance Certificate issued by the Inspector(s).

20.2 The Vendor shall exercise due care to ensure that the consignment is booked under appropriate railway classification, failing which any additional freight

incurred by IOCL due to the Vendor booking the Material(s) under a wrong railway classification shall be borne by the Vendor.

20.3 The Material(s) shall be consigned in the name of the consignee viz.

Indian Oil Corporation Ltd.,
[Site address]

20.4 The Material(s) shall be transported only through bank approved transporters by the most economical and expeditious mode of transport to the destination as applicable for respective mode of despatches as follows :

- a. By Rail in wagon load consignment to : *[Name and address of Refinery / Project to be specified]*
- b. By road transport to : *[Name and address of Refinery / Project to be specified]*

IOCL and the Procurement Coordinator shall have the right to advise any change in despatch point or destination and/or mode of transport in respect of any Material(s). Any extra expenditure incurred by the Vendor on this account supported by satisfactory documentary evidence, will be reimbursed to the Vendor by IOCL.

21.0 SHIPMENT AND SHIPMENT NOTICES

21.1 Imported Material

The Vendor shall make shipment only after prior approval of the Inspector(s) unless otherwise specifically authorized in writing by IOCL or the Procurement Coordinator. As soon as any shipment is made, the Vendor shall send advance information by way of FAX message [Fax No 022-26400774] to the Dy. General Manager, Indian Oil Corporation Ltd.(Refinery Division), G-9, Ali Yavar Jung Marg, Bandra (East) Mumbai- 400 051 for Mumbai consignments and to the Dy. General Manager (Fax: 033-24145020) Indian Oil Corporation Ltd.(Refinery Division), Indian Oil Bhavan (Refineries Division) Central Wing, 6th Floor, 2, Gariahat Road (South), Kolkata-700068 for Kolkata consignments (or other specified authority in respect of Material(s) consigned to other Ports), giving particulars of the shipments, vessel's name, port of shipment, Bill of Lading number and date for ocean shipment and Airway Bill number & Date & Flight details for air consignment, total FOB and freight value with confirmation copy to IOCL, addressed to [designation and address]

21.2 Indigenous Material

Immediately after shipment, the Vendor shall inform despatch particulars to IOCL/ Procurement Coordinator hereunder :

1 copy to Dy. General Manager (Materials) , *[Address & Fax no]*

1 copy to IOCL (Stores) addressed to *[Designation, Address & Fax no.]*

In the case of project orders, in addition to the above, a copy to the Dy. General Manager (Project) addressed to: *[Address & Fax no.]*

(PMC as per Purchase Order) addressed to: *[Designation, Address & Fax no.]*

22.0 MARINE AND TRANSIT RISK INSURANCE

- 22.1 Marine/Air and Transit Risk Insurance shall be covered by IOCL against its Open General Policy.
- 22.2 The Vendor shall send IOCL information of the proposed shipment/consignment well in advance by telegram/fax/e-mail/courier to enable IOCL to take necessary action for the marine/air/transit insurance of the shipment/consignment.
- 22.3 The Vendor shall advise the despatch particulars of the shipment/consignment to the Insurance Company by fax / email under advice to the Procurement Coordinator promptly after shipment to ensure that the consignment is fully covered by insurance. Any failure by the Vendor to do so shall place the consignment at the Vendor's risk.

23.0 SHIPPING AND SHIPPING DOCUMENTS

23.1 For Imported Materials(s)

- a. The Vendor shall arrange with Vessel owner(s) or Forwarding Agent(s) specified in the Contract documents for proper storage of the Material(s) in a manner so as to facilitate the handling and off-loading at the port of destination and to avoid any over carriage or discharge.
- b. The Bill(s) of Lading/Airway Bill shall be made out in favor of "Indian Oil Corporation Ltd." [Refinery/Unit] or to the order of the L/C opening bank, and the notify column should indicate [Designation] Indian Oil Corporation Ltd. [Refinery Division], G-9, Ali Yavar Jung Marg, Bandra (East), Mumbai- 400061 for port of discharge Mumbai and to the Dy. General Manager, Indian Oil Corporation Ltd., Indian Oil Bhavan (Refineries Division) Central Wing, 6th Floor, 2, Gariahat Road (South), Kolkata-700 068 for port of discharge Kolkata or other specified authority in respect of Material(s) consigned to other ports.
- c. All columns in the body of the Bill of Lading/Airway Bill namely marks and Numbers, material description, weight particulars, etc. should be completed accurately and such statement should be uniform in all the shipping documents. The freight particulars should mention the basis of freight tonnage, heavy lift charges, if any, surcharge, discount, etc. clearly and separately and the net total freight payable, shown at the bottom.
- d. The Bill of Lading/Airway Bill shall be free of any liability of IOCL to the carrier for demurrage.

- e. The Bill of Lading/Airway Bill shall indicate the following:

Consignee : Indian Oil Corporation Limited
[Name of Refinery/Project]

- f. All documents viz. Bill of Lading/Airway Bill, invoices, packing list, freight memos, country of origin certificate, Third Party Inspection Release Certificate, inspector's certificate, Export certificate (wherever applicable), test certificates, drawings and catalogues should be in the English language.

- g. i. In addition to the Bill of Lading/Airway Bill, which should be obtained in 3 (three) stamped originals plus as many copies as required, invoices, packing lists, freight memos (if the freight particulars are not shown in the Bill of Lading), country of origin certificate(s), Third Party Inspection Release Certificate, inspector's certificate, Export certificate (wherever applicable) and test/composition certificate, shall be made out against each shipment in as many number of copies as are shown in Clause 23.3.
- ii. The Bill of Lading/Airway Bill, invoice and packing list must specifically show uniformly, the marks and numbers, material description, contents case-wise, country of origin, consignee's name, port of destination and all other indicated particulars. The invoice must show the unit rates and net total FOB price. The invoice must cover also items packed separately and the value shown accordingly.
- iii. The packing list must show, apart from other particulars, the actual contents in each case, net and gross weights and dimensions and the total number of packages.
- iv. (All documents must be duly signed by an authorized representative of the Vendor.

23.2 In case of FOB contracts:

- i) Shipping Arrangements shall be made through nominated freight forwarders (in the country of exit) as detailed in the Purchase Order and freight will be accordingly paid by IOCL in Indian Rupees.
- ii) The Vendor shall furnish to the respective nominated freight forwarder, the full details of consignment such as outside dimensions, weights (both gross and net), No. of packages, technical description and drawings, name of the supplier, ports of loading etc. two weeks prior to the proposed date of shipment to enable the concerned agency to arrange the shipping space.

23.3 The Vendor shall obtain the shipping documents in required number of sets including three original stamped copies of the Bill of Lading/Airway Bill immediately after the shipment is made and airmail the shipping documents in the manner stipulated hereunder to ensure that the documents so forwarded are received at least one week before the vessel's arrival. The Vendor shall be fully responsible for any delay and/or demurrage in clearance of the consignment at the port due to delay in forwarding the shipping documents. If in terms of the Letter of Credit, the complete original set of documents are required to be sent to IOCL through the bank, the distribution indicated below will be confined to obtaining copies of documents only.

Documents	IOCL (Office that issued the PO)	IOCL (Port Office)	IOCL (Project Site)
Bill of lading/Airway Bill	3 (including 1 original)	1	1
Invoice	2	2	1
Packing List	2	2	1
Certificate of Origin	2	2	1

Test/Composition Certificate	2	2	1
Third Party Inspection Release Certificate	1	1	1 (original)
Drawing/Catalogue	1	1	1
Invoice of Third Party/Lloyds for Inspection Charges, wherever applicable.	2	1	1
Export Certificate (where applicable)	1	1	1

24.0 **INVOICING & NEGOTIATION OF DOCUMENTS**

24.1 Indigenous Material(s)

- a. Unless otherwise directed by IOCL, Invoices and other documents shall be forwarded by the Vendor to IOCL as stipulated hereunder:
 - i. Original Invoice+1 copy of document as per Purchase Order to the Dy. General Manager (Finance), [Address, Fax No., e-mail id]
 - ii. 1 copy of Invoice with original documents as per Purchase Order to Dy. General Manager (Materials), [Address, Fax No., e-mail id] along with technical catalogues, Inspection certificate and Inspectors Release Note.
- b. Where payment is to be released to the Vendor against despatch documents through the bank, the Vendor shall forward two complete original sets of the documents specified in clause 5.2(c) to the specified banker of IOCL with a stipulation that the banker shall forward one set of the documents to IOCL with LSC intimation and acceptance before retirement of the documents from the Bank. One complete set of all of the abovementioned documents shall be sent to the Dy. General Manager (Materials) [Address, Fax No., e-mail id]. Documents will not be retired by the bank failing strict compliance by the Vendor of the above mentioned despatch requirements.
- c. Where payment is to be released to the Vendor directly by IOCL, two sets of all the documents mentioned in (b) above shall be submitted/forwarded directly to the Dy. General Manager (Materials) [Address, Fax No., e-mail id] and upon processing, the payment shall be released through the Finance Department, by cheque/RTGS/NEFT.

25.0 **TRANSFER OF TITLE AND RISK OF LOSS**

25.1 For Indigenous Material(s):

The transfer of property and risk in Indigenous Material(s) shall be deemed to take place as follows:

- a) For delivery F.O.R. or F.O.T. despatch point: On handing over the Material(s) to the carrier against receipt of clean Railway Receipt/Truck or Lorry Receipt and such receipt having been handed over to IOCL.

- b) For despatch F.O.R destination station : On removal of the Material(s) by IOCL from the railway authorities at the destination station.
- c) Equipment sent freight/carriage paid to the Project Site: On receipt of the Material(s) by IOCL at the Project Site.

25.2 For Imported Material(s):

The transfer of property and risks in Imported Material(s) shall be deemed to take place as follows:

- a) For FOB / FCA deliveries: On handing over the Material(s) to the carrier and issue of clean Bill of Lading/Airway Bill (except for freight to pay) and its transmission to IOCL.
- b) For CFR deliveries: Transfer of title and risk of loss passes to IOCL when delivered on board the ship by vendor who pays the transportation cost upto the destination port or to the designated destination airport (as per INCOTERMS).

26.0 TERMINATION

26.1 Without prejudice to IOCL's right to price adjustment by way of discount or any other right or remedy available to IOCL, IOCL may terminate the Contract or any part thereof by a written notice to the Vendor, if:

- i) The Vendor fails to comply with any material term of the Contract.
- ii) The Vendor informs IOCL of its inability to deliver the Material(s) or any part thereof within the stipulated Delivery Period or such inability otherwise becomes apparent.
- iii) The Vendor fails to deliver the Material(s) or any part thereof within the stipulated Delivery Period and/or to replace/rectify any rejected or defective Material(s) promptly.
- iv) The Vendor becomes bankrupt or goes into liquidation.
- v) The Vendor makes a general assignment for the benefit of creditors.
- vi) A receiver is appointed for any substantial property owned by the Vendor.
- vii) The Vendor has misrepresented to IOCL, acting on which misrepresentation IOCL has placed the Purchase Order on the Vendor.
- viii) Violation of Integrity Pact, if applicable.

26.2 Upon receipt of said termination notice, the Vendor shall discontinue the work on the Contract so far as terminated, and matters connected therewith.

26.3 On termination of the Contract, without prejudice to any other right or remedy available to IOCL under the contract, in the event of IOCL suffering any loss on

account of delayed delivery or non-delivery, IOCL reserves the right to claim and recover damages from the Vendor in respect thereof.

26.4 Notwithstanding anything to the contrary herein contained, IOCL will be at liberty to take independent administrative action to place the Vendor under 'holiday list' for delay or non-performance of its contractual obligations or any of them.

26.5 Action in case of submission of fraudulent documents :

If any information given by a bidder/ tenderer is found to be incorrect in any particular considered by IOCL to be relevant for the evaluation of the bid/ tender, or is found by IOCL to misrepresent or conceal facts, or if any of the documents submitted by the bidder in support of or relevant to the bid/ tender is found by IOCL to be forged, false or fabricated, IOCL may reject the bid, and without prejudice to any other right(s) of action or remedy available to IOCL, IOCL may forfeit the Earnest Money given by the bidder in order to compensate IOCL for the expenses incurred by it in considering the bid (and not by way of penalty) and take action for putting the bidder on holiday list for such period as IOCL in this behalf considers warranted and / or remove the bidder from any approved list of vendors / contractors. If prior to the discovery of the incorrect information, misrepresentation or forged, false or fabricated document (s), the bid has resulted in a contract, the Contract shall be liable to be terminated by IOCL with consequences of termination as provided in Cl 26 of the General Purchase Conditions.

27.0 **RECOVERY OF SUMS DUE**

Whenever there is any claim against the Vendor for payment of sums of money arising out of or under the execution of the Purchase Order, IOCL may, without prejudice to any other mode or source of recovery available, recover the same from any sum(s) then due or which at any time thereafter may become due to the Vendor under this or any other contract with IOCL and/or by recourse to any bank guarantee available to IOCL for this purpose, and should these sum(s) be not sufficient to cover the recoverable amount, the Vendor shall pay IOCL on demand, the balance.

28.0 **NON-WAIVER**

Failure of IOCL/IOCL's representative(s) to insist upon adherence to any of the terms or conditions incorporated in the Contract or failure or delay to exercise any rights or remedies herein or by law accruing, or failure to promptly notify the Vendor in the event of breach or the acceptance of or the payment for any Material(s) hereunder or approval of any design or Material(s) shall not release the Vendor and shall not be deemed a waiver of any right of IOCL to insist upon the strict performance thereof or of any of its rights or remedies as to any such Material(s) regardless of when the Material(s) are shipped, received or accepted nor shall any purported oral modifications or revisions of the Contract by IOCL or IOCL's representative(s) act as a waiver of the terms hereof.

29.0 **COMPLETE AGREEMENT**

The Contract Document(s) including, technical documents, drawings and specifications and other Annexures to the Contract documents constitute the entire agreement between the Vendor and IOCL in relation to the Contract arising out of the Purchase Order. Changes or amendments will be binding only if the

amendments/modification are agreed to in writing as an amendment/variation to the relative Contract Document and signed by an authorised representative of IOCL.

30.0 EXCLUSION OF THE GOVT. OF INDIA'S LIABILITY

- 30.1 It is expressly understood and agreed that IOCL has entered into the Contract solely on its own behalf and not on behalf of any other person or entity. In particular, it is expressly understood and agreed that the Government of India is not a party to the Contract and will have no liability, obligation or right whatsoever under the Contract. It is expressly understood and agreed that IOCL is an independent legal entity with power and authority to enter into the Contract solely on its own behalf under the applicable laws of India. The Vendor expressly agrees, acknowledges and undertakes and accepts that IOCL is not an agent, representative or delegate of the Government of India and that the Government of India is not and shall not be liable for any act, omission, commission, breach or other wrong or liability arising out of the Contract. The Vendor hereby expressly waives, releases and forgoes any and all actions or claims, including cross claims, impleader claims or counter claims, against the Government of India arising out of the Contract and covenants not to sue the Government of India for any manner of claim, cause of action or thing whatsoever arising out of or under the Contract.

31.0 TECHNICAL INFORMATION/CONFIDENTIALITY

- 31.1 Drawings, specifications and details shall at all times be the property of IOCL and shall be returned by the Vendor to IOCL on demand. The Vendor shall not make use of any document, drawing, specification, data or any other information connected with the Contract, for any purpose at any time, save and except in the implementation of the Contract.
- 31.2 The Vendor shall not disclose the technical information furnished or gained by the Vendor under or by virtue of or as a result of the implementation of the Contract and shall make all efforts to ensure that the technical information is kept confidential.
- 31.3 Notwithstanding anything contained in this contract to the contrary, nothing contained herein shall be construed as transferring between the parties any patent, trademark, copyright or other intellectual property rights relating to the supply of equipment and / or materials, or provisions of services covered by this contract, and all such rights are hereby expressly reserved to the true and lawful owners thereof.

32.0 MODE OF COMMUNICATION

- 32.1 It is understood that IOCL is a multifaceted and multi-locational organization and that for any communication to receive attention it is a prerequisite that the communication is properly addressed and that the subject of the communication is properly identified. To this end, except where otherwise provided, all communications, drawings, invoices, shipping notes, packages, packing lists and other document connected with reference to the Contract shall in the heading boldly set out the Purchase Order Number and date, and shall be addressed to the following:

Dy. General Manager (Materials)
[Office issuing the Purchase
Order]

Phone

Fax

Dy. General Manager (Projects)
[Site address]

Phone

Fax

Dy. General Manager
IOCL [concerned Port office]

Phone

Fax
[Concerned Office Address]

(For imports)

With copies to the following in case a Procurement Co-ordinator or Project Management Consultant is involved:

(i) Resident Construction Manager Phone
[Site address]

Fax

(ii) Dy. General Manager (Inspection) of the Procurement Co-ordinator/Project Management Consultant.

33.0 **PART ORDER/REPEAT ORDER**

The Vendor hereby agrees to accept part order at unit prices without limitation and also agrees in case of bulk consumables to accept repeat order(s) during a period of 6 (six) months from the date of original Purchase Order at the same unit price(s) and on the same terms and conditions.

34.0 **ARBITRATION AND GOVERNING LAW**

34.1 Arbitration: All disputes or differences which may arise out of or in connection with the Contract including any dispute or difference regarding the interpretation of the terms and conditions of any clause thereof which cannot be amicably resolved between the parties may be referred to Arbitration.

The Vendor may select one person out of a panel of three persons nominated by IOCL who shall act as the sole arbitrator.

The Arbitration proceedings shall be governed by and conducted in accordance with the Arbitration and Conciliation Act, 1996 as amended from time to time. The seat of the arbitration shall be New Delhi, India. However, with the consent of IOCL and the Vendor, the arbitrator may agree upon any venue at London or Singapore.

Laws of India only would be applicable.

34.2 Arbitration in case of order on Indian CPSE shall be governed by the prevailing guidelines of Department of Public Enterprises (DPE).

34.3 **CONCILIATION**

At any time prior to or during arbitration of any arbitrable dispute(s) pursuant to IOCL's Arbitration Clause, if eligible, the Vendor may seek resort to the Conciliation under the Indian Oil Conciliation Rules, 2014 as amended and / or re-enacted from time to time. The proposal for conciliation shall be made in accordance with said Conciliation Rules. The said Rules are available on the IOCL's website.

- 34.4 **Governing Law:** The Contract(s) shall be construed in accordance with and governed by the laws of India. IOCL shall warrant that the terms and conditions of the Purchase Order shall be valid under existing Indian laws.

35.0 **JURISDICTION**

- 35.1 Notwithstanding any other Court or Courts having jurisdiction to decide the disputed issue, and without prejudice to the provisions or generality of the Arbitration clause, jurisdiction to decide the question(s) arising out of or relative to the Contract in all matters touching or affecting any arbitration, or arising out of or in relation to or under or in accordance with the Arbitration and Conciliation Act, 1996 or otherwise under or with reference to the Contract shall vest exclusively in the court(s) of competent civil jurisdiction at ____ [where the contract(s)/Purchase Order shall be signed on behalf of IOCL] or at New Delhi and only the said Court(s) shall have the jurisdiction to entertain and try any such actions and/or proceedings to the exclusion of all other Courts, provided that nothing herein stated shall be deemed to anyway authorize any party to seek resolution of any dispute(s) otherwise than the recourse to arbitration in accordance with the provisions of the Arbitration clause herein.

Provided always that an award rendered in any arbitration proceedings arising out of or in relation to the Contract may be enforced or executed in any other country or jurisdiction including without limitation a country in which any party against whom the award is to be enforced or executed is located and a country in which the assets of any such party are located.

36.0 **Limitation of Liability**

The maximum liability shall be limited to 100% of total contract value except in case of fraud, deliberate default, negligence or misconduct by the vendor. The vendor shall not be liable for consequential losses on account of production, revenue or profit.

37.0 **Use of white/ erasing fluid**

In case the bidder has been asked to submit price bid/ price implication in physical form, the use of white/ erasing fluid for correcting the rates is banned. Wherever the rates are corrected with white/ erasing fluid, the bids will be summarily rejected.

* * * *

FORM OF BANK GUARANTEE IN LIEU OF EARNEST MONEY DEPOSIT

(On non-judicial stamp paper of appropriate value)

BG NO: _____
 DATED: _____
 VALID UPTO: _____

To,
 Indian Oil Corporation Limited
 (Refineries Division)

[Address]

Dear Sirs,

In consideration of the Indian Oil Corporation Ltd. [Address]....., (hereinafter called the "Corporation", which expression shall include its successors and assigns) having agreed inter alia to consider the tender of _____ (Name) _____, (Constitution) _____ (Address) _____ (hereinafter referred to as the "Tenderer" which expression shall wherever the subject or context so permits include its successors and assigns) for supply of materials to be awarded under Tender No. _____ upon the Tenderer furnishing an undertaking from the Bank as hereinafter appearing in lieu of a Demand Draft or Bankers Pay Order for the Earnest Money.

We _____ (Name of Bank), a Bank constituted/Registered under the _____ Act, having our Head Office/Registered Office at _____ [Address] _____ (hereinafter called the "Bank" which expression shall include its successors and assigns), at the request of the Tenderer and with the intent to bind the Bank and its successors and assigns do hereby unconditionally and irrevocably undertake to pay the Corporation at New Delhi forthwith on first demand without protest or demur or proof or satisfaction or condition and without reference to the Tenderer, all sums payable by the Tenderer as and by way of Earnest Money to the Corporation, for an amount of Rs. _____ (Rupees _____) only or US Dollar _____ (United States Dollars _____)

AND THE BANK DOTH HEREBY FURTHER AGREE AS FOLLOWS:

1. The amount stated by the Corporation in any demand, claim or notice made or given with reference to this Guarantee/Undertaking shall as between the Bank and the Corporation for the purpose of this Guarantee/Undertaking be conclusive of the amount payable by the Bank to the Corporation hereunder.
2. This Guarantee/Undertaking shall not be determined or affected by the liquidation or winding up or dissolution or change of constitution or insolvency of the Tenderer or by any change in the legal constitution of the Bank or the Corporation.
3. Without prejudice to any other mode of service, a demand or claim or any other communication may be made, given and/or transmitted by the Corporation to the Bank either by post or by fax. If transmitted by fax, the transmission shall be

complete and shall be deemed to have been acknowledged as soon as the "OK" facsimile transmission report for the fax message has been received.

4. Notwithstanding anything contained herein:

- i. The Bank's liability under this Guarantee/Undertaking shall not exceed Rs./ US\$ _____ (Rupees / United States Dollars _____ only).
- ii. This Guarantee/Undertaking shall remain in force upto (fill in date) and any extension(s) thereof; and
- iii. The Bank shall be released and discharged from all liability under this Guarantee/Undertaking unless a written claim or demand is issued to the Bank on or before the midnight of _____ and if extended, the date of expiry of the last extension of this Guarantee/Undertaking.

The Bank doth hereby declare that Shri [designation] is authorised to sign this Guarantee/Undertaking on behalf of the Bank and to bind the Bank thereby.

This _____ day of _____ 20

Yours faithfully,

Signature: _____

Name & Designation: _____

Name of the Branch: _____

.....

NOTES:

1. The Bank Guarantee in lieu of Earnest Money Deposit shall be strictly as per above proforma and shall be through a Scheduled Bank operating in India, including the Indian Branch of a foreign bank recognized as a Scheduled bank in India.
2. The Bank Guarantee shall be typed on stamp paper applicable to an agreement in the State in which the Bank Guarantee is issued.
3. This Bank Guarantee shall be sent by the Bank directly to:- Dy. General Manager (Materials), IOCL (Refineries Division)].

[IRREVOCABLE LETTER OF CREDIT- FORMAT]

To:

This communication is to be considered as our credit instrument and is subject to the Uniform Customs and Practice for Documentary Credit 1993 revision, I.C.C. publication No. 500.

At the request of Indian Oil Corporation Ltd. (hereinafter called "the Corporation" which expression shall include its successors and assignees) we hereby establish our irrevocable Letter of Credit No. _____ dated _____ in favour of :

(Beneficiary)

for a sum not exceeding (Currency in figures and words) which is payable at sight at the counter of [Beneficiary's Bank] in [Address], covering the FOB/CIF/C&F port supply of Material(s) and equipment under Purchase Order No.[] for the Unit/Refinery of Indian Oil Corporation Ltd.. (IOCL).

This Letter of Credit shall be valid up till [Date]

TERMS OF PAYMENT

Payments under this Letter of Credit shall be made of _____ % of the value of the Invoice(s) drawn by the Beneficiary on IOCL under the said Purchase Order against presentation of the following documents:

Imported Materials:

- i. Invoice;
- ii. Clear Bill of Lading/Airway Bill covering the Materials(s) invoiced;
- iii. Packing list for the consignment;
- iv. Inspector's Certificate covering the invoiced Material(s);
- v. Test/Composition Certificate;
- vi. Certificate of origin;
- vii. Drawing(s)/Catalogue(s) covering the Material(s);
- viii. Export Certificate, wherever applicable;
- ix. Invoice of Inspector's charges, wherever applicable;
- x. Freight Memo(s) if the freight particulars are not shown in the Bill of Lading/Airway Bill.
- xi. Copy of faxed/e-mail intimation of the shipment to IOCL certified by the Beneficiary to be a true copy of the faxed intimation of shipment to IOCL

Indigenous Supply:

- i. Invoice
- ii. Clear Railway Receipt/Truck Receipt/Goods Receipt covering the Material(s) invoiced;
- iii. Packing list for the consignment;
- iv. Third Party Inspector's Certificate covering the invoiced Material/Release Note;
- v. Test/Composition Certificate; _
- vi. IBR Certificate/CMRS Certificate;
- vii. Drawing(s)/Catalogue(s) covering the Material(s);

- viii. Guarantee/Warranty Certificate(s), wherever applicable;
- ix. Invoice of Inspector's charges, wherever applicable;
- x. Freight Memo(s) if inland freight is not included in the Price and the RR/TR/GR does not give the freight particulars.
- xi. Copy of faxed/e-mail intimation of the shipment to IOCL certified by the Beneficiary to be a true copy of the faxed intimation of shipment to IOCL.

SPECIAL INSTRUCTIONS

- * All Bank charges and commissions outside India shall be borne by the Beneficiary
- * Drawing permitted in not more than 3 (three) tranches.
- * Partial shipment is not permitted.
- * Trans-shipment not permitted.
- * Negotiating Bank to reimburse itself after giving 7 (seven) banking days notice to the Issuing Bank from Issuing Bank's account with _____ (Name of the Issuing Bank's correspondent in _____) at maturity under telex/cable advice to the Issuing Bank indicating the amount claimed.
- * IOCL to be intimated the shipping details by fax immediately on shipment.
- * Documents to be dispatched to Issuing Bank by courier within 7 banking days of receipt by Negotiating Bank.
- * Documents must be presented within _____ days after the date of shipment/dispatch to ensure receipt thereof 7 days prior to the arrival of the vessel.

* * * *

[PROFORMA OF BANK GUARANTEE (PERFORMANCE)]

(On non-judicial stamp paper of appropriate value)

To
Indian Oil Corporation Ltd.
[Address]

Dear Sirs,

In consideration of the Indian Oil Corporation Ltd. (hereinafter called the "Corporation" which expression shall include its successors and assigns) having awarded to [Name], [Constitution] _____ [Address] _____ (hereinafter referred to as the "Supplier" which expression shall wherever the subject or context so permits include its successors and assigns) a Supply Contract in terms inter alia, of the Corporation(s) Purchase Order No. [] dated (hereinafter referred to as the "Contract") upon the condition of the Supplier's furnishing security in lieu of cash deposit for the Performance of the Supplier's obligations and/or discharge of the Supplier's liabilities under and/or in connection with the said Supply Contract upto a sum of Rs./US\$ [] [Rupees/United States Dollars _____] only amounting to 10% (ten percent) of the total contract value.

We _____ (name) a body corporate registered/constituted under the laws of _____ and having a branch at [Indian branch address] (hereinafter called "the Bank" which expression shall include its successors and assigns) with the intent to bind the Bank and its successors and assigns, hereby undertake to pay the Corporation at [place] on first demand in writing without protest or demur or proof or satisfaction or condition and without reference to the Supplier, any and all amounts from time to time demanded by the Corporation from the Bank with reference to this Guarantee/Undertaking upto an aggregate limit of Rs./US\$ [] only or [Rupees / United States Dollars _____].

AND THE BANK DOTH HEREBY FURTHER AGREE AS FOLLOWS:

1. This Guarantee/Undertaking shall be in addition to any other guarantee or any other security whatsoever that the Corporation may now or at any time anyway have in relation to the Supplier's obligations and/or liabilities under and/or in connection with the Contract and the Corporation shall have full authority to take recourse to or reinforce this Guarantee/Undertaking in preference to the other guarantee(s) or security(ies) at its discretion, and no failure on the part of the Corporation in enforcing or requiring enforcement of any other guarantee or security shall have the effect of releasing the Bank from its full liability hereunder.
2. The Corporation shall be at liberty without reference to the Bank and without affecting the full liability of the Bank hereunder to take any other security in respect of the Supplier's obligation(s) and/or liability(ies) under/or in connection with the Contract and/or to vary the terms vis-a-vis the Supplier of the Contract and/or to grant time and/or indulgence to the Supplier or to reduce or to increase or otherwise vary the prices or the total contract value or to release or to forebear from enforcement of all or any of the obligations of the Supplier under the Contract and/or the remedies of the Corporation under any

other guarantee(s) or security(ies) now or hereafter held by the Corporation and no such dealing(s), variation(s), reduction(s) or other indulgence(s) or arrangement(s) with the Supplier or release or forbearance whatsoever shall have the effect of releasing the Bank from its full liability to the Corporation hereunder or of prejudicing the rights of the Corporation against the Bank.

3. This Guarantee/Undertaking shall not be determined or affected by the liquidation or winding up or dissolution or change of constitution or insolvency of the Supplier or any change in the legal constitution of the Bank or of the Corporation.
4. The Bank hereby waives all rights at any time inconsistent with the terms of this Guarantee/Undertaking and the obligations of the Bank in terms hereof shall not be anyway affected or suspended by reasons of any dispute or disputes having been raised by the Supplier (whether or not pending before any Arbitrator, Officer, Tribunal or Court) or any denial of liability by the Supplier or any other order or communication whatsoever by the Supplier stopping or preventing or purporting to stop or prevent any payment by the Bank to the Corporation in terms hereof.
5. Notwithstanding anything contained herein:
 - a. The Bank's liability under this Guarantee/Undertaking shall not exceed (currency in figures) (currency in words only) ;
 - b. This Guarantee/Undertaking shall remain in force upto _____ (here put the entire period required for the performance of the Contract and the defect liability period plus 3 (three) months) and any extension(s) thereof; and
 - c. The Bank shall be released and discharged from all liability under this Guarantee/Undertaking unless a written claim or demand is issued to the Bank on or before the midnight of _____ and if extended, the date of expiry of the last extension of this Guarantee/Undertaking.
6. The Bank doth hereby declare that Mr. _____ [name & designation of the person authorised to sign on behalf of the Bank] is authorised to sign this Guarantee/Undertaking on behalf of the Bank and to bind the Bank thereby

Yours faithfully,

Signature)

NAME & DESIGNATION

NAME OF THE BANK

NOTES :

1. The Performance Bank Guarantee shall be strictly as per above proforma and shall be through a Scheduled Bank operating in India, including the Indian Branch of a foreign bank recognized as a Scheduled Bank in India.
2. The Bank Guarantee shall be typed on stamp paper applicable to an agreement in the State in which the Bank Guarantee is issued.
3. This bank guarantee shall be sent by the bank directly to:- Dy. General Manager (Materials), IOCL (Address)

**PROFORMA OF BANK GUARANTEE
(FULL VALUE OF FREE ISSUE MATERIALS)**

(On non-judicial stamp paper
Of appropriate value)

To

Indian Oil Corporation Ltd.
[Address]

Dear Sirs,

In consideration of the Indian Oil Corporation Ltd. [address] (hereinafter called the "Corporation" which expression shall include its successors and assigns) having awarded to _____ [Name], _____ (Constitution) _____ (Address) (hereinafter referred to as the "Supplier" which expression shall wherever the subject or context so permits include its successors and assigns) a Supply Contract in terms, interalia, of the Corporation(s) Purchase Order No. [] dated [] (hereinafter referred to as the "Contract") and having agreed to provide certain free issue material(s) hereinafter referred to as "Free Issue Material" to the Supplier for incorporation in the materials(s) to be supplied under the Contract) upon the condition of the Supplier's furnishing security in lieu of cash for the said Free Issue Material(s) upto a sum of Rs./US\$ (Rupees/ United States Dollars _____ only] being the value of the Free Issue Material(s):

We _____ [name] a body corporate registered/constituted under the laws of [Country] and having a branch at [Indian branch address] (hereinafter called "the Bank" which expression shall include its successors and assigns) with the intent to bind the Bank and its successors and assigns, hereby undertake to pay the Corporation at [place] on first demand in writing without protest or demur or proof or satisfaction or condition, and without reference to the Supplier, any and all amounts from time to time demanded by the Corporation from the Bank with reference to this Guarantee/Undertaking upto an aggregate limit of Rs./US\$ _____ (Rupees/ United States Dollars _____ only]

AND THE BANK DOTH HEREBY FURTHER AGREE AS FOLLOWS:

1. This Guarantee/Undertaking shall be in addition to any other guarantee or any other security whatsoever that the Corporation may now or at any time anyway have in relation to the Supplier's obligations and/or liabilities under and/or in connection with the Contract and/or the Free Issue Material and the Corporation shall have full authority to take recourse to or enforce this Guarantee/Undertaking in preference to the other guarantee(s) or security(ies) at its discretion, and no failure on the part of the Corporation in enforcing or requiring enforcement of any other guarantee or security shall have the effect of releasing the Bank from its full liability hereunder.
2. The Corporation shall be at liberty without reference to the Bank and without affecting the full liability of the Bank hereunder, to take any other security in respect of the Supplier's obligation(s) and/or liability(ies) under or in connection with the Contract and/or the Free Issue Material and to vary

the terms vis-a-vis the Supplier of the Contract or the Free Issue Material and/or to grant time and/or indulgence to the Supplier and/or to reduce or to increase or otherwise vary the prices or the total contract value or the value of the Free Issue Material or to release or to forebear from enforcement of all or any of the obligations of the Supplier under the Contract and/or the remedies of the Corporation under any other guarantee(s) or security(ies) now or hereafter held by the Corporation and no such dealing(s), variation(s), reduction(s) or other indulgence(s) or arrangement(s) with the Supplier or release or forbearance whatsoever shall have the effect of releasing the Bank from its full liability to the Corporation hereunder or of prejudicing the rights of the Corporation against the Bank.

3. This Guarantee/Undertaking shall not be determined or affected by the liquidation or winding up or dissolution or change of constitution or insolvency of the Supplier or any change in the legal constitution of the Bank or of the Corporation.
4. The Bank hereby waives all rights at any time inconsistent with the terms of this Guarantee/Undertaking and the obligations of the Bank in terms hereof shall not be anyway affected or suspended by reasons of any dispute or disputes having been raised by the Supplier (whether or not pending before any Arbitrator, Officer, Tribunal or Court) or any denial of liability by the Supplier or any other order or communication whatsoever by the Supplier stopping or preventing or purporting to stop or prevent any payment by the Bank to the Corporation in terms hereof.
5. Notwithstanding anything contained herein:
 - a. The Bank's liability under this Guarantee/Undertaking shall not exceed [currency in figures]. [currency in words] only.
 - b. This Guarantee/Undertaking shall remain in force upto the midnight of (here put the scheduled date of delivery of the Free Issue Material + 3 months) and any extension thereof.
 - c. The Bank shall be released and discharged from all liability under this Guarantee/Undertaking unless a written claim or demand is issued to the Bank on or before [] and if extended, the date of expiry of the last extension of this Guarantee/Undertaking.
6. The Bank doth hereby declare that Mr. _____ (name & designation of the person authorised to sign on behalf of the Bank) is authorised to sign this Guarantee/Undertaking on behalf of the Bank and to bind the Bank thereby.

Yours faithfully,
(Signature)
NAME & DESIGNATION
NAME OF THE BANK

NOTES:

1. The Bank Guarantee shall be for the full value of the Free Issue Material(s) as specified by IOCL and shall be strictly as per above proforma and shall be through a Scheduled Bank operating in India, including the Indian Branch of a foreign bank recognized as a Scheduled Bank in India.
2. The Bank Guarantee shall be typed on stamp paper applicable to an agreement in the State in which the Bank Guarantee is issued.
3. This bank guarantee shall be sent by the Bank directly to:- Dy. General Manager (Materials), IOCL [Address].

**PROFORMA OF BANK GUARANTEE
(FOR THE FULL VALUE OF REJECTED MATERIALS)**

(On non-judicial stamp paper
Of appropriate value)

To

Indian Oil Corporation Ltd.
[Address]

Dear Sirs,

In consideration of the Indian Oil Corporation Ltd. (hereinafter called the "Corporation" which expression shall include its successors and assigns) having awarded to [Name], (Constitution) (Address) (hereinafter referred to as the "Supplier" which expression shall wherever the subject or context so permits include its successors and assigns) a Supply Contract in terms inter alia, of the Corporation(s) Purchase Order No. [] dated [] (hereinafter referred to as the "Contract") and having agreed to permit the Supplier to remove certain rejected material(s) for which the Corporation has paid the Supplier (hereinafter referred to as the "Rejected Material(s)") upon the condition of the Supplier furnishing security for the satisfactory replacement of the Rejected Material(s) upto a sum of Rs./US\$ [] (Rupees/ United State Dollars _____ only) amounting to the full value of the Rejected Material(s).

We _____ [name] a body corporate registered/constituted under the laws of [Country] and having a branch at [Indian branch address] (hereinafter called "the Bank" which expression shall include its successors and assigns) with the intent to bind the Bank and its successors and assigns, hereby undertake to pay the Corporation at [place] on first demand in writing without protest or demur or proof or satisfaction or condition, and without reference to the Supplier, any and all amounts from time to time demanded by the Corporation from the Bank with reference to this Guarantee/Undertaking upto an aggregate limit of Rs./US\$ [] [Rupees/United States Dollars].

AND THE BANK DOTH HEREBY FURTHER AGREE AS FOLLOWS:

1. This Guarantee/Undertaking shall be in addition to any other guarantee or any other security whatsoever that the Corporation may now or at any time anywise have in relation to the Supplier's obligations and/or liabilities under and/or in connection with the Contract or the Rejected Material(s) and the Corporation shall have full authority to take recourse to or reinforce this Guarantee/Undertaking in preference to the other guarantee(s) or security(ies) at its discretion, and no failure on the part of the Corporation in enforcing or requiring enforcement of any other guarantee or security shall have the effect of releasing the Bank from its full liability hereunder.
2. The Corporation shall be at liberty without reference to the Bank and without affecting the full liability of the Bank hereunder, to take any other security in respect of the Supplier's obligation(s) and/or liability(ies) under or in connection with the Contract and/or the Rejected Material(s) and to vary the terms vis-a-vis the Supplier of the Contract or Rejected Material(s) and/or to grant time and/or

indulgence to the Supplier and/or to reduce or to increase or otherwise vary the prices of the total contract value or the value of the Rejected Material or to release or to forebear from enforcement of all or any of the obligations of the Supplier under the Contract or otherwise in respect of the Rejected Material and/or the remedies of the Corporation under any other guarantee(s) or security(ies) now or hereafter held by the Corporation and no such dealing(s), variation(s), reduction(s) or other indulgence(s) or arrangement(s) with the Supplier or release or forbearance whatsoever shall have the effect of releasing the Bank from its full liability to the Corporation hereunder or of prejudicing rights of the Corporation against the Bank.

3. This Guarantee/Undertaking shall not be determined or affected by the liquidation or winding up or dissolution or change of constitution or insolvency of the Supplier or any change in the legal constitution of the Bank or of the Corporation.
4. The Bank hereby waives all rights at any time inconsistent with the terms of this Guarantee/Undertaking and the obligations of the Bank in terms hereof shall not be anyway affected or suspended by reasons of any dispute or disputes having been raised by the Supplier (whether or not pending before any Arbitrator, Officer, Tribunal or Court) or any denial of liability by the Supplier or any other order or communication whatsoever by the Supplier stopping or preventing or purporting to stop or prevent any payment by the Bank to the Corporation in terms hereof.
5. Notwithstanding anything contained herein:
 - a. The Bank's liability under this Guarantee/Undertaking shall not exceed [currency in figures]. [currency in words only]
 - b. This Guarantee/Undertaking shall remain in force upto (put date fixed for replacement of the Rejected Material + 3 months) and any extension(s) thereof;) and
 - c. The Bank shall be released and discharged from all liability under this Guarantee/Undertaking unless a written claim or demand is issued to the Bank on or before [] and if extended, the date of expiry of the last extension of this Guarantee/Undertaking.
6. The Bank doth hereby declare that Mr. _____ (name & designation of the person authorised to sign on behalf of the Bank) is authorised to sign this Guarantee/Undertaking on behalf of the Bank and to bind the Bank thereby.

Yours faithfully,
(Signature)
NAME & DESIGNATION
NAME OF THE BANK

NOTES:

1. The Bank Guarantee for full value of Rejected Material(s) shall be strictly as per above proforma and shall be through a Scheduled Bank operating in India, including the Indian Branch of a foreign bank recognized as a Scheduled Bank in India.

2. The Bank Guarantee shall be typed on stamp paper applicable to an agreement in the State in which the Bank Guarantee is issued.
3. This bank guarantee shall be sent by the Bank directly to:- Dy. General Manager (Materials), IOCL [Address].

.....

PROFORMA OF BANK GUARANTEE
(ADVANCE)
(On non-judicial paper of appropriate value)

To
Indian Oil Corporation Ltd.
(Refineries Division)

.....
.....
.....

Dear Sirs,

WHEREAS INDIAN OIL CORPORATION LIMITED (REFINERIES DIVISION) (hereinafter called "The IOCL" which expression shall include its successors and assigns) has awarded M/s _____ (hereinafter called "The Supplier" which expression shall include its successors and assigns) the work of designing, manufacturing, fabricating and supply of _____ in terms of a contract as constituted by Purchase Order No. _____ dated _____ issued by the IOCL to the Supplier (hereinafter called "The Contract" which expression include all the amendments and/or modifications of the Purchase Order).

AND WHEREAS the IOCL has agreed to advance the Supplier a sum of Currency _____ (Currency _____) hereinafter called "The Advance" as financial assistance to the Supplier under the Contract on the condition, inter alia, that the advance shall be secured by a Bank Guarantee as hereinafter appearing.

We _____ Bank _____ a Bank incorporated/constituted under the laws of _____ and having _____ its _____ registered/principal _____ office _____ at _____ (hereinafter called "The Bank" which expression shall include our successors and assigns) in consideration of the aforesaid promises and at the request of the Supplier DO HEREBY bind ourselves and our successors and assigns, and irrevocably undertake to pay the IOCL on first demand in writing without protest or demur or proof or condition and without reference to the Supplier any and all amounts at any time and from time to time claimed by you, as due to you under or in respect of the said advance, and demanded by you from us, with reference to this undertaking upto an aggregate limit of Currency _____ (Currency _____).

AND, we, the Bank DO HEREBY further agree as follows:

- i. The IOCL shall have the fullest liberty without reference to the Bank and without affecting in any way the liability of the Bank under this Guarantee/Undertaking, at any time and/or from time to time to anywise vary the Contract and/or any of terms and conditions thereof or of or relative to the advance and to extend time for the performance of the Contract and/or repayment of the advance or to postpone for any time or from time to time the obligations of the Supplier and to waive or postpone exercise of any of the rights available to the IOCL against the Supplier or to forebear from enforcing any of the terms or conditions of the Contract and/or the advance or any security(ies) available to the IOCL, AND the liability of the Bank shall remain in full force and effect notwithstanding any exercise by the IOCL of the liberty with reference to any or all the matters

aforesaid or by reason of time being given to the Supplier or any forbearance, waiver, act or omission on the part of the IOCL or any indulgence by the IOCL to the Supplier or any other act, matter or thing whatsoever which under the law relating to sureties would have the effect of releasing the Bank from its liability hereunder or any part thereof, AND the BANK DOTH HEREBY waive all rights at any time inconsistent with the terms of this Guarantee/Undertaking.

- ii. It shall not be necessary for the IOCL to proceed against the Supplier before proceeding against the Bank and this guarantee/undertaking shall be enforceable against the Bank as principal debtor notwithstanding the existence of any other security for any indebtedness of the Supplier to the IOCL (including relative to the advance) and notwithstanding that any such security shall at the time when claim is made against the Bank or proceedings taken against the Bank be outstanding or unrealised.
- iii. As between the Bank and the IOCL for the purpose of this guarantee/undertaking the amount claimed by the IOCL from the Bank with reference to this guarantee/undertaking shall be final and binding upon the bank as to the amount payable by the Bank to the IOCL hereunder.
- iv. The liability of the Bank to the IOCL under this guarantee/undertaking shall remain in full force and effect notwithstanding the existence of any difference or dispute between the Supplier and the IOCL, the Supplier and the Bank and/or the Bank and the IOCL, or otherwise howsoever touching or affecting these presents or the liability of the Supplier to the IOCL, and notwithstanding the existence of any instructions or purported instructions of the Supplier or any other person(s) to the Bank not to pay or for any cause withhold or defer payment to the IOCL under these presents with the intent that notwithstanding the existence of such difference, dispute or instruction, the Bank shall be and remain liable to make payment to the IOCL.
- v. This guarantee/undertaking shall not be affected by any change in the constitution of the Bank or that of the Supplier or the IOCL, or any irregularity in the exercise of borrowing powers by or on behalf of the Supplier.
- vi. This guarantee/undertaking shall be valid for all claims/demands made by the IOCL to or upon us upto midnight of _____ provided always that if for any reason, the Supplier is unable to complete supplies under the Contract, the Bank shall at the request of the IOCL and without recourse to the Supplier extend the validity of this guarantee/undertaking for a further period of six months. For the purpose of this clause, the IOCL's statement that the Supplier is unable to complete supplies under the contract shall be conclusive and final binding on us.
- vii. Notwithstanding anything contained herein:
 - a. The Bank's liability under this Guarantee/Undertaking shall not exceed Currency..... (Currency..... only),
 - b. This Guarantee/Undertaking shall remain in force upto..... and any extension(s) thereof; and
 - c. The Bank shall be released and discharged from all liability under this Guarantee/Undertaking unless a written claim or demand is

issued to the Bank on or before..... or the date of expiry of any extension(s) thereof if this Guarantee/Undertaking has been extended.

- viii. The Bank DOTH HEREBY declare that Mr. _____ (name of the person signing on behalf of the Bank) who is _____ (his designation), is authorised to sign this guarantee/undertaking on behalf of the Bank and to bind the Bank thereby.

Dated this _____ day of _____

Yours faithfully

For _____

Signature _____

Name & Designation _____

Name of the Branch _____

NOTE

1. This Guarantee/Undertaking is not to be witnessed.
2. This Guarantee is required to be stamped as an agreement according to the stamp duty act.
3. This Guarantee is required to be sent by Vendor's Bankers directly to the IOCL.

Guidelines on Personal Protective Equipment (PPE)

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Guidelines on Personal Protective Equipment (PPE)

<u>INDEX</u>			
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Guidelines on Personal Protective Equipment (PPE)

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SN	DESCRIPTION	PPE TO BE USED	Page No
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14	DG Operation	• Helmet (B) • Safety shoe (B) • Ear muff • Electrical glove	50

1) **Additional PPE to be provided for various activities as per requirement of Job Safety Analysis (JSA), OISD and Statutory stipulations.**

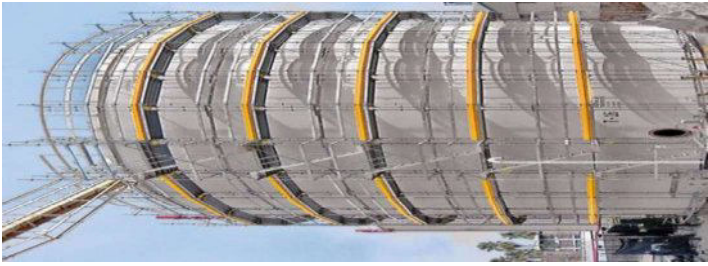
2) Training inputs as required to be given for proper usage, maintenance of PPE.

3) Various EN Standards / BIS codes mentioned are available on line on IOCL CO, HSE website.

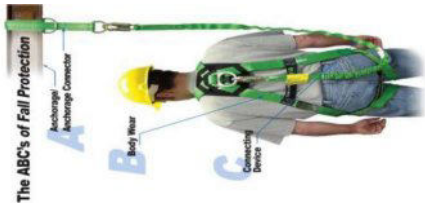
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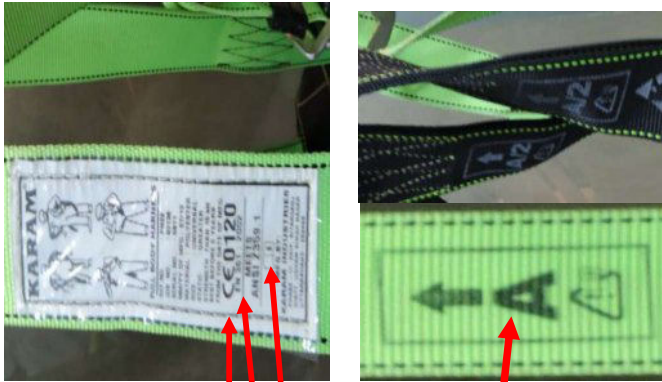
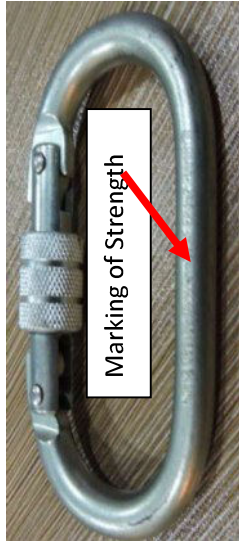
Guidelines on Personal Protective Equipment (PPE)

SN	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard
1	Work at Height (height > 2 M) Contd... 	I) Safety Shoe (A)  A Typical specimen of markings. 	The safety shoe shall have following marking as per IS 15298 (part -2) : a) size; b) manufacturer's identification mark; c) Year of manufacture and at least quarter; d) License No (CM/L) e) IS-Mark Category of Safety Shoe Category of Safety shoe (S1,S2,S3 etc) as required as per Table 16 of IS 15298 (part 2) : 2011 S1 : Closed seat region, Antistatic properties , Energy absorption of seat region S2 : S1 plus Water penetration and water absorption. S3 : S2 plus Penetration resistance (S3) Cleated outsole	- Striking against stationary object. - Striking by moving object - Stepping on hot object - Stepping on sharp object - Penetration (S3 category) - Water penetration and absorption. (S2 & S3 category)	- Not suitable for hazards like Chemical burns , electrical flash, welding spark and heat radiation - Not suitable if it is necessary to minimise electrostatic charges in the shortest possible time . - Not suitable for work in explosive work area.		- Exceeding one year from the date of first use of the shoe . - sign of crack / damage . - Excessive wear - As per Manufactures recommendations.

Guidelines on Personal Protective Equipment (PPE)

SN	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard
	Work at Height (height > 2 M) Contd... 	II) Full body Safety Harness with energy absorber : (Alternative -I) Lanyard along with 5 Point (1 Dorsal + 2 Textile loops+ 2 sternal D ring) harness to be used for rescue or tower climbing  The ABC's of Fall Protection	1. The full body harness shall conform to EN 361 Marking on the full body harness shall conform to 2.2 of EN 365:1992 and any text shall be in English. In addition to conforming to 2.2 of EN 365:1992 the marking shall include the following. - On the full body harness, a pictogram to indicate that users shall read the information supplied by the manufacturer.  - A capital letter "A" at each fall arrest attachment element; - The model/type identification mark of the full body harness; - The number of this European Standard, i.e. EN 361. 2. Connector shall conform to EN 362 and Marking on the connector shall conform to EN 365. The marking shall include: - The model/type identification mark of the connector. - EN number & the letter of the class e.g. EN 362:2004/A	Accidental fall - Direct the loads to legs. - Keeping body upright. - Prevent the neck damage - slightly opens the breathing way. - Prevents from colliding with the ground or structure in case of a fall. - Antistatic characteristics	- Shall be of no use if anchor point / life line / lanyard is not properly designed. - There should be proper arrangement for rescue - After accidental fall & before safety harness becoming effective, the person should not strike ground / object. (Prevent risk of bottoming out) SAFETY BELT NOT TO BE USED	 Always wear a full body harness with a short lanyard in boom type platforms	- Sign of crack / damage/ stitching giving way - Webbing and rope for cuts, tears, excessive wear and damages - If in doubt "Throw it Out" - As per Manufacturer's recommendations

Guidelines on Personal Protective Equipment (PPE)

SN	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard
	Work at Height (height > 2 M) Contd... CE marking EN Marking Pictogram Capital letter A marking at attachment Element	A Typical specimen of marking. 	• Marking of major axis strength with gate closed & locked.   Please see required PPE of "Energy absorbing lanyard " for attaching to safety Harness. Energy absorbing lanyard double 'Y' Type To be attached to full body harness at one end and life line at other end • Must if full body harness being used for protection against fall. • The total length of a lanyard connected to an energy absorber (including terminations and connectors) shall not exceed 2 m.				

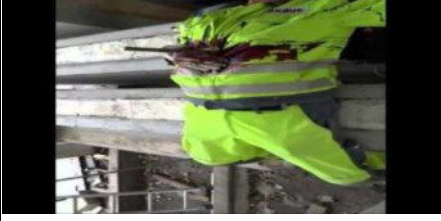
Guidelines on Personal Protective Equipment (PPE)

SN	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard
	Work at Height height > 2 m) Contd... 	III) Full body Safety Harness with energy absorber (Alternative -II) 	Full body harness conforming to IS 3521 may be allowed in "Green field project" where antistatic safety harness are not required. Following marking to be ensured in case of IS marked full body Harness. - The name, trade-mark or other means of identification of the manufacturer or the supplier who is responsible for acting on behalf of the manufacturer for claiming compliance with this standard; - Manufacturer's product identification information that shall include the manufacturer's batch or serial number that enables the origin of the item to be traced; - The year of manufacture; The identity of the fibre used as the material of construction; - Information that states by appropriate means the intended purpose of each attachment element and to identify specifically those attachment elements that are designed to be used as part of a complete fall arrest system; and - Warning for not to deviate from the manufacturer's instructions. A Typical specimen of marking 	Accidental fall - Direct the loads to legs. - Keeping body upright. - Prevent the neck damage slightly opens the breathing way. - Prevents from colliding with the ground or structure in case of a fall. Other details such year of manufactures , batch number etc Material used	- Shall of no use if anchor point / life line / lanyard is not properly designed. - There should be proper arrangement for rescue - After accidental fall & before safety harness becoming effective, the person should not strike / ground object. (Prevent risk of bottoming out) SAFETY BELT NOT TO BE USED ISI marked full body harness are not antistatic hence not recommended in running plants.		- Sign of crack / damage/ stitching giving way - Webbing and rope for cuts, tears, excessive wear and damages - If in doubt "Throw it Out" - As per Manufacturers recommendations

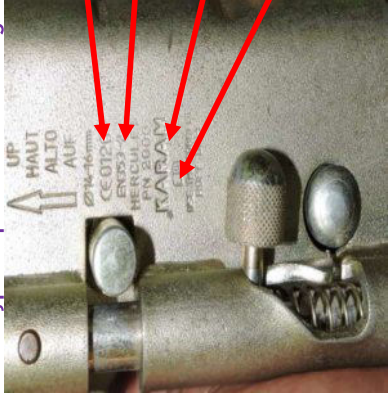
Guidelines on Personal Protective Equipment (PPE)

SN	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard
	Work at Height (height > 2 M) - Contd... 	Energy absorbing lanyard double 'Y' Type To be attached to full body harness at one end and life line at other end • Must if full body harness being used for protection against fall. • The total length of a lanyard connected to an energy absorber (including terminations and connectors) shall not exceed 2 m. A Typical specimen of marking 	Energy absorbing lanyard shall conform to EN 355 and shall have the following marking : a) On the energy absorber, a pictogram to indicate that users shall read the information supplied by the manufacturer (see figure);  b) the maximum length allowed of the energy absorber including lanyard; c) the model/type identification mark of the energy absorber; d) the number of this European Standard, i.e. EN 355. The marking shall conform to EN 365 and additionally shall include the following : - Means of identification, e.g. manufacturer's name, supplier's name, or trademark; - Manufacturer's production batch or serial number or other means of traceability; - Model and type/identification; - Number and year of the document to which the equipment conforms; - Pictogram or other method to indicate the necessity for users to read the instructions for use.	Accidental Fall	• Shall of no use if anchor point / life line is not properly designed. • There should be proper arrangement for rescue • After accidental fall & before safety harness becoming effective, the person should not strike / ground object. (Prevent risk of bottoming out)		• Sign of cut / damage • After every fall. • As per manufacturer's recommendation.

Guidelines on Personal Protective Equipment (PPE)

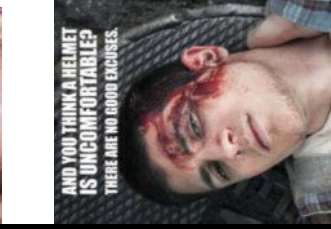
SN	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard
	Work at Height (height > 2 M) - Contd... 	IV) Restraint lanyard - To be secured to properly designed anchorage - The restraint lanyards need not have shock absorption element incorporated in them	Lanyard shall conform to EN 354 (latest edition). Connector incorporated in lanyard shall conform to EN 362. Marking on the lanyard shall conform to EN 365 and, in addition, shall include at least the following: - the maximum lanyard length, in accordance with 4.1.6; - the month and year of manufacture. As per EN 365 marking shall include : - Means of identification, e.g. manufacturer's name, supplier's name, or trademark; - Manufacturer's production batch or serial number or other means of traceability; - Model and type/identification; - Number and year of the document to which the equipment conforms; - Pictogram or other method to indicate the necessity for users to read the instructions for use. A Typical specimen of marking 	Accidental fall - Lets a worker travel just far enough to reach the edge but not far enough to fall over	- Shall be of no use if life line & anchor points are not properly designed. - To ensure that fall restraint lanyards are never used for the purpose of fall arrest		Check metal fittings for sharp edges, excessive wear, correct operation and distortion. - If in doubt "Throw it Out"  - As per Manufacturers recommendations

Guidelines on Personal Protective Equipment (PPE)

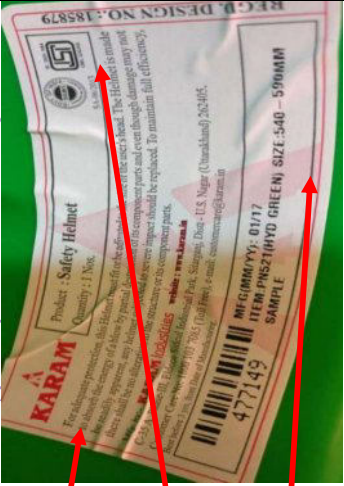
SN	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard
	Work at Height (height > 2 M) - Contd... 	V) Rope Grab (in case of vertical lifeline being used) The rope grab immediately grabs on the line in the event of a fall, thereby arresting the fall   Pictogram	Rope grab shall conform to EN 353-2 : 2002 & Marking on the guided type fall arrester and the flexible anchor line shall conform to EN 365 . In addition shall include the following: - Means of identification, e.g. manufacturer's name, supplier's name, or trademark; - Manufacturer's production batch or serial number or other means of traceability; - Model and type/identification; - Number and year of the document to which the equipment conforms; - Pictogram or other method to indicate the necessity for users to read the instructions for use. A Typical specimen of marking  CE Marking EN Number Name of Manufacture Pictogram	- Accidental fall - The anchorage line in connection with the given rope grab provides necessary shock absorption.	Shall be of no use if life line & anchor points are not properly designed.		- Check metal fittings for sharp edges, excessive wear, correct operation and distortion. - If in doubt "Throw it Out" - Coloured tracer strand which loses its colour in due course of time to show that the rope is now unfit for future use - As per Manufacturers recommendations

Note : PPE mentioned at III, IV & V above may not be required simultaneously while working at height. These use shall depend upon type of activity

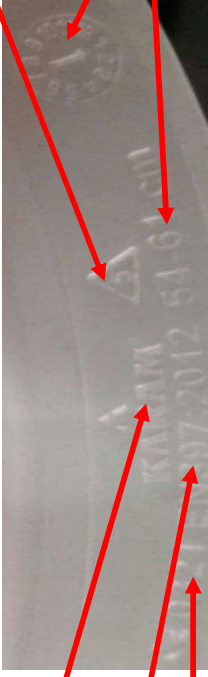
Guidelines on Personal Protective Equipment (PPE)

SN	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard
1	Work at Height (height > 2 M) 	VI) Helmet (A) 	The helmet shall conform to EN 12492 and shall have following markings : a) the number of this European Standard; b) the name or trademark of the manufacturer and/or his authorized representative; c) the designation of the model; d) the year and quarter of manufacture; e) the size or size range (in cm).	• Shock absorption • Penetration • Impact Within limits stipulated in EN 12492	• The protection given by a helmet depends on the circumstances of the accident and wearing a helmet cannot always prevent death or long term disability. • There may be a foreseeable risk that helmets could become trapped and thereby cause a risk of strangulation. • Cannot provide protection against hazard like splash of hot liquid, work in hot area, cryogenic or corrosive liquid , flying hot particles like chipping, welding, direct fire hazard, contact with bare live electrical conductor .	 	• Sign of crack / damage . • De-colouration • failing in lab test to be done every 1-2 years depending on condition • cradle to be changed after every one year • On sustaining a severe blow even if damage is not apparent • As per Manufactures recommendations. For cleaning, maintenance or disinfection, use only substances (No Solvent) that have no adverse effect on the helmet and are not known to be likely to have any adverse effect upon the wearer, when applied in accordance with the manufacturer's instructions and information).

Guidelines on Personal Protective Equipment (PPE)

SN	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard
2	a) Excavation. b) Fire pump Operation. c) Testing of Pressure Gauge	I) Helmet (B)  Name of manufacturers ISI Mark Size	The helmet shall conform to either IS 2925 or EN 397 a) The helmet conforming to IS 2925 shall have following marking - Manufacturer's name or trade-mark, - Size of helmet. - The helmets may also be marked with the ISI Certification Mark. A Typical specimen of marking 	- Shock Absorption Resistance - Penetration Resistance - Impact Protection as per EN 397 - Shock absorption - Penetration resistance - Impact The above protection shall be within the limitations of various test as stipulated in IS 2925 /EN-397. Marking for Optional test as per EN 397 as per clause no 7.2.2. Each helmet shall carry moulded or impressed marking or shall carry a durable self-adhesive label stating the optional requirements complied with, as follows: Optional requirement Marking/Label - Very low temperature - 20 °C or - 30 °C as appropriate - Very high temperature + 150 °C - Electrical insulation 440 V a.c. - Lateral deformation LD - Molten metal splash MM	Not suitable for hazards like splash of hot liquid, work in hot area, cryogenic or corrosive liquid, flying hot particles like chipping, welding, direct fire hazard, contact with bare live electrical conductor		- Sign of crack / damage . - De-colouration - cradle to be changed after every one year - On sustaining a severe blow even if damage is not apparent - As per Manufacturers recommendations <i>For cleaning, maintenance or disinfection, use only substances (No Solvent) that have no adverse effect on the helmet and are not known to be likely to have any adverse effect upon the wearer, when applied in accordance with the manufacturer's instructions and information).</i>

Guidelines on Personal Protective Equipment (PPE)

SN	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard
2	Contd a) Excavation. b) Fire pump Operation. c) Testing of Pressure Gauge	  A Typical specimen of marking II) Safety shoe-(A) 	b) In case helmet conforming to EN 397 to be used to facilitate various attachment for providing protection against hazards like splash of hot liquid, flying hot particles like chipping, welding, direct fire hazard the following moulded or impressed marking to be ensured. a) number of this European Standard ie 397 b) name or identification mark of the manufacturer; c) year and quarter of manufacture; d) type of helmet (manufacturer's designation). This shall be marked on both the shell and the harness; e) size or size range (in centimetres). This shall be marked on both the shell and the harness. f) abbreviation for the material of the shell shall be in accordance with EN ISO 472. (For example, ABS, PC, HDPE, etc.) A Typical specimen of marking	Type of Helmet Year of Manufacture Size			Please refer (I) on page 4

Guidelines on Personal Protective Equipment (PPE)

SN	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard
3	Excavation work Involving dewatering works : Contd.. 	I) Helmet as per IS and EN (B) 	Please refer (I) on page 12 &13				Please refer (I) on page 12 &13.

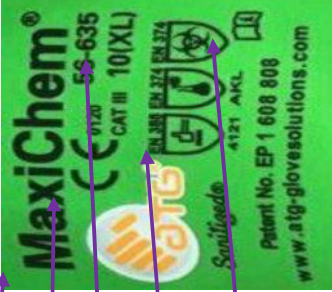
Guidelines on Personal Protective Equipment (PPE)

SN	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard
3	Excavation work Involving dewatering works : Contd 	II) Gum Boot -Safety  A Typical specimen of marking  	The gum shall conform to IS 12254 and have following marking : - Name of the manufacturer or its recognised trade-mark, if any; - Size No.; - Batch No., and - Month and year of manufacture.	- Striking against stationary object. - Striking by moving object - Stepping on sharp object - Water, alcohols, acids and alkalis	- Not suitable for hazards like Chemical burns , electrical flash, welding spark and heat radiation - Not suitable if it is necessary to minimise electrostatic charges in the shortest possible time . - Not suitable for work in explosive work area.		- exceeding one year from the date of first use of the shoe . - sign of crack / damage / cut - Excessive wear - As per Manufactures recommendations

Guidelines on Personal Protective Equipment (PPE)

SN	Activity (Pictorial Display)	Required PPEs	Quality assurance	Typical Industrial Operation	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard
	Excavation work Involving dewatering works : Contd.. 	III) Goggle :  A Typical specimen of marking  Scratch Resistance Manufacturer Name	The goggles shall conform to EN 166 and EN 170 & shall have following markings : - Marking on the lens as Impact resistance (B) Optical Class (1) , anti fogging (N), Anti Scratch resistance (K), no 2-1.2 marked 2C - shade as per EN 170, Manufacturer's Name CE and any other point as per discretion of IOCL in line with EN 166 and 170 CE Marking Optical Class	surround the eye area, give more protection in situations where one encounters splashing liquids, fumes, vapors, powders, dusts, and mists	Limitation : Uncomfortable to wear with other head gear like helmet, ear muffs or respirator		- exceeding one year from the date of first use of the goggles . - sign of crack / damage . - Excessive wear - As per Manufacturers recommendations

Guidelines on Personal Protective Equipment (PPE)

SN	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard
3	Excavation work Involving dewatering works : Contd.. 	IV) Gloves Alternative - I : Gloves as per EN stand 374 and 388.  A Typical specimen of marking 	Gloves shall conform to EN 374 and 388 & gloves shall have the following markings as per as per EN 420 a) Name, trade mark or other means of identification of manufacturer or his authorized representative; b) Glove designation (commercial name or code allowing the user to identify clearly the product within the manufacturer's/authorized representative's range); c) Size designation; d) Date of obsolescence a if applicable per clause 7.2.3 e) Pictogram (s) appropriate to the standards accompanied by the reference of the applicable standards and performance levels which shall always be in the same fixed sequence as defined in the corresponding standard Cat -III Certificate to be ensured.	- Tear - cut - Abrasion - Puncture	Not suitable for hazards like electrical flash, welding spark and heat radiation		- sign of crack / damage / cut - Excessive wear - IMPORTANT All gloves must be thrown away (in the hazardous waste bin if required) no more than 8 hours after initial contact with the chemical. - Achieving date of obsolescence - As per Manufactures recommendations WARNING If you work with moving machine parts, choosing a glove that is the right size and made from a less durable material is vital, since the glove easily tears apart if you get caught in the machinery.

Guidelines on Personal Protective Equipment (PPE)

SN	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard
3	Excavation work Involving dewatering works : Contd.. 	Alternative - II Gloves as per IS 6994. 	Alternative -II Alternatively Gloves shall conform to IS : 6994 (Part I) - 1973 & shall have the following marking . a) The manufacturer's name or recognized trade-mark; b) The type and nominal size of the gloves; c) Year of manufacture; and d) Where applicable, the words 'light mass', 'medium mass', or 'heavy mass ' The gloves may also be marked with the Standard Mark. Light Abrasion ix of table 2 Recommended type of Gloves. is 1, 2, 8, 14, 15, 16	- Light handling operation - Tear - Puncture - Cut	Not suitable for hazards like electrical flash, welding spark and heat radiation		- sign of crack / damage / cut - Excessive wear - As per Manufacturers recommendations IMPORTANT All gloves must be thrown away (in the hazardous waste bin if required) no more than 8 hours after initial contact with the chemical. WARNING If you work with moving machine parts, choosing a glove that is the right size and made from a less durable material is vital, since the glove easily tears apart if you get caught in the machinery.
As of May 2017 there is no party having BIS license. Use of this product is permitted assuming that in future some party may get BIS license.							

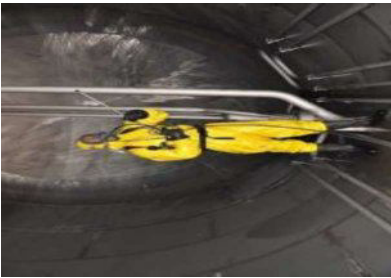
Guidelines on Personal Protective Equipment (PPE)

SN	Activity (Pictorial Display)	Required PPEs	Quality assurance	Typical Industrial Operation	Protection Against hazard	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard
4	Blast cleaning (confined space / external) 	I) Helmet (A) 	Please refer (VI) on page 11					Please refer (VI) on page 11
		II) Safety Shoe 	Please refer (I) on page 4					Please refer (I) on page 4
		III) Goggle 	Please refer (III) on page 16					Please refer (III) on page 16

Guidelines on Personal Protective Equipment (PPE)

	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard																						
4	Blast cleaning (confined space external) - Contd <table><tr><td colspan="2">Permissible Noise exposure as per OSHA 29 CFR 1910.95</td></tr><tr><td>DB</td><td>Hours</td></tr><tr><td>90</td><td>8</td></tr><tr><td>92</td><td>6</td></tr><tr><td>95</td><td>4</td></tr><tr><td>97</td><td>3</td></tr><tr><td>100</td><td>2</td></tr><tr><td>102</td><td>1.5</td></tr><tr><td>105</td><td>1</td></tr><tr><td>110</td><td>0.30</td></tr><tr><td>115</td><td>0.15 or less</td></tr></table>	Permissible Noise exposure as per OSHA 29 CFR 1910.95		DB	Hours	90	8	92	6	95	4	97	3	100	2	102	1.5	105	1	110	0.30	115	0.15 or less	IV) Ear Muff of suitable size "Medium size range "fit satisfactorily in majority of Industrial Application  A Typical specimen of marking  Name of manufacture CE Marking EN Number	Ear muff shall conform to EN 352 shall have following marking : a) the name, trade mark or other identification of the manufacturer or his authorised representative; b) the model designation; c) the number of this EN Standard, i.e "EN 352" d) in the case of ear-muffs intended by the manufacturer to be worn in a particular orientation, an indication of the FRONT and/or TOP of the cups, and/or an indication of LEFT and RIGHT cup. Check the NRR (Noise Reduction Rating,) to ensure noise exposure within permissible limits	Extreme noise Noise induced hearing losses Note : In addition to hearing loss, excessive noise exposure may contribute to mental and physical stresses, and certain illnesses, and accidents	Over 8 hours may be uncomfortable in hot environments Eyeglass wearers may not get a good seal (vibrate) at lower sound frequencies		Ear muff with cracked, cut, or missing gaskets Excessive wear & tear Damage if any. As per Manufacturers recommendations
Permissible Noise exposure as per OSHA 29 CFR 1910.95																													
DB	Hours																												
90	8																												
92	6																												
95	4																												
97	3																												
100	2																												
102	1.5																												
105	1																												
110	0.30																												
115	0.15 or less																												

Guidelines on Personal Protective Equipment (PPE)

SN	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard
4	Blast cleaning - (confined space / external) Contd 	V) Gloves Alternative -I Hand gloves - involving high pressure as per EN 388 and 374. 	• Please refer (IV) on page 17				Please refer (IV) on page 17.
	Blast cleaning - (confined space / external) Contd 	Alternative -II - Gloves as per IS 6994 				• Please refer (IV) on page 18 Gross Abrasion sr no. VIII of table 2 Recommended type of Gloves. is 2,8	

Guidelines on Personal Protective Equipment (PPE)

SN	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard
4	Blast cleaning - (confined space / external) - Contd 	VI) Apron Alternative -I : Apron as per EN 13982 -1 	The apron shall conform to EN 13892-1 and shall have following markings : - The marking shall be clearly visible and as durable as adequate for the life of the clothing. - name, trademark or other means of identification of the manufacturer; - manufacturer's type number, identification number or model number; - type of this chemical protective clothing, i.e. type 5; - reference number and date of publication of this part of ISO 13982 (i.e. ISO 13982-1:2004); - year of manufacture and, if appropriate, the expected shelf-life of the clothing (this information may be marked on every commercial packaging unit instead of being marked on every item of clothing); - size designation as defined in EN 340:2003, Clause 6; - pictogram showing that the suit is for protection against chemicals [ISO 7000-2414; see Figure 1 a)] and - pictogram to show that the manufacturer's instructions should be read [ISO 7000-1641; see Figure 1 b)];  a)  b)	Protection to the full body against airborne solid particulates.	Not suitable for flame and Hot material	Damage / infection to skin etc 	- exceeding six month from the date of first use of the apron . - sign of crack / damage . - Excessive wear - As per Manufactureres recommendations - Do not use compressed air to clean as this will create dust in the air. - Clean and decontaminate tarps and other equipment on the worksite.

Guidelines on Personal Protective Equipment (PPE)

SN	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitati on of PPE	Hazard of Not wearing of pPE	When to be discard
4	Blast cleaning - (confined space / external) : Contd Name of Manufacture Size CE marking Other information Pictograms as per EN	A Typical specimen of marking  Year of manufactures	Type 5 – Protection against airborne solid particulate chemicals (Norm: EN ISO 13982-1) 2. 3. Apron / instructions shall have following pictogram indicating the intended purpose . (Table E-2 of EN 340)  Protective clothing (equipment) for abrasive blasting operat ISO 7000-2482				

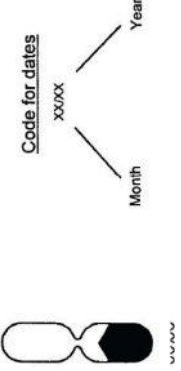
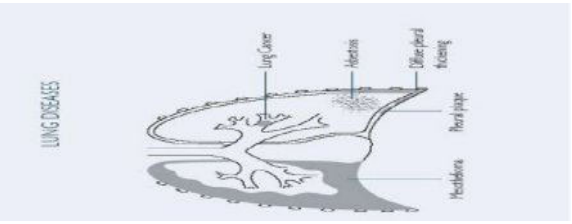
Guidelines on Personal Protective Equipment (PPE)

SN	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitation of PPE	Hazard of wearing of PPE	When to be discard
	Blast cleaning - (confined space / external) Contd 	Alternative -II : Apron as per IS 4501 	Quality assurance Alternative -II : Alternatively suit shall conform to IS : 4501 : 1981 shall have the following marking . The marking shall be clearly visible and as durable as adequate for the life of the clothing. - marked inside with manufacturer's name or recognized trade mark, if any. The ink shall be non-irritating to skin and shall not impair the quality of aprons. - The aprons may also be marked with the ISI Certification Mark. - The finished material shall be white or of a suitable colour on two sides as agreed to between the purchaser and the supplier. As of May 2017 there is no party having BIS license. Use of this product is permitted assuming that in future some party may get BIS license.	Protection to the full body against airborne solid particulates.	Not suitable for flame and Hot material	Damage / infection to skin etc 	- exceeding six month from the date of first use of the apron . - sign of crack / damage . - Excessive wear - As per Manufactureres recommendations - Do not use compressed air to clean as this will create dust in the air. - Clean and decontaminate tarps and other equipment on the worksite.

Guidelines on Personal Protective Equipment (PPE)

SN	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard
	Blast cleaning - (confined space / external) Contd	Alternative -III : Boiler suit / overall 	Alternative -III : Cloth and stitching should be of good quality on visual inspection	Protection to the full body against airborne solid particulates.	Not suitable for flame and Hot material	Damage / infection to skin etc 	- exceeding six month from the date of first use of the apron . - sign of crack / damage . - Excessive wear - As per Manufactures recommendations - Do not use compressed air to clean as this will create dust in the air. - Avoid blasting in windy conditions to prevent the spread of any hazardous materials.

Guidelines on Personal Protective Equipment (PPE)

SN	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard
	Blast cleaning - confined space - Contd  Name of Manufactures EN Number CE Marking	VII) Half face mask A Typical specimen of marking  	1. The half air mask shall conform to EN 140 and shall have following : a) The manufacturer shall be identified by name, trade mark or other means of identification. b) All units of the same model shall be provided with a type-identifying marking. c) Size (if more than one size is available). d) The number and the year of this European Standard. ie EN 140 e) Where the reliable performance of components may be affected by ageing, means of identifying the date (at least the year) of manufacture shall be given Parts which are designed to be replaced by the authorized user and sub-assemblies with considerable bearing on safety shall be readily identifiable. For parts which cannot reasonably be marked e.g. straps of head harness, the relevant information shall be included in the information supplied by the manufacturer. The end of shelf life may be indicated on packing eg e.g. by the following pictogram. 	Respiratory protection. Protection against inhaling dust, etc.	Not suitable for heavy gas concentration	Silicosis Occupational lung diseases. Deposition of particulate matter in Lung. 	• Sign of crack / damage • Excessive wear • Damage of strap • After end of shelf life • Change of filter / cartridges at least every six month • Performance of the components may be affected by aging • As per Manufactures recommendations Cleaning Always clean the half-mask after use. First remove the filter and remove dust with compressed air. Use a cloth to remove any stubborn deposits. If necessary, dismantle the parts and rinse in warm water with a small quantity of mild detergent. Never use solvents. The inhale and exhale valves should be removed and cleaned thoroughly .

Guidelines on Personal Protective Equipment (PPE)

SN	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard
5	Painting - confined space / external 	I) Helmet (A) 			. Please refer (VI) on page 11		Please refer (VI) on page 11
		II) Safety Shoe 			. Please refer (I) on page 4		Please refer (I) on page 4
		III) Goggles 			. Please refer (III) on page 16		Please refer (III) on page 16

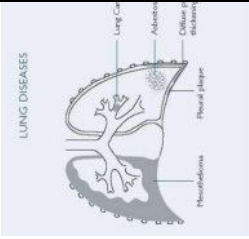
Guidelines on Personal Protective Equipment (PPE)

SN	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard
5	Painting -(confined space / external) : Contd 	VI) Gloves Alternative -I Hand gloves - involving high pressure as per EN 388 and 374 	• Please refer (IV) on page 17				Please refer (IV) on page 17
		Alternative -II - Gloves as per IS 6994 	• Please refer (IV) on page 18 Spraying paints or cellulose lacquers sr no. XIV of table 2 : Recommended type of Gloves. is 1,8				Please refer (IV) on page 18

Guidelines on Personal Protective Equipment (PPE)

SN	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard
	Painting -(confined space / external) : Contd 	V) Apron :Alternative -I Apron as per EN 13982 			• Please refer (VI) on page 22 and 23		Please refer (VI) on page 22 and 23
		Alternative -II Apron as per IS 4501 			• Please refer (VI) on page 24		Please refer (VI) on page 24

Guidelines on Personal Protective Equipment (PPE)

SN	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard
	Painting -(confined space / external 	VI) Half face mask 	. Please refer (VII) on page 26				Please refer (VII) on page 26

Guidelines on Personal Protective Equipment (PPE)

	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard
6	a) Working in Confined space b) Testing of Gas sensor c) Tank Gauging d) De Gassing of LPG Cylinder e) Shuttering works f) Brick masonry g) Handling of Battery	I) Safety Helmet (B) 	• Please refer (I) on page 12 & 13				Please refer (I) on page 12 & 13
		II) Safety Shoe (A) 	• Please refer (I) on page 4				Please refer (I) on page 4

Guidelines on Personal Protective Equipment (PPE)

	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard
6	Contd.. a) Working in Confined space b) Testing of Gas sensor c) Tank Gauging d) De Gassing of LPG Cylinder e) Shuttering works f) Brick masonry g) Handling of Battery	III) Gloves Alternative -I : Hand gloves - involving high pressure as per EN 388 and 374 	Please refer (IV) on page 17	Please refer (IV) on page 17	Please refer (IV) on page 17		Please refer (IV) on page 17
		Alternative -II Gloves as per IS 6994 	Please refer (IV) on page 18 Light Abrasion ix of table 2 Recommended type of Gloves. is 1, 2, 8, 14, 15, 16	Please refer (IV) on page 18	Please refer (IV) on page 18		Please refer (IV) on page 18

Guidelines on Personal Protective Equipment (PPE)

SN	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard
7	a) Road work b) Reinforcement c) Concreting	I) Helmet (B) 	. Please refer (I) on page 12 &13				Please refer (I) on page 12 &13
		II) Gum Boot 					
		III) Goggles 					

Guidelines on Personal Protective Equipment (PPE)

	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard
7	Contd.. a) Road work b) Reinforcement c) Concreting	VI) Gloves Alternative -I : Hand gloves - involving high pressure as per EN 388 and 374 	Please refer (IV) on page 17				
		Alternative II as per IS 6994 	Please refer (IV) on page 18 Light Abrasion ix of table 2 Recommended type of Gloves. is 1, 2, 8, 14. 15. 16				

Guidelines on Personal Protective Equipment (PPE)

N	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard
8	a) Grass Cutting b) Blinding and de- blinding flange work	I) Gum Boot 	• Please refer (II) on page 15				Please refer (II) on page 15
		II) Helment (B) 					Please refer (I) on page 12 & 13

Guidelines on Personal Protective Equipment (PPE)

SN	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard
9	Electrical works Electrical sub-station current carrying equipment 	II) Safety Shoe (B)   A Typical specimen of marking  The sole shall be regulated to high voltage test upto 15 KV voltage applied across the sole for 1 min. Necessary test certificate for this test from FDI/NABL accredited party to be furnished .	The safety shoe shall have following marking as per IS 15298 (part -2) : a) size; b) manufacturer's identification mark; c) Year of manufacture and at least quarter; d) License No (CM/L) e) IS Mark Category of Safety shoe (,S3 etc) as required as per Table 16 of IS 15298 (part 2) : 2011	- Striking against stationary object. - Striking by moving object - Electrical resistance	- Not suitable for work in explosive work area. - Or - Work activities requiring anti static work		- Exceeding one year from the date of first use of the shoe . - Sign of crack / damage - Excessive wear - As per Manufacturer's recommendations

Guidelines on Personal Protective Equipment (PPE)

SN	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard
9	Electrical works : Electrical sub-station current carrying equipment Contd 	II) Electrical Hand gloves Insulating Rubber Electrical Gloves 	The gloves shall be marked indelibly at the back with the following information as per IS 4770 - Size and type of glove; - Maximum working potential in Volts, - followed by the word 'working' in brackets; - Identification of the source of manufacture; and - Month and year of manufacture moisture absorption certificate to be checked. <i>A Typical specimen of marking</i>  Manufacture Name Test Potential Maximum working potential Size Type -1 Gloves not to used	Type 2—For use at voltage not exceeding 1 100 ac rms Type 3—For use at voltage not exceeding 7 500 ac rms Type 4—For use at voltage not exceeding 17 000 ac rms.	1) Type of the PPE restricts the maximum voltage at which it can be used 2) Other precautions to be taken while working on electrical installation		- Frequently used Gloves to be re-tested at intervals of not more than 6 months. - Gloves issued for occasional use shall be re-tested after use or in any case at intervals of not more than 12 months. - Gloves Showing any defects - As per Manufactures recommendations

Guidelines on Personal Protective Equipment (PPE)

SN	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard
9	Electrical works : Electrical sub- station current carrying equipment Contd 	Helmet as per EN 397 	• Please refer (I) on page 12 & 13				Please refer (I) on page 12 and 13

Guidelines on Personal Protective Equipment (PPE)

SN	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard
10	Working with possibility of splashes of hot, cryogenic or corrosive liquids 	I) Helmet (B) as per EN 397 	• Please refer (I) on page 12 and 13				Please refer (I) on page 12 and 13
		II) Safety Shoe 	• Please refer (I) on page 4				Please refer (I) on page 4
		III) Goggles 	• Please refer (III) on page 16				Please refer (III) on page 16

Guidelines on Personal Protective Equipment (PPE)

	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard
10	Working with possibility of splashes of hot, cryogenic or corrosive liquids. Contd 	IV) Gloves Alternative - I : Hand gloves - involving high pressure as per EN 388 and 374 	• Please refer (IV) on page 17	• Please refer (IV) on page 18 Light Abrasion ix of table 2 Recommended type of Gloves. is 1, 2, 8, 14. 15. 16			Please refer (IV) on page 17
		Alternative - II Gloves as per IS 6994. 					Please refer (IV) on page 18

Guidelines on Personal Protective Equipment (PPE)

SN	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard
	Working with possibility of splashes of hot, cryogenic or corrosive liquids Contd	V) Apron Alternative -I Apron as per EN 13982 	Please refer (VI) on page 22 &23				Please refer (VI) on page 22 &23
		Alternative -II Apron as per IS 4501 					Please refer (VI) on page 24

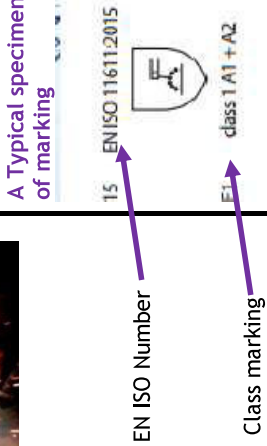
Guidelines on Personal Protective Equipment (PPE)

SN	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard
11		I) Helmet attachable welding shield (A)  II) Welding Helmet with welding Shield (B)  Name of Manufacture CE Mark and EN Mark  Name of Manufacture EN166 FT	a) Helmet mountable welding shield. • Conforms to EN 175 • Protective lens made of clear high impact resistant. polycarbonate conforming to EN 166 and ANSI Z 87.1 • polypropylene Impact Resistance Shell conform to EN 175 F • The welding shield shall be CE marked • Marking on protective shall be fully visible • Ocular marking shall be as per clause 9.2 of EN 166 b) Welding Helmet with welding Shield • Protective lens made of clear high impact resistant. polycarbonate conforming to EN 166 and ANSI Z 87.1 • polypropylene Impact Resistance Shell conform to EN 175 F • Marking on protective shall be fully visible • Ocular marking shall be as per clause 9.2 of EN 166	Protection during welding. Liftable welding lens allows clear view while restricting harmful dust particles.	To be used only in conjunction with safety helmet & should not be used independently. However welding helmets can be used independently.		• Exceeding one year from the date of first use of the goggles . • sign of crack / damage on lenses • Excessive wear • As per Manufactures recommendations

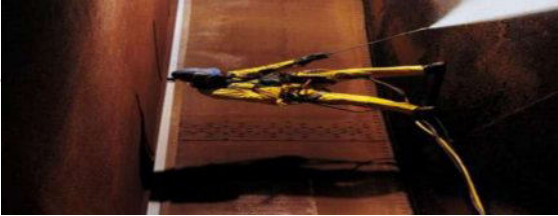
Guidelines on Personal Protective Equipment (PPE)

	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard
11	Welding and cutting work : Contd 	II) Safety Shoe 	Please refer (I) on page 4				Please refer (I) on page 4
		Helmet as per EN 397 (in case Helmet attachable welding shield being used) 	. Please refer (I) on page 12 & 13				Please refer (I) on page 12 and 13

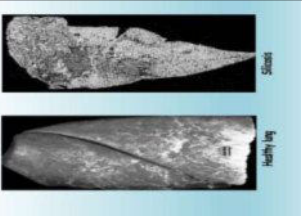
Guidelines on Personal Protective Equipment (PPE)

SN	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard
11	Welding and cutting work Contd. 	III) Apron  A Typical specimen of marking  EN ISO Number Class marking	- Apron shall conform to EN ISO 11611 & shall have the following markings : - classification: : - Class 1: the number and year of this International Standard (ISO 11611) followed by the graphical symbol shown in below and the indication "Class 1" and the indication "A1" or "A1 + A2" as appropriate for Limited Flame Spread; - Class 2: the number and year of this International Standard (ISO 11611) followed by the graphical symbol shown in Figure 1 and the indication "Class 2" and the indication "A1" or "A1 + A2" as appropriate; garments conforming to Class 2 shall meet Class 2 for all performance requirements; instructions for cleaning shall be marked (e.g. on a label). 	minimize skin burns caused by sparks, spatter, or radiation	- Additional electrical insulation layers will be required where there is an increased risk of electric shock; garments meeting the requirements of clause of en ISO 11611 (6.10) are designed to provide protection against short term, accidental contact with live electric conductors at voltages up to approximately 100 V d.c. - any identified hazards against which the clothing is intended to protect (e.g. flames, molten metal spatter, radiant heat, and short term accidental electrical contact); for protective clothing, a warning that additional partial body protection may be required, e.g. for welding overhead;		- On contaminated with flammable material. - Manufacturers shall include the information that welder's protective clothing be cleaned regularly in accordance with the manufacturer's recommendations. After cleaning, the clothing shall be visually inspected for any sign of damage. - Similarly, users should be advised that if they experience sunburn-like symptoms, UVB is penetrating. - In either case, the garment should be repaired (if practicable) or replaced and consideration given to the use of additional, more resistant, protective layers in future. - As per Manufacturers recommendations

Guidelines on Personal Protective Equipment (PPE)

SN	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard
12	Tank cleaning 	I) Helmet (B) 	Please refer (I) on page 12 &13				Please refer (I) on page 12 &13
		II) Gum Boot 	Please refer (II) on page 15				Please refer (II) on page 15

Guidelines on Personal Protective Equipment (PPE)

SN	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard
12	Tank cleaning Contd. 	III) Apron Alternative -I Apron as per EN 13982  Alternative -II Apron as per IS 4501 	. Please refer (VI) on page 22-23 & 24				Please refer (VI) on page 22-23 & 24

Guidelines on Personal Protective Equipment (PPE)

SN	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard
12		IV) Gloves Alternative - I : Hand gloves - involving high pressure as per EN 388 and 374 	• Please refer (IV) on page 17				Please refer (IV) on page 17
		Alternative - II Gloves as per IS 6994. 					Please refer (IV) on page 18

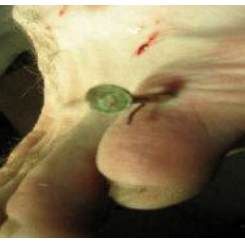
Guidelines on Personal Protective Equipment (PPE)

SN	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard
13	Product pump house operation 	I) Helmet (B) 	• Please refer (I) on page 12 &13				Please refer (I) on page 12 &13
		II) Safety Shoe 	• Please refer (I) on page 4				Please refer (I) on page 4
		III) Goggles 	• Please refer (III) on page 16				Please refer (III) on page 16

Guidelines on Personal Protective Equipment (PPE)

SN	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard
13	Product pump house operation Contd 	IV) Gloves :Alternative -I : Hand gloves - involving high pressure as per EN 388 and 374 	• Please refer (IV) on page 17				Please refer (IV) on page 17 & 18
		Alternative - II Gloves as per IS 6994. 	• Please refer (IV) on page 18 Light Abrasion ix of table 2 Recommended type of Gloves. is 1, 2, 8, 14. 15. 16				

Guidelines on Personal Protective Equipment (PPE)

SN	Activity (Pictorial Display)	Required PPEs	Quality assurance	Protection Against hazard	Limitation of PPE	Hazard of Not wearing of PPE	When to be discard
14	DG Operation :	I) Helmet (B) 	• Please refer (I) on page 12 &13				Please refer (I) on page 12 &13
		II) Safety Shoe (B) 	• Please refer (II) on page 36				Please refer (II) on page 36
		III) Ear Muff 	• Please refer (IV) on page 20				Please refer (IV) on page 20
		IV) Electrical Gloves 	• Please refer (II) on page 37				Please refer (IV) on page 37

This BOM is for reference purpose only. Serial of items shall be as per GeM Schedule only.

ENQUIRY CUM OFFER

Enquiry No.:9050M25E08/2452322

Date:30.09.2025

Enq.Due on:03.10.2025 15:00hrs IST

SINGLE BID / TWO BID

Offer Ref.....

Date.....

Dear Sir,

We shall be grateful to receive your quotation filled in the copy of this enquiry for the supply of following items.

Sr.no.	Item Code and Description	Unit	Qty	
0010	Complete High speed motor package	LOT	1.000	
	<u>ITEM TEXT</u> Complete High speed motor package along with Power cables, Instrumentation & Controls and Auxiliaries, excluding Hot stand by VFDs, Input Transformers, PLC.	Lot		
0020	Spare High Speed Motor	EA	1.000	
		each		
0030	Mandatory Spares	LOT	1.000	
		Lot		
0040	Site supervision, Testing & Commissioning	SU	1.000	
		Service Unit		

Signature of Vendor with Office Seal

ENQUIRY CUM OFFER

Enquiry No.:9050M25E08/2452322

Date:30.09.2025

Sr.no.	Item Code and Description	Unit	Qty
0050	CPWAMC	SU 1.000 Service Unit	
0060	Hot stand by VFDs,Input Transformers,PLC	LOT 1.000 Lot	
<u>ITEM TEXT</u> Complete High speed motor package along with Power cables, Instrumentation & Controls and Auxiliaries, excluding Hot stand by VFDs, Input Transformers,PLC.			

Signature of Vendor with Office Seal

बिड दस्तावेज़ / Bid Document

बिड विवरण / Bid Details	
बिड बंद होने की तारीख/समय / Bid End Date/Time	14-11-2025 17:00:00
बिड खुलने की तारीख/समय / Bid Opening Date/Time	14-11-2025 17:30:00
बिड पेशकश वैधता (बंद होने की तारीख से) / Bid Offer Validity (From End Date)	180 (Days)
मंत्रालय/राज्य का नाम / Ministry/State Name	Ministry Of Petroleum And Natural Gas
विभाग का नाम / Department Name	Indian Oil Corporation Limited
संगठन का नाम / Organisation Name	Indian Oil Corporation Limited
कार्यालय का नाम / Office Name	IoCl Mathura Refinery
कुल मात्रा / Total Quantity	11
वस्तु श्रेणी / Item Category	Supply of Complete High Speed Motor Package inclusive of TPI, PF, Insurance other than transit Insurance, Taxes and duties, commissioning spares etc , Supply of Spare High Speed Motor inclusive of TPI, PF, Insurance other than transit Insurance, Taxes and duties etc. , Supply of Mandatory Spares inclusive of TPI, PF, Insurance other than transit Insurance, Taxes and duties etc. , Supply of Hot stand by VFDs, Input Transformers, PLC inclusive of TPI, PF, Insurance other than transit Insurance, Taxes and duties etc , Freight Charges of all supply items schedule 1 to 4 , Site Supervision, Testing and Commissioning Charges , CPWAMC of item at Schedule 4 for 1st year , CPWAMC of item at Schedule 4 for 2nd year , CPWAMC of item at Schedule 4 for 3rd year , CPWAMC of item at Schedule 4 for 4th year , CPWAMC of item at Schedule 4 for 5th year
GeMARPTS में खोजी गई स्ट्रिंग्स / Searched Strings used in GeMARPTS	High Speed Electric Motor
GeMARPTS में खोजा गया परिणाम / Searched Result generated in GeMARPTS	High speed stirrer, Lawn Mowers, High speed tripping relay, Electric Two Wheeler - Motorcycle, Scooter and Moped, High Steel Speed Cutters, Electric Ceiling Fan with BLDC Motor (V3) ISI Marked to IS 374, High Speed Drill System for Neurosurgery & Spinal Surgery, Electric Motor Fire Siren (IOCL), Reciprocating Air Compressors - Electric Motor Driven, Video Conferencing Camera / Web Camera (V2)
अधिसूचना के लिए चयनित प्रासंगिक श्रेणियाँ / Relevant Categories selected for notification	Reciprocating Air Compressors - Electric Motor Driven
बीओक्यू शीर्षक / BOQ Title	9050M25E08

बिड विवरण/Bid Details	
एमएसएमई के लिए अनुभव के वर्षों और टर्नओवर से छूट प्रदान की गई है/MSE Exemption for Years of Experience and Turnover	No
स्टार्टअप के लिए अनुभव के वर्षों और टर्नओवर से छूट प्रदान की गई है /Startup Exemption for Years of Experience and Turnover	No
विक्रेता से मांगे गए दस्तावेज़/Document required from seller	Additional Doc 1 (Requested in ATC),Additional Doc 2 (Requested in ATC),Additional Doc 3 (Requested in ATC),Compliance of BoQ specification and supporting document *In case any bidder is seeking exemption from Experience / Turnover Criteria, the supporting documents to prove his eligibility for exemption must be uploaded for evaluation by the buyer
क्या आप निविदाकारों द्वारा अपलोड किए गए दस्तावेजों को निविदा में भाग लेने वाले सभी निविदाकारों को दिखाना चाहते हैं? संदर्भ मेनू है/Do you want to show documents uploaded by bidders to all bidders participated in bid?	No
बिड लगाने की समय सीमा स्वतः नहीं बढ़ाने के लिए आवश्यक बिड की संख्या। / Minimum number of bids required to disable automatic bid extension	3
दिनों की संख्या, जिनके लिए बिड लगाने की समय-सीमा बढ़ाई जाएगी। / Number of days for which Bid would be auto-extended	7
ऑटो एक्सटेंशन अधिकतम कितनी बार किया जाना है। / Number of Auto Extension count	3
बिड से रिवर्स नीलामी सक्रिय किया/Bid to RA enabled	No
बिड का प्रकार/Type of Bid	Two Packet Bid
प्राथमिक उत्पाद श्रेणी/Primary product category	Supply of Complete High Speed Motor Package inclusive of TPI, PF, Insurance other than transit Insurance, Taxes and duties, commissioning spares etc
तकनीकी मूल्यांकन के दौरान तकनीकी स्पष्टीकरण हेतु अनुमत समय /Time allowed for Technical Clarifications during technical evaluation	10 Days
निरीक्षण आवश्यक (सूचीबद्ध निरीक्षण प्राधिकरण /जेम के साथ पूर्व पंजीकृत एजेंसियों द्वारा)/Inspection Required (By Empanelled Inspection Authority / Agencies pre-registered with GeM)	No
मूल्यांकन पद्धति/Evaluation Method	Total value wise evaluation
वित्तीय दस्तावेज की आवश्यकता है / Financial Document Required	Yes
मध्यस्थता खंड/Arbitration Clause	No
सुलह खंड/Mediation Clause	No

ईएमडी विवरण/EMD Detail

एडवाइजरी बैंक/Advisory Bank	State Bank of India
ईएमडी राशि/EMD Amount	2137000

ईपीबीजी विवरण /ePBG Detail

एडवाइजरी बैंक/Advisory Bank	ICICI
ईपीबीजी प्रतिशत (%) /ePBG Percentage(%)	5.00
ईपीबीजी की आवश्यक अवधि (माह) /Duration of ePBG required (Months).	20

(a). जेम की शर्तों के अनुसार ईएमडी छूट के इच्छुक बिडर को संबंधित केटेगरी के लिए बिड के साथ वैध समर्थित दस्तावेज़ प्रस्तुत करने हैं। एमएसई केटेगरी के अंतर्गत केवल वस्तुओं के लिए विनिर्माता तथा सेवाओं के लिए सेवा प्रदाता ईएमडी से छूट के पात्र हैं। व्यापारियों को इस नीति के दायरे से बाहर रखा गया है।/EMD EXEMPTION: The bidder seeking EMD exemption, must submit the valid supporting document for the relevant category as per GeM GTC with the bid. Under MSE category, only manufacturers for goods and Service Providers for Services are eligible for exemption from EMD. Traders are excluded from the purview of this Policy.

(b).ईएमडी और संपादन जमानत राशि, जहां यह लागू होती है, लाभार्थी के पक्ष में होनी चाहिए। / EMD & Performance security should be in favour of Beneficiary, wherever it is applicable.

लाभार्थी /Beneficiary :

MTM

IOCL Mathura Refinery, INDIAN OIL CORPORATION LIMITED, INDIAN OIL Corporation Limited, Ministry of Petroleum and Natural Gas
(Vikalp Dhiman)

UIN Number NCTGC2415P

बोली विभाजन लागू नहीं किया गया/ Bid splitting not applied.

एमआईआई खरीद वरीयता/MII Purchase Preference

एमआईआई खरीद वरीयता/MII Purchase Preference	Yes

एमएसई खरीद वरीयता/MSE Purchase Preference

एमएसई खरीद वरीयता/MSE Purchase Preference	Yes

1. Preference to Make In India products (For bids < 200 Crore):Preference shall be given to Class 1 local supplier as defined in public procurement (Preference to Make in India), Order 2017 as amended from time to time and its subsequent Orders/Notifications issued by concerned Nodal Ministry for specific Goods/Products. The minimum local content to qualify as a Class 1 local supplier is denoted in the bid document. If the bidder wants to avail the Purchase preference, the bidder must upload a certificate from the OEM regarding the percentage of the local

content and the details of locations at which the local value addition is made along with their bid, failing which no purchase preference shall be granted. In case the bid value is more than Rs 10 Crore, the declaration relating to percentage of local content shall be certified by the statutory auditor or cost auditor, if the OEM is a company and by a practicing cost accountant or a chartered accountant for OEMs other than companies as per the Public Procurement (preference to Make-in -India) order 2017 dated 04.06.2020. Only Class-I and Class-II Local suppliers as per MII order dated 4.6.2020 will be eligible to bid. Non - Local suppliers as per MII order dated 04.06.2020 are not eligible to participate. However, eligible micro and small enterprises will be allowed to participate .The buyers are advised to refer the OM No.F.1/4/2021-PPD dated 18.05.2023.

[OM No.1 4 2021 PPD dated 18.05.2023](#) for compliance of Concurrent application of Public Procurement Policy for Micro and Small Enterprises Order, 2012 and Public Procurement (Preference to Make in India) Order, 2017.

2. Purchase preference will be given to MSEs having valid Udyam Registration and whose credentials are validated online through Udyam Registration portal as defined in Public Procurement Policy for Micro and Small Enterprises (MSEs) Order, 2012 dated 23.03.2012 issued by Ministry of Micro, Small and Medium Enterprises and its subsequent Orders/Notifications issued by concerned Ministry. If the bidder wants to avail themselves of the Purchase preference, the bidder must be the manufacturer / OEM of the offered product on GeM. Traders are excluded from the purview of Public Procurement Policy for Micro and Small Enterprises and hence resellers offering products manufactured by some other OEM are not eligible for any purchase preference. In respect of bid for Services, the bidder must be the Service provider of the offered Service. Relevant documentary evidence in this regard shall be uploaded along with the bid in respect of the offered product or service and Buyer will decide eligibility for purchase preference based on documentary evidence submitted, while evaluating the bid. If L-1 is not an MSE and MSE Seller (s) has / have quoted price within L-1+ 15% (Selected by Buyer) of margin of purchase preference /price band defined in relevant policy, such MSE Seller shall be given opportunity to match L-1 price and contract will be awarded for 100% (selected by Buyer) percentage of total quantity. The buyers are advised to refer the OM No. F.1/4/2021-PPD dated 18.05.2023 [OM No.1 4 2021 PPD dated 18.05.2023](#) for compliance of Concurrent application of Public Procurement Policy for Micro and Small Enterprises Order, 2012 and Public Procurement (Preference to Make in India) Order, 2017. Benefits of MSE will be allowed only if seller is validated on-line in GeM profile as well as validated and approved by Buyer after evaluation of documents submitted.

3. Estimated Bid Value indicated above is being declared solely for the purpose of guidance on EMD amount and for determining the Eligibility Criteria related to Turn Over, Past Performance and Project / Past Experience etc. This has no relevance or bearing on the price to be quoted by the bidders and is also not going to have any impact on bid participation. Also this is not going to be used as a criteria in determining reasonableness of quoted prices which would be determined by the buyer based on its own assessment of reasonableness and based on competitive prices received in Bid / RA process.

Pre Bid Detail(s)

मूल्य भिन्नता खंड दस्तावेज़/Pre-Bid Date and Time	प्री-बिड स्थान/Pre-Bid Venue
15-10-2025 14:00:00	Admin Building, Mathura Refinery, Mathura (UP) 281005

Supply Of Complete High Speed Motor Package Inclusive Of TPI, PF, Insurance Other Than Transit Insurance, Taxes And Duties, Commissioning Spares Etc

(क्रमशः श्रेणी 1 और श्रेणी 2 के स्थानीय आपूर्तिकर्ता के रूप में अर्हता प्राप्त करने के लिए आवश्यक/Minimum 50% and 20% Local Content required for qualifying as Class 1 and Class 2 Local Supplier respectively)

तकनीकी विशिष्टियाँ /Technical Specifications

Specification Document	View File
BOQ Detail Document	View File

Advisory-Please refer attached BOQ document for detailed consignee list and delivery period.

प्रेषिती/रिपोर्टिंग अधिकारी तथा मात्रा/Consignees/Reporting Officer and Quantity

क्र.सं./S.No.	प्रेषिती/रिपोर्टिंग अधिकारी /Consignee Reporting/Officer	पता/Address	मात्रा /Quantity	डिलीवरी के दिन/Delivery Days
1	Prevender Singh	281005,Mathura Refinery Indian Oil Corporation	1	600

Supply Of Spare High Speed Motor Inclusive Of TPI, PF, Insurance Other Than Transit Insurance,Taxes And Duties Etc.

(क्रमशः श्रेणी 1 और श्रेणी 2 के स्थानीय आपूर्तिकर्ता के रूप में अर्हता प्राप्त करने के लिए आवश्यक/Minimum 50% and 20% Local Content required for qualifying as Class 1 and Class 2 Local Supplier respectively)

तकनीकी विशिष्टियाँ /Technical Specifications

Specification Document	View File
BOQ Detail Document	View File

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प्रेषिती/रिपोर्टिंग अधिकारी तथा मात्रा/Consignees/Reporting Officer and Quantity

क्र.सं./S.No.	प्रेषिती/रिपोर्टिंग अधिकारी /Consignee Reporting/Officer	पता/Address	मात्रा /Quantity	डिलीवरी के दिन/Delivery Days
1	Prevender Singh	281005,Mathura Refinery Indian Oil Corporation	1	600

Supply Of Mandatory Spares Inclusive Of TPI, PF, Insurance Other Than Transit Insurance, Taxes And Duties Etc.

(क्रमशः श्रेणी 1 और श्रेणी 2 के स्थानीय आपूर्तिकर्ता के रूप में अर्हता प्राप्त करने के लिए आवश्यक/Minimum 50% and 20% Local Content required for qualifying as Class 1 and Class 2 Local Supplier respectively)

तकनीकी विशिष्टियाँ /Technical Specifications

Specification Document	View File
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परेषिती/रिपोर्टिंग अधिकारी तथा मात्रा/Consignees/Reporting Officer and Quantity

क्र.सं./S.No.	परेषिती/रिपोर्टिंग अधिकारी /Consignee Reporting/Officer	पता/Address	मात्रा /Quantity	डिलीवरी के दिन/Delivery Days
1	Prevender Singh	281005,Mathura Refinery Indian Oil Corporation	1	600

Supply Of Hot Stand By VFDs, Input Transformers, PLC Inclusive Of TPI, PF, Insurance Other Than Transit Insurance, Taxes And Duties Etc

(क्रमशः श्रेणी 1 और श्रेणी 2 के स्थानीय आपूर्तिकर्ता के रूप में अर्हता प्राप्त करने के लिए आवश्यक/Minimum 50% and 20% Local Content required for qualifying as Class 1 and Class 2 Local Supplier respectively)

तकनीकी विशिष्टियाँ /Technical Specifications

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क्र.सं./S.No.	परेषिती/रिपोर्टिंग अधिकारी /Consignee Reporting/Officer	पता/Address	मात्रा /Quantity	डिलीवरी के दिन/Delivery Days
1	Prevender Singh	281005,Mathura Refinery Indian Oil Corporation	1	600

Freight Charges Of All Supply Items Schedule 1 To 4

(क्रमशः श्रेणी 1 और श्रेणी 2 के स्थानीय आपूर्तिकर्ता के रूप में अर्हता प्राप्त करने के लिए आवश्यक/Minimum 50% and 20% Local Content required for qualifying as Class 1 and Class 2 Local Supplier respectively)

तकनीकी विशिष्टियाँ /Technical Specifications

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परेषिती/रिपोर्टिंग अधिकारी तथा मात्रा/Consignees/Reporting Officer and Quantity

क्र.सं./S.N o.	परेषिती/रिपोर्टिंग अधिकारी /Consignee Reporting/Officer	पता/Address	मात्रा /Quantity	डिलीवरी के दिन/Delivery Days
1	Prevender Singh	281005,Mathura Refinery Indian Oil Corporation	1	600

Site Supervision, Testing And Commissioning Charges

(क्रमशः श्रेणी 1 और श्रेणी 2 के स्थानीय आपूर्तिकर्ता के रूप में अर्हता प्राप्त करने के लिए आवश्यक/Minimum 50% and 20% Local Content required for qualifying as Class 1 and Class 2 Local Supplier respectively)

तकनीकी विशिष्टियाँ /Technical Specifications

Specification Document	View File
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परेषिती/रिपोर्टिंग अधिकारी तथा मात्रा/Consignees/Reporting Officer and Quantity

क्र.सं./S.N o.	परेषिती/रिपोर्टिंग अधिकारी /Consignee Reporting/Officer	पता/Address	मात्रा /Quantity	डिलीवरी के दिन/Delivery Days
1	Prevender Singh	281005,Mathura Refinery Indian Oil Corporation	1	660

CPWAMC Of Item At Schedule 4 For 1st Year

(क्रमशः श्रेणी 1 और श्रेणी 2 के स्थानीय आपूर्तिकर्ता के रूप में अर्हता प्राप्त करने के लिए आवश्यक/Minimum 50% and 20% Local Content required for qualifying as Class 1 and Class 2 Local Supplier respectively)

तकनीकी विशिष्टियाँ /Technical Specifications

Specification Document	View File
BOQ Detail Document	View File

Advisory-Please refer attached BOQ document for detailed consignee list and delivery period.

परेषिती/रिपोर्टिंग अधिकारी तथा मात्रा/Consignees/Reporting Officer and Quantity

क्र.सं./S.N o.	परेषिती/रिपोर्टिंग अधिकारी /Consignee Reporting/Officer	पता/Address	मात्रा /Quantity	डिलीवरी के दिन/Delivery Days
1	Prevender Singh	281005,Mathura Refinery Indian Oil Corporation	1	365

CPWAMC Of Item At Schedule 4 For 2nd Year

(क्रमशः श्रेणी 1 और श्रेणी 2 के स्थानीय आपूर्तिकर्ता के रूप में अर्हता प्राप्त करने के लिए आवश्यक/Minimum 50% and 20% Local Content required for qualifying as Class 1 and Class 2 Local Supplier respectively)

तकनीकी विशिष्टियाँ /Technical Specifications

Specification Document	View File
BOQ Detail Document	View File

Advisory-Please refer attached BOQ document for detailed consignee list and delivery period.

परेषिती/रिपोर्टिंग अधिकारी तथा मात्रा/Consignees/Reporting Officer and Quantity

क्र.सं./S.N o.	परेषिती/रिपोर्टिंग अधिकारी /Consignee Reporting/Officer	पता/Address	मात्रा /Quantity	डिलीवरी के दिन/Delivery Days
1	Prevender Singh	281005,Mathura Refinery Indian Oil Corporation	1	365

CPWAMC Of Item At Schedule 4 For 3rd Year

(क्रमशः श्रेणी 1 और श्रेणी 2 के स्थानीय आपूर्तिकर्ता के रूप में अर्हता प्राप्त करने के लिए आवश्यक/Minimum 50% and 20% Local Content required for qualifying as Class 1 and Class 2 Local Supplier respectively)

तकनीकी विशिष्टियाँ /Technical Specifications

Specification Document	View File
BOQ Detail Document	View File

Advisory-Please refer attached BOQ document for detailed consignee list and delivery period.

परेषिती/रिपोर्टिंग अधिकारी तथा मात्रा/Consignees/Reporting Officer and Quantity

क्र.सं./S.N o.	परेषिती/रिपोर्टिंग अधिकारी /Consignee Reporting/Officer	पता/Address	मात्रा /Quantity	डिलीवरी के दिन/Delivery Days
1	Prevender Singh	281005,Mathura Refinery Indian Oil Corporation	1	365

CPWAMC Of Item At Schedule 4 For 4th Year

(क्रमशः श्रेणी 1 और श्रेणी 2 के स्थानीय आपूर्तिकर्ता के रूप में अर्हता प्राप्त करने के लिए आवश्यक/Minimum 50% and 20% Local Content required for qualifying as Class 1 and Class 2 Local Supplier respectively)

तकनीकी विशिष्टियाँ /Technical Specifications

Specification Document	View File
BOQ Detail Document	View File

Advisory-Please refer attached BOQ document for detailed consignee list and delivery period.

परेषिती/रिपोर्टिंग अधिकारी तथा मात्रा/Consignees/Reporting Officer and Quantity

क्र.सं./S.N o.	परेषिती/रिपोर्टिंग अधिकारी /Consignee Reporting/Officer	पता/Address	मात्रा /Quantity	डिलीवरी के दिन/Delivery Days
1	Prevender Singh	281005,Mathura Refinery Indian Oil Corporation	1	365

CPWAMC Of Item At Schedule 4 For 5th Year

(क्रमशः श्रेणी 1 और श्रेणी 2 के स्थानीय आपूर्तिकर्ता के रूप में अर्हता प्राप्त करने के लिए आवश्यक/Minimum 50% and 20% Local Content required for qualifying as Class 1 and Class 2 Local Supplier respectively)

तकनीकी विशिष्टियाँ /Technical Specifications

Specification Document	View File
BOQ Detail Document	View File

Advisory-Please refer attached BOQ document for detailed consignee list and delivery period.

प्रेषिती/रिपोर्टिंग अधिकारी तथा मात्रा/Consignees/Reporting Officer and Quantity

क्र.सं./S.N o.	प्रेषिती/रिपोर्टिंग अधिकारी /Consignee Reporting/Officer	पता/Address	मात्रा /Quantity	डिलीवरी के दिन/Delivery Days
1	Prevender Singh	281005,Mathura Refinery Indian Oil Corporation	1	365

क्रेता द्वारा जोड़ी गई बिड की विशेष शर्तें/Buyer Added Bid Specific Terms and Conditions**1. Generic**

OPTION CLAUSE: The Purchaser reserves the right to increase or decrease the quantity to be ordered up to 25 percent of bid quantity at the time of placement of contract. The purchaser also reserves the right to increase the ordered quantity up to 25% of the contracted quantity during the currency of the contract at the contracted rates. The delivery period of quantity shall commence from the last date of original delivery order and in cases where option clause is exercised during the extended delivery period the additional time shall commence from the last date of extended delivery period. The additional delivery time shall be $(\text{Increased quantity} \div \text{Original quantity}) \times \text{Original delivery period (in days)}$, subject to minimum of 30 days. If the original delivery period is less than 30 days, the additional time equals the original delivery period. The Purchaser may extend this calculated delivery duration up to the original delivery period while exercising the option clause. Bidders must comply with these terms.

2. Inspection**THIRD PARTY INSPECTION for IOCL:**

Goods and Services shall be subjected to stage wise and final inspection by any of the IOCL approved Third Party Inspection (TPI) agency

AS PER ATTACHED IOCL APPROVED TPI LIST

, and TPI charges are included in quoted prices, and no additional charges shall be paid by Owner.

It will be bidder's responsibility to arrange for third party inspection and submit the third party inspection release note on time. No time extension shall be allowed by IOCL for any delay/lapse in this regard.

Quoted prices are:

- i) Inclusive of charges for all facilities required for testing and all inspection requirements specified in the technical specifications and documents enclosed with the TENDER inclusive of destructive testing charges (if any), all expenses like travel, incidental and fees payable to third party inspectors.
- ii) Inclusive of all IBR/IGC/NACE/Radiography charges as per IOCL's technical specifications and the documents enclosed with the TENDER.
- iii) All built in import content (if applicable) shall also be subjected to inspection by any of IOCL approved TPI agency, in the country of origin of the import content, and charges for the same are included in quoted prices, and no additional charges shall be paid by Owner.

[Click here to view the file](#)

3. Buyer Added Bid Specific ATC

Buyer Added text based ATC clauses

GeM National Tender

- Kindly contact at dhimanv@indianoil.in. ashokkumar8@indianoil.in kumarabhishek1@indianoil.in for any clarifications.
- This bid has technical & commercial loading. Evaluation shall be done accordingly.
- For delivery period against PWCAMC items, also refer attached documents for details.
- Kindly refer attached specifications and BOM before quoting. Link for few documents is also shared below due to file size constraint on GeM portal.
- Format for Net-worth compliance is attached in given below link-
[Net worth format.pdf](#)
- Kindly refer Annexure-8 Electrical design basis 2023 from given below link-
[Annexure-8 Electrical design basis 2023.pdf](#)
- Kindly refer Master Supplied list from given below link-
[CPMSL.pdf](#)

Note- **Annual Turnover (ATO):** kindly consider below mentioned ATO and ignore this criterion mentioned anywhere else.

The Annual Turnover (ATO) of the bidder during any of the preceding three financial years (2022-23, 2023-24 & 2024-25) should be at least Rs. 29,63,25,000/- (Rs Twenty-Nine Crore Sixty Three Lakhs Twenty Five thousand only)

अस्वीकरण/Disclaimer

The additional terms and conditions have been incorporated by the Buyer after approval of the Competent Authority in Buyer Organization, whereby Buyer organization is solely responsible for the impact of these clauses on the bidding process, its outcome, and consequences thereof including any eccentricity / restriction arising in the bidding process due to these ATCs and due to modification of technical specifications and / or terms and conditions governing the bid. If any clause(s) is / are incorporated by the Buyer regarding following, the bid and resultant contracts shall be treated as null and void and such bids may be cancelled by GeM at any stage of bidding process without any notice:-

1. Definition of Class I and Class II suppliers in the bid not in line with the extant Order / Office Memorandum issued by DPIIT in this regard.
2. Seeking EMD submission from bidder(s), including via Additional Terms & Conditions, in contravention to exemption provided to such sellers under GeM GTC.
3. Publishing Custom / BOQ bids for items for which regular GeM categories are available without any Category item bunched with it.
4. Creating BoQ bid for single item.

5. Mentioning specific Brand or Make or Model or Manufacturer or Dealer name.
6. Mandating submission of documents in physical form as a pre-requisite to qualify bidders.
7. Floating / creation of work contracts as Custom Bids in Services.
8. Seeking sample with bid or approval of samples during bid evaluation process. (However, in bids for [attached categories](#), trials are allowed as per approved procurement policy of the buyer nodal Ministries)
9. Mandating foreign / international certifications even in case of existence of Indian Standards without specifying equivalent Indian Certification / standards.
10. Seeking experience from specific organization / department / institute only or from foreign / export experience.
11. Creating bid for items from irrelevant categories.
12. Incorporating any clause against the MSME policy and Preference to Make in India Policy.
13. Reference of conditions published on any external site or reference to external documents/clauses.
14. Asking for any Tender fee / Bid Participation fee / Auction fee in case of Bids / Forward Auction, as the case may be.
15. Buyer added ATC Clauses which are in contravention of clauses defined by buyer in system generated bid template as indicated above in the Bid Details section, EMD Detail, ePBG Detail and MII and MSE Purchase Preference sections of the bid, unless otherwise allowed by GeM GTC.
16. In a category based bid, adding additional items, through buyer added additional scope of work/ additional terms and conditions/or any other document. If buyer needs more items along with the main item, the same must be added through bunching category based items or by bunching custom catalogs or bunching a BoQ with the main category based item, the same must not be done through ATC or Scope of Work.

Further, if any seller has any objection/grievance against these additional clauses or otherwise on any aspect of this bid, they can raise their representation against the same by using the Representation window provided in the bid details field in Seller dashboard after logging in as a seller within 4 days of bid publication on GeM. Buyer is duty bound to reply to all such representations and would not be allowed to open bids if he fails to reply to such representations.

All GeM Sellers / Service Providers are mandated to ensure compliance with all the applicable laws / acts / rules including but not limited to all Labour Laws such as The Minimum Wages Act, 1948, The Payment of Wages Act, 1936, The Payment of Bonus Act, 1965, The Equal Remuneration Act, 1976, The Payment of Gratuity Act, 1972 etc. Any non-compliance will be treated as breach of contract and Buyer may take suitable actions as per GeM Contract.

[यह बिड सामान्य शर्तों के अंतर्गत भी शासित है /This Bid is also governed by the General Terms and Conditions](#)

जेम की सामान्य शर्तों के खंड 26 के संदर्भ में भारत के साथ भूमि सीमा साझा करने वाले देश के बिडर से खरीद पर प्रतिबंध के संबंध में भारत के साथ भूमि सीमा साझा करने वाले देश का कोई भी बिडर इस निविदा में बिड देने के लिए तभी पात्र होगा जब वह बिड देने वाला सक्षम प्राधिकारी के पास पंजीकृत हो। बिड में भाग लेते समय बिडर को इसका अनुपालन करना होगा और कोई भी गलत घोषणा किए जाने व इसका अनुपालन न करने पर अनुबंध को तत्काल समाप्त करने और कानून के अनुसार आगे की कानूनी कार्रवाई का आधार होगा।/In terms of GeM GTC clause 26 regarding Restrictions on procurement from a bidder of a country which shares a land border with India, any bidder from a country which shares a land border with India will be eligible to bid in this tender only if the bidder is registered with the Competent Authority. While participating in bid, Bidder has to undertake compliance of this and any false declaration and non-compliance of this would be a ground for immediate termination of the contract and further legal action in accordance with the laws.

---धन्यवाद/Thank You---