



BAP:RANIPET

BHARAT HEAVY ELECTRICALS LIMITED
(A Government of India Undertaking)
Boiler Auxiliaries Plant
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LETTER / FAX ENQUIRY

Dear Sir(s),

SUB : REQUIREMENT OF

REF : 3880129E

DT :

ENQUIRY NO. : 3880129E

ENQUIRY DATE : 02/05/2018

DUE DATE : 31st 23/05/2018

Please Submit your lowest quotation on FIRM PRICE basis.

FAX TO :

02/05/2018

Sln	Mcd	Description	Qty	Unit	Lot Sln	Lot Qty	Dly Dt
001	RFW801690001		1.00	ST	001	1.000	31/01/2019
	RFW801690001	SUPPLY OF SLURRY PUMPS AND ACCESSORIES AS PER TECH SPECIFICATION PART I OF DADRI : FGD: SLP:ROO AT NTPC DADRI SITE					
002	RFW801690002		1.00	ST	001	1.000	31/01/2019
	RFW801690002	SUPERVISION OF ERECTION&COMMISSIONING FOR SLURRY PUMPS &ACC AS PER TECHNICAL SPECIFICATION(PART-I) DADRI:FGD:SLP:R00 ATNTPC DADRI SITE.					

DESTINATION : STORES/NCPTP STAGE-II/NTPC DADRI. 10COPIES OF Q&M MANL READ POINTWISE CONFORMATION TO OUR SPECIFICATION SHALL BE SUBMITTED. SCOPE OF SUPPLY: SUPPLY OF SLURRY PUMP AND ACCESSORIES, SUPERVISION OF ERECTION AND COMMISSIONING, INSPECTION, TESTING AND HANDING OVER AT NTPC DADRI SITE. ENQUIRY SL NO 1 AND 2 WILL BE PROCURED AS A SET AND EVALUATION WILL BE DONE ON SET BASIS ONLY. REQUESTED TO TAKE A SPL NOTE THAT THERE ARE 11 TYPES OF PUMP. FOR DETAILS PL REF TABLE A OF TECHNICAL SPECN.

REGARDS

02/05/18

SR. MANAGER / PURCHASE श्री. प्रहलाद पटवर्धन / V. RAGUPATHY

श्री. प्रहलाद पटवर्धन (वर्गीकृत)
Sr. Manager (Commercial) man (V.S.G.FGD)
नगरपालिका, बीरगंज, नगरपालिका/BHEL, BAP, Ranipet-6

TECHNICAL SPECIFICATION FOR SLURRY PUMPS

CONFIDENTIAL

CUSTOMER : NTPC
PROJECT : DADRI 2 x 490MW
APPLICATION : FLUE GAS DESULPHURIZATION SYSTEM



BHARAT HEAVY ELECTRICALS LIMITED
(A GOVT OF INDIA UNDERTAKING)
Flue Gas Desulphurization Group
Ranipet



**TECHNICAL SPECIFICATION OF SLURRY PUMP
NTPC-Dadri (2X490 MW)**

DADRI:FGD:SLP:R00

TECHNICAL SPECIFICATION FOR SLURRY PUMP

Department	Prepared	Checked	Approved
FGD	R. Yuvaraj Senior Engineer-FGD	M Gane Naik Dy. Manager-FGD	Shaktikanta Dash DGM-FGD
Revision – 00 Dated 24/04/2018		COMMENTS : -----	

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**TECHNICAL SPECIFICATION OF SLURRY PUMP
NTPC-Dadri (2X490 MW)**

DADRI:FGD:SLP:R00

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**TECHNICAL SPECIFICATION OF SLURRY PUMP
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PART –I



TECHNICAL SPECIFICATION OF SLURRY PUMP NTPC-Dadri (2X490 MW)

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1.0 PROJECT INFORMATION:

a.	Owner	NTPC
b.	Buyer	BHEL, Ranipet
c.	Process/Application	Flue Gas Desulphurization

A) SITE CONDITIONS

1.	Ambient Temperature and Relative Humidity		
a.	Average Site Condition (ASC)		
	Ambient Temperature	:	27 deg C
	Ambient Temperature (Design)	:	45 deg C
	Relative Humidity	:	60 %

Note:

- 1) Reference site conditions shall apply for the Guarantee Values as well as for the Guarantee test/Performance test
- 2) Equipment and Material must be suitable for the range of ambient site conditions.

B) PROJECT LOCATION AND APPROACH

a.	State/Division	Uttar Pradesh
b.	District	Gautam Buddha Nagar

2.0 APPLICABLE CODES & REGULATIONS

The design and materials shall conform to the requirements of applicable codes and regulations of the latest edition. The design, manufacture, installation and testing of the pump shall follow the latest applicable Indian/International (ASME/EN/Japanese) Standards. In general, pumps shall confirm to latest edition of the following standards

- IS:1520 : Horizontal centrifugal pumps for clear cold fresh water
- IS:5120 : Technical requirements of roto dynamic special purpose pumps
- API:610: Centrifugal pumps for general refinery service
- IS:5639: Pumps handling chemicals & corrosion liquids
- IS:5659: Pumps for process water
- HIS: Hydraulic Institute Standards USA
- ASTM-1-165-65: Standard methods for Liquid Penetration Inspection



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3.0 INTENT OF SPECIFICATION

This specification covers the minimum requirements for the complete design, material, manufacturing, shop inspection, testing at the manufacturer's works, supervision of erection & commissioning and performance guarantee testing, 10 years AMC of slurry pumps along with accessories which are provided in the Flue Gas Desulphurization plant of DADRI 2 x 490 MW TPS. The following points may be noted.

- a. There are 2 units of each 490 MW and each unit is envisaged with one FGD system. Slurry pumps are required for various application in the FGD system.
- b. Bidder shall assume full responsibility for the entire equipment assembly and make all possible efforts to comply strictly with the requirements of this specification and other specifications/attachments to inquiry/order.
- c. In case, deviations are considered essential by the Bidder (after exhausting all possible efforts), the same shall be separately listed in the Bidder's proposal under separate section, titled as "List of Deviations/Exceptions to the Enquiry Document (Annexure-IV)".
- d. Any deviation, not listed under the above section, even if reflected in any other portion of the proposal, shall not be considered applicable.
- e. No deviation or exception shall be permitted without the written approval of the purchaser.
- f. Compliance to this specification shall not relieve the Bidder of the responsibility of furnishing equipment and accessories/auxiliaries of proper design, materials and workmanship to meet the specified start up and operating conditions.
- g. In case, the Bidder considers requirement of additional instrumentation, controls, safety devices and any other accessories/auxiliaries essential for safe and satisfactory operation of the equipment, the same shall be recommended along with reasons in a separate section and include the same in scope of supply.
- h. All accessories, items of work, though not indicated but required to make the system complete for its safe, efficient, reliable and trouble free operation and maintenance shall also be in supplier's scope unless specifically excluded.

4.0 PROVENNESS CRITERIA:

The Bidder shall offer only proven design which meets the Provenness criteria indicated in the **Annexure-I**. Necessary documentary evidences as per **Annexure-3K for qualification** shall be submitted along with the bid. If the bidder doesn't meet the specified provenness criteria, they are denied to participate in this tender.

Bidders are required to meet the Qualification Requirement (QR) for Slurry Pumps as per **Annexure-I & submit the Annexure-3K to qualification requirement**



**TECHNICAL SPECIFICATION OF SLURRY PUMP
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5.0 TECHNICAL INFORMATION

1	Designation	Slurry pumps	
2	Quantity	Please refer Table-A	
3	Location	Outdoor	
4	Operation	Continuous	
8	Design Capacity	Please refer Table-A	
9	Type of Pump	Please refer Table-A	
10	Type of Seal	Mechanical Seal	
11	Pump Driver	Motor (Please refer motor specification)	
12	Voltage level for Motors	Please refer motor specification	
13	Nozzle orientation		
i.	Orientation of Suction	End Suction	
ii.	Orientation of Discharge	Vertical	
14	Material of construction	Horizontal Centrifugal Pump Id No. (1) To (8)	Vertical Sump Pump Id No. (9) To (11)
i.	Casing	Ductile iron (65-45-12, ASTM A-536) with replaceable rubber liner / Hi chrome alloy	Ductile iron (65-45-12, ASTM A-536) with replaceable rubber liner / Hi chrome alloy
ii.	Impeller	Hi Chrome (ASTM 532 Grade IIIA) with minimum hardness of 600-650 BHN or superior material	Hi Chrome (ASTM 532 Grade IIIA) with minimum hardness of 600-650 BHN or superior material
iii.	Shaft	Duplex Stainless steel (S31803, ASTM A-276) or equivalent	Duplex Stainless steel (S31803, ASTM A-276) or equivalent
iv.	Shaft sleeve	CD4M Cu ASTM A-743 or equivalent with a minimum hardness of- 275 BHN	CD4M Cu ASTM A-743 or equivalent with a minimum hardness of- 275 BHN
v.	Base Plate	Carbon steel epoxy coated	Carbon steel epoxy coated



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5.3 FLUSHING WATER ANALYSIS

Process water shall be used for flushing of the Slurry pump. Process water analysis is given below.

S.No	Constituents	Unit	Water quality
1.	Total Dissolved Solids	ppm	~2110
2.	Calcium as CaCO ₃	ppm	721
3.	Magnesium as CaCO ₃	ppm	286
4.	Sodium as CaCO ₃	ppm	358
5.	Potassium as CaCO ₃	ppm	
6.	Iron as Fe	ppm	1.7
7.	Fluoride as F	ppm	0.11
8.	Bicarbonate as CaCO ₃	ppm	688
9.	Chlorides as CaCO ₃	ppm	168
10.	Sulphate as CaCO ₃	ppm	512
11.	Nitrate as NO ₃	ppm	0.55
12.	Silica	ppm	121
13.	pH		7.0 – 8.2
14.	Turbidity	NTU	55



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TABLE-A

SERVICE CONDITION OF SLURRY PUMPS

Pumps should be designed with the following service condition

Sl. No	Description	Limestone Slurry Feed Pump	Gypsum Bleed Pump	Primary Hydro Cyclone Feed Tank Pump	Filtrate Water Tank Pump
1	PUMP ID NO.	(1)	(2)	(3)	(4)
2	Type	Horizontal Centrifugal pump			
3	Capacity of the Pump (in m ³ /hr)	55	105	210	190
4	Head of the pump (in m)	45	40	60	30
5	Number of pumps	4 nos. (1W +1 S) x 2	4 nos. (1W +1 S) x 2	2 nos. (1W + 1S)	2 nos. (1W + 1S)
6	Mode of operation	Continuous	Continuous	Continuous	Continuous
7	Minimum liquid level in the tank (in m)	1.0	1.5	1.2	1.2
8	Maximum liquid level in the tank (in m)	12.0	6.0	6.1	5.0
9	Maximum operating temperature	65 deg C	65 deg C	65 deg C	65 deg C
10	Minimum operating temperature	10 deg C	10 deg C	10 deg C	10 deg C
11	Maximum operating speed	Vendor to confirm	Vendor to confirm	Vendor to confirm	Vendor to confirm
12	Power loading for bid evaluation	Applicable	Applicable	Applicable	Applicable
13	Pump efficiency	Minimum 65%	Minimum 65%	Minimum 65%	Minimum 65%
14	Type of seal	Mechanical seal	Mechanical seal	Mechanical seal	Mechanical seal

Sl. No.	Description	Secondary Hydro Cyclone Feed Tank Pump	Waste Water Tank Pump	Auxiliary Absorbent Tank Pump	Emergency Transfer Pump
1	PUMP ID NO.	(5)	(6)	(7)	(8)
2	Type	Horizontal Centrifugal pump			
3	Capacity of the Pump (in m ³ /hr)	125	55	155	570
4	Head of the pump (in m)	50	35	25	30
5	Number of pumps	2 nos. (1W + 1S)	2 nos. (1W + 1S)	1 no. (1W)	2 nos. (1W) x 2
6	Mode of operation	Continuous	Continuous	Intermittent	Intermittent



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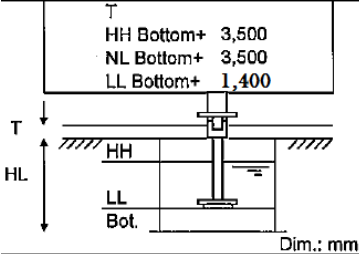
7	Minimum liquid level in the tank (in m)	1.0	1.0	1.2	1.5
8	Maximum liquid level in the tank (in m)	5.0	6.8	11.2	6.0
9	Maximum operating temperature	65 deg C	65 deg C	65 deg C	65 deg C
10	Minimum operating temperature	10 deg C	10 deg C	10 deg C	10 deg C
11	Maximum operating speed	Vendor to confirm	Vendor to confirm	Vendor to confirm	Vendor to confirm
12	Power loading for bid evaluation	Applicable	Applicable	Not Applicable	Not Applicable
13	Pump efficiency	Minimum 65%	Minimum 65%	Minimum 65%	Minimum 65%
14	Type of seal	Mechanical seal	Mechanical seal	Mechanical seal	Mechanical seal

Sl. No.	Description	Absorber area drain sump pump	Gypsum area drain sump pump	Limestone area drain sump pump
1	PUMP ID NO.	(9)	(10)	(11)
2	Type	Vertical sump pump		
3	Capacity of the Pump (in m3/hr)	155	50	50
4	Head of the pump (in m)	30	25	25
5	Number of pumps	4 nos. (1W +1 S) x 2	1 no. (1W)	1 no. (1W)
6	Service	Outdoor	Outdoor	Outdoor
7	Mode of operation	Continuous	Continuous	Continuous
8	Process Fluid parameters			
	Liquid :	Gypsum Slurry	Gypsum Slurry	Limestone Slurry
	Cl conc: :	< 20,000 ppm	< 20,000 ppm	120 ppm
	Temperature :	65 °C	65 °C	45 °C
	Specific Gravity :	1.215	1.215	1.215
	Viscosity :	0.01 Pa.s	0.01 Pa.s	0.1 Pa.s
	Solid conc. :	30 wt%	30 wt%	30 wt%
	SiO ₂ content :	20.7 g/l	20.7 g/l	18 g/l
	pH :	4-8	4-8	5-8
9	Maximum solid particle size	6-7 mm	6-7 mm	6-7 mm
10	Normal solid particle size,d50	325 mesh (43 micron)	325 mesh (43 micron)	325 mesh (43 micron)



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11	Tank level sketch			
12	Power loading for bid evaluation	Not applicable	Not applicable	Not applicable
13	Maximum operating speed	Vendor to confirm	Vendor to confirm	Vendor to confirm
14	Pump efficiency	Minimum 65%	Minimum 65%	Minimum 65%
15	Type of seal	Mechanical seal	Mechanical seal	Mechanical seal

**TABLE-B
SLURRY CONDITION**

Sl. No.	Parameter	Limestone Slurry Feed Pumps	Gypsum Bleed Pump / Primary Hydro Cyclone Feed Tank Pump / Emergency Transfer Pump	Filtrate water tank pump	Secondary Hydro Cyclone Feed Tank Pump	Auxiliary Absorbent Tank Pump	Waste Water Tank Pump
1.	Slurry to be handled	Limestone Slurry	Gypsum slurry	Gypsum slurry	Gypsum slurry	Limestone / Gypsum / mixture of two	Lime stone / Gypsum / mixture of two
2.	Maximum solid particle size	150 mesh (140 micron)	150 mesh (140 micron)	150 mesh (140 micron)	150 mesh (140 micron)	150 mesh (140 micron)	150 mesh (140 micron)
3.	Normal solid particle size, d50	325 mesh (43 micron)	325 mesh (43 micron)	325 mesh (43 micron)	325 mesh (43 micron)	325 mesh (43 micron)	325 mesh (43 micron)
6.	Chloride concentration	20,000 ppm (max)	20,000 ppm (max)	20,000 ppm(max)	20,000 ppm (max)	20,000 ppm (max)	20,000 ppm (max)
7.	Hardness of particle	5-7 (Mho scale)	5-7 (Mho scale)	5-7 (Mho scale)	5-7 (Mho scale)	5-7 (Mho scale)	5-7 (Mho scale)
8.	Slurry concentration	30 wt%	30 wt%	10.8 wt%	16.6 wt%	30 wt%	3 wt%
10.	Sp. Gravity of Slurry	1.215	1.215	1.068	1.111	1.215	1.022
11.	Viscosity at pump	0.03 Pa.S	0.01 Pa.S	0 Pa.S	0 Pa.S	0.01 - 0.03 Pa.S	0 Pa.S
12.	Slurry temperature	65 deg C	65 deg C	65 deg C	65 deg C	65 deg C	65 deg C



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6.0 SCOPE OF SUPPLY

Scope for the bidders shall include Design, Supply and Supervision of Erection & Commissioning.

Design: Includes basic engineering, detail engineering, preparation and submission of engineering drawings/calculations/datasheets/quality assurance documents/field quality plans, storage instructions, commissioning procedures, operation & maintenance manuals, performance guarantee test procedures and assisting BHEL in obtaining time bound approval from NTPC.

Supply: Includes manufacturing/fabrication, shop floor testing, stage inspections, final inspections, painting & packing.

Supervision of Erection & commissioning: Includes supervision of erection & commissioning, supervision of trial operation, training of customer's O&M Personnel.

The scope of supply for Slurry pump shall include but not limited to the following:

Sl. No	Scope
1.	Slurry pump complete with
	i. Casing
	ii. Rotor and Shaft assembly
	iii. Drive motor as per specification
	iv. Coupling
	v. Common base frame and shock pads
	vi. Single Mechanical seal with automatic flushing with a connection for additional manual flushing.
	vii. Flushing and drain system
	viii. Coupling guards with bolts
	ix. Suction filter
	x. Expansion joints at suction and Discharge
	xi. Companion flanges with gaskets and fasteners
	xii. Casing drain terminated at battery limit with flange
	xiii. Cooling water piping for Bearing cooling
	xiv. Lubrication system
	xv. Foundation bolts for supplied items
	xvi. Pedestal
	xvii. Drip tray
	xviii. Lantern Ring
	xix. Mechanical Running and Performance test at shop
	xx. Painting and Rust Prevention during shipment and construction
	xxi. Supervision of Erection & commissioning at site
	xxii. Special tools & tackles as applicable
	xxiii. Pressure & Temperature gauges and service indicator as applicable
	xxiv. Accessory Piping within the skid



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Sl. No	Scope
	xxv. Start-up & Commissioning spares as applicable
	xxvi. Seaworthy Packing & Forwarding (for import supplies) to Project Site office
	xxvii. Installation, operation and maintenance manuals
	xxviii. Any other items required for completeness of the equipment except the items covered in the exclusions.

6.1	TECHNICAL REQUIREMENTS									
1.	All slurry pumps for a particular service shall be identical and interchangeable.									
2.	All the slurry pumps shall be provided with motorized suction and discharge valves. In addition, flushing water lines with motorized valves shall be provided for each pump for automatic flushing of the pump after each shut down. The flushing water for the pumps shall be taken from the process water supply.									
3.	In case of pump with rubber lined casing, the casing should be radially split to allow easy removal of impeller.									
4.	All the pump wear parts in contact with the slurry shall be provided with replaceable rubber/elastomer liners suitable for the fluid handled. The Bidder can also offer a hi chrome alloy lined pump if the Bidder has previous experience of the same for similar applications. The material used by the contractor shall be proven in previous installations.									
5.	The material and thickness of the liners shall ensure a minimum service life of 2 years before replacement. All the wear parts of the pump shall be guaranteed for a minimum wear life of not less than 14000 hrs.									
6.	The design of the shaft shall ensure that the operating speed is at least 20% above the critical speed of the shaft.									
7.	The pump shall be provided with seals of proven type and shall be designed for minimization of seal water consumption. The shaft shall be supported on heavy duty ball/roller bearings.									
8.	The Pump shall be capable of developing the required total head at rated capacity for continuous operation. Also the pumps shall be capable of being operated to give satisfactory performance at any point on the HQ characteristics curve. The operating range of the pump shall be 40% to 120% of the duty point unless otherwise mentioned elsewhere. The maximum efficiency of pump shall preferably be within ± 10% of the rated design flow as indicated.									
9.	The total head capacity curve shall be continuously rising from the operating point towards shut-off without any zone of instability and with a minimum shut-off head of about 15% more than the design head.									
10.	Pumps of a particular category shall be identical and shall be suitable for parallel operation with equal load division. The head Vs capacity and BHP Vs capacity characteristics should match to ensure even load sharing and trouble free operation throughout the range. Components of identical pumps shall be interchangeable.									
11.	Pumps shall run smoothly without undue noise and vibration. Peak to peak vibration limits shall be restricted to the following values during operation: <table><tr><th>Speed</th><th>Antifriction Bearing</th><th>Sleeve Bearing</th></tr><tr><td>1500 rpm and below</td><td>75.0 micron</td><td>75.0 micron</td></tr><tr><td>3000 rpm</td><td>50.0 micron</td><td>65.0 micron</td></tr></table>	Speed	Antifriction Bearing	Sleeve Bearing	1500 rpm and below	75.0 micron	75.0 micron	3000 rpm	50.0 micron	65.0 micron
Speed	Antifriction Bearing	Sleeve Bearing								
1500 rpm and below	75.0 micron	75.0 micron								
3000 rpm	50.0 micron	65.0 micron								



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12.	The pumps shall be capable of starting with discharge valve fully open and close condition. Motors shall be selected to suit to the above requirements. Minimum motor margin (as per table below) shall be provided above maximum load demand of the pump in the entire operating range to take care of the system frequency variation and no case less than the maximum power requirement at any condition of the entire characteristic curve of the pump. Continuous Motor rating shall be at 50 deg.C ambient. Motor margin shall be as below <table><tr><th>Pump rated BKW</th><th>Motor rating</th></tr><tr><td><22 kW</td><td>125% of pump rated BKW</td></tr><tr><td>22 kW – 55 kW</td><td>115% of pump rated BKW</td></tr><tr><td>>55 kW</td><td>110% of pump rated BKW</td></tr></table>	Pump rated BKW	Motor rating	<22 kW	125% of pump rated BKW	22 kW – 55 kW	115% of pump rated BKW	>55 kW	110% of pump rated BKW
Pump rated BKW	Motor rating								
<22 kW	125% of pump rated BKW								
22 kW – 55 kW	115% of pump rated BKW								
>55 kW	110% of pump rated BKW								
13.	The kW rating of the drive unit shall be based on continuously driving the connected equipment for the conditions specified. However, in cases where parallel operation of the pumps are specified, the actual motor rating is to be selected by the Bidder considering overloading of the pumps in the event of tripping of operating pump(s).								
14.	Pumps shall be so designed that pump impellers and other accessories of the pumps are not damaged due to flow reversal.								
15.	The Contractor under this specification shall assume full responsibility in the operation of pump and motor as a unit.								
16.	The pumps shall be designed as impeller centrifugal (non-clog centrifugal) pump. The pumps shall be wear-resistant, be equipped with flushing devices to prevent sedimentation and shall be designed and installed in a manner to allow easy replacements, repair and maintenance.								
17.	Single mechanical seals with automatic flushing with a connection for additional manual flushing shall be applied.								
18.	Pumps shall have the rated capacity near the best efficiency point								
19.	Impellers shall be single piece casting. Fabricated impellers shall not be accepted.								
20.	The Pumps shall be wear resistant be equipped with flushing devices to prevent sedimentation and shall be designed and installed in a manner to allow easy replacements, repair and maintenance.								
21.	The slurry pumps shall be equipped with oil level indication, coupling guard and collecting equipment for leakage, made of resistant material.								
22.	Single mechanical seals with automatic flushing with a connection for additional manual flushing shall be applied.								
23.	Pump shall be either belt drive or Gear Box type. If the belt drive is chosen by the vendor, vendor should adhere to the applicable standards for ensuring the performance of the pumps as per the specification. A service factor of 1.5 or better should be considered for Gear Box.								
24.	All pumps shall be designed to withstand a test pressure of 200% of pump rated head or 1.5 times the maximum possible pump shut off pressure under maximum suction pressure conditions.								
25.	Product water flushing lines and drains are to be supplied for each pump handling the prevailing water to avoid corrosion if the pump is out of operation for extended periods.								
26.	Pumps must be carefully set to ensure that the net positive suction head available under all operating conditions will be adequate. The NPSH Values are to be referred to the least								



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	favorable operating conditions- lowest atmospheric pressure, lowest level of water on the suction side of the pump and highest temperature of the pumped fluid. An adequate safety margin of normally greater than 1m to the max NPSH required shall be provided.
27.	The Pump flow/head characteristics shall be such that within the operation range the head will continuously increase with decreasing flow, maximum head (shut off head) being at least 10% higher than the duty point head.
28.	All pumps shall be fitted with suction and discharge pressure gauges
29.	Venting valve shall be fitted to all pumps at suitable points on the pump casing unless the pump is self-venting due to the arrangement of the suction and discharge nozzles. Drainage facilities shall be provided on the pump casing or adjacent pipe work to facilitate the dismantling of pumps.
30.	Pumps shall have stable head-capacity characteristics curve from run-off to shut-off. Shut-off head should be minimum 125% of Best Efficiency Point (BEP).
31.	Selection of Duty point should preferably be at BEP (Best Efficiency Point) or slightly at the left of BEP. Selection point beyond 115% of BEP will not be acceptable. It should be noted that head variation is due to level variation in tank. Pump has to run in the system without compromising it's NPSH requirement at lowest water level in tank. Hence, when tanks are filled-up and is at normal water level, pump will operate at the right of BEP, pump's operating zone should be considered accordingly.
32.	External flushing is required to remove the accumulated particles and all related information should be mentioned in data sheet.
33.	Pump should have adjustment provision of axial clearance between casing and impeller for maintenance of performance at best efficiency when there is wear in between impeller and casing.
34.	In case rubber or nonmetallic linings are used, these will be two piece molded under pressure and adjusted to the screwed metallic clamping which have been welded to the casting.
35.	Each pump will have a coupling of adequate size, designed for full load and capable of supporting start –Up an overload moment. Each half of the coupling will be factory mounted and locked to its shaft. The coupling must be able to accept the adjustment of the impeller.
36.	The Antifriction bearing of the pumps shall be designed for minimum useful life (L-10) of 20,000 hours of continuous operation (Under the design condition). The thrust bearing will have dimensions for a minimum of 175 % of the required load.
37.	The pumps shall have mechanical seals of cartridge type with self-lubrication sliding ring cartridges. The static part will be mounted on the seal plate with circumferential ring (O-ring) or another flexible sealing ring. Built in seal design will not be accepted.
38.	The sealing areas shall be designed in such a way so that solids do not precipitate in them affect the cooling or affect the adjustment and mechanical functioning of the seals. Seals which do not need jet cleaning are preferred.
39.	Pump induced vibration due to flow pulsations shall be avoided through suitable design.
40.	Each rotating equipment shall be first statically balanced and then dynamically balanced



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	according to ISO 1940 (in the case of impellers this shall be done before and after mounting of the service rotor shaft).
6.2	CONSTRUCTIONAL FEATURES
A)	CASING
a.	Pumps shall be of Radial Split Casing, Close/Semi-open, Over-hang, End Suction Type Back Pull-out design, Vertical Discharge type for Horizontal Centrifugal Pump.
b.	The casing shall be designed to withstand the maximum shut-off pressure developed by the pump at the pumping temperature.
c.	Pump casing shall be provided with a vent connection and piping with fittings & valves. Casing drain as required shall be provided complete with drain valves, piping and plugs.
d.	Pump casing be provided with a connection for suction and discharge pressure gauge as standard feature. It shall be structurally sound to provide housing for the pump assembly and shall be designed hydraulically to minimum radial load at part load operation.
e.	Lifting provision of pump as a whole and individual casing half should be provided.
f.	For replaceable rubber liner, hardness of rubber should be of Shore hardness- SA 65 (+/-) 5. Rubber should be of Type and Class as defined by ASTM D-2000 which is suitable for uninterrupted operation of 5 years (minimum).
g.	Renewable wear rings shall be provided at points of running clearance and shall be made from appropriate materials.
B)	IMPELLER
a.	Impeller shall be closed, semi-closed or open type and designed in conformance with the detailed analysis of the liquid being handled. The impeller shall be secured to the shaft, and shall be retained against circumferential movement by keying, pinning or lock rings. On pumps with overhung shaft, impellers shall be secured to the shaft by a lockout or cap screw which tightness in the direction of normal rotation.
b.	For rubber lined pumps, tip speed of impeller shall not exceed 25 m/sec and for other pumps not over 30 m/sec.
c.	Miller number for the material should be justified for that pumping medium as per ASTM G75-95 as well as the corrosion effect of pumping medium
d.	Base material for rubber-lined impeller should be capable of handling speed as specified in the respective clause without affecting adhesion of lining. Impeller as rotating assembly along with all elements should be dynamically balanced according to ISO 1940
e.	Maximum size impellers for the pump body shall not be quoted for. By installation of a new impeller a head increase of 5% minimum shall be possible.
C)	IMPELLER/CASING WEARING RINGS



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a.	Replaceable type wearing rings shall be provided at suitable locations of pumps. Suitable method of locking the wearing ring shall be used. Wearing rings shall be provided in pump casing and/or impeller as per manufacturer's standard practice.
D)	SHAFT
b.	The critical speed shall be well away from the operating speed and in no case less than 130% of the rated speed. The shaft shall be ground and polished to final dimensions and shall be adequately sized to withstand all stresses from rotor weight, hydraulic loads, vibration and torques coming in during operation.
c.	All Pump shafts shall be of ample size to transmit the maximum possible output from the prime mover.
d.	The pump shaft and coupling are to be so dimensioned that the maximum permissible torque of the shaft is higher than the maximum transmissible torque of the coupling and gear.
e.	Pumps shall operate smoothly throughout the speed range up to their operating speeds. The first coupled critical speed must be at least 20% higher than the maximum operating speed. The determination of the shaft diameter and the distance between two consecutive bearings must include a sufficiently large safety margin to satisfy this condition.
f.	Shafts shall be conservatively designed to transmit maximum power required and to assure rigidity. Shafts shall be machined and ground to close tolerances and shall be tapered to permit easy removal of the seals and bearings.
g.	Shaft shall run in high precision heavy duty roller bearings. Lubrication system provided shall be such that visual checking of lubricant level is possible
h.	The shaft shall be finished to close tolerance at the rotor, coupling and bearing diameters. The size of shaft shall be calculated on the basis of maximum combined shear stress. This shear stress shall not exceed 30 percent of the elastic limit in tension or 18 percent of ultimate tensile strength.
i.	No parts of the shaft should come in contact with the liquid medium for horizontal centrifugal pump.
j.	Shaft should have a keyed joint at impeller hub. No thread connection between impeller and shaft is acceptable.
E)	SHAFT SLEEVES
a.	Renewable type fine finished shaft sleeves shall be provided at mechanical seals. Shaft sleeves shall be fastened to the shaft to prevent any leakage or loosening. Shaft and shaft sleeve assembly should ensure concentric rotation.
F)	BEARINGS
a.	Heavy duty bearings, adequately designed for the type of service specified in the enclosed pump data sheet and for long, trouble free operation shall be furnished. The bearings offered shall be capable of taking both the radial and axial thrust coming into play during operation. In case, sleeve bearings are offered additional thrust bearings shall be provided. Antifriction bearings of standard type, if provided, shall be selected for a minimum life 20,000 hrs. of continuous operation at maximum axial and radial loads and rated speed.



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	Proper lubricating arrangement for the bearings shall be provided. The design shall be such that the bearing lubricating element does not contaminate the liquid pumped. Where there is a possibility of liquid entering the bearings suitable arrangement in the form of deflectors or any other suitable arrangement must be provided ahead of bearings assembly. Bearings shall be easily accessible without disturbing the pump assembly. A drain plug shall be provided at the bottom of each bearings housing.
b.	The bearings may be ball, roller or sleeve bearing. If sleeve bearings are used these shall be machined for close running fit. The bearings shall be designed to take the necessary radial load as well as the net axial thrust. Bearings shall be lubricated properly and sized for an operating life of 20,000 hours on the basis of maximum load. Oil level indication shall be provided.
c.	The bearings shall be of automatic oil lubricated type. Vibration sensors and temperature measurements incl. temperature transmitter for continuous monitoring shall be provided.
d.	Bearing housings on horizontal shaft pumps shall be designed to enable the bearings to be replaced without removing the pump or motor from its mounting. Bearing housings on horizontal shaft pumps shall be effectively protected against the ingress of water, pumped fluid and dust by suitable nonferrous deflectors.
e.	If bearing housing requires cooling water, volume and pressure of cooling water is to be indicated in Technical Data Sheet.
f.	Lubricating oil will be the responsibility of pump manufacturer. Hence, manufacturer has to make arrangement of first fill of oil at installation, and at commissioning stage. Quantity of oil and its grade is to be indicated in Drawing and Operation Manual.
G)	MECHANICAL SEALS
a.	Mechanical seals shall be of single type with either sliding gasket or bellows between the axially moving face and shaft sleeves or any other suitable type. The sealing faces should be highly lapped surfaces of materials known for their low frictional coefficient and resistance to corrosion against the liquid being pumped.
b.	The pump supplier shall coordinate with the seal maker in establishing the seal chamber of circulation rate for maintaining a stable film at the seal face. The seal piping system shall form an integral part of the pump assembly. For the seals under vacuum service, the seal design must ensure sealing against atmospheric pressure even when the pumps are not operating. Necessary provision for seal water supply along with complete piping fittings and valves as required shall form integral part of pump supply.
c.	The Mechanical Seals shall be so arranged that repacking or fitting of replacement seals can be carried out with the minimum of disruption to plant operation.
d.	Design the mechanical seals chamber to have sufficient room to lubricate and get seal face cool with its own slurry.
e.	Provide requirements for periodical flushing to rinse the seal face for leaked slurry.
f.	Pump shall be supplied with mechanical seal. All mechanical seals, regardless of type or arrangement, shall be of the cartridge design. Hook sleeve cartridge should not be used.



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g.	Requirement of flushing water, its quantity, and pressure to be indicated in data sheet.
h.	Zero leakage is the intension of this specification. However, quantity of leakage, if it is unavoidable, pump should have a provision of collecting of any drip leakage and flushing the same to nearby pit is to be providing without corroding the base plate of pump.
i.	Mechanical seals shall be fitted and installed in the pump before shipment and shall be clean. Mechanical seals shall be plugged with screw for shipping
j.	Intention of the specification is not to specify Type of Seal, Seal design, Spring configuration, Seal configuration, Balanced or Unbalance type etc. Pump manufacturer to decide the same along with seal manufacturer the best seal that is suitable for the offered pump.
k.	Seal life has to be guaranteed, taking into consideration all its components for 25000 hrs. If the seals fail before the completion of guaranteed period, the same should be replaced free of cost by the bidder.
H)	COUPLING
a.	The pump and motor shafts shall be connected with an adequately sized flexible coupling of proven design with a spacer to facilitate dismantling of the pump without disturbing the motor. Necessary coupling guards shall also be provided.
b.	Coupling halves shall be machine matched to ensure accurate alignment. Couplings and gears must have a rated capacity of at least 120% of the maximum potential power transmission requirement.
c.	Coupling shall be of flexible type made of cast steel. The Bidder shall furnish both halves of the coupling. Both the Coupling halves shall be bored and keyed to fit shafts of the gearbox and the motor by bidder.
d.	All rotating parts such as coupling shall be covered with suitable protective guards. Guards shall be easily removable type. If weight of the coupling is heavy (>40 kgs), provision of tapped hole should be incorporated in right place of hub to handle the same effortlessly
I)	BASE PLATE
a.	A common base plate mounting both for the pump and motor shall be furnished. The base plate shall be fabricated steel and of rigid construction, suitably ribbed and reinforced. Base plate and pump supports shall be so constructed and the piping unit so mounted as to minimize misalignment caused by mechanical forces such as normal piping strain, internal differential thermal expansion and hydraulic piping thrust. Suitable drain troughs and drip lip shall be provided.
b.	Suitable holes shall be provided for grouting and these shall be so located that the base plate can be grouted in place without disturbing the pump and motor.
c.	Base plate must have provision of aligning driver and driven shaft in both directions of base plate so that shafts can be aligned. Similarly, provision must be provided for alignment of shaft in vertical plane.



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d.	Pump manufacturer is to supply base plate along with Foundation bolt & Nut, "Taper wedge" and the necessary fastener for Pump and Motor with Base plate.
e.	Base plate must be provided with a trough, material of which must be compatible of pumping liquid. Leaked liquid, collected in trough, can be systematically routed at designated point
f.	Base plate must be stress-relieved for any residual welding stress and certificate to that effect is to be submitted as per inspection requirement.
J)	ASSEMBLY AND DISMANTLING
i.	Assembly and dismantling of each pump with drive motor shall be possible without disturbing the grouting base plate or alignment.
K)	ADDITIONAL REQUIREMENT FOR VERTICAL SUMP PUMP
	The pumps shall be designed for continuous operation. The pump shall be single stage centrifugal type with semi open or open impeller. The pump impeller shall be cantilever type and shall not be supported below the base plate for easy withdrawal.
	The pump shall deliver the rated flow at rated head with margins as specified in the respective clauses. The pump shall be capable of pumping of slurry with solid concentration upto 30 wt% & particle lumps of 6-7mm.
	The material chosen for the pump components shall be suitable for the fluid handled and shall be proven in similar application.
	The pumps shall not be supported below the base plate level for easy withdrawal without entering the sump.
M)	ACCESSORIES:
1.	Expansion Joints:
i.	Expansion Joints shall be provided at suction and discharge of each pump
2.	Pressure Gauges:
i.	Pressure Gauges shall be furnished for at suction & discharge of each pump. Pressure gauges of class 1.6 or better must be used. Pressure instrument for measurement of steady pressure at varying pressure shall operate in a band centered on 60% of its maximum range. Pressure gauges shall have a dial size of 160 mm.
3.	Pump control:
i.	Each pump shall be furnished with required instrumentation and electrical accessory devices mounted and connected in a control cabinet.
ii.	Provisions shall be made for the interface between the local cabinet and the DCS such that the operation of the pumps can be controlled from the control console in the FGD Control room



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6.3 Motor

6.3.1 General

This specification generally covers the requirement for motors involved in gypsum dewatering system package.

6.3.2 Voltage level:

The voltage level for motors shall be as follows:

S.No	Rating	Voltage	Freq and voltage variation
1	Upto 0.2 kw	Single phase 240V AC / Three phase 415V AC	1. 50 Hz- +3% & -5 % 2. 10% combined variation of voltage & frequency.
2	Above 0.2 and up to 200 kw	Three phase 415V AC	

6.3.3 Starting voltage requirement

Up to 85% of rated voltage for ratings below 110 KW

Up to 80% of rated voltage for ratings from 110 KW to 200 KW

- Voltage rating for special purpose motors viz, VFD shall be as per manufacturer's standard.

6.3.4 Degree of protection:

S.NO	Item	Indoor	Outdoor
1	Motors	IP 54	IP 55
2	Cable box	IP 54	IP 55

6.3.5 Efficiency class:

Premium efficiency IE3 (For Continuous duty motors up to 200 kw) as per IS 12615, IEC:60034-30

6.3.6 General requirements:

S.No	Parameters	To be confirmed by vendor	Vendors confirmation
1	Direction of rotation	Suitable for both directions	
2	Class of Insulation	Thermal class 155 (F) insulation	



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3	Winding Insulation	The winding insulation process shall be Global Vacuum Pressure Impregnated i.e. resin poor method		
4	Starting Current	1. Less than or equal to 600 % full load current subject to tolerance as per IS (Normal motor) 2. Less than or equal to 700 % full load current subject to tolerance as per IS (Normal motor)		
5	Starting Voltage	1. Up to 85% of rated voltage for ratings below 110 KW 2. Up to 80% of rated voltage for ratings from 110 KW to 200 KW		
6	Torque requirement	1. Accelerating torque at any speed with the lowest permissible starting voltage shall be at least 10% motor full load torque. 2. Pull out torque at rated voltage shall not be less than 205% of full load torque. It shall be 275% for crane duty motors.		
7	Type of enclosure	1. Motors shall be either Totally enclosed fan cooled (TEFC) or totally enclosed tube ventilated (TETV) or Closed air circuit air cooled (CACA) type. 2. VFD driven motors to be offered with forced cooling type with machine mounted fan or pump driven by separate electric motor.		
8	Dimensions of Terminal box for LV motors	Motor MCR	Distance between center of stud & gland plate (in mm)	
		a. Upto 3 Kw b. Above 3 kw to 7 kw c. Above 7 kw to 13 kw d. Above 13 kw to 24kw e. Above 24 kw to 37kw f. Above 37 kw to 55kw g. Above 55 kw to 90kw	As per manufacturer's practice 85 115 167 196 249 277	
9	Cable glands & Lugs	Double compression type Nickel plated brass cable gland & insulated tinned copper crimping lugs to suit the cable sizes		
10	Paint shade	RAL 5012 (Blue)		
11	Space heaters	Suitable single phase space heaters shall be provided on motors rated 30KW and above. Separate terminal box for space heaters shall be provided		



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6.3.7 Locked rotor withstand time

S.No	Starting time at min permissible voltage	Locked rotor withstand time
1	Upto 20 secs	Under hot condition at highest voltage limit shall be at least 2.5 secs. more than starting time
2	More than 20 sec & less than 45 sec	Under hot condition at highest voltage limit shall be at least 5 secs. more than starting time
3	More than 45 sec's	under hot condition at highest voltage limit shall be more than starting time by at least 10% of the starting time

6.3.8 Special Requirement:

Motor operating through variable frequency drives shall be suitable for inverter duty. Also these motors shall comply the requirements stipulated in IEC: 60034-18-41 and IEC: 60034-18-42 as applicable.

6.3.9 Torque Requirements

- Accelerating torque at any speed with the lowest permissible starting voltage shall be at least 10% motor full load torque.
- Pull out torque at rated voltage shall not be less than 205% of full load torque. It shall be 275% for crane duty motors.

6.4 INSTRUMENTS

6.4.1 General:

This section covers the specification for instruments involved in slurry pumps.

Instruments as per attached list (Section 6.4.3) shall be minimum. Instruments that are required for satisfactory operation of the system though not indicated in the list shall also be supplied.

6.4.2 INSTRUMENTS:

6.4.2.1 General:

All transmitters, sensors, switches and gauges for parameters like pressure, level, flow etc. as required for the safe and efficient operation and maintenance of equipment in the system under the scope of specification shall be provided on as required basis.



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6.4.2.2 Instrumentation valves:

The necessary root valves, impulse piping, drain cocks, gauge-zeroing cocks, valve manifolds and all the other accessories required for mounting/erection of these local instruments shall be furnished, even if not specifically asked for, on as required basis.

6.4.2.3

The contacts of equipment mounted instruments, sensors, switches etc. for external connection including spare contacts shall be wired out in flexible/rigid conduits, independently to suitably located common junction boxes. The necessary cables, flexible conduits, junction boxes and accessories for the above purpose shall also be supplied. Double root valves shall be provided for all pressure tapping where the pressure exceeds 40 Kg./sq.cm.

6.4.3 LIST OF INSTRUMENTS:

6.4.3.1 Pressure gauge

To be provided at Pump Suction & Pump Discharge

6.4.3.2 Pressure Transmitter

To be provided at Pump Discharge

6.4.3.3 Specification for Pressure Transmitter:

Microprocessor based 2 wire loop powered electronic transmitter with 4-20 mA DC HART output signal shall be provided. For calibration ranges greater than or equal to 400mmwc, accuracy of transmitter shall be ± 0.060 % of calibrated range(min), stability 0.25 % of calibrated range for 10 years and 50:1 turn down. For calibration ranges less than 400mmwc accuracy shall be ± 0.10 % of calibrated range (min) and 20:1 turndown. Overpressure rating of transmitter shall be 150% of maximum operating pressure. Transmitter shall have weather proof IP-67 metallic housing with durable corrosion resistant coating, integral digital display with self-indicating diagnostics, ,plug and socket type electrical connection, calibration using HART calibrator, 2/3/5 Valve non integral manifold and rack with canopy.



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7.0 GENERAL REQUIREMENTS:

S. No.	Description
1.	Metric unit shall be used in the drawings and in the any displays on the equipments. Special attention should be taken that the unit of pressure shall be in dual scales of kPa and kg/cm ² G. For instance the pressure gauges should have dual unit's indication.
2.	Descriptions in the drawings, in the documents, and in the displays shall be in English
3.	All rotating parts such as coupling shall be covered with suitable protective guards. Guards shall be easily removable type.
4.	The equipment shall be designed to withstand the corrosive and moist environment in which these are proposed to operate.
5.	Noise level produced by any rotating equipment individually or collectively shall not exceed 85 dB measured at a distance of 1.0 meter horizontally from the source in any direction and 1.5m above operating floor. Predicted sound pressure levels for the pump drive assemblies shall be submitted as part of the proposal data.
6.	The overall vibration level shall be as per ISO 10816.
7.	Suitable drain connections shall be provided.
8.	The equipment shall be suitable for stable operation continuously.
9.	Limit of connection: The buyer (BHEL) has an intention to minimize interface for utilities as much as possible. The bidder shall consider this requirement in the planning stage of layout for the equipment. The bidder shall provide the header piping for utilities and branch piping to each nozzle. Terminal points for all utilities shall be located at skid edge. The bidder shall specify all terminal points with tie-in number in the P&ID and submit it in the proposal to confirm the scope of supply.
10.	Service life: Entire equipment except wearing parts shall be designed and fabricated for a minimum service life of 30 years of operation or 200,000 full load operating hours whichever is longer.
11.	Corrosion allowance: Corrosion allowance for entire equipment shall be in accordance with latest applicable Indian / International standard.
12.	Unless otherwise specified , flanges shall be in accordance with ANSI B16.5 Class 150
13.	Name plate: All equipment shall be provided with nameplates indicating the item number and service name. Name plates shall be of 304 Stainless steel plate and placed at a readily visible location. Nameplate of main equipment shall have enough information, which will be confirmed during engineering phase. Stainless steel nameplates for all instruments and valves shall be provided.
14.	Rotation arrows shall be cast in or attached with stainless steel plate on each item of rotation equipment at a readily visible location.



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S. No.	Description
15.	Unless otherwise specified, all equipment items where the weight exceeds 15 kg shall be provided with suitable lifting lugs, ears or ring bolts or tapped holes for lifting rings. Minimum shock factor for lifting lugs shall be minimum 2.0. The position of lifting lugs and reference dimension shall be shown on GA and/or outline drawings. NDT shall be conducted for lifting lugs. When any spreader bars are required for lifting and laydown, the bidder shall provide spreader bar with equipment.
16.	Skid Mount/Transportation: Equipment shall be fabricated as skid mount design as much as practical to minimize erection at the site.
17.	Two pieces of stainless steel earth lugs shall be provided with equipment diagonally. The position of earth lugs shall be shown on each GA and/or outline drawing.
18.	Provide double nuts for anchor bolts
19.	Bidder shall provide allowable vibration level on foundation in foundation drawings and/or general arrangement drawings.
20.	If the driver/driven equipment train is in the resonance condition or any vibration problems occur, the bidder shall solve the problems in a timely manner.
21.	Bidder shall provide the mating flanges with the necessary gaskets.
22.	All the surfaces of the carbon steel should be rust prevented before shipment for the period of at least 12 months for storage and construction.
23.	Bidder to provide capacity of crane or hoist required for material handling and the details of heaviest component to be handled.
24.	The list of all Bought out items with makes and country of origin to be mentioned along with offer to be submitted.
25.	Quality Plan to be submitted along with the offer.
26.	Cost towards the participation in discussions/meetings, providing technical assistance during technical discussions/meetings with customer for approval of drawing/documents etc. TA/DA, boarding and lodging to attend these meetings shall be borne by the bidder and shall be inclusive in supply portion.
27.	Material of construction for all equipment/components shall be subject to NTPC/ BHEL approval during detail engineering. Accordingly bidder shall consider MOC for all equipment/component as per best engineering practice, global standard and global references.
28.	Bidder to provide sub vendor list and Bidder shall strictly adhere to NTPC approved vendor list. In case bidder proposes an additional vendor for an item or vendor approval is required for any new item, acceptance shall be subject to approval by NTPC/ BHEL before placing order and bidder shall submit relevant documents as per Attachment-VI-Sub-Supplier Questionnaire .
29.	It shall be the complete responsibility of the successful bidders to obtain "Sub Vendor Approval" from BHEL / NTPC for all equipments & components. Any delay in sub vendor's approval should not affect the project schedule. If any of the sub vendors does not have the approval of NTPC/ BHEL, the same may be replaced with another NTPC/BHEL approved sub-



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S. No.	Description
	vendor only, without any price implications to BHEL.
30.	The modalities of inspection (Stage, Final, In-process) shall be finalized during detail engineering after submission of quality assurance plan (QAP). It shall be reviewed by the NTPC/ BHEL. Bidder shall follow the procedures of inspection as per the approved QAP. Bidder has to submit the following documents along with inspection call and if any other documents required as per approved QAP. - Raw material inspection certificate - Internal test reports - Statutory certificates as required. - All inspection & testing shall be carried out based on the following documents: a. Relevant Standards b. Specifications c. Approved drawings d. Data Sheets e. Calibration certificate for all the measuring instruments f. Bidder should also coordinate in getting the MDCC's (Material Dispatch clearance certificate) and all types of IC's (Inspection Certificates) from the NTPC along with BHEL.
31.	Minor Chipping i.e. up to 50 mm thk, micro leveling and providing shim plates for erection of equipment / item at site shall be in the scope of bidder.
32.	During detail engineering, bidder to strictly adhere to BHEL/NTPC drawing formats, document numbering, quality plan & FQP formats
33.	The identification and numbering of equipment, systems, items, etc. of supply, as well as of all documents and drawings shall be in accordance with reference Designation System for Power Plants - KKS system.
34.	Complete detail engineering drawings, calculations, selection of components etc. shall be reviewed & subject to approval of BHEL/NTPC during detail engineering
35.	Bidder shall furnish necessary inputs & drawings of all equipment in editable Auto CAD/ MS-Word /Excel format.
36.	During detail engineering, successful bidder shall ensure flow of drawings/documents as per schedule. Any comments from BHEL/NTPC should be addressed timely by the bidder.
37.	Bidder to note that list above is not exhaustive and any work /items required for completing the smooth operation and ensuring satisfactory running of the machines till final hand over to the end user shall also be in the scope of the bidder.
38.	Bidder shall submit the signed and stamped copy of all the pages which constitutes this technical enquiry specification signed by authorized signatory and clearly mentioning each clause under following two categories to avoid any ambiguity in scope understanding & the scope division along with technical offer.



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S. No.	Description
	a. "Accepted without deviation and considered in scope of work" b. "Not considered in scope of work"
8.0	PACKING AND FORWARDING
1.	Proper packing to be ensured. Indigenous Supply: Pump & sub system assembly shall be wrapped in polythene bags & packed in a strong rigid wooden crate. Rain water should not enter into the pump internals during storage in the outer yard of power plant. Imported Supply: All imported supply should be packed as per Sea worthy packing standards Annexure - VI. All imported items should have Sea worthy packing. Liberal packing materials and struts shall be provided to arrest rolling and to protect from transit damages.
2.	Equipment and process materials shall be packed and semi-knocked down, to the extent possible, to facilitate handling and storage and to protect bearings and other machine surfaces from oxidation. Each container, box, crate or bundle shall be reinforced with steel strapping in such a manner that breaking of one strap will not cause complete failure of packaging. The packing shall be of best standard to withstand rough handling and to provide suitable protection from tropical weather while in transit and while awaiting erection at the site.
3.	Equipment and materials in wooden cases or crates shall be properly cushioned to withstand the abuse of handling, transportation and storage. Packing shall include preservatives suitable to tropical conditions. All machine surfaces and bearings shall be coated with oxidation preventive compounds. All parts subject to damage when in contact with water shall be coated with suitable grease and wrapped in heavy asphalt or tar impregnated paper.
4.	Crates and packing material used for shipping will become the property of owner.(NTPC)
5.	Packaging or shipping units shall be designed within the limitations of the unloading facilities of the receiving ports and the ship will be used. It shall be the bidder's responsibility to investigate these limitations and to provide suitable packaging and shipping to permit transportation to site.
6.	Packing (tare) shall be part of the equipment cost and shall not be subject to return. The packing should ensure integrity and cohesiveness of each delivery batch of equipment during transportation. In case of equipment assemblies and unit's delivery in the packing of glass, plastics or paper the specification of packing with the material and weight characteristics are to be indicated.
7.	Each package should have the following inscriptions and signs stenciled with an indelible ink legibly and clearly: a. Destination b. Package Number c. Gross and Net Weight d. Dimensions e. Lifting places



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S. No.	Description
	f. Handling marks and the following delivery marking
8.	Each package or shipping units shall be clearly marked or stenciled on at least two sides as follows. NTPC NATIONAL CAPITAL THERMAL POWER PROJECTS STAGE – II DADRI, 2 X 490 MW. UTTAR PRADESH INDIA EPC CONTRACTOR: BHARAT HEAVY ELECTRICALS LIMITED, INDIA” In addition, each package or shipping unit shall have the symbol painted in red on at least two sides of the package, covering one fourth of the area of the side.
9.	Each part of the equipment which is to be shipped as a separate piece or smaller parts packed within the same case shall be legibly marked to show the unit of which it is part, and match marked to show its relative position in the unit, to facilitate assembly in the field. Unit marks and match marks shall be made with steel stamps and with paint.
10.	Each case shall contain a packing list showing the detailed contents of the package. When any technical documents are supplied together with the shipment of materials no single package shall contain more than one set of such documents. Shipping papers shall clearly indicate in which packages the technical documents are contained.
11.	The case number shall be written in the form of a fraction, the numerator of which is the serial number of the case and the denominator the total number of case in which a complete unit of equipment is packed.
12.	Wherever necessary besides usual inscriptions the cases shall bear special indication such as “Top”, “Do not turn over”, “Care” , “Keep Dry” etc. as well as indication of the center of gravity (with red vertical lines) and places for attaching slings (with chain marks)
13.	Marking for Safe handling: To ensure safe handling, packing case shall be marked to show the following: a. Upright position b. Sling position and center of Gravity position c. Storage category d. Fragile components (to be marked properly with a clear warning for safe handling)
14.	Each crate or package is to contain a packing list in a waterproof envelope. All items are to be clearly marked for easy identification against the packing List. All cases, packages etc. are to be clearly marked on the outside to indicate the total weight where the weight is bearing and the correct position of the slings are to bear an identification mark relating them to the appropriate shipping documents. All stencil marks on the outside of cases are either to be made in waterproof material or protected by shellac or varnish to prevent obliteration in transit.
15.	The packing slip shall contain the following information: - Customer name, Name of the equipment, Purchase Order number with Date, Address of the delivery site, Name and Address of the Sender, Serial Number of pump & accessories, BHEL



**TECHNICAL SPECIFICATION OF SLURRY PUMP
NTPC-Dadri (2X490 MW)**

DADRI:FGD:SLP:R00

S. No.	Description
	item Code, Gross Weight and Net weight of Supplied items.
16.	Prior to transport from manufacturer's work to destination, components of the unit shall be completely cleaned to remove any foreign particles. Flange faces and other machined surfaces shall be protected by an easily removable rust preventive coating followed by suitable wrapping.
17.	All necessary painting, corrosion protection & preservation measures shall be taken as specified in painting schedule. Supplier shall consider the coastal environment zone which is defined as "very severe" during final finishing/shipping.
18.	Successful bidder shall furnish the detail packing /shipment box details with information like packing box size, type of packing, weight of each consignment, sequence no. of dispatch, no. of consignment for each deliverable item against each billing break up units/ billable blocks. Without these details the BBU shall not be approved during detail engineering. Also, complete billing break-up with above mentioned details shall be submitted within 10days of LOI.
19.	All items/equipment shall be dispatched in properly packed condition (i.e. no item shall be dispatched in loose condition such that it becomes difficult to store/identify its location at site at a later stage).
20.	Cases which cannot be marked as above shall have metal tags with the necessary markings on them. The metal tags shall be securely attached to the packages with strong steel binding wire. Each piece, Skid, Case or package shipped separately shall be labelled or tagged properly.
9.0	SUPERVISION OF ERECTION, TESTING AND COMMISSIONING
1.	The erection of Slurry Pumps will be done by owner as per Erection Manual and check List. However, the bidder shall make one visit per boiler for the supervision of erection, pre-commissioning & post-commissioning check-up, start-up, testing and trial runs of all the items covered under the scope of supply.
2.	There will be one visit per boiler and totally there will be 2 visits for 2 boilers. The bidder will be informed well in advance for the visit. Bidder shall include 15 working days per visit in the offer with minimum 2 visits.
3.	TA/DA, boarding and lodging shall be borne by the bidder and shall be inclusive in supply portion.
10.0	EXCLUSION
	The following work associated with the slurry pump will be by BHEL: a. Civil foundations b. Walkways, platforms and ladders c. Element handling hoists
11.0	INSPECTION AND TESTING



**TECHNICAL SPECIFICATION OF SLURRY PUMP
NTPC-Dadri (2X490 MW)**

DADRI:FGD:SLP:R00

S. No.	Description
A)	Minimum Testing requirements to be considered are as below:
1.	Hydrostatic test is to be conducted at 200% of pump rated head or at 150% of shut off head, whichever is higher for duration of 30 minutes, taking into consideration of the fact that actual operating temperature is 65 deg Celsius (maximum).
2.	Impeller and rotor shall be first statically balanced and then dynamically balanced according to ISO 1940 (in the case of impellers this shall be done before and after mounting of the service rotor shaft).
3.	Vibration levels measured on the non-rotating parts shall not exceed the zone limit "B" as defined in ISO 10816 at steady conditions and shall not exceed the zone limit "C" as defined in ISO 10816 at transient conditions.
4.	List of Non-Destructive test over and above the material test are as follows: a. Casing: Material test, Magnetic particle (MPI), DP and Hydro test as applicable. b. Impeller- DPT and MPI as applicable. c. Shaft- Ultrasonic (UT), DPT and MPI. d. Sleeve- DP and Hardness test / Manufacturer's recommendation. e. Mechanical Seal- Manufacturer's recommendation. f. Base Plate- Stress relieving of weld. g. Replaceable Rubber liner- Spark test, Shore Hardness, Class and Type certificate
5.	UT on shaft forgings (greater or equal to 40mm) and MPI/DPT shall be done on shafts and impeller to ensure freedom from defects.
6.	Once mounting is finished and operation less will be conducted on each pump to determine the characteristic curves. For dynamic pressure and volume output, and to determine the parameters at the design point, mechanical running & performance testing shall be performed & witnessed.
7.	The pump rotating parts shall be subjected to static and dynamic balancing.
8.	NPSH Test, Vibration test and Noise level test shall be witnessed at shop.
9.	For surfaces with rubber lining Welding shall be visually inspected to verify the absence of rough area and unacceptable transition between surfaces which prevent the adequate adherence of rubber. The acceptance criteria shall be as per latest standard.
10.	For surfaces with rubber lining, degree of cleaning shall be visually checked before the application of the coating. There must be no area with oxidation, dirt or partially or generalized corrosion defects.
11.	Test certificates shall be issued for each lot of raw material used in the coating, corresponding to specific weight and traction resistance.
12.	For surfaces with rubber lining, adherence test shall be conducted on production samples. Adherence test shall be conducted on the actual surface through hammering. In order to verify the absence of air packets (or) surface without adherence.



**TECHNICAL SPECIFICATION OF SLURRY PUMP
NTPC-Dadri (2X490 MW)**

DADRI:FGD:SLP:R00

S. No.	Description
13.	For surfaces with rubber lining, Coating thickness shall be checked at 100%. A High voltage porosity test will be conducted on 100 % of the coated surface.
B)	General Inspection requirements to be considered are as below:
1.	Bidder shall furnish written copies of shop production, fabrication and quality test procedures and drawings to be used for review by BHEL / NTPC prior to manufacture. Inspection of above mentioned tests by BHEL/ NTPC representative at bidder's works is envisaged.
2.	The Bidder shall furnish performance test procedure along with standard. The test procedure will be reviewed and approved by the BHEL/NTPC.
3.	Slurry Pumps will be inspected at the Bidder's works before dispatch or where the test facilities are available.
4.	The Bidder shall conduct performance test for the remaining pumps and submit the reports.
5.	A dynamic balancing certificates stating that the rotating assembly has been balanced dynamically shall be sent to NTPC/ BHEL within one (1) week of the successful completion of balancing.
6.	Acceptance tolerance of actual versus guaranteed performance for capacity, head, efficiency and power absorbed shall be as per applicable standard.
7.	Vibration levels shall be measured during shop running/performance tests.
8.	Contract shaft seals shall be used during shop tests, unless the seal design is unsuitable for the shop-test condition.
9.	Slurry pumps shall not be released for shipment, until shop tests data and performance tests curves have been approved by Owner.
10.	Bidder should furnish performance guarantee as per applicable standard guarantee for the design, manufacture, material and safe operation of the equipments.
11.	BHEL shall witness the test at Bidder's works and a notice of minimum three (3) weeks shall be given for attending the inspection.
12.	Bidder to arrange all calibrated gauges, Instruments during inspection.
13.	Mechanical running and the performance test shall be carried out at factory. Bidder to arrange Motor of same / higher rating for the shop test and inspection.
14.	The performance test may be carried out using water at shop and shall be converted to the design condition.
12.0	PAINTING
1.	Surface Preparation : Power Tool Cleaning to St3 (SSPC-SP3)
2.	PRIMER COAT: 1. Primer: Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats) – DFT: 60 microns. 2. Intermediate: One coat of Synthetic Enamel intermediate coat to IS 2932; DFT- 50μ



**TECHNICAL SPECIFICATION OF SLURRY PUMP
NTPC-Dadri (2X490 MW)**

DADRI:FGD:SLP:R00

S. No.	Description
3.	FINISH COAT: One coats of Synthetic Enamel to IS 2932, DFT- 50µ/ coat Total DFT : 50 micron.
4.	COLOUR CODE (based on DIN 2403:2007-05 & DIN 5381) a. Base: To be informed later b. Lettering: To be informed later.
5.	Corrosion protection, coating and galvanizing, painting shall be taken care by the bidder. Bidder shall submit the painting scheme during detail Engg in line with the specification and shall be subject to approval of BHEL / NTPC.
13.0	SPARES,TOOLS & TACKLES
13.1	START UP & COMMISSIONING SPARES
	Start-up & Commissioning Spares shall be part of the main supply of the Slurry pumps. Start-up & commissioning spares are those spares which may be required during the start- up and commissioning of the equipment/system. All spares required for successful operation till commissioning of pump shall come under this category. Bidder shall provide an adequate stock of such start up and commissioning spares to be brought by him to the site for the equipment erection and commissioning. The spares must be available at site before the equipments are energized.
13.3	SPECIAL TOOLS & TACKLES:
	Any special tools & tackles required for the entire equipment to disassemble, assemble or maintain the units, they shall be included in the quotation and furnished as part of the initial supply of the machine. List of special tools & tackles shall be decided by bidder as per his proven practice. When special tools are provided, they shall be packaged in separate, boxes with lugs and marked as "Special Tools for (tag / item number)." Each tool shall be stamped or tagged to indicate its intended usage. Levers and eye bolts for the removal of parts to be serviced shall be submitted with special tools.
14.0	PERFORMANCE GUARANTEE
	All performance tests for Slurry pumps shall be carried out in accordance with any latest international codes/standards. 1) Bidder shall furnish Performance guarantee for the design, manufacture, material, safe and trouble-free operation of the Slurry pump and its accessories 2) Bidder shall guarantee and demonstrate the rated capacity of the pump at the rated head. 3) The Bidder shall ensure a design of the equipment to achieve an average target availability of 98% for 120 days and average target availability of 95% for 1 year. 4) The material and thickness of the liners shall ensure a minimum service life of 2



**TECHNICAL SPECIFICATION OF SLURRY PUMP
NTPC-Dadri (2X490 MW)**

DADRI:FGD:SLP:R00

S. No.	Description
	years before replacement. All the wear parts of the pump shall be guaranteed for a minimum wear life of not less than 25000 hrs. 5) Noise level ≤ 85 dB (A) at 1m horizontal distance from equipment/enclosures and 1.5m above operating floor is to be guaranteed. 6) Vibration levels measured on the non-rotating parts shall not exceed the zone limit "B" as defined in ISO 10816 at steady conditions and shall not exceed the zone limit "C" as defined in ISO 10816 at transient conditions. 7) Acceptance tests to be carried out as per the procedure defined by the bidder which shall be submitted for BHEL/ NTPC approval. 8) In the event that the performance test is unsuccessful, bidder shall take necessary remedial action at his cost and the performance test shall be repeated.
15.0	BID EVALUATION CRITERIA FOR POWER CONSUMPTION:
1.	POWER GUARANTEE Bidder to specify the guaranteed power consumption at motor input terminal per Pump operating at the duty point in their offer.
2.	BID EVALUATION CRITERIA FOR POWER CONSUMPTION: Power loading shall be applicable for designated slurry pumps as specified in Sl. No. 12 of Table A. Guaranteed power consumption at motor input terminal shall be quoted by bidder. Lowest quoted guaranteed power consumption will be taken as base value. Bid prices of other bidders will be loaded @ 197,080 INR for every KW excess over the base value as per the formula given below. Adjustment factor for excess power consumption in INR = $(GPC-BV) \times PL \times \text{No's of Working pumps}$ GPC- Guaranteed Power Consumption quoted by bidder in KW BV- base Value i.e. lowest quoted power consumption in KW PL- Power Loading @ 197,080 INR/KW
16.0	LIQUIDATED DAMAGES FOR POWER CONSUMPTION
	If actual Power Consumption at motor input terminal during prove out (or) PG Test operating at the duty point exceeds the value guaranteed by the bidder, liquidated damages for shortfall in performance shall be deducted from contract price as per the formula given below Liquidated damage deductible in INR = $(APC-GPC) \times P \times \text{No's of Working pumps}$



**TECHNICAL SPECIFICATION OF SLURRY PUMP
NTPC-Dadri (2X490 MW)**

DADRI:FGD:SLP:R00

S. No.	Description
	Where • GPC- Guaranteed Power Consumption quoted by bidder in KW • APC- Actual Power Consumption in KW • P- Penalty @ 197,080 INR per KW
17.0	WARRANTY
1.	The warranty period shall begin on the date of taking over by NTPC or date of issuance of the provisional acceptance certificate for the unit (whichever occurs first) and shall end after twenty-four (24) months. Provided that the successful bidder shall extend the provisions of this warranty to cover all repaired and replacement parts furnished under the warranty obligations hereunder, subject to the warranty period for the same being for a period of 24 months from the date on which replacement or renewal work is completed.
2.	In case of failure of the equipment to meet the guarantee, NTPC/BHEL reserves the right to reject the equipment. However, NTPC/BHEL reserves the right to use the equipment until new equipment supplied by bidder meets the guaranteed requirement .
18.0	FIRST FILL OF CONSUMABLES:
1.	Bidder's scope shall also include supply and filling of all chemicals, reagents, resins, lubricants, grease, filters and consumable items for operation up to commissioning including top up requirements. All lubricants proposed for the plant operation shall be suitable for all operating and environmental conditions that will be met on site consistent with good maintenance procedures as instructed in the maintenance manuals.
2.	Detailed specifications for the lubricating oil, grease, gases, servo fluids, control fluids, chemicals including items qualities and quantities required per month of the plant operation for the NTPC/BHEL's approval herein shall be furnished within 2 months of placement of Order. On completion of erection complete list of bearings/equipment giving their location and identification marks shall be furnished to BHEL along with lubrication requirements. All types of chemicals, consumables, lubricants and grease shall be readily obtainable locally and the number of different types shall be kept to a minimum. For each type and grade of lubricant recommended, bidder shall list at least three equivalent lubricants manufactured by alternative companies.
19.0	TRAINING
	Successful bidder shall provide comprehensive training for NTPC/BHEL Engineering, O&M, Erection & Commissioning staffs at site covering all aspects of the Slurry pumps - Operation & Maintenance, Troubleshooting etc.
20.0	CONFLICT
	Bidder's equipment shall be designed for and shall meet the service, performance and minimum level of quality requirements specified. Bidder shall be solely responsible for advising NTPC in writing of any conflicts between the specifications and Bidder's design, including



**TECHNICAL SPECIFICATION OF SLURRY PUMP
NTPC-Dadri (2X490 MW)**

DADRI:FGD:SLP:R00

S. No.	Description
	performance and levels of quality. Bidder agrees that its obligations, liabilities and warranties shall not be diminished or extinguished due to its meeting the requirements of the Specification.
21.0	DOCUMENTATION
A	DOCUMENTS TO BE SUBMITTED ALONG WITH THE OFFER
	The Bidder shall submit all documents, drawings, diagrams and all such information, which are necessary to fully understand the offer for techno – commercial evaluation. As a minimum requirement, the following information shall be furnished to fully describe the scope of work and services offered. a. Duly filled-in Technical Data sheets (Annexure II) and guarantee schedule furnished under Annexure-III. b. PID diagram c. Performance curve d. Terminal point details. e. General Arrangement drawings indicating dimensional data with civil loads and pocket details. f. Rotor GD² (kg-m²) g. Torque Vs Speed curve h. Calculation of Motor rating, Bearing capacity and selection of coupling i. Bill of material along with material and code j. Overall space and headroom requirement with details of handling during Erection, operation & maintenance of the equipment. k. Erection, Operation & Maintenance manual with lubrication schedule l. Procedure for shop / site performance tests m. Time schedule for delivery. n. Quality Assurance Plan. o. Make of all bought out items. p. Deviation list q. Spares list. r. Hoist / Crane requirement. s. Reference list of similar projects executed. t. List of proposed makes and vendors u. Training program and schedule for BHEL/NTPC personnel v. Equipment maintenance schedules



**TECHNICAL SPECIFICATION OF SLURRY PUMP
NTPC-Dadri (2X490 MW)**

DADRI:FGD:SLP:R00

S. No.	Description
	The above documents are required for proper evaluation purpose and vendors are requested to comply with above in all respect.
B	DOCUMENTS TO BE SUBMITTED AFTER AWARD OF CONTRACT
	The Successful bidder shall submit necessary data, documents and drawings for review, approval with requirements specified here under. However as minimum the following shall be submitted. a. Duly filled technical datasheet. b. Warranted performance curves. c. General arrangement drawings indicating dimension and civil loading details. d. Motor Data e. Recommended repair procedure etc. f. Operation and maintenance manuals g. Any unique installation instructions shall be noted on the submitted drawings or be provided as a separate document prior to the submission of the Operation and Maintenance Manual. h. Erection schedule and component list. i. Successful Bidder shall submit Calculation for Motor power requirement for sizing Motor within 2 weeks from the date of ordering. j. The characteristic curves of Slurry pumps shall be provided along with the documents. These shall be identical and uniform for all the pumps. The pumps shall be designed for optimum power consumption and should not fall under surge point between the operating range k. The following characteristic curves of the pump shall be submitted: i. Flow v/s Head ii. Flow v/s NPSH iii. Flow v/s Efficiency iv. Flow v/s power consumption v. Torque vs. speed curve for Motor selection l. The system-resistance point at different loads shall be indicated in the above performance curves. Drawings that are reviewed by the NTPC/ BHEL will be returned to bidder with a transmittal letter with any comments and / or questions marked on the drawings or noted in the letter. All comments and questions must be resolved before a resubmission of drawings / documents. If the design has not developed enough to resolve some of the comments or questions, bidder shall place a "hold" on those items or areas of design. NTPC/ BHEL reserves the right to return drawings unprocessed to bidder if there exists any evidence that bidder has not acknowledged all comments and questions. All necessary GA drawings, sections, sub-assembly drawings, specifications of main and sub



**TECHNICAL SPECIFICATION OF SLURRY PUMP
NTPC-Dadri (2X490 MW)**

DADRI:FGD:SLP:R00

S. No.	Description
	components and necessary set of operation & maintenance manual as asked by NTPC must be furnished by bidder in soft and hard copy forms. For all documents softcopy format shall be searchable pdf, however in addition all drawings, diagrams like P&IDS shall be supplied in ACAD or other editable format and all lists in Excel format. Further break up of technical documents will be discussed during finalization of the purchase contract. Unless agreed otherwise, Ten (10) hard copies and five (05) sets of electronic copies of all documents are to be submitted in the English language. Electronic Copies shall be submitted in primary original data format (e.g. DOC, XLS, DWG) as well as in a printable non-proprietary document format (e.g. PDF). Especially P&IDs shall be submitted as DWG files and PDF files. Bidder to ensure submission of hard copies as per NTPC requirement for all engineering drg/doc and for all subsequent revisions along with a soft copy through email to concerned project team. However all the engineering related information shall be furnished in soft form to BHEL.



**TECHNICAL SPECIFICATION OF SLURRY PUMP
NTPC-Dadri (2X490 MW)**

DADRI:FGD:SLP:R00

22.0 ANNEXURES

ANNEXURE-I- PROVENNESS CRITERIA

ANNEXURE-F-PROVENNESS CRITERIA											
CLAUSE NO.	INTENT OF SPECIFICATION										
4.00.00	QUALIFYING REQUIREMENTS FOR EQUIPMENTS/SYSTEMS										
4.01.00	Provenness criteria for critical equipment, auxiliaries, systems and bought out items: The Bidder / Bidder's sub-vendor(s) is required to meet the Provenness criteria and/or qualification requirement for critical equipment, auxiliaries, system and bought out items as per criteria stipulated below:										
4.01.01	Slurry Pumps for the Wet Limestone based Flue Gas Desulphurisation (FGD) System offered by the Bidder shall be only from such manufacturer(s) who has previously designed (either by itself or under collaboration / licensing agreement), manufactured / got manufactured the respective equipment(s) of the type, application and minimum equipment rating as stipulated below such that the respective equipment(s) should have been in successful operation in at least one (1) plant for a period not less than one(1) year reckoned as on the date of consideration for approval but not later than six months to award date of contract to the Main bidder: <u>Type and Rating for Qualification</u> <table><tr><th>Sl. No.</th><th>Name of Equipment</th><th>Type of Equipment</th><th>Application</th><th>Equipment Rating</th></tr><tr><td>(e)</td><td>Slurry Pumps</td><td>Centrifugal type</td><td>Wet Limestone based FGD application or ash slurry application in Coal fired power plant</td><td>80% of the flow & 100% of the head of the offered Slurry Pump(s)</td></tr></table>	Sl. No.	Name of Equipment	Type of Equipment	Application	Equipment Rating	(e)	Slurry Pumps	Centrifugal type	Wet Limestone based FGD application or ash slurry application in Coal fired power plant	80% of the flow & 100% of the head of the offered Slurry Pump(s)
Sl. No.	Name of Equipment	Type of Equipment	Application	Equipment Rating							
(e)	Slurry Pumps	Centrifugal type	Wet Limestone based FGD application or ash slurry application in Coal fired power plant	80% of the flow & 100% of the head of the offered Slurry Pump(s)							
4.01.03	Bidder shall offer and supply only the type of the above equipment(s) for which he himself or the manufacturer proposed by the bidder for the above equipment(s) is qualified. A JV / Subsidiary Company formed for manufacturing and supply of equipment(s) as listed at clause no. 4.01.01 above in India, can also manufacture such equipment(s), provided that it has a valid collaboration or licensing agreement for design, engineering, manufacturing of such equipment(s) in India with a qualified equipment manufacturer who meets the requirements stipulated at clause 4.01.01 above (or the technology provider of the qualified equipment manufacturer) for the respective equipment(s). Before taking up the manufacturing of such equipment(s), the bidder/ his sub-vendor(s) must create /have created manufacturing facilities at his works as per collaborator's/licenser's design, manufacturing and quality control system for such equipment(s).										

CLAUSE NO.	INTENT OF SPECIFICATION
	Further, in such a case, such qualified equipment manufacturers should have, directly or indirectly through its holding company/ subsidiary company, at least 26% equity participation in the Indian Joint Venture Company/ Subsidiary company, which shall be maintained for a lock-in period of seven (7) years from the date of incorporation of such Joint Venture/ Subsidiary or upto the end of defect liability period of the contract, whichever is later.
4.01.08	Before taking up the manufacturing of such equipment(s) as per clause 4.01.02, 4.01.03, 4.01.04, 4.01.05(i), 4.01.06 & 4.01.07 above, the Bidder / its sub vendor(s) must create (or should have created) manufacturing and testing facilities at its works as per Collaborator / licensor's design, manufacturing and quality control system for such equipments duly certified by the Collaborator / licensor. Further, the Collaborator / Licensor shall provide (or should have provided) all design, design calculation, manufacturing drawings and must provide (or should have provided) technical and quality surveillance assistance and supervision during manufacturing, erection, testing, commissioning of equipments.
4.01.09	Bidder shall offer and supply only the type of the above equipment(s) for which it, itself or the manufacturer / Collaborator(s) / Licensor(s) proposed by the Bidder for the above equipment(s) is qualified.
4.01.10	The Employer reserves the right to fully satisfy himself regarding capability and capacity of Bidder / its sub-vendor(s) and the proposed arrangement and may prescribe additional requirement before allowing manufacture of the equipment listed above for this contract. Note to clause 4.01.01 (1) Whenever the term 'coal fired' is appearing above, "Coal" shall be deemed to also include bituminous coal/brown coal/Anthracite Coal/lignite.

**FOR
NCTPP DADRI ST-II (2X490 MW)
BIDDING DOCUMENT NO. CS-6130/0330-109-9**

Bidder's Name and Address:

To
Contract Services-II
NTPC Limited
Noida-201301

Summary of Critical Equipment indicated under clause 4.01.00, sub-Section-I, Part-A of Section-VI.

Equipment Name	Sub-Vendor Name	Collaborator's Name, if applicable	Seeking Qualification as per clause... Sub-Section-I, Part-A of Section-VI
Booster Fans			*4.01.01 /*4.01.02 /*4.01.03
*Slurry Recirculation Pumps			*4.01.01 /*4.01.03 /*4.01.07
Oxidation Blowers			*4.01.01 /*4.01.03 /*4.01.04
Wet limestone Grinding mills			*4.01.01 /*4.01.03 /*4.01.05 (i)/ 4.01.05 (ii)
Slurry Pumps			*4.01.01/*4.01.03
Agitators			*4.01.01 /*4.01.03 /*4.01.06
Vacuum Belt filters			*4.01.01 /*4.01.03

Note : *Strike-off whichever is not applicable.

1. If qualification sought as per clause 4.01.01, sub-Section-I-A, Part-A of Section-VI then the details of the sub vendor (manufacturer) shall be filled by the bidder in the format A to G.

2. ~~If the qualification sought as per the clause 4.01.02, sub-section-I-A, Part-A of Section-VI, then the details of proposed sub vendor (i.e. manufacturer of such equipments for at least 490 MW unit rating) shall be filled individually by the bidder in the format A and the details of collaborator who meets the requirement stipulated at 4.01.01, sub-section-I-A, Part-A of Section-VI shall also be filled by the bidder in the format A separately. Further, in case of qualification vide clause 4.01.02, sub-section-I-A, Part-A of Section-VI a copy of valid ongoing collaboration and technology transfer agreement for design, engineering, manufacturing, supply of such equipment in India with the collaborator who meets the requirement stipulated at 4.01.01, sub-section-I-A, Part-A of Section-VI shall also be furnished.~~
3. If the qualification sought as per the clause 4.01.03, sub-section-I-A, Part-A of Section-VI then the details of JV/Subsidiary Company formed for manufacturing of such equipments in India shall be furnished individually for each equipment by the bidder such as,
- i) Copy of document of incorporation of JV/Subsidiary company in India
 - ii) Copy of valid ongoing collaboration and technology transfer agreement for design, engineering, manufacturing, supply of such equipment in India with the collaborator who meets the requirement stipulated at 4.01.01, sub-section-I-A, Part-A of Section-VI.
 - iii) Copy of document of at least 26% equity participation of qualified equipment manufacturer in the Indian JV company/subsidiary company directly or indirectly through its holding company /Subsidiary company, which shall be maintained for a lock -in period of seven (7) years from the date of incorporation of such JV/subsidiary or up to the end of defect liability period of the contract which ever is later.

Further, the details of collaborator or technology provider of the qualified equipment manufacturer who meets the requirement stipulated at 4.01.01, sub-section-I-A, Part-A of Section-VI shall be filled by the Bidder in the format A to G (format given at 1.00.00). In addition to that, the sub vendor along with the Indian JV company/subsidiary company, qualified equipment manufacturer and its holding company/subsidiary company as applicable shall furnish the DJU.

*** strike out whichever is not applicable.**

- 1.00.00 (Applicable for Bidder/his sub vendors seeking qualification as per clause no. 4.01.01, Sub section-I, Part-A of Section-VI. Bidder shall furnish the required data only for those equipments / auxiliaries which are proposed to be sourced under this route.)

We, hereby furnish the data on proveness criteria for critical equipment, auxiliaries, systems and Bought Out Items such as Slurry Pumps which have been designed (either by self manufacturer or under valid ongoing collaboration and technology transfer agreement), *manufactured/ *got manufactured and supplied by us /Manufacturer (or manufactured/ got manufactured & supplied by our proposed sub-vendors) and these are in successful operation in at least one (1) plant for a period not less than one year reckoned as on the date of consideration for approval but not later than six months to award date of contract to the Main bidder. The details of type and minimum equipment rating of such equipment are given below :

- E. Slurry Pumps:** We declare that, we/our Sub-Vendor, have designed (either by itself or under collaboration / licensing agreement), *manufactured/*got manufactured and supplied at least one (1) number of Slurry Pump of minimum 80% of the flow & 100% of the head of the offered Slurry Pump(s), Centrifugal type working in Wet Limestone based FGD application or ash slurry application in coal fired power plant and which has been in successful operation for minimum one (1) year reckoned as on the date of consideration for approval but not later than six months to award date of contract to the Main bidder, as per the details furnished below:

Sl. No.	Description	Reference Work
1.	Name of the reference plant & location:	
2.	Client name and his address:	
3.	No. of units and capacity in MW of unit:	
4.	Whether operating in a Wet Limestone based FGD application or similar process/duty application	-*Yes/*No
5.	Whether operating in a similar process/duty application	-*Yes/*No....(indicate industry type)
6.	Name of equipment manufacturer & address:	
7.	Date of commission of the equipments:	
8.	Model no. of the equipment:	
9.	Brief Technical particulars of the equipments:	
10.	Flow-	m ³ /h

Sl. No.	Description	Reference Work
11.	Head-	 meters of liquid column
12.	Whether the equipment(s) are in successful operation in atleast one(01) plant for a period not less than one(01) year reckoned as on the date of consideration for approval but not later than six months to award date of contract to the Main bidder	-*Yes/*No
13.	Flue gas Desulphurization system details:	*Technical extract/ *paper letter/ *email/ *Drawaing from user or *contract document or *scheme or *any document in public domain enclosed at annexure....to Attachment-3K
14.	Scope of Work:	*Letter of Award or *Contract or *P.O. enclosed at Annexure.....to Attachment-3K
15.	Performance details:	*Certificate/*Letter/*E-mail from End user enclosed at Annexure.....to Attachment-3K

*** Strike off whichever is not applicable.**

***Bidder to strike off whichever is not applicable.**

(Data to be furnished in line with format given at 1.00.00 of this Attachment)

2.02.00 We further confirm that details in respect of collaboration / valid licensing agreement for the aforesaid equipment as per 2.01.00 above who meets the requirement stipulated at clause **4.01.01**, sub-section-I, Part-A, Section-VI are enclosed at **Annexure-.....** to this Attachment. The data in respect of Provenness criteria for these equipment which are in successful operation in at least one (1) plant for a period not less than one reckoned as on the date of consideration for approval but not later than six months to award date of contract to the Main bidder are furnished below. We further confirm that we/ our sub vendor(s) have created manufacturing and testing facilities at our/ their works as per collaborator's/ Licensor's design, manufacturing & quality control system for these equipment(s)/ Auxiliary(ies).

(Data to be furnished in line with format given at 1.00.00 of this Attachment)

***3.00.00 Applicable for JV Company/Subsidiary Company meeting provenness criteria as per clause no. 4.01.01, Sub section-IA, Part-A of Section-VI.**

3.01.00 We, hereby confirm that JV company/ Subsidiary company (Strike off whichever is not applicable) formed for manufacturing and supply of equipment(s) (Slurry Pumps) has a valid ongoing collaboration and technology transfer agreement for design, engineering, manufacturing of such equipment(s) in India with a qualified equipment manufacturer who meets the requirements stipulated at clause 4.01.01 of sub-section-I, Part-A, Section VI of bidding documents (or the technology provider of the qualified equipment manufacturer).

Further, in such a case, such qualified equipment manufacturers is having, directly or indirectly through its holding company/subsidiary company, at least 26% equity participation in the Indian Joint Venture Company/subsidiary company, which shall be maintained for a lock-in period of seven (7) years from the date of incorporation of such Joint Venture / Subsidiary or up to the end of defect liability period of the contract, whichever is later. Before taking up the manufacturing of such equipment(s) (Slurry Pumps), we/our sub vendor(s) *will create /*have created manufacturing facilities at his works as per collaborator's/licenser's design, manufacturing and quality control system.

We further confirm that details in respect of collaboration / valid licencing agreement for the aforesaid equipment(s) (Slurry Pumps,) who meets the requirement stipulated at clause **4.01.01**, sub-section-I, Part-A, Section-VI for are enclosed at **Annexure-.....** to this Attachment.



TECHNICAL SPECIFICATION OF SLURRY PUMP
NTPC-Dadri (2X490 MW)

DADRI:FGD:SLP:R00

ANNEXURE – II- TECHNICAL DATA SHEET (to be repeated and filled by bidder for each type of pump)

Sl. No	Description	Data
1.0	GENERAL	
	a. Client	: BHEL-Ranipet
	b. Project	: DADRI (2x 490MW)
	c. Ultimate Customer	: NTPC
	d. Location	: Gautam Budh Nagar, UP, India
	e. Service	: Continuous
	f. Installation	: Outdoor
	g. Pump name	: Bidder to fill
	h. No. of working pumps	: Bidder to fill
	i. No. of standby pumps	: Bidder to fill
2.0	MANUFACTURER DETAILS	
	a. Model	: Bidder to provide
	b. Type	: Centrifugal (non- Clogging)
	c. Type of Driver	: Bidder to provide
3.0	OPERATING CONDITION	
	Medium to be handled	: Bidder to fill
	Maximum solid particle size	: Bidder to fill
	Normal solid particle size, d 50	: Bidder to fill
	Concentration of chloride	: Bidder to fill
	Viscosity of slurry	: Bidder to fill
	Concentration of slurry	: Bidder to fill
	Specific gravity of slurry	: Bidder to fill
	pH of slurry	: Bidder to fill
4.0	PERFORMANCE DATA	
	a. Capacity m ³ /hr	: Bidder to Provide
	b. Head M	: Bidder to Provide
	c. Pump efficiency %	: Bidder to Provide
	d. BkW Normal / Maximum KW	: Bidder to Provide
	e. Motor rating KW	: Bidder to Provide
	f. Motor Speed Rpm	: Bidder to Provide
	g. Differential pressure (inclusive of losses) Kg/cm ²	: Bidder to Provide
	h. Speed Maximum/ Normal/Minimum rpm	: Bidder to Provide
	i. Noise level dB(A)	: Bidder to Provide
	j. Performance curve	: Bidder to Provide
4.0	CONSTRUCTION DATA	
	a. Manufacturer	: Bidder to Provide
	b. Model No.	: Bidder to Provide
	c. Suction Rating / Size	: Bidder to Provide
	d. Discharge Rating / Size	: Bidder to Provide
	e. Type of rotor	: Bidder to Provide
	f. Size of rotor Dia mm	: Bidder to Provide
	g. Journal bearing: Type / Size:	: Bidder to Provide



TECHNICAL SPECIFICATION OF SLURRY PUMP
NTPC-Dadri (2X490 MW)

DADRI:FGD:SLP:R00

	h. Thrust bearing: Type / Size:	:	Bidder to Provide
	i. Bearing cooling required	:	Yes / No - Bidder to confirm
	j. Cooling water required	:	Bidder to confirm the quantity
	k. Type of drive	:	Direct Drive
	l. Shaft seal	:	Mechanical
	m. Size / Code	:	Bidder to Provide
	n. Type of coupling	:	Bidder to Provide
	o. Service factor	:	Bidder to Provide
	p. GD ² at drive shaft end	:	Bidder to Provide
	q. Rotation viewed from coupling end	:	Clock wise / Counter clock wise
	r. Coupling type	:	Yes / No - Bidder to confirm
	s. Coupling make	:	Bidder to Provide
	t. Base plate common to pump, bearing housing, coupling	:	Yes / No - Bidder to confirm
	u. Total weight kg	:	Bidder to Provide
	v. Maximum Erection weight kg	:	Bidder to Provide
5.0	MATERIALS		
	a. Casing	:	Bidder to Provide
	b. Impeller	:	Bidder to Provide
	c. Shaft	:	Bidder to Provide
	d. Shaft Seal	:	Bidder to Provide
	e. Base frame	:	Bidder to Provide
6.0	INSPECTION AND TESTING		
	a. Material Test certificates required for : Casing, Impeller, shaft, shaft sleeve	:	[R] [O]
	b. DPT & MPI Test for impeller, if applicable	:	[R] [O]
	c. Ultrasonic & Liquid penetrant test for shaft	:	[R] [O]
	d. Dimensional & visual inspection	:	[R] [W]
	e. Mechanical running test for 4 hrs.	:	[R] [W]
	f. Vibration test at rated speed	:	[R] [W]
	g. Performance test	:	[R] [W]
	h. Balancing test of Rotor Assembly	:	[R] [O]
	i. Noise level test	:	[R] [W]
	j. NPSH Test	:	[R] [W]
	k. Hydrostatic Test	:	[R] [W]
	[R]: Required, [W]: Witnessed by BHEL/ NTPC representative, [O]: Observed		

SIGNATURE OF BIDDER -----

NAME -----

DESIGNATION -----



**TECHNICAL SPECIFICATION OF SLURRY PUMP
NTPC-Dadri (2X490 MW)**

DADRI:FGD:SLP:R00

ANNEXURE III- SCHEDULE OF GUARANTEES (to be repeated and filled by bidder for each type of pump)

Sl. No	Description	Data
1.	Pump name	: Bidder to provide
2.	Rated capacity of pump m ³ /hr	: Bidder to provide
3.	Total head at rated capacity MLC	: Bidder to provide
4.	Guaranteed power consumption at motor input terminal per pump at rated capacity & head kW	: Bidder to provide
5.	Noise level at a distance of 1.0 meter horizontally from the equipment at site and 1.5 m above operating floor dB(A)	: Bidder to provide
6.	Maximum vibration (peak to peak amplitude at site) microns	: Bidder to provide
7.	Equipment Availability (%)	
	Equipment availability for 120 days %	: Bidder to provide
	Equipment availability for 1 year %	: Bidder to provide
8.	Pump Efficiency %	: Bidder to provide
9.	Guaranteed life of all pump wear parts including casing liners, bearing, etc. Hours	: Bidder to provide

SIGNATURE OF BIDDER -----

NAME -----

DESIGNATION -----



**TECHNICAL SPECIFICATION OF SLURRY PUMP
NTPC-Dadri (2X490 MW)**

DADRI:FGD:SLP:R00

ANNEXURE – IV- LIST OF DEVIATIONS/EXCEPTIONS TO THE ENQUIRY DOCUMENT

SI No	Clause No	Page No	Description of Deviation

Note: Enlarge the table to incorporate items

SIGNATURE OF BIDDER -----

NAME -----

DESIGNATION -----



**TECHNICAL SPECIFICATION OF SLURRY PUMP
NTPC-Dadri (2X490 MW)**

DADRI:FGD:SLP:R00

ANNEXURE -V

A) DOCUMENTS TO BE SUBMITTED ALONG WITH THE OFFER:

Sl. No.	Description	No of copies With proposal
1.	Specification	1
2.	Price Sheet	1
3.	Anchor Plan & Civil foundation Loading details	1
4.	Data Sheet	1
5.	Performance curve	1
6.	Annexure to qualification requirement- Annexure 3K.	1
7.	Proforma Packing List	1
8.	Shortest Manufacturing Time	1
9.	Approximate weight of each skid	1
10.	Reference plant details	1
11.	Required Electric power & other Utility List	1
12.	Deviation List	1
13.	General Assembly Drawing	1
14.	Pump and Motor Sizing Calculation	1
15.	Cross-sectional Drawing	1
16.	Sub-Vendor List	1
17.	Scope of Supply	1
18.	Quality Plan	1
19.	Spare List (Mandatory, Recommended)	1
20.	Start-up & Commissioning Spares	1
21.	List of Special Tools	1
22.	Delivery Schedule	1
23.	Test Arrangement & Test procedure	1
24.	T-S curve	1
25.	Hoist/Crane requirement	1
26.	P & I Diagram	1
27.	Catalogue	1



**TECHNICAL SPECIFICATION OF SLURRY PUMP
NTPC-Dadri (2X490 MW)**

DADRI:FGD:SLP:R00

B) DOCUMENTS TO BE SUBMITTED AFTER CONTRACT:

Sl. No.	Description	No of copies After award of contract	Delivery Time
1.	Utility Consumption	1	2 weeks after contract
2.	Foundation Data including Anchor plan	1	2 weeks after contract
3.	Performance curve	2	2 weeks after contract
4.	Assembly drawings of each equipment	1	1 month after contract
5.	Cross section detail drawing	1	1 month after contract
6.	Data Sheet	1	2 weeks after contract
7.	Annexure to qualification requirement- Annexure 3K.	1	2 weeks after contract
8.	Lubricating oil list	1	2 months after contract
9.	Special tools list	1	2 months after contract
10.	Installation and assembly procedure	1	4 months after contract
11.	Inspection and Test Procedure	1	1 month after contract
12.	Inspection & Test record	1	In 2 weeks after test
13.	Inspection Certificate	1	In 2 weeks after test
14.	Sub vendors List	1	2 weeks after contract
15.	Manufacturing Schedule	1	2 weeks after contract
16.	Progress report	1	Every month
17.	Proforma Packing List	1	2 months prior to shipping
18.	Approximate weight of each skid	1	2 months after contract
19.	Required Electric power	2	2 weeks after contract
20.	Pump and Motor Sizing Calculation	1	2 weeks after contract
21.	Material Test Certificates	2	In 2 weeks after test
22.	Pre Commissioning Check List	2	4 months after contract
23.	Scope of Supply	2	2 weeks after contract
24.	Quality Plan	4	1 month after contract



**TECHNICAL SPECIFICATION OF SLURRY PUMP
NTPC-Dadri (2X490 MW)**

DADRI:FGD:SLP:R00

Sl. No.	Description	No of copies After award of contract	Delivery Time
25.	Operation and Maintenance Manual	• 10 hardcopies and 5 electronic copies in English • 1 hardcopy and 1 electronic copy in "Bangla"	4 months after contract
26.	Spare List (Mandatory, Recommended)	1	1 month after contract
27.	Start-up & Commissioning Spares	2	1 month after contract
28.	List of Special Tools	1	1 month after contract
29.	Delivery Schedule	1	2 weeks after contract
30.	Test Arrangement & Test procedure	2	1 month after contract
31.	T-S curve	2	2 weeks after contract
32.	P & I Diagram	2	2 weeks after contract
33.	Catalogue	2	2 weeks after contract

SIGNATURE OF BIDDER -----

NAME -----

DESIGNATION -----



**TECHNICAL SPECIFICATION OF SLURRY PUMP
NTPC-Dadri (2X490 MW)**

DADRI:FGD:SLP:R00

ANNEXURE-VI

TECHNICAL SPECIFICATION FOR SEAWORTHY PACKING

Refer to Specification No: PE-TS-888-100-A001 for detailed specification on Seaworthy packing.

SIGNATURE OF BIDDER -----

NAME -----

DESIGNATION -----

VOLUME IIB

**TECHNICAL SPECIFICATION
FOR
SEAWORTHY PACKING FOR EXPORT JOBS**

SPECIFICATION NO. PE-TS-888-100-A001



**BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NEW DELHI, INDIA**

	TITLE TECHNICAL SPECIFICATION FOR SEAWORTHY PACKING FOR EXPORT JOBS	SPECIFICATION NO. PE-TS-888-100-A001	
		VOLUME II B	
		SECTION D	
		REV. NO. 0	DATE 10/08/2010
		SHEET 1	OF 52

1.0 Purpose

The purpose of this specification is to describe minimum packing requirements for the different items/equipment for all export Project and also to define marking and shipping requirements during transportation by ship, road and air for all export jobs.

2.0 SCOPE

For export jobs, sea worthy packing capable of performing all necessary functions like prevention of damage to the contents, sufficient to support frequent handling and lengthy period of outdoor storage in adverse weather conditions are required. Workmanship and materials used shall be of high standard meeting the technical requirements and in accordance with best commercial export packing practices. Vendor shall be responsible for sea worthy export packing, however it shall meet the minimum requirements specified herein. Equivalent or better packing methods may be deployed subject to approval of the BHEL/Purchaser. Vendor shall submit the packing procedure for its equivalent for purchaser's approval during detailed engineering.

The scope this specification is to define VENDOR's responsibilities in terms of:

- Preservation of the GOODS/items/equipments before packing.
- Packing of the GOODS for road, rail, sea and/or air transportation to desired destination i.e. project site
- Making cases/crates
- Chemical Treatment/Fumigation before packing to prevent fungus, damage due to termite, borer, rats, etc.
- Marking of cases/crates.
- Other Services required.

3.0 Application

This specification is applicable to all the goods to be transported to project site and requires to be in transit for longer duration. *However, for "Misc cable erection items", "Fire sealing system" & "Exothermic welding material", the packing requirements shall be as per the procurement specification.*

4.0 Definitions

- "BHEL" : Main EPC vendor
- "OWNER" : Customer for a particular export project.
- "VENDOR" : Company(ies)/VENDOR(s) to whom the BHEL has placed Purchase Order for GOODS/ items/system/package.
- "GOODS": means all or part of the articles, material, equipment supplies including technical documentation, as described in the Purchase Order, to be supplied by VENDOR.
- "PACKER": Packaging Company to whom VENDOR intends to sub-contract the packing in case they do not have own packing capability/facilities .
- "FREIGHT FORWARDER" : Means the Company responsible for performing freight forwarding activities.

5. General Information

	TITLE TECHNICAL SPECIFICATION FOR SEAWORTHY PACKING FOR EXPORT JOBS	SPECIFICATION NO. PE-TS-888-100-A001	
		VOLUME II B	
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The following requirements are intended as minimum requirements, and compliance to these requirements in no way absolves or relieves VENDOR of any responsibility or obligation outlined in the Purchase Order. In all circumstances, the packing will be designed and constructed in order to support GOODS during transportation as well as to prevent the Goods from damage due to impact, extreme climatic conditions, sun and rain. It must be ensured that the delivery of the GOODS to the jobsite by sea, road or air, in good condition.

GOODS shall be export packed in compliance with the best-established practices for international projects, in accordance with the following instructions. In the event of any conflict between these specified requirement and the established practices, specification requirement shall govern.

Due to climatic conditions and the complex transport operation(s), it is essential that protection and packing is of the highest standard. Packing means to efficiently protect the GOODS during the total transport operation; from the moment they leave the factory until they are delivered to the jobsite, including handling operations (loading/unloading) and storage.

When VENDOR do not have packing capabilities/facilities of their own and therefore intends to sub-contract, VENDOR have to inform BHEL/Purchaser of the name and address of proposed PACKER(s) for approval.

6.0 Criteria for Selection of Packaging

Packages are to be made according to categories, described in articles 8.1 to 8.5, depending on the type of materials, their fragility and size.

These categories have been established for the protection of equipment and material during multi-mode transports, i.e.: combination of overland and sea transport; containerization, air transportation.

In a general manner, the GOODS have to be packed in such a way that crates, bundles, pallets can be stored into General Purpose containers, wherever possible.

If VENDOR has any doubt about the correct method of protection or packing, he should contact BHEL/Purchaser in order to mutually agree on the adequate type of packing to be used.

Materials can be classified in following categories

- Hazardous Material
- Non-Hazardous Material
-

Further to above categorisation, non-hazardous materials can be sub- categorised for selection of packing.

6.1 Hazardous Materials

Though handling of hazardous material may is not applicable in the scope of this specification. All hazardous material must be packed in adherence to the detailed requirement relating to packing, marking and labelling set out in the most recent report of the Board's Standard Advisory Committee on the Carriage of Dangerous Goods in Ships for sea freight, and the Restricted Articles Regulations, laid down by the International Air Transport Association for airfreight.

6.2 Non-Hazardous GOODS

The scope of this specification is to provide necessary guidelines for packing for power plant equipment, components, Pipings & Valves, Fittings, other structural items, electrical items, spare parts and erection materials. The procedure is defined in subsequent paragraphs in details in clause no. 8.0.

	TITLE TECHNICAL SPECIFICATION FOR SEAWORTHY PACKING FOR EXPORT JOBS	SPECIFICATION NO. PE-TS-888-100-A001	
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7.0 Marking Instructions & Despatch details, Storage Code

7.1 Marking Instructions & despatch details

Packages and crates will be marked with indelible black paint, resistant to seawater. Marking must be perfectly legible.

The shipping marks, which will be as per fig-13, shall be stencilled on two sides and one end in clear characters at least 5 centimetres high (where crate size permits, otherwise use optimum size for each package dimension).

When the GOODS are to be shipped in containers then marking may be stencilled on one end only. However, packages must be stowed in a manner that shows these marks.

Crates containing fragile articles must be packed with special precaution against risk of breakage and must be stencilled on all sides "FRAGILE - HANDLE WITH CARE". Where crates are not to be overturned, VENDOR must show on the crates, clear and readily visible identification as per fig-12, to ensure they are kept in the correct position.

Packages/equipment of 2,000 kg or more must be marked with slinging points on all sides, in addition to the centre of gravity marks.

Number packages consecutively i.e. 1 of 10, 2 of 10, etc. Do not duplicate package numbers. VENDOR is responsible for any loss or damage caused by incorrect marking.

All cases/crates shall also be marked with the appropriate international standard graphic symbols for handling as shown in Fig 12.

As a minimum, all cases/crates are to be marked clearly on all four sides with:

- "HANDLE WITH CARE"
- "RIGHT SIDE UP"
- "KEEP DRY"

In the case of packages with a single gross weight totalling 2,000 kg and/or a height of more than 1m, the centre of gravity shall be clearly marked with the symbol on two adjoining sides. For all items of equipment with an eccentric centre of gravity this symbol shall be marked at the bottom, side and top of the package.

The slinging and lashing points shall be marked with a chain symbol.

When packing in cases/crates, these packages shall also have metal corners at the slinging points. (Fig-11)

External front and rear sides of the boxes to be planed for writing instructions.

Dispatch details such as consigner/consignee address, contract and case details, country of origin, port of delivery, stacking instructions shall be written on one side of the boxes. An anodized aluminum plate as per details and specifications given in fig-13 shall be provided on one side of the boxes.

One copy of packing slip wrapped in polyethylene bag covered with aluminum packing slip holder to be nailed on the external surface of the box. One more copy of the packing slip wrapped in polyethylene bag is to be kept inside the box at the pertinent place.

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7.2 Storage Code

The type of storage required is required to be specified, it will be shown on each packaging in **RED colour**.

- X Crates or packages to be stored outdoor without covers
- XX Crates or packages to be stored under tarpaulin
- XXX Crates or packages to be stored in covered or enclosed premises
- XXXX Crates or packages which must be stored in air-conditioned premises

8.0 GUIDELINES FOR PACKING GOODS

8.1 In the subsequent paragraphs details of different types of packings for different types of GOODS are defined. Vendor shall make packing details/procedure based on the guidelines and submit for approval.

8.1.1 Packing for Pipe, Fittings, Flanges and Valves, Structural Steel

Particular attention should be brought to pipe, fittings, flanges, valves and structural steel. Packing categories for piping and fittings will differ according to the diameter and wall thickness of these products. VENDOR shall comply with the following established practice.

IMPORTANT NOTE:

Depending on the project schedule and availability of ocean vessels, the piping and structural steel may be shipped in containers. In this event, VENDOR has to arrange the packages in such a way it allows the stuffing into Open Top in gauge containers.

8.1.2 Pipe

Where practicable, pipe lengths shall be limited to 11.8 meters.

All pipes 2" included and below shall be packed in crates. All pipes to be capped and ends sealed with waterproof tape.

Pipes over 2" up to 6", shall be bundled and banded in bundles of uniform length. Bundling is carried out with U-IRON or traversal planks, joined with threaded connecting rods with locknuts. Quantities and strapping positions depend on the lengths, with a 120 cm spacing to prevent distortion. Bundle weight shall not exceed 2,000 kg. All pipes are to be capped and ends sealed with waterproof tape (tape is not necessary if end caps are of the pre-shrunk or self-sealing type).

Pipes larger than 6" shall be shipped as single lengths with the ends capped. End caps are to be of the recessed type to enable the use of soft faced hooks, but still completely sealing the end and also protecting the weld.

All stainless steel piping must be packed separately in wooden crates. Any banding of bundles is to be with the same material.

8.1.3 Pipe Fittings, Flanges and Valves

All pipe fittings, flanges and valves up to 6", are to be packed in cases/crates. For items over 6", these may be fixed securely to a pallet base and enclosed in a crate, for protection. Where valves have actuators attached, rigidity must be ensured for the valve and actuator. The vulnerable parts of the actuator are to be completely protected within a wooden crate.

All stainless steel fittings, flanges and valves of all sizes, must be packed separately in wooden crates. Any strapping is to be with the same material.

8.1.4 Structural Steel

	TITLE TECHNICAL SPECIFICATION FOR SEAWORTHY PACKING FOR EXPORT JOBS	SPECIFICATION NO. PE-TS-888-100-A001	
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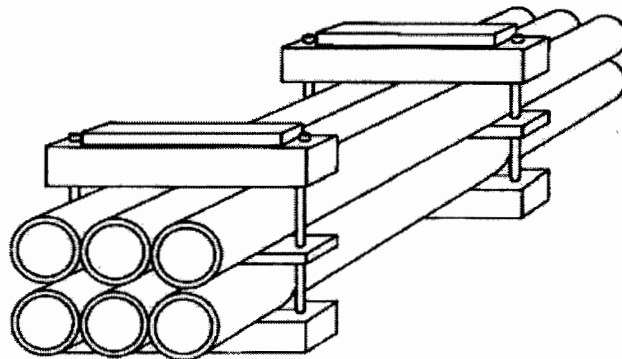
Structural Steel, reinforcing rods, bars, etc., should be packed in bundles of uniform length. Refer to articles 8.1.2, for strapping requirements. Bundle weight not normally to exceed 2,000 kg. Fabricated structures and structural steelwork, etc, should be bundled and packed using wooden beams and long bolting to secure the load.

8.2 Bundling – Packing Category I

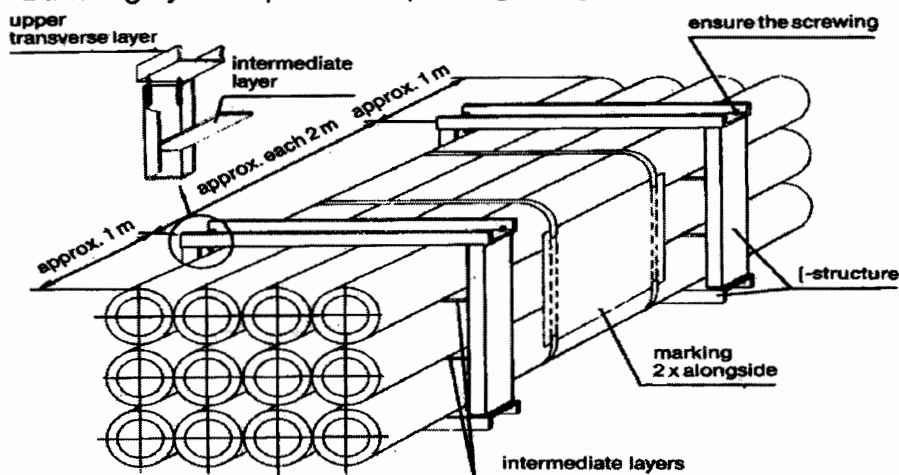
8.2.1 Type of Equipment

Equipment which is not subject to damage by corrosion or mechanical effect, i.e. pipes, piping, structural steel.

Packing category I



Bundling by U-shaped iron – packing category I A



8.2.2 Type of Construction

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- Bundling has to be effected
- By squared timber and threaded rods.
- With an intermediate layer (threaded on tightening bolts) according to the weight of the package.
- Wedge-shaped timbers must be added at the outer points of lower layer.
- Between the bolts a spacer must be nailed.
- The bolts must be secured (e.g. by locking nut).
- If single parts could protrude, an appropriate protection must be installed (flat iron or plates).
- Bundling with steel straps or PVC straps is not accepted.

8.3 Skids, Square Timber Constructions, Casings – Packing (Category II)

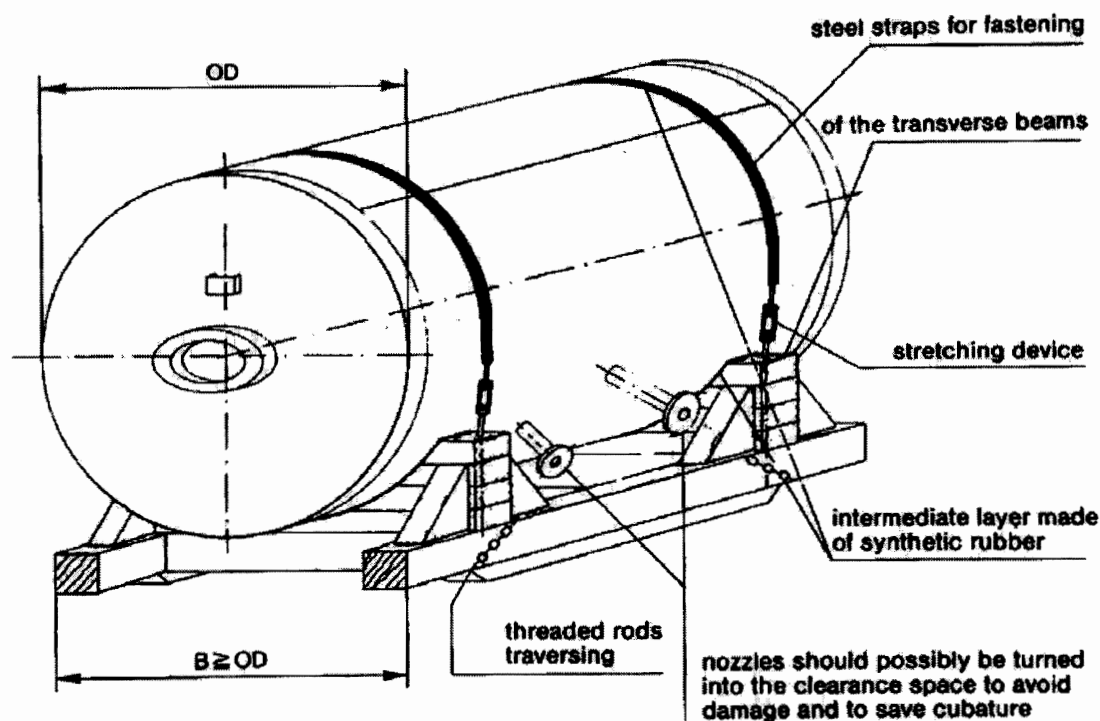
8.3.1 Type of Equipment

Voluminous apparatus, tanks and/or heavy pieces those are not vulnerable to mechanical or corrosive effects.

8.3.2 Type of Construction

- The construction skid can be made of wood or of metal.
- The fastening of the packages on the skid will be made by steel straps (flat iron) which have to be elastically lined, non-slip and securely bolted onto the skids.
- Flange openings have to be closed with gaskets and blind flanges or, if necessary, provided with cover.
- Skid constructions may not be less than the dimensions of the package in length or in width.
- Tanks and apparatus with their own support cradles must be supplied with an anti-slip lining.

PACKING CATEGORY-II



	TITLE TECHNICAL SPECIFICATION FOR SEAWORTHY PACKING FOR EXPORT JOBS	SPECIFICATION NO. PE-TS-888-100-A001	
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8.4 Packing of GOODS in Wooden Crates/Cases/Boxes

The construction of wooden crate/cases/boxes shall be as per the details indicated in clause 9.0 & Fig 1 to 11. Details indicated in the sketches for different categories Packing crates/boxes are only for a typical equipment considered for illustration.

8.4.1 Packing Category III

8.4.1.1 Type of Equipment

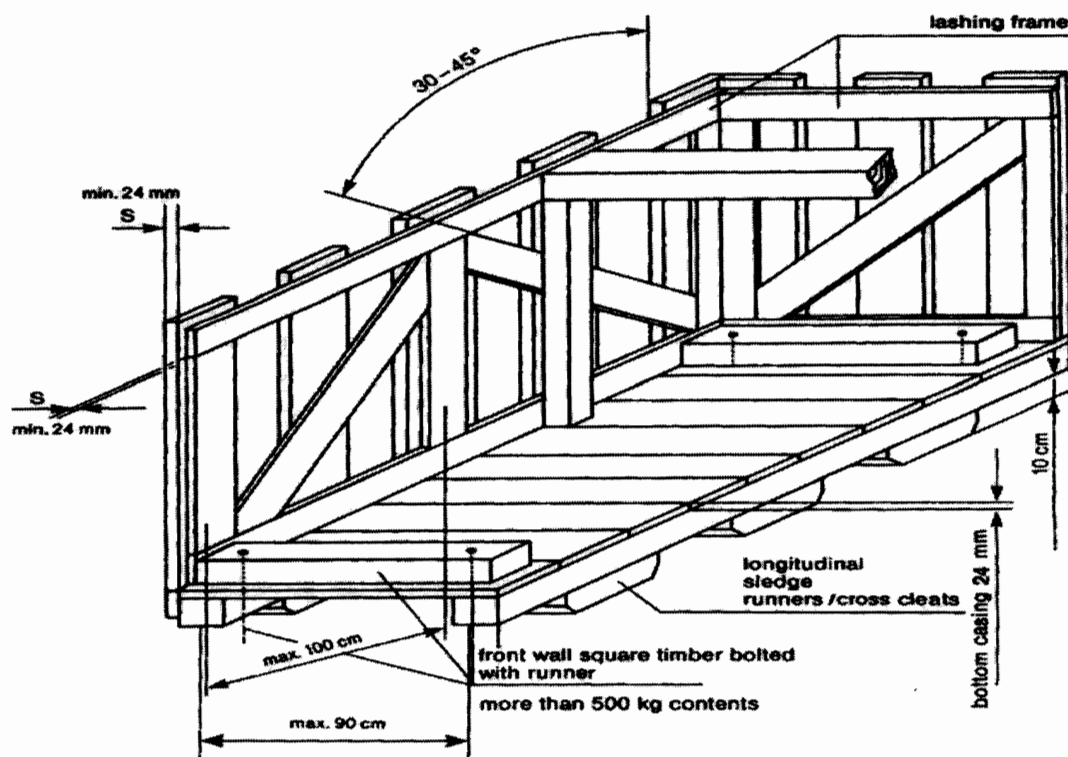
Fabricated equipment, which cannot be transported on cradles; frame-works, prefabricated piping and fittings, mechanical and electrical assemblies. *This type of packing is recommended where many parts of the equipment/component/assembly are not protruding out.*

8.4.1.2 Type of Construction

The equipment must be safely fastened to the bottom with bolts, possibly by the runners or to be spread in such a manner that no protruding parts are possible. For parts, sensitive to rainwater and/or debris, a protection has to be made by a foil cap.

If it is possible that single part could protrude through the front/back side wall, they shall be closed completely. The marking of the package shall be done on plywood plates at the prescribed sides.

Packing Category III



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8.4.2 Cases with Lining – Packing Category IV

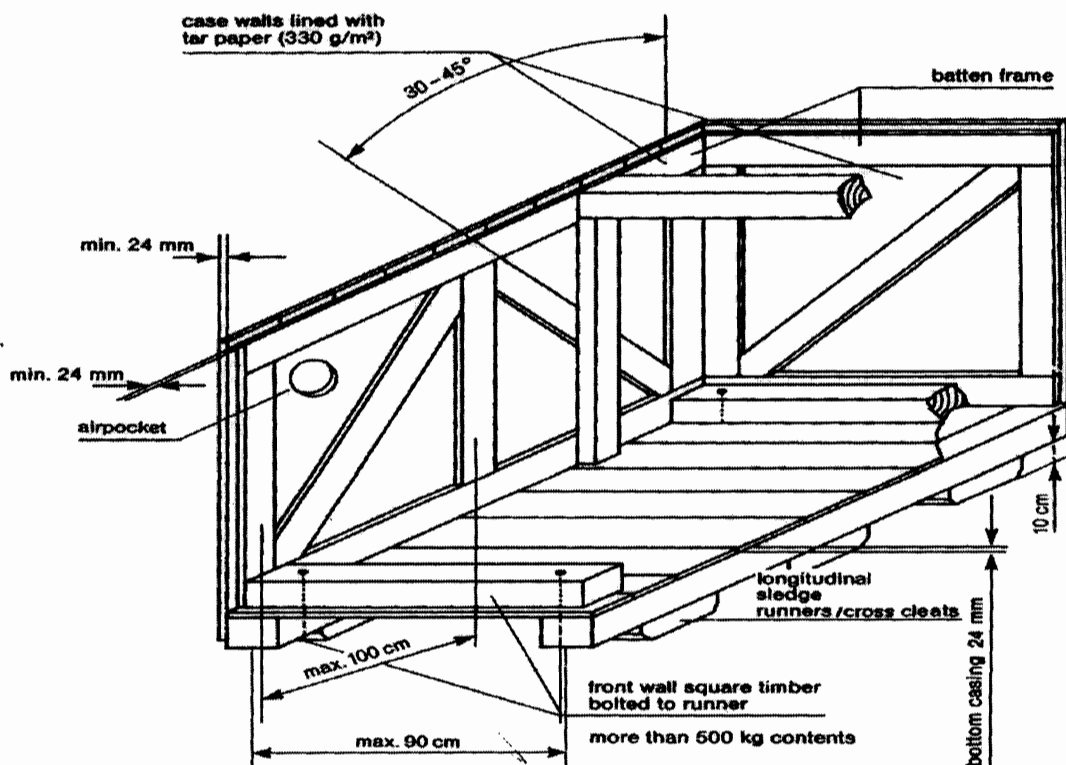
8.4.2.1 Type of Equipment

Recommended for equipment and mechanical parts Equipment sensitive to mechanical damage or parts and components that are particularly at risk of theft or loss; pumps, elbows, flanges, fittings, tools, erection materials, etc.

8.4.2.2 Type of Construction

The same type of construction as article 8.4.1.2, but with all sides completely boarded without space between the boards. Sides to be provided with waterproof lining; fabric-reinforced waterproof tar paper or polyethylene-foils resistant to ultraviolet rays can be used. Polyethylene-foil shall be fixed under the lid cover to avoid penetration of water. At weights of more than 500 kg the longitudinal runner must be bolted to the front all square timber. For ventilation inside the case, an opening in the waterproof lining must be placed between the diagonal battens and diagonal joists.

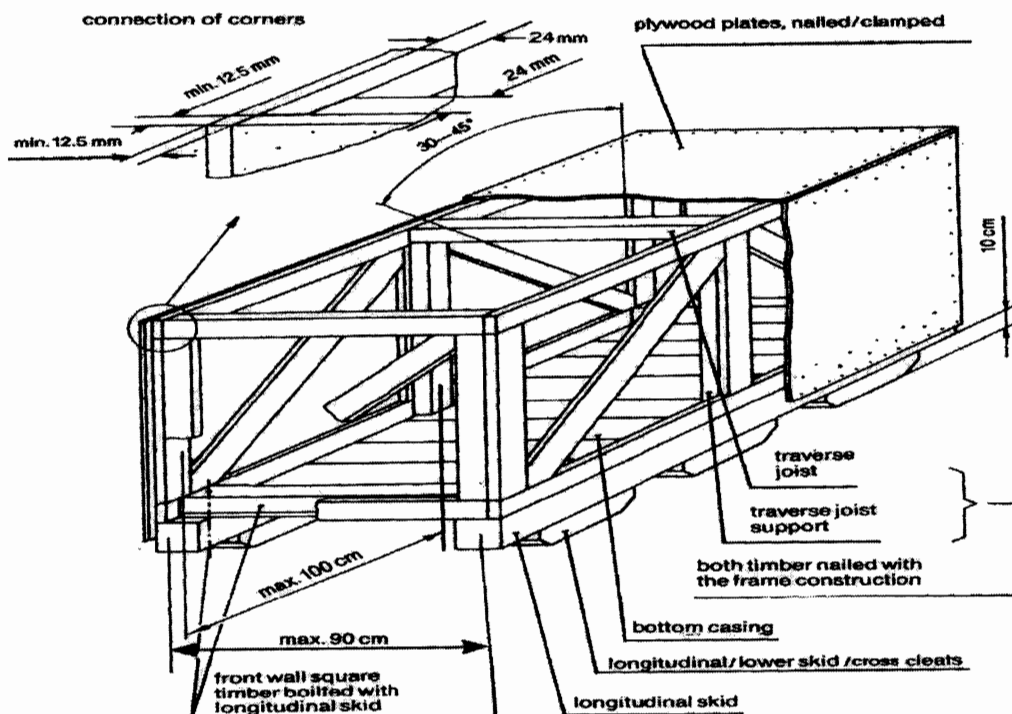
Packing Category IV



8.4.3 Cases with Alternative Surface Materials

8.4.3.1 Plywood Box – Packing Category IV A

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Case constructed of 5 layers of watertight, glued plywood with a total thickness of 12.5 mm. The frame must be constructed from minimum 24 mm timber or as per guide lines given above against clause 8.0, Fig 1 to 11 and must be suitable for the weight and nature of the parts to be packed. Planed square timber must be bolted with longitudinal skid and covered with diagonal joists. If applicable, construction of the cover and sides is to include diagonal bracing. Covers consisting of several layers of plywood are to be sealed with durable elastic putty or additional water-resistant sheets to be fixed.

8.4.4 Case with Barrier Material – Polyethylene Foil – Packing Category V

8.4.4.1 Type of Equipment

Sensitive equipment, simple electrical equipment, insulation materials, fire-resistant materials, with non-corrosion- guarantee for a period up to twelve (12) months.

8.4.4.2 Type of Construction

Preservation by welding in polyethylene-foil with addition of desiccants and if necessary, application of non-corrosive contact agents, otherwise, type of construction as indicated in article 8.4.2.2.

Additional marking:

- Case with desiccants.

8.4.5 Case with Barrier Material – Aluminium Compound Foil – Packing Category VI

8.4.5.1 Type of Equipment

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Electrical equipment such as, switchboards, electric motors, sensitive equipment, with non-corrosion guarantee, for a period up to twelve (12) months.

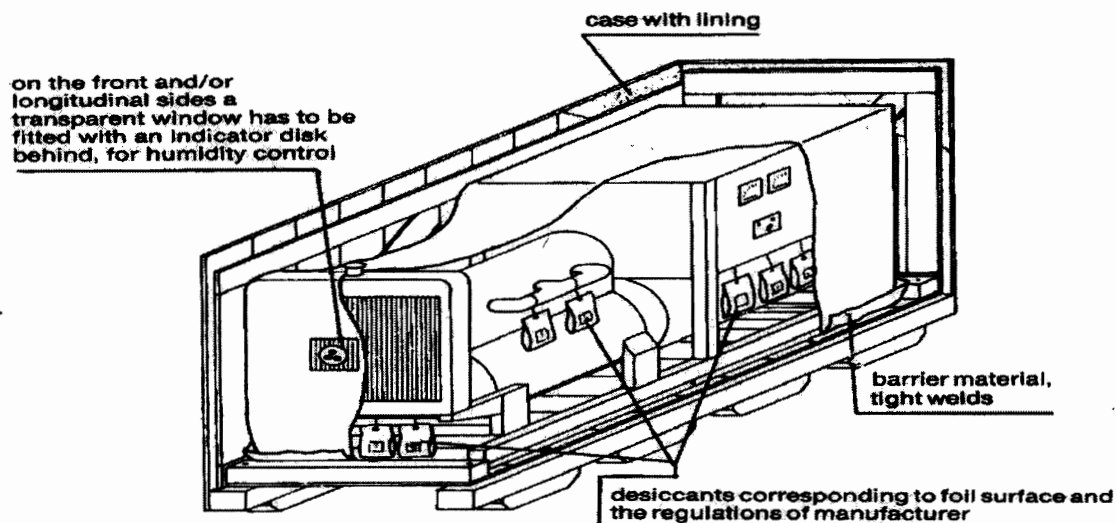
8.4.5.2 Type of Construction

Type of construction as indicated in article 8.4.2.2. Preservation by sealing an aluminium compound foil, with the addition of desiccants. Humidity indicators, if required and installed in the barrier wrapping, shall allow easy control from the outside.

Additional marking:

- Case with desiccants.

Packing Category V/VI



8.4.6 Double Case – Packing Category VII

8.4.6.1 Type of Equipment

GOODS which are of high sensitivity to shock, impact and vibration, for instance, special electrical equipment like computers, switchboards, laboratory instruments

8.4.6.2 Type of Construction

Case construction as indicated in article 8.4.2.2, with additional floating inner packing (case-in-case principle), padding corresponding to weight and sensitiveness. Preservation by sealing in aluminium compound foil with the addition of desiccants. The inner case has to be made of plywood or equivalent material with a thickness of 8-12 mm, depending on the weight of the GOODS to be packed. The inner buckles and/or frame borders have to be dimensioned so that the full stability of the inside case will be reached and no twisting is possible. The inner sides of the inside case will be lined with bituminous kraft paper on all sides (except bottom).

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8.4.7 Cable Drum – Packing Category VIII

8.4.7.1 Type of Equipment

All type of cables, wires, ropes, hoses.

8.4.7.2 Type of Construction

For all type of cables refer clause no. 11.1. For other items (wires, ropes, hoses) new or practically new drums are to be used. Planking of the e drums by use of boards, thickness minimum 20 mm, with additional double steel strapping, nailed, and carefully preserved/protected cable ends prior to packing.

8.4.8 Hazardous Materials – Packing Category IX

8.4.8.1 Type of Equipment

Hazardous materials according to the law are explosives, compressed gases, liquefied gases dissolved under pressure or deeply refrigerated, flammable liquids, flammable solids: substances liable to spontaneous combustion; substances which, on contact with water, emit flammable gases, oxidizing substances, organic peroxides, poisonous (toxic) and infectious substances; radioactive materials, corrosives, miscellaneous dangerous goods.

8.4.8.2 Type of Construction

Hazardous materials shall always be packed and documented separately from any other material. Selection of packaging materials, execution of packing and marking as well as documentation shall always be in compliance with the applicable laws and regulations. Any certificates required for transportation or for authorities to be supplied before shipment of the GOODS.

8.4.9 Wooden Floor as a Transport Support – Packing Category X

8.4.9.1 Type of Equipment

Any materials to be stuffed in containers or on flat racks and that are not stowed on standard pallets or otherwise suitably packed

8.4.9.2 Type of Construction

- Longitudinal internal square timbers bolted to the front wall runners, longitudinal skid.
- Maximum distance between longitudinal runners 90 cm (middle to middle of the runner).
- Full boarding of the floor.
- Attaching of lifting lugs and/or iron ropes for lifting/pulling the units off the transport equipment.
- If applicable, preservation of the equipment by sealing in polyethylene-foil or aluminium compound foil and the addition of desiccants.

8.5 Air Transport Packing

8.5.1 General

Certain types of material may have to be shipped by air from their country of origin. This means of transport will be exceptional, and will be used only:

- For GOODS, which are highly sensitive to shock or vibrations, such as computers, electronic instruments, or those of small dimensions and weight.
- For GOODS urgently required at the module yard(s) and/or jobsite.

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8.5.2 Type of Packing

Depending on the goods to be packed, VENDOR may use one of the following types:

- A triple-corrugated cardboard container made with waterproofed glue and a barrier layer of polyethylene on the outsides to keep out humidity.
- Wooden/cardboard packing cases: the wood being used for the framework and base of the cases, waterproofed triple-corrugated cardboard being used for the sides and top. These cases are of the "Bell" type, and used for material of small or medium dimensions.
- For larger dimensions, plywood cases are acceptable. The timber characteristics, cross-sections and thickness will be systematically determined by the nature of the loads to be packed.

8.5.3 Dimensions

In order to optimize the existing transport facilities (passenger or cargo aircraft), the dimensions of:

- Triple-corrugated containers.
 - Wooden/cardboard packing cases.
 - Plywood cases.
- Are to be adapted to pallets used for air transportation.

9.0 Detailed specification for Wooden Crates/Boxes/Cases and other packing materials

9.1 Technical specification for wood

The wood shall be Fir, Chir, Silver Oak (Gravillea Robusta), chemically treated mango and Pinewood with moisture content not exceeding 50%. The wood shall have flexural and compressive strength, stiffness, shock absorption and nail retention properties. The wood shall be free from common defects such as warp, bone, twist, knot, cracks, splits, end splits, bend, visible sign of infection and any kind of decay caused by insects or fungus, etc. Surface cracks with maximum depth of 3mm are permissible. A continuous crack of any depth all along the length is not allowed.

9.2 Chemical Treatment of Wood:

The wood shall be chemically treated to provide protection against deterioration due to fungi and attack by termites, borers, marine organism and any other kind of infection. It shall be treated only after final processing like cutting, planning, joint grooving, etc.

9.3 TYPE, DESIGN & DIMENSION OF WOODEN PACKING CASES:

9.3.1 PACKING OF EQUIPMENTS

Various mechanical, electrical and C&I equipment e.g. Pumps, motors, equipment skids, heat exchangers, control panels, switch gears, transformers, etc. shall be wrapped in weather proof packing and then secured in wooden packing cases. The construction of wooden packing cases/crates shall be as per details given below and also given in figure 1 to 11.

9.3.1.1 Bottom Frame

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The construction of bottom frame shall be as per Fig-2. The No. of slides/runners for bottom frames shall be selected depending upon the weight and overall dimensions of the load to be carried. The equipment shall be secured by fixing their base frame/plate with the help of bolt and nuts etc. to bottom frame of the wooden packing cases/crates. The equipment not provided with base frame/plate like cylindrical vessels, etc to be secured to the bottom frame of the wooden cases with "C" clamps fabricated from steel channels/ angle iron.

9.3.1.2 TOP FRAME

The construction of top frame shall be as per fig-3.

9.3.1.3 END PANELS

The dimension of the end and lateral panels shall be calculated according to overall dimensions of the items to be packed. Diagonal braces shall be used for packing cases having height exceeding 500mm. Details of bracings shall be as per fig 5 to 9.

9.3.1.4 Sling Plate

To facilitate lifting of cases, longitudinal under slide boards shall be fixed. To avoid damage to the box while lifting sling plates shall be provided. Refer fig-11.

9.3.1.5 Angle Iron Cleats

Angle iron cleats shall be used for strengthening the joints as indicated in fig-10

9.3.1.6 Other Requirements

- The thickness of planks for top, bottom, side and end panels shall be at least 25mm. Planks used for this purpose shall be joined with each other by tongue and groove joint. The groove dimension shall be such that tongue fits tightly into groove to make the joint.
- Runners/slides, traverse bars, etc shall be of single length i.e. without any joint. Planks for sheathing, diagonal bracing etc shall also be of single length up to 2400mm, proper jointing is permitted for planks for sheathing and diagonal bracings.
- Each equipment to be individually covered with double polyethylene petticoat. Sheet thickness of polythene sheet shall not be less than 0.175 mm (175 microns). The sealing shall be such so as not to allow moisture inside.
- The inner surface of 4 sides of shooks shall be nailed with bituminized water proof craft paper. Wherever 2 pieces of kraft paper are used, joint shall have an overlap of minimum 20 mm.
- All the inner sides of the box shall be nailed with bitumen coated HESSIAN POLYTHYLENE KRAFT PAPER. For top frame it shall project on all sides by 100mm and shall be nailed on sides. Wherever 2 pieces of kraft paper are used, joint shall have an overlap of minimum 20 mm.
- For delicate equipment like control panels and switchgears, lighting panels and lighting transformers, suitable cushioning material like rubberised coir (min. 50 mm thick and 100 mm wide) shall be provided on their bottom support and the gap between the panel and casing

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shall be filled with rubberized coir with distance between consecutive supports less than 500 mm (ref fig15). For other equipment suitable support from sides of the casing shall be provided.

- Switchgear cubicles, control panels and control desks shall be packed and shipped in separate convenient sections. The components e.g. circuit breakers relays and instruments etc. which are removed from panels for shipping purpose and shall be separately packed and shipped as per packing instructions in clause 10.4.
- Packing case for control panels and switchgear panels shall be finally covered with GI sheet of minimum thickness of 0.4mm.
- Packing cases shall be bound at edges by nailing MS clamps/brackets at sufficient intervals. Further heavier boxes shall be strapped with C clamps (ref fig-4) fabricated from steel channels/angles and lighter boxes shall be strapped with hoop iron strips.
- Silica gel is used for this purpose to protect contents over sufficiently long time from corrosion. Silica gel shall be indicating type confirming to IS-304 (1979) packed in cotton bags placed at different positions inside the packing for absorbing moisture and shall not come into directly contact with equipment/material inside the package. The quantity of silica gel shall be adequate for storage period of one year, however it shall not be less than 4 gm. per ltr. Volume of case subject to minimum 400 gm. Per case.



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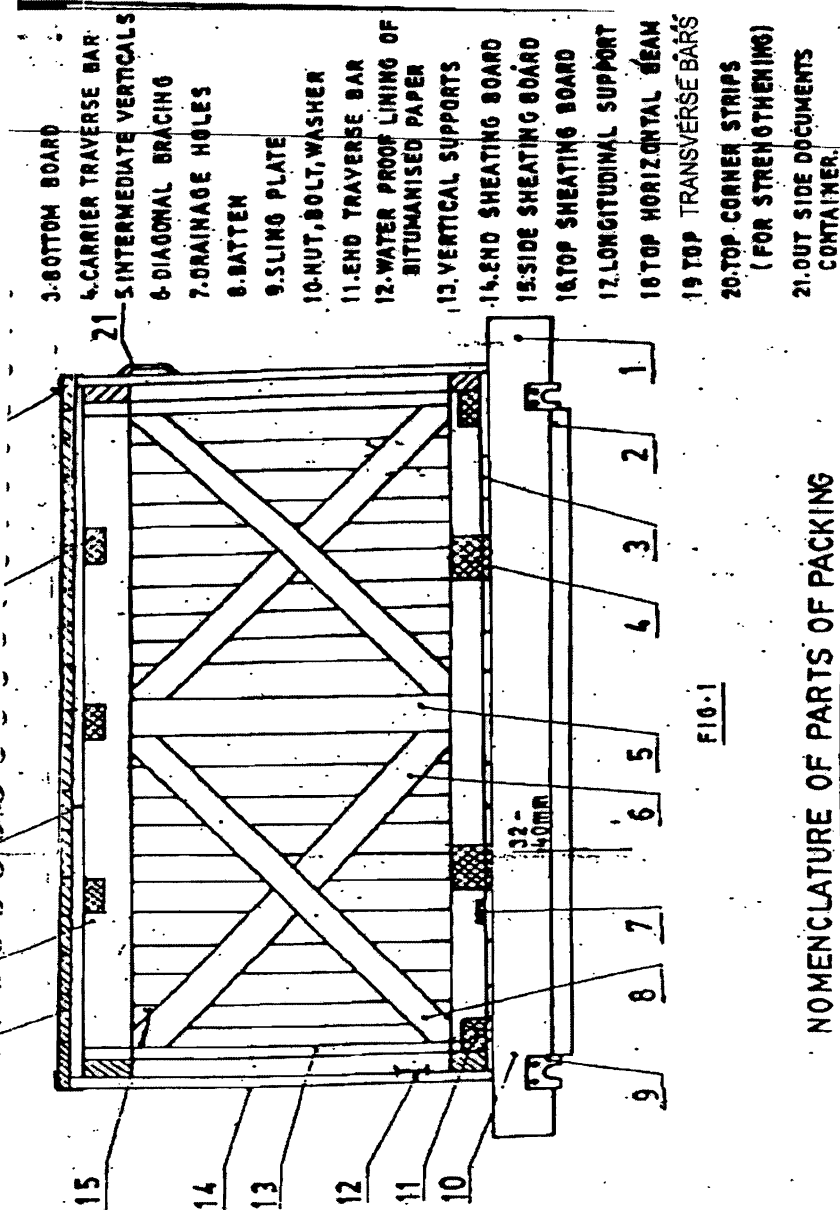


FIG-1

NOMENCLATURE OF PARTS OF PACKING

CASES

FIG-1

- 1 SLIDE
- 2 UNDER SLIDE BOARD

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BOTTOM FRAME ARRANGEMENTS

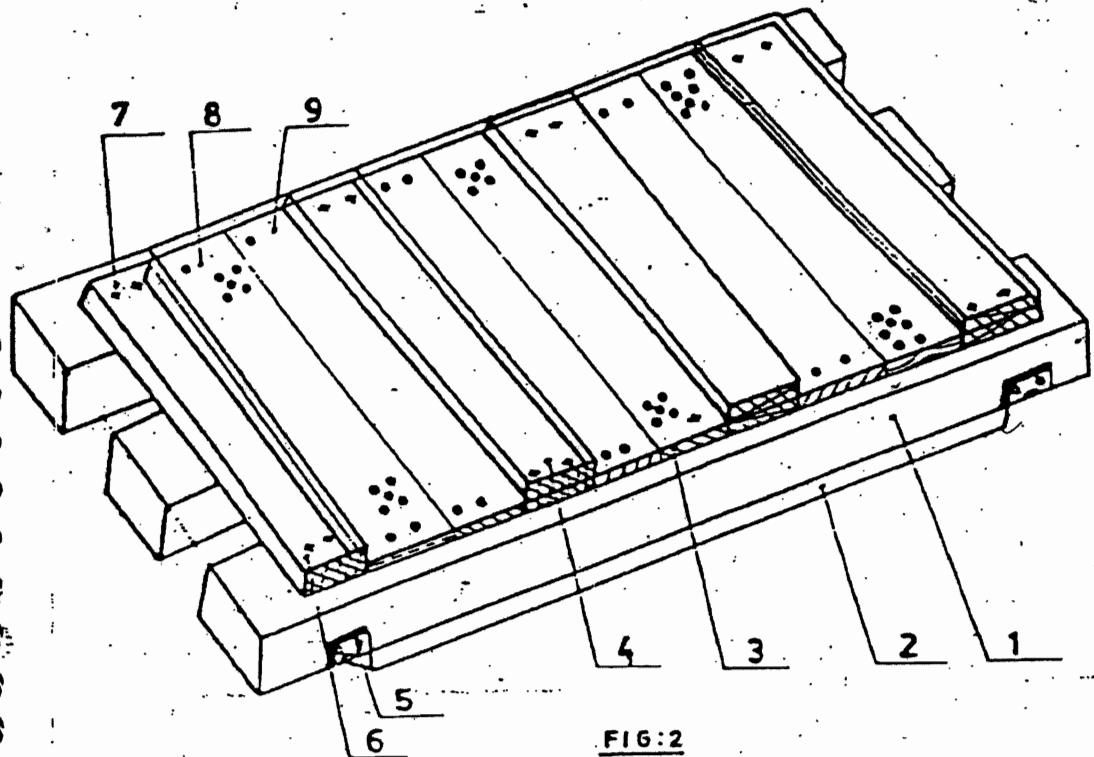


FIG:2

Nos. of slides: Minimum 2 Nos.
For length more than 1800 mm or
load more than 1000kg, Nos. of
slides shall be minimum 3 Nos.
For dimensions of slides, refer Table 1
Cross section of end traverse bar; 100x100 mm.
(minimum)

1. SLIDE
2. UNDER SLIDE BOARD
3. BOTTOM BOARD
4. CARRIER TRAVERSE BAR
5. SLING PLATE
6. TRAVERSE BAR
7. BOLT, NUT & WASHER
8. DRAINAGE HOLES
9. NAILS

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TOP FRAME ARRANGEMENT

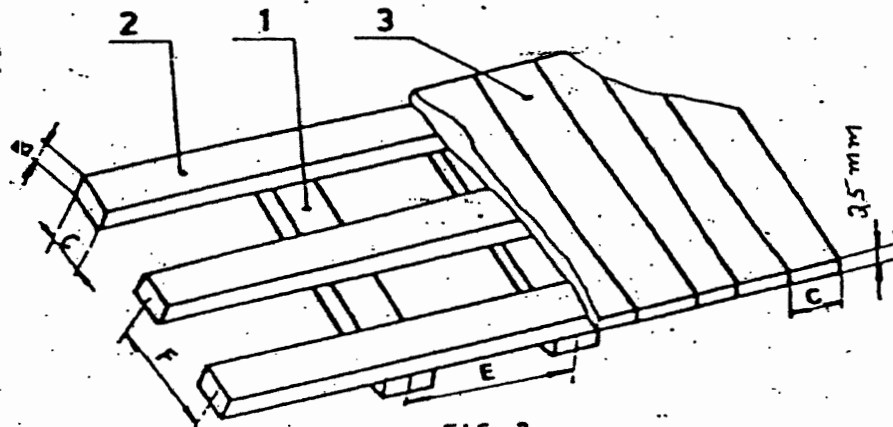
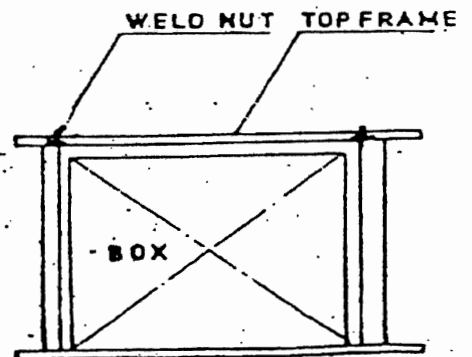
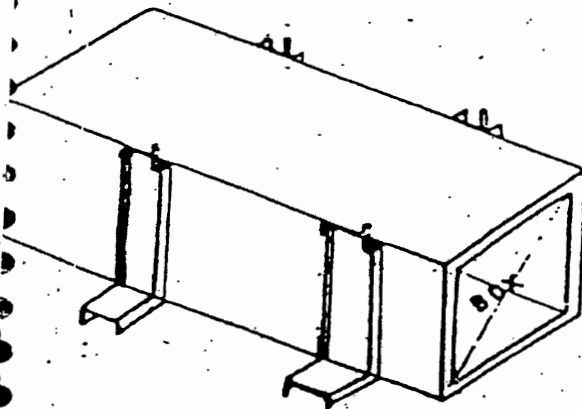


FIG-3

F : 700 to 1000 mm
E : 500 to 900 mm
30 x 100 mm.

- 1 - Traverse Bars
- 2 - Horizontal Soans
- 3 - Top Board

ARRANGEMENT OF C-CLAMPS AROUND CASES



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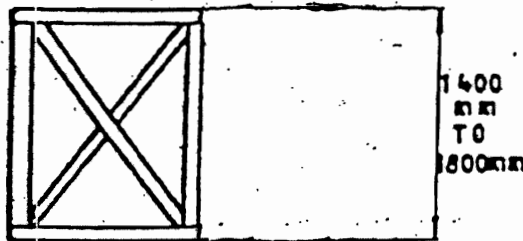
**ARRANGEMENT OF DIAGONAL BRACING AND
HORIZONTAL SUPPORT**

FIG: 6

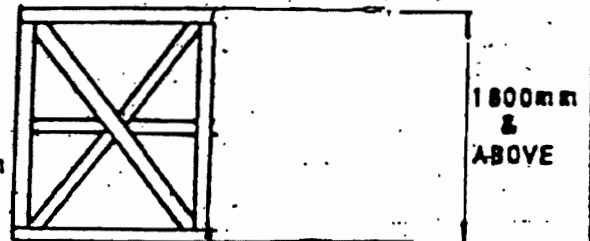


FIG: 8

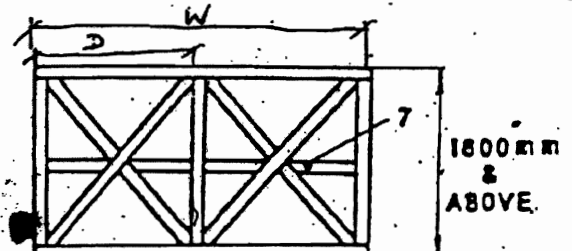


FIG: 7

7- Middle Horizontal Support

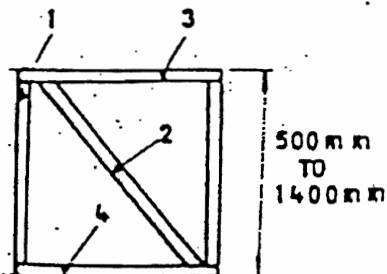


FIG: 5

1- Vertical Support

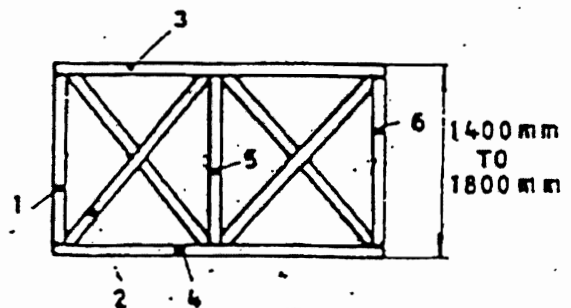


FIG: 7

1, 5, 6 - Vertical Support

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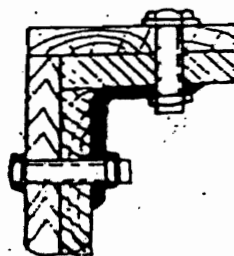
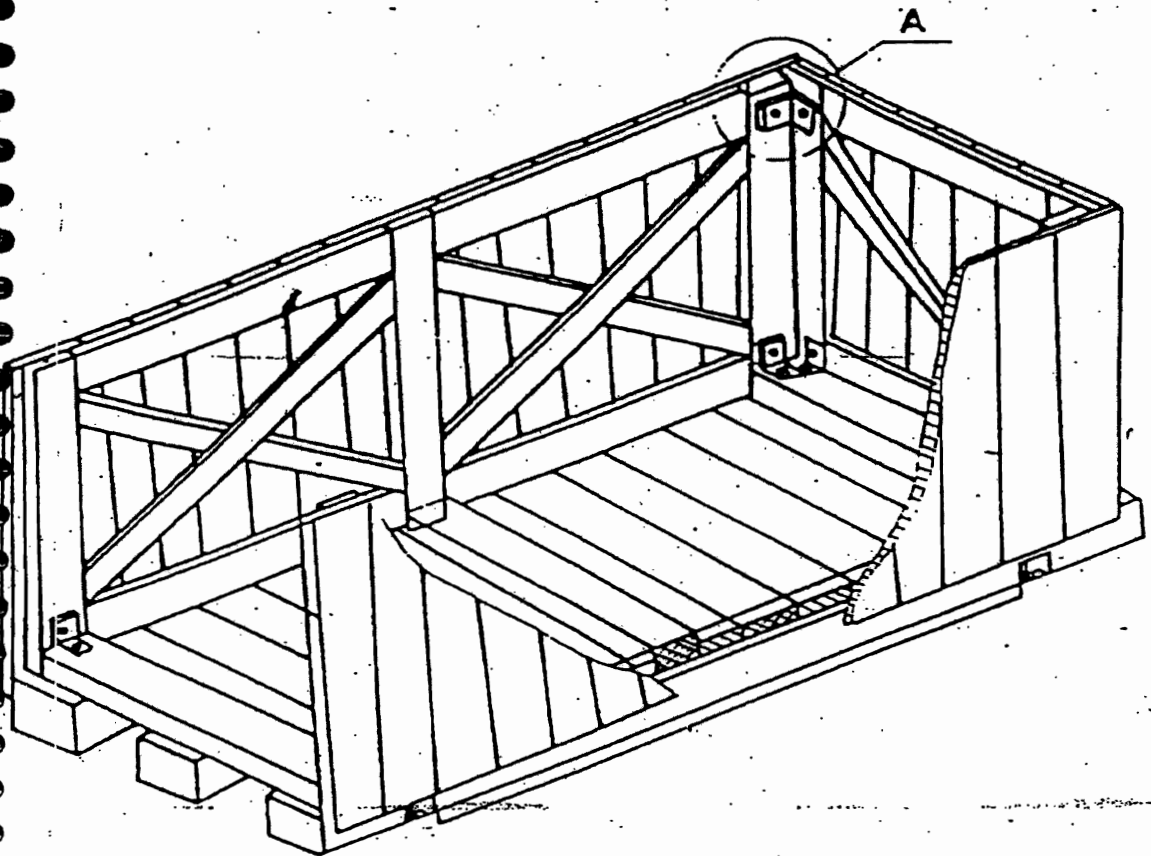
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ARRANGEMENT OF PACKING CASE



DETAIL-A

HOLE DIAMETER
MUST CONFORM
TO BOLT DIA

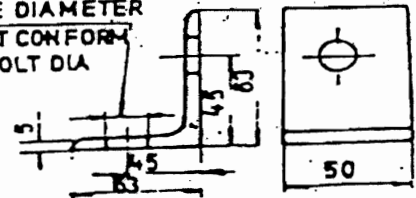


FIG:10

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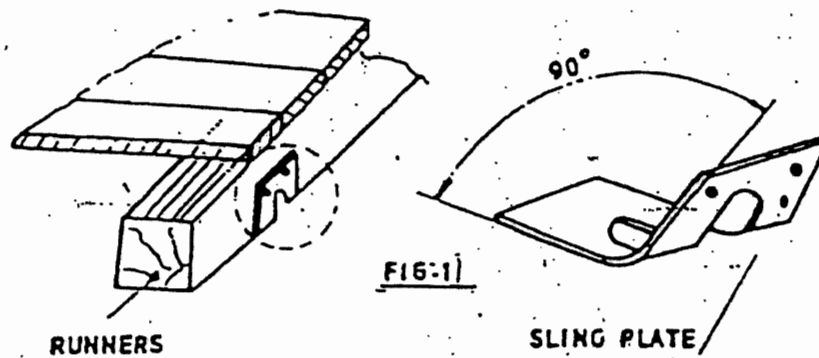
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**ARRANGEMENT OF SLING & PLATE ON
CASES**

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TABLE-1

LOADS	LENGTHS OF SLIDES						
	600	800	1000	1200	1300	1500	2000
	Cross section b x c				c b		
500	50 X 100	50 X 100	50 X 100	50 X 100	75 X 100	75 X 100	100 X 100
800	50 X 100	50 X 100	75 X 100	75 X 100	75 X 100	75 X 100	100 X 100
1000	75 X 100	75 X 100	75 X 100	100 X 100	100 X 100	100 X 110	100 X 150
1500	75 X 100	75 X 100	100 X 100	100 X 100	100 X 100	100 X 150	100 X 150
2000	75 X 100	100 X 100	100 X 100	100 X 150	100 X 150	100 X 150	150 X 150
2500	75 X 100	100 X 100	100 X 150	100 X 150	100 X 150	150 X 150	150 X 150
3000	100 X 100	100 X 150	150 X 150	150 X 150	150 X 150	150 X 150	150 X 150

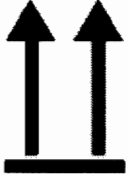
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Table-2

End and side panels	Width of the panel "W"	Distance between longitudinal support (Dimension "D")						
		600	800	1000	1200	1400	1600	1800
		Cross section b x c				Item 1 to 7		
Fig- 5 to Fig-9	600 to 1200	30	30	30	30	30	30	30
		X	X	X	X	X	X	X
	1201 to 1600	100	100	100	130	130	130	130
		30	30	30	30	30	30	30
	1601 to 2000	X	X	X	X	X	X	X
		130	130	130	130	130	130	130
	2001 to 3000	30	30	30	30	30	30	40
		X	X	X	X	X	X	X
	3001 to 4000	130	130	130	130	130	130	150
		40	40	40	40	40	40	40
		X	X	X	X	X	X	X
		150	150	150	150	150	150	150

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INDICATION MARKS ON CASES/BOXES/CRATES

Designation	Symbol	Explanation
Fragile, Handle with care		The symbol should be applied to easily broken cargoes. Cargoes marked with this symbol should be handled carefully and should never be tipped over or slung.
Use no hooks		Any other kind of point load should also be avoided with cargoes marked with this symbol. The symbol does not automatically prohibit the use of the plate hooks used for handling bagged cargo.
Top		The package must always be transported, handled and stored in such a way that the arrows always point upwards. Rolling, swinging, severe tipping or tumbling or other such handling must be avoided.
Keep away from heat (solar radiation)		Compliance with the symbol is best achieved if the cargo is kept under the coolest possible conditions. In any event, it must be kept away from additional sources of heat. It may be appropriate to enquire whether prevailing or anticipated temperatures may be harmful.
Protect from heat and radioactive sources		Stowage as for the preceding symbol. The cargo must additionally be protected from radioactivity.
Sling here		The symbol indicates merely where the cargo should be slung, but not the method of lifting. If the symbols are applied equidistant from the middle or center of gravity, the package will hang level if the slings are of identical length. If this is not the case, the slinging equipment must be shortened on one side.
Keep dry		Cargo bearing this symbol must be protected from excessive humidity and must accordingly be stored under cover. If particularly large or bulky packages cannot be stored in warehouses or sheds, they must be carefully covered with tarpaulins.

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Center of gravity		This symbol is intended to provide a clear indication of the position of the center of gravity. To be meaningful, this symbol should only be used where the center of gravity is not central. The meaning is unambiguous if the symbol is applied onto two upright surfaces at right angles to each other.
No hand truck here		The absence of this symbol on packages amounts to permission to use a hand truck on them.
Stacking limitation		The maximum stacking load must be stated as "... kg max.". Since such marking is sensible only on packages with little loading capacity, cargo bearing this symbol should be stowed in the uppermost layer.
Clamp here		Stating that the package may be clamped at the indicated point is logically equivalent to a prohibition of clamping anywhere else.
Temperature limitations		According to regulations, the symbol should either be provided with the suffix "...°C" for a specific temperature or, in the case of a temperature range, with an upper ("...°C max.") and lower ("...°C min.") temperature limit. The corresponding temperatures or temperature limits should also be noted on the consignment note.
Do not use forklift truck here		This symbol should only be applied to the sides where the forklift truck cannot be used. Absence of the symbol on other sides of the package amounts to permission to use forklift trucks on these sides.
Electrostatic sensitive device		Contact with packages bearing this symbol should be avoided at low levels of relative humidity, especially if insulating footwear is being worn or the ground/floor is nonconductive. Low levels of relative humidity must in particular be expected on hot, dry summer days and very cold winter days.

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Do not destroy barrier		A barrier layer which is (virtually) impermeable to water vapor and contains desiccants for corrosion protection is located beneath the outer packaging. This protection will be ineffective if the barrier layer is damaged. Since the symbol has not yet been approved by the ISO, puncturing of the outer shell must in particular be avoided for any packages bearing the words "Packed with desiccants".
Tear off here		This symbol is intended only for the receiver.

FIG-12

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BHEL-PEM-DELHI-INDIA	
CONSIGNEE	
MATERIAL	
CUSTOMER REF.	MO. NO.
DESPATCH ADVICE NOTE NO.	CASE NO.
DIMENSIONS(MM) LXBXH	NET WT -KGS
	GROSS WT -KGS
SPECIAL INSTRUCTIONS	HANDLE WITH CARE -- KEEP DRY DO NOT DROP -- DO NOT TILT

FIG-13: MARKING PLATE



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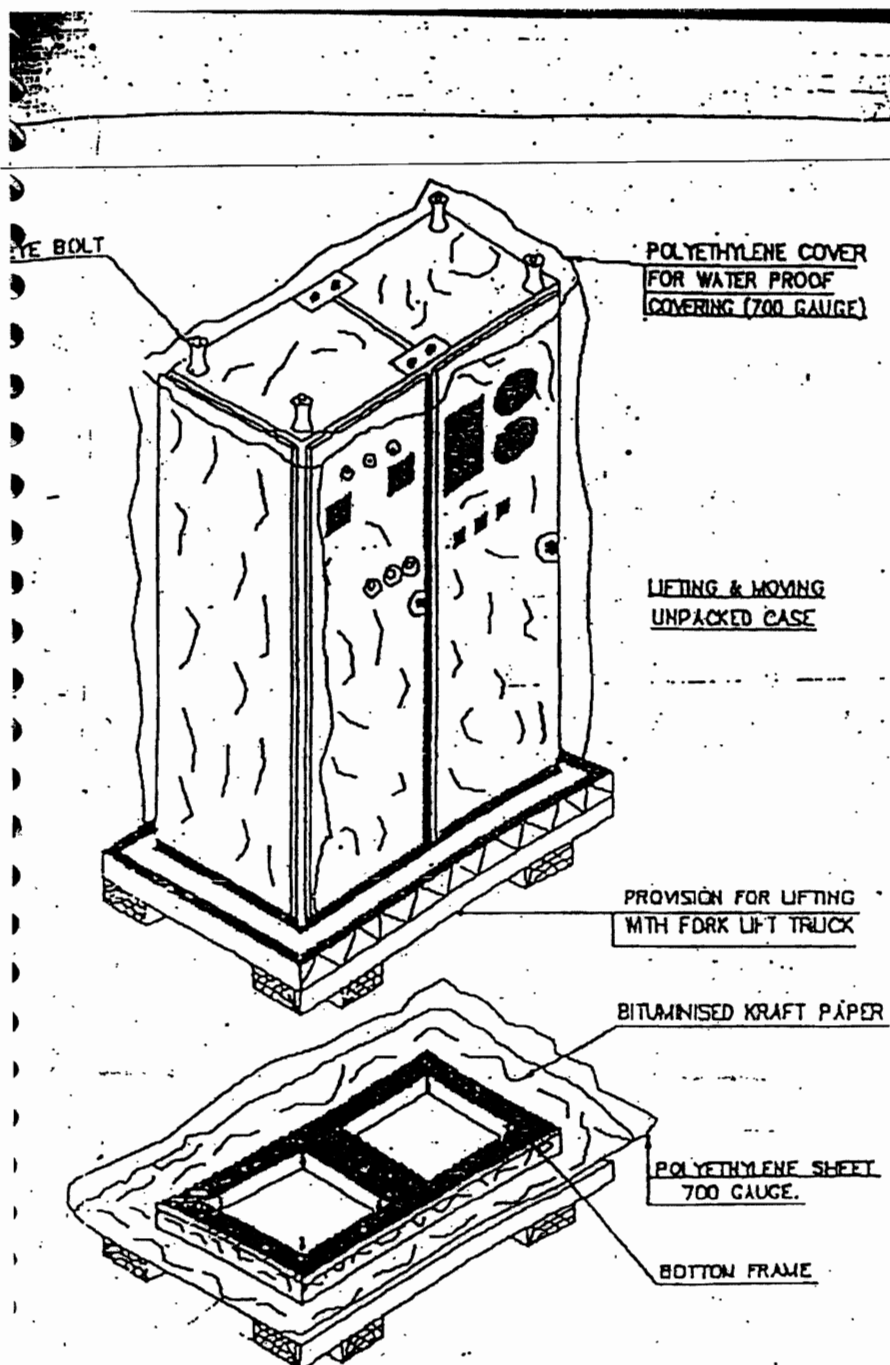


FIGURE-14



TITLE

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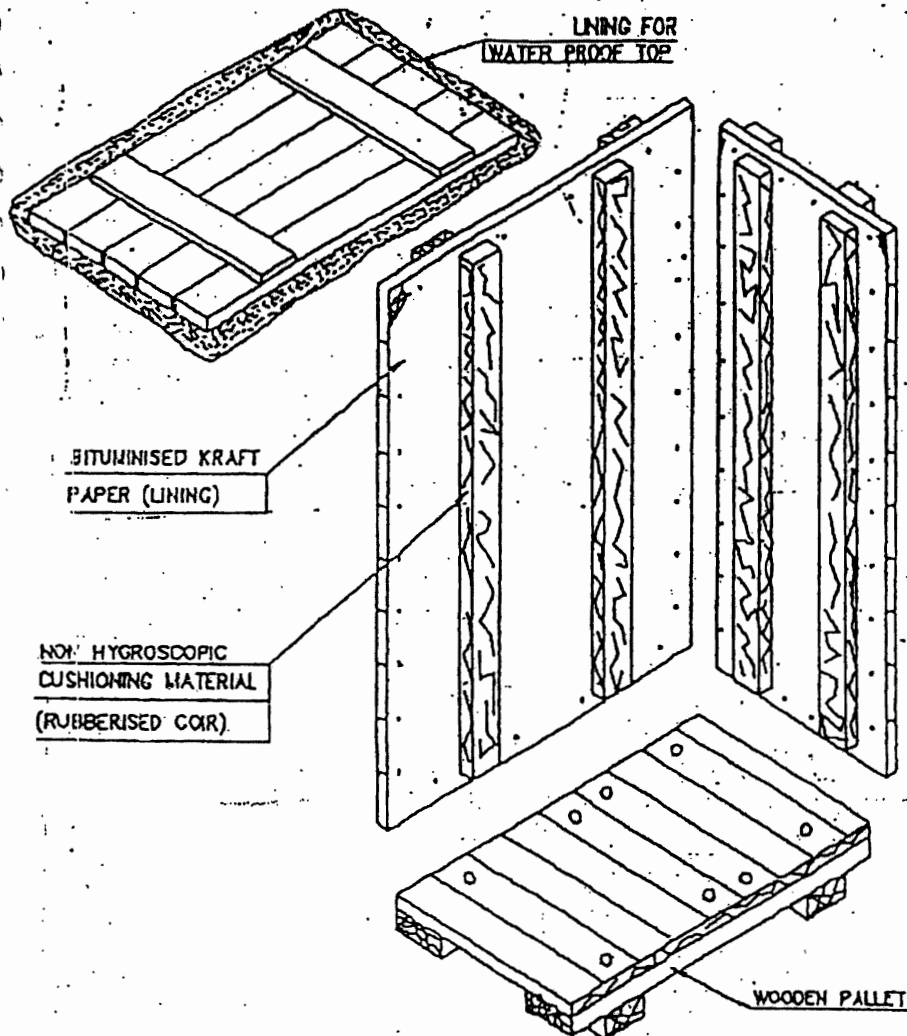
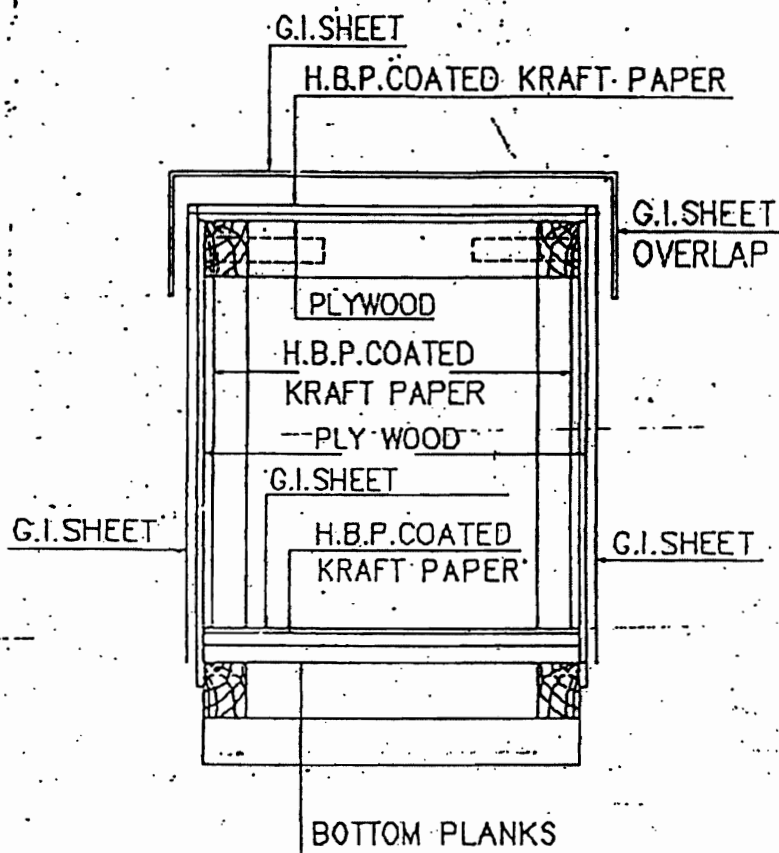


FIGURE-15

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**FIG-16 : CLOSED PACKING CASE WITH G.I.SHEET
SHOWING LAYERS OF PACKING MATERIALS.**

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10.0 TYPICAL PACKING DETAILS/PROCEDURE FOR MECHANICAL ITEMS

10.1 INSULATION MATERIAL (MINERAL WOOL MATTRESSES)

This specification covers the requirements of seaworthy packing and marking for bonded mineral (rock) wool mattresses having metallic hexagonal wire netting as facing on one or both sides.

10.1.1 TYPE OF CONSTRUCTION

Mattress shall be packed in Polythene (of 0.2 mm thickness) all around and sealed to prevent moisture absorption during transit and storage. Further it shall be wrapped with Bitumen coated Polythene bonded/lined Hessian and stitched and then packed in 5 ply DFC carton box.

Silica gel is used for this purpose to protect contents over sufficiently long time from corrosion. Silica gel shall be of indicating type conforming to IS:304-1979 packed in cotton bags placed at different positions inside the packing for absorbing moisture and shall not come into direct contact with the material inside the package. The quantity of silica gel shall be enough for storage period of one year. However, it shall not be less than 4 gms per litre volume of case subject to minimum of 400 gms per case.

Each mattress as well as the packages shall be serial numbered. Also, printed sheets indicating the nominal thickness, density and wire netting details (i.e. material and size) shall be placed below the wire netting.

Following details shall be legibly written on the packages. The details shall also be typed on a sheet of paper & kept in a sealed Polythene cover, inside the packages

- a) Project Name
- b) Purchase Order No.
- c) Sl. No. of package
- d) Size of mattress (Thickness x Length x Width)
- e) Density
- f) Wire netting material and size
- g) Weight of the package

10.2 INSULATION MATERIAL (ALUMINIUM COIL)

Heavy Gauge Aluminium Coil Packaging are done by Eye-to-Sky packaging or by Eye to eye packaging as per the proven practice being followed by manufacturer of Aluminium sheets.

10.2.1 Type of construction for Eye to Sky packaging

- a. Strapping of coil with polyester strap around circumference at one place.
- b. Putting paper I. D. Edge protector.
- c. Wrapping the coil with VCI stretch film after putting silica gel bags (4 nos.) Inside the coil.
- d. Wrapping the coil with HDPE film.
- e. Covering the coil including its build up & bore with masonite / particle board.
- f. Putting metallic I. D on coil.
- g. Putting O.D edge protector (paper) on coil.

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- h. Putting circumferential polyester strap (3 nos.) & eye polyester strap (4 nos.).
- i. After placing the coil on coil tilter ply wood (10mm thick) of suitable size along with wooden pallet is to be put at the bottom side of the coil.
- j. Coil is to be tilted to eye-to-sky position.
- k. Final strapping with metallic strap to unit coil and skid at 2 places with top cover of plywood.
- l. Fixing the coil with wooden blocks at 4 corners.
- m. Labeling 2 nos.(one metallic & one adhesivetype) For specification, net wt. & gross wt.

10.2.2 Type of construction for Eye to Eye packaging

- a. Strapping of coil with polyester strap around circumference at one place.
 - b. Putting paper I. D. Edge protector.
 - c. Wrapping the coil with VCI stretch film after putting silica gel bags (4 nos.) Inside the coil.
 - d. Wrapping the coil with HDPE film.
 - e. Covering the coil including its build up & bore with masonite / particle board.
 - f. Putting metallic I. D on coil.
 - g. Putting O.D edge protector (paper) on coil.
 - h. Putting circumferential polyester strap (3 nos.) & eye polyester strap (4 nos.).
 - i. Placing of coil on wooden skid Coil is to be tilted to eye-to-sky position.
 - j. Final strapping of coil and skid at 2 places with steel strap. Fixing the coil with wooden blocks at 4 corners.
- Labeling 2 nos.(one metallic & one adhesive type) For specification net wt. & gross wt.

10.3 Packing Procedure for Online Tube Cleaning System and accessories

This procedure is applicable for the shipment of Onload Tube Cleaning System and accessories by sea.

10.3.1 Packing details:

- The Packing case shall be made of treated rubber wood. The design of the case shall be as per Annexure IIIA & IIIB.
- The Equipments shall be placed on the wooden base of the Packing case and fastened if required to arrest the movement of the same.
- Equipment shall be covered by Polythene sheet and inside wall surfaces of the wooden cases also shall be covered by polythene sheet.
- All Nozzles shall be closed with plywood dummies.
- All electrical components assembled or loose shall be covered with polythene sheets along with silica gel pack.
- Silica gel desiccants shall be kept inside each case in sufficient quantities in order to absorb the moisture.

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- Thermocol packing shall be made for glass items like Ball vessel sight glass, Vpiece
- sight glass & pressure gauge.
- Silica gel desiccants shall be kept inside of each case to absorb the moisture.
- A Packing list covered in a polythene envelope shall be fixed inside and outside of each packing case.
- Shipping marks and consignee address shall be painted on the outer surface of the case.
- All handling instruction required for the case like top, sling, rain, handle with care etc, shall be marked on the case as per the symbol attached.
- Machined surface will be applied with Anti rust oil and covered by polyurethane sheet to protect from external oxidation.
- All valves will be closed with dummies to protect the internals and placed in the wooden case which will covered by polyurethane sheet.



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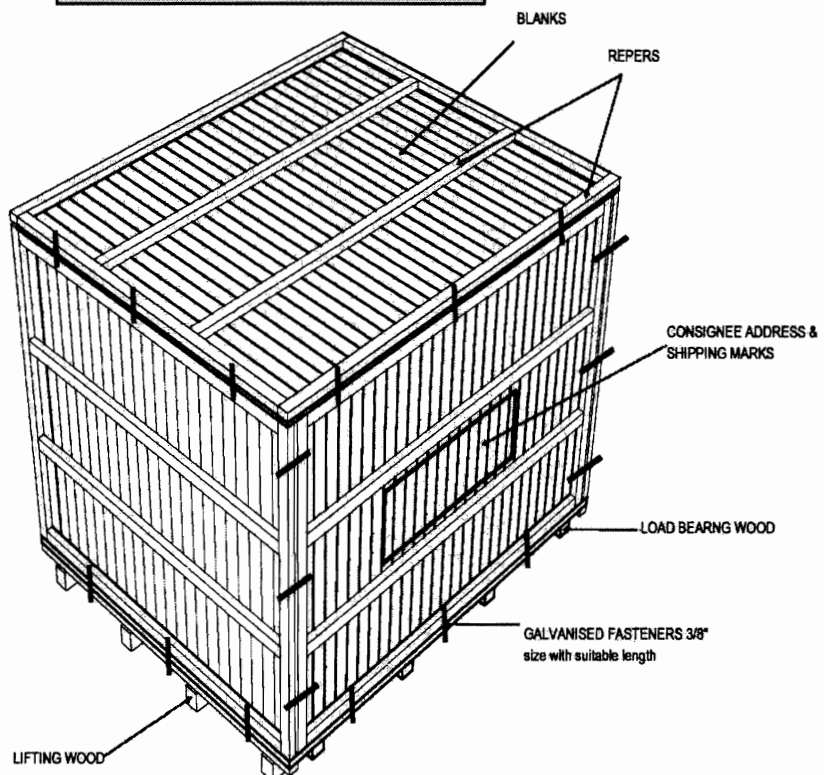
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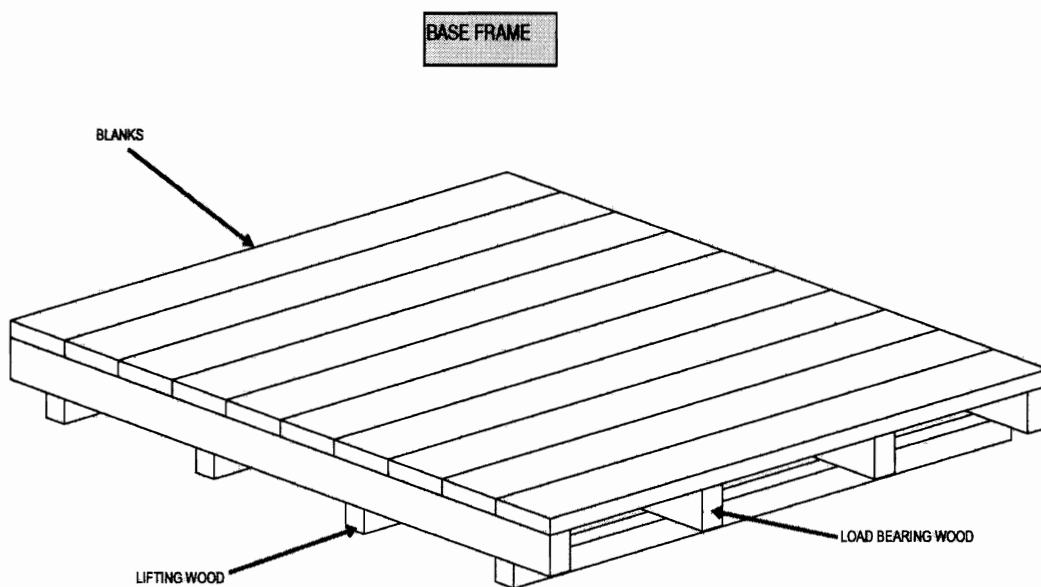
MODEL: FASTNERS TYPE (BASE, SIDE & TOP
ATTACHED WITH BOLT, NUT & WASHER)

This Type of case to be used for
following items:

1. BALL SEPERATOR
2. BALL COLECTOR SKID



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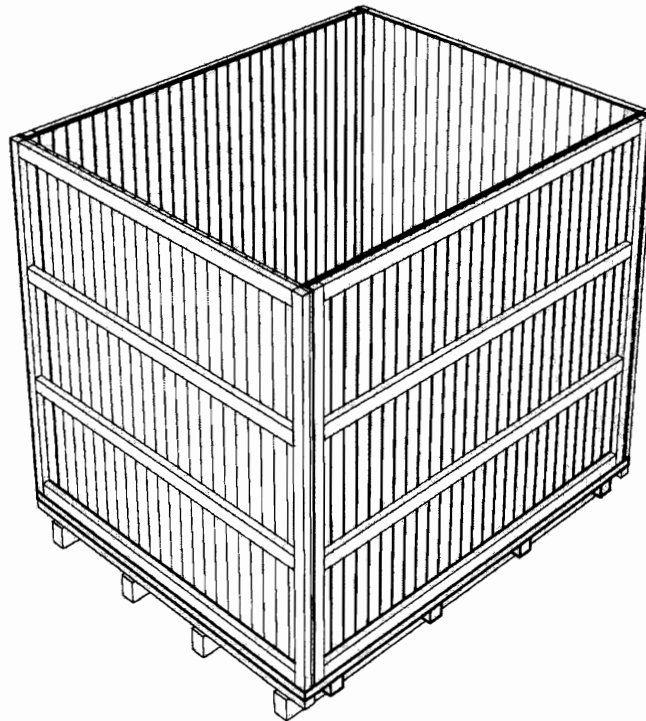
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MODEL: FASTNERS TYPE - WITHOUT TOP





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MODEL: NAILING TYPE
(FRAME & INSIDE REEPER NAILED)

- THIS TYPE OF CASE TO BE USED FOR THE FOLLOWING ITEMS:
1. PUMP SKID
 2. CONTROL PANEL
 3. LOOSE ITEMS, TOOLS & TACKLES
 4. DPMS, BRM
 5. SPARES
 6. CLEANING BALLS
 7. CABLES & ACCESSORIES

Shipping marks & Consignee
Address

BLANKS

LIFTING WOOD

BLANKS

REEPERS

BLANKS

REEPERS

LOAD BEARING WOOD

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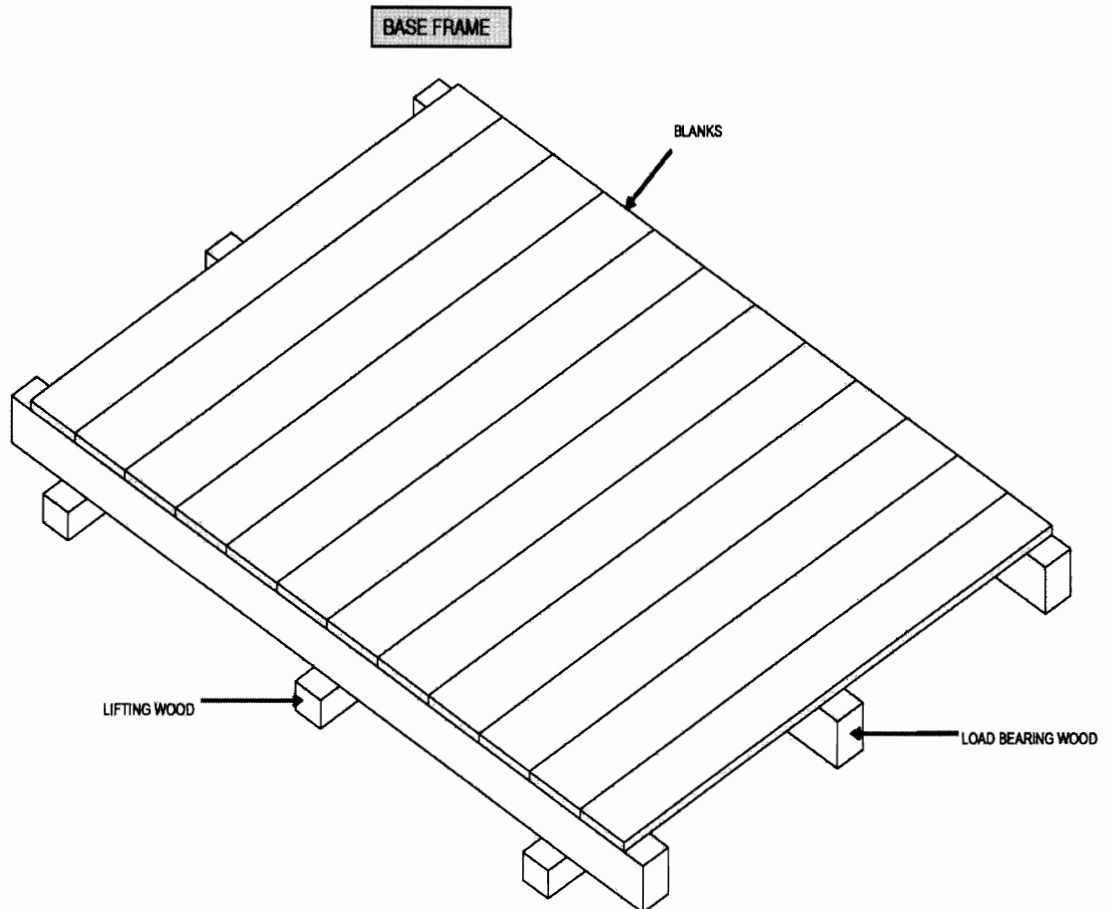
SPECIFICATION NO. PE-TS-888-100-A001

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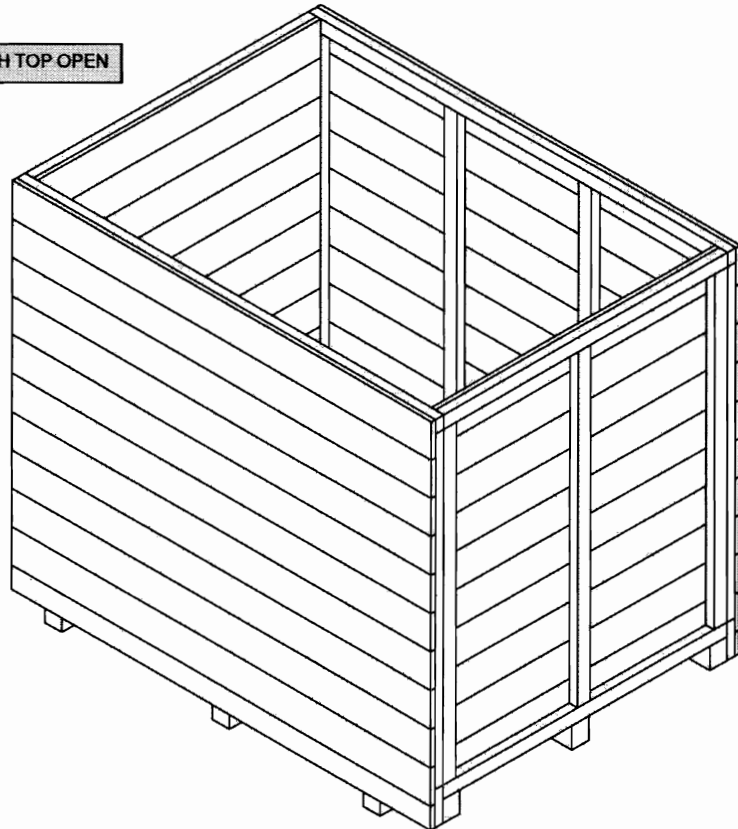
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10.4 PACKING OF LOOSE ITEMS

Loose mechanical, electrical and C&I items e.g. valves, fittings, pressure/temperature gauges/switches, circuit breakers, relays etc shall be individually wrapped using polyethylene sheets/U foam/ thermocol sheets/air bubble sheets depending upon the items and then packed in wooden boxes. The left out spaces and top of the boxes shall be filled with rubberized coir to get proper cushioning effect, Special attention shall be paid to relays, instruments etc for arresting the movements of their operating mechanism during transportation.

The construction of wooden packing cases shall be as per clause 9.3.1 retaining its all features concerning strength of the box. The construction of wooden packing case for electrical and C&I items shall be as per fig-16.

Inner surface of 6 sides of the box shall be lined with bitumen coated hessian polyethylene kraft paper. Rubberized coir of min. 25mm thickness and 100 mm width shall be nailed to inner surfaces of bottom and 4 sides of the boxes.

11.0 PACKING OF ELECTRICAL ITEMS

11.1 CABLES

11.1.1 Type of Equipment
All type of cables..

11.1.2 Type of Construction

New or practically new cable drums made of steel and painted with epoxy resin paint are to be used. Cable ends are carefully protected before packing. Over the cables polyethylene sheet shall be wrapped and then sealed properly. Cable drum can be put in wooden crates for ease in transportation and handling. (Wooden cable drum is also acceptable, however vendor to furnish constructional details for approval).



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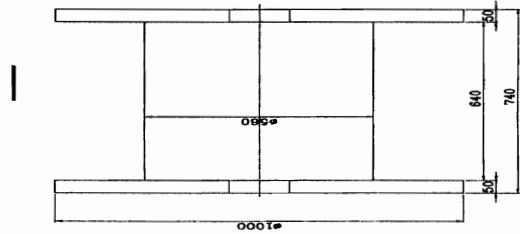
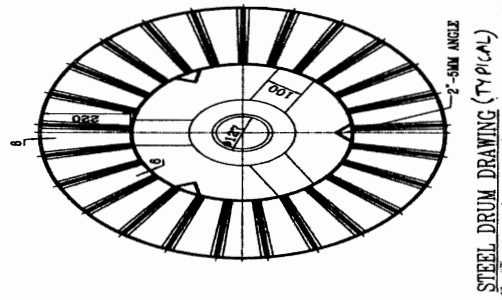
SPECIFICATION NO. PE-TS-888-100-A001

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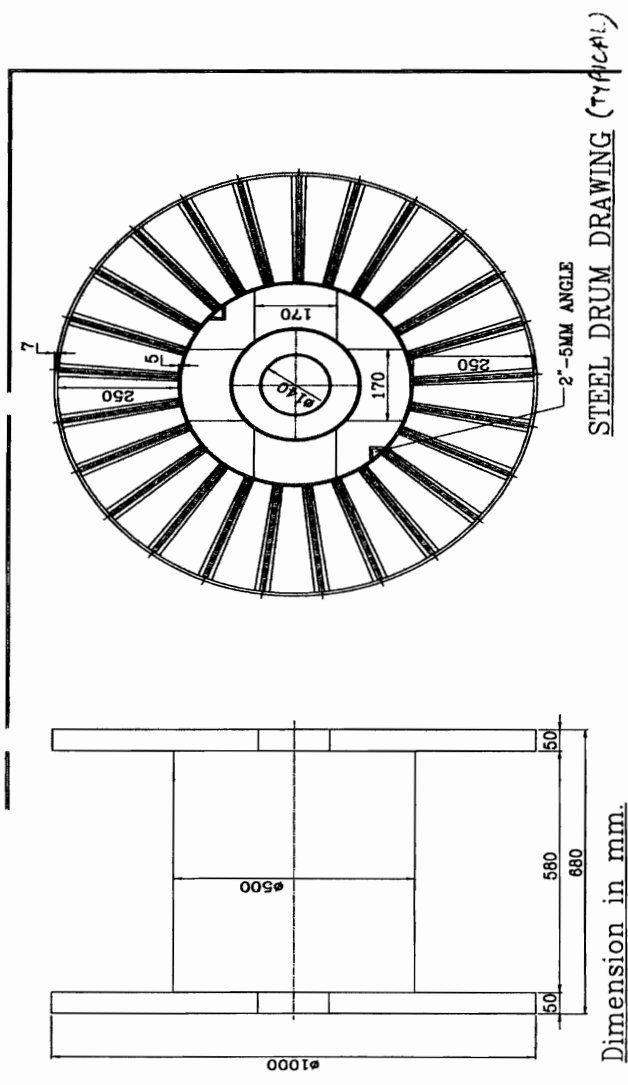
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11.2 PACKING OF CABLE TRAYS & ACCESSORIES AND CABLE TRAY SUPPORT MATERIAL

11.2.1 Cable trays can be packed in wooden boxes as per fig 1 to 11 or in steel boxes. Details of steel box construction is as indicated below.

- 1) All Dimensions are in "mm" unless otherwise stated.
- 2) Packing Box shall be fabricated using 50x50x6mm MS Angle, 50x3mm Flat, 2.5 mm thick C Channel, 1mm & 1.6mm Thick sheet.
- 3) Finish of Packing Box Shall be Galvanized.
- 4) Angle & Channel Section forming part of the Main frame shall be welded thoroughly with each other to give a rigid structure.
- 5) Sheet Section and Flat section shall be bolted/ Riveted/ Welded suitably to the Main frame stated in '4' above.

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- 6) Welding Portion on galvanized surfaces shall be painted with Zinc Rich Paint.
- 7) Dispatch details such as consignor/consignee address, contract and case details, 'country of origin, port of delivery, stacking instructions shall be written on one of the side of boxes. An anodized aluminium plate as per details and specifications given in page 3 of 5 shall be provided on the boxes
- 8) One copy of packing slip wrapped in polythylene bag covered with suitable aluminium .packing slip holder to be nailed on the external surface of the box. One more copy 9f the packing Slip wrapped in polythylene bag to be kept inside the box at the prominent place.
- 9) **INDICATION MARKS ON THE BOXES:** Markings shall be provided on the boxes indicating position of Boxes for handling, storage and nature of consignment. For guidelines referred page 4 of 5. The ink issued for this purpose as well as for marking dispatch instruction shall be indelible/non-washable marking ink.
- 10) Each item as mentioned in BOQ shall be packed & supplied as a set comprising of required numbers of associated fasteners & hardware etc

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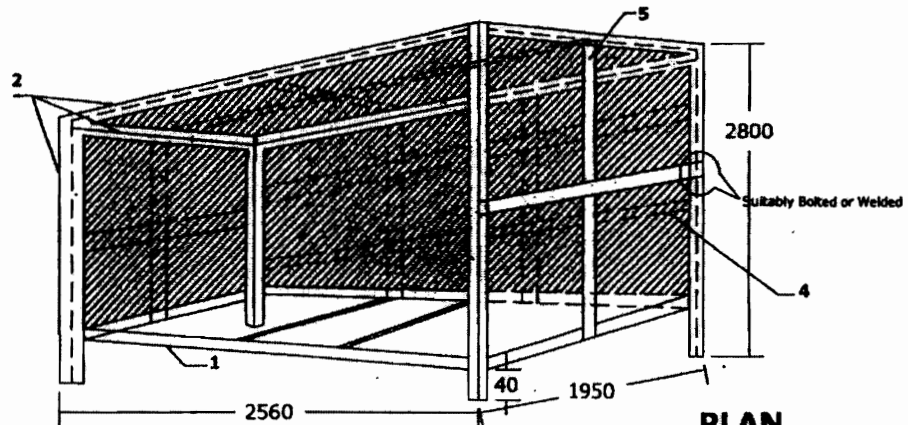
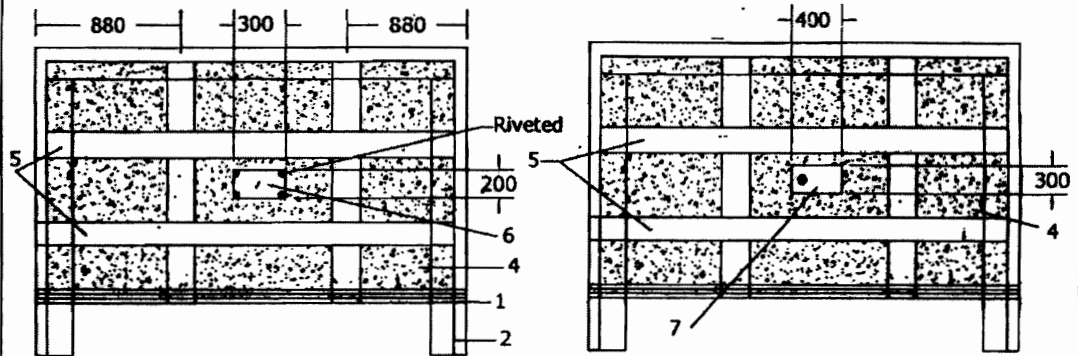
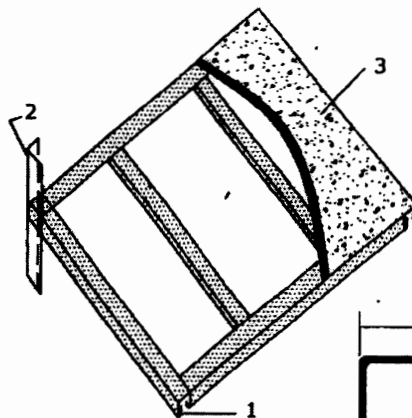
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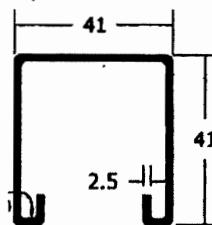
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STEEL PACKING (TYPICAL DETAILS)**PLAN****FRONT SIDE OF BOX****BACK SIDE OF BOX****BOTTOM FRAME ARRANGEMENT****Note:**

1. "C" Channel to be used on Bottom Frame.
2. 50x50x6 Angle to be used Vertically on four sides of the Box and Horizontally on four sides on the top Frame.
3. 1.6mm thick sheet (plain) on Bottom Plate.
4. 1.0mm thick sheet to cover top & four sides of BOX.
5. 50x3 Flat as additional cross members to be used Horizontally & Vertically on top & Four Sides of Box.
6. Anodised Aluminium Plate for Marking.
7. Hinged Inspection Window.

**DETAILS OF "C" CHANNEL**

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11.3 PACKING FOR STATION LIGHTING SYSTEM

Aspects of packing specific to equipments / items of station lighting system are given here. All other instructions / aspects as per the main specification of export packing which are not covered here shall also be applicable.

11.3.1 For LIGHTING TRANSFORMER, DISTRIBUTION BOARDS, LIGHTING PANELS,

- Construction of packing case for LIGHTING DISTRIBUTION BOARDS, LIGHTING PANELS, TRANSFORMER . shall be EITHER as per FIGURE 1,2,3,5,6,7,8,9,10,11 OR FIGURE 14,15,16.
- Each Panel/Transformer shall be individually covered with double polythene sheet of thickness 175 microns minimum.
- All the 6 inner surfaces of packing shall be nailed with bitumen coated hessian polythene craft paper. Wherever 2 pieces of craft paper are used, the joint shall have minimum overlap of 20mm.

For the top frame it shall be project on all sides by 100mm and shall be nailed on sides .

- The gap between the panels and packing case shall be filled with rubberized coir of thickness 50mm minimum and width 100mm. The distance between two consecutive supports of rubberized coir shall be less than 500mm.
- Silica get packed in cotton bags shall be placed at different positions inside the packing.
- Packing case shall be finally covered with GI sheet of thickness 0.4mm minimum.

11.3.2 For LUMINARIES, RECEPTACLES. EMERGENCY LIGHT, 240/24V TRANSFORMER, CEILING FAN, SWITCH BOARDS, FLEXIBLE CONDUIT, WIRES, EARTH WIRE. JUNCTION BOXES, ERECTION COMMISSIONING SPARES, RECOMMENDED SPARES , ERECTION MATERIAL AND CONSUMABLES

- Construction of packing case for THE ABOVE MATERIAL shall be as per FIGURE 1to11.
- Items placed inside the case shall be covered with double polythene sheet of thickness 175 microns minimum.
- All the 6 inner surfaces of packing shall be nailed with bitumen coated hessian craft paper. wherever 2 pieces of craft paper are used, the joint shall have minimum overlap of 20mm. For the top frame it shall be project on all sides by 100mm and shall be nailed on sides.
- Silica get packed in cotton bags shall be placed at different positions inside the packing.

11.3.3 For CONDUIT PIPE

As per international practice pipes are shipped in open bundles with metal strapping. Packing as per attached figure A shall be provided which is described as following:

- Each bundle shall be wrapped with 2 layers of 175 microns thick polythene sheet.
- Then bundle will be wrapped with bitumen coated hessian craft paper.
- Bundle shall be strapped with steel straps.
- An anodized aluminium packing description plate as per Figure No. 13 shall be provided.

11.3.4 For POLES

Poles will be wrapped with 2 layers of minimum 175 microns thick polythene sheet and then with bitumen coated hessian craft paper, packed as per Figure – C i.e. bundling.

11.3.5 For STRUCTURAL STEEL

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Structural steel will be different sizes and shapes. Hence it will be packed as per Figure No. B and described as following :

- a) Each bundle shall be wrapped with 2 layers of 175 microns thick polythene sheet.
- b) Then bundle will be wrapped with bitumen coated hessian craft paper.
- c) Bundle shall be strapped with steel straps.
- d) An anodized aluminium packing description plate as per Figure No. 13 shall be provided.

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PACKING PROCEDURE FOR CONDUIT PIPE

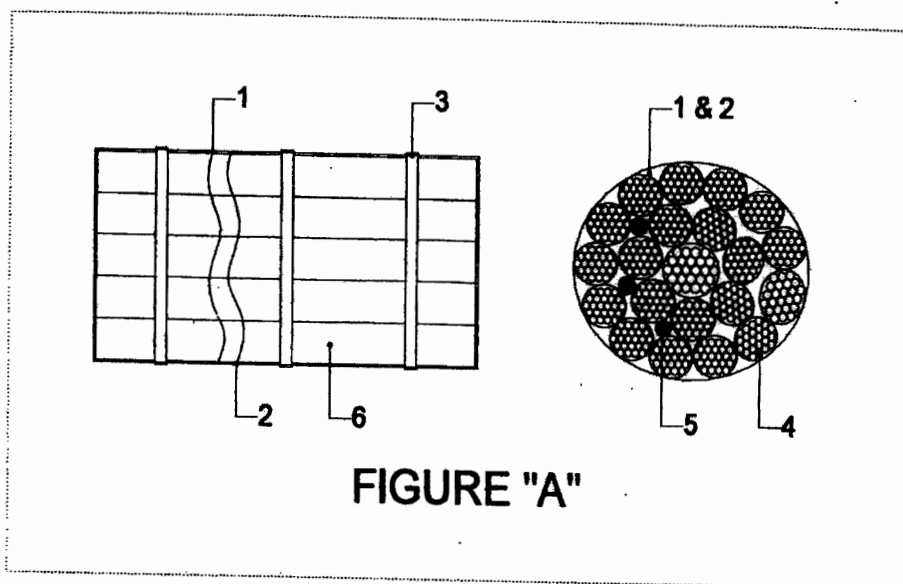


FIGURE "A"

- 1) LAYER OF BITUMEN COATED HESSIAN KRAFT PAPER.
- 2) LAYER OF POLYTHENE SHEET.
- 3) METAL STRAPPING.
- 4) CONDUIT PIPES.
- 5) SILICA GEL POUCHES.
- 6) BUNDLES OF CONDUIT PIPES.

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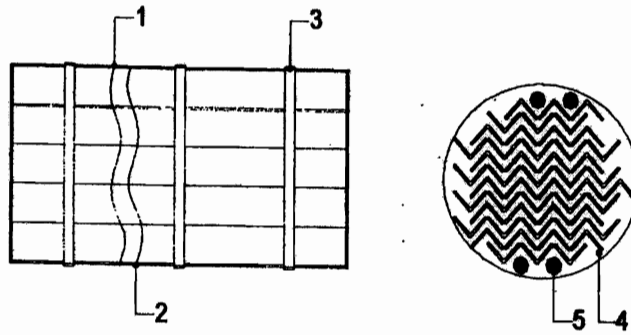
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PACKING PROCEDURE FOR STRUCTURAL STEEL**FIGURE "B"**

- 1) LAYER OF BITUMEN COATED HESSIAN KRAFT PAPER.
- 2) LAYER OF POLYTHENE SHEET.
- 3) METAL STRAPPING.
- 4) STRUCTURAL STEEL.
- 5) SILICA GEL POUCHES.



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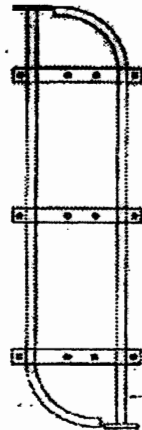
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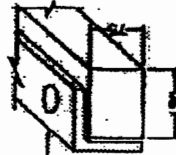
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packing procedure for poles



POLES WRAPPED WITH POLYTHENE SHEET &
EXTRUDING COATED HESSIAN CLOTH



TOP WOODEN BATTEN TO BE
FIXED WITH 150x80x8 MM ON TOP
OF IT FOR TIEING THE ROD
25 MM DIA



BOTTOM WOODEN BATTEN TO BE
FIXED ON 150x80x8 MM ANGLE

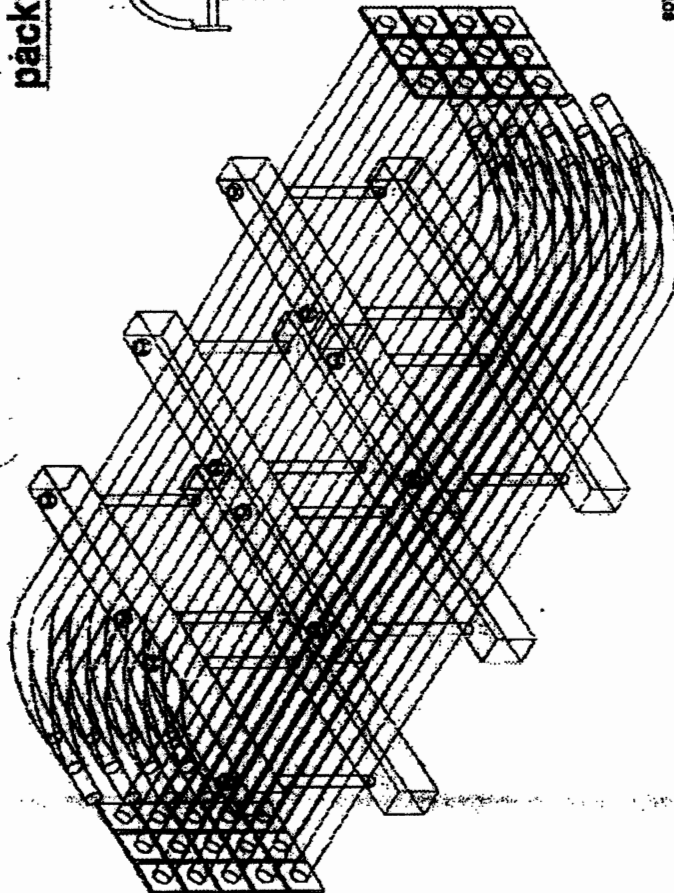


FIGURE "C"

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11.4 PACKING FOR DC BATTERY

The packing procedure for seaworthy packing of DC Battery is defined below, which is capable of withstanding impacts, compression, vibration, toppling, sea water spray, prevention against rust, temperature and extreme atmospheric conditions. Aspects of packing specific to equipments / items of DC Battery are given here. All other instructions / aspects as per the main specification of export packing which are not covered here shall also be applicable.

The packing procedure consists of various stages namely primary packing, cushioning, securing, desiccant, outside packing box, Runners/ sliders/ transverse bars of plywood, etc., provided for each movement.

- a) The packing boxes shall be made up of plywood boxes (thickness 9mm min.) with blocks at the bottom of the box for provision for handling the boxes using the forklift. The packing boxes sizes are generally standardized to half-euro size (capable of handling equipment's weight).
- b) Rubberized coir of 25mm thickness shall be provided as cushioning material at the bottom and thermocole of 20mm shall be provided inside on all four sides. Other than this polyethylene film wrap or cover also will be provided. Left out spaces to be filled with rubberized coir/ thermocol to get cushioning effect.
- c) Silica gel in dust free air permeable cotton/paper bag shall be placed in the packing boxes for storage period of 1 year as per IS 304 (1979)
- d) While packing the cells, transit caps (polypropylene) of red and blue shall be used for big size cells for ensuring that cells does not get damaged during the transport due to vibrations etc.
- e) The battery accessories shall be packed with suitable precautions as follows:
 - i) Copper connectors shall be packed after making bunches with lead wire seals to avoid misplacement.
 - ii) Hardware items shall be packed in polyethylene bags (Thickness $\geq 0.175\text{mm}$) with item slip
 - iii) Battery rack shall be packed in dismantled condition, wrapped with polyethylene sheet
 - iv) For Ni-Cd type battery, electrolyte in solid form for dry cells shall be packed in cans with KOH, LiOH being packed separately.
 - f) Galvanized Steel straps are provided for binding the packing box sides.
 - g) The handling instructions shall be marked in indelible/ non-washable ink, indicating the upright position.

11.5 PACKING OF SERVICE TRANSFORMERS(OIL FILLED) & ACCESSORIES

This instruction is applicable for packing of transformers (oil filled), its accessories and components so as to ensure safe delivery to end user. Aspects of packing specific to equipments / items of transformers(oil filled) are given here. All other instructions / aspects as per the main specification of export packing which are not covered here shall also be applicable.

11.5.01 PACKING DETAILS :

- a) Items shall be packed in case / crates as per the shipping list.
- b) All fragile items and small items shall be packed in cases and to be marked as "Fragile, handle with care Fragile items".
- c) Fragile accessories are to be first packed in their original boxes (VENDOR's packing). Very

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- d small / delicate items such as glass thermometer, door keys shall be packed in separate box.
- d In case original box is found damaged, suitable alternate box or packing method using felt or foam sheet and polythene wrap to be used.
- e These boxes are then placed in identified wooden boxes. Inside of such boxes are lined with a layer of polythene sheet, packing wool / grass and another layer of polythene sheet before placing the boxes. All boxes are then wrapped with this polythene sheet before closing the box. Fragile items shall not be placed loose, one above the other inside the case.
- f All wiring cables, connection flats of non-ferrous materials, CTs, valves bellows shall also be packed.
- g Items like CTs, Oil communicating bushings, insulators, wired equipments and housings such as RTCC Panel, M. Box, Drive Mechanism, thermometers, gauges shall be wrapped in polythene from all around.
- h Buchholz relay and OSR relay openings will be blanked using covers, before putting them in the box
- i Items shall be carefully lowered and arranged inside the crate / case and each item shall be locked from all sides in such a way to avoid its movement in any way. Wooden stoppers and separators shall be provided for this and nailed to the crate / case wood.
- j Wooden planks and batons in contact with fragile items shall be provided with kit foam at the locations of contact.
- k Oil communication bushings shall be packed in separate case on V or U shape wooden felted supports, as in case of condenser bushings.
- l While placing and arranging the items inside the crates / cases, these shall be verified for correctness and then the packing note shall be signed. The cover top of the crate / case shall then be closed.
- m The main equipment like transformer tank shall be packed suitably to prevent any damage during transit / storage. Support structures like frame, header supports etc. shall be crated. Conservator headers shall also be crated. Radiators pipe work and other instruments & components shall be packed in cases. All the cases shall be lined with polythene from inside.

11.6 ALTERNATIVE PACKING CASES FOR CONTROL PANELS AND SWITCH GEARS

For Control and switch gear panels, construction of wooden packing cases may be provided as per fig 14 & 15 and as detailed below.

Thickness of planks for all sides, binding and jointing battens shall be at least 25 mm. Width of the plank shall be at least 125mm and that of binding and jointing planks shall be at least 100mm.

Top frame shall be suitable so that it does not collapse due to sandwiching between slings while lifting. Longitudinal and traverse bars for the bottom wooden pallet to be suitably selected.

Diagonal bracings shall be as per cl 9.3.1.3 and all other requirements shall be as per clauses 9.3.1.4 to 9.3.1.6.

12.0 Containerization

As required by BHEL, the VENDOR shall stuff the GOODS into 20 or 40 foot containers (dry, open top, flat racks, etc.).

The maximum inside dimensions of containers are to be considered:

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- 40 foot containers: 11.80 m x 2.20 m x 2.05 m
- 20 foot containers: 5.80 m x 2.20 m x 2.05m
-

The present definition of containerization is valid for sea containers only. Vendor to check the size of containers before start of packing of equipment.

12.1 Protection of Cases/Crates

Since shipping containers are in general not water tight, packing in contact with the floor of the container shall be raised in order to prevent it from being damaged by the accumulation of water.

12.2 Mechanical Constraints

The mechanical constraints for "general use" closed containers are of a different nature (height of "stacking" being limited inside the containers), the packing for the GOODS may be of a lighter structure. However, it is necessary that the packing be appropriate so as to protect the GOODS on site during the storage period, as required after discharging of the GOOD'S from the containers.

Note:

It is the responsibility of the VENDOR to ensure that the cases/crates are stowed, secured and fastened inside the container. The VENDOR will take all necessary precautions to conform to the maximum weight allowed and the centre of gravity of the container. The securing and fastening of the cases/ crates can be carried out by nailing timbers on the bottom or on the vertical sides of the container.

13.0 Other Services to be provided by Vendor

In addition to the packing and shipping documents, VENDOR must also carry out the following services, which shall be included in his quotation:

Carriage of VENDOR's sub-contracted equipment and material, which must be re-grouped in VENDOR's or PACKER's workshops, whilst waiting for packaging.

BHEL reserves the right to postpone the shipping of the GOODS. In this event, any storage and insurance costs during the first ninety (90) days shall be borne by the VENDOR.

Loading, including lifting, securing, lashing, and stowing, of all cases, crates, or packages onto means of transportation such as, but not limited to, trailers, containers, etc.

14.0 Responsibilities and Guarantees

VENDOR is responsible for the choice of category for packing according to the transport facilities used, and on the basis of the present document. In case of doubt or disagreement regarding the choice, VENDOR must inform BHEL prior to packing and await BHEL's approval. All phases of packaging, marking, loading, etc. will be subject to BHEL inspection.

BHEL reserves the right to reject the packing when the packing does not conform to these instructions and/or when the packing does not ensure perfect protection of the GOODS. VENDOR is responsible for the weights and dimensions declared, and the marking of the packages.

The documents must be in strict conformity with the packing contents.

The packing specified in these "Packing, Marking and Shipping Instructions" is guaranteed for a twelve (12) months storage period after delivery on site.

VENDOR is responsible for providing storage recommendation adapted to the GOODS. According to this guarantee, VENDOR is held responsible in the event of goods becoming

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useless, damaged or broken, as a result of poor packing and/or stowing, or due to corrosion, subsequent to insufficient or inadequate protection. All direct or indirect costs resulting thereof, will be back-charged to VENDOR.



**TECHNICAL SPECIFICATION OF SLURRY PUMP
NTPC-Dadri (2X490 MW)**

DADRI:FGD:SLP:R00

ANNEXURE-VII

INSPECTION & TESTING

Refer to all clauses for Inspection & testing requirements.

SIGNATURE OF BIDDER -----

NAME -----

DESIGNATION -----



**TECHNICAL SPECIFICATION OF SLURRY PUMP
NTPC-Dadri (2X490 MW)**

DADRI:FGD:SLP:R00

ANNEXURE-VIII

HEALTH & SAFETY MANAGEMENT MANUAL

Refer to all clauses for Health & Safety requirements.

SIGNATURE OF BIDDER -----

NAME -----

DESIGNATION -----



TECHNICAL SPECIFICATION OF SLURRY PUMP NTPC-Dadri (2X490 MW)

DADRI:FGD:SLP:R00

ANNEXURE – I(a) - LIST OF TESTS FOR WHICH REPORTS HAVE TO BE SUBMITTED:

The following type test reports shall be submitted for each type and rating of LT motor of above 50 KW only

1. Measurement of resistance of windings of stator and wound rotor.
2. No load test at rated voltage to determine input current power and speed
3. Open circuit voltage ratio of wound rotor motors (in case of Slip ring motors)
4. Full load test to determine efficiency power factor and slip.
5. Temperature rise test.
6. Momentary excess torque test.
7. High voltage test.
8. Test for vibration severity of motor.
9. Test for noise levels of motor:
 - Noise level for all the motors shall be limited to 85dB (A) except for BFP motor for which the maximum limit shall be 90 dB(A). Vibration shall be limited within the limits prescribed in IS/IEC 60034-14. Motors shall withstand vibrations produced by driven equipment. HT motor bearing housings shall have flat surfaces, in both X and Y directions, suitable for mounting 80mmX80mm vibration pads.
10. Test for degree of protection
11. Over speed test.
12. Type test reports for motors located in fuel oil area having flame proof enclosures as per IS 2148 / IEC 60079-1
 - All acceptance and routine tests as per the specification and relevant standards shall be carried out. Charges for these shall be deemed to be included in the equipment price.
 - The type test reports once approved for any projects shall be treated as reference. For subsequent projects of NTPC, an endorsement sheet will be furnished by the manufacturer confirming similarity and “No design Change”. Minor changes if any shall be highlighted on the endorsement sheet.

TERMS AND CONDITIONS FOR INDIGENOUS OFFERS

- a) **Quotations :** Each Tender should be sent in duplicate in a sealed cover. Inner cover should be sealed with tender's distinctive seal and superscribed with correct Tender No., item of supply and due date of opening. Tender should not be addressed to any individual's names but only by designation and shall be addressed to Manager/Purchase, BHARAT HEAVY ELECTRICALS LIMITED, BOLIER AUXILIARIES PLANT, INDIRA GANDHI INDUSTRIAL COMPLEX, RANIPET, VELLORE DISTRICT - 632406, INDIA.
- b) Tenders should be neatly typewritten and should be free from CORRECTION AND ERASURES. Corrections, if any, must be attested. All amount shall be indicated both in words as well as in figures. Where there is difference between amount quoted in words and figures, amount quoted in words shall prevail.
- c) Price should be net F.O.R. destination inclusive of risk in transit and remain valid for 90 days from the due date.
- d) If any Sales Tax is payable as extra to the quoted price it should be specifically stated in quotation failing which the purchaser will not be liable for payment of Sales Tax. Our TIN No. 33024364741 & CST Number 1141686.
- e) Products with I.S.I certification marks will be preferred.
- f) The applicable rate of excise duty shall be clearly indicated in the quote itself.
- g) The tenderer shall fill up the specification Deviation Disposition Report either NIL or the deviation taken by the tenderer against the Tender specification.
2. **Samples :** Wherever possible samples should be submitted separately whether specifically requested or not, so as to reach the purchase on or before the due date of the enquiry. They should be clearly marked with the Enquiry No. and the date on the outside cover to facilitate identification.
3. **Packing and Marking :** The supplier shall arrange for securely protecting and packing the stores to avoid loss or damages during transit.
4. **Terms of Payment :** Payment will be made within 45 days for MSME (Small / Micro) Vendors and 90 days for others after receipt and acceptance of materials at BHEL Stores or receipt of site acknowledgment in case of direct to site items of satisfactory receipt of materials at site. Where required by the purchase, the successful tenderer must send the operation and maintenance manuals, test certificates, drawings, etc., as called for, for the materials ordered. These should be sent immediately after despatch of the materials and a statement to that effect should be made in the invoice. Failure to comply with this provision will result in delay in payment of the bills. Goods despatched either by V.P.P. or by the documents presented through bank will not be accepted unless agreed to by the Purchaser.
5. **Liquidated Damages :** It is clearly understood among the parties to the contract that "Time is the essence of the contract". Therefore, the delivery of the goods specified in the purchase order should be made within the time limit prescribed. Where the seller supplies or despatches the goods, beyond the delivery period specified, the Purchaser will have no obligation to accept the goods. If accepted, liquidated damages at the rate of 1/2% of the value of goods delayed for each week of delay or part thereof will be levied without prejudice to any other relief or compensation due to the purchaser under any other condition of this contract.
6. **Risk Purchase :** Alternatively, the purchaser at his option will be entitled to purchase elsewhere at the risk and cost of the seller either the whole of the goods or any part which the supplier has failed to deliver or despatch within the time stipulated as aforesaid or if the same were not available, the best and the nearest available substitute therefor. The supplier shall be liable for any loss which the purchaser may sustain by reason of such risk purchases in addition to penalty at the rate mentioned in Clause 5 above.
7. **Preferential Delivery :** It should be noted that if a contract is placed on higher tenderer as a result of this invitation to tender in preference to the lowest acceptable offer in consideration to the earlier delivery, the seller will be liable to pay to the purchaser the difference between the contract rate and that of the lowest acceptable tender on the basis of final price F.O.R. destination including all elements of freights, sales tax, duties and other incidentals in case of failure to complete supplies in terms of such contract within the date of delivery specified in the tender and incorporated in the contract.
8. **MODVAT CREDIT :** If any Excise duty is payable, the chapter head/sub - head reference and the rate of duty should be quoted. If the tenderer is availing MODVAT credit for his input materials, the effect of proforma credit should be passed on the purchaser. Tender under "MODVAT" shall be preferred.
9. **General :** a) The Purchaser reserves the right to split up the tender and place for individual items with different tenderers and also increase the quantity.

TERMS AND CONDITIONS FOR FOREIGN OFFERS

Offer : Offer in ENGLISH LANGUAGE AND IN TRIPLICATE IN A SEALED COVER superscribing the enquiry number and due date shall be submitted addressed to : THE MANAGER / PURCHASE, BHARAT HEAVY ELECTRICALS LIMITED, BOILER AUXILIARIES PLANT, INDIRA GANDHI INDUSTRIAL COMPLEX, RANIPET - 632 406, TAMIL NADU, INDIA.

Offers should be firm for net FOB / FCA nearest Sea / air port price and C & F Chennai Port Price indicating the shipping specifications and the earliest delivery in the respect of others from overseas suppliers.

Documents :

- (i) Offers should be accompanied by detailed technical literature, catalogue and detailed dimensional drawing in ENGLISH and in DUPLICATE, or otherwise the offers will not be considered.
- (ii) In case overseas suppliers route their accredited selling agents, a letter of authority should be furnished mentioning the name and address of their selling agents, who are authorised to bid, negotiate and conclude a contract on their behalf.

Agency Commission : In respect of offers from overseas suppliers, agency commission, if any, payable to their agents in India shall invariably be shown separately in the proforma invoice and this will be paid by us in India, in Indian Rupees, on satisfactory completion of the contract.

Spares : The tenderer should quote separately for spares that are required for two years trouble free operation. The spares offer should accompany the offer of main equipment, otherwise the quotation will be overlooked.

Validity : The offers for main equipment and spares shall be kept open for acceptance for 90 days (Ninety days) for the date of opening of the tender.

Test Certificates, Operating and Maintenance Manuals : The tenderer shall clearly mention in their offer that Test Certificates and Operating and Manuals, etc., as called for in technical specification, in the required number of copies will be provided at no extra cost. If any amount is payable as extra, the same shall be indicated separately in the offer.

Terms and payment : In the event of an order the purchaser will arrange for an unconfirmed irrevocable letter of credit against presentation of documents. Under, no circumstances confirmed irrevocable letter of credit will be established by the purchaser.

General :

- (i) Preference will be given to suitable indigenous or ex-stock imported offers, failing which imported offers from incoming consignment against the indigenous supplies "Stock and sale Licence" will be accepted, if Stock and sale licence is not available with the indigenous suppliers, the same shall be indicated in their offer.
- (ii) The offer should reach us on or before 14.00 Hours of date of tender opening. The offer will be opened at 14.30 hours on the due date in the presence of the tenderers who may like to be present.
- (iii) **BANK GUARANTEE** (if applicable) : The supplier in the event of an order, should furnish a Bank Guarantee from an approved Bank at no extra cost in a proforma which will be supplied to the supplier, along with the order, for an amount equivalent to 10% of the value of the contract. The Bank Guarantee should remain in full force and effect during the period that would be taken of successful completion of the contract and shall continue to be enforceable till 12 months from the date of receipt of consignment at purchaser's site or 18 months from the date of last shipment at the port of Delivery, whichever is earlier.
- (iv) **INCOTERMS :** The definition for terms shall be as per Incoterms 2010
- (V) **PLEASE QUOTE YOUR RATE FOR ALL THE FOLLOWING CONDITIONS.**
- (a) FOB on at sight L.C.
- (b) On C & F Chennai Port India with at sight L.C.
- (c) Rate on credit basis with rate of interest and period of credit.
- (d) Rates with suppliers credit.

Payment Mechanism at BHEL, Ranipet

(Effective for all tenders issued by BHEL Ranipet from 01 July 2011 onwards unless otherwise notified of change/s in writing given by an authorized official of BHEL, Ranipet)

BHEL, Ranipet's payment mechanism will be as follows: (All Bidders are requested to read this carefully and take note of it before submitting their offer)

All bills of Suppliers processed for payment by BHEL, Ranipet shall pass through the following mile stones:

- (1) Receipt of materials at BHEL, Ranipet Stores (evidenced by the Day-Book Number and Date generated at BHEL Stores, Ranipet) or Receipt of materials at Project Site / Destination specified in the Purchase Order (as evidenced by the acknowledgement given by the Consignee).
- (2) Acceptance of the supplied materials at BHEL Stores, Ranipet. (Proof of evidence: Stores Receipt voucher - Short form "SRV", raised by BHEL Stores, Ranipet referenced by the SRV Number and Date)
- (3) Receipt and Registration of the Bills / Invoices of the Supplier at BHEL, Ranipet Accounts Department. (evidenced by the ABS Number and Date)
- (4) Receipt of clarifications, if any that may be required by BHEL, Ranipet Accounts or Purchase Department, from the Supplier. (As evidenced by the IOM Inward Date)
- (5) Bill processing and passing.
- (6) Payment release.

All these events are transparently available in the SCM web-site of BHEL, Ranipet, { <http://bapscm.bhelrpt.co.in/purc> } which can be viewed by all registered suppliers with a password.

Allowed Time frames:

- A] From DB to SRV: 10 Days
- B] From SRV to ABS: 15 Days
- C] From ABS to Bill Pass: 07 Days (if Stage 4 above is not applicable)

OR

From IOM to Bill Pass: 07 Days (if Stage 4 above is applicable)

- D] From Bill Pass to Payment Release: As per payment terms of the Purchase order.

All Suppliers payment/s would be released based on seniority of receipt of the processed bills at the payment section of BHEL, Ranipet Accounts Department.

The seniority would be based on the sequence of milestone events listed above.

In the sequence of the bill processing the preceding mile-stone seniority will be void, if the subsequent event occurs beyond the permitted time frame between two successive events.

Thus for example:

Start seniority would be with the DB date.

If the SRV date is greater than 10 days of the DB date, then the seniority of the DB date would be replaced by the SRV date.

If the ABS date is greater than 15 days of the SRV date, then the seniority would be reckoned by the ABS date.

If the Bill pass date is greater than 07 days of the ABS date then the seniority would be the date of inward receipt of the IOM.

The logics of these sequence is that SRV, ABS, IOM inward entry are dependent entirely on submission of correct documentation by Suppliers, as called for in the Purchase Order. If the documents are correctly submitted each of the milestone listed above will occur within BHEL, Ranipet within the timelines specified above.

Hence, in their own interest all Suppliers are requested to take note of this process and comply with the same.

Caution: Suppliers' payments would get delayed / affected if they fail to adhere to the submission of the documents specified in the Purchase Order / Contract, since the listed milestone events occurrence are contingent upon the availability of the requisite documents.

Online SRF Submission Procedure

Following are the formalities to be completed by your company for registration purpose.

NOTE: BEFORE PROCEEDING FOR ONLINE REGISTRATION " PLS READ STEPS FOR FILLING UP ONLINE REGISTRATION FORM - HELP MENU" - DETAILS ATTACHED WITH THIS MAIL

With effect from 01.04.2015 onwards, we have migrated to online Supplier Registration Form (SRF) as per our Corporate guidelines. **Supplier Registration Form (SRF)** is to be fed in our BHEL website portal – **ie., PDF documents of SRF and its annexure as called for shall be signed by authorized signatory & uploaded in portal.**

We request to visit our Web Site : www.bhel.com and click under heading "Supplier Registration" and fill up the **"Supplier Registration Form"** which is available in the Online Supplier Registration Portal.

Or else, copy the following URL Link and paste in the web link address: http://www.bhel.com/vender_registration/vender.php and proceed with.

Or else, type directly as <http://203.129.195.108>

Click the button "search material" on the home page of supplier registration portal and search thoroughly your required material / product

*After completing the material search then proceed for User Id & Password for filling up the details of registration requirements. **Note: If you are an already registered supplier with any of our BHEL Unit - pls select "existing permanent supplier" or else select "New Registration" and then proceed accordingly.***

Please note that for a foreign suppliers' there is a separate format to be filled in, which may be taken care suitably.

After successful submission of SRF along with all annexures as called for thro' online i.e., authorized signatory signed pdf documents of SRF and its annexures are to be uploaded thro' online portal and confirm the same in **"form dispatch"** area ie., registration part-4 – wherein supplier has to confirm that all the documents were submitted "online" and click the button **"confirm"**. After clicking confirmation button, the same will be appearing against BHEL Ranipet for registration.

Looking for a long successful & sustaining business association with BHEL.

(TO BE STAMPED IN ACCORDANCE WITH STAMP ACT AND THE EXPIRY DATE OF BG MUST BE AFTER 3 MONTHS FROM THE DATE OF COMPLETION OF SUPPLIES)

CONTRACT EXECUTION BANK GUARANTEE

In accordance of M/s. Bharat Heavy Electricals Limited (A Government of India undertaking, a company incorporated under the Companies Act 1956 having its Registered Office at "BHEL House", SIRI Fort, New Delhi 110 049) through its Boiler Auxiliaries Plant located at Ranipet – 632 406, (hereinafter called 'the Company') having entered into a contract with M/s.....
..... hereinafter called 'the said contractor' which term includes 'suppliers' for the purpose of this Bond and under the terms and conditions of the Contract No.....Dt.....between BHEL, Ranipet and as per the Contract, the Contractor / Supplier is to furnish a Contract Execution Bank Guarantee for Rs.....in words.....
.....for the due performance of the contract and for the fulfillment of all the terms and conditions of the contract.

Sign and seal of issuing bank
Please affix Non Judicial Stamp
here, as per Stamp Act

Bank Guarantee No.....Date.....Banker Name.....
Bank Guarantee Value Rs.....

1. We.....
.....
.....(Bank's name, Branch, Place – address to be mentioned [herein after referred to as the Bank) at the request of.....
.....(Contractor(s)] do hereby undertake to pay the company an amount not exceeding Rs.....in words
.....
.....
.....against any loss or damage caused to or suffered or would be caused to or suffered by the company by reason of any breach by the said Contractor(s) of any of the terms and conditions contained in the said agreement.

2. We.....
.....
.....(name of the bank with full address), do hereby undertake to pay the amounts due and payable under this guarantee without any demur, merely on a demand from the Company stating that the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by the Company by reason of breach by the said Contractor(s) of any of the terms and conditions contained in the said Agreement or by the reason of the Contractor(s) 'failure to perform' the said agreement. 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.....in words.....
.....

Sign and seal of issuing bank

Bank Guarantee No.....Date.....Banker Name.....
Bank Guarantee Value Rs.....

3. We undertake to pay conditionally to the Company any money so demanded notwithstanding any dispute(s) raised by the Contractor in any suit, or proceedings pending before any Court or Tribunal or Arbitration or before any other authority relating thereto our liability under this present being absolute and unequivocal. The payment under this guarantee would not wait till the disputes have been decided by any Court or Tribunal or in the arbitration proceedings or by any other authority. The payment so made by us under this Bond shall be a valid discharge of liability for payment thereunder and the Contractor(s) shall have no claim against us for making such payment.

4. We.....(name of 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 Agreement and that it shall continue to be enforceable till all the dues of the Company under or by virtue of the said Agreement have been fully paid and its claims satisfied or discharged or till Purchase Department of the Company certifies that the terms and conditions of the said Agreement have been fully and properly carried out by the said Contractor(s) and accordingly discharges this guarantee.

5. (i) Unless a demand or claim under this guarantee is made on us in writing on or before(date) (After 3 months from the date of completion of supplies) we shall be discharged from all the liability under this guarantee thereafter. But where such claim or demand has been preferred by the Company with the Bank before the expiry of the said date, the claim shall be enforceable notwithstanding the fact that the said enforcement is effected after the said date. (ii) For the purpose of this clause, any letter making demand on the Bank by M/s. BHEL dispatched by Registered Post with Ack. Due or by Telegram or by any Electronic media addressed to the above mentioned address of the Bank shall be deemed to be the claim / demand in writing referred to above irrespective of the fact as to whether and when the said letter reaches the Bank, as also any letter containing the said demand or claim is lodged with the Bank personally.

Sign and seal of issuing bank

Bank Guarantee No.....Date.....Banker Name.....
Bank Guarantee Value Rs.....

6. We.....(name of the Bank), further agree with the company that the Company 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 agreement 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 Company against the said Contractor(s) and to forbear or enforce any of the terms and conditions relating to the said Agreement 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 company or any indulgence by the company to the said Contractor(s) or by any such matter or thing whatsoever which under the law relating would, but for this provision, have effect of not so relieving us.

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

8. The guarantee herein contained shall not be determined or affected by the liquidation or winding up or insolvency of or change in the constitution of the Contractor, but shall in all respects and for all purpose be binding and operative until all payments of all moneys due or that may hereafter become due to the said company or settled irrespective of any liability or obligation of the Contractor under the said Contract.

9. It shall not be necessary for the company to proceed against the Contractor before proceeding against the guarantor-bank and the guarantee herein contained shall be enforceable against them notwithstanding any security, which the company may have obtained from the Contractor shall, at the time when proceedings are taken against the Guarantor hereunder be outstanding or unrealized.

10. Any claim or dispute arising under the terms of this document shall only be enforced or settled in the Courts at Ranipet, Tamilnadu Jurisdiction.

11. The Bank declares that it has powers to issue this Guarantee under the Bank's Memorandum and Articles of Association and the undersigned has full powers to do so on its behalf under the power granted to him by the proper authorities of the Bank.

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

In witness whereof we.....
(name of Bank) have hereunto setout Bank Seal the.....
day of.....month 20__.

Sign and seal of issuing bank.

Date : 26-MAR-18

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PO Ref	MKTG REF 71804 AND NOTE DT 03/01/2018			PO Date	03-JAN-18
Cont #	G501	Project Name	FGD PACKAGE for DADRI-II 2x490 MW		
Proj abrvn	DAFGD	Exp code	Indigenous	Advance Ind	Not identified
Order Type	DIRECT ORDER			Finance remarks	
Freight code	PAID				
Mode of desp	BOTH				
INSU code	BHEL(OTHERS)				
Export Box code					
Cust numbers	G501,G502			DI Status	Completed by coml
Carrier	BHEL APPROVED CARRIER			Inv Address	State Code : 09
				AGM ME(FGD) 4X490MW	
Consignee Address				NATIONAL CAPITAL THERMAL POWER PROJECT	
AGM ME(FGD) 4X490MW				STAGE II, NTPC, DADRI,PO-Vidyut nagar	
NATIONAL CAPITAL THERMAL POWER PROJECT				DIST: GAUTAM BUDHA NAGAR	
STAGE II, NTPC, DADRI,PO-Vidyut nagar				UTTER PRADESH.	
DIST: GAUTAM BUDHA NAGAR				Pin - 201008	GSTIN 09AAACN0255D9ZO
UTTER PRADESH.					
Pin - 201008				Supply Address	State Code : 09
GSTIN 09AAACN0255D9ZO				AGM ME(FGD) 4X490MW	
Units	G502	DADRI-II- FGD-2		NATIONAL CAPITAL THERMAL POWER PROJECT	
Units	G501	DADRI-II- FGD-1		STAGE II, NTPC, DADRI,PO-Vidyut nagar	
				DIST: GAUTAM BUDHA NAGAR	
				UTTER PRADESH.	
				Pin - 201008	GSTIN 09AAACN0255D9ZO
Special Instructions (if any)					

ANNEXURE –B
GENERAL TERMS & CONDITIONS
(FOR GUIDANCE TO THE SUPPLIERS)

A] Submission of Offer

a) Invitation for bid

Tenders are invited through electronic mode from eligible suppliers in case of open tenders and from suppliers to whom the enquiry is addressed in case of Limited / Single Tender.

The offers shall be posted into the system before the date and time specified in the tender.

The offer shall be sent on single part / two part / three part basis as specified in the main tender document.

Bids shall be submitted through e-Procurement portal, <http://bhel.abcprocure.com>, of M/s **E-Procurement Technologies Ltd** - www.abcprocure.com who are our solution provider.

b) Hardware and Software requirements for participating in e-tender

Requirement for participating in e-Procurement is as under:

System Components	Requirement
Internet Connection	Minimum 256 kbps
Web browsers	IE 9 & above, Firefox , Chrome
Operating system	Windows XP and above

c) Instructions for Registered Suppliers

For all types of tenders (Single / Limited / Open) an automated email alert regarding issue of the Tender will be sent by the e-procurement portal to all Suppliers registered with BHEL, Ranipet for the item/s for which the tender is issued.

In case of open tenders, Registered suppliers with registered DSC will have to login with their user id/password & DSC and search for the Open Tender. On clicking the “Interest” button, they will get attached to that particular Open Tender.

Registered suppliers without DSC will have to first register themselves in <http://bhel.abcprocure.com> as new supplier by clicking the “New Supplier” button.

To know the procedure for obtaining Digital Signature Certificate (DSC), suppliers who are not having the DSC are advised to visit our website www.bhel.com → Tender Notifications → Sample Checklist.

d) Instructions for new suppliers wishing to bid against open tenders

New, unregistered suppliers wanting to bid against open tender/s will have to first register themselves in <http://bhel.abcprocure.com> as new supplier by clicking the “New Supplier” button.

After entering the Income Tax Permanent Account Number (PAN) details and pressing “Enter”, they have to click the “Interested” button against the respective BHEL Unit for which they want to participate in the Open Tender and also fill up other relevant Company information as a one-time activity.

Then, a box for filling in a “preferred login id” will appear at the top of the page. After giving the “preferred login id” and then clicking the “Next” button, Supplier would have to map their DSC (which will be activated by M/s **E- Procurement Technologies Ltd**), if available. Or else, by pressing “skip” button and selecting relevant procurement category from the list available in the next page and “agreeing” to the BHEL’s terms & conditions, user id and password will be generated/activated once in 2 hours and mailed to their registered email id. Using this user id and password, Supplier has to login and map the Digital Signature Certificate they have purchased to their code. The DSC will then be activated by M/s **E- Procurement Technologies Ltd**.

As required by the tender, the necessary documents have to be filled-in online, in the provided template. Additional documents required are to be scanned and uploaded as .pdf file. Suppliers are advised to take note that the maximum space that is provided for uploading the documents that are to be attached is 300 MB. However the size of an individual document cannot exceed 10 MB. For any clarification on submission of offer on line, attention of the Supplier/s is invited to our document “Supplier Manual” hosted in the home-page of the e-procurement portal. During normal business hours, helpline maintained by the service provider **E- Procurement Technologies Ltd** <mailto:bhel.support@abcprocure.com> is available for clarifying any doubts of supplier/s. The helpline number is +91-9099090830.

Typical documents that would be required as part of tender submission would be

- a) **Complete technical Offer** with details, catalogues, as applicable.
- b) **Un-priced bid** (i.e. Bid without the Price) as per given format, if any.
- c) **Filled-in BHEL’s Standard Terms & Conditions** as per Annexure enclosed with the Tender Document,
- d) **Deviation summary** submitted in two parts – giving the summary of technical deviations separately and the commercial deviations separately, if any and
- f) **Supporting documents** to substantiate equivalent material specifications / sections, where quoted for.
- g) Where asked for, **Client list** with their full address including detail of contact person with phone no., fax no. & e-mail ID (if any) to whom the same / similar items are supplied in the past two years. The date of supply may also be indicated, against each client.
- h) **Bidders who are not already registered with BHEL Ranipet** are requested to submit the Supplier Registration Form (SRF) online (<http://supplier.bhel.in/>) for evaluating and registering as an approved vendor. The Supplier Development Cell (SDC) of BHEL, Ranipet would process the SRF for evaluation / registering the Supplier.

Suppliers can also upload their credentials by way of submission of Performance certificate/s issued by their customer/s detailing the quantity supplied and specification along with the un-priced PO copies and proof of supply along with the offer.

Technical acceptance of offer by BHEL shall be based on the evaluation of offer and the submitted documents.

Note

- (i) The materials offered, shall conform to the specification and scope attached in the tender.
- (ii) In case the offered materials are not conforming to the Enquiry material Specification, such offers would not be considered for evaluation and would be rejected.

Where equivalent specifications are offered, considering such offers will be at the sole discretion of BHEL. Wherever alternative standards / specifications are offered by Bidder, the Bidder shall provide sufficient documentary evidence to ensure equivalence to the designated standards / specifications, failing which the offer would be considered as not technically acceptable and hence shall stand rejected.

(iii) All taxes and duties payable as extra to the quoted price should be specifically stated in offers (as appearing in the online template).

Offer/s from within India shall be submitted along with the applicable HS Number and the applicable Goods & services Tax (GST) for each quoted item, failing which the purchaser will not be liable for payment of such taxes and duties. Our GST No: **33AAACB4146P2ZL**.

(iv) The un-priced bid shall be used to indicate relevant commercial terms such as scope of freight and insurance, applicability of duties and taxes etc. All Commercial terms are to be indicated clearly in the offer.

(vi) No changes shall be entertained once the bid is opened unless otherwise specifically agreed to in writing by BHEL.

(vii) Money values other than for those items appearing in the un-priced bid template shall not be indicated anywhere in the un-priced bid.

(viii) Time required for inspection (at Supplier's works), should be clearly given in terms of numbers of working days.

(x) **Offers sent by FAX / E-mail:** would not be entertained.

(xi) Bid should be free from correction, overwriting, using corrective fluid, etc. Any interlineation, cutting, erasure or overwriting shall be valid only if they are attested under full signature(s) of person(s) signing the bid else bid shall be liable for rejection.

Price Bid in conformance with the specification and terms as given in the Un-Priced bid document.

Caution:

The suppliers are severely cautioned to note that the price bid document accepts the price in figures only. It does not allow the supplier to write the value by words. Therefore all care shall be exercised by the supplier while filling in the figures. Once the price bid is opened no option is available for the supplier to retract the offer under any grounds. If a supplier, for any reason whatsoever approaches BHEL with a request for change in the price, it would be treated as going back on the offer submitted. In such cases, action would be initiated by BHEL for suspending further business dealings with such suppliers as per policy of BHEL which prevails at that point of time.

Foreign / Overseas suppliers are hereby informed that offers with differential currencies are not permitted for a given tender document.

Note

(i) The price break-up should be in line with technical specification / scope of the tender. (Cost of material, packing charges, forwarding charges, freight and insurance charges shall be shown appropriately, as applicable).

(ii) Unless otherwise specified as a part of the tender condition, No Price Variation Clause will be entertained and No advance payment will be made by BHEL.

- (iii) In case, there is a discrepancy in the term quoted in techno-commercial bid and price bid, the term as per the techno-commercial bid (Part I) shall hold good and the commercial term quoted in the Price Bid (Part II) shall not be considered.
- (iv) In their own interest, all Tenderers are advised to double check their prices, applicable duties and taxes.
- (v) The quotation should be valid at least for a period of 90 days from the tender opening date.
- (vi) Indian bidders should submit the prices in Indian Rupees only.
- (vii) Foreign bidders may submit their bid in foreign currency. The currency for quoting shall be selected from the drop-down menu provided.
- (x) Indian Suppliers shall quote on FOR Destination basis only. Destination is BHEL, Ranipet Stores or BHEL Project Site as specified in the tender requirement. Foreign Suppliers shall quote on CFR Chennai Seaport Delivery and Insurance will be in BHEL's scope. No other delivery terms shall be acceptable. Shipment shall be arranged by the Seller on *Liner in / Liner out basis*. As per Government of India guidelines, BHEL Ranipet being a Government of India Undertaking the Bill of Lading shall be made with the Shipper as "Government of India". This shall be specifically confirmed by the Bidder.
- (xi) Where the cargo is containerized, Container washing charges, stuffing charges and / or any other such charges would be to the account of the supplier, where the containers are to be stuffed at the works of the supplier.

B] Opening of Offers

a) Tenders can be submitted up to 1400 Hours on tender opening due date. Part I will be opened on the same day at 1430 Hours. Results of the tender opening will be available for viewing for upto 7 days from the date of opening.

b) Requests by Bidders for extension of due date will not be entertained by BHEL.

c) Price Bid opening will be done through e-mode / Reverse Auction method (English method) **which will be decided after techno-commercial bid evaluation is completed.** All tenderers would have to specifically give their acceptance for this in their bid/s.

Note

- (i) Bids including all enclosures and supporting documents like catalogues, pamphlets, etc., shall be provided in ENGLISH language only.
- (ii) In exceptional circumstances, at its option, BHEL may consider extending the due date/s for the tender openings for reasons such as (but not limited to) paucity of offers etc. However, sufficient notice would be given by BHEL for such extension.
- (iii) Deviations shall be summarized and provided in a "Deviation Statement", listing the points and the deviation against each point.
- (iv) BHEL reserves the right to increase or decrease the tendered quantity and to order on more than one vendor at the lowest acceptable price to BHEL. In ordering on more than one source, the ratio of quantity split will be as specified in the tender terms.

If not explicitly specified, BHEL reserves the right to split the quantity of the enquiry as follows: 70% quantity being ordered on the original lowest bidder (L1) and balance 30% on the next higher bidder/s excluding H1, who accepts the L1 price. However, the final decision to split the order rests with BHEL only.

In the event that the other than L1 suppliers do not accept the L1 price, then the balance will be reverted to the original L1 and the original L1 shall be bound to accept the balance of the enquiry quantity kept reserved for order splitting. This decision would be given by BHEL within 60 days of the price bid opening.

Notwithstanding the quantum of split that may be indicated in the main body of the enquiry, bidders are advised to note that the splitting of the orders will be decided by BHEL after the evaluation of the techno-commercial and price bids.

(v) Offers for part quantities on item level basis are not acceptable to BHEL. While tenderers can quote for some or all the tendered items, no supplier shall quote for partial quantity of any given enquiry item. Such partial offer would not be considered in the enquiry for that item. Suppliers are to note that the evaluation unless otherwise specified will be on item level and not for the tendered items as a whole.

C] Evaluation of Offers

a) The price bids including the impact price (if any) of the technically acceptable offers alone shall be opened.

b) Offers with pre-conditions (like conditional discounts) for price are liable to be not considered / rejected. For evaluation such conditions would be removed and only the base offer would be considered for evaluation and comparison.

d) In the event of any change in scope / quantity arising out of the discussions, offerers would be given a chance to submit their revised offer / Impact bids. The option for the revised offer / impact offer will be triggered by BHEL. The Supplier then will have the facility to feed-in the revised price / impact price as per the provision given by BHEL. The impact price can be positive or negative (or nil). The impact price option shall contain only the price addition / deletion for such change in the scope / quantities, over and above the original scope and price quoted. The original price quoted would remain unchanged. The total price would then be computed by the arithmetic addition of the original price and the impact price. Where BHEL gives the option of submitting the revised offer, the impact would be computed as the arithmetic difference of the revised price and the original price.

e) For evaluating the overseas offers, CFR Chennai Sea Port price quoted will be taken into account. The cost to BHEL will be arrived at by loading the applicable customs duty project wise, insurance charges, inland transportation charges to BHEL stores and LC charges etc.,

f) Deleted.

g) BHEL reserves the right to reject without assigning any reasons / load any offer with factors other than already specified for such offers having deviations to BHEL Specifications, Standard Terms & Conditions at its discretion. The decision of BHEL in this regard shall be final.

h) BHEL reserves the right to reject an offer due to unsatisfactory past performance during tender finalisation / execution of a contract at any of BHEL projects / units or if unsatisfactory performance report is received from the party/s referenced by the supplier at any time during tender finalisation.

i) BHEL reserves the right to operate Purchase / Price preference to Government of India Undertakings, which shall be given as per the guidelines of Government of India given from time to time and / or relax the Terms and Conditions of the tender.

j) For the purpose of comparing prices, tender prices shall be converted to Indian rupees and the conversion shall be made by using the TT Selling rate of State Bank of India (SBI) prevailing on the date of opening of

Techno-Commercial / Unpriced bids. 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. This exchange rate will be followed till placement of order. Tenderers may please note that even if an impact price is taken as in (d) for purpose of price evaluation and arriving at the rank; the exchange rate will be taken as explained above.

k) Unless otherwise specified, evaluation will be on individual line item basis only and ordering will be on respective L1 vendors.

l) BHEL reserves the right to conduct negotiations on the “Price” and “Other Commercial Terms and Conditions” with the lowest ranked offerer at any time after the bid opening but before the release of the Purchase Order and If so required by BHEL, Supplier may have to share their costing sheet with BHEL.

m) Bidders are required to confirm in writing in their techno-commercial document that other than themselves (the bidder) none of its group companies, concerns or affiliates etc., are participating in the tender either directly or indirectly or through any other agency under the same proprietor / common partner(s)/ common Directors. If during the evaluation of the bids it is found that the bidder has submitted the offer in violation of this condition then all the offers received from the group companies would stand rejected. If such relationship is found at a later date where the Purchase Order has been issued, then BHEL would cancel the Purchase Order and initiate suitable action/s under the contract/s including but not limited to invoking the Risk Purchase clause of the order and other applicable legal provisions / guidelines of BHEL including guidelines on suspension of business dealings. (Please see clause L sub-clause c).

D] Execution of the Order

a) BHEL will have the option to pre-inspect the materials at Supplier's works by BHEL's own inspector or by third party agency appointed by BHEL or BHEL's end customer/s. The mere act of the pre-dispatch inspection (PDI) does not absolve the Supplier from giving the specifications as agreed upon in the Purchase Order. In the case of inspection being carried out by a third party inspector (TPI) as per the extant practice, the TPI would forward the Inspection Report (IR) along with Test Certificates and other related documents to the Quality Assurance (QA) Department of BHEL. The QA department after scrutinising the report/s submitted by the TPI would issue the Material Dispatch Clearance Certificate (MDCC). Suppliers are hereby informed that materials should be dispatched only after getting the MDCC, failing which the materials may be rejected on receipt at BHEL Stores.

b) In the case of overseas suppliers Inspection call for carrying out the inspection shall be given 30 days before the scheduled contract delivery date. The Inspection date/s given by the Supplier shall be on firm basis. For local Suppliers the Notice period of Inspection shall be 10 working days.

c) Deviations, if any pointed out by the visiting Inspection team of BHEL shall be corrected and the items as per specification shall be dispatched on or before the contract delivery date after getting the MDCC.

d) The final inspection for acceptance will, however be carried out at BHEL's works at Ranipet.

e) The contract delivery date is the date of receipt at BHEL Stores for suppliers in India, applicable in the case of FOR Destination Contracts.

For ex-works contracts or FOR dispatching station indigenous contracts, the date of the Lorry way bill issued by the authorised transport carriers of BHEL / Railway Receipt / Courier Way bill / Airway bill or any such dispatch documents of carriage approved by BHEL would be considered as the Contract Delivery Date. In the case of CFR contracts with overseas suppliers, the B/L date shall be taken as the Contract Delivery Date

f) Travel & other local stay cost for the Inspectors sent by BHEL will be to BHEL account, but other Inspection Charges, if any shall be to the account of the Seller only.

g) The supplier shall arrange for packing suitably in all respects for normal transport by sea / rail / road and Materials shall be suitably protected against effect of tropical salt laden atmosphere in the event of shipment being delayed at ports / store yards and as per BHEL TDC.

h) Foreign suppliers shall dispatch on CFR agreed Sea-Port basis, according to the contract conditions. Indian suppliers shall dispatch on free delivery (door-delivery) at BHEL stores basis only. Unloading the materials at BHEL Stores would be to the account of BHEL only.

i) In the event of any short supply, it shall be the responsibility of the supplier to deliver such short supplied/ missing items on Free-of-Cost basis at BHEL stores, including customs clearances at Indian Ports in the case of foreign suppliers.

k) Terms of payment:

k.1) For Indigenous Suppliers: Unless otherwise agreed to by BHEL, the standard payment terms of BHEL shall be: For non-MSE suppliers 100% payment made directly through EFT within 90 days from the date of receipt and acceptance of materials at BHEL Stores, Ranipet or 90 days from the date of acknowledgement of receipt of materials at destination specified. If any supplier asks for payment terms other than the above specified, then suitable loading on cost will be considered. **Loading of any deviation in the payment terms w.r.t tender terms will be "Base rate of State Bank of India (SBI) (as applicable on the date of bid opening: Techno-commercial bid opening in case of two part bids) + 6%, will be considered for loading for the periods of relaxation sought by bidders.**

k.2) For MSE vendors (under Micro & Small category alone) 100% payment will be made within 45 days from the date of receipt and acceptance of materials at BHEL Stores, Ranipet or 45 days from the date of acknowledgement of receipt of materials at destination specified.

l) NOTE:

Where the destination specified is other than BHEL Stores Ranipet, for claiming payment, Supplier has to submit proof of receipt of the materials at the destination by furnishing a copy of the acknowledged despatch document (LR/RR/Courier receipt etc.) .

If the Bidder is bidding for the first time and wants to be considered as an MSE then, the Bidder shall submit document evidencing that they are an MSE along with a certificate from a Chartered Accountant certifying the status of their Unit / Works clearly specifying the address of the works which is to be considered as MSE and send the same to BHEL, Ranipet either before the tender opening date or upload it as a part of the tender document in the e-procurement portal. Where the document is submitted electronically a hard copy shall invariably be sent within a reasonable period (not exceeding 30 days) from the bid opening date for the purpose of BHEL's records. If the hard copy is not received within this specified time, then the supplier would be treated as a non-MSE. BHEL will not be responsible for any postal / courier / delivery delays.

For approved vendors the status as on the date of the bid opening as available with BHEL Ranipet's records shall be used for reckoning the status of the Bidder as an MSE or otherwise.

Offer/s received without these documents will be treated as non-MSE and order finalization will be done based on this premise. Documents submitted after Bid-opening will not be considered in this tender. This provision for MSE will apply subject to the condition that the participating MSE meets the tender requirements.

For approved suppliers, in case of any change in the MSE status, it shall be the responsibility of the Bidder to notify the change as a part of the Bid document. If at a later date it comes to the knowledge of BHEL, Ranipet that the change in the status has not been intimated by the Bidder and the order is obtained under the premise of an MSE then BHEL would cancel the pending order against this tender and take necessary steps for suspension of the business dealing with the Bidder as per the procurement policy of BHEL. Similarly if a supplier claims MSE status after the Part I bid opening, then the same would not be considered in the tender.

In case after the bid opening it is seen that no MSE has become L1, then depending on the nature of the item, if it is not possible to split the tendered items / quantities on account of reasons like customer contract requirements of supplying one make for a given project or technical reasons like the tendered item being a system etc. then BHEL would not counter offer the L1 prices even though there may be MSE bidders within the +15% band of L1.

Other concessions for MSEs / Reserved sectors

In addition to the concessions specified above, MSE suppliers will be eligible for such other concessions as per the MSME Act 2006 and any other benefits / concessions that may be announced by the Government of India from time to time.. However, such concessions as applicable at the time of tender opening alone will be applicable. Any concessions advised after tender opening will not be considered for the current tender.

Items that are reserved for MSE and for any other items for which reservations for Indian manufacturers are notified by the Govt. Of India, such concessions as prevailing on the date of tender opening shall apply as a part of this tender conditions.

ii) Foreign Suppliers “100% thru’ irrevocable & unconfirmed LC at sight within 3 weeks from the PO date through any one of our Bankers listed elsewhere in the tender conditions for 100% value (less Agency Commission, if any) valid up to the PO delivery period and 15 days thereafter for negotiation. All bank charges in India to BHEL's account and all other charges outside India to Supplier's account. **BHEL would load the price of foreign suppliers in order to bring them on common platform as per Indigenous Suppliers on the account of differential payment terms to Indigenous Suppliers. Loading of payment terms will be “Base rate of State Bank of India (SBI) (as applicable on the date of bid opening: Techno-commercial bid opening in case of two part bids) + 6%, will be considered for loading for the periods of relaxation compared to indigenous suppliers i.e. 90 days.**

m) Any incidence of tax like Income tax, Goods & Services Tax (GST) and Withholding any other similar tax / duties /levies imposed by the Government of India, or the State Government, where the BHEL Unit is located, deductible at Source, during the tenure of the Order shall be deducted by BHEL and necessary certification of the deduction (Tax deduction at Source) would be given. This is subject to the supplier fulfilling the necessary documentation as specified by the Government of India. (e.g. Tax Residency Certificate, PAN Number etc.)

n) The Guarantee period shall start from the “Date of receipt and acceptance of the materials at BHEL Stores.”

o) Where any bidder gives extended credit period over and above that offered by BHEL, then all other Non-MSE bidders and foreign bidders would have to match the extended period of payment terms. This information would be given to such bidders after opening of the techno-commercial bids; but before opening the price bids. However bidders would not be allowed to change their price bid for purpose of confirming the extended credit period. In the event such bidder/s do not accept the extended credit period

for payment, then their offer would be loaded to the extent of the differential between their offered payment terms and the revised payment terms offered by BHEL as explained above.

E] Liquidated Damages Clause:

BHEL will levy penalty as Liquidated Damages (LD), for delay in delivery. The damages shall be at the rate of ½% per week or part thereof subject to a maximum of 10% PLUS applicable Goods & Services Tax (GST). The contract delivery date for purpose of L.D is the date of receipt at BHEL Stores for suppliers in India for F.O.R. Destination Contract and the date of dispatch clearance given by BHEL for overseas suppliers. For ex-works or F.O.R dispatching station contracts, the date of the dispatch document will be reckoned as the date of delivery for computing the LD. Supplier shall deduct the applicable LD from the first payment when raising the claim for the same. The applicable LD if any would be communicated by BHEL along with the dispatch clearance. It is taken by BHEL that Foreign Suppliers have confirmed their acceptance to BHEL for opening the LC for value which is the value of the order reduced by the applicable LD. The LD would apply on the undelivered portion only. In case of reasons attributable to BHEL for the delay in delivery (for e.g. delay in arranging the pre-inspection) then the delivery time would be reset to the extent of the time delay attributable to BHEL, with waiver of the LD. Delivery being the essence of BHEL's contract requirements, Unless otherwise specified the LD would apply on the undelivered portion of the contracted items. **In the event that a Supplier does not accept the LD condition above, the offer would be loaded to the extent of the shortfall with respect to upper limit specified above.**

F) Miscellaneous

i) Role of Principals and Agents:

BHEL will deal directly with indigenous manufacturers only.

BHEL strongly discourages the engagement of Agents in India by foreign principals, to deal with BHEL, in BHEL's tenders.

BHEL will not enter into any correspondence with an Indian Agent.

The Indian Agent will not be extended the privilege given to the principals, such as that of attending the tender openings, attending technical discussions, commercial discussions or price negotiations and such like.

In case, in spite of the above, a foreign principal insists on engaging an Indian Agent, It is made clear by BHEL that:

It is the sole responsibility of the foreign principal to ensure the Agent does not represent any other foreign principal in a given tender.

An undertaking to this effect shall be given by the foreign principal that his / her Agent does not represent any other foreign principal in the tender. This document shall form a part of the techno-commercial offer.

A Principal shall authorise only one Agent to quote against each BHEL's tender. In the event a Principal authorises more than one agent to quote against a BHEL's tender, then all such offers will be rejected by BHEL in that tender. Principals are also advised to include BHEL's tender Number / Reference in their authorisation issued to the Agent.

If at any stage of the tender, BHEL finds that an Indian Agent has represented more than one foreign principal, all such offers of and all the foreign principals would be disqualified summarily in the tender inquiry.

BHEL will only give an intimation of notice of the disqualification. No correspondence would be entertained by BHEL, on their decision. Such decision of BHEL shall be irrevocable, firm and final and shall be binding on the tenderer.

BHEL, due to business reasons would ban, would have banned Indian agents from dealing with BHEL.

Any foreign principal who engages such a banned agent, or an employee of the banned agency, or any other person connected with the banned agency, at any time during the tender proceedings, would be disqualified from the tender proceedings. The decision of BHEL in this regard shall be final and be binding on the OEM.

Hence in their own interests, prospective tenderers may check with BHEL, the status of their proposed agent vis-à-vis BHEL.

In view of the requirement of BHEL, it is strongly suggested that in their own interest, foreign principals may desist from engaging any Indian agent and deal with BHEL directly and it is stressed that any Main producer proposing to deal with BHEL by engaging and through an Indian Agent does so at their own risk.

BHEL shall in no way be responsible for any consequences that may arise to the foreign principal on account of the antecedents / actions of their Indian Agent.

In the event of the foreign principal engaging an Indian Agent:

a) The Supplier shall furnish an authenticated copy of the Agency Agreement with his agent detailing the precise relationship between them and their mutual interest in the business along with techno-commercial bid.

b) The Supplier shall furnish original authorization letter for the Indian Agent. The letter shall contain name, contact person, complete postal address including phone, fax and e-mail ID. It shall also spell out the type of services to be rendered by Indian Agent.

c) Indian Agent & Agency commission: An Indian Agent can represent only one Foreign Manufacturer against a particular Tender. The CFR price quoted by the foreign bidder shall include the agency commission. However, the agency commission component payable to their Indian Agents shall be shown separately in the Offer, either as a lump-sum or as a percentage of the quoted price. This will be paid by BHEL in Indian Rupees, on satisfactory receipt & acceptance of the materials. For calculation of Rupee equivalent of Agency Commission, exchange rate as prevailing on the date of Purchase Order will be taken and

d) For all discussions, technical clarification and negotiations etc. only the principal would be authorized for interaction with BHEL. The Agent shall not be a party to the discussions / negotiations and would not be normally allowed to participate.

ii) Terms & Conditions of Letter of Credit (L/C) for overseas suppliers (indicated for acceptance).

a) Unconfirmed irrevocable Letter of Credit at Sight only will be opened by BHEL. Confirmation of L/C is not preferred by BHEL. Also L.C will be opened in Lots in line with the staggered delivery.

b) All Bank charges out side India are to the Supplier's account and within India to BHEL's account.

c) In case of L/C extension caused by delays attributable to the Supplier, the L/C extension / commitment charges are to be borne by the Supplier.

iii) Other terms & conditions for letter of credit: - Documents for negotiation

- a) Signed Commercial invoice in quadruplicate, for a value not exceeding the draft amount, quoting the import Licence No and certifying goods evidencing shipment of the merchandise are as per Applicant's Purchase Order. The amount of invoice after deducting Indian Agent's commission, if any, should not exceed the Credit amount. (The Indian agent's commission, if any, is payable in India in Indian rupees only.)
- b) Certificate of Country of Origin, from the country of manufacture, issued by the Chamber of Commerce.
- c) One set of Original and two sets of Non-negotiable copies of 'signed', 'unmarked', 'clean on board' Ocean Bill of Lading, showing Shipper as "Government of India" Account M/s. Bharat Heavy Electrical Ltd, Unit: BHEL, Ranipet as consignee (The opening bank should not be notified as consignee), marked freight payable / prepaid at destination.
- d) Packing list in 4 copies in English, indicating Size wise Number of bundles / pieces shipped and weight.
- e) Certified copy of the fax / e-mail sent by the beneficiary to the applicant giving the following particulars of shipment, as the insurance is to be arranged by the Applicant in India: (a) Purchase Order Number & date; (b) Bill of Lading Number & date (c) Name of vessel; (d) Port of Loading; (e) Number of bundles / pieces and weight; (f) Invoice Number, date and value (g) Purchase Order item number's despatched. The cable / fax is to be sent within 2 working days of shipment.
- f) Beneficiary's certificate showing the relevant airmail / courier reference no. and date that the following clauses have been complied with:
- 1] Beneficiary to forward by Registered Airmail / Courier one complete set of original documents and one set of non-negotiable documents within 3 working days of obtaining shipping documents to Regional Manager (ROD), Bharat Heavy Electricals Ltd, 6th Floor, EVR Periyar Bldg. No 690 (Old 474), Anna Salai, Nandanam, Chennai-600035. India. (Phone: +91-24330931, 24330253; e-mail: pbpwar@bhel.in)
 - 2] Beneficiary to courier at his cost 3 copies of complete set of non-negotiable documents to the Officer who released the Purchase Order.
 - 3] Declaration by the Supplier certifying that the contents in each case are not less than those entered in the invoices / packing list and that the invoicing for the supplies effected is strictly in accordance with agreed rates as stipulated in the Purchase Order.
 - 4] Declaration to the effect that all other documents as per purchase order has been couriered to the Purchase order releasing authority
 - 5] The carrying steamer should be seaworthy, less than 25 years of age and approved by Lloyds / Classification Societies / General Insurance Corporation of India from time to time and
 - 6] Copy of Dispatch Clearance / Instruction issued by BHEL.

iv) Documents to be sent directly to the Purchaser prior to shipment

- a) Manufacturer's Original Internal Inspection / Test certificate in triplicate.
- b) Manufacturer's Original Guarantee certificate as per Purchase Order. The material shall be guaranteed for a period of 12 months from the date of acceptance of the materials at BHEL stores or 18 months from the date of dispatch whichever is earlier. The acceptance would be evidenced by the Stores Receipt Voucher (SRV) which will be raised by BHEL.
- c) Inspection / Test Certificate issued by BHEL / Inspection agency specified in the Purchase Order. In the event that Inspection prior to dispatch is not carried out by the Engineers of BHEL, the Inspection certificate of the third party so authorized by BHEL and

d) Any other documentation as specified in the Purchase Order.

v) Conditions for transportation:

a) All shipping documents shall show the Purchase Order Number & Date, Import Licence Number & Date, and Letter of Credit Number & Date.

b) Transshipment is to be avoided.

c) Loading on deck is not permitted. The transport document must not contain a provision that goods may be carried on deck.

d) A transport document which is produced or appearing to have been produced by reprographic, automated or computerized systems or as carbon copy will be accepted as an original document provided that it is marked as original and is ink-signed.

e) The transport document must contain all the conditions of carriage on the original document.

f) The transport document must not indicate the place of destination as being different from the port of discharge.

g) The transport document must not contain the indication 'intended' or similar qualification in relation to the vessel or other means of transport or port of loading or port of discharge.

h) The transport document must be issued by the carrier or his agent and not by any freight forwarder.

i) Transport documents bearing reference by stamp or otherwise, to costs additional to the freight charges are not acceptable.

j) The Bills of Exchange must be dated and presentation of documents for negotiation must not be later than 15 days after the date of shipment and in any case not later than the expiry date of the Credit.

l) Indian suppliers shall dispatch the materials on freight prepaid and on door-delivery basis (FOR Destination – Destination: BHEL Stores) and

m) In the event there is a delay by the Supplier in negotiating / submitting the document, any demurrage / wharfage arising out of the same shall be to the account of the Supplier and shall be deducted from the final payment. Also, in such cases, the Supplier shall authorize the Steamer / Shipping agent / transporter to freely release the consignment to BHEL by providing a “Surrender Bill of Lading”. Over-seas Suppliers have to give a No-Objection Certificate to BHEL, authorizing BHEL to get the Delivery Order from the Steamer Agent without producing the Original Bill of Lading. This is required to ensure avoidance of incidence of demurrage at Chennai Sea-port that may arise in case of delayed presentation of documents by the Seller.

G) Reverse auction (RA) / on-line bidding on internet:

1. “BHEL reserves the right to go for Reverse Auction (RA) (Guidelines as available on www.bhel.com) instead of opening the sealed envelope price bid, submitted by the bidder. This will be decided after techno-commercial evaluation. Bidders shall give their acceptance with their offer for participation in RA. Non-acceptance to participate in RA may result in non-consideration of the bids, in case BHEL decides to go for RA.”

2. Those bidders who have given their acceptance to participate in Reverse Auction will have to necessarily submit ‘Process compliance form’ (to the designated service provider) as well as ‘Online sealed bid’ in the Reverse Auction. Non-submission of ‘Process compliance form’ or ‘Online sealed bid’ by the agreed bidder(s) will be considered as tampering of the tender process and will invite action by BHEL as per extant

guidelines for “Suspension of Business Dealings with Suppliers/ Contractors (as available on www.bhel.com).”

3. The philosophy followed for reverse auction shall be English Reverse (No ties).
4. For the proposed reverse auction, technically and commercially acceptable bidders only shall be eligible to participate.
5. BHEL will engage the services of a service provider who will provide all necessary training and assistance before commencement of on line bidding on internet.
6. In case of reverse auction, BHEL will inform the bidders the details of Service Provider to enable them to contact & get trained.
7. Business rules like event date, time, bid decrement, extension etc. also will be communicated through service provider for compliance.
8. Bidders have to fax the Compliance form (annexure IV) before start of Reverse auction. Without this, the bidder will not be eligible to participate in the event.
9. Reverse auction will be conducted on scheduled date & time.

Note: Decision to go for RA or not will be on case to case basis.

10. At the end of Reverse Auction event, the lowest bidder value will be known on auction portal.
11. The lowest bidder has to fax/e-mail the duly signed and filled-in prescribed format for price breakup including that of line items, to the Service provider within two working days of Auction without fail.
12. Bidders are required to read the “Terms and Conditions” section of the auctions site of Service provider, using the Login IDs and passwords given to them by the service provider before reverse auction event. Bidders should acquaint themselves of the „Business Rules of Reverse Auction“, which will be communicated before the Reverse Auction.
13. If the Bidder or any of his representatives are found to be involved in Price manipulation/ cartel formation of any kind, directly or indirectly by communicating with other bidders, action as per extant BHEL guidelines, shall be initiated by BHEL and the results of the RA scrapped/ aborted.
14. The Bidder shall not divulge either his Bids or any other exclusive details of BHEL to any other party.
15. The bidders have to necessarily submit online sealed bid less than or equal to their envelope sealed price bid already submitted to BHEL along with their offer. The envelope sealed price bid of successful L1 bidder in RA, if conducted, would also be opened after the RA and the order will be placed on lower of the two bids (RA closing price & envelope sealed price) thus obtained. It is considered that the bidder having submitted their offer specifically agrees to this condition and undertakes to execute the contract on thus awarded rate/s.
16. If it is found that L1 bidder has quoted higher in the online sealed bid in comparison to the envelope sealed bid for any item(s), the bidder will be issued a warning letter to this effect. However, if the same bidder again defaults on this count in any subsequent tender, it will be considered as fraud and will invite action by BHEL as per extant guidelines for suspension of business dealings with suppliers/ contractors (as available on www.bhel.com).”

17. The calculation sheet e.g. excel sheet (which will help to arrive at 'Total Cost to BHEL') will be communicated to respective bidders of RA by BHEL. In line with the NIT terms, BHEL will provide the calculation sheet (e.g., EXCEL sheet) which will help to arrive at "Total Cost to BHEL" like Packing & forwarding charges, Taxes and Duties, Freight charges, Insurance, Goods & Services Tax (GST) and loading factors (for non-compliance to BHEL standard Commercial terms & conditions) for each of the bidder to enable them to fill-in the price and keep it ready for keying in during the Auction.]

18. This calculation sheet will be finalized based on the evaluation criteria specified in the NIT.

19. Suppliers are required to submit their best price bid in a separate sealed cover along with techno-commercial bid. After evaluation of Techno-Commercial Bids:

a) In case BHEL decides not to conduct RA, the envelope sealed price bids of all techno-commercially qualified bidders, along with price impact, if any, would be opened and processed as per extant the internal Purchase/ Works Policy as applicable to BHEL.

b) In case BHEL decides to conduct RA, business rules of RA will be sent to service provider.(See Annexure for Model General Business Rules of RA.)

20. Generally the start price for the RA would be the lowest of

a) Lowest online sealed bid and

b) Internal Estimate of BHEL

Note: Wherever more than one lowest online sealed bids are identical and lower than the estimate, the start price, would be that price arrived by reducing the lowest online sealed bid by maximum of one decrement.

21. Reverse auction process would deemed to have started upon receipt of 'Online Sealed Bids' from the bidders within the prescribed time frame as per Business Rules.

22. After receipt of 'online sealed bids', the start price & bid decrement will be decided by BHEL and the same would be communicated to the service provider, to start the bidding process.

23. Only those bidders who have submitted the 'online sealed bid' within the scheduled time would be eligible to participate further in RA process. However, the H1 bidder (whose quote is highest in online sealed bid) will not be allowed to participate in further RA process provided minimum three bidders are left after removal of H1 bidder. In case of tie for H1 bid (identical online sealed bids), 15 minutes additional time would be provided and all the participating bidders would be informed by mail/ message on bidding screen to enable bidders submit revised online sealed bids so as to break the tie.

24. If the lowest online sealed bid is the starting price, then the lowest bidder in online sealed bid shall be shown as current L1 automatically by the system. System would have the provision to indicate this bid as current L1 for further bidding.

25. If the start price is lower than the lowest online sealed bid, on acceptance of such start price by any bidder, this bid would be indicated as current L1 for further bidding.

26. In case of no further bidding, RA will be deemed to have been successful with current L1 bidder.

27. All bidders who had given online sealed bid would be able to see their rank and L1 price and their ranking L1, L2 etc. would be based on their last quoted price irrespective of quote received in RA or online sealed bid.

28. RA shall be treated as failed in the following scenarios:

- a) In cases where the start price is (a) estimate or (b) one decrement (maximum) lower than the lowest of the online sealed bids and no bidder accepts the start price.
- b) In cases where the number of online sealed bids are less than four before removal of highest bidder.
- c) In cases of tie among H1 bidders, even after extension of submission of online sealed bids once by 15 minutes.
- d) Wherever, the evaluation is done for individual line items, RA shall be treated as failed only for those line item(s) for which any of the above a), b) or c) satisfies.

29. In cases of failure of RA, sealed envelope price bids (of item(s) for which RA has failed) of all the techno-commercially qualified bidders would be opened and the tender would be processed accordingly. However, the envelope sealed bid(s) of techno-commercially acceptable bidder(s) who had agreed to participate in the RA and had failed to submit the online sealed bid would not be opened.

30. After declaring L1 upon completion of RA, the envelope sealed price bid of L1 bidder would also be opened for placement of order on lower of the two bids (RA closing price & envelope sealed price) and the offers would be processed as per extant their internal Purchase/ Works policy provisions of BHEL. Action as per NIT terms would be taken if online sealed bid is higher than the envelope sealed bid.

31. Relative position of bidders (for usage in cases of predefined splitting the quantities) would also include bidders who have given 'online sealed bids' but have not given further bids in auction. In case of splitting requirement, H1 bidder may be considered for counter offer if the pre-stated (NIT) numbers of suppliers do not accept the counter offer. However, principle of splitting to N-1 bidder would be maintained.

32. In case H1 bidder happen to be MSE and was removed from further bidding but is within L1 + 15% band, then this bid would be considered and to be processed in line with 'Public Procurement Policy for Micro & Small Enterprises (MSEs) order, 2012'.

33. For providing preference to domestically manufactured Electronic Products, in accordance with Department of Electronics and Information Technology (DeitY) Gazette Notification No. 33(3)/2013-IPHW dated 23.12.2013 and its related notifications issued from time to time, H1 bidder removed from further bidding would be considered for counter-offer to meet domestic bidder requirement for the item(s) under procurement.

34. In case BHEL decides not to go for Reverse Auction for the tender enquiry, the Price bids and price impacts, if any, already submitted and available with BHEL would be opened as per BHEL's standard practice.

35. In case of enquiry through e-Procurement, the sealed electronic price bid (e-bid) would be treated as sealed envelope price bid.

Note: In order to bring more transparency and to address any queries of Bidders on Reverse Auction, an abridged version of BHEL's "Common Guidelines for conducting Reverse Auction (RA)" has been hosted in BHEL's web site www.bhel.com under the links "Supplier Registration Page" and "Tender Notification". All Bidders are requested to visit the link and familiarize themselves with BHEL's RA procedures and guidelines before submission of their bid/s. Submission of Bid shall mean that the Bidder has read and understood BHEL's RA procedures and the bid is in agreement with the same.

H] Force Majeure

If at any time during the currency of this contract, the performance in whole or in part, by either party of any obligations under this contract shall be prevented or delayed by reason, of any war, hostilities, acts of the public enemy, civil commotion, sabotage, fires, explosions, epidemics, quarantine, restrictions or acts of GOD (hereinafter referred to as events), then provided notice of happening of any such events is given by either party to other within ten days from the date of occurrence thereof, neither party shall reason of such events be entitled to terminate this contract nor shall either party have any such non performance and delay is resumed as soon as practicable after such events has come to an end or ceased to exist. If the performance in whole or part of any obligation under this contract is prevented or delayed by reason or any such event claims for extension of time shall be granted for period considered reasonable by the purchaser subject to prompt notification by the seller to the purchaser of the particulars of the events and supply to the purchaser if required of any supporting evidence. Any waiver of time in respect of partial installment shall not be deemed to be a waiver of time in respect of remaining deliveries.

I] Cancellation of Order:

In the event of non-performance of the contract by the Supplier, BHEL reserves the right to cancel the order with issue of a written notice. BHEL would provide a curing period of 30 days, for the Supplier to rectify the situation. If the Supplier fails to rectify the reason/s that led to the issue of cancellation notice by BHEL, then the cancellation order would be issued automatically by BHEL, without further recourse to the Seller. BHEL will not pay any cancellation charges or any other charges / damages to the Supplier, arising out such cancellation. In the event of the non-performance of the supply contract, by the Supplier, the rights of BHEL include, in addition to cancelling the order, to take alternate purchase action at the cost and risk of the supplier. The additional expenditure to be incurred by BHEL in such alternate purchase would be to the account of the supplier. (Risk Purchase). This remedy would be in addition to the invoking of the CEBG on grounds of failure of the Supplier in executing the Contract and any other legal remedies." BHEL reserves the right to initiate the alternate purchase action at the cost and risk of the erring supplier by issue of a simple notice of intention for the alternate purchase action duly sent by any electronic means and / or by a letter. The cancellation of the order would not be a pre-condition for initiation of the alternate purchase action.

J] Contract Execution Bank Guarantee:

To demonstrate the fidelity of the successful bidder, in executing the Contract, on receipt of the Letter of Intent / Purchase Order, the Supplier shall arrange to provide a contract execution bank guarantee (CEBG). The format of the CEBG is a part of this enquiry. The format may be downloaded and necessary stamping may be obtained from the Banker towards submission of the CEBG. The indigenous suppliers have to provide the CEBG from any one of the Nationalized Banks, listed in the annexure to these terms. Overseas suppliers can submit the CEBG from any of the reputed International / National Bankers. However the CEBG is to be confirmed by any of the Bankers listed by us. In the event of failure by the Supplier to execute the contract either fully or partially, BHEL would encash the entire CEBG. The CEBG shall be valid for the period covering the agreed delivery date of the order with a further claim period of 3 months on the last specified delivery date. In the event of the failure of delivery BHEL would proceed with encashing the CEBG without reference to the Supplier. In the event of BHEL granting extension of the delivery dates, then the CEBG validity shall also be got extended by the Supplier to the extent of the extended delivery times together with the claim period as specified elsewhere. **The CEBG shall be for a value of 2% of the Purchase order.**

Suppliers who are all already registered with BHEL and having a vendor performance rating of A or A+ grade would be exempted from submission of CEBG.

Performance Bank Guarantee

Where ever so required, the Supplier shall arrange to provide a Performance bank guarantee (PBG). The indigenous suppliers have to provide the PBG from any one of the Nationalized Banks, listed in the tender terms. Overseas suppliers can submit the PBG from any of the reputed International / National Bankers. However the PBG shall be confirmed by any of the Bankers listed by us. The PBG shall guarantee the performance of the equipment / materials / items supplied and shall cover the guarantee period. The PBG shall have a claim period of 3 months in addition to the guarantee period. In the event of failure of the supplies made within the guarantee period, BHEL would encash the entire PBG. **The PBG shall be for a value of 10% of the Purchase order.**

The supplier/s have to get the PBG format (pre-printed) from BHEL and get the same stamped by the Banker. Change of PBG terms either by the supplier's Banker or by the supplier, after servicing of the order is not acceptable. Similarly PBG prepared by the supplier (typed by them) will also not be acceptable to BHEL. The pre-printed form issued by BHEL shall be used for making the PBG.

K] Post-order submission of documents for approval

In the event of the release of Letter of Intent (LoI) / Purchase order/s (PO) against this tender, Bidders have to submit the applicable documents as called for in the tender / LoI / PO/s, such as drawings, data sheets, design calculations etc. These documents for approval have to be submitted within the agreed timelines between BHEL and Bidder. Normally the time period for submission for approval is 15 days from the date of receipt of the LoI / PO by the supplier. The actual time period within which the documents have to be submitted for approval would be specified in the LoI / PO.

Such documents would be subjected to evaluation and approval by BHEL and / or by BHEL's customer / Consultant / Customer's Consultant. Bidders have to give their specific acceptance for this.

After approval of such documents and after getting clearance from BHEL, only the items ordered can be taken up for manufacture.

Any changes required by BHEL / Customer etc. in the documents submitted for approval shall be incorporated by the Bidder and no extra cost would be payable by BHEL for such changes.

In the event that the Bidder does not carry out the required corrections, then the LoI / PO would be liable for cancellation by BHEL and BHEL would resort to alternate purchase action at the risk and cost of the Bidder under the Risk Purchase Condition of the Purchase Order.

Note: After receiving the LoI / PO, supplier shall also forward the acknowledgement / acceptance of the LoI / PO by signing and returning the second copy of the LoI / PO as the token of acceptance.

L] Others

a) In case of any contradiction in the terms and conditions given here and elsewhere in the other documents of the tender, it shall be the responsibility of the tenderer to get it clarified from BHEL. The officer authorized to provide such clarifications is the tender issuing officer.

b) Alterations to the conditions of the Tender can be done only by the authorized officer, at any time before the date and time of tender opening and would be duly communicated through a corrigendum.

c) **Suspension of Business dealings with Suppliers:**



(i) Before submitting offer, prospective bidders are advised to visit our web-site www.bhel.com / supplier registration to familiarize themselves with BHEL's policy and procedures of Suspension of Business Dealings with Suppliers.

Submission of offer shall be deemed to be evidence of the Bidder to have read and understood the above said policy.

ii) Treatment of Banned / Under-performing Vendors:

Any supplier who has been put on "Hold" or "Banned" from having business dealings with BHEL, Ranipet or any other unit of BHEL shall not submit their offer against this tender. If any such offers are received they would be summarily rejected and sent back. During the processing of tender, if any unit of BHEL puts a supplier on "Ban" then further processing of the offer will not be taken up and in case an order is placed, BHEL, Ranipet may resort at their discretion to cancel the PO either fully or partially.

If any of the supplier who is supplying similar material to BHEL, Ranipet has a Vendor Performance Rating (VPR) score of 'C' or below, then offer given by such parties will not be considered for ordering in this tender.

If any of the Bidders have unexecuted order/s with BHEL and if in such orders, the deliveries have been delayed beyond a reasonable period (say 30 days of agreed delivery period), the offer of such Bidders will also be liable for rejection.

Offers of such of those bidders against whom action for suspension of business dealings has been initiated by BHEL, Ranipet or any other Units/Division of BHEL will also not be considered in this tender.

d) Fraud Prevention Policy:

The Bidder along with its associate/ collaborators/ sub-contractors/ sub-vendors/ 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.

e) Applicability of Integrity Pact:-

IP is a tool to ensure that activities and transactions between the Company and its Bidders/ Contractors are handled in a fair, transparent and corruption free manner. A panel of Independent External Monitors (IEMs) have been appointed to oversee implementation of IP in BHEL.

The IP as enclosed with the tender is to be submitted (duly signed by authorized signatory who signs in the offer) along with techno-commercial bid. Only those bidders who have entered into such an IP with BHEL would be competent to participate in the bidding. In other words, entering into this Pact would be a preliminary qualification.

Details of IEM for this tender is furnished below:

Name _____
Address _____
Email _____

Please refer Section-8 of IP for Role and Responsibilities of IEMs. In case of any complaint arising out of the tendering process, the matter may be referred to the IEM mentioned in the tender.

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

For all clarifications/ issues related to the tender, please contact:

Name: (1) (2)
Dep't:
Address:
.....
Phone: (Landline/Mobile) (1) (2)
Email:
Fax:

Integrity Pact are applicable for all the BHEL enquiries whose estimated value is equal to or more than Rupees 05 Crores.

Copy of Integrity Pact with applicable nominated IEM is attached along with the tender documents for ready reference of Suppliers.

f) If any Supplier attempts to bribe, or pay commission, gift or any advantage or bring in undue influence either by himself or on his behalf any one including a stranger to the tender, in addition to instituting legal proceedings as per the extant laws prevailing, will disqualify the supplier from this tender and all future tenders of BHEL. Decision of the Purchaser would be final in this matter.

g) The laws governing this transaction shall be the laws in India.

h) Wherever not specified, Inco terms 2010 shall be used to interpret the Commercial terms and conditions and

i) In the event of an order, Supplier shall agree to settlement of disputes or differences, if any, by way of arbitration, in accordance with the "Rule of Arbitration" of the Indian Council of Arbitration.

The language in the tender documents downloaded by the Bidders shall at no point of time be changed, altered or modified in any manner by the Tenderer. If such changes are made by any tenderer, it shall be considered as tampering with BHEL's terms and the offer shall be summarily rejected, whenever it is noticed by BHEL. Such Bidders would be disqualified from the Bidding Process and their offers would be forfeited / Bank Guarantees invoked. They would also not be allowed to participate in future tenders of BHEL.

M. Conditions for rejection of offers:

Following is the list of situations which would lead to rejection of offer/s.

This list is not exhaustive but only indicative.

BHEL reserve the right to reject one or all offers without assigning any reason. The decision of BHEL will be final in this regard.

- 1. If the offer fails to meet the technical requirements/specifications of the tendered item/s.*
- 2. If the offer does not meet the commercial terms & conditions, such as but not limited to delivery period specified in the tender, Delivery terms, payment terms, Liquidated damages, Risk Purchase, cancellation clause etc., including the load factors specified in the tender.*
- 3. If the bidder fails to respond to clarification sought, within a reasonable period. In case of doubts / lack of clarity on the technical and commercial offer of the bidder, BHEL will seek clarifications. Bidders are required to respond completely to such BHEL's queries within 3 working days unless otherwise agreed to in writing by BHEL for period beyond 3 days. If supplier fails to respond within*

3 working days or maximum 2 working days on a reminder thereon, the offer of such bidders will be automatically dis-qualified in the tender without further recourse to informing the bidder.

4. If any of the conditions listed below are applicable to the bidder, the offer is liable to be rejected:

If any

- Debt recovery / Winding up Proceedings are initiated against the Company in Courts / Debt Recovery Tribunals (DRTs),
- Proceedings are there against the Company in National Company Law Tribunal (NCLT) with respect to Insolvency and Bankruptcy Code (IBC) or otherwise,
- Any proceedings are there against the Company under the “Securitization and Reconstruction of Financial Assets and Enforcement of Security Interest (SARFAESI) Act,
- Any restructuring proceedings are underway for the Company under Corporate Debt Restructuring (CDR), Strategic Debt Restructuring (SDR) or otherwise,
- Divestment / demerger proceedings are underway for the Company under the Companies Act.

5. Failure to sign & accept the Integrity Pact (where applicable). Bidders are hereby informed that the contents of the Integrity Pact are firm and fixed and cannot be changed.

The above list is not exhaustive but is indicative only.

N. Special Note:

BHEL is a Government of India Undertaking. Its procurement practices are governed by the (Internal) Purchase Policy issued by the management of the company and as per Annexure B applicable at the time of finalising the order against this tender.

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Record of Revisions:

Revision No.	Revision Date	Modification
01	17.08.2016	Payment terms for Foreign suppliers modified wrt loading- Clause k.ii
02	29.08.2016	Treatment of banned vendors – Para 3 added - Clause L.ii
03	14.09.2016	Opening of offers – clause B – sub clause ‘b’ included and existing clause ‘b’ renamed as ‘c’.
04	14.09.2016	Opening of offers – Note – sub clause (ii) modified
05	12.10.2016	Clause N. Special Note added
06	22.10.2016	Clause G Reverse Auction modified. Annexure on General Business Rules for Reverse Auction appended Role of Principals added under ‘Miscellaneous’
07	20.01.2017	Clause L (e) is modified. Clause L (f ,g ,h) renumbered.
08	24.02.2017	Clause F(c) modified.
09	08.07.2017	Clause M, Point 4 is added – regarding the financial health of the Bidder - as a criterion for disqualification.
10	20.07.2017	Duties and Taxes replaced with GST; Applicability of GST for LD inserted in Clause E; Treatment of poor performing current vendors inserted in clause L.c.(ii)
11	25.07.2017	Clause A.Note (iii) CST etc., replaced with GST; Clause C.f Deleted;
12	15.09.2017	Clause M, Point 5 inserted regarding Integrity Pact
13	21.03.2018	Clause A, Point xi inserted regarding Overwriting in Price Bids

ANNEXURE

Model General Business Rules for Reverse Auction

This has reference to tender no {tender number....date...}. BHEL shall finalise the Rates for the supply of {item name} through Reverse Auction mode. BHEL has made arrangement with M/s. {Service provider}, who shall be BHEL's authorized service provider for the same. Bidders should go through the instructions given below and submit acceptance of the same.

The technical & commercial terms are as per (a) BHEL Tender Enq. No. {...} dated {...}, (b) Bidders' technical & commercial bid (in case of two part bid) and (c) subsequent correspondences between BHEL and the bidders, if any.

1. Procedure of Reverse Auctioning

- i. Online Sealed Bid: This duration of online sealed bid will be {...} minutes. All bidders to submit their online sealed bids during this period.
- ii. Online Reverse Auction: The 'opening price' i.e. start price for RA and 'bid decrement' will be decided by BHEL.
- iii. If BHEL decides the lowest online sealed bid as the starting price, then the lowest bidder in online sealed bid shall be shown as current L1 automatically by the system and no acceptance of that price is required. System shall have the provision to indicate this bid as current L1.
- iv. Bidders by offering a minimum bid decrement or the multiples thereof can displace a standing lowest bid and become "L1" and this continues as an iterative process.
- v. After the completion of the online reverse auction, the Closing Price (CP) shall be available for further processing.

2. Schedule for Reverse Auction: The Reverse Auction is tentatively scheduled on {date}:

and the duration of online sealed bid will be {...} minutes. All bidders to submit their online sealed bids during this period.

- Online Sealed Bid:-

- {Start Time:
- Close Time: }

- Online Reverse Auction:-

- {Start Time:
- Close Time: }

3. Auction extension time:

If a bidder places a bid in the last {...} minutes of closing of the Reverse Auction and if that bid gets accepted, then the auction's duration shall get extended automatically for another {...} minutes, for the entire auction (i.e. for all the items in the auction), from the time that bid comes in. Please note that the auto-extension will take place only if a bid comes in those last {...} minutes and if that bid gets accepted as the lowest bid. If the bid does not get accepted as the lowest bid, the auto-extension will not take place even if that bid might have come in the last {...} minutes. In case, there is no bid in the last {...} minutes of closing of Reverse Auction, the auction shall get closed automatically without any extension. However, bidders are advised not to wait till the last minute or last few seconds to enter their bid during the auto-extension period to avoid complications related with internet connectivity, network problems, system crash down, power failure, etc.

The above process will continue till completion of Reverse Auction.

Complaints/ Grievances, if any, regarding denial of service or any related issue should be given in writing thru e-mail/ fax to M/s. {Service provider} with a copy to BHEL within 15 minutes prior to initial closing time of Online Reverse Auction.

4. Bid price: The Bidder has to quote the {.....} Price inclusive of Packing & Forwarding charges, all the routine & type tests as per tender scope, GST, Freight (bidder to provide original Freight paid receipt), insurance charges, etc. including loading (if indicated by BHEL due to deviations in technical/commercial terms) for the Items specified. Details are as shown in Excel Sheet for calculation of total cost to BHEL (To be specified by Unit as per NIT conditions).

5. Bidding currency and unit of measurement:

Bidding will be conducted in *Indian Rupees per Unit* of the material as per the specifications {...}

In case of foreign currency bids, exchange rate (TT selling rate of State Bank of India) as on scheduled date of tender opening (Part-I bid) shall be considered for conversion in Indian Rupees. 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.

6. Validity of bids: Price shall be valid for {... days} from the date of reverse auction. These shall not be subjected to any change whatsoever.

7. Lowest bid of a bidder: In case the bidder submits more than one bid, the lowest bid at the end of Online Reverse Auction will be considered as the bidder's final offer to execute the work.

8. Bidders shall be assigned a **Unique User Name & Password** by M/s. {Service provider}. Bidders are advised to change the Password and edit the information in the Registration Page after the receipt of initial Password from M/s. {Service provider} to ensure confidentiality. All bids made from the Login ID given to the bidders will be deemed to have been made by the bidders/ bidders 'company'.

9. Post auction procedure: BHEL will proceed with the Lowest Bid in the Reverse Auction for further processing.

10. Any commercial/ technical loading shall be intimated to bidders prior to RA. The excel sheet provided in this regard shall cover all these aspects. Commercial/ technical loading if any, shall be added by the respective bidder in its price during online sealed bid & Online Reverse Auction. Modalities of loading & de-loading shall be separately intimated to the bidders. The responsibility for correctness of total cost to BHEL shall lie with the bidders.

11. Computerized reverse auction shall be conducted by BHEL (through M/s. {Service Provider}), on pre-specified date, while the bidders shall be quoting from their own offices/ place of their choice. Internet connectivity shall have to be ensured by bidders themselves.

During the RA process if a bidder is not able to bid and requests for extension of time by FAX/ email/ phone then time extension of additional 15 minutes will be given by the service provider provided such requests come before 5 minutes of auction closing time. However, only one such request per bidder can be entertained. Despite this extension if bidder fails to upload his prices due to extreme case of failure of Internet connectivity, (due to any reason whatsoever may be) it is the bidders' responsibility/ decision to send fax communication immediately to M/s. {Service provider}, furnishing the price the bidder wants to bid online with a request to the service provider to upload the faxed price online so that the service provider will upload that price online on behalf of the Bidder. It shall be noted clearly that the concerned bidder communicating this price to service provider has to solely ensure that the fax message is received by the service provider in a readable/ legible form and also the Bidder should simultaneously check up with service provider about the clear receipt of the price faxed. It shall also be clearly understood that the bidder shall be at liberty to send such fax communications of prices to be uploaded by the service provider only within the closure of Bid time and under no circumstance it shall be allowed beyond the closure of Bid time /reverse auction. It shall also be noted that the service provider should be given a reasonable required time by the bidders, to upload such prices online and if such required time is not available at the disposal of the Service provider at the time of receipt of the fax message from the bidders, the service provider will not be uploading the prices and either BHEL or the service provider are not responsible for this unforeseen circumstances. In order to ward-off such contingent situation bidders are requested to make all the necessary arrangements/ alternatives whatever required so that they are able to circumvent such situation and still be able to participate in the reverse auction successfully. Failure of power

or loss of connectivity at the premises of bidders during the Reverse auction cannot be the cause for not participating in the reverse auction. On account of this, the time for the auction cannot be extended and neither BHEL nor M/s. {Service provider} is responsible for such eventualities.

12. Proxy bids: Proxy bidding feature is a pro-bidder feature to safeguard the bidder's interest of any internet failure or to avoid last minute rush. The proxy feature allows bidders to place an automated bid in the system directly in an auction and bid without having to enter a new amount each time a competing bidder submits a new offer. The bid amount that a bidder enters is the minimum that the bidder is willing to offer. Here the software bids on behalf of the bidder. This obviates the need for the bidder participating in the bidding process until the proxy bid amount is decrementally reached by other bidders. When proxy bid amount is reached, the bidder (who has submitted the proxy bid) has an option to start participating in the bidding process.

The proxy amount is the minimum amount that the bidder is willing to offer. During the course of bidding, the bidder cannot delete or change the amount of a proxy bid. Bids are submitted in decrements (decreasing bid amounts). The application automates proxy bidding by processing proxy bids automatically, according to the decrement that the auction originator originally established when creating the auction, submitting offers to the next bid decrement each time a competing bidder bids, regardless of the fact whether the competing bids are submitted as proxy or standard bids. However, it may please be noted that if a manual bid and proxy bid are submitted at the same instant manual bid will be recognized as the L1 at that instant. In case of more than one proxy bid, the system shall bid till it crosses the threshold value of 'each lowest proxy bid' and thereafter allow the competition to decide the final L1 price. Proxy bids are fed into the system directly by the respective bidders. As such this information is privy only to the respective bidder(s).

13. Bidders are advised to get fully trained and clear all their doubts such as refreshing of screen, quantity being auctioned, tender value being auctioned etc. from M/s. {Service provider}.

14. M/s. {Service provider}, shall arrange to demonstrate/ train the bidder or bidder's nominated person(s), without any cost to bidders. M/s. {Service provider}, shall also explain the bidders, all the business rules related to the Reverse Auction. Bidders are required to submit their acceptance to the terms/ conditions/modalities before participating in the Reverse Auction in the process compliance form as enclosed. Without this, the bidder will not be eligible to participate in the event.

15. Successful bidder shall be required to submit the final prices (L1) in prescribed format (Annexure-VI) for price breakup including that of line items, if required, quoted during the Online Reverse Auction, duly signed and stamped as token of acceptance without any new condition (other than those already agreed to before start of auction), after the completion of auction to M/s. {Service provider} besides BHEL within two working days of Auction without fail.

16. Any variation between the final bid value and that in the confirmatory signed price breakup Document will be considered as tampering the tender process and will invite action by BHEL as per extant guidelines for suspension of business dealings (as available on www.bhel.com).

17. Bidders' bid will be taken as an offer to execute the work/ supplies of the item as per enquiry No. {...} dt. {...}. Bids once made by the bidder, cannot be cancelled/ withdrawn and bidder shall be bound to execute the work as mentioned above at bidder's final bid price. Should bidder back out and not execute the contract as per the rates quoted, BHEL shall take action as per extant guidelines for suspension of business dealings (as available on www.bhel.com).

18. Bidders shall be able to view the following on their screen along with the necessary fields during Online Reverse Auction:

- a. Leading (Running Lowest) Bid in the Auction (only total price of package).
- b. Bid Placed by the bidder.
- c. Start Price.
- d. Decrement value.
- e. Rank of their own bid during bidding as well as at the close of auction

19. BHEL's decision on award of contract shall be final and binding on all the Bidders.



20. BHEL reserves the right to extend, reschedule or cancel the Reverse Auction process at any time, before ordering, without assigning any reason, with intimation to bidders.

21. BHEL shall not have any liability to bidders for any interruption or delay in access to the site irrespective of the cause. In such cases, the decision of BHEL shall be binding on the bidders.

22. Other terms and conditions shall be as per bidder's techno-commercial offers and other correspondences, if any, till date.

23. If there is any clash between this business document and the FAQ available, if any, in the website of M/s. {Service provider}, the terms & conditions given in this business document will supersede the information contained in the FAQs. Any changes made by BHEL/ service provider (due to unforeseen contingencies) after the first posting shall be deemed to have been accepted if the bidder continues to access the portal after that time..

24. Bidder shall not divulge either his Bids or any other exclusive details of BHEL to any other party. If the Bidder or any of his representatives are found to be involved in Price manipulation/ cartel formation of any kind, directly or indirectly by communicating with other bidders, action as per extant BHEL guidelines for suspension of business dealings (as available on www.bhel.com), shall be initiated by BHEL.



RA price confirmation and breakup
(To be submitted by L1 bidder after completion of RA)

To
- M/s. Service provider
- Postal address

CC: M/s BHEL

BOILER AUXILIARIES PLANT
INDIRA GANDHI INDUSTRIAL COMPLEX
RANIPET – 632406
TAMILNADU
INDIA.

Sub: Final price quoted during Reverse Auction and price breakup

Dear Sir,

We confirm that we have quoted.

Rs.{ _____ in value & in words _____ } for item(s) covered under tender enquiry
No. {...} dt.{...}

Total price of the items covered under above cited enquiries is inclusive of {Packing & forwarding, GST, freight and insurance charges up to {.....}
District,{.....} State and Type Test Charges etc., [exclusive of Goods & Services tax (GST)],
other as
per NIT}

as our final landed prices as quoted during the Reverse Auction conducted today {date} which will
be valid for a period of { ____ in nos. & in words ____ } days.

The price break-up including that of line items is as given below.

Total
=====

	- Rs.in value & in words
	=====

Thanking you and looking forward to the valuable order from BHEL.

Yours sincerely,
For _____
Name:
Company:
Date:
Seal:

SI No	TERMS	SUPPLIER COMMENTS	REMARKS ON DEVIATION TAKEN
1	Terms of Delivery- Indigenous Supplies : FOR Destination: Destination as indicated in the enquiry header (Cost, Packing, Forwarding & Freight etc., are in Supplier's scope i.e. included in the quoted prices. For details of destination pl ref DADRI FGD DESP INSTRUCTION).		
2	Terms of Delivery -Foreign Supplies : CFR Destination. Destination as indicated in the enquiry header (Cost, Packing, Forwarding & Freight etc., are in Supplier's scope i.e. included in the quoted prices. For details of destination pl ref DADRI FGD DESP INSTRUCTION). Insurance in BHEL Scope.		
3	Delivery Period: To mention clearly the exact delivery period as it attracts contractual penalty on delays.To be indicated in days from date of receipt of Purchase Order (P.O)		
4	Terms of payment for Indigenous Suppliers: 100% payment will be made directly thru' EFT within 45 day for MSE Vendors and 90 days for Non-MSE Vendors from the date of receipt and acceptance of materials at Stroes /BIFPCL,Bangladesh site . If any supplier is asking for payment terms other than the above specified, then suitable loading on cost will be considered. Loading of any deviation in the payment terms w.r.t tender terms will be "Base rate of State Bank of India (SBI) (as applicable on the date of bid opening: Techno-commercial bid opening in case of two part bids) + 6%, will be considered for loading for the periods of relaxation sought by bidders. (For details PI ref point No k.1 & k.2 of k under D of Annexure-B-General Terms and conditions.)		
5	Terms of Payment for Foreign Suppliers: "100% thru' irrevocable & unconfirmed LC at sight within 3 weeks and LC will be established 3 months prior to PO delivery date through any one of our Bankers listed elsewhere in the tender conditions for 100% value (less Agency Commission, if any) valid upto the PO delivery period and 15 days thereafter for negotiation. All bank charges in India to BHEL's account and all other charges outside India to Supplier's account. BHEL reserves the right to load the price of foreign suppliers in order to bring them on common platform as per Indigenous Suppliers on the account of differential payment terms to Indigenous Suppliers. Loading of payment terms will be "Base rate of State Bank of India (SBI) (as applicable on the date of bid opening: Techno-commercial bid opening in case of two part bids) + 6%, will be considered for loading for the periods of relaxation compared to indigenous suppliers i.e. 90 days.		
6	Whenever there is an Indian Agent to represent a Supplier, it is mandatory to give the details of services to be rendered by Indian Agent and / or the details of agreement between Supplier and Agent. Supplier to indicate the Agency Commission payable. Indian Agency Commission will be paid only in Indian Rupees, calculated at the rate of exchange prevailing on the date of price bid opening. This is payable on satisfactory completion of the contract. Agency agreement copy shall be submitted along with Annexure-C without fail. Note: In order to maintain sanctity of the tender system, it is mandatory that one Agent cannot represent two Suppliers or quote on their behalf in a particular tender enquiry. If any Agent represents more than one Suppliers all such offers will be rejected.		

7	Contract Execution Bank Guarantee (CEBG): The Supplier shall submit a BG for 2% of the contract value valid for the agreed delivery period + 3 Months. Attached CEBG Format is to be signed and submitted along with Annexure-C as a token of acceptance. Please note no deviation is allowed.		
8	OFFER Validity: Supplier to mention clearly the validity date of the offer. Minimum 90 days from the date of Technical Bid opening and 30 days from the date of the Reverse Auction/Price bid opening date;		
9	Clientele List: Supplier to submit detailed clientele list with their full address including detail of contact person with phone no., fax no. & e-mail ID as per clause Aji) of Annexure - B (STANDARD TERMS & CONDITIONS).		
10	Reverse Auction (RA) / Sealed bid : Supplier confirmation required.		
11	Test Certificate: To be submitted. With Chemical and Mechanical properties and dimensions as per Standards and our Technical Delivery Conditions		
12	QP: Specific conformation to Submission of manufacturer/vendor quality plan for opur review and approval		
13	Guarantee Certificate: Guarantee regarding manufacturing defect should be for a period of 12 months from date of acceptance of the materials at BHEL Stores, or 18 months from the date of shipment whichever event occurs earlier. Guarantee certificate to be submitted along with invoices.		
14	Inspection before despatch: Inspection before despatch at supplier's works by BHEL/TPI agency		
15	Liquidated Damages (LD) : The applicable LD shall be at the rate of 0.5% per week to maximum of 10% for the undelivered portion and for the deliveries made beyond the agreed Delivery Period. Delivery being the essence of BHEL's contract requirements, in the event that a Supplier does not accept the above LD condition, the offer would be loaded to the extent of the shortfall with respect to upper limit specified above. Date of material receipt at our stores (Day Book date) will be considered as the 'Delivery date as mentioned in purchase order.		
16	PERFORMANCE BANK GUARANTEE (10% OF ORDER VALUE): REQUIRED for a period of 21 months from the date of SRV (including 3 months retention period). If any supplier is asking for any deviation or non-acceptance, then suitable loading on cost will be considered (on 10% value for 21 months). Loading of any deviation w.r.t tender terms will be "Base rate of State Bank of India (SBI) (as applicable on the date of bid opening: Techno-commercial bid opening in case of two part bids) + 6%, will be considered for loading for the relaxation sought by bidders.		
17	Risk Purchase Clause (as per clause-I of Annexure-B) (Supplier Confirmation Required)		
18	Firm Price: Prices shall be kept firm till completion of supplies.		
19	Supplier Registration Form- Online submission is to to be done and soft copy of the same to be uploaded along with Technical Bid by new vendors.		
20	MSE / Non MSE Status with proof for indigenous suppliers.		
21	For Foreign Offers -Manufacturers' Name and address:		
22	For Foreign Offers Country of Origin:		
23	For Foreign Offers - Mills Letter of Authority		
24	For Foreign Offers- Agency Agreement		
25	For Foreign Offers-Approximate weight and cubage of the consignment.		
26	It is mandatory to incorporate the following details in the Bill of Lading for Foreign Suppliers Import & export Code (IEC) of importer : BHEL, Ranipet IEC No: 0588138690/38		
27	It is mandatory to incorporate the following details in the Bill of Lading for Foreign Suppliers GST Identification No (GSTIN) of importer;		
28	It is mandatory to incorporate the following details in the Bill of Lading for Foreign Suppliers Official email id of importer (to be used for correspondence by shipping lines and Customs).		
29	Signature & Office Seal of Vendor		