

Bharat Heavy Electricals Ltd
Electronics Division
Mysore Road, Bangalore – 560026

Tender Document for Design, Engg., Manufacturing, Testing, Supply and E&C Support Services of Steam and Water Analysis System (SWAS)- Analysers + Sample Handling System for TANGEDCO/ UPPUR (2X800 MW) TPP Project

RFQ Ref.: MGR00000265 Dt: 14/06/2018
Due date : 06.07.2018

Content

- A. Technical Specification (Ref. section –B for Pre-qualification requirements)
- B. Engineering Checklist (To be submitted along with Part-I Bid).
- C. Commercial Terms & Conditions Comprising of:
 - i) Special Commercial Conditions of Contract,
 - ii) Instructions To Bidders with Annexures &
 - iii) General Commercial Conditions of Contract.

Important Information:

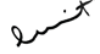
Last Date and Time of Tender Submission : 06/07/2018, up to 13:00 Hrs.

Date and Time of Tender/ Part-I Bid Opening : 06/07/2018, 13:30 Hrs.

Venue of Tender opening : MM Conference hall , NEB II Floor, BHEL-EDN, Bangalore-26.

Contact Persons at BHEL-EDN, Bangalore:

1. Mr. Mounish G, Sr. Purchase Officer (CE-MM-PR)
Ph: 080-26989576, Mob: 09164510626
Email:mounishg@bhel.in
2. Ms. Kanimozhi D, Deputy General Manager (CE-MM-PR)
Ph: 080-26998842
Email:kanimozhid@bhel.in

			REF.: CE/416/UPPUR/SWAS/PS			
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			PAGE : 01 OF 02			
COPY RIGHT AND CONFIDENTIAL THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICAL LIMITED. IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY		PROJECT :- UPPUR 2X800 MW CUSTOMER :- TANGEDCO CONTRACTOR :- TRACTEBEL ENGG PVT LTD PURCHASE SPECIFICATION FOR STEAM & WATER ANALYSIS SYSTEM				
		REVISIONS :		APPROVED		
				 (Punit P Singh)		
CO	P			PREPARED	ISSUED	DATE
				 PRK	416	02-06-2018

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SECTION- A

GENERAL INSTRUCTIONS TO BIDDERS:

All required documents against this Tender/Specification shall be submitted in English only.

Introduction: Bidders are required to offer SWAS to be used in Power Plant applications.

In order to accept the Technical offers / proposals from Bidders for the project mentioned in this Specification (refer Sections C, D, E & F), certain Pre-qualification criteria are required to be met by Bidder.

Pre-qualification requirements are clearly mentioned in AA of Section-B of this Specification. Bidder to read the same carefully and submit the details/documents required for BHEL's acceptance.

In case Bidder does not include the details or meet the requirements of Pre-qualification requirements, their offer will be summarily rejected and Bidder's Technical offers will not be evaluated.

Evaluation methodology: BHEL shall initially open Bidder's PQR documents as per Section-B of this specification for review & acceptance. Only after acceptance of PQR documents, BHEL shall open Bidder's technical offers for evaluation. Technically acceptable vendors will be proposed to customer / End user for vendor approval. Commercial bids of only accepted/approved vendors by End users/Customers, shall be considered by BHEL for further processing.

Bidders are required to submit offers as detailed below:

- A. Documents pertaining to Pre-Qualification requirements for AA of Section-B along with point-wise compliance to be uploaded as Part-I Bid.
- B. Documents pertaining to Clause BB Section-B along with point-wise compliance to be uploaded in Part-I Bid, documents for this clause to be identifiable separately in the uploaded documents.
- C. Technical offers/proposals for the Project, whose requirements are mentioned in Sections C & D to be submitted along with point-wise compliance and uploaded as Part-II Bid.

Note 1:-Whenever required during evaluation of PQR and Technical offers/bids, vendor is required to be present at BHEL Electronic Division, Bangalore, for discussions. Further in the event of order, during approval of the Vendor documents by End users/Customers, Vendor shall accompany BHEL representative for discussions.

Note 2:- Deviations (if any) shall be discussed with only those vendors who quote for this tender.

SECTION- B

AA. Pre-Qualification Requirements (PQR) of Bidders for SWAS:

1. “Bidder/OEM/System Integrator shall have successfully completed design, engineering, procurement, manufacturing, shop testing, erection and commissioning of SWAS, which had guaranteed and trouble free performance has been proven at least for Two (02) Years as on 01.10.2015, in not less than two (02) Nos of different reheat type pulverized coal fired units of unit size not less than 500 MW except some specific requirements indicated elsewhere.”
 2. Original Equipment Manufacturers based outside India, who are making offer for this tender shall have authorized representatives in India for support related to Documentation, Erection, Commissioning & post commissioning services. The Indian representative should have the team of experienced service engineers on payroll.
 3. Submit Reference List of Projects wherein offered system is supplied & commissioned and working satisfactorily, along with details of critical components like Coolers, High Pressure Reducer/regulator, Back Pressure regulator and Year of Commissioning.
 4. If Bidder is procuring Chiller from a subcontractor, he should declare subcontractor name & location. Bidder to certify that Chiller subcontractor meets required Quality standards for the product. Bidder should have supplied & commissioned Chiller from offered subcontractor for min. one system.
 5. For bidder/OEM/System Integrator offering upgraded / latest models of various analysers, PQR of equivalent previous model is acceptable subject to meeting PQR indicated in clause AA. 1. In such cases OEM shall certify that offered model is upgraded version of previous model.
 6. OEM shall furnish an undertaking that in case of change in Indian representative / agent, OEM shall continue to support supplies made by previous representatives/agents w.r.t to field service and supply of spare parts.
 7. Bidder shall have optimum inventory of critical components like sensors/ electronic modules of Analysers and Coolers, pressure regulators etc. to meet site requirements/failures on urgency basis.
 8. BHEL shall issue call for service / commissioning with 07 days' notice. Bidder shall agree to visit BHEL project sites within above notice period.
 9. BHEL shall submit credentials/details furnished by vendor with their offers to customer and await customer's decision for a maximum of one month from the date
-

of PQ bid opening. If approval is not received within above period, BHEL shall treat the offer as “NOT Meeting PQ” criteria and offer shall be rejected.

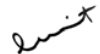
10. In case Customer/End user does not accept the offered makes of analysers, bidders offers will be acceptable only if they agreed to supply Analysers of customer approved make of Analysers without any commercial implications to BHEL.

BB. Additional Documents to be submitted along with the documents related to PQR above for reference (OPTIONAL):

1. Technical literature / Manuals of offered Sensors/ System/ Accessories.
2. In the event of technical specification not indicated in Technical literature, confirmation from OEM is acceptable. Such confirmations shall be suitably supported by certificates like Type test/ Routine test certificates.
3. Submit Unpriced Purchase Order copies for executed projects in the past three years.
4. Submit List of Projects, for which Erection & Commissioning has been carried out in the past three years. Also, submit reports of successful erection & commissioning Protocols & Minutes of the meetings for handing over of SWAS for these projects.
5. Name & registered address of the Indian branch office or Indian representative for support of E&C and after sales service with Organization chart.
6. Bidder shall have facility in India for Engineering activities, preparation of Documents, trouble shooting and calibration of the system. Submit these details.
7. If Bidder is not Original Equipment Manufacturer (OEM), then Bidder to include Authorization letter from OEM for Design, Engineering, Manufacture, Testing, supply, Erection, Commissioning and Servicing of the offered System. This Authorization letter provided by OEM to Bidder shall indicate the Type and Duration of Validity of the agreement.

Important Note: In case Bidder does not submit details mentioned in above clauses (AA) or meet the requirements of Pre-qualification requirements (AA), Offers will be summarily rejected and Bidder's Technical offers/proposals will not be evaluated. Please read carefully the GENERAL INSTRUCTIONS in Section A of this specifications.

Note: A point-wise compliance to be submitted for SECTION-B along with all relevant documents.

						REF. : UPPUR/416/SWAS/SOS	
						REV. NO. : 00	
			A4 - 11			PAGE : 01 OF 03	
		PROJECT :- UPPUR 2X800 MW CUSTOMER :- TANGEDCO CONSULTANT :- TRACTEBEL ENGG PVT LTD SCOPE OF SUPPLY					
		COPY RIGHT AND CONFIDENTIAL THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICAL LIMITED. IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY	REVISIONS :		APPROVED  (Punit P Singh)		
					PREPARED	ISSUED	DATE
					 PRK	416	02-06-2018



SCOPE OF SUPPLY FOR UPPUR 2X800 MW

SL NO	ITEM DESCRIPTION	UNITS	QTY PER SET	TOTAL QTY
1	SAMPLE HANDLING SYSTEM -			
a	PRIMARY RACKS (With IBR certified Isolation , Blowdown Valves & IBR certified Cooler Coils)	NO.	2	4
b	WET PANEL - ENCLOSED TYPE WALK WAY THROUGH TYPE PANEL	NO.	1	2
c	DRY PANEL	NO.	1	2
d	CHILLER UNIT - 2x100% REDUNDANT - Min. 5 TR rating (With 25% extra Capacity)	NO.	1	2
2	ANALYSERS - MICROPROCESSOR BASED WITH DIGITAL COMMUNICATION FACILITY LIKE RS 485/Modbus/Profibus and HART			
a	CONDUCTIVITY(SPECIFIC, CATION) ANALYSER - SINGLE CHANNEL	NOS.	18	36
b	CONDUCTIVITY(SPECIFIC) ANALYSER FOR HOTWELL - SINGLE CHANNEL	NOS.	2	4
c	pH ANALYSER- SINGLE CHANNEL	NO	11	22
d	DISSOLVED OXYGEN ANALYSER- SINGLE CHANNEL	NOS.	4	8
e	SODIUM ANALYSER (MULTI CHANNEL- 4 CHANNEL INCLUDING SPARE CHANNEL)	NO	1	2
f	SILICA ANALYSER (MULTI CHANNEL- 3 CHANNEL INCLUDING SPARE CHANNEL)	NO	2	4
g	HYDRAZINE ANALYSER (DUAL CHANNEL - 2 CHANNEL INCLUDING SPARE CHANNEL)	NO	1	2
h	CHLORIDE ANALYSER (MULTI CHANNEL- 3 CHANNEL INCLUDING SPARE CHANNEL)	NO	1	2
3	LOOSE SUPPLY ITEMS AS PER ANNEXURE-A	ST	1	2
4	Mandatory Spares as per Annexure- B	ST	1	2
5	COMMISSIONING SPARES- Reagents / Standard Solution / Calibrators required for commissioning & Handing over of System to Owner	ST	1	2
6	CONSUMABLES OTHER THAN CHEMICAL REAGENTS LIKE PH CELL , DO Sensors ,ETC	ST	1	2
7	CONSUMABLES I.E. CHEMICAL REAGENTS FOR 1 YEAR OPERATION	ST	1	2
8	ANNUNCIATOR - Microprocessor based Minimum 65 Points, Window size : 70 mm x 50 mm	ST	1	2
9	O & M MANUALS / DOCUMENTATION CHARGES	LOT	1	2
10	TEST, CALIBRATION & GUARANTEE CERTIFICATES AS PER APPROVED QUALITY CHECKLIST/ PLAN	LOT	1	2
11	SUPERVISION OF ERECTION, TOTAL COMMISSIONING AND HANDING OVER OF SWAS SYSTEM	ST	1	2
12	Price for one line of High Pressure & High Temp. - Primary & Secondary cooling to be considered along with other instruments as per P&ID applicable for the project.	ST	1	1
13	Price for one line of Low Pressure & Low Temp. - Secondary cooling to be considered along with other instruments as per P&ID applicable for the project.	ST	1	1
14	Sample/Metering Pump with MCB & Starting panel - Suitable for metering sample.	No.	1	1
15	Thermal Shut-off Valve	No.	1	1
16	Chloride Analyser - Single Channel	No.	1	1
17	Chloride Analyser - Dual Channel	No.	1	1
18	Following activities will be in Vendor's scope :-			
	i. Supervision of erection, Total commissioning & Handing over of the system to the End user.			
	ii. Erection of inter connecting cabling / tubing between wet & dry panel, chiller & wet panel etc.			
	iii. Complete Erection of Chiller system including proper insulation of pipes between chiller & wet panel.			
	iv. Vendor to also consider 1 no. of Gas filling at Site for Chiller during Commissioning/Handing over. This shall be in addition to Gas filling done at OEM works for inspection.			
19	Note:-			
	1.0 Vendors to quote unit rates for all above items individually.			
	2.0 Vendors who do not quote prices as per pt. 1.0, shall be disqualified.			
	3.0 BHEL shall use unit rates indicated above for quantity addition/deletion required during execution.			
	4.0 Bidders to quote item wise prices for all the items indicated above. Evaluation for L1 shall be done considering offered prices for all items indicated above however Items in sl. No. 12, 13, 14, 15, 16 & 17 shall be ordered only if required.			

ANNEXURE - "A"

LOOSE SUPPLY ITEMS FOR SWAS

SL. NO	DESCRIPTION	QTY / UNIT
1	Power Cable to SWAS panels	25 Meter
2	Power Cable to Chiller(3 phase 3 wire)	25 Meter
3	Special Cables between wet and dry panel . (for each cell / analyser Combination)	30 Meter/ run
4	All cabling and Tubing(along with connection fittings) between wet and dry panel	30 Meter / run
5	Cooling water header, A 106 Gr. B, 2 " NB Sch 40 (between nearest tapping point & chiller and chiller & Wet panel)+ Elbows (20 Nos) and Bends(10 Nos) .	60 Meter
6	Blow down header(Wet Panel) , A 106 Gr. B, 2" NB SCH 40 + Elbows (3 nos.)	20 Meter
7	Blow down header (Primary Racks) , A 106 Gr. B , 2" NB SCH 80 + Elbows (3 Nos)	20 Meter
8	Recoverable drain header , SS 316 , 2" NB SCH 40 + Elbows (3 Nos.)	20 Meter
9	Waste Drain header (analyser Panel) A 106 Gr. B , 2" NB SCH 40 + Elbows (6 Nos.)	30 Meter
10	Waste drain header(Primary Racks)) , A 106 Gr. B , 2" NB SCH 40 + Elbows (3 Nos)	30 Meter
11	Waste drain header (wet panel) , A 106 Gr. B , 2" NB SCH 40 + Elbows (3 Nos)	20 Meter
12	Furniture:-	
i	Teak wood laminated work tables 1x2 meters	2 Nos.
ii	Industrial grade high adjustable wheeled swivel chairs	5 Nos
iii	vertical cabinets 1000 x 480 x 2000 mm made of sheet steel (18 gauge sheet thickness)	2 Nos.
	and equipped with safety locks, one shelf 200 x 500 x 200 mm with partitions made of steel	

Note :-

1.0 Vendors to quote unit rates for all items individually.

2.0 Vendors who do not quote prices as per pt. 1, shall be disqualified.

3.0 BHEL shall use unit rates indicated above for quantity addition/deletion required during execution.

4.0 In addition to the set of flanges(mating & counter) which is mounted on the header in panel/rack , vendors to consider one additional set of mating & counter flanges for all headers,as indicated above.

5.0 For Tubing between wet and dry panel suitable connectors shall be provided.

6.0 Insulation of pipe between Chiller and Wet Panel shall be done at site by bidder.

ANNEXURE - "B"

MANDATORY SPARES FOR SWAS

SL. NO	DESCRIPTION	Quantities are per unit basis
a.	High pressure reducing elements for sample flow.	10% spare of qty. installed or 3 nos. (whichever is more).
b.	Panel mounted type sample pressure gauges, sample temp gauges and sample flow indicators.	2 nos. each.
c.	Temp switch/flow switch/temp.controller/temp gauge/pressure gauge each for the chilled water system.	1 no. each.
d.	Filters along with filter elements.	Two nos. of filters along with 40 nos. of filter elements.
e	Sample probes	Ten nos. or minimum 1 no. of each type whichever is more
f	Sample shut-off valves	2 nos.
g	sample blow down valves	4 nos
h	Solenoid valves	2 nos. of each type and rating
i	safety relief valves	2 nos.
j	Isolation valves used for pressure indicator and flow indicator isolation	6 nos.
k	Back pressure valves.	2 nos.
l	Grab sample valves	2 nos.
m	Quick disconnection type valves.	4 nos
n	Sample temp. control valves/Thermal Shut Off Valve	4 nos.
o	Ion exchange columns with resin as utilized with cation conductivity analysers	Four Nos. and 12 sets or No. of sets required for complete one year operation, whichever is more of replacement cartridge for ion exchange column.
p	Conductivity cells as utilised with conductivity monitors	Two nos of each type
q	pH flow-through type cells used with pH monitors	Two nos of each type
r	Chemical reagents for all analysers	12 months continuous operation of all analysers from date of taking over.
s	Chemical reagents for colorimetric silica analyzers	12 months continuous operation of all analysers from date of taking over.
t	Electronic Modules, sensor, flow assembly and measuring chamber	One (1) no. for each type of Analyser.
u	Power supply sub-assemblies	10% or two no. (Whichever is more) for each type of Analyser.
v	Pressure gauge, solenoid valves, temperature gauge, Back Pressure regulating valves, 3 way grab valves, needle valves, isolation valves, PRV, flow switch, flow indicator and temperature switch, erection hardware's, valves in SWAS.	Two (2) no. of each type
w	Primary coolers/secondary coolers.	Three (3) No of each type

SECTION D

**TECHNICAL REQUIREMENTS &
ANALYSER SPECIFICATIONS**

CHAPTER-5**STEAM AND WATER ANALYSIS SYSTEM AND FLUE GAS ANALYZERS**

5.00.00 Design criteria for continuous on line analytical measurements of important plant media such as water, steam and flue gas shall be based on microprocessor based instruments only.

5.01.00 General Requirements

- a) Separate Steam and Water Analysis System shall be furnished for continuous monitoring and control of water and steam purity in the plant cycle of each unit and at other important points as specified in this specification. The SWAS System and Analytical lab may preferably be located on the "0" M floor in TG building.
- b) The sampling system shall obtain samples from steam and water system, which shall be adequately conditioned and fed to analyzers for continuous analysis and provide parallel facility for grab sampling as specified.

The analyzer outputs from SWAS shall be used for providing -

- i) Continuous monitoring of various parameters using SWAS OS as specified herein with isolated analog outputs of 4-20mA, DC for each parameter for monitoring in plant monitoring system i.e DDCMIS.
- ii) Alarm for all significant parameters measurements which exceed their permissible limits including those of sample conditioning system, with repeat facility in the Central Control Room in the form of potential free contacts and for hooking up to plant monitoring system.

This will enable the plant chemist and operators either to make adjustments in the water and steam conditioning system or to modify plant-operating procedure so as to minimize equipment damage due to corrosion, scaling etc.

- c) The Bidder shall furnish all analyzers/monitors including sample conditioning components and other devices as specified in the sample stream detail table. The bidder shall furnish all required accessories for completeness of the analyzers furnished by him even though this may not be specifically stated in other clauses of this specification.
- d) The system shall be furnished complete with sample conditioning devices and monitoring instruments (for temperature, pressure, flow & sample), analyzers, transmitters, indicators, alarm initiating devices, interlocks, isolated 4-20 mA DC for plant monitoring system and all required accessories to provide a complete and integrated sampling and analysis system as per the intent and requirements of this specification. Sample line diagrams shall be used to implement the design at system level that shall be subject to Owner approval. All necessary piping, tubing, fittings and valves etc. shall be furnished.

-
- e) The SWAS system shall be designed in accordance with the recommendations in ASME PTC 19.11 Part II (latest edition) – Standard Practice for Steam and water sampling, conditioning and analysis in power plant, ASTM D3370 (Latest edition) – Standard Practice for sampling water from closed conduits, ASTM D5540 (Latest edition) – Standard Practice for Flow control and Temperature control for on-line water sampling and analysis and ASTM D1066 (latest edition) - Standard Practice for sampling steam.
 - f) The Bidder shall be fully responsible on system basis, for proper engineering, selection of hardware, manufacture, testing, installation, commissioning and satisfactory functioning of complete and fully operational steam and water analysis system, meeting the intent of this specification. All system components and accessories required for completeness of this system shall be furnished by the Bidder although these may not be individually specified herein.
 - g) The equipment shall be constructed to operate accurately and safely under the operating conditions described or implied in this specification, without undue heating, vibration, wear, corrosion or other operating troubles.
 - h) All parts subject to high pressure or temperature or other severe duty shall be of materials suitable for the service.
 - i) All piping, tubing, fittings, valves, filters and other wetted parts in the sampling and analyzing system shall be of type 316 H stainless steel or other suitable material for the service approved by the Owner of Swagelok, Dr Thiedig or Parker make only. No plastics or rubber shall be permitted except within analyzers as furnished by the manufacturer. Double ferruled double compression type fittings shall be used only. All critical components like sample coolers, PRV, Back pressure regulator, thermal shutoff valve etc shall be of Sentry, Lowe or Dr Thiedig make only.
 - j) All other SWAS system components and accessories shall be from the latest proven product range of qualified/reputed approved manufacturers. The SWAS components and accessories shall be of specified makes and models approved by owner, fully meeting the qualifying requirements.
 - i) To ensure operation under adverse conditions the equipments mounted outside the Sampling and Analysis Room shall be designed for outdoor conditions.
 - ii) Sample room located instruments and electronic hardware will be required to operate normally in an air-conditioned area.

However, they shall also be able to operate indefinitely with ambient room temperature between + 5 deg. C to + 55 deg. C and relative humidity upto 95%, during air conditioning failure.

- k) One WORK STATIONS-based operator station with A4 sized B&W LaserJet printer for water chemistry parameters as a part of performance calculations & optimization package (Hooked up to the DDC MIS through redundant "OPC, MODBUS or DDCMIS TCP/IP network etc") and one no. SWAS OWS shall be kept

in SWAS/Chemical Express lab room as specified in chapter 4. Specification for WORK STATIONS and printer shall be same as specified else where in the specification. **Work Station in BHEL Scope**

- l) All the analysers should work with sample temperature of 40-45 deg.C with out chilled water requirement.

m) **Alarm Annunciation:**

HW Alarm annunciator shall have adequate/required points (80 or more which shall be finalized during detailed engineering) and with 50 windows.

- n) All the components, piping, tubing, fittings, valves, filters and other wetted parts in the sampling and analyzing system shall be designed to handle the over range of One Fifty (150) percent of operating process parameters.

All materials, furnished shall conform to the latest editions of America National Standard Code for Pressure piping, Power piping, ANSI B31.1, ANSI B16.11, ASME Boiler and Pressure Vessel Codes, IBR and other applicable ASME, ANSI and Indian Standards. Schedule numbers, sizes and dimensions of all carbon steel, stainless steel and alloy seamless steel pipe shall confirm to ANSI B.36.10 and of stainless steel pipe shall confirm to ANSI B 36.19 unless otherwise specified.

- o) Field proven reputed international make microprocessor based MONITORS/analysers with LCD/TFT display AND WITH NECESSARY FAULT DIAGNOSTIC FEATURES shall be supplied for complete plant.

5.02.00 Sample Conditioning System

a) General

- i) Sample conditioning system shall be designed and constructed to receive and condition all samples (listed in the enclosed Sample Stream Specification) as required by the respective analyzers connected to the sample streams. This will include all conditioning as specified herein and shall cover the following:

- Sample filtering
- Primary and final sample cooling and temperature control
- Pressure reduction and control as required
- Flow rate control
- Pressure & Temperature protection
- Other treatment as required by individual analyzers or specified herein.

- ii) The sample conditioning system shall provide samples at 25°C or a preset temperature required by the analyzer within tolerance of $\pm 1^\circ\text{C}$, at a pressure of about 2 kg/cm² and at flow rates as required by individual analyzers/streams.

- iii) Sample line to analyzer elements shall incorporate an anti-syphon design to prevent possibility of running dry because of a broken or plugged sample line.

-
- iv) Sample conditioning system shall be designed and constructed to fully meet the intent and requirements of this specification.

Suitable arrangement shall be made by the bidder to condition the sample by way of providing chiller and sample coolers.

- v) The cooling and chilled water header (inlet & outlet) shall be provided with pressure gauge, temperature gauge, RTD, flow switches, safety relief valves, flanged, isolating valves and instruments as indicated in Drawings enclosed with specification.

Safety relief valve shall be provided at DMCW inlet header with drain of safety relief valve connected to waste drain header.

Outlet valve of each sample cooler shall be isolating & throttling type in line with ASME PTC 19.11 standard.

Inlet valve of each sample cooler shall be isolating & diverting 3 way type in line with ASME PTC 19.11 standard.

- vi) Provision shall be made for heat exchanger shell drain, which will be connected to drain header.
Potential free contact shall be provided for annunciating loss of cooling/chilled water.

b) Sample Filters

Sample particulars removal shall be accomplished by passing all sample through cartridge filters with type sintered 316 stainless steel body. Removable type filter element shall be capable of retaining particles of 40 micron and larger. These elements shall be installed downstream of solenoid operated sample shut of valves at each branch of analyser sample stream.

c) Sample Cooler

All samples having a temperature in excess of 45degC shall be cooled by use of primary sample coolers.

The sample cooler shall use DMCW water (softened water) as cooling water. This cooling water is tapped from DMCW water system, whose temperature may vary from 20degC to 40degC. A maximum cooling water temperature of 40degC shall be considered for design of sample cooling system. Capacity of cooler shall be adequate to cool the sample within 5degC of cooling water inlet temperature considering the combined flow of each analyzer connected to sample cooler and one manual grab sample at flow rate of 500 cc per minute and assuming adequate fouling factor of 0.2. Cooler capacity calculations shall be submitted by bidder during detailed engineering.

Provision shall be made for adjusting the temp. of each sample individually at an optimum value.

Sample cooler shall be of submerged Helical coil type of shell and tube design with removable shell. The sample tube shall be of seamless with no welds and other joint inside the cooling jacket. Unions shall be provided to facilitate removal of coils. All sample coolers shell, coil, tubing and fittings, other components shall be constructed of type 316 stainless steel or better as per process requirements. Cooler design shall conform to requirements of ASTM D1192-1998 (Equipment for sampling industrial water and steam). IBR certificate is required, wherever applicable. The shell relief valve shall be built in type.

d) Secondary Sample cooler

In secondary sample coolers provided with each sample stream, sample shall be finally cooled to minimum 25 deg. C or to the required temperature as specified by the analyzer manufacturer and as approved during engineering within a variation ± 1 Deg. C before passing sample to the respective measuring cells. This shall be accomplished in the secondary sample cooler by counter current heat exchange of each sample against the flow of chilled water at 20 Deg. C. The chilled water for the secondary sample cooler shall be provided by package refrigeration unit (chillers).

Cooler capacity calculations (considering fouling factor of 0.2) shall be submitted by bidder during detailed engineering.

All samples will be passed through cartridge type filters before being cooled in respective secondary coolers. Sample cooler shall be of submerged Helical coil type of shell and tube design with removable shell. The sample tube shall be of seamless with no welds and other joint inside the cooling jacket. Unions shall be provided to facilitate removal of coils. All sample coolers shell, coil, tubing and fittings, other components shall be constructed of type 316 stainless steel or better as per process requirements. Cooler design shall conform to requirements of ASTM D1192- 1998 (Equipment for sampling industrial water and steam). IBR certificate is required wherever applicable. The relief valve shall be provided on the cooling water jacket of each cooler in addition to a relief valve at the cooling water header.

Wherever primary coolers are not required for sample temperature less than 45 deg C, Temperature switches shall be provided in the sample lines at the secondary coolers outlets for sample outlet temperature high annunciation and Thermal shut-off valve shall be provided in the sample lines at the secondary coolers outlets for shut down of high temp. sample at inlet to the Analysers.

Duplex RTD shall be provided to annunciate high chilled water Temperature on the Dry panel and in DDCMIS.

e) Chiller

Two (2) 100% capacity hot redundant water cooled chillers shall be provided for the SWAS package.

Each chiller unit shall be designed with sufficient refrigeration capacity to ensure each sample stream temperature to 25 deg. C ± 1 deg. C when all streams are

Chiller Tank shall be SS316 material

All components of chiller shall be compatible to work with DMCW.

simultaneously at maximum flow rate and maximum temperature. The chiller capacity shall have a provision of 25% spare capacity for future samples.

Suitable temperature monitoring and control systems with duplex RTD shall be provided for maintaining the chilled water temperature at chiller outlet at 20 deg. C or at a designed preset value and within the desired band. The compressor shall be readily accessible for service and shall include low noise hermetically sealed motors. Compressor assembly shall also include crank case heaters, suction and discharge valves, oil sight glasses, forced feed lubrication system and an integrated motor protection system alongwith the necessary instruments.

The condenser shall be water cooled, cleanable shell and tube with water regulating valve. The cooling water shall be supplied from closed cooling water system.

Chiller shall be of the direct expansion type with refrigerant tubes inside a shell, completely insulated and to be constructed in accordance with the ASME code for unfired pressure vessels.

Refrigerant circuit shall be complete with a thermostatic expansion valve, liquid line solenoid valve, sight glasses, filter-dryer, refrigerant shut-off and charging valves.

The chiller water pump shall be of the centrifugal type, close coupled, bronze fitted construction, complete with motor. Pump & motor shall be designed for continuous operation. Vibration dampeners shall be mounted between the packaged chiller and the channel base.

DM Cooling water and chilled water piping shall be provided with block valves.

The Bidder shall provide detailed calculation for chiller capacity and other technical particulars like foundation details/mounting etc. and the same shall be subject to Owner's approval.

The chiller system shall be provided with 100% redundant chilled water pumps with suction and discharge pressure gauges and temperature gauges; Chilled water circulation pump with 100% standby facility; Storage tank automatic water make up with manual by-pass facility, temperature indicator, level gauge and drain and overflow connection, in addition to any other instruments/equipments required for smooth, convenient operation of the system, which shall also be furnished by the Bidder.

f) Sample Pressure Conditioning

The pressure reduction of samples shall be accomplished by using high pressure reducing element. All samples after high pressure reducing element shall be provided with back pressure regulating valves.

Each sample line shall include a safety relief valve down stream of the control valve.

For samples with pressure less than 2 kg/cm², suitable field mounted pumps shall be provided by bidder as part of the sampling system.

i) **Pressure reducing element**

Pressure reduction of samples shall be accomplished by means of a variable rod-in-tube capillary capable of discharging low flow at low pressure into a sample stream (In primary wet sample panel and in secondary wet sample panel) as per requirement of analyzers. These pressures reducing element shall be conveniently located for removal and cleaning.

ii) **Pressure regulating valves**

The pressure regulating valves shall be furnished for all samples to maintain constant sample flow at a pre-set sample pressure. Variation in sample flow to individual analyzer shall not exceed 5% when total sample flow is increased or decreased due to change in number of individual analyzers utilizing a particular sample. Valve shall be back pressure regulating type.

g) **Sample system thermal shutoff valve, RTD, temperature switches, pressure gauge, Flow switches and flow indicator**

The temperature gauge shall be 100 mm size, gas filled type thermometer with SS armoured capillary of suitable length required with $\pm 1\%$ accuracy for installation in wet panel (for other details refer chapter 3). Bimetallic type thermometer will not be acceptable.

Automatic Thermal shut-off valves shall be provided for shut down of high temp. sample after primary cooler and after secondary cooler to protect the analysers. Thermal shut off valve body material & wetted part material shall be SS316. Valve position indication (Open & close) shall also be provided in SWAS panel and DDCMIS.

The pressure gauge shall be 100 mm dial size. Sample rate of flow indicator shall be purge type meter with 75 mm scale length, panel mounting bezel and SS316 float & SS316 body.

Level gauges shall be tampered, borosilicate transparent type of minimum pressure rating 300 psig.

Each gauge shall have a dial engraving or separate phenolic name plate to identify the service. Service engravings, make, model, ranges and other technical features shall be subject to Owner approval. Gauges shall be located on the front of sample conditioning panel.

Flow indicator & flow switches shall be provided on the primary cooling water outlet and on the chilled water outlet as indicated in the drawings for SWAS.

Accuracy/repeatability shall be $\pm 2\%$. Make & model of flow switches & flow switch shall be of Owners approved one.

Temperature switches/RTDs shall be provided on the sample lines and water lines as indicated in the drawings for SWAS. All switches shall have repeatability within $\pm 1.0\%$ of full scale range.

Above instruments shall meet the technical specification requirements mentioned in Vol. V, chapter 3.

h) **Grab samples**

Grab sample valves on the front of SWAS panel shall be arranged to allow grab sample flow to be directed to either a drain header or through a grab sample nozzles to samples trough. Enough flexible Tygon tubing shall be furnished to allow sample collection without splashing. Grab sample nozzle shall be provided with adaptor and panel mounted flanges.

i) **Sample table**

All steam and water analyzers should be installed in a room. This arrangement would help better maintenance and better control of water chemistry.

For measurement of conductivity of condensate water in the hotwell, direct mounting type conductivity cells shall be used. Hotwell conductivity analyzer/monitor shall be mounted on a standalone panel in an Air conditioned environment. For all measurements other than conductivity of condensate water in hot well, sample shall be brought to the sample table, where sample shall be cooled and their pressure reduced and flow regulated before being led to the respective sensors for analysis of different parameters. For make up DM water sample stream, sample extraction pump shall be provided.

The core of sampling system is the high pressure sample cooler. One or two high pressure shut off valve depending upon sample inlet pressure shall be provided in the sampling line at the inlet of the cooler. Another high pressure shut off valve for blowing down the sampling line shall be connected before sampling line shut off valves. An indicator shall be provided to measure the temperature of a sample after cooler. One signaling contact for alarm at high temperature shall be provided with temperature switch. The required contact multiplication shall be done through relays mounted inside the analyzer panel by bidder. This measurement point is to be followed by high pressure reducing element, pressure reducing valve, safety shut off valve and safety relief valve, pressure gauge and multi valve manifold. The multi valve manifold and fittings are liable to be subjected to high pressure in the line when the valves are closed. Thus the pressure rating of these valves and all associated fitting should be same as that of the root valve in the corresponding sample line. This multi valve manifold should have separate outlets leading to individual analyzers. The flow of sample to individual analyzers should be indicated by a flow meter. The flow, temperature and pressure indicators and needle valves should be mounted on the front of vertical portion of sample table for ease of operation as well as for proper layout.

Two numbers of cation exchange columns (one working and one standby) should be provided with manual switching for each cation conductivity measurements. Bidder shall provide all equipment necessary for bringing cooling water to sample table from one common point of cooling water supply line. Flow switch shall be provided for signaling loss of cooling water flow at each cooler outlet. During collection of grab samples, flow of sample to analyzers shall not be affected.

j) Sample patch board

A quick disconnect patch board shall be furnished on the SWAS panel. The patch board shall allow sample to be routed to any analyser through quick disconnect valve at patch board on the sample conditioning panel. The area shall consist of a patch board with bulk head fittings with double end shut off and hose inserts. Body protector plugs shall be provided for each bulkhead tube fittings. Number of hose inserts, disconnect fittings etc shall be as shown in SWAS diagram and other specification documents.

The plug shall be of type SS 316 construction. Sufficient length of 6 mm ID, 9.5mm OD tubing shall be provided for complete spanning of the patch board area for interconnection of the bulkhead tube fittings. Each connection shall be provided with a phenolic name plate engraved with a legend acceptable to the owner.

5.03.00 Steam and Water Analysis System (SWAS) Panels

a) Design Consideration for SWAS Panel and

Accessories

The SWAS Panels shall have two sections namely sample conditioning section and analyzer section . The first section shall be the wet section of SWAS panels which shall be called as the "Sample Table". The second section shall be the dry section housing the analytical transmitters, signal conditioning devices and other requisite accessories.

All monitoring instruments and controls for sampling system shall be located on the front panel and shall be grouped accordingly to function in a logical and orderly fashion. There shall be a general progression of flow from top-to-bottom and left-to-right to minimize sample line length, purge times and material exposed to sample. Similarly, the conditioning components for each stream shall be grouped together wherever possible.

Indicating instruments such as pressure, temperature and flow shall be arranged in a vertical line directly above the grab sample valve. Sufficient clearance shall be maintained between instruments banks of adjacent sample points so that there is no confusion in reading these instruments.

b) Ease of Maintenance

Sample conditioning, analyzer, panels shall be designed for ready access of components. Panel design shall ensure that:-

- i) Parts subject to wear, corrosion or other deteriorations or requiring adjustments, inspection or repair are readily accessible and capable of convenient removal, when required.
- ii) Individual components or groups of components mounted on sub-panels can be removed for replacement or repair without the need of prior removal of components of other healthy streams.
- iii) Flow meters, pressure gauges and temperature indicators can be removed for repair or replacement from the front of the panel without disturbing any piping.
- iv) Filter elements and pressure reducing elements can be easily disassembled for periodic cleaning.

The general arrangement drawings of panels as well as location and spacing of all instruments and equipment shall be subject to Owner approval. SWAS panels shall be designed based on human engineering considerations fully keeping in view the convenience of operation and maintenance personnel.

Each sample inlet shall be provided with bulkhead type tubing connection and an isolation valve or block valve suitable for sample operating conditions.

A blowdown connection and suitable blow down valve shall be furnished upstream of each isolating valve. Blow down valves shall be manifolded into a suitable blow down header.

Strainers, filters, relief valves etc. shall be provided as specified and as required to properly protect the coolers, valves, analyzer elements etc.

All drains shall be piped into two separate drain headers. One header shall be called "Waste Drain Header" and will receive all drains which contain substances not wanted in the plant heat cycle water. The other header shall be called "recoverable drain header" and will receive all other drains not containing unwanted substances. All drains shall be headered as indicated above. Vendor shall pipe the waste drain header to the building drain system.

c) Constructional Features

The SWAS panel (wet panel) shall be constructed of 3 mm thick steel plates except for the extreme top of the Sample Table and Analyzer Panel (Dry Panel) and doors, which shall be of 2 mm sheet steel. The counter top, sample sink and front section above the counter top shall be 2.5 mm type 316 stainless steel.

The sample table shall be of free standing, totally enclosed panel whereas the Dry Panel shall be of free standing, totally enclosed construction with back doors.

General constructional features described in chapter -6, Vol V of this specification shall apply.

All SWAS panels shall be furnished with 100 mm base angle for bolting to 100 mm high concrete curb. The foundation details shall be as approved by the Owner during detailed engineering.

Panel sections shall be reinforced to ensure true surfaces and adequate support for instruments and equipment. All equipment and piping shall be firmly anchored and supported from within the respective panel section to ensure vibration free operation.

Doors and equipment arrangement shall be such that all items are readily accessible for maintenance and repair. The arrangement and spacing of the equipment shall be acceptable to the Owner.

Doors shall have concealed type hinges and three point type latches to assure tight closing. Doors shall have turned back edges and additional bracing where required to assure rigidity.

The SWAS panels and equipment shall be suitably braced to prevent damage during shipping and handling. These additional supports shall be removed after final installation.

Exterior joints shall be continuous seam welded and ground smooth. Interior joints shall be neatly finished in a manner so as to eliminate hazards to personnel.

All surfaces shall be free from waves, bellies, or other imperfections. All stainless steel surfaces shall have uniform finish. All exterior steel surfaces shall be sand blasted, ground smooth, filled, primed, sanded and finished with a smooth backed enamel. The final color shall be as specified in chapter 6.

- d) Two teak wood laminated work tables 1x2 meters, Five nos. industrial grade high adjustable wheeled swivel chairs, two vertical cabinets 1000 x 480 x 2000 mm made of sheet steel (18 gauge sheet thickness) and equipped with safety locks, one shelf 200 x 500 x 200 mm with partitions made of steel, Operating work station table & printer table shall also be provided by bidder. Thickness of steel almirah/cabinet sheet shall be 18 gauges. All items shall be placed in SWAS air conditioned room.
- e) SWAS panels shall be placed in separate SWAS room, SWAS room shall be divided in two part i.e one part shall be air conditioned for SWAS dry panel & Chemist and other part non air conditioned for wet pael & chiller unit. Necessary exhaust fans with louvers shall be provided by bidder in SWAS wet panel room.

5.04.00 Piping, Tubing and Accessories

- a) All internal piping, tubing and system components required for making the system complete shall be shop installed and tested as per applicable codes, prior to shipment to project site.

-
- b) All tubing and wiring shall be located behind the face of the panel with projections allowed only for indicator faces, valve handles, manual grab sample lines etc. The physical arrangement of the tubing and wiring shall, in all cases, be so as to permit easy access for maintenance of all items of equipments.
 - c) All piping and tubing materials, fabrication, erection and application of piping materials shall be in accordance with the latest applicable requirements of the code for pressure piping (ANSI B 31.1,B36.19) and all other applicable regulations.
 - d) Unless otherwise specified, fittings used with pipe 50 mm and smaller shall be socket welding type, and fittings used with larger pipe shall be butt-welding type. All fittings shall be constructed of materials equivalent to the pipe with which they are used.
 - e) All piping and tubing shall be neatly installed and securely braced to ensure adequate mechanical rigidity. Routing and support of tubing shall be such that expansion and contraction of tubing or equipment mounted in the sample table do not impose any excessive stress on the tubing.
 - f) Special tools shall be used for all bending and forming operations. Bends in tubing shall be based on the requirements of the Code for Pressure Piping (ANSI B 31.1), concerning tube thinning at the bends. Tubing shall be carefully handled to avoid flat spots, kinks and short bends. Any tubing so damaged shall not be used in this sample table.
 - g) All piping and tubing shall be blown with oil free compressed air after installation and before attachment to equipment at either end.
 - h) All piping and tubing terminal connections shall be suitably capped after completion of installation and tests to prevent entry of foreign materials during transit, storage etc.
 - i) All piping and tubing shall be installed so as to ensure easy accessibility for any maintenance or repair that may be required. High density tubing runs shall not interfere with accessibility to any system component and shall not impair system function.
 - j) All sample piping shall be One inch NB seamless type of material ASTM A213 TP316H, conforming to ANSI 36.19. For exceptional cases like sea water services, material shall be super deluxe SS.
 - k) All fitting shall be socket welding type and of material ASTM A 182 F316H conforming to ANSI B16.11. For exceptional cases like sea water services, material shall be super deluxe SS.
 - l) All process connection, piping, valves etc. of SWAS analysers shall be conform to ANSI/ISA SP 77.70 – 1994 (R 2005) "Fossil Fuel Power Plant Instrument piping Installation", ANSI B 31.1 "Power Piping", PTC 19.11.1997 & IBR.

5.05.00 Material Specifications for Pipe Lines

The piping to be furnished and installed for water and steam analysis system and for BOP packages shall be as indicated below:-

Sr. No.	Piping System	Material
a)	Piping from the sample inlet bulk-head fittings to the shut-off valve for low pressure samples	Stainless Steel, ASTM A-213 Type 316H, ¼" OD 16 SWG seamless tubing.
b)	Piping from the sample inlet bulk-head fittings to the pressure reducing valves for high pressure samples and sample blowdown piping	Stainless Steel, ASTM A-213 Type 316H, ½" OD 14 SWG seamless tubing.
c)	Blowdown header	Stainless Steel, ASTM A-312 Type 316, 2" NB, Sch. 160 minimum, pipe header flanged to ANSI B 16.5, class 3000 # R/F SS 316 flange.
d)	Miscellaneous drains receiver header	Stainless Steel, ASTM A-312 Type 316, 2"NB,Sch 40, pipe header flanged to ANSI B 16.5, class 150 # R/F SS 316 flange.
e)	Piping from the shut-off valves for low pressure samples and from the pressure reducing valves for high pressure samples to the terminal points including branch piping	Stainless Steel, ASTM A-213 Type 316H, 1/4" OD 16 SWG seamless tubing
f)	Closed cooling & chilled water piping header	Stainless Steel, ASTM A-312 Type 316, 2"NB, Sch. 40 minimum, pipe header flanged to ANSI B 16.5, class 150 # R/F SS 316 flange.
g)	Sample through drain piping and waste header piping header.	Carbon Steel, ASTM A- 106 Gr. B, 2"NB, Sch. 40 minimum, pipe header flanged to ANSI B 16.5, class 300 # R/F SS 316 flange.
h)	Sample impulse piping from field up to SWAS wet panels	SS316H, 1" NB size.
i)	The closed cooling & chilled water piping.	Stainless Steel, ASTM A-312 Type 316, 3/4" OD 16 SWG seamless tubing.
j)	Purge air piping/tubing and filling valves	Brass/copper

Sr. No.	Piping System		Material
k)	For water analysers – material of pipes, tubes & erection hardware		SS316/Super duplex SS depending upon application.
l)	Sea water services		Super Duplex SS

5.06.00 Valves and Fittings

The requirements of the important valves are specified as under :

The sample shut off valves, blow down valves and pressure reducing valves shall have stellite spindle tip and shall be suitable for an operating pressure of 400 bars and an operating temperature of 400 C.

The back pressure regulating valve shall be globe type and shall be suitable for a pressure range of 0-50 psi. The back pressure regulating valve shall consist of a range spring and a diaphragm assembly. The back pressure of the regulating valve is adjusted to the required set point by the range spring. In case of any excess pressure the diaphragm shall be lifted to release the excess pressure to maintain back pressure equal to the set value. Stainless steel SS316 trim with liner flow characteristics shall be provided bidder shall submit the data sheet of these valves and these shall be subject to Owners approval during detailed engineering stage.

All valves & fittings shall be furnished as required. All other valves and fittings required for making the system complete as per the intent of this specification shall also be furnished by the Bidder. The make, model and technical features of all valves furnished by the Bidder shall be subject to Owner's approval.

All fitting shall be socket welding type and of material ASTM A 182 F316H conforming to ANSI B16.11.

5.07.00 Wiring

All control and instrumentation wiring used within the SWAS panel sections shall conform to NEC and NEMA standards. All measurement and control circuits shall be factory wired and tested by energizing at operating voltage.

Sensor cables or cables from wet panel / field shall not be terminated directly to analyser/transmitters in dry panel. Sensor cables shall be terminated to terminal blocks in dry panel.

All electric connections shall be made between devices within the SWAS panel sections and shall be made to suitable terminal blocks, if devices are to be connected to equipment outside the SWAS panel.

All electrical connections shall enter and leave through the top or bottom of the panels as indicated during detailed engineering.

High impedance circuits shall be connected using shielded or co-axial wire suitable for the service. Terminals shall be furnished for termination of shield.

Wiring in the sampling section shall be routed in covered metallic trays located as distant as is practicable from sampling lines and drains with due care taken to isolate electric wiring, termination etc. from liquid areas.

5.08.00 POWER SUPPLY

Power supply to all instruments and control systems shall be separately fused with MCB and it should be possible to disconnect any instrument without interrupting power supply to any other equipment/device.

UPS shall provide power supply to the complete SWAS system. Redundant UPS feeders shall be provided by bidder with auto changeover facility for complete SWAS system.

5.09.00 LIGHTING AND RECEPTACLES

Sample table and analyzer section shall be provided with rapid start, low noise, fluorescent strip fixtures installed in a continuous row along the top of each section. The panel shall have a ceiling mounted LED lamps for illumination. Light switches shall be provided within the panel sections at suitable locations.

Universal type Three receptacles shall be provided on the front of the sample table below the work surface. These will be equally spaced. Two more receptacles shall be provided inside the sample table and one receptacle shall be installed inside the dry panel.

Wiring for lighting and receptacles shall be run in flexible metallic conduits.

5.10.00 GROUNDING

One earthing terminal with accessories shall be provided at each end of strip for connecting copper earthing strip of 50 x 6 mm size.

5.11.00 Technical Specifications of Conductivity Analyser

All analysers shall have Digital communication facility like RS 485 / HART/ Modbus/ Profibus.

- | | | |
|----|---------------------|---|
| a) | Applicable standard | ASME PTC 19.11-1970 except as modified in this specification. |
| b) | Type: | |
| | i) Cell | Continuous Flow through type/ removable type (withdraw able with sealing valve) |
| | ii) Monitors | Electronic (Microprocessor based) indicating type with multi range facility (Single Channel). |
| c) | Material : | |
| | i) Cell | Epoxy resin/SS316 |
| | ii) Electrode | Platinised/SS316 |
| | iii) Monitors body | Carbon steel/Aluminum/Polycarbonate |
| d) | Monitor output | |
| | | i) 4-20 mA D.C. with HART protocol spare out put |
| | | ii) 4-20mA DC with HART protocol for |

		DDCMIS Output load : 500Ω	Note: For cation conductivity measurement - cation column resin should change its colour indicating depletion of its capacity and shall be regenerative type resin and not replaceable type. Column caps shall be SS316. This shall be complied for cation conductivity.
e)	Power supply	240V, AC, 50 Hz from UPS	
f)	Accuracy	$\leq \pm 1\%$ of full scale span	
g)	Stability	$\pm 1\%$ of full scale per month non-cumulative	
h)	Repeatability	$\pm 0.3\%$ of span	
i)	Response time (90% of full scale)	≤ 5 seconds	
j)	Annunciation contacts from monitors		
	i) Number	2SPDT	
	ii) Type	Snap action micro switch	
	iii) Rating	5 amp, 240 V, 0.2 Amp, 220V DC	
k)	Connection:		
	i) Cell	On line/pipe mounted (ON LINE in sample table) 1/4 (Quarter) inch NPT (F) SCRD for on-line type and Three quarter (3/4) inch NPT (M) SCRD for pipe mounted. flush panel mounting	
	ii) Monitors		
l)	Electrical	Half (1/2) inch NPT (F) SCRD / Plug in Type.	
m)	Accessories	i) Automatic temperature compensation in the range 0-100 degC ii) Ammonia (NH ₃) removal equipment. iii) Sample coolers iv) Flow and pressure regulators v) SS316 impulse tubing and fittings vi) Isolation & drain valves as required vii) Other accessories as required viii) Adequate length of cables for connecting coils to monitors ix) Sample rate set valves x) Alarm settings and Alarm indications on monitor. xi) Auto Calibration, Comprehensive diagnostic and alarm features.	
n)	Other particulars	Cell shall be suitable for maximum pressure of 7 kg/cm ² and maximum temp. of 100degC For Hotwell conductivity (specific & cation) measurement, the bidder shall provide direct insertion/withdrawal type conductivity cell, whereas for all other samples it shall be continuous flow through type. Monitors for Hotwell conductivity	

(specific and cation) shall be mounted in air conditioned room. Dual cation exchange column shall be provided for cation conductivity.

5.11.01 CONDUCTIVITY COMPARATOR Not Required.

Applicable Standard	:	ASME PTC 19-11-1970 except as modified this specification
Type of cells	:	Continuous Flow through type / removable type with draw able with sealing valve)
Transmitter	:	Electronic (Micro processor based) indicating type with multi range facility pipe mounted. (Single Channel).
Material of Cell body	:	SS316
Material of cell Electrode	:	Platinised/SS316
Output	:	4 to 20mA DC isolated with HART output
Power Supply	:	240V AC, 50 Hz. From UPS
Accuracy	:	+/-1% of full scale span.
Stability	:	±1% of full scale per month non-cumulative
Repeatability	:	+/-1% of span
Protection class	:	IP - 65
Process connection	:	¼ inch NPT (F) / SCRD for on line type. ¾ inch NPT (M) SCRD for pipe mounted
Electrical connection	:	½ inch NPT (F) SCRD/Plug in type.
Accessories	:	Automatic temp. Compensation in the range of 0-100 Deg.C

5.12.00 Technical Specification of pH Cell and Transmitters

- a) Applicable Standard pH electrodes shall conform to IS: 6804-1972 except as modified in this specification
- b) Type:
 - i) Cell Measuring and Reference Electrode Combination with Flow through type (SS316/Polypropylene flow chambers) for power plant's steam & water application. Sensor shall not be

		affected by flow variation. Sensor shall be designed for power plant applications.
	ii) Monitors	Electronic (microprocessor based) indicating type with adjustable range facility.
c)	Material:	
	i) Measuring & reference	Toughened sensitive
	ii) Electrode	pH glass
	iii) Monitor body	Carbon steel/Aluminum/Polycarbonate
d)	Monitor output	i) 4-20 mAmp D.C. with HART protocol spare out put
		ii) 4-20mA DC with HART protocol for DDCMIS
		Output load : 500Ω
e)	Power supply	240V AC, 50 Hz from UPS
f)	Accuracy/repeatability	+ 0.01 pH/+0.02PH
g)	Resolution	+ 0.01 pH or 1 mV. 1C
h)	Stability	0.02 pH per week
i)	Response time (90% of full scale)	≤ 5 seconds
j)	Annunciation contacts from monitors:	
	i) Number	2 SPDT 'Hi' and 'Lo'
	ii) Type	Snap action micro switch
	iii) Rating	5 amp, 240V AC, 0.2 Amp, 220V DC
k)	Connection:	
	i) Process	One-quarter (1/4)inch NPT(F) SCRD ON-LINE
	ii) Electrical	Half (1/2) inch NPT(F) SCRD/Plug in type.
l)	Mounting:	
	i) Cell	Pipe Mounted
	ii) Monitors	Flush panel mounting
m)	Accessories	i) Automatic temperature compensation with fast response integral temperature sensors in the range 0-100degC
		ii) Co-axial cable as required
		iii) Sample coolers
		iv) low and pressure regulators
		v) Standard pH solutions
		vi) SS316 impulse tubing and fittings
		vii) Isolation & drain valves as required
		viii) Electrode holders

- ix) Other accessories as required
- x) Sample rate set valves
- xi) Alarm settings and indications on monitor.
- xii) RFI/EMI shielded, weather and corrosion proof casing
- xiii) Auto Calibration, Comprehensive diagnostic and alarm features.

5.13.00 Technical Specification of Dissolved Oxygen Analyser

- | | | |
|----|---|--|
| a) | Applicable Standards | ASTM PTC 19.11-1970 except as modified in this specification |
| b) | Type | Microprocessor based continuous flow through type Electro-chemical |
| c) | Material | Die-cast aluminum/SS/Polycarbonate |
| d) | Output | <ul style="list-style-type: none"> i) 4-20 mAmp DC spare output ii) 4-20 mAmp, DC Isolated output for DCS. |
| e) | Supply | 240V AC, 50 Hz from UPS |
| f) | Accuracy | $\leq \pm 5$ % of reading |
| g) | Response: | |
| | <ul style="list-style-type: none"> i) Sensitivity ii) Time (sensor) | $\pm$ Two (2) per cent overall
≤ 30 seconds for 90% step change. |
| h) | Connection: | |
| | <ul style="list-style-type: none"> i) Process ii) Electrical | One quarter (1/4) inch NPT(F) SCRD
Half (1/2) inch NPT (F) SCRD/Plug in type. |
| i) | Accessories | <ul style="list-style-type: none"> i) Sample cooler assembly with shut off valve at cooling water inlet, with thermometer and reducing valve at sample outlet. ii) Flow stabilizer iii) Automatic temperature compensation iv) Other accessories as required v) Calibration device. vi) Auto Calibration, Comprehensive diagnostic and alarm features. |
| j) | Ranges | As per sample stream detail table |
| k) | Mounting | Flush |
| l) | Annunciation contacts: | |
| | <ul style="list-style-type: none"> i) Number ii) Type | 2 SPDT
Snap action microswitch |

iii) Rating 5 Amp 240V AC, 0.2 amp 220V DC

5.14.00 Technical Specification of Silica Analyzer (SI OX)

- | | | |
|----|---|---|
| a) | Applicable standard | ASME PTC 19.11-197 except as modified in this specification |
| b) | Type | In Built Multi Channel (max of each Three channel with one channel spare).
Colourimetric Analyzer (with auto reagent shut off feature in case of sample loss or power loss) built in phosphate inhibition feature. Microprocessor continuous based. |
| c) | Material: | |
| | i) Case | Die cast aluminum |
| d) | Cycle/Response Time (90% of full scale) | ≤ Fifteen (15) minutes including sample switching. |
| e) | Analyser output (per stream) | i) 4 to 20 m Amp DC for spare output
ii) 4 to 20 m Amp DC Isolated output for DDCMIS/DCS/PLC |
| f) | Display | LCD display for each stream simultaneously. |
| g) | Power supply | 240V AC, 50 Hz from UPS |
| h) | Accuracy | ≤ ± 2% of reading. |
| i) | Repeatability | ± 2% of full scale |
| j) | Sensitivity | 0.2 micrograms/liter |
| k) | Connection: | |
| | i) Process | Quarter (1/4) inch NPT(F) SCRD |
| | ii) Electrical | Half (1/2) inch NPT (F) SCRD/Plug in type. |
| l) | Ranges | As per sample stream detail table |
| m) | Mounting | Flush |
| n) | Annunciation contacts: | |
| | i) Number | 2 SPDT |
| | ii) Type | Snap action micro switch |
| | iii) Rating | 5 amp 240V AC 0.2 Amp 220V DC |
| o) | Accessories | i) Automatic temperature compensation between 5 to 50 deg C
ii) Automatic zeroing provision
iii) SS316 tubing & vessels
iv) All chemical reagents for 12 months operation of the analyzer
v) Sample rate set values |

- vi) Time stamping for each stream, Auto Calibration, Comprehensive diagnostic and alarm features.
- vii) Auto sampling facility with necessary valves & solenoid valves in the sample lines shall be provided.
- viii) Sample shut off solenoid valve shall be provided.

5.15.00 Technical Specification of Hydrazine Analyzer

- | | | |
|-------|--------------------------------------|---|
| i) | Type | Microprocessor based continuous Electrochemical |
| ii) | Case material | Die-cast aluminum/SS/Polycarbonate |
| iii) | Analyzer output | <ul style="list-style-type: none"> i) 4-20 mA DC for spare output ii) 4-20 mA DC isolated output for DDCMIS |
| iv) | Power supply | 240V AC, 50 Hz from UPS |
| v) | Accuracy | $\leq \pm 5\%$ of full scale |
| vi) | Response Time
(90% of full scale) | < 4 minutes. |
| vii) | Sensitivity | 1.0 microgram/liter |
| viii) | Annunciation contacts: | |
| | - Number | 2 SPDT |
| | - Type | Snap action micro switch |
| | - Rating | 5A 240V AC, 0.2 A, 220V DC |
| | - Mounting | Flush mounting |
| ix) | Accessories | <ul style="list-style-type: none"> i) Flow regulator ii) Flow gauges iii) Other accessories as required iv) Sample rate set valves v) Chemical reagents as applicable for 12 months consumption vi) Auto Calibration, Comprehensive diagnostic and alarm features. vii) Sample shut off solenoid valve to be provided. |

5.16.00 Technical Specification of Sodium Ion Analyzer

- | | | |
|-----|---------------|--|
| i) | Type | Microprocessor based Continuous flow through sample type with sodium responsive electrode and reference electrode having pH adjustment facility (Max 3 streams per analyser with 1 spare stream) |
| ii) | Case material | Die-cast aluminum/SS/Polycarbonate |

iii)	Analyzer power supply	240V AC, 50 Hz from UPS
iv)	Analyzer output (For each stream separate)	i) 4-20 mA DC for spare output ii) 4-20 mA DC isolated output for DDCMIS
v)	Display	LCD display for each stream simultaneously.
vi)	Accuracy	Better than $\pm 5\%$ of full scale
vii)	Response Time (90% of full scale)	4 minutes. Max
viii)	Sensitivity	0.1 ppb
ix)	Annunciation contacts:	
	- Number	2 SPDT
	- Type	Snap action microswitch
	- Rating	5A 240V AC, 0.2A, 220V DC
	- Mounting	Flush
x)	Terminal points	All components piped & wired to terminal points
xi)	Accessories	i) Flow regulator ii) Flow gauges iii) Sample rate set valves iv) Other accessories as required to make the system complete v) Chemical reagents as applicable for 12 months consumption vi) Temp Sensor for Automatic temperature compensation vii) Time stamping for each stream, Auto Calibration, Comprehensive diagnostic and alarm features.

5.17.00 Technical Specification of Phosphate Analyzer Not Applicable.

i)	Type	Microprocessor based continuous with colourimetric detection system (Max 3 streams with 1 stream spare)
ii)	Case material	Die-cast aluminum/SS/Polycarbonate
iii)	Analyzer power supply	240V AC, 50 Hz from UPS
iv)	Analyzer output (For each stream separate)	i) 4-20 mA DC for spare output ii) 4-20 mA DC isolated output for DDCMIS
v)	Display	LCD display for each stream simultaneously.
vi)	Accuracy	Better than $\pm 5\%$ of reading.
vii)	Sensitivity	Better than 1 ppm
viii)	Response Time (90% of full scale)	16 minutes maximum
ix)	Annunciation contacts:	
	- Number	2 SPDT
	- Type	Snap action micro switch

	- Rating	5A 240V AC, 0.2A, 220V DC
	- Mounting	Flush
x)	Terminal points	All components piped & wired to terminal points
xi)	Accessories	i) Flow regulator ii) Flow gauges iii) Sample rate set valves iv) Other accessories as required to make the system complete v) Chemical reagents as applicable for 12 months consumption vi) Time stamping for each stream, Auto Calibration, Comprehensive diagnostic and alarm features. Temperature compensation automatic

5.18.00 Technical Specification of Chloride Analyzer

i)	Type	Microprocessor based Continuous flow through sample type with Chloride & Sulphate Responsive Electrodes.
ii)	Analyzer power supply	240V AC, 50 Hz, Single Phase from UPS
iii)	Analyzer output	i) 4-20 mA, DC spare output ii) 4-20 mA, DC isolated output for DDCMIS
iv)	Accuracy	Better than ± 5 % of full scale
v)	Sensitivity	Better than 1 ppm
vi)	Range	As per Requirements.
vii)	Annunciation contacts:	
	- Number	As per schedule, 2 SPDT
	- Type	Snap action micro switch
	- Rating	5A, 240V AC, 0.2A, 220V DC
	- Mounting	Flush
viii)	Terminal points	All components piped & wired to terminal points
ix)	Accessories	i) Flow regulator ii) Flow gauges iii) Sample rate set valves iv) Other accessories as required to make the system complete v) Auto Calibration, Comprehensive diagnostic and alarm features. Temperature compensation automatic

8.00.00 DRAWINGS AND DOCUMENTS

Bidder shall furnish following drawings and documents after award of contract:

- a) Final version of all the drawing and document furnished along with bid**
- b) Drawing and document submission schedule**
- c) Power supply scheme**
- d) Interconnection and wiring diagram.**
- e) Spare part list**
- f) Consumable list**
- g) QAP**
- h) Inspection and Test report**
- i) Training details**
- j) O&M Manual**
- k) Any other scheme, data, drawing, document, etc required to establish product quality and completeness of supply**

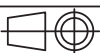
NOTE: - Vendors need to offer all components/accessories required to meet the intent of the specification. If it is found, at any stage of procurement /commissioning, that some components./accessories have not been offered/supplied, same shall be supplied without any cost/time implication to BHEL to meet the system / product requirement.

Important Note: Mandatory Spares shall be sent in pre-decided lots in containers / secure boxes distinctly marked in Red colour with boldly written "S" mark on each face of the containers /secure boxes.

SECTION - E

SWAS SCHEME

FIRST ANGLE PROJECTION

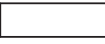
JOB NO. 425		CUSTOMER		 TAMILNADU GENERATION AND DISTRIBUTION CORPORATION LIMITED																	
STATUS CONTRACT		CUSTOMER'S CONSULTANT		 TRACTEBEL ENGINEERING PVT. LTD.																	
PRINT SCALE 		PROJECT		2X800MW UPPUR STPP (STAGE-I, UNIT#1&2) IN RAMANATHAPURAM DISTRICT, TAMILNADU																	
REV. DATED ALTD CHD APPD		 BHARAT HEAVY ELECTRICALS LTD POWER SECTOR PROJECT ENGINEERING MANAGEMENT NOIDA		<table border="1"> <tr> <th>DEPT CODE</th> <th>NAME</th> <th>SIGN</th> <th>DATE</th> </tr> <tr> <td>DSGN</td> <td>PC</td> <td>-sd-</td> <td>01.03.17</td> </tr> <tr> <td>CHD</td> <td>PJ</td> <td>-sd-</td> <td>01.03.17</td> </tr> <tr> <td>APPD</td> <td>BS</td> <td>-sd-</td> <td>01.03.17</td> </tr> </table>		DEPT CODE	NAME	SIGN	DATE	DSGN	PC	-sd-	01.03.17	CHD	PJ	-sd-	01.03.17	APPD	BS	-sd-	01.03.17
DEPT CODE	NAME	SIGN	DATE																		
DSGN	PC	-sd-	01.03.17																		
CHD	PJ	-sd-	01.03.17																		
APPD	BS	-sd-	01.03.17																		
01 16.01.2018 PC PJ BS Revised in line with customer comments wide letter no. SE/E/T&H(P)/E9/A1/F UPPUR-BTG/D.68/17, Dated : 01.04.2017 and Revised P&IDs.		TITLE		SWAS SCHEME																	
		DEPT.		SCALE																	
		SIGN		DRAWING NO. PE-DG-425-145-I110																	
		DATE		 SHEET 1 OF 17 REV 01																	

INDEX :-

Sl. No.	DESCRIPTION	REFERENCE DRAWING No.	REFERENCE DRAWING NAME	SHEET No.
1.	TITTLE SHEET OF SWAS SCHEME	---	---	1
2.	INDEX & REFERENCE DRAWINGS	---	---	2
3.	LEGEND	---	---	3
4.	DMCW SCHEME FOR PRIMARY COOLERS	PE-DG-425-179-N001	P&ID OF DMCW SYSTEM	4
5.	DMCW SCHEME FOR PRIMARY COOLERS	PE-DG-425-179-N001	P&ID OF DMCW SYSTEM	5
6.	CHILLED WATER SCHEME FOR SECONDARY COOLERS	PE-DG-425-179-N001	P&ID OF DMCW SYSTEM	6.
7.	FEED WATER TO ECONOMISER	PE-DG-425-100-N105	P&ID FEED WATER SYSTEM	7
8.	SH STEAM/MAIN STEAM	PE-DG-425-100-N101	P&ID MS CRH & HRH SYSTEM	8
9.	SAT STEAM/DRUM STEAM	---	SCHEME OF WATER & STEAM CIRCUIT	9
10.	CONDENSATE AFT CPU	PE-DG-425-100-N106	P&ID CONDENSATE SYSTEM	10
11.	CONDENSATE AT CEP DISCHARGE	PE-DG-425-100-N106	P&ID CONDENSATE SYSTEM	11
12.	DEAERATOR OUTLET	PE-DG-425-100-N105	P&ID FEED WATER SYSTEM	12
13.	HOTWELL	PE-DG-425-100-N106	P&ID CONDENSATE SYSTEM	13
14.	DM MAKEUP WATER	PE-DG-425-100-N110	P&ID DM MAKE UP WATER SYS	14
15.	HOT REHEAT	PE-DG-425-100-N101	P&ID MS CRH & HRH SYSTEM	15
16.	DMCW TG AUX	PE-DG-425-179-N001	P&ID OF DMCW SYSTEM	16
17.	DMCW SG AUX	PE-DG-425-179-N001	P&ID OF DMCW SYSTEM	17

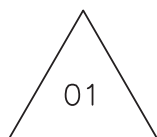
	UPPUR STPP (STAGE-I, UNIT#1&2)	TITLE SWAS SCHEMES INDEX	DRG. NO. PE-DG-425-145-I110	
	2X800MW		SHEET 2 OF 17	REV 01

LEGEND :

	ISOLATING VALVE (NORMALLY OPEN)		ANALYSER IN DRY PANEL
	ISOLATING VALVE (NORMALLY CLOSED)		PRESSURE GAUGE
	PRESS REDUCING VALVE		TEMPERATURE GAUGE
	BACK PRESS REGULATOR		TEMPERATURE SWITCH
	SOLENOID OPERATED VALVE		FLOW INDICATING SWITCH
	SAFETY RELIEF VALVE		LEVEL INDICATOR
	3 WAY NEEDLE VALVE		IMPULSE LINE
	SAMPLE COOLER		CABLE
	SAMPLE FILTER	CR	CONTROL ROOM
	EXPANDER	DCS	DISTRIBUTED CONTROL SYSTEM
	FLOW INDICATOR WITH REGULATING VLV	OWS ALARM	ALARM ON OWS IN CONTROL ROOM
QDV	QUICK DISCONNECTION VALVE		INDICATES RESPECTIVE SCOPE
	CATION COLUMN	EDN	BHEL-EDN
	CONDUCTIVITY ELEMENT	B(T)	BHEL-TRICHY
	pH ELEMENT	CUST	CUSTOMER
	DISSOLVED O2 ELEMENT		

NOTES :

- ONE SET OF ALARM CONTACTS OF SPDT TYPE SHALL BE PROVIDED WITH EACH ANALYSER/MONITOR.
4-20 mA SIGNAL FROM ALL ANALYSERS SHALL BE HOOKED-UP TO DCS FOR MONITORING PURPOSE AS WELL AS ALARMS.
- SAMPLING LINE SHALL BE OF 15 Nb,ASTM213 TP316H CONFORMING TO ANSI B36.19.
- ALL PRIMARY COOLERS SHALL BE LOCATED IN FIELD.
- SAMPLE OUTLET TEMP SHALL BE AROUND 45 DEG C AT PRIMARY COOLER OUTLET AND SAMPLE TEMP AT SECONDARY COOLER OUTLET SHALL BE 25°C.
- SAMPLE ENTRY IN PANEL SHALL BE FROM "TOP" AND CABLE ENTRY FROM "BOTTOM".
- SAMPLE TEMP HI (COMMON) GROUP ALARM SHALL BE PROVIDED IN DCS.
- SECONDARY PRESSURE REDUCING VALVE SHALL BE PROVIDED ONLY, IF REQUIRED BY VENDOR DESIGN.
- THIS DRAWING IS FOR UNIT-1 & COMMON SYSTEM. SIMILAR DOCUMENT SHALL BE APPLICABLE FOR UNIT-2 ALSO. KKS NO. IN COMMON SYSTEM ARE PREFIXED BY 9.
- ALL MULTI CHANNEL ANALYSERS MAX OF THREE CHANNEL SHALL BE USED AND ONE CHANNEL CONSIDERED AS SPARE.
- ALL DUAL CHANNEL ANALYSERS MAX OF ONE CHANNEL SHALL BE USED AND ONE CHANNEL CONSIDERED AS SPARE.
- SAFETY RELIEF VALVE AT DMCW I/L HEADER WITH DRAIN OF SAFETY RELIEF VALVE CONNECTED TO WASTE DRAIN HEADER SHALL BE PROVIDED.



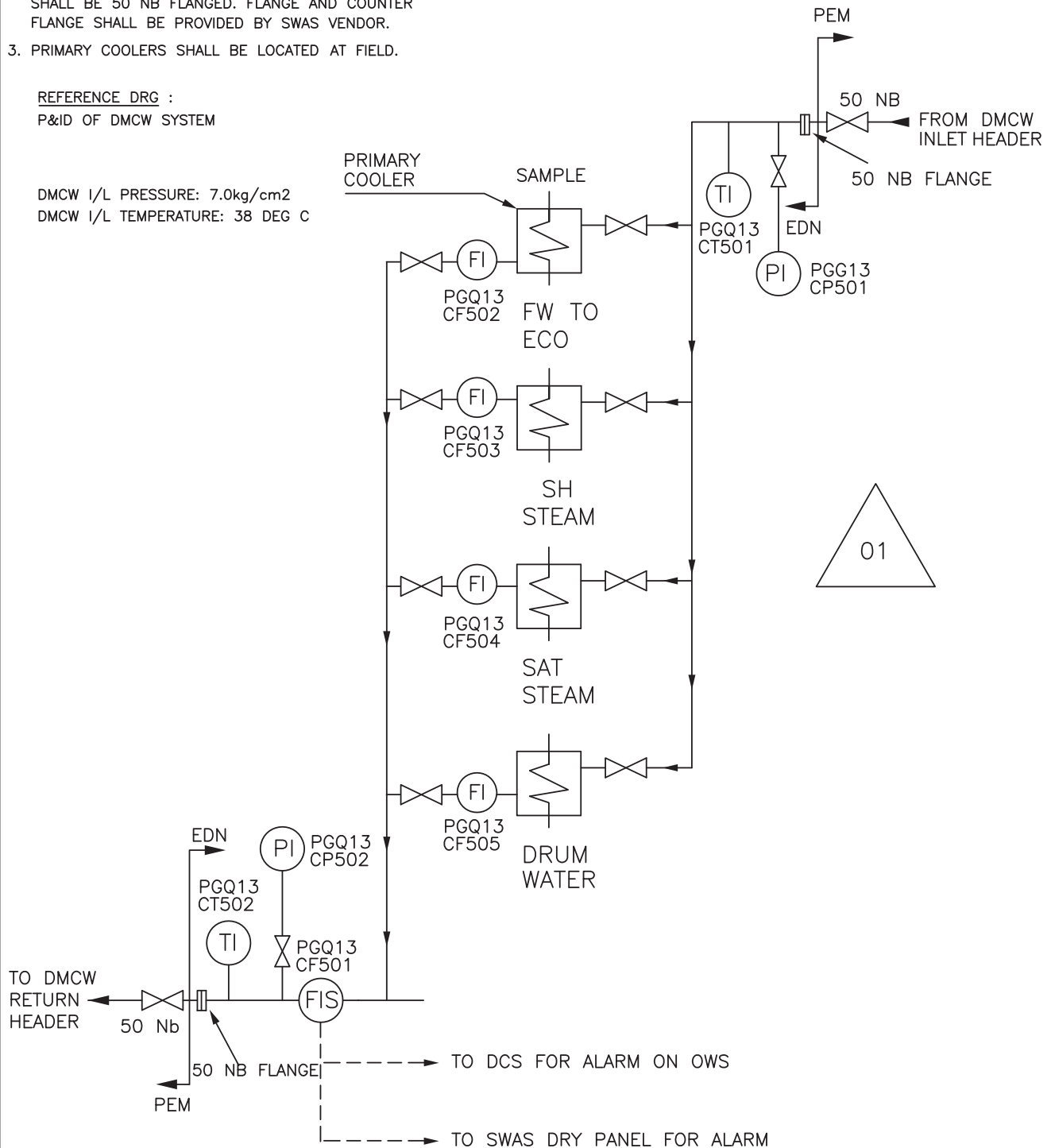
	UPPUR STPP (STAGE-I, UNIT#1&2)	TITLE SWAS SCHEMES LEGEND	DRG. NO. PE-DG-425-145-1110	
	2X800MW		SHEET 3 OF 17	REV 01

NOTES:

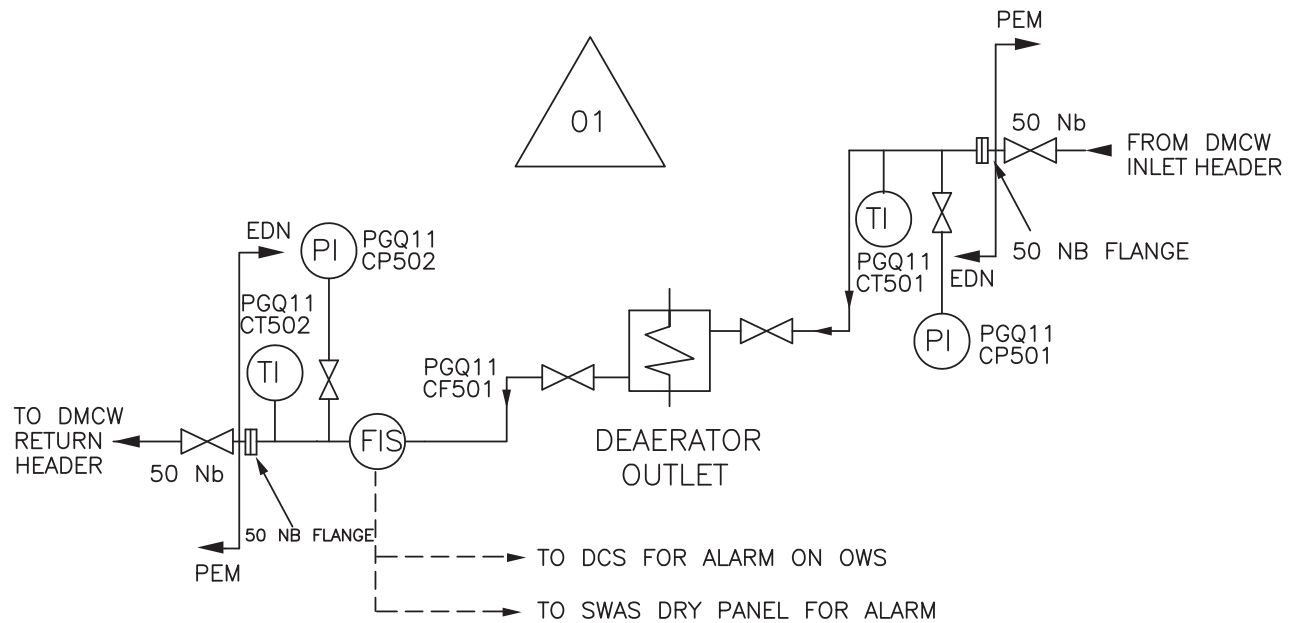
1. SUITABLE EXPANDER(S) SHALL BE PROVIDED TO ERECT THE TEMPERATURE GAUGE.
2. DMCW TERMINAL POINT FOR SWAS PRIMARY COOLERS SHALL BE 50 NB FLANGED. FLANGE AND COUNTER FLANGE SHALL BE PROVIDED BY SWAS VENDOR.
3. PRIMARY COOLERS SHALL BE LOCATED AT FIELD.

REFERENCE DRG :
P&ID OF DMCW SYSTEM

DMCW I/L PRESSURE: 7.0kg/cm²
DMCW I/L TEMPERATURE: 38 DEG C



	UPPUR STPP (STAGE-I, UNIT#1&2) 2X800MW	TITLE SWAS SCHEMES DMCW SCHEME FOR PRIMARY COOLERS	DRG. NO. PE-DG-425-145-1110 SHEET 4 OF 17 REV 01
---	--	---	--



DMCW I/L PRESSURE: 7.0kg/cm²
DMCW I/L TEMPERATURE: 38 DEG C

NOTES:

1. SUITABLE EXPANDER(S) SHALL BE PROVIDED TO ERECT THE TEMPERATURE GAUGE.
2. DMCW TERMINAL POINT FOR SWAS PRIMARY COOLERS SHALL BE 50 NB FLANGED. FLANGE AND COUNTER FLANGE SHALL BE PROVIDED BY SWAS VENDOR.
3. PRIMARY COOLERS SHALL BE LOCATED AT FIELD.



UPPUR STPP (STAGE-I, UNIT#1&2)

2X800MW

TITLE

SWAS SCHEMES

DMCW SCHEME FOR PRIMARY COOLERS

DRG. NO.

PE-DG-425-145-1110

SHEET 5 OF 17

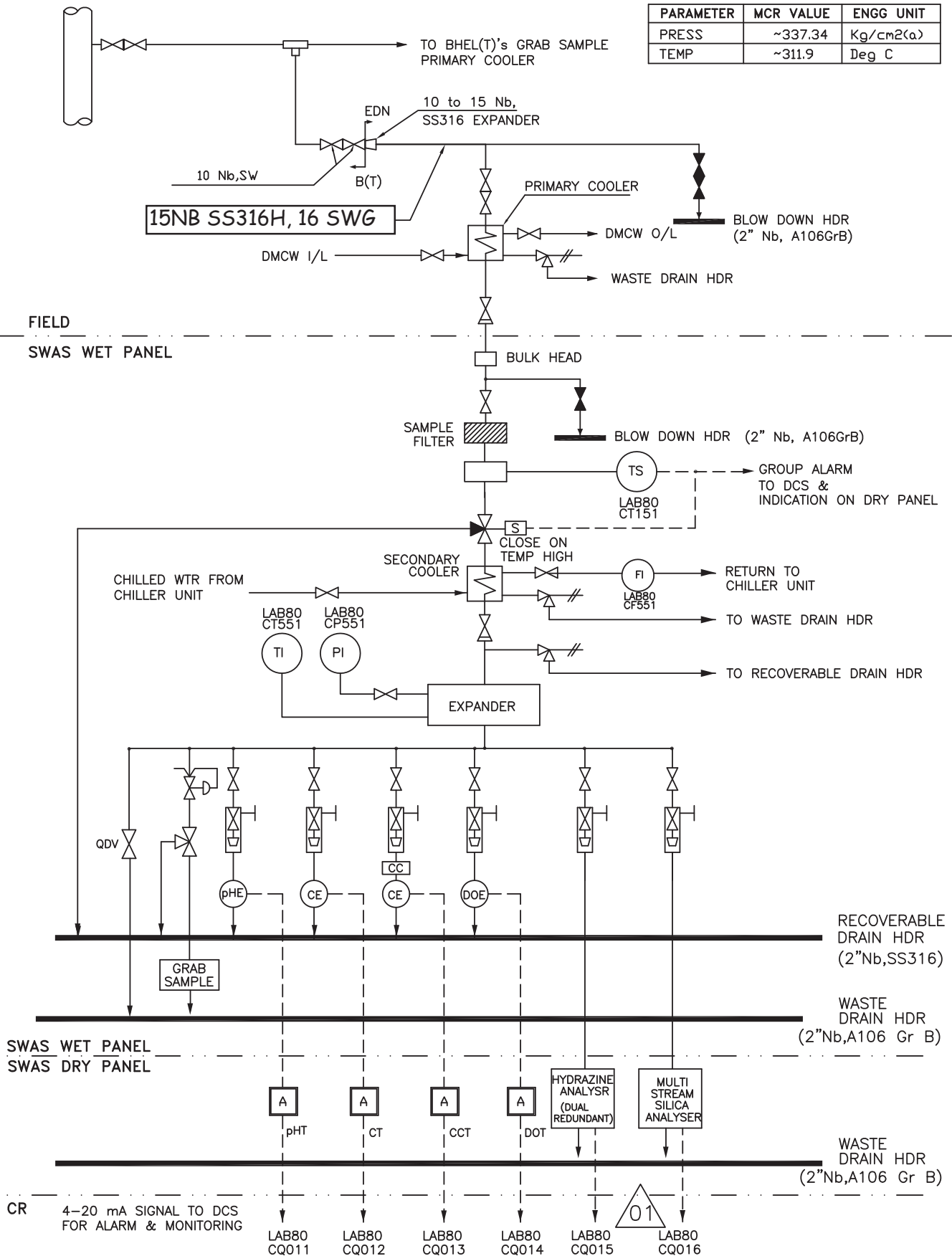
REV 01



1. ALL SECONDARY COOLERS ARE LOCATED IN SWAS WET PANELS.
2. DMCW TERMINAL POINT FOR SWAS CHILLER UNIT SHALL BE FLANGED.
FLANGED AND COUNTER FLANGE SHALL BE PROVIDED BY SWAS VENDOR.

PROCESS :

PARAMETER	MCR VALUE	ENGG UNIT
PRESS	~337.34	Kg/cm ² (a)
TEMP	~311.9	Deg C



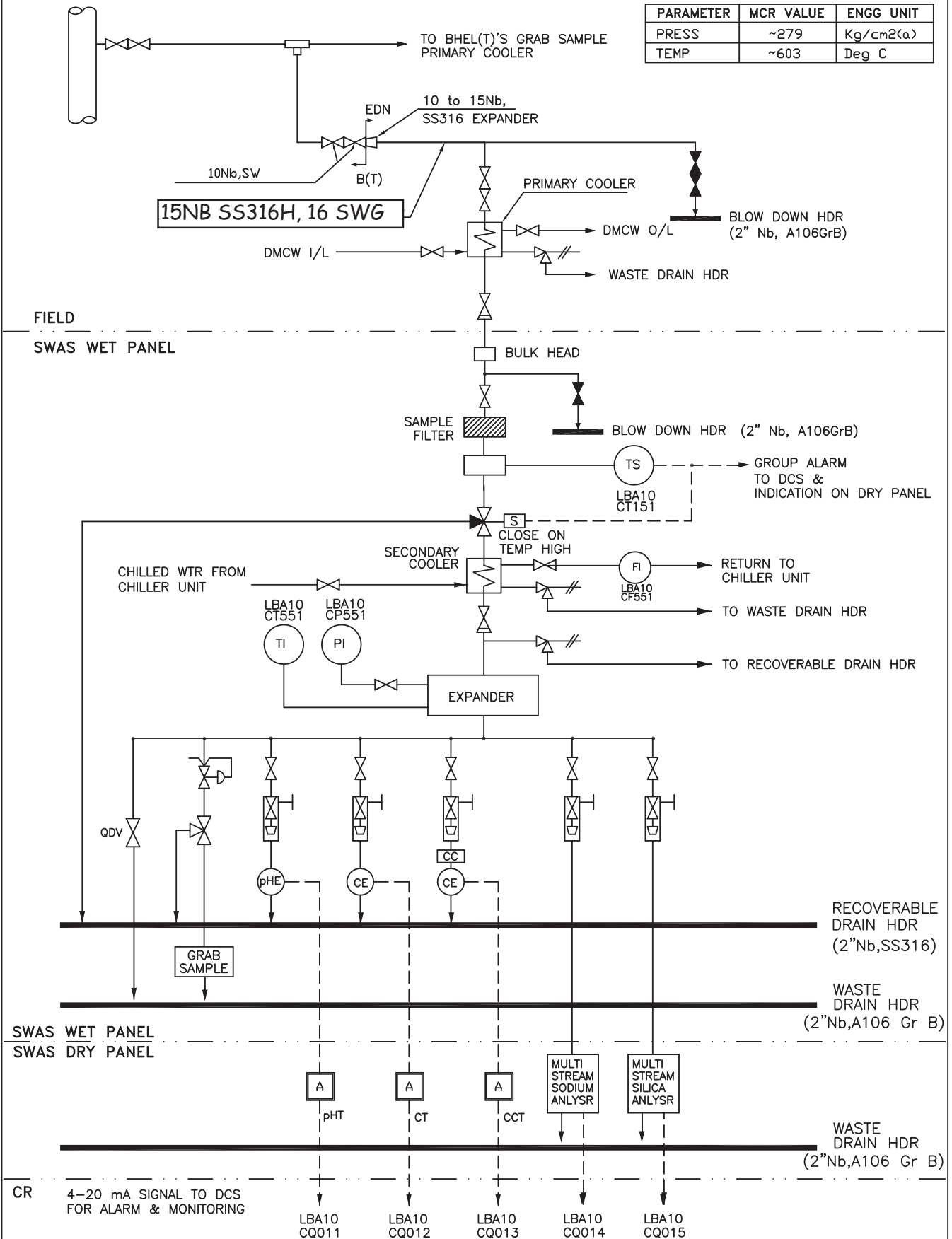
UPPUR STPP (STAGE-I, UNIT#1&2)
2X800MW

TITLE
SWAS SCHEMES
FEED WATER TO ECONOMISER

DRG. NO.
PE-DG-425-145-1110
SHEET 7 OF 17 REV 01

PROCESS :

PARAMETER	MCR VALUE	ENGG UNIT
PRESS	~279	Kg/cm ² (a)
TEMP	~603	Deg C



UPPUR STPP (STAGE-I, UNIT#1&2)

2X800MW

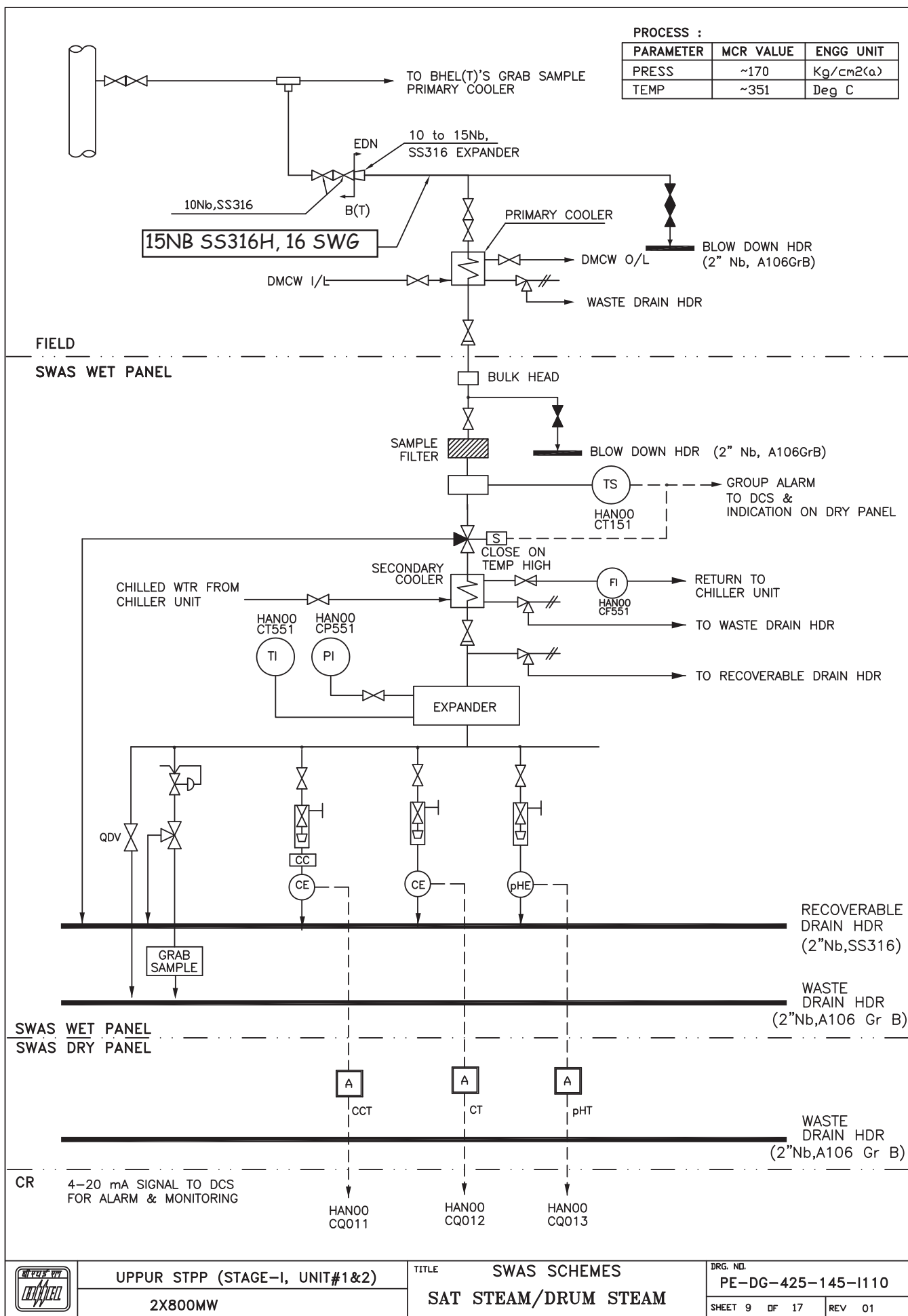
TITLE

SWAS SCHEMES
SH STEAM/MAIN STEAM

DRG. NO.

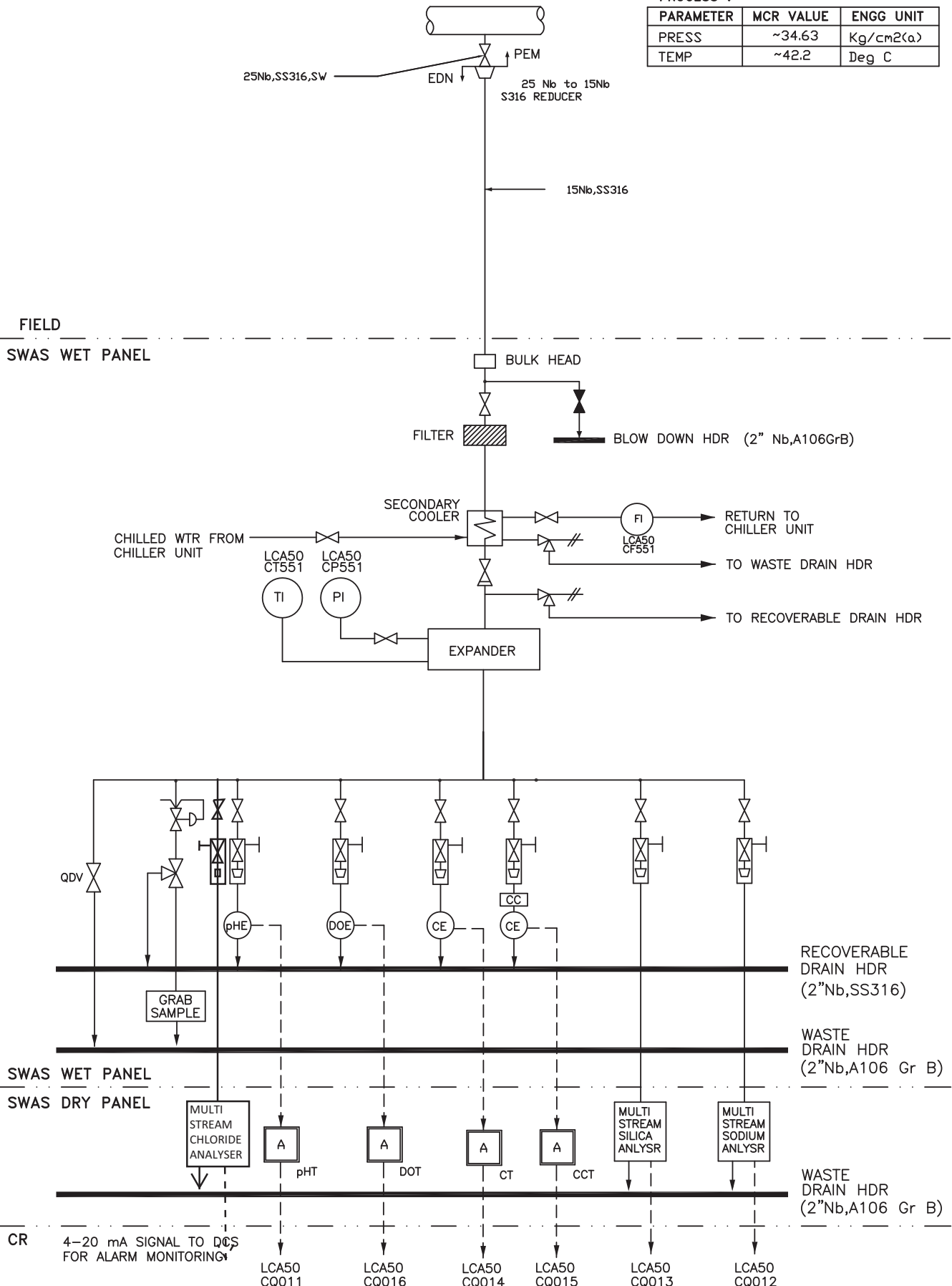
PE-DG-425-145-1110

SHEET 8 OF 17 REV 01



PROCESS :

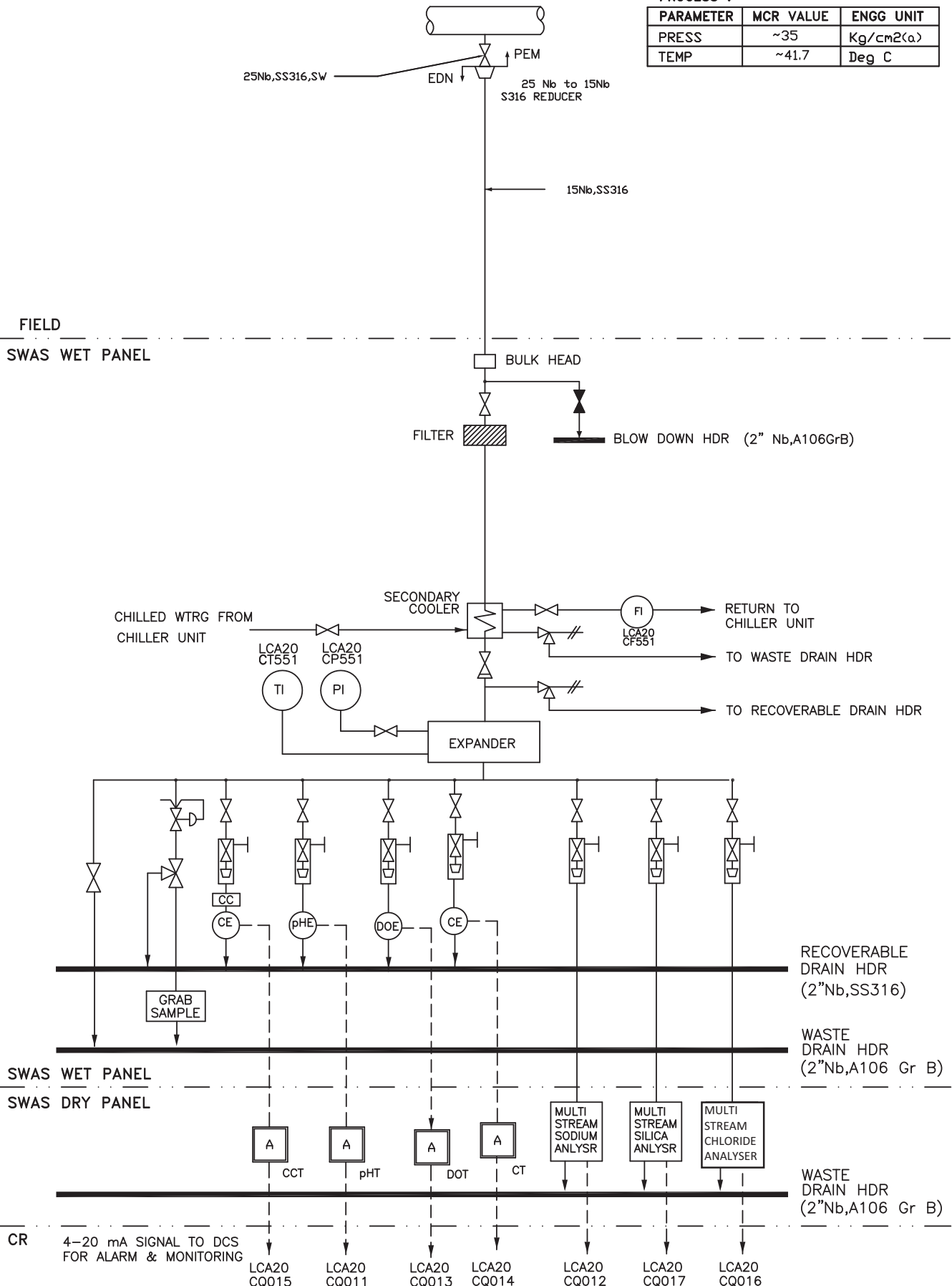
PARAMETER	MCR VALUE	ENGG UNIT
PRESS	~34.63	Kg/cm2(a)
TEMP	~42.2	Deg C



	UPPUR STPP (STAGE-I, UNIT#1&2)	TITLE SWAS SCHEMES CONDENSATE AFTER CPU	DRG. NO. PE-DG-425-145-1110
	2X800MW		
			SHEET 10 OF 17 REV 01

PROCESS :

PARAMETER	MCR VALUE	ENGG UNIT
PRESS	~35	Kg/cm ² (a)
TEMP	~41.7	Deg C



CR 4-20 mA SIGNAL TO DCS FOR ALARM & MONITORING

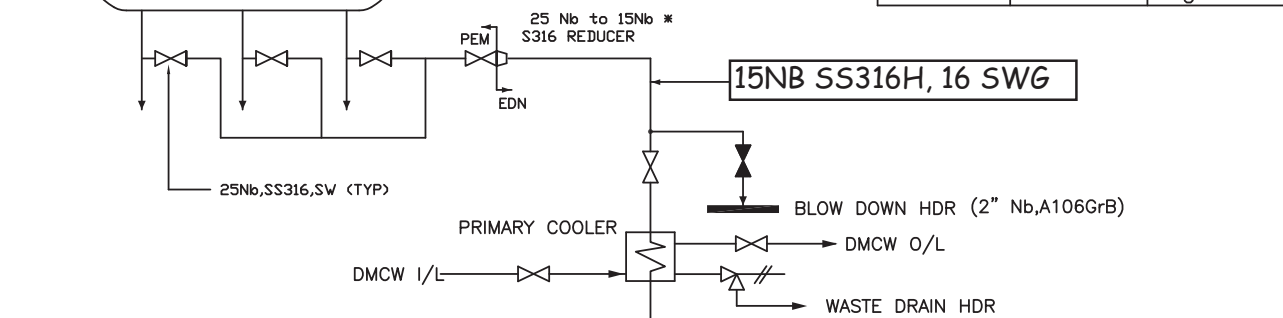
	UPPUR STPP (STAGE-I, UNIT#1&2)	TITLE SWAS SCHEMES CONDENSATE AT CEP DISCHARGE	DRG. NO. PE-DG-425-145-1110
	2X800MW		
			SHEET 11 OF 17 REV 01



DEAERATOR

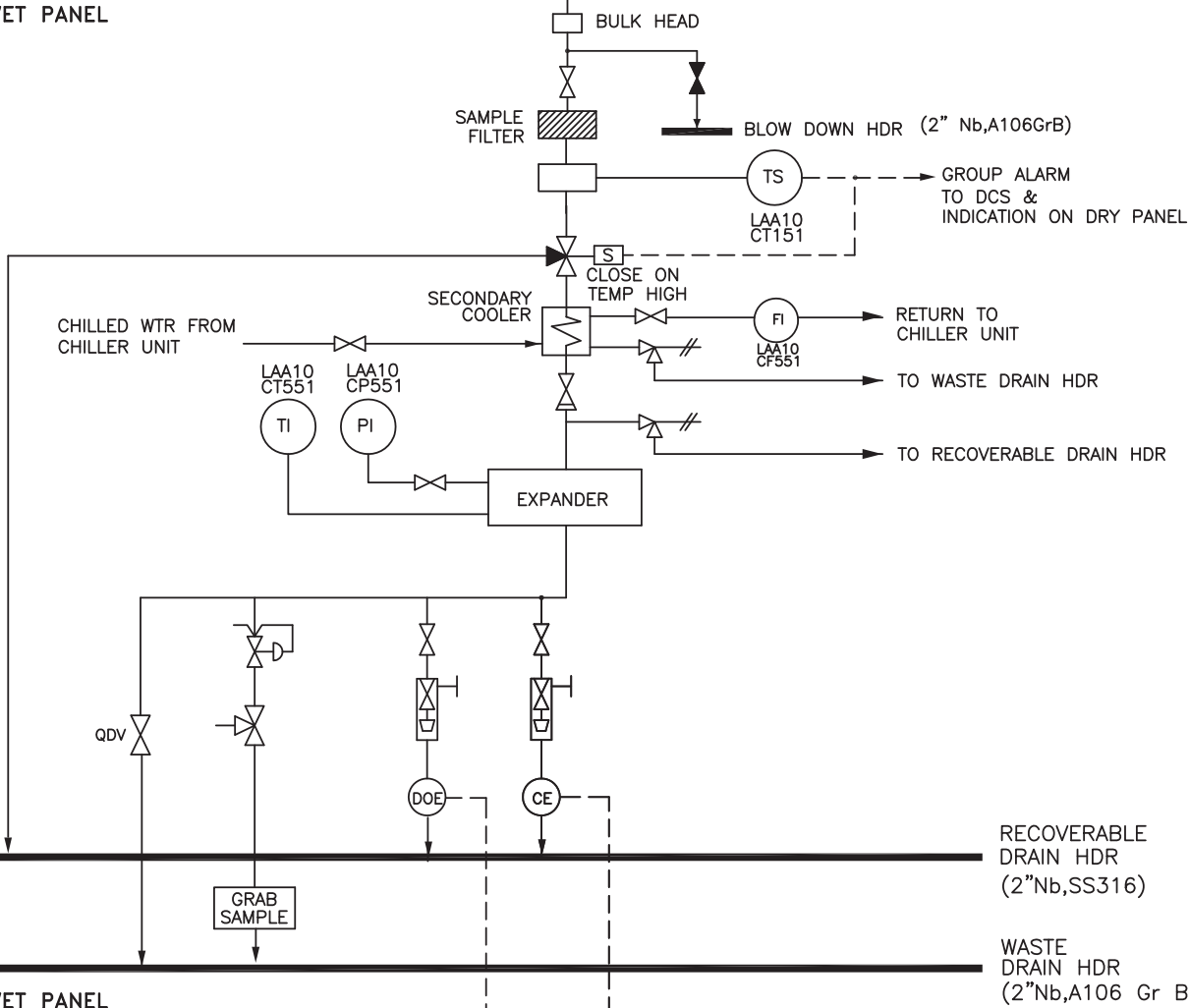
PROCESS :

PARAMETER	MCR VALUE	ENGG UNIT
PRESS	~50	Kg/cm ² (a)
TEMP	~200	Deg C



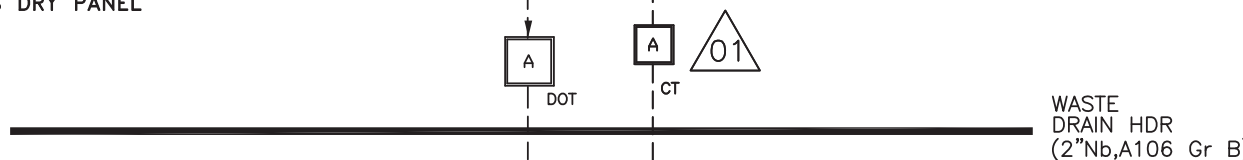
FIELD

SWAS WET PANEL



SWAS WET PANEL

SWAS DRY PANEL



CR

4-20 mA SIGNAL TO DCS
FOR ALARM MONITORING



UPPUR STPP (STAGE-I, UNIT#1&2)

2X800MW

TITLE

SWAS SCHEMES
DEAERATOR OUTLET

DRG. NO.

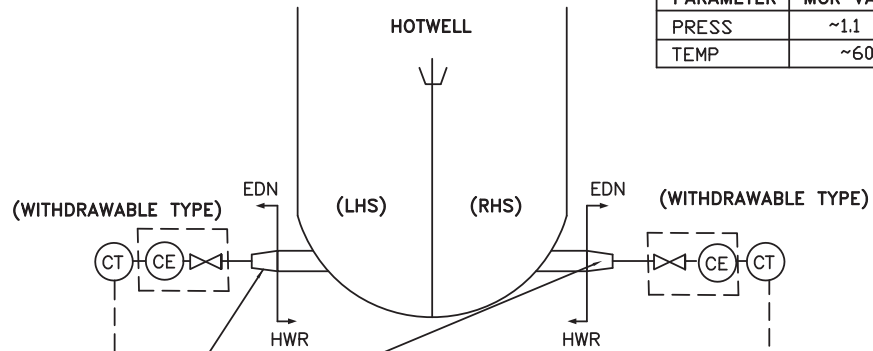
PE-DG-425-145-1110

SHEET 12 OF 17

REV 01

PROCESS :

PARAMETER	MCR VALUE	ENGG UNIT
PRESS	~1.1	Kg/cm ² (a)
TEMP	~60	Deg C



SUITABLE ADAPTER SHALL BE PROVIDED ALONG WITH PROBE FOR TAPPING POINT SIZE= 60.3X5.54mm
 LENGTH OF PROBE SHALL BE DECIDED CONSIDERING
 HOTWELL WALL THK + STUB HEIGHT + LENGTH OF ADAPTER.

FIELD

SWAS DRY PANEL

CR

4-20 mA SIGNAL
 FOR ALARM &
 MONITORING TO DCS

MAG20
 CQ011

MAG20
 CQ012



UPPUR STPP (STAGE-I, UNIT#1&2)

2X800MW

TITLE

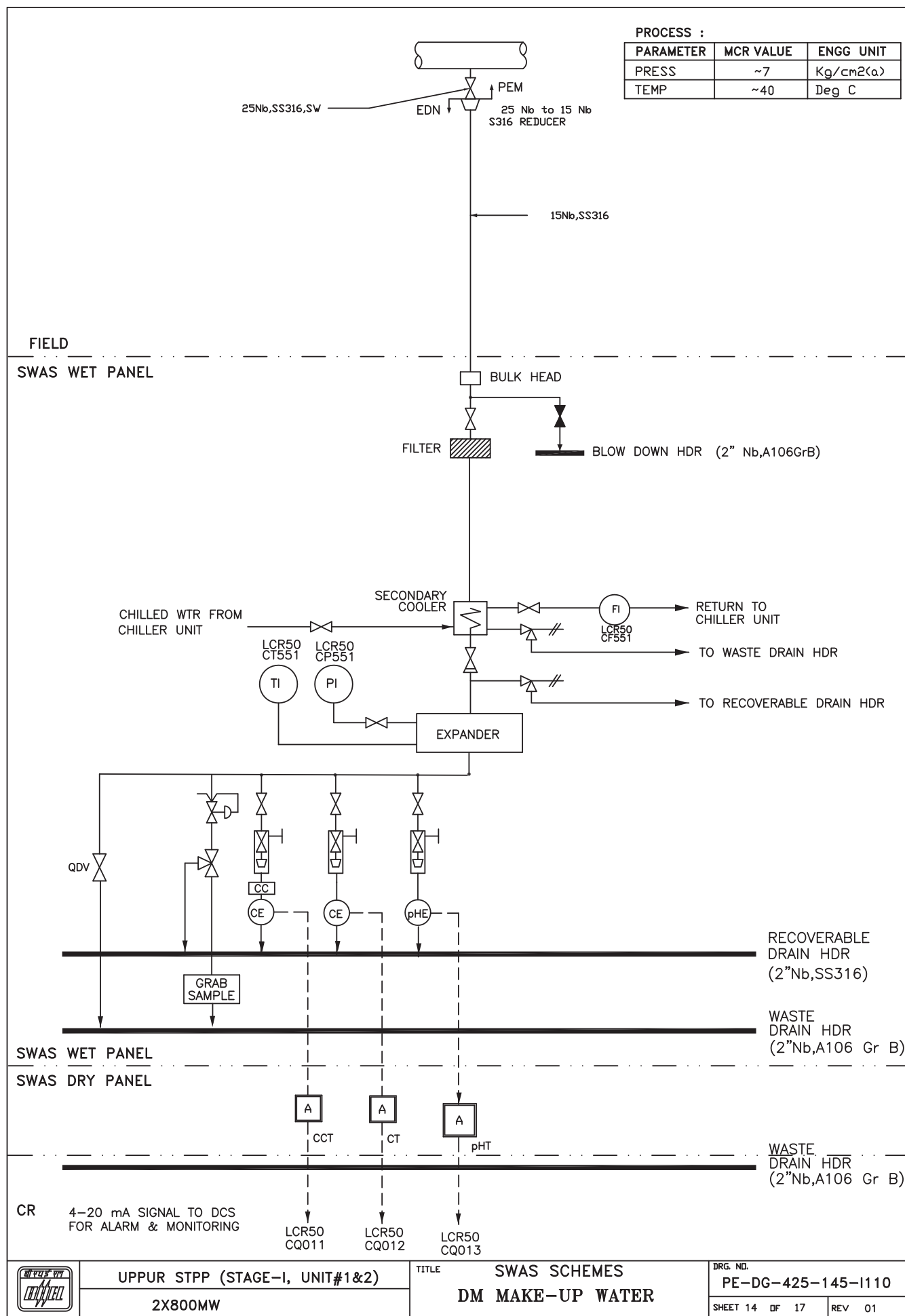
SWAS SCHEMES
 HOTWELL

DRG. NO.

PE-DG-425-145-1110

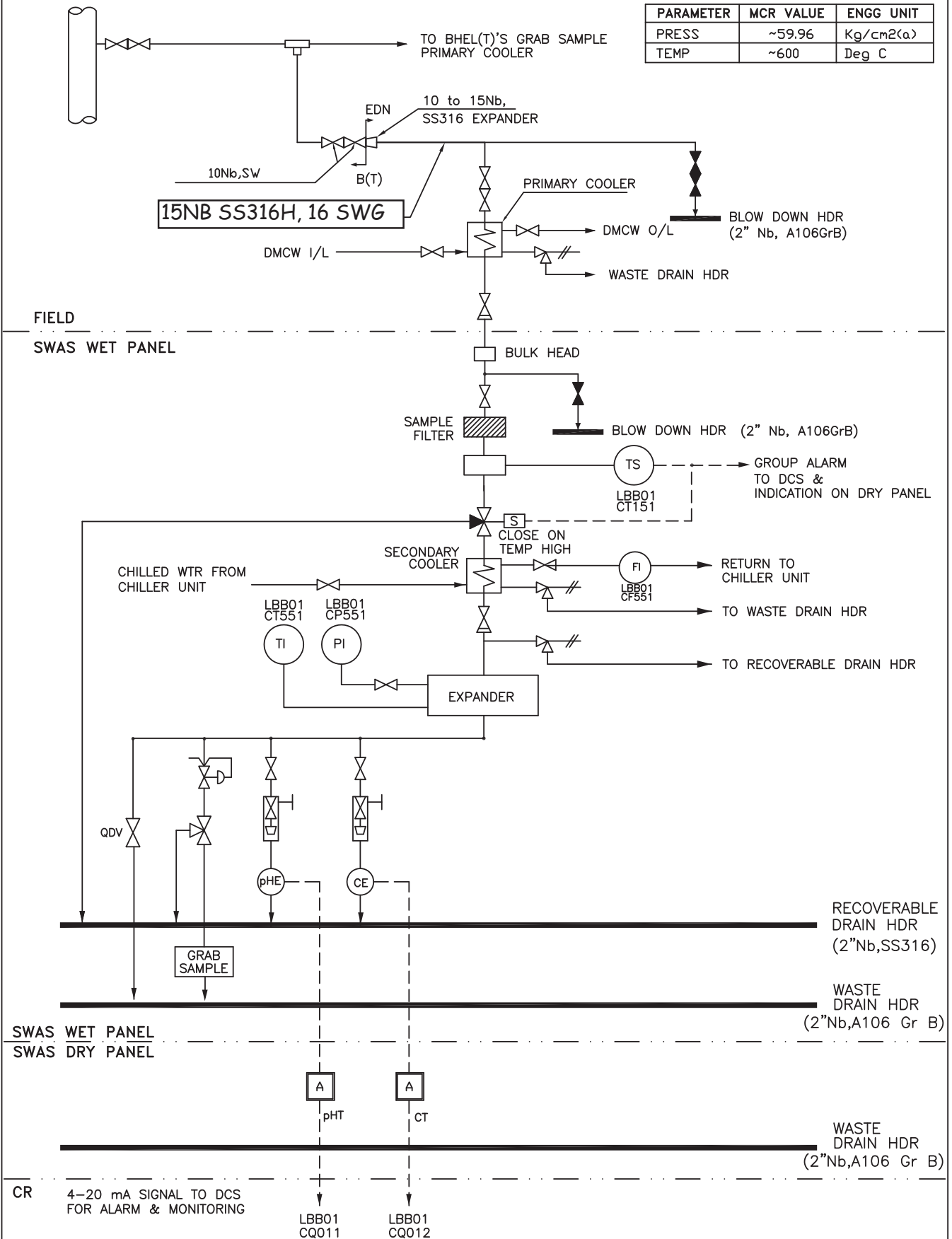
SHEET 13 OF 17

REV 01



PROCESS :

PARAMETER	MCR VALUE	ENGG UNIT
PRESS	~59.96	Kg/cm ² (a)
TEMP	~600	Deg C



UPPUR STPP (STAGE-I, UNIT#1&2)

2X800MW

TITLE
SWAS SCHEMES
HOT REHEAT

DRG. NO.
PE-DG-425-145-1110

SHEET 15 OF 17 REV 01

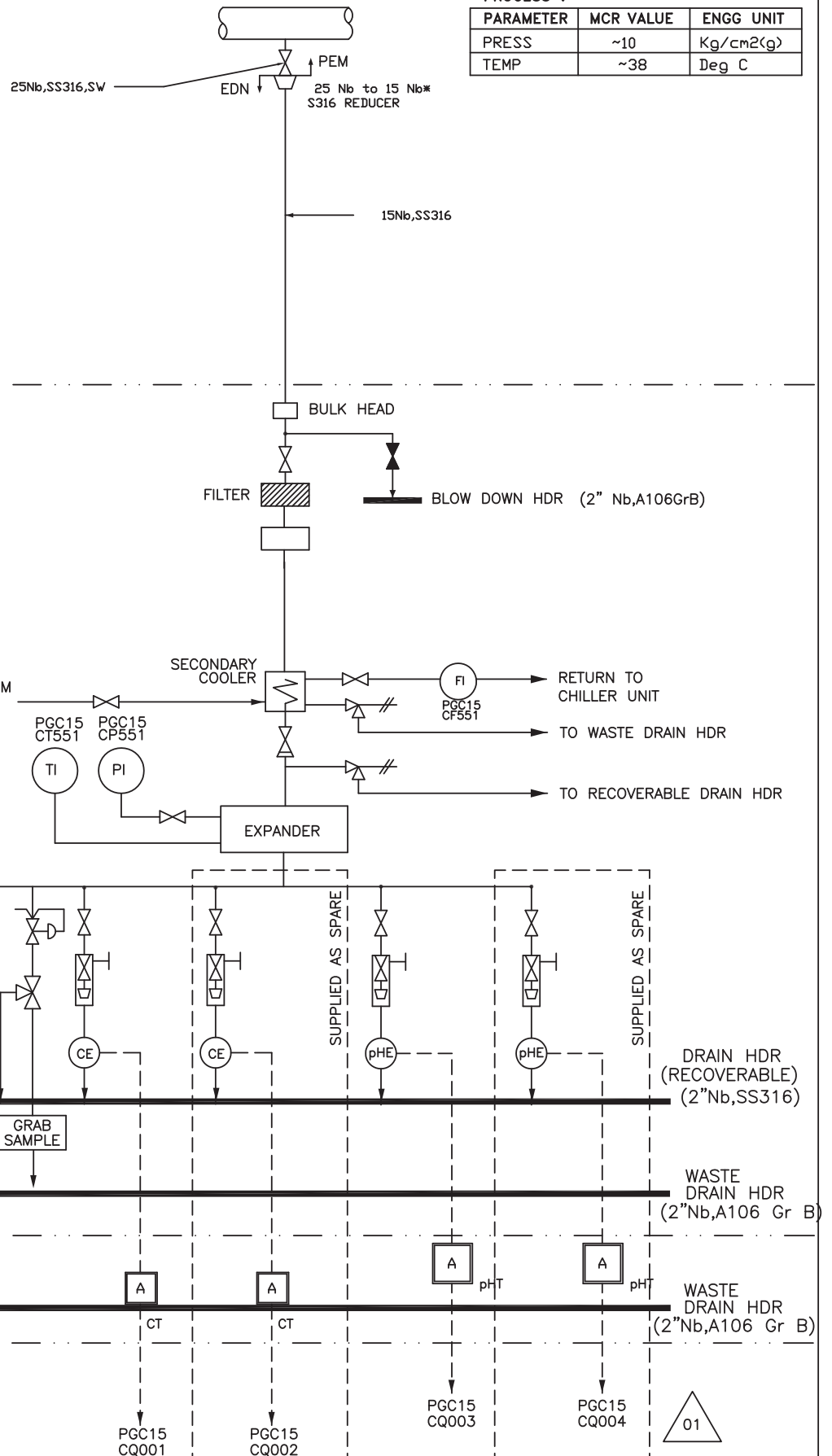
PROCESS :

PARAMETER	MCR VALUE	ENGG UNIT
PRESS	~10	Kg/cm ² (g)
TEMP	~38	Deg C

FIELD
SWAS WET PANEL

SWAS WET PANEL
SWAS DRY PANEL

CR 4-20 mA SIGNAL
FOR ALARM &
MONITORING TO
DCS



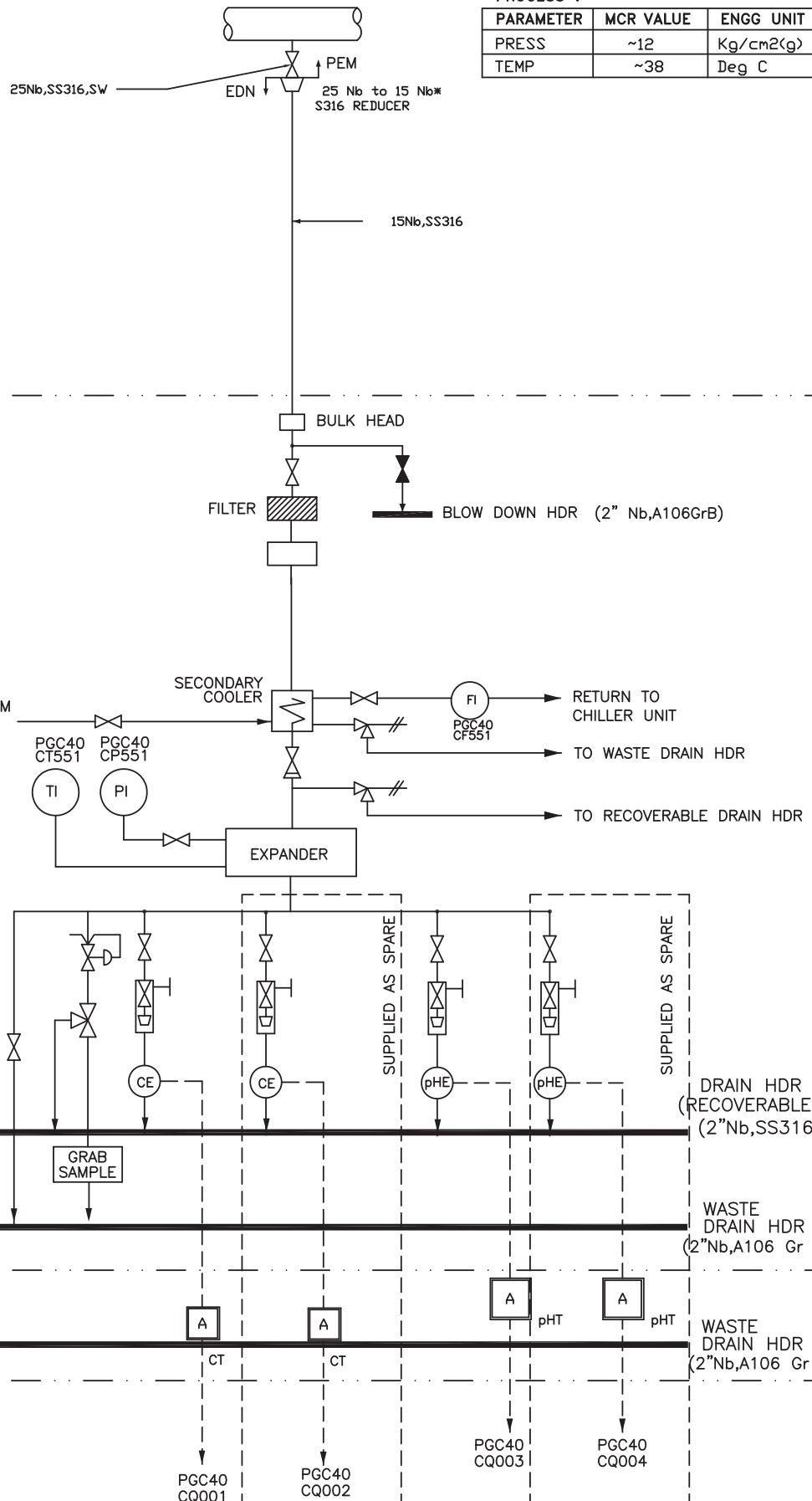
PROCESS :

PARAMETER	MCR VALUE	ENGG UNIT
PRESS	~12	Kg/cm ² (g)
TEMP	~38	Deg C

FIELD
SWAS WET PANEL

SWAS WET PANEL
SWAS DRY PANEL

CR 4-20 mA SIGNAL
FOR ALARM &
MONITORING TO
DCS



	UPPUR STPP (STAGE-I, UNIT#1&2)	TITLE SWAS SCHEMES DMCW SG AUX	DRG. NO. PE-DG-425-145-1110
	2X800MW		
		SHEET 17 OF 17	REV 01

SECTION F

Electronics Division, BHEL-Bangalore.

CHECK LIST FOR STAINLESS STEEL COMPRESSION FITTINGS

NUMBER : CE/416/SSF/CL REVISION : 00 DATE : 21-07-15

CONTRACTOR : M/s BHEL-EDN

SL NO.	TESTS/CHECKS	QUANTUM OF CHECK	REFERENCE DOC. ACCEPTANCE NORMS.	AGENCY**				REMARKS
				M	C	N	D*	
1	DIMENSIONS	REFER NOTE : 1	↑	P	V	V		
2	MATERIAL	SAMPLE/	APPROVED SPECS./ DATA SHEETS ↓	P	V	V		
2.1	CHEMICAL	HEAT /		P	V	V	✓	
2.2	PHYSICAL, HARDWARE	LOT	↑	P	V	V	✓	
3	PROOF PRESSURE TEST	5 RDM. SAMPLE	MANUFACTURER'S STANDARD ↓	P	V	V		
4	DISMANTLING RE-ASSEMBLY TEST	3 RDM. SAMPLE		P	V	V		
5	HYDRAULIC IMPULES & VIBRATION TEST	5 RDM. SAMPLE		P	V	V	✓	

LEGEND :

* RECORDS, IDENTIFIED WITH 'S' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION.

** M: MANUFACTURER/SUB CONTRACTOR, C:CONTRACTOR/NOMINATED INSP.AGENCY
N: CUSTOMER "P" PERFORM "W" WITNESS "V" VERIFICATION

NOTE 1) QUANTUM OF CHECK SHALL BE AS BELOW :

100% - BY MANUFACTURER
NIL -BY M/s BHEL
NIL CUSTOMER

2) MANUFACTURER TO MAINTAIN CALIBRATED INSTRUMENT HAVING BETTER ACCURACY THAN THE ITEM UNDER TEST. INSPECTING ENGINEER SHALL CHECK THE SAME.

PREPARED BY
M/S BHEL

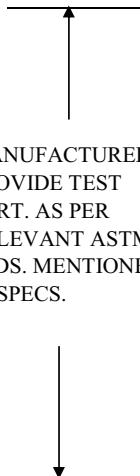


CHECK LIST FOR IMPULSE PIPES AND TUBES

NUMBER : CE/416/SP/CL

REVISION : 00 DATE : 21-07-15

CONTRACTOR : M/S BHEL-EDN

SL NO.	TESTS/CHECKS	QUANTUM OF CHECK	REFERENCE DOC. ACCEPTANCE NORMS.	AGENCY**				REMARKS
				M	C	N	D*	
1	CHEEH FOR DIMENSION, GRADE, SURFACE-DEFECTS	SEE NOTE: BELOW	APPROVED DATA SHEET AND CORES SPONDING ASTM STDSFOR GRADE OF MATERIAL	P	V	V	✓	 MANUFACTURER TO PROVIDE TEST CERT. AS PER RELEVANT ASTM STDS. MENTIONED IN SPECS.
2	CHEMICAL PROPERTIES AND PHY. PROPERTIES AS PER RELEVANT ASTM. (GRADE SHALL BE AS PER APPROVED DATA SHEET)	FOR LOT		P	V	V	✓	
3	FLATTENING TEST.		DO	P	V	V	✓	
4	FLARING TEST	##		P	V	V	✓	
5	BENDING TEST.	**		P	V	V	✓	
6	HYDRAULIC TEST OR EDDY CURRENT TEST			P	V	V	✓	
7	HARDNESS CHECK	##		P	V	V	✓	

LEGEND :

* RECORDS, IDENTIFIED WITH ' ✓' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION.

** M: MANUFACTURER/SUB CONTRACTOR, C:CONTRACTOR/NOMINATED INSP.AGENCY
N: CUSTOMER "P" PERFORM "W" WITNESS "V" VERIFICATION

NOTE : 1) QUANTUM OF CHECK SHALL BE AS BELOW :

100% - BY MANUFACTURER.

NIL -BY M/S BHEL

NIL - BY CUSTOMER

2) MANUFACTURER TO MAINTAIN CALIBRATED INSTRUMENT HAVING BETTER ACCURACY THAN THE ITEM UNDER TEST. INSPECTING ENGINEER SHALL CHECK THE SAME.

3) ## APPLICABLE FOR TUBES ONLY

4) ** APPLICABLE FOR CS PIPES ONLY.

5) WHEN MATERIAL CORRELATION IS NOT POSSIBLE , MATERIAL SAMPLES ARE TO BE TESTED AT THIRD PARTY LAB & TEST CERTIFICATES ARE TO BE SUBMITTED FOR NTPC REVIEW - CHP

PREPARED BY
M/S BHEL



CHECK LIST FOR FLOW SWITCH

NUMBER : CE/416/FS/CL REVISION : 00 DATE : 21-07-15

CONTRACTOR : M/s BHEL-EDN

SL NO.	TESTS/CHECKS	QUANTUM OF CHECK	REFERENCE DOC. ACCEPTANCE NORMS.	AGENCY**				REMARKS
				M	C	N	D*	
1.0	TYPE , MODEL , SL . NO . TAG NO. , RANGE.	↑	↑	P	V	V	✓	IN CASE OF IMPORTED ITEMS, CONTR. SHALL REVIEW TC's & NOT INSPECT.
2.0	SIZE , DIMENSIONS	REFER	AS PER APPROVED DATA SHEETS	P	V	V	✓	
3.0	REPEATABILITY	NOTE : 1 BELOW ↓		P	V	V	✓	
4.0	HV / IR	100%		P	V	V	✓	
5.0	CONTACT RATNG / NO. OF CONTACTS	RANDOM		P	V	V	✓	
6.0	MATL. T.C. FOR BODY, WET PARTS.	ONE/LOT		P	V	V	✓	
7.0	ACCESSORIES AS APPLICABLE	100%	↓	P	V	V	✓	

LEGEND :

* RECORDS, IDENTIFIED WITH ✓ SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION.

** M: MANUFACTURER/SUB CONTRACTOR, C:CONTRACTOR/NOMINATED INSP.AGENCY
N: CUSTOMER "P" PERFORM "W" WITNESS "V" VERIFICATION

NOTE : 1) QUANTUM OF CHECK SHALL BE AS BELOW :

100 % - BY MANUFACTURER.
NIL - BY CONTRACTOR.
NIL -BY M/S CUSTOMER.

2) MANUFACTURER TO MAINTAIN CALIBRATED INSTRUMENT HAVING BETTER ACCURACY THAN THE ITEM UNDER TEST.

PREPARED
M/S BHEL



CHECK LIST FOR TEMPERATURE SWITCH

NUMBER : CE/416/TS/CL REVISION : 00 DATE : 21-07-15

CONTRACTOR : M/s BHEL-EDN

SL NO.	TESTS/CHECKS	QUANTUM OF CHECK	REFERENCE DOC. ACCEPTANCE NORMS.	AGENCY**				REMARKS
				M	C	N	D*	
1.0	TYPE, MODEL, SL. NO., TAG NO., RANGE.	↑	↑	P	W	V	✓	IN CASE OF IMPORTED ITEMS, CONTR. SHALL REVIEW TC's & NOT INSPECT.
2.0	DIMENSIONS CHECK	REFER NOTE : 1 BELOW	APPROVED SPECS./ DATA SHEETS	P	W	V	✓	
3.0	REPEATABILITY	↓		P	W	V	✓	
4.0	SWITCHING DIFFERENTIAL							
5.0	CONTACT RATING / NO. OF CONTACTS	RANDOM		P	W	V	✓	
6.0	MATL. T.C. FOR BULB, CAPILLARY, ARMOUR	ONE/LOT		P	V	V	✓	
7.0	HV / IR	RANDOM		P	W	V	✓	
8.0	DEGREE OF PROTECTION	TYPE TEST		P	V	V	✓	
9.0	THERMOWELLS							
9.1	DIMENSIONS	100%		P	V	V	✓	
9.2	MATL. T.C. FOR THERMOWELL	ONE/LOT		P	V	V	✓	
9.3	HYD. TEST	100%		P	W	V	✓	
9.4	IBR CERT. IF APPLICABLE.		↓	P	V	V	✓	

LEGEND :

* RECORDS, IDENTIFIED WITH ' S' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION.

** M: MANUFACTURER/SUB CONTRACTOR, C:CONTRACTOR/NOMINATED INSP. AGENCY
N: CUSTOMER "P" PERFORM "W" WITNESS "V" VERIFICATION

NOTE : 1) QUANTUM OF CHECK SHALL BE AS BELOW :

- 100 % - BY MANUFACTURER.
NIL - BY CONTRACTOR.
NIL - BY M/s CUSTOMER.

2) MANUFACTURER TO MAINTAIN CALIBRATED INSTRUMENT HAVING BETTER ACCURACY THAN THE ITEM UNDER TEST. INSPECTING ENGINEER SHALL CHECK THE SAME.



PREPARED BY :
M/S BHEL



CHECK LIST FOR TEMPERATURE GAUGE / PAGE 1 OF 2

NUMBER : CE/416/TG/CL REVISION : 00 DATE : 21-07-15

CONTRACTOR : M/s B H E L - EDN

SL NO.	TESTS/CHECKS	QUANTUM OF CHECK	REFERENCE DOC. ACCEPTANCE NORMS.	AGENCY**				REMARKS
				M	C	N	D*	
1.0	CHECK FOR		APPROVED SPECS. / APPROVED DATA SHEETS	P	V	V	✓	BY GO / NOGO GAUGE
1.1	DIAL SIZE			P	V	V	✓	
1.2	MODEL NO/TAG NO			P	V	V	✓	
1.3	RANGE/SCALE			P	V	V	✓	
1.4	END CONNECTION		DO	P	V	V	✓	MFR TO CARRY OUT ROUTINE TEST ON 100 %
2.0	CALIBRATION			P	V	V	✓	
2.1	ACCURACY			P	V	V	✓	
2.2	REPETABILITY			P	V	V	✓	
2.3	HYSTERESIS		DO	P	V	V	✓	WHEN MAT'L CORRELATION ARE NOT AVAILABLE MFR'S COMPLIANCE TO BE PROVIDED
3.0	OVER TEMPERATURE TEST			P	V	V	✓	
4.0	AMBIENT TEMP. COMPENSATION CHECK			P	V	V	✓	
5.0	REVIEW OF T.C FOR MATERIALS OF-			P	V	V	✓	
5.1	SENSOR		AS PER APPROVED DRAWING	V	V	V	✓	IBR CERT. TO BE PROVIDED IF CALLED IN SPECS.
5.2	MOVEMENT			V	V	V	✓	
5.3	PROCESS CONNec.			V	V	V	✓	
5.4	HOUSING			V	V	V	✓	
6.0	REVIEW OF TC FOR DEGREE OF PROTEC.	TYPE TEST	AS PER APPROVED DRAWING	V	V	V	✓	IBR CERT. TO BE PROVIDED IF CALLED IN SPECS.
7.0	THERMOWELL			V	V	V	✓	
7.1	HYD TEST ON THERMOWELL			V	V	V	✓	
7.2	MATERIAL T.C FOR THERMOWELL			V	V	V	✓	
7.3	DIMENSIONAL CHECK	TYPE TEST	AS PER APPROVED DRAWING	V	V	V	✓	IBR CERT. TO BE PROVIDED IF CALLED IN SPECS.
				V	V	V	✓	
				V	V	V	✓	
				V	V	V	✓	

LEGEND:

* RECORDS, IDENTIFIED WITH '✓' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION

** M: MANUFACTURER/SUB CONTRACTOR, C: CONTRACTOR/NOMINATED INSP. AGENCY, N: CUSTOMER "P" PERFORM "W" WITNESS "V" VERIFICATION



CHECK LIST FOR TEMPERATURE GAUGE / PAGE 2 OF 2

NUMBER : CE/416/TG/CL REVISION : 00 DATE : 21-07-15

CONTRACTOR : M/s B H E L - EDN

NOTE : 1) QUANTUM OF CHECK SHALL BE AS BELOW :

100 % - BY MANUFACTURER.

NIL - BY M/s BHEL.

NIL - BY CUSTOMER

2) MANUFACTURER TO MAINTAIN CALIBRATED INSTRUMENT HAVING
BETTER ACCURACY THAN THE ITEM UNDER TEST. INSPECTING
ENGINEER SHALL CHECK THE SAME.

PREPARED BY :
M/S BHEL



CHECK LIST FOR PRESSURE & DIFFERENTIAL PRESSURE SWITCH

NUMBER : CE/416/PS/CL REVISION : 00 DATE : 21-07-15

CONTRACTOR : M/s B H E L - EDN

SL NO.	TESTS/CHECKS	QUANTUM OF CHECK	REFERENCE DOC. ACCEPTANCE NORMS.	AGENCY**				REMARKS
				M	C	N	D*	
1.0	CHECK FOR	↑	APPROVED SPECS. / DATA SHEETS	P	V	V	✓	BY GO/ NO GO GAUGE
1.1	MODEL NO. TAG NO.			P	V	V	✓	
1.2	RANGE			P	V	V	✓	
1.3	END CONNECTION	↓	DO	P	V	V	✓	MFR. TO CARRY OUT ROUTINE TEST ON WHEN MAT'L CORRELATION ARE NOT AVAILABLE MFR'S COMPLIANCE TO BE PROVIDED.
2.0	REPEATABILITY			P	V	V	✓	
2.1	HYSTERESIS			P	V	V	✓	
2.2	DIFFERENTIAL	↓	DO	P	V	V	✓	
3.0	OVER PRESSURE AND LEAK TEST			P	V	V	✓	
4.0	ELECTRICAL INSULATION / H.V TEST			P	V	V	✓	
5.0	REVIEW OF T.C FOR MATERIALS OF- FOR LOT	↓	DO	V	V	V	✓	
5.1	SENSOR			V	V	V	✓	
5.2	MOVEMENT			V	V	V	✓	
5.3	HOUSING	↓	DO	V	V	V	✓	
6.0	TC OF MICRO SWITCH-CH			V	V	V	✓	
7.0	REVIEW OF T.C FOR DEGREE OF PROTECTION.			V	V	V	✓	

LEGEND:

* RECORDS, IDENTIFIED WITH ' ✓ ' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION

** M: MANUFACTURER/SUB CONTRACTOR, C: CONTRACTOR/NOMINATED INSP. AGENCY.
N: CUSTOMER "P" PERFORM "W" WITNESS "V" VERIFICATION

NOTE : 1) QUANTUM OF CHECK SHALL BE AS BELOW : 100 % - BY MANUFACTURER
NIL - BY CONTRACTOR.
NIL - BY M/s CUSTOMER

2) MANUFACTURER TO MAINTAIN CALIBRATED INSTRUMENT HAVING BETTER ACCURACY THAN THE ITEM UNDER TEST. INSPECTING ENGINEER SHALL CHECK THE SAME.

3) IN CASE OF IMPORTED PRESSURE SWITCHES DP SWITCHES BHEL SHALL REVIEW TC AND SHALL NOT INSPECT.

PREPARED BY :

M/S BHEL



CHECK LIST FOR PRESSURE GAUGE & DIFFERENTIAL PRESSURE GAUGE

NUMBER : CE/416/PG/CL REVISION : 00 DATE : 21-07-15

CONTRACTOR : M/S B H E L - EDN

SL NO.	TESTS/CHECKS	QUANTUM OF CHECK	REFERENCE DOC. ACCEPTANCE NORMS.	AGENCY**				REMARKS
				M	C	N	D*	
1.0	CHECK FOR	SEE NOTE-1 BELOW	APPROVED SPECS. / DATA SHEETS	P	V	V	✓	MFR TO CARRY OUT ROUTINE TEST ON 100 % . WHEN MAT'L CORELATION ARE NOT AVAILABLE MFR'S COMPLIANCE TO BE PROVIDED
1.1	DIAL SIZE			P	V	V	✓	
1.2	MODEL NO/TAG NO			P	V	V	✓	
1.3	RANGE/SCALE			P	V	V	✓	
1.4	END CONNECTION			P	V	V	✓	
2.0	CALIBRATION							
2.1	ACCURACY			P	V	V	✓	
2.2	REPETABILITY			P	V	V	✓	
2.3	HYSTERISIS			P	V	V	✓	
3.0	OVER PRESSURE AND LEAK TEST			P	V	V	✓	
4.0	OPERATION OF PR. RELIEF DEVICE.	# ONE		P	V	V	✓	
5.0	REVIEW OF T.C FOR MATERIALS OF-	FOR LOT		V	V	V	✓	
5.1	SENSOR	TYPE TEST SEE NOTE-1		V	V	V	✓	
5.2	MOVEMENT			V	V	V	✓	
5.3	PROCESS CONNEC.			V	V	V	✓	
5.4	HOUSING			V	V	V	✓	
6.0	REVIEW OF TC FOR DEGREE OF PROTEC.			V	V	V	✓	
7.0	ACCESSORIES, AS APPLICABLE			V	V	V	✓	

LEGEND:

* RECORDS, IDENTIFIED WITH ' ✓ ' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION

** M: MANUFACTURER/SUB CONTRACTOR, C: CONTRACTOR/NOMINATED INSP. AGENCY.
N: CUSTOMER "P" PERFORM "W" WITNESS "V" VERIFICATION

NOTE : 1) QUANTUM OF CHECK SHALL BE AS BELOW :

100 % - BY MANUFACTURER.

NIL - BY M/s BHEL.

NIL - BY M/s CUSTOMER

2) MANUFACTURER TO MAINTAIN CALIBRATED INSTRUMENT HAVING
BETTER ACCURACY THAN THE ITEM UNDER TEST. INSPECTING
ENGINEER SHALL CHECK THE SAME.

3) # ONE FOR PR. GAUGE AND ONE FOR DP GAUGE.

PREPARED BY :
M/S BHEL



REF.:UPPUR/416/SWAS/VL

REV. NO. : 00

PAGE : 01 OF 02

PROJECT :- UPPUR 2X800 MW

CUSTOMER :- TANGEDCO

CONSULTANT :- TRACTEBEL

SECTION G

APPROVED VENDOR LIST

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COMPANY

REVISIONS :

APPROVED

(Punit P Singh)

PREPARED

ISSUED

DATE

PRK

416

02-06-2018



**VENDOR LIST
FOR
SWAS**

UPPUR/416/SWAS/VL
REV.NO.: 00

SS TUBES AND PIPES:

SUMITOMO CORPORATION,JAPAN.	Subject to approval
TPS TECHNITUBE ROHREN WERKE GMBH,DAUN,GERMANY	Subject to approval
RATNAMANI METALS & TUBES LTD,AHMEDABAD	Subject to approval
MAXIM TUBES COMPANY PVT LTD,AHMEDABAD	Subject to approval
SURAJ STAINLESS LIMITED,AHMEDABAD	Subject to approval
MBM TUBES PVT LTD,CHATRAL,GUJARAT	Subject to approval
TUBACEX PRAKASH INDIA PVT LTD,UMBERGAON ,GUJARAT	Subject to approval
HEAVY METAL AND TUBES LTD,AHMEDABAD/MUMBAI	Subject to approval
SHUBHLAXMI METALS AND TUBES PVT. LTD, MUMBAI	Subject to approval

PRESSURE GAUGES:

A.N.INSTRUMENTS PVT LTD,CHENNAI	Subject to approval
GOA THERMOSTATIC INSTRUMENTS,GOA	Subject to approval
H.GURU INSTRUMENTS(SOUTH INDIA)PVT LTD,BANGALORE	Subject to approval
MANOMETER (INDIA) PVT. LTD,MUMBAI	Subject to approval
FORBES MARSHALL(HYD) LTD,HYDERABAD	Subject to approval
WALCHANDNAGAR INDUSTRIES LTD,DHARWAD,KARNATAKA.	Subject to approval
PRECISION MASS PRODUCTS PVT. LTD,GANDHI NAGAR,GUJARAT.	Subject to approval
WIKI INSTRUMENTS INDIA PVT. LTD,PUNE	Subject to approval
THERMAL INSTRUMENT INDIA PVT. LTD,MUMBAI.	Subject to approval
GAUGES BOURDON (INDIA) PVT. LTD,MUMBAI.	Subject to approval
BAUMER TECHNOLOGIES INDIA LTD,MUMBAI/VAPI	Subject to approval
PRECIMEASURE CONTROLS PVT LTD, BANGALORE	Subject to approval

TEMPERATURE GAUGES:

A.N.INSTRUMENTS PVT LTD,CHENNAI	Subject to approval
GAUGES BOURDON (INDIA) PVT. LTD,MUMBAI.	Subject to approval
GOA THERMOSTATIC INSTRUMENTS,GOA	Subject to approval
H.GURU INSTRUMENTS(SOUTH INDIA)PVT,BANGALORE	Subject to approval
FORBES MARSHALL(HYD) LTD, HYDERABAD	Subject to approval
PRECISION MASS PRODUCTS PVT. LTD,GANDHI NAGAR	Subject to approval
WIKI INSTRUMENTS INDIA PVT. LTD,PUNE	Subject to approval
GOA INSTRUMENTS INDUSTRIES PRIVATE LTD,GOA.	Subject to approval



**VENDOR LIST
FOR
SWAS**

UPPUR/416/SWAS/VL
REV.NO.: 00

THERMAL INSTRUMENT INDIA PVT. LTD,MUMBAI.	Subject to approval
BAUMER TECHNOLOGIES INDIA LTD,MUMBAI/VAPI	Subject to approval

PRESSURE SWITCH:

PRECISION MASS PRODUCTS PVT. LTD,GANDHI NAGAR,GUJARAT.	Subject to approval
INDFOS INDUSTRIES LTD CHENNAI	Subject to approval
SWITZER PROCESS INSTRUMENTS PVT. LTD,CHENNAI.	Subject to approval
TRAFAG CONTROLS INDIA PVT. LTD,GURGOAN,HARYANA.	Subject to approval
GAUGES BOURDON (INDIA) PVT. LTD,MUMBAI.	Subject to approval
BAUMER TECHNOLOGIES INDIA LTD,MUMBAI/VAPI	Subject to approval

TEMPERATURE SWITCH:

INDFOS INDUSTRIES PRIVATE LTD, CHENNAI
SWITZER PROCESS INSTRUMENTS PVT. LTD, CHENNAI.
GAUGES BOURDON (INDIA) PVT. LTD, MUMBAI

TERMINAL:

Wago Noida, Phoenix Noida,

INSTRUMENT VALVES:

BHARAT HEAVY ELECTRICALS LIMITED VALVES DIVISION,TIRUCHIRAPALLI,TAMILANADU.	Subject to approval
PRECISION ENGG INDUSTRIES, MUMBAI	Subject to approval
EXCEL HYDRO-PNEUMATICS PVT LTD,MUMBAI	Subject to approval
METPRESS ENGINEERING WORKS,KOLKATA	Subject to approval
BALDOTA VALVE AND FITTINGS PVT LTD,MUMBAI	Subject to approval
PMT ENGINEERS,AHMEDABAD	Subject to approval
AURA INC,NEW DELHI	Subject to approval
HP VALVES & FITTINGS (INDIA) PVT. LTD,CHENNAI	Subject to approval
FLUID CONTROLS PVT LTD,PUNE	Subject to approval
FLOWTECH,KOLKATA.	Subject to approval
INSTRUMENTATION LIMITED,PALGHAT	Subject to approval

COMPRESSION FITTINGS:

PRECISION ENGG INDUSTRIES, MUMBAI
EXCEL HYDRO-PNEUMATICS PVT LTD, MUMBAI
METPRESS ENGINEERING WORKS, KOLKATA
ASTEC VALVE & FITTINGS PVT. LTD., MUMBAI
FLUID CONTROLS PVT. LTD,PUNE
PANAM ENGINEERS LTD,MUMBAI
AURA INC, NEW DELHI



**VENDOR LIST
FOR
SWAS**

UPPUR/416/SWAS/VL
REV.NO.: 00

HP VALVES & FITTINGS (INDIA) PVT. LTD, CHENNAI
PMT ENGINEERS,AHMEDABAD
PRIME ENGINEERS,MUMBAI
ARCELLOR CONTROLS ,AHMEDABAD
ARYA CRAFTS & ENGINEERING PVT. LTD,MUMBAI
SWAGELOCK,USA
DYNA FLUID VALVES AND FLOW CONTROLS,UDYAMBAG,BELGAUM
FLOWTECH. KOLKATA.
PARKER HANNIFIN INDIA PVT. LTD.,CHENGAL PATTU,TAMILANADU

Annunciator:- PROCON CHENNAI

ANALYSERS:

ROSEMOUNT ANALYTICAL INC, USA. (Subject to approval)
ENDRESS + HAUSER INDIA PVT. LTD, MUMBAI. (Subject to Approval)
HACH USA. (Subject to approval)
ABB INDUSTRIES, SWITZERLAND. (Subject to Approval)
THERMO ORION INC, CHELMSFORD, USA. (Subject to Approval)
SWAN SWITZERLAND. (Subject to approval)
METTLER-TOLEDO INDIA PVT. LTD, MUMBAI (Subject to Approval)

Note:-

1. Vendors to note that for major components of Sample Handling System, above indicated vendors only will be acceptable

SECTION - "H"

- Analysers & Spares shall be packed project wise in lockable Metal Container suitable for outside storage at project sites. Typical requirements are as below:-
 - Type: Standard Outdoor type MS container, fully closed.
 - Dimension: Vendor to decide based on Qty of Analysers & Spares.

General condition:

- 1) The container shall be suitable to store imported and sophisticated components in open environment at thermal power plants. It shall be leak proof.
- 2) Container shall be provided with proper glass wool thermal insulation at inside.
- 3) Wall thickness (all sides), reinforcement, supporting lugs, lifting lugs, etc., shall be suitable to store and transport the container with the permissible load as required.
- 4) Doors shall have suitable latches to lock the container with pad locks for safety purpose.
- 5) Interior and external surface shall be completely painted as per the standard practice and it shall be Suitable for sea-shore atmosphere.
- 6) Containers shall be provided with Tag Plates with Project Name.

Important Note: Mandatory Spares shall be sent in pre-decided lots in containers / secure boxes distinctly marked in Red colour with boldly written "S" mark on each face of the containers /secure boxes.

SECTION I

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REVISION HISTORY SHEET

REV NO.	DATE	NATURE OF CHANGE	REASONS	CHANGED BY	APPROVED BY
00	06/03/92	SUPERCEDS CN43000	-	VS MAS SHG	NJ
01	19/06/93	GENERAL	FEEDBACK FROM QUALITY	SHG	NJ
02	24/06/93	CL 3.4.10	FEEDBACK FROM QUALITY	SHG	NJ
03	01/07/93	SEMICONDUCTOR & PHOTOVOLTAIC PANELS ADDED	FEEDBACK FROM DESPATCH	SHG	NJ
04	17/10/94	TOTALLY REVISED	FEEDBACK FROM QUALITY	SHG	NJ
05	08/06/95	ANNEXURE ADDED	FEEDBACK FROM QUALITY & ACCEPTANCE CRITERIA OF WOOD ADDED	SHG	NJ
06	17/11/95	CL 2.5.10 ALTERED	FEEDBACK FROM QUALITY & SHIPPING	SHG	NJ
07	05/03/97	UNDER CL 3.0 & 3.9.1 RPP ADDED ACCEPTANCE CRITERIA REMOVED	FEEDBACK FROM SHIPPING & QC	SHG	N.S
08	29/08/2001	CL 2.2.8 & 4.1 CHANGED	FEEDBACK FROM SHIPPING & QC	SHG	NS
09	15.12.2009	INCLUSION OF PINE WOOD AND SOME CLAUSES HAVE AMENDED	FEEDBACK FROM SHIPPING	PGD / KPN	MSS
10	21.06.2013	Inclusion of recommendations pertaining to spares in page-11&28	Recommendations from Corporate systems & IT	HRN	MSS

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REV-10.

APPROVED: M. Sivaramaiah

PREPARED: HRN

ISSUED: STDS GROUP

DATE: 21/06/13



PLANT STANDARD

ED 049 00 99

REV NO 10

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PROCEDURE FOR PACKING OF CONTROL EQUIPMENTS PRODUCTS USING RUBBER WOOD, SILVER OAK WOOD, PINE WOOD AND CARTONS

1.0 SCOPE: This standard covers the guidelines for packing of Control Equipments, semiconductor devices and Photo voltaic panels/cells.

2.0 MATERIALS:

2.1 WOOD:

2.1.1 INLAND: The wood shall be Rubber wood (*Havea Brasiliensis*) for packing of cubicles, loose items, spares and photovoltaic items meant for customers in India.

2.1.2 EXPORT: Silver Oak (*Grevillea Robusta*) / Pine wood shall be used for packing of cubicles and loose items meant for export.

2.2 DIMENSIONS:

2.2.1 Thickness of planks for Front, rear, top and bottom sides and binding, jointing battens shall be 25 +2/-3 mm.

2.2.2 Width of all planks including the tongue shall be more than 125 mm after planing, except to adjust total height of item to be packed.

2.2.3 Minimum number of planks shall be used for a shook.

2.2.4 In any case, only one plank can be of width less than 125 mm, but greater than 100 mm.

2.2.5 Horizontal, vertical, diagonal planks shall be given for binding (number of such planks depend on the dimension of panel, as given in Figure-2).

2.2.6 External sides of front and rear planks to be planed to facilitate writing of address and other markings.

2.2.7 Width of binding planks shall be minimum 100 mm.

REV-10

APPROVED: M. Sivaramaiah

PREPARED: HRN

ISSUED: STDS GROUP

DATE: 21/06/13



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PLANT STANDARD

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2.2.8 Distance between any 2 binding planks shall be less than 750 mm. As shown in Fig-3, diagonal planks shall be used in between vertical binding planks when distance between inner to inner of vertical planks is more than 750 mm

2.2.9 Distance of the outer edges of these planks from the edge of case shall be less than 250 mm.

2.2.10 Diagonal planks are not required for top planks and width side also, if the width of pallet is less than 750 mm.

2.2.11 **Jointing of planks:** Single length planks shall be used for cubicles whose overall length is less than 2400 mm. For cubicles of length more than 2400 mm, jointing is permitted. The jointing shall be done with one single or maximum of 2 planks of wood same as other planks of width 250 mm (minimum) with two rows of nails on either side of the joint in zigzag manner. From the joint along height side it shall be of lap joint with over lap of at least the width of plank.

2.2.12 **Tongue and Groove joints:** Two Consecutive planks shall be joined by tongue and groove joint. Depth of tongue shall be 12 ± 1 mm, thickness of tongue shall be 8 ± 1 mm. The groove dimensions shall be such that the tongue fits tightly into the groove to make a good joint.

2.3 **PERMISSIBLE DEFECTS:** - Wood shall be free from knots, bows, visible sign of infection and any kind of decay caused by insects, fungus, etc.

End splits: Longest end splits at each end shall be measured and lengths added together. The added length shall not exceed 60 mm per meter run of shock's. Wood pins shall be used to prevent further development of split.

Surface cracks: Surface cracks with a maximum depth of 3 mm are permissible. A continuous crack of any depth all along the length is not allowed.

2.4.0 CHEMICAL TREATMENTS FOR PRESERVATION OF WOOD:-

2.4.1 This treatment provides protection to the packing wood against deterioration due to fungi and attack by termites, borers and marine organism and any kind of infections.

2.4.2 The wooden planks, after making tongues / grooves shall be treated with chemicals. For pine wood, treatment with ASCU/ CCA solution need not be done.

2.4.3 The chemical used shall be ready mix ASCU paste. This consists of Arsenic pentoxide, copper sulphate sodium dichromate. This Paste shall be mixed at the rate of 1 kg of paste per 10 liters of water to the extent of water used. Alternate this CCA paste as mentioned at Para 2.4.5 can also be used.

2.4.4 The chemical treatment shall be done at the premises of the contractor. A cement concrete tank of capacity to hold a minimum of 2000 liters of solution shall be constructed. The solution



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shall be prepared in the presence of BHEL- EDN's Representative by contractor. The wooden planks shall be soaked in the solution for a minimum of 12 hours. The solution shall be replenished after treating a maximum of 12 cubic meters of wood. A log book shall be maintained by the contractor to give the details of date of preparation of solution, quantity of solution prepared, quantity of chemicals used, Quantity of wood treated and the details of replenishment. Samples of solutions before mixing will be got tested at the laboratories designated by BHEL. The testing fees to be paid to the laboratories will have to be borne by the contractor. The paste shall be tested as and when required.

2.4.5 Specifications for water soluble type wood preservatives: Copper – Chromium – Arsenic [CCA]:

Copper – Chromium – Arsenic preservative formulation shall be as per IS : 10013 Part – II – 1981 shall consist of following active ingredients in nominal proportions by weight as shown below:

Arsenic Pent oxide	$As_2O_5 \cdot 2H_2O$	12.5
Copper Sulphate	$CuSO_4 \cdot 5H_2O$	37.5
Sodium Dichromate	$Na_2Cr_2O_7 \cdot 5H_2O$	50.0
Or		
Potassium Dichromate	$K_2Cr_2O_7$	

2.5 OTHER MATERIALS:

2.5.1 NAILS: The dia. of the nails shall be 3.15 mm. The length of the nails shall be 65 mm wherever two planks of 25 mm thickness are joined and 75 mm wherever a 25 mm plank is joined to a 50 mm plank.

2.5.2 BLUE NAILS: These are used for nailing bituminized Kraft paper/hessian cloth to the planks. The length of the nails shall be 16 mm.

2.5.3 HOOP IRON STRIPS: These are used for strapping the boxes. The width of the strips shall be 19 ± 1 mm and thickness 0.6 ± 0.01 mm. The material shall be free from rust.

2.5.4 CLIPS: These shall be used for strapping the hoop iron strips on the boxes.

2.5.5 BRACKETS: These brackets are used for nailing to the corners of cubicle boxes. The brackets shall be of mild steel of thickness 2 ± 1 mm and width 25 ± 1 mm. The brackets shall be of "L" shape, the length of each side being 100 ± 2 mm. Two holes shall be provided towards the end of each side for screwing /nailing.



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- 2.5.6 FASTENERS: Bolts, double nuts, spring washers will have to be used for packing of some special items like transformers, reactors, breakers, etc., to hold the job to the bottom plank of the box. The bolts, nuts, washers will be provided by BHEL. However, drilling of holes will have to be done using contractor's tools.
- 2.5.7 POLYETHYLENE SHEET: The polyethylene sheets are used to make covers to the jobs individually. The material shall have a thickness of 0.175 mm (175 microns). The polyethylene sheet shall be clear and transparent.
- 2.5.8 BITUMINISED WATER PROOF KRAFT PAPER: This is used for lining the inside of shoots of cubicles.
- 2.5.9 BITUMEN COATED HESSIAN POLYETHYLENE KRAFT PAPER: This is used for lining the inside of top planks of cubicles and for lining of all inner sides of boxes.
- 2.5.10 RUBBERISED COIR: The rubberized coir is used as cushioning material. For the packing of loose items, items are to be arrested by using rubberized coir. For the packing of cubicles rubberized coir of thickness 25mm and width 75mm shall be used.
- 2.5.11 FOAM RUBBER / 'U' FOAM: This is used for covering the delicate items. This material is normally provided by BHEL.
- 2.5.12 THERMOCOL (EXPANDED POLYSTYERENE) SHEETS: This is used for covering delicate items. This material is normally provided by BHEL.
- 2.5.13 MARKING PLATE: This shall be of anodized aluminum sheet. Details and specifications are given in Fig-5.
- 2.5.14 PACKING SLIP HOLDER: This shall be of galvanized iron /tinned
- 2.5.15 SILICA GEL: This shall be of indicating type.
- 2.5.16 COTTON BAGS: These are used for holding silica gel. The bags shall have the following matter indicated them:

BHEL-EDN, BANGALORE - 5 60 026

SILICA GEL INDICATING TYPE

BLUE : ACTIVE

ROSE : REDUCED ACTIVITY

WHITE : NO ACTIVITY. TO BE REPLACED WITH FRESH SILICA GEL



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2.5.17 COTTON/ PLASTIC TAPE: This is used for tying small items .And also to prevent vibrations of moving parts within the cubicles.

2.5.18 MARKING INK: The ink used normally is black in color. In some special cases other color also will have to be used. The ink shall be non-fading/indelible and non-washable by water.

2.5.19 POLYETHYLENE BAGS: These are to be used for keeping the, Packing slips. The bag shall be of size 70 mm X 100 mm (minimum).

2.5.20 Hessian cloth, twine thread, paint will have to be used in packing certain items.

2.5.21 Mechanical Latching clamps: For CLW Railway panels and similar Panels self locking clamps can also be used on need basis in conjunction with or apart from regular bolt and nut fixing arrangement. [Refer Drawing Fig-7]. For reusable boxes, these clamps provide easy locking and unlocking arrangement. These clamps will be made available from BHEL in some cases.

3.0 PACKING SPECIFICATIONS: Different types of packing are used as follows:

- 1) Packing of cubicles with rubber wood.
- 2) Packing of cubicles with Silver Oak wood / Pine wood
- 3) Packing of empty cubicles with rubber wood.
- 4) Packing of loose items/spares with rubber wood.
- 5) Packing of loose items /spares with Silver Oak wood.
- 6) Packing of Photo-voltaic items with rubber wood.
- 7) Packing using bitumen coated hessian polyethylene Kraft papers.
- 8) Supply of rubber wood pallets for empty cubicles.
- 9) Packing of semiconductor panels.
- 10) Packing of material covered under category of RPP (Registered Postal Parcel)
- 11] Packing of materials using PVC [sunspace] / corrugated Kraft paper cartons.
- 12] Packing of materials using heavy duty cartons

3.1 PACKING OF CUBICLES WITH RUBBER WOOD:

3.1.1 The packing is to be done as per clause 2.0 in all respects.

3.1.2 The cubicles are already fixed on wooden pallets. Hence the contractor need not arrange the bottom pallets normally.

3.1.3 The cubicles will be of different sizes both widthwise and lengthwise. The cubicles may be made up of single suite, 2 Suite, 3 Suite, 4 Suite, etc., The width of the cubicles generally varies from 400 mm to 1650mm. The length of the cubicle, generally varies from 1500 mm to 4800 mm. The height is normally 2430 mm. In some cases the height may be less/more.



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- 3.1.4 BITUMINISED WATER PROOF KRAFT PAPER: The inner surface of 4 sides of shok's shall be nailed with Bituminized water proof Kraft paper (as per 2.5.8) using blue nails (as per 2.5.2) wherever 2 pieces of Kraft paper are used, the joint shall have an overlap of minimum 20 mm.
- 3.1.5 BITUMEN COATED HESSIAN POLYETHYLENE KRAFT PAPER: The inner surface of top cover shall be nailed with Bitumen coated Hessian polyethylene Kraft paper (as in 2.5.9). This sheet shall project outside on 4 sides by at least 100 mm and shall be nailed properly on sides. Joining of sheets should have overlap of minimum 20 mm.
- 3.1.6 POLYETHYLENE SHEET COVERING: The cubicles shall be covered with a polyethylene petticoat (Polyethylene sheet as per 2.5.7). This shall be 'tailor made' to fit the cubicle. The sealing shall be such as not to allow any moisture to enter the cubicle.
- 3.1.7 SILICA GEL: Silica gel (as per 2.5.15) packed in cotton bags shall be kept at different places inside the cubicle as per EDN directions. Each suit of cubicle shall be provided with 1 kg of Silica gel (for a 4 suit cubicle 4 kgs of Silica Gel to be used. The bag containing silica gel to be as per 2.5.16).
- 3.1.8 LOOSE PARTS: Any loose parts in the cubicles shall be tied using cotton/ plastic tape. Wooden battens shall be provided wherever necessary.
- 3.1.9 WOODEN BATTENS: In case of cubicle which are not rectangular in shape like control desks, sufficient number of wooden rafters/battens of proper size shall be provided to give strength to the package.
- 3.1.10 RUBBERISED COIR: Gap between the cubicle and the case shall be filled with rubberized coir (as per 2.5.10) with distance between consecutive layers less than 500 mm.
- 3.1.11 CLAMPING: Packing shall be bound at edges by nailing M.S.clamps / Brackets (as per 2.5.5). Each vertical edge shall have minimum 3 clamps. Top horizontal edges will have one clamp for every meter length of package. However, minimum 4 clamps shall be nailed at the top for any cubicle.
- 3.1.12 PACKING SLIP: Packing slip kept in the polyethylene bag (As per 2.5.19) shall be placed in the box at appropriate place. In addition, one more packing slip covered in polyethylene cover and packing slip holder (as per 2.5.14) shall be nailed to front / rear of case.
- 3.1.13 MARKING PLATE: One no. (As per 2.5.13) shall be nailed to the front side of the case.
- 3.1.14 CASE MOUNTING: After complete packing, stencil marking of various details and marking of symbols shall be done as per BHEL instructions using indelible / non washable marking ink.

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- 3.2 PACKING OF CUBICLES WITH SILVER OAK / PINE WOOD: Packing of cubicles for export shall be done exactly in same manner as described at 3.1 except for the following changes: -

Wood shall be Silver oak/ Pine wood instead of rubber wood.
- Double polyethylene petticoat instead of one.
- Fumigation may have to be done if required (BHEL Scope).

- 3.3 Different types of Cubicles with sizes for Packing

SL TYPE OF CUBICLE VARIANT DIMENSIONS [Internal sizes]

01 Single suite cubicle	- 900 x 950 x2500
02 Two suite cubicle	- 1650 x 950 x 2500
03. Three suite cubicle	- 2400 x 950 x2500
04. Four suite cubicle	- 3150 x 950 x 2500
05. Regulation cub	- 1300 x 1350 x 2500
06. Thy cub	- 2870 x 1350 x 2500
07. VFD Cub	- 3800 x 1550 x 2500

- 3.4 PACKING OF LOOSE ITEMS/SPARES USING RUBBER WOOD:

3.4.1 Shape of cases shall be square, rectangular with single gabled roof or with double gabled roof depending on the nature of the job to be packed. Construction shall be as per drawings enclosed. Only gable will be additional as required.

3.4.2 Wood shall be rubber wood with Tongue and Groove joint as per clause 2.2.12.

3.4.3 Chemical treatment as per clause 2.4 to be done.

3.4.4 Width of planks shall be at least 100 mm. Width of binding planks (battens) shall be at least 75mm.

3.4.5 External surface of planks on front and rear shall planed 100% (except bottom plank).

3.4.6 Inner surfaces of all 6 sides shall be lined with bitumen coated hessian polyethylene Kraft paper (as per clause 2.5.9) using blue nails.

3.4.7 Rubberized coir of minimum 25mm thickness and 100 mm width shall be nailed to inner surfaces of bottom and 4 sides of box.

3.4.8 Internal packing: Items that go into the box shall be packed using polyethylene sheet/ U foam/ thermocol sheets/ air bubbled sheets/ paper cartoons and cotton tape. Any space left. Between the job and the sides and the top of the box shall be filled with rubberized coir to get proper cushioning effect.



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3.4.9 Certain items like transformers, reactors, breakers, etc., shall be bolted to the bottom of the box using bolts, nuts and washers.

3.4.10 Silica gel as per clause 2.5.15 held in cotton bags as per clause 2.5.16 shall be kept at proper places in the box.

SL NO	BOX INNER DIMENSIONS (mm)	VOLUME (liters)	QUANTITY OF SILICA GEL (grams)
1	300X300X300	27	100
2	400X400X400	64	100
3	500X500X400	100	100
4	600X600X400	144	100
5	700X700X400	196	100
6	770X770X500	297	100

3.4.11. Packing slip kept in polyethylene bag (clause 2.5.19) shall be placed in the box.

3.4.12. Marking plate as per clause 2.5.13 shall be nailed to side of the box.

3.4.13. Two numbers of hoop iron strips as per clause 2.5.3 shall be strapped tightly on the case using clips.

3.4.14. Stencil marking of various details and marking of various symbols shall be done as per BHEL instructions using indelible/non-washable marking ink.

3.4.15 Loose items to be kept inside the cubicle

- The components which are removed from cubicle for shipping purpose only, such as meters shall be kept inside the cubicle individually kept in wooden box and tied firmly in bottom of Cubicle.
- Other items which are given loose in addition to cubicle shall be packed in separate boxes (like cables).
- For transformer cubicles loose items shall be packed in separate boxes and these boxes may be tied firmly in bottom of cubicles.
- Items which are bigger in size such as impulse tubes may be kept in top of cubicles firmly bunched and tied.



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3.5. PACKING OF LOOSE ITEMS USING SILVER OAK / PINE WOOD: Packing of loose items for export shall be done in same manner as at clause.3.4 . except for the following changes:

- Wood shall be Silver oak/ Pine wood instead of rubber wood.
- Fumigation may have to be done.
- 2 polyethylene covers to be provided.

3.6 PACKING OF PHOTO VOLTAIC PANELS, ETC.USING RUBBER WOOD:
Same as 3.4 above except for the following changes:

- Wood need not be treated with chemical solution.
- Tongue and groove jointing is not required. But planks shall be so joined as to not leave any gap at the joint. Bituminized Kraft paper and Bituminized Kraft sheet need not be used.
- Silica gel need not be used.

3.7 PACKING USING BITUMEN COATED HESSIAN POLYETHYLENE KRAFT PAPER:

3.7.1. This method is adopted for packing of poles, frames, Empty boxes, etc.

3.7.2. Job shall be covered and stitched tightly with bitumen coated hessian polyethylene Kraft paper.

3.7.3. Marking has to be done as mentioned in CL 3.4.14.

3.8 SUPPLY OF RUBBER WOOD PALLETS FOR EMPTY CUBICLES:

3.8.1. The wood shall be rubber wood.

3.8.2. Thickness of planks shall be 25 ± 2 mm. The size of the supporting battens at bottom shall be 75 ± 2 mm (width) and 100 ± 2 mm (height).

3.8.3. If the width of the pallet is 1000 mm or less, only 2 supporting battens at the edges may be provided. In case of pallets having width of more than 1000 mm, one extra supporting batten shall be provided in the middle.

3.8.4. Jointing of top planks is not permitted for pallets of width less than 1000mm. For pallets of width more than 1000 mm, jointing of top plank is permitted. However, joint shall be at the center of the supporting batten.

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3.8.5 The consecutive top planks shall be so nailed as to leave no gap. Tongue and groove joint is not required.

3.9 PACKING OF SEMICONDUCTOR DEVICES

Semiconductor devices shall be received in prepackaged condition as per the device type and packed in plywood boxes as per the following procedure,

- Provide thermocole sheets/rubberized coir.
- Stack the preplaced devices inside the case.
- Fill up gaps with thermocol sheets/rubberized coir.
- Close the top cover and nail.
- Provide suitable marking of the package details.

3.9.1 Packing of material for Registered Post Parcel (RPP) RPP packing boxes to be made in-house with 12mm (for sides) and 6mm thick (for top and bottom) commercial quality ply wood sheet. The size of the box should be decided on the material to be dispatched. Between material 10mm and 15mm thick thermocole sheets or rubberized coir/foam should be provided as cushion.

3.9.2. Packing of materials using sunpac cartons and corrugated Kraft paper cartons: Individual items can be packed using sunpac or polypropylene [PVC]/corrugated Kraft paper cartons of suitable sizes and grammage depending upon the items to be packed. Heavy duty cartons can also be used for packing of loose items, manuals, repaired items and others.

3.9.3. Packing of materials using Heavy duty cartons: Panels can also be packed using Heavy duty carton with other required packing materials having 2000gsm corrugated board of 7 ply 15 thick. Loose items and spares can be packed using 5ply 2000gsm corrugated heavy board with other packing materials. Different sizes of cartons are required depending upon the sizes of the items being packed. Details are separately given.

4.0 ADDITIONAL POINTS TO BE FOLLOWED FOR EXPORT ORDER SEAWORTHY PACKING:

4.1 Packing to be done as per Fig - 6.
Thickness of G.I. sheet 0.3 mm. plus or minus 0.05 [0.3-0.05]

Additional points to be taken care for :

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Easy spares [Initial and O&M] Traceability and Identification at units and as well as at sites:

(Recommendations from Corporate Systems & IT)	
Sl	Activity
1	All Initial and O&M spares preferably supplied in one lot to site and progressive inventory till all spares are accumulated could be kept at units.
2	Spares (Initial and O&M) should be supplied in separate Boxes / Containers and not mixed in main supply boxes.
3	i) Initial spares Box / Container to be labeled as "INITIAL SPARES " in RED. Ref fig: 14 (Page-26). ii) O & M spares Box /Container to be labeled as" O&M SPARES " in GREEN. Ref fig: 14 (Page-26).
4	iii) Initial Spares Box to have red Color strip as per diagram. Ref fig: 14 (Page-26). iv) Majority of spares (initial and O&M) are for indoor storage at site. v) O&M spares box to have green Color strip as per diagram. Ref fig: 14 (Page-26).
5	vi) Spares (Initial and O&M) Packing list kept inside the boxes and affixed securely outside the box to contain vii) Custom name viii) Project / Power station Name ix) Customer PO No and date x) Sl no of customer PO. xi) Quantity total & dispatched. xii) Unit work order number xiii) All above to be developed from Unit IT System
6	xiv) All spares (Initial and O&M) items to have tags (wono, item customer order no, customer item.description)
7	xv) Supply of spares by Vendor should also be instructed for following point 2,3,4,5,6 mentioned above.

Action By : Sites on arrival of spares (Initial and O&M)Receipt .

	Activity
1	Material utilized if any from Initial and O&M spares , should have prior written approval of concerned MUs. Such MUs shall also confirm replacement dates which should be entered in the system for creation of repository.



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5.0 DETAILS OF DRAWINGS/FIGURES ENCLOSED

FIG-1: Details Of Cubicle Packing Box

FIG-2: Binding Of Panel

FIG-3: Lifting Of Packed Case

NOTE: 1) Spreaders are to be used only for lifting the case.

2) Spreaders are wooden items & not nailed to the case.

3) Height between crane hook & spreaders to be kept Minimum to void rotation of case while lifting.

FIG-4: Lifting And Moving Un Packed Case

FIG-5: Marking Plate

FIG-6: Closed Packing Case With G.I. Sheet Showing Layers Of Packing Materials.

FIG-7: Mechanical Latching Clamp

FIG-8 to 15 : Sample Packing drawing of single/ double / triple & four suit pane.l



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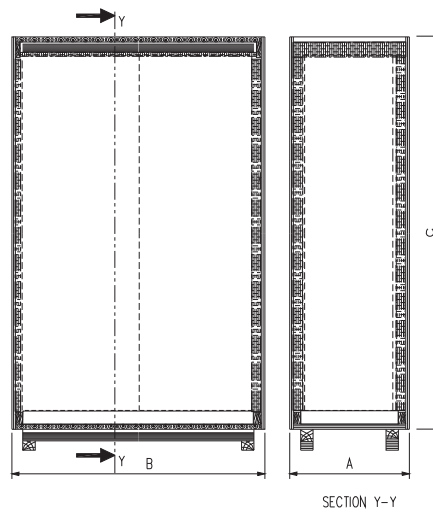


FIG-1 : DETAILS OF CUBICLE PACKING BOX.



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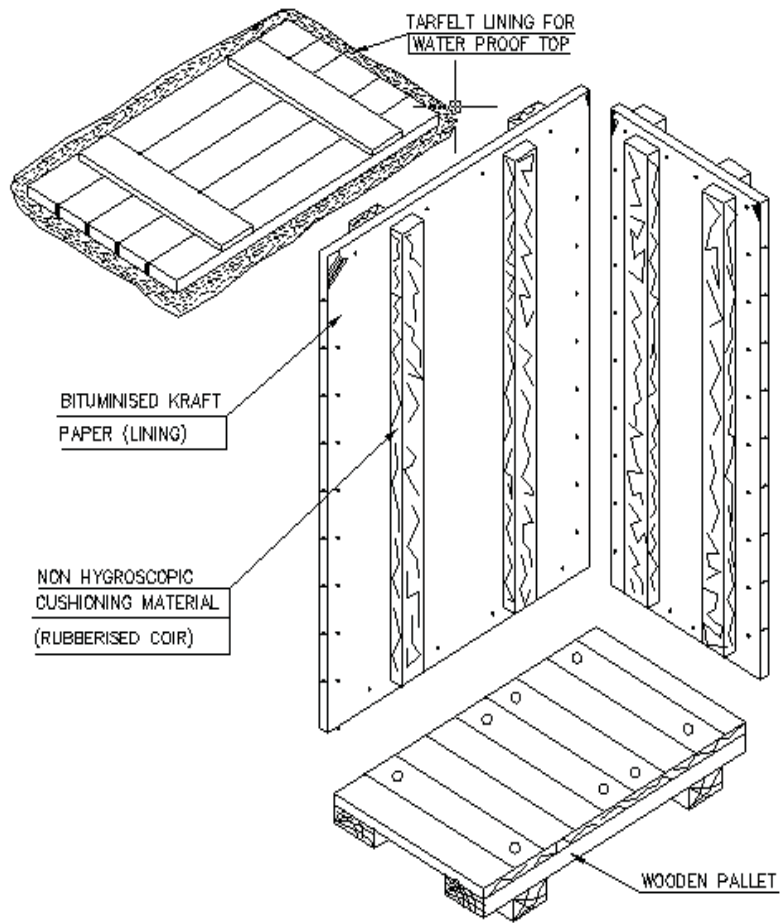


Fig. 2 : Binding of Panel



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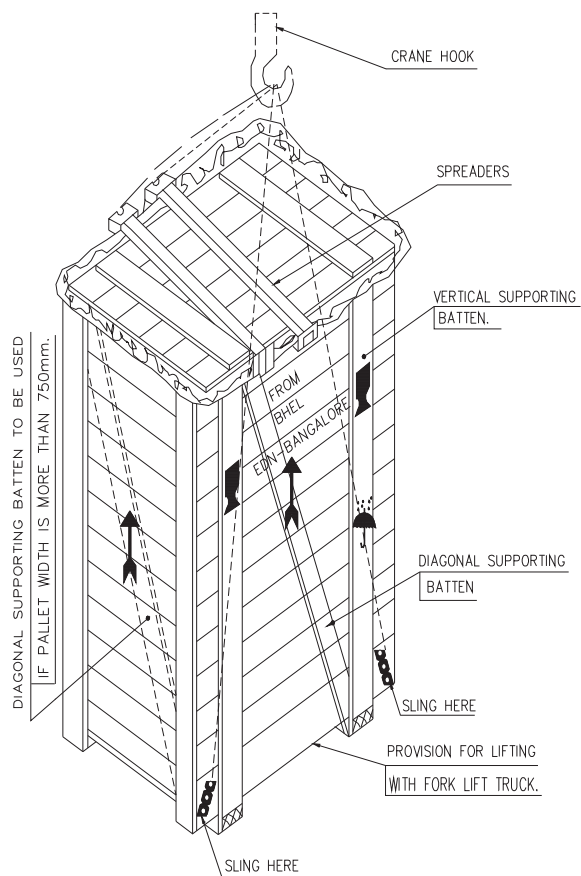


FIG-3 : LIFTING OF PACKED CASE.



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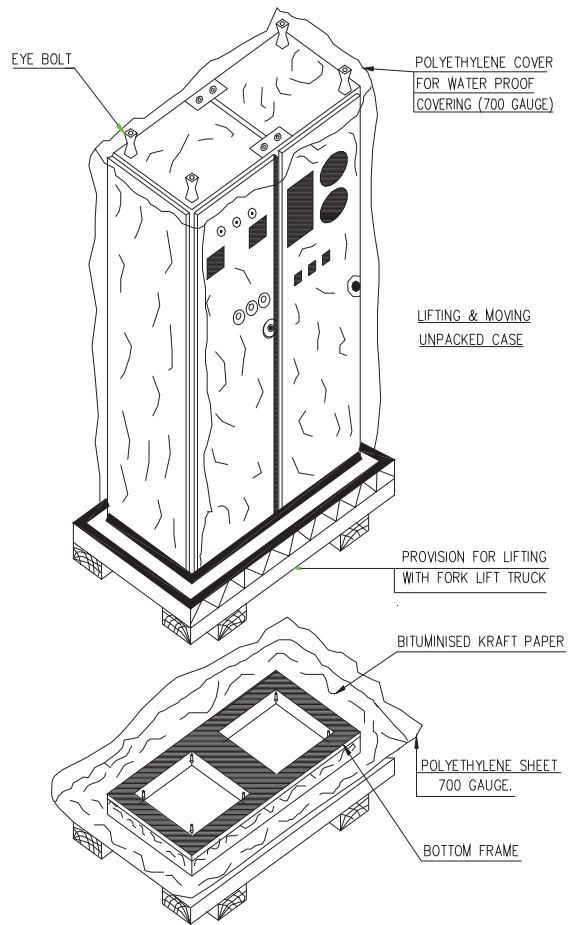


FIGURE-4

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		BHEL – EDN – BANGALORE – 26					
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					

225

170

FIG-5 : MARKING PLATE.



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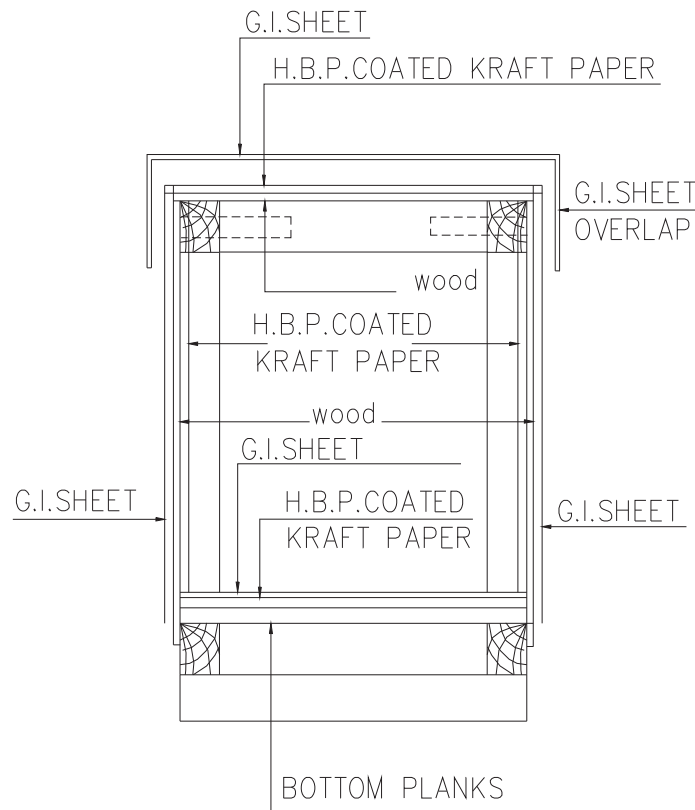


FIG-6 : CLOSED PACKING CASE WITH G.I.SHEET
SHOWING LAYERS OF PACKING MATERIALS.

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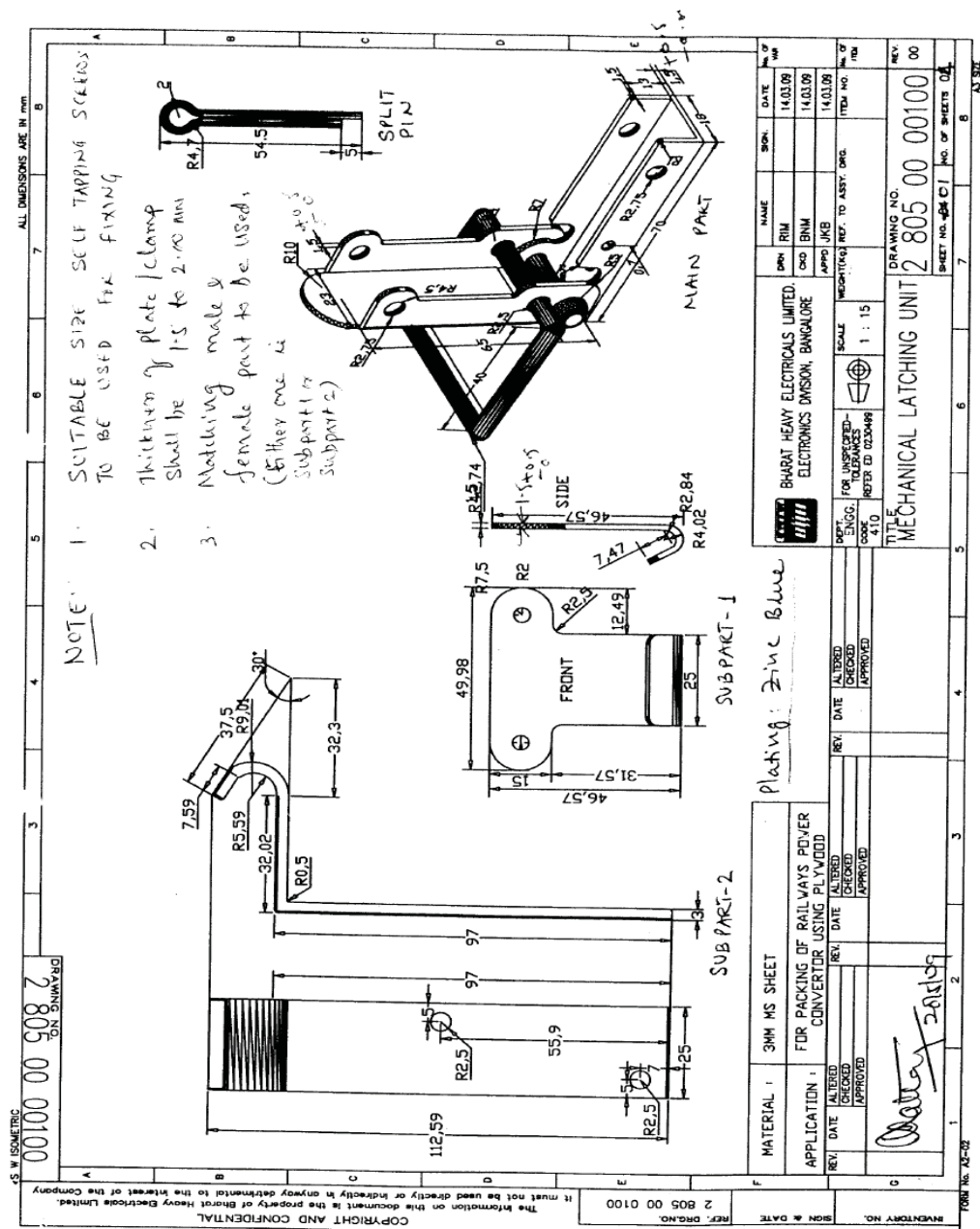


Fig – 7 : Mechanical Latching Clamp



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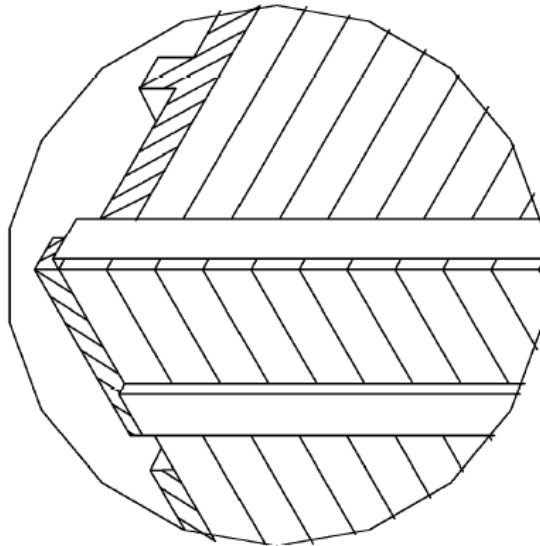
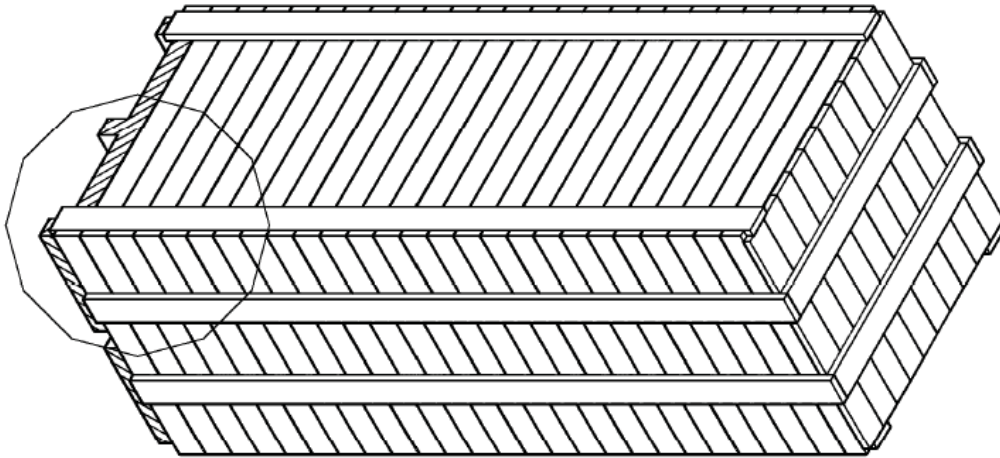


Fig – 8 : Single Suit Cubicle Packing View

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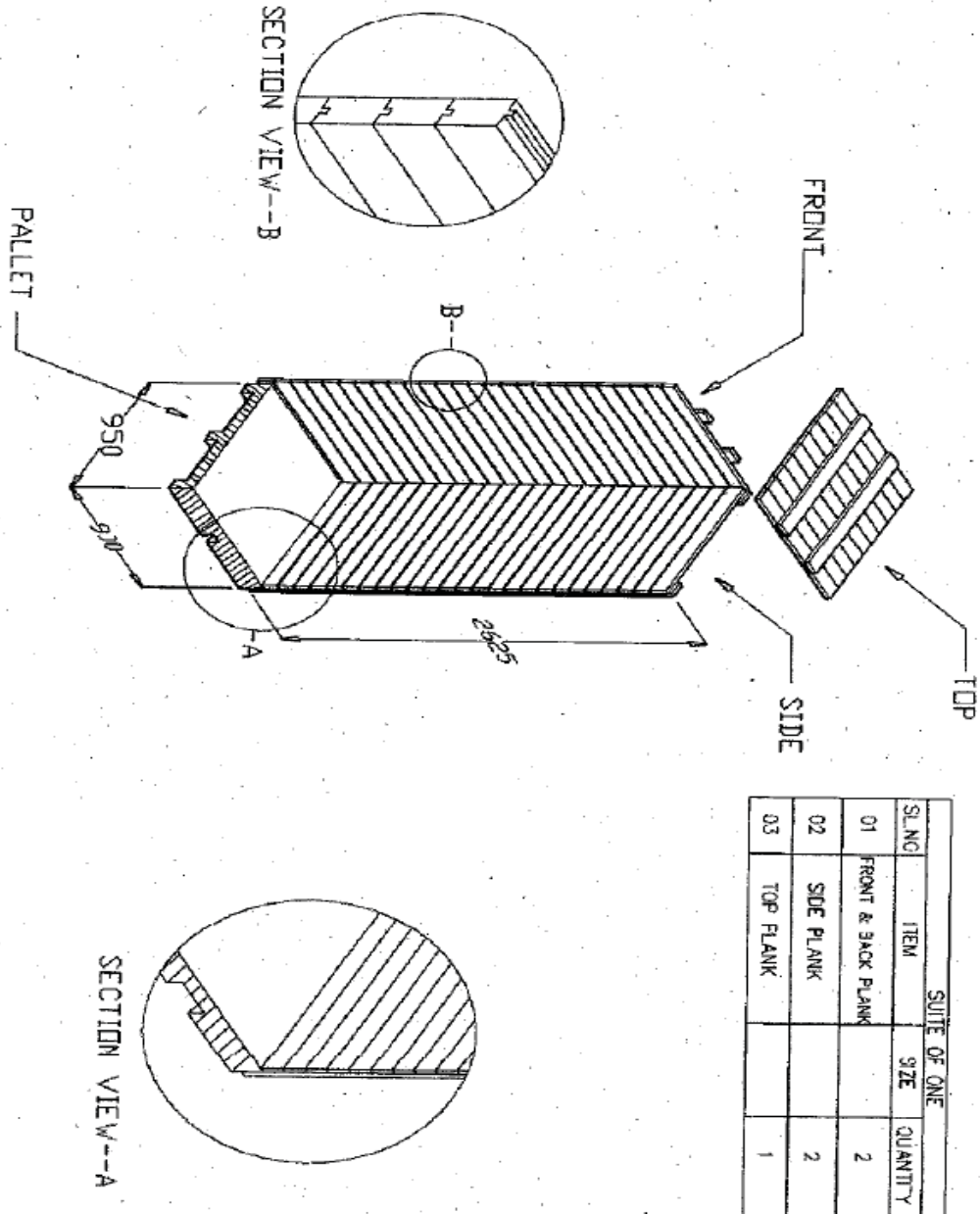


Fig – 9 : Single Suit Packing Assembly Drawing



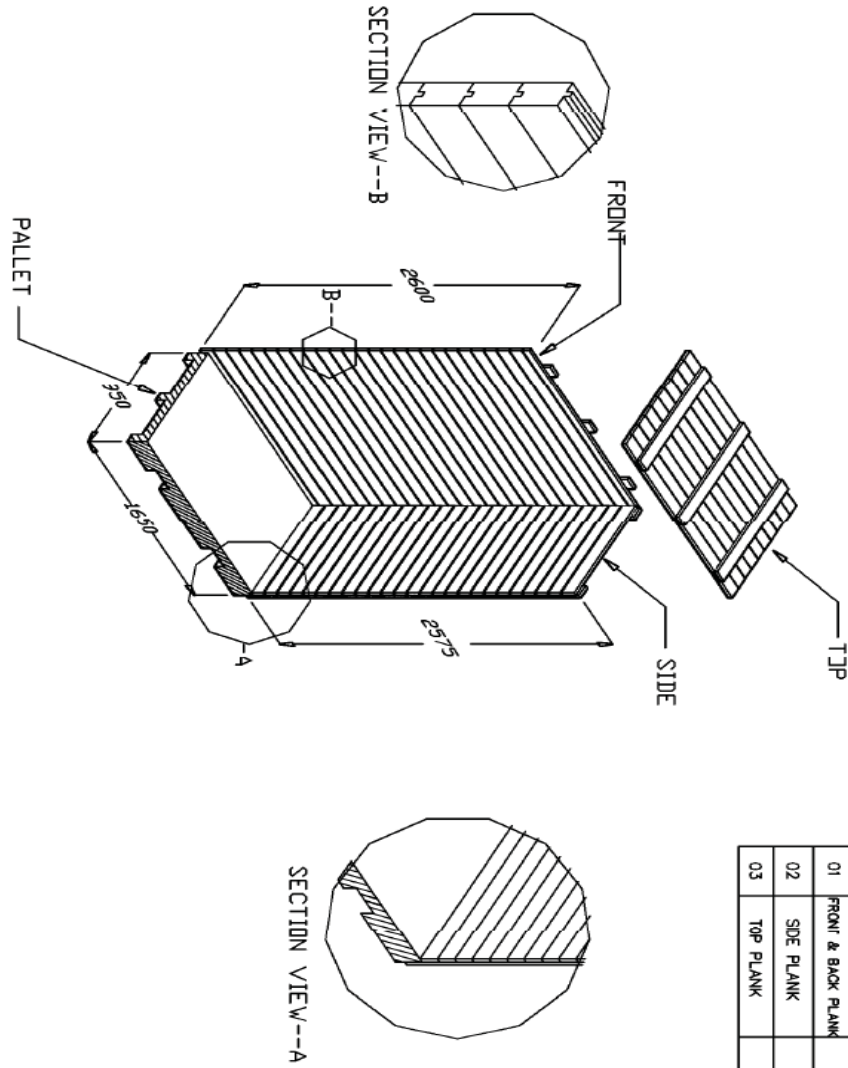
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SUITE OF ONE			
S/NO	ITEM	SIZE	QUANTITY
01	FRONT & BACK PLANK		2
02	SIDE PLANK		2
03	TOP PLANK		1

Fig – 10 : Two Suit Packing Assembly Details



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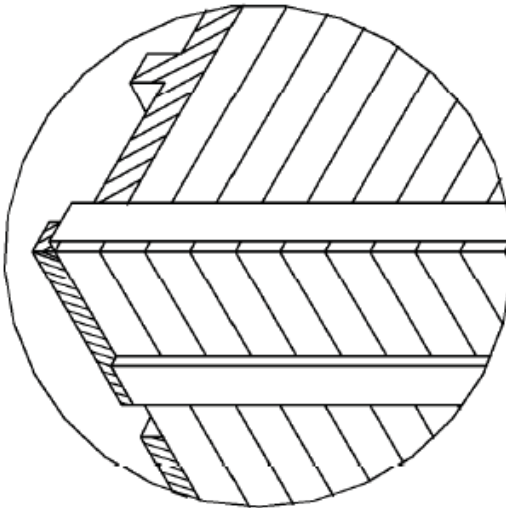
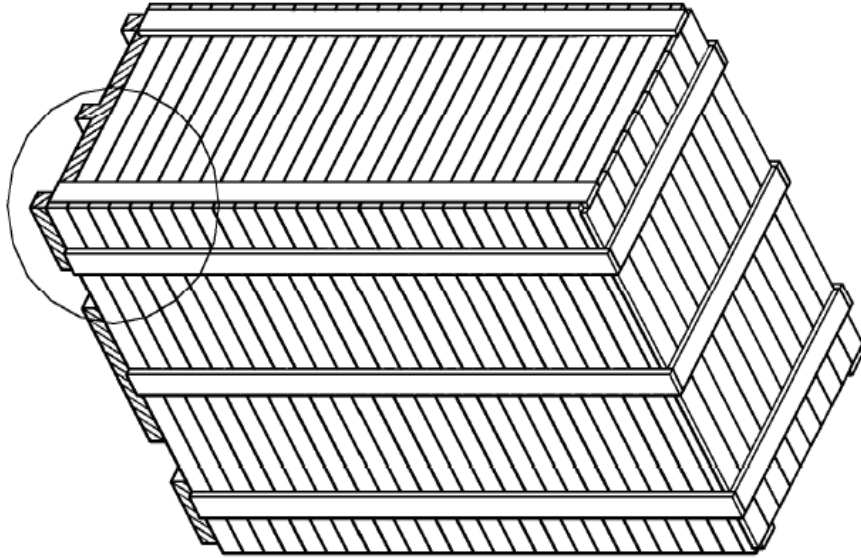


Fig – 11 : Two Suit Panel Packed view



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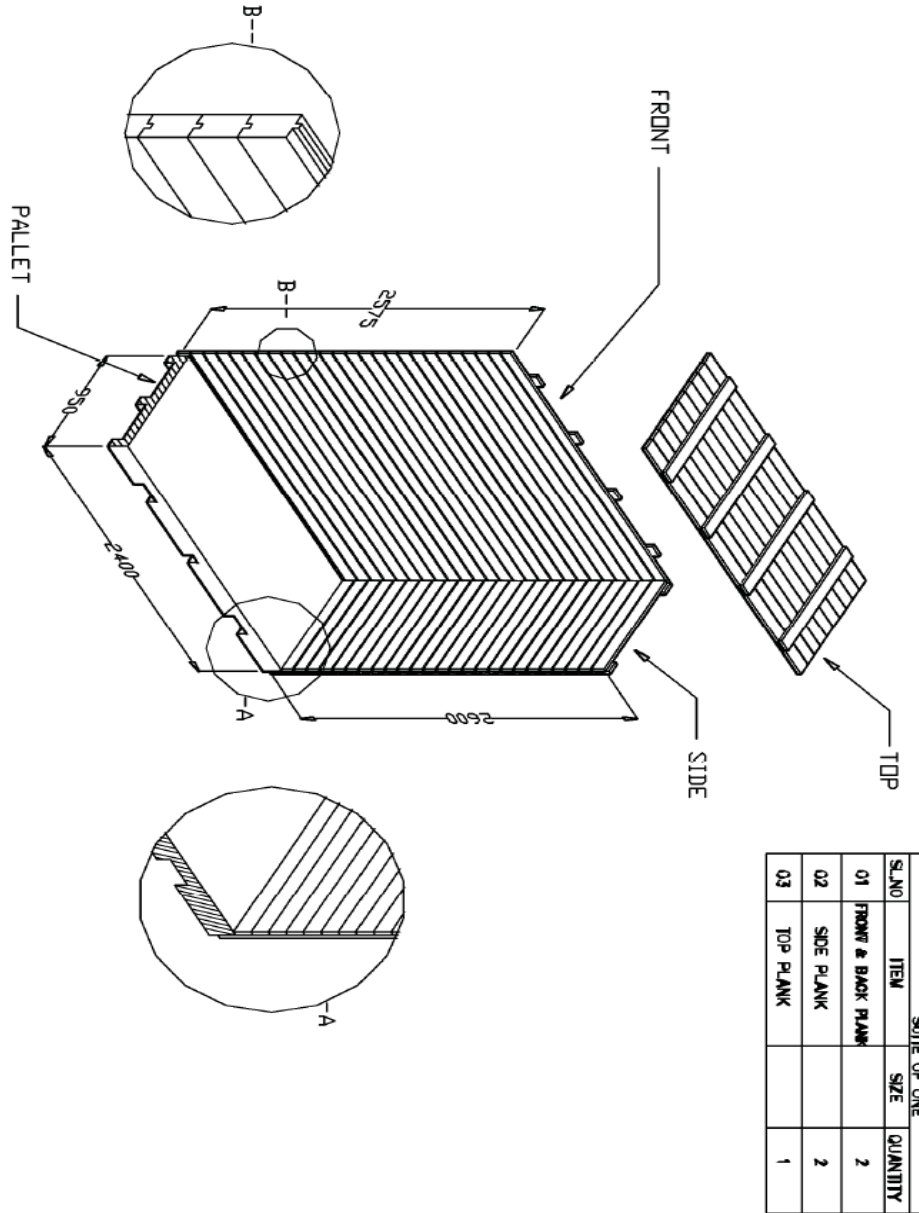


Fig – 12 : Three Suit Panel Packing Assembly View



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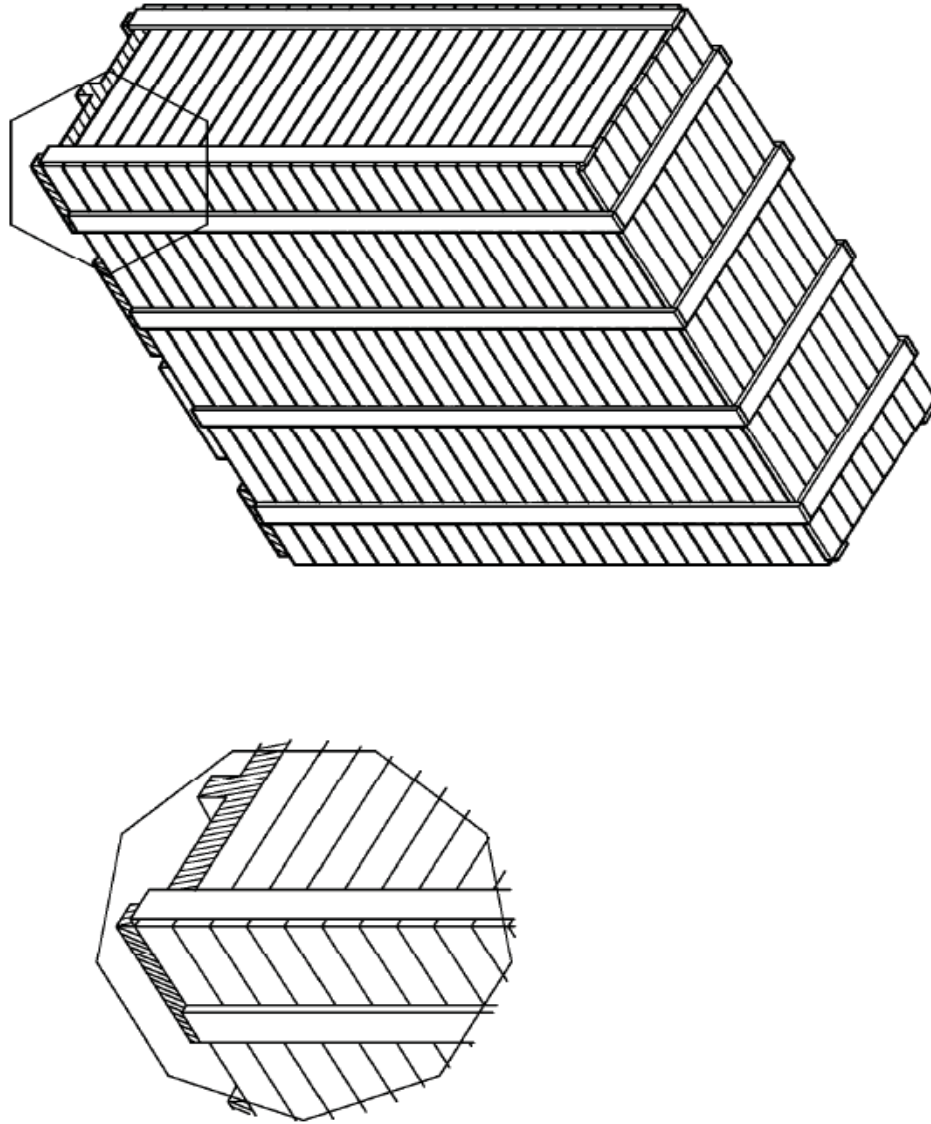


Fig -13 : Three Suit Panel Packed View



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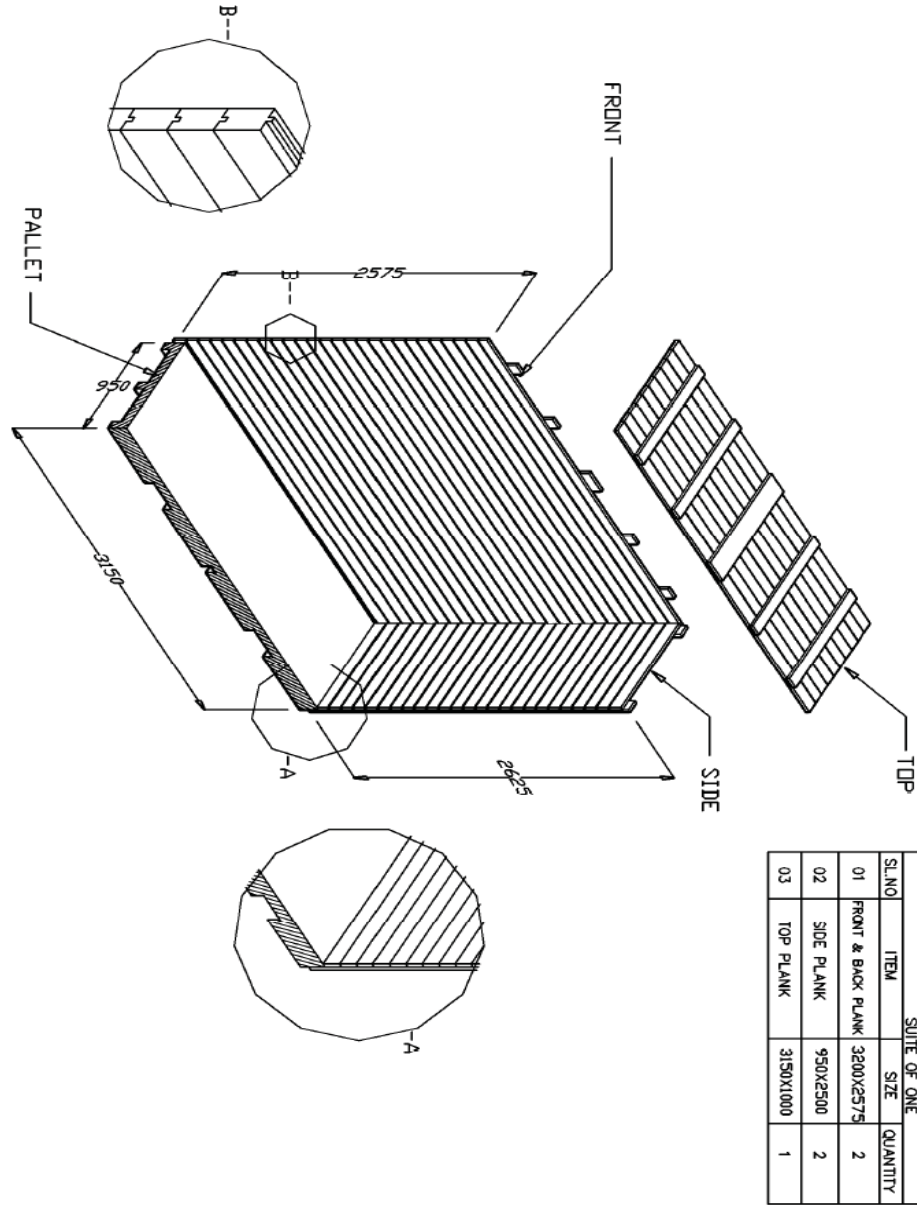


Fig – 14 : Four Suit Panel Packing assembly Detail



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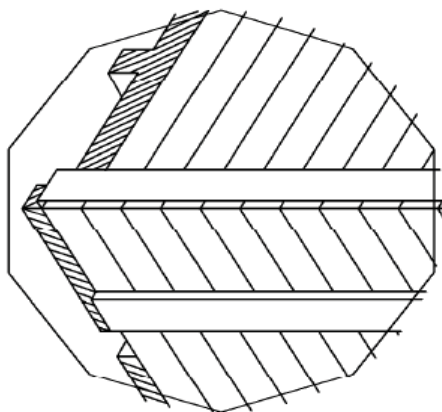
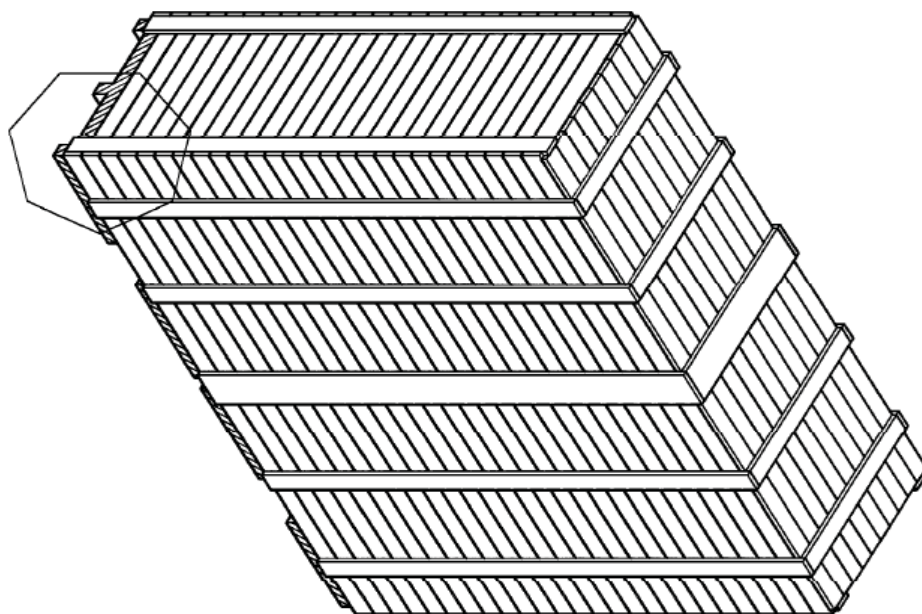
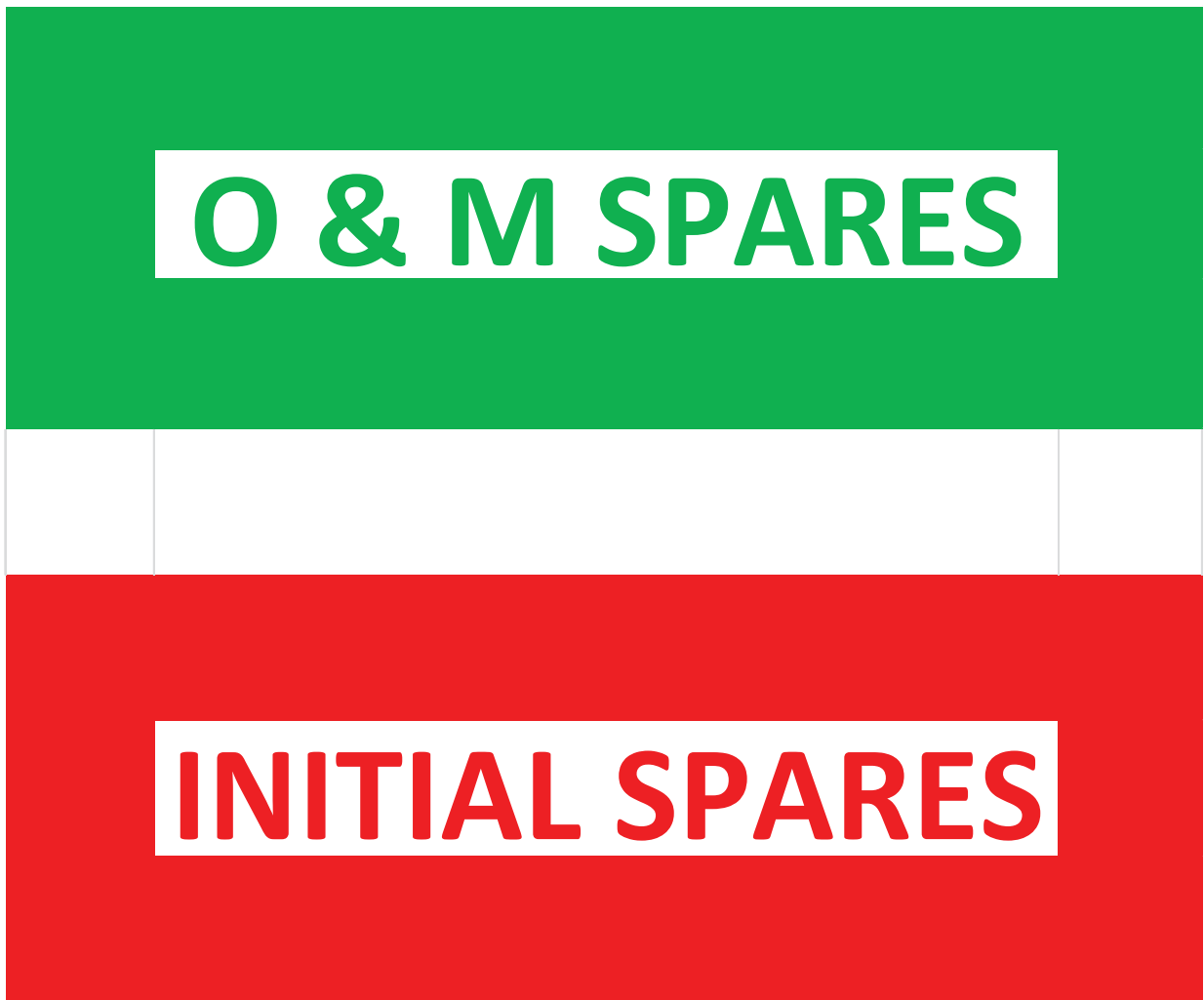


Fig -15 : Four Suit Panel Packing View

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Easy spares [Initial and O&M] Traceability and Identification at units and as well as at sites:

Fig: 14



ENGINEERING CHECKLIST

ITEM : SWAS

PROJECT: UPPUR 2X800 MW

Important Note: Bidders to Mandatorily fill the below checklist (with Company seal and Signature), otherwise offers shall be rejected.

Sl. No.	DESCRIPTION	NOT CONFIRMED (If applicable Please Tick Mark 'v')	CONFIRMED (If applicable Please Tick Mark 'v')
1	"Bidder/OEM/System Integrator shall have successfully completed design, engineering, procurement, manufacturing, shop testing, erection and commissioning of SWAS, which had guaranteed and trouble free performance has been proven at least for Two (02) Years as on 01.10.2015, in not less than two (02) Nos of different reheat type pulverized coal fired units of unit size not less than 500 MW except some specific requirements indicated elsewhere."		
2	Compliance to Each point in PQR		
3	All Analysers shall have 2 x 4-20 mA, galvanically isolated outputs and relay contacts for alarms shall be provided as per Specs.		
4	All offered analyser shall be suitable for 240 V supply & shall be 4 wire analysers.		
5	Mandatory spares shall be offered against each line item of the specs. If any item is not available meeting the description of the specs, then functionally equivalent item shall be offered against that line item.		
6	Pl. furnish the cell constants for each Tag No. and confirm that in the event of any change in cell constant required during approval stage, same shall be done without any commercial implication.		
7	Analysers are with digital communication facility like RS485 / HART / Modbus / Profibus		
8	All sample wetted parts & Sampling tubes/coil of Primary & Secondary coolers shall be SS316 material. Also cooling water lines from headers to Coolers shall be SS 316		
9	Pl. confirm that offer includes high pressure reducing valve in the primary rack for all High Pr. Samples (>100 Kg/cm2		
10	Chiller for the project shall have required capacity for the system (Minimum 5 TR) & shall be with SS 316 Tank		
11	1 time Gas filling shall be considered for Chiller at site during commissioning/handling over. This is in addition to gas filling done for functional checking during inspection at vendor works.		
12	Packing shall be as per corporate standard indicated in Specs		
13	Pl. confirm that all analyzers shall be provided with all consumables & reagents required for 12 months operation after commissioning of system.		
14	All items with limited shelf life shall be supplied during commissioning only. If any items require replacement due to expiry of shelf life, same shall be replaced without any commercial implication to BHEL-EDN (Such as Tygon tube, pH Cells, DO sensors, Reagents).		
15	All headers in Primary racks & Wet Panel shall be supplied with suitable sized counter and mating flanges. In addition to this, 1 set of mating & counter flanges shall be provided for all the cooling water headers for connecting to tapping point in field.		
16	Pl. confirm that that IBR certified Isolation valve, Blowdown valves in primary rack shall be offered, and for primary coolers IBR certified coil/U-stamped cooler shall be offered.		
17	Pl. confirm that all components/accessories required to meet the intent of the specification shall be offered. If it is found, at any stage of procurement /commissioning, that some components/accessories have not been offered/supplied, same shall be supplied without any cost/time implication to BHEL to meet the system / product requirement		
18	Pl. confirm that for tubing between wet and dry panel suitable DFDC connectors shall be provided		
19	Pl. confirm that Insulation of Pipe between Chiller and wet panel shall be done at site.		
20	Pl. confirm that stream selector shall be with pulse based selection.		
21	Mandatory Spares shall be sent in pre-decided lots in containers /secure boxes distinctly marked in Red colour with boldly written "S" mark on each face of the containers /secure boxes.		
22	Pl. confirm that There is no deviation w.r.t Purchase Specifications.		
23	At later stage if it is found that vendor offer is not in line with tender specification then vendor to supply material in line with tender specification without any price impact to BHEL.		

(Company seal and Signature)



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भारत हेवी इलेक्ट्रिकल्स लिमिटेड
Bharat Heavy Electricals Ltd.,
(A Government of India undertaking)
Electronics Division

Page 1 of 3

CE: PR: 003- Rev 01

PB 2606 , Mysore Road Bangalore , 560026 INDIA

SPECIAL COMMERCIAL CONDITIONS OF CONTRACT

Reference is brought to BHEL's Instructions to Bidders (Document Ref: CE: PR: 001- Rev 01) and General Commercial Conditions for Contract (Document Ref: CE: PR: 002- Rev 01).

These two documents along with Special Conditions of Contract annexed to this RFQ will form an integral part of the contract as and when the RFQ culminates into a Purchase Order / Contract.

RFQ No: MGR0000265

RFQ Date: 14/06/18 ; Due Date: 06/07/2018

Customer/Project: TANGEDCO / UPPUR (2x800 MW) STPP-BTG Package

Item Description: Steam and Water Analysis System - Analysers + Sample Handling System

TYPE OF BID: ~~SINGLE PART BID~~ / ~~TWO PART BID~~ / THREE PART BID

Purchase Executives: Clarifications with regard to the tender shall be addressed to purchase officers whose e-mail IDs are given below:

mounishg@bhel.in or kanimozhid@bhel.in

Splitting of tendered quantity to MSE vendors: The tendered quantity ~~will~~ /will not be split to MSE vendor/s ~~subject to submission of relevant documents by vendors. Refer clause I of Instructions to Bidders for conditions applicable and for information on documents to be submitted.~~

Destination: a) For Indigenous scope of supply, items are to be directly despatched to BHEL/Customer Stores located at **Uppur project site in Ramanathapuram Dist. of Tamilnadu state**. Consignee details and Road Permit, if applicable, will be issued by BHEL along with Despatch Clearance.

b) For Imported scope of supply, destination is Bangalore port. In case of shipment by sea, port of discharge will be Chennai seaport and port of delivery shall be ICD,Bangalore.

Project Benefits:

Imported scope of supply:

- ~~a) DEEC / EPCG/DFIA/ Physical Export contract: Eligible for "NIL" Basic Customs Duty.~~
- ~~b) Project Imports: Eligible for Basic Concessional Customs Duty.~~
- ~~c) Basic Custom duty and Cess on Basic Custom duty are reimbursable by customer.~~

All Analysers & Spares are eligible for "NIL" Basic Customs Duty.

Note.a : Any change in project status/duty benefits will be intimated before price-bid opening/RA.

Terms of Delivery:

• **Indigenous scope of supply:**

Ex-works < station of dispatch > (including Packing & Forwarding charges but excluding Taxes & Duties).

• **Imported scope of supply:**

F.C.A. (for air consignments) < indicate international port of dispatch > / C.I.F. (for sea consignments) < ICD,Bangalore > (including Packing, Forwarding, Handling, Ancillary charges like processing of Sight Draft/ Letter of Credit, negotiation of bank documents, Export declaration, Country of Origin etc.).

Kindly indicate the approximate weight of the total imported consignment, which is required for calculating air-freight charges:

Under-mentioned details shall be provided against indigenous supplies:

a. GSTIN (no.) of place of supply: _____

b. HSN (Harmonized System of Nomenclature) code: _____
 Applicable tax and Rate: _____ & _____

Note.b: Please ensure the suitable packing standard to avoid damages during transit.

I. Bidders to mandatorily provide confirmation/compliance for the under-mentioned terms:

SL NO.	TERMS	BHEL ACCEPTABLE TERM	BIDDER'S CONFIRMATION	REMARKS,if any
01	Reverse Auction	BHEL's decision for opting Reverse Auction or price-bid opening, will be intimated separately to qualified bidders after finalization of techno-commercial evaluation. In case BHEL does not resort to Reverse Auction, the price bids and price impacts (if any) shall be opened as per BHEL's standard practice. Note: Non-acceptance to participate in RA may result in non-consideration of the bid, in case BHEL decides to go for RA.	AGREE	
02	Parting of license for imported raw materials	In case of projects where Basic Custom Duty is NIL and vendor is importing any raw materials / components for the enquired item, same are eligible for Zero Customs duty. As per EXIM policy, BHEL will part the import licence with the vendors to obtain import licence by themselves and custom clear the raw materials / components by availing zero customs duty. Hence, please furnish list of raw materials / components to be imported by you with Quantity and CIF value (for which BHEL has to share import licence). The benefit due to the above shall be passed on to BHEL and confirmed in the quotation. If there are no imported raw materials/components, same shall be confirmed in the offer.	AGREE CIF value Yes, benefit passed on to BHEL in the priced quotation. (or) We confirm that there are no imported components	
03	Delivery Period	Within <u>08</u> weeks from the date of issue of Manufacturing clearance along with approved document. However for Commissioning spares and all consumable items, delivery shall be within <u>06</u> weeks from the date of accordance of manufacturing clearance by BHEL at the time of commissioning of equipment. Delay in contractual delivery will attract Penalty as per GCC Clause no.:04.b.	AGREE weeks	
04	Terms of Payment at the time of material supply	Refer Clause "F" of Instructions to Bidder for BHEL standard Payment terms and loading factors applicable for non-compliance against payment terms: Indigenous Scope : a) Supply with Erection & Commissioning b) Supply with Erection Supervision & Commissioning c) Supply only Imported Scope : d) Supply with Erection & Commissioning e) Supply with Erection Supervision & Commissioning f) Supply only High-Sea sales : g) Supply with Erection & Commissioning h) Supply with Erection Supervision & Commissioning i) Supply only Spares: c) and/or f/i) depending upon the scope	AGREE	

II. Bidder to note that Deviations shall not be permitted for the below mentioned terms and are deemed to be complied. In case of non-compliance/deviation, offer shall be liable for rejection:

- (1) **Submission of documents post PO viz., drawings /data sheet etc. as indicated in Cl: 04 of GCC:** Within 02 weeks from the date of receipt of Purchase Order. Delay in submission of complete set of specified documents in NIT, will attract Penalty as per GCC

Clause no.:04.a.

- (2) **Validity:** The offer will be valid for a period of 120 days from the date of part-I bid opening and in case of Negotiation/ Counter-offer/Reverse Auction, price validity will apply afresh for a period of 60 days from the date of according final price by bidder (or) up to original validity period, whichever is later.
- (3) **Guarantee/ Warranty:** 36 months from the date of dispatch of goods or 30 months from the date of commissioning of goods, whichever is earlier. However, Warranty for Commissioning Spares and all Consumables is applicable only for a period of 12 months from the date of dispatch of goods.
- (4) **Performance Bank Guarantee (PBG):** PBG will be applicable for a period of 36 months from the date of dispatch of goods + claim period of 03 months, for a value equal to 10% of the basic value of the purchase order. It shall however be noted that PBG is not applicable against supply of Commissioning Spares and all Consumables.
Refer Clause "H" of Instructions to Bidders. Also note that PBG should be in the format specified in Annexure VII of ITB and no deviation to this format will be allowed.
Note: In case PBG is not furnished, the 10% basic amount will be withheld from the supply invoice. This withheld amount will be paid either against submission of supplementary invoice & Original PBG (or) against supplementary invoice without PBG after expiry of Warranty period.
- (5) **Despatch Documents:** Complete set of despatch documents (original + 1 photocopy set) as per Purchase Order shall be forwarded to Purchase Executive/BHEL directly. Depending upon the project/customer demands, despatch documents may include one or more documents from the following: Invoice (02 sets of original), Lorry Receipt (L/R), Packing List, Air Way Bill (AWB)/Bill Of Lading (BOL), Copy of High Sea Sales (HSS) agreement, Country of origin certificate, NIL Short Shipment Certificate, Original Performance Bank Guarantee (directly from issuing bank to BHEL), insurance intimation letter, POD (Proof of Delivery) on L/R.
The precise list of despatch documents needed for the project will be specified in the Purchase Order.
One set of Invoice, Packing List and L/R or AWB shall be e-mailed/faxed immediately to BHEL-EDN after despatch.
- (6) **Freight Charges (for indigenous scope of supply):** Freight charges shall be to vendor's account. Bidder to quote lump sum reasonable Freight charges along with applicable tax, in priced offer.
- (7) Commissioning Spares and all Consumables are to be arranged for dispatch to project site only after receiving manufacturing clearance from BHEL which will be based on the requirement of these items at project site as per commissioning schedule of the equipment.
- (8) **Evaluation criteria for tendered item/s:**
~~Item wise evaluation of tendered item.~~
(or)
Item/s shall be evaluated and procured as a combined package. However, separate purchase orders will be released for Main supply and Spares supply.

~~(9) **Integrity Pact:** Execution of Integrity Pact is applicable for this tender (Refer clause "K" of Instructions to Bidders).~~

Details of IEM for this tender are mentioned below:

Name: _____ Address: _____ Email: _____

~~(10) Comprehensive Annual Maintenance Contract:~~

~~CAMC will be applicable for a period of 04 years from the date of expiry of warranty period (or) from the date of completion of commissioning of equipment, whichever is later.~~

~~In case the quoted total AMC value is less than 20% of the main supply value, BHEL shall evaluate Bidders Price deducting differential amount from main supply price and apportioning towards AMC charges.~~

~~Refer Sl. no. 'j' under Clause 'F' of Instructions to Bidder for Payment term.~~

With this, we hereby confirm that all the terms & conditions as indicated in Instructions to Bidders (Document Ref: CE: PR: 001- Rev 01) & General Commercial Conditions for Contract (Document Ref: CE: PR: 002- Rev 01) are accepted without any deviation.

Vendor's Signature with Seal

Note c: The above filled-in document shall be furnished as part of Techno-commercial Bid without fail.



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भारत हेवी इलेक्ट्रिकल्स लिमिटेड

Bharat Heavy Electricals Ltd.,
(A Government of India undertaking)
Electronics Division

PB 2606 , Mysore Road Bangalore , 560026 INDIA

CE:PR:001- Rev 01

INSTRUCTIONS TO BIDDERS

Bidder is requested to read the instructions carefully and submit their quotation taking into consideration of all the points:

A. GENERAL INSTRUCTIONS:

1. Any Purchase Order resulting from this enquiry shall be governed by the Instructions to Bidders (document reference: CE: PR: 001 – Rev 01), General Conditions of Contract (document reference: CE: PR: 002 - Rev 01) and Special Conditions of Contract, if any, of the enquiry.
2. Any deviations from or additions to the “General Conditions of Contract” or “Special Conditions of Contract” require BHEL’s express written consent. The general terms of business or sale of the bidder shall not apply to this tender.
3. Regret letter (either through post or by mail or by EPS) indicating reasons for not quoting must be submitted without fail, in case of non-participation in this tender. Supplier shall be liable for removal as a registered vendor of BHEL when the supplier fails to quote against four consecutive tender enquiries for the same item or all enquiries in last two years for the same item, whichever is earlier.
4. Procurement directly from the manufacturers is preferred. However, if the OEM/ Principal insist on engaging the services of an agent, such agent shall not be allowed to represent more than one manufacturer/ supplier in the same tender. Moreover, either the agent could bid on behalf of the manufacturer/ supplier or the manufacturer/ supplier could bid directly but not both. Agent/Representative authorized by the OEM/Principal in turn cannot further sub authorize any other firm for submitting the offer or for placement of order.

In case bids are received from the manufacturer/ supplier and his agent, bid received from the agent shall be ignored.

5. Consultant / firm (and any of its affiliates) shall not be eligible to participate in the tender/s for the related goods for the same project if they were engaged for consultancy services for the same project.
6. If an Indian representative/associate/liaison office quotes on behalf of a foreign based bidder, such representative shall furnish the following documents:
 - a. Authorization letter to quote and negotiate on behalf of such foreign-based bidder.
 - b. Undertaking from such foreign based bidder that such contract will be honored and executed according to agreed scope of supply and commercial terms and conditions.
 - c. Undertaking shall be furnished by the Indian representative stating that the co-ordination and smooth execution of the contract and settlement of shortages/damages/replacement/repair of imported scope till the equipment is commissioned and handed over to customer will be the sole responsibility of the Indian representative/associates/agent/liaison office.
 - d. Refer **Annexure I** on “Guidelines for Indian Agents”.
7. In case of imported scope of supply, customs clearance & customs duty payment will be to BHEL account after the consignment is received at Indian Airport /Seaport. Bidders must provide all original documents required

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for completing the customs clearance along with the shipment. Warehousing charges due to incomplete or missing documentation will be to supplier's account. All offers for imported scope of supply by air, must be made from any of the gateway ports (within the country) indicated (**Refer Annexure II**).

8. The offers of the bidders who are on the banned list and also the offers of the bidders, who engage the services of the banned firms, shall be rejected. The list of the banned firms is available on BHEL website: http://www.bhel.com/vender_registration/vender.php
9. Business dealings with bidders will be suspended if they are found to have indulged in any malpractices/misconduct which are contrary to business ethics like bribery, corruption, fraud, pilferage, cartel formation, submission of fake/false/forged documents, certificates, information to BHEL or if they tamper with tendering procedure affecting the ordering process or fail to execute a contract, or rejection of 3 consecutive supplies or if their firms / works are under strike/lockout for a long period. Bidder may refer "Guidelines for Suspension of Business Dealings with Suppliers/ Contractors" available on www.bhel.com for more details.
10. 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 your notice.

B. GUIDELINES FOR PREPARATION OF OFFER:

1. Quotation shall be submitted in Single Part Bid, Two Part Bid or Three Part Bid, as called for in the tender:
 - **SINGLE PART BID:** Technical and Commercial Bid with prices along with price summary & filled in BHEL Standard Commercial terms and conditions in a single sealed envelope.
 - **TWO PART BID:** Unpriced offer i.e. "Techno-commercial Bid" with filled in BHEL Standard Commercial terms and conditions in a sealed envelope **along with the copy of the "Price Bid" without the prices** should be enclosed in one cover and the cover must be super scribed "**Techno-commercial offer**) and Priced offer i.e. "Price Bid" containing price summary in a separate sealed envelope and must be super scribed "**Price Bid**". Both these envelopes shall be enclosed in a single sealed envelope superscribed with enquiry number, due date of tender and any other details as called for in the tender document.
 - **THREE PART BID:** Pre-qualification Bid (Part-I), Techno Commercial Bid with filled in BHEL Standard Commercial terms and conditions (Part-II), and Price Bid (Part-III). All three envelopes shall be enclosed in a single sealed envelope superscribed with enquiry number, due date of tender and any other details as called for in the tender document.

If any of the offers (Part I, Part II or Part III) are not submitted before the due date and time of submission (or) if any part of the offer is incomplete, the entire offer of the bidder is liable for rejection.

2. Supplier shall ensure to superscribe each envelope with RFQ number, RFQ Date, RFQ Due date and time, Item Description and Project clearly & boldly. Also mention on the envelope whether it is "Techno Commercial Bid" or "Price Bid" or "Pre-Qualification Bid". Please ensure complete address, department name and purchase executive name is mentioned on the envelope (before dropping in the tender box or handing over) so that the tender is available in time for bid opening.
3. BHEL standard Commercial Terms and Conditions (duly filled, signed & stamped) must accompany Technical-Commercial offer without fail and should be submitted in original only.

The above indicated submission of Offers in "sealed envelope/hard copy" as mentioned in points B.1-B.3 is applicable for tenders that are not floated through E-Procurement System (EPS).

4. Validity: Unless otherwise specified in SCC (special commercial conditions of contract), the offer will be valid for a period of 90 days from the date of part-I bid opening and in case of Negotiation/Counter-offer/Reverse



Auction, price validity will apply afresh for a period of _60_ days from the date of according final price by bidder (or) upto original validity period, whichever is later.

5. Any of the terms and conditions not acceptable to supplier, shall be explicitly mentioned in the Techno-Commercial Bid. If no deviations are brought out in the offer it will be treated as if all terms and conditions of this enquiry are accepted by the supplier without deviation.
6. Deviation to this specification/item description, if any, shall be brought out clearly indicating "DEVIATION TO BHEL SPECIFICATION" without fail, as a part of Techno-Commercial Bid. If no deviations are brought out in the offer it will be treated as if the entire specification of this enquiry is accepted without deviation.
7. Suppliers shall submit one set of original catalogue, datasheets, bill of materials, dimensional drawings, mounting details and/or any other relevant documents called in purchase specification as part of Technical Bid.
8. "Price Bid" shall be complete in all respects containing price break-up of all components along with all applicable taxes and duties, freight charges (if applicable) etc. Once submitted no modification / addition / deletion will be allowed in the "Price Bid." Bidders are advised to thoroughly check the unit price, total price to avoid any discrepancy.
9. In addition, bidder shall also quote for erection & commissioning charges/erection supervision & commissioning charges (E&C service charges) if applicable, documentation charges, testing Charges (type & routine), training charges etc. as applicable along with corresponding tax. The price summary must indicate all the elements clearly.
10. For Physical Export projects or wherever services are rendered by foreign suppliers in India, bidders should indicate "lumpsum" Erection and Commissioning (or) Erection Supervision and Commissioning charges, as applicable (including To & Fro Fare, Boarding, Lodging, Local Conveyance etc.) for carrying out E&C activity and further handing over to customer. The quotation shall clearly indicate scope of work, likely duration of commissioning, pre-commissioning checklist (if any).
11. Wherever bidders require PAC (Project Authority Certificate)/applicable certificates for import of raw materials, components required for DECC,EPCG Power Projects, Export Projects or other similar projects wherein supplies are eligible for customs duty benefits, lists and quantities of such items and their values (CIF) has to be mentioned in the offer. Prices must be quoted taking into account of such benefits.
12. Prices should be indicated in both figures & words. 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. Any typographical error, totalling mistakes, currency mistake, multiplication mistake, summing mistakes etc. observed in the price bids will be evaluated as per **Annexure III** "Guidelines for dealing with Discrepancy in Words & Figures – quoted in price bid" and BHEL decision will be final.
13. Documents submitted with the offer shall be signed and stamped in each page by authorized representative of the bidder. However, this requirement is not mandatory for offers uploaded through E-Procurement System (EPS).

C. GUIDELINES FOR OFFER SUBMISSION:

The under-mentioned clauses 1, 2&3 will not be applicable for EPS tenders.

1. Offers / Quotations must be dropped in tender box before 13.00 Hrs. on or before due date mentioned in RFQ. The offers are to be dropped in the proper slot of the Tender Box kept in our reception area with caption "CE, SC&PV, DEFENCE". Tenders are opened on 3 days in a week (Monday/Wednesday/Friday). Tender must be deposited in the slot corresponding to the day (Monday - Box no.4/Wednesday - Box no. 6 /Friday - Box no.8) while depositing the offer.



2. E-Mail/ Internet/EDI offers received in time shall be considered only when such offers are complete in all respects. In case of offers received through E-mail, please send the offer to the email ID specified in the SCC document of the tender.
3. Offers of Vendors who already have a valid Technical/Commercial MOU with BHEL-EDN for the items of the RFQ shall mention the relevant MOU reference no. and give only such other details not covered in the MOU.
4. In cases where tender documents are bulky, or due to some reasons tender documents are required to be submitted by hand or through posts/couriers, the offers are to be handed over either of the two purchase officers whose names are mentioned in the SCC document of tender RFQ.
5. Tenders will be opened on due date, time and venue as indicated in the RFQ in the presence of bidders at the venue indicated in the RFQ. For EPS tenders, e-mail notifications will be automatically generated and forwarded to registered e-mail ID/s of bidders during opening of tenders.
6. Bidder will be solely responsible:
 - a. For submission of offers before due date and time. Offers submitted after due date and time will be treated as "Late offers" and will be rejected.
 - b. For submission of offers in the correct compartment of the tender box based on the day of due date (Monday/Wednesday/Friday). Please check before dropping your offer in the correct tender box.
 - c. For depositing offers in proper sealed condition in the tender box. If the bidder drops the tender in the wrong tender box (or) if the tender document is handed over to the wrong person, BHEL will not be responsible for any such delays.
 - d. For offers received through email etc., suppliers are fully responsible for lack of secrecy on information and ensuring timely receipt of such offers in the tender box before due date & time (This clause will not be applicable for EPS tenders).

The above indicated submission of Offers as mentioned in points 6.a-6.d is applicable for tenders that are not floated through EPS.

- e. In case of e-tender, all required documents should be uploaded before due date and time. Availability of power, internet connections, system/software requirements etc. will be the sole responsibility of the bidder. Wherever assistance is needed for submission of e-tenders, help-line numbers as available in the web-site of service provider of BHEL may be contacted.

Purchase Executive/ BHEL shall not be responsible for any of the activities relating to submission of offer.

D. PROCESSING OF OFFERS RECEIVED:

1. Any discount/ revised offer submitted by the supplier on its own shall be accepted provided it is received on or before the due date and time of offer submission (i.e. Part-I bid). The discount shall be applied on pro-rata basis to all items unless specified otherwise by the bidder.
2. Changes in offers or Revised offers given after Part-I bid opening shall not be considered as a part of the original offer unless such changes/revisions are requested by BHEL. In case of withdrawal of any Technical/Commercial deviation(s) by the bidder before opening of price bids/conducting the Reverse Auction, revision of price/impact bid will not be accepted.
3. In case there is no change in the technical scope and/ or specifications and/ or commercial terms & conditions, the supplier will not be allowed to change any of their bids after Technical bids are opened (after the due date and time of tender opening).
4. In case of changes in scope and/ or technical specifications and/ or commercial terms & conditions by BHEL and it accounts for price implications from bidders, all techno-commercially acceptable bidders shall be asked



by BHEL (after freezing the scope, technical specifications and commercial terms & conditions) to submit the impact of such changes on their price bid. Impact price will be applicable only for changes in technical specification / commercial conditions by BHEL. The impact price must be submitted on or before the cut-off date specified by BHEL and the original price bid and the price impact bid will be opened together at the time of price bid opening.

5. BHEL reserves the right to adopt Reverse Auction or standard Price Bid Opening procedure for price evaluation, at its discretion. This shall be decided after completion of techno-commercial evaluation of tender (Refer BHEL website http://www.bhel.com/vender_registration/vender.php for Guidelines of Reverse Auction). In case BHEL does not resort to Reverse Auction, the price bids and price impacts (if any) already submitted and available with BHEL shall be opened as per BHEL's standard practice.
6. Un-opened bids (including price bids) will be returned to the respective bidders after release of Purchase order. Regarding Offers for EPS tenders that get rejected on PQC/ techno-commercial grounds, the bids for the subsequent parts will not be opened i.e., both technical bid and price bid (Parts-II & III) will not be opened in case of rejection on PQC ground and price bid (Part-II/Part-III, as applicable) will not be opened in case of rejection on techno-commercial ground.
7. After receipt of Purchase Order, supplier should submit required documents viz., specified drawings, bill of materials, datasheets, catalogues, quality plan, test procedure, type test report, O & M Manuals and/or any other relevant documents as per Specification/Purchase Order, as and when required by BHEL/Customer.
8. Any deviation to the terms and conditions not mentioned in the quotation by supplier in response to this enquiry will not be considered, if put forth subsequently or after issue of Purchase Order, unless clarification is sought for by BHEL and agreed upon in the Purchase Order.
9. Evaluation shall be on the basis of delivered cost (i.e. "Total Cost to BHEL").

"Total Cost to BHEL" shall include total basic cost, packing & forwarding charges, taxes and/or duties (as applicable), freight charges, taxes on Services, customs clearance charges for imported items, any other cost indicated by bidder for execution of the contract and loading factors (for non-compliance to BHEL Standard Commercial Terms & Conditions). Benefits arising out of Nil Import Duty on DEEC, EPCG, DFIA Projects, Physical Exports or such 100% exemptions (statutory benefits), project imports, customer reimbursements of statutory duties (like Basic Customs Duty and cess on customs duty), Input tax credits as applicable will also be taken into account for arriving at the Total cost to BHEL (wherever applicable and as indicated in SCC document of tender).

For EPS tenders, it shall be noted that the prices (including discounts) vis-a-vis currency quoted in EPS portal only will be considered as Final for the purpose of evaluation of the lowest bidder. Bidder shall ensure to indicate the applicable taxes against each line item in online portal, failing to which the same will be considered as inclusive/NIL.

10. For evaluation of offers in foreign currency, the exchange rate (TT selling rate of SBI) shall be taken as under:

Single part bids:	Date of tender opening
Two/three part bids:	Date of Part-I bid opening
Reverse Auction:	Date of Part-I bid opening

In case of Performance Bank Guarantee (PBG) also, exchange rate will be considered as mentioned above for converting foreign currency to Indian currency and vice versa.

If the relevant day happens to be a bank holiday, then the exchange rate as on the previous working day of the bank (SBI) shall be taken.



11. Ranking (L-1, L-2 etc.) shall be done only for the techno-commercially acceptable offers.

E. INFORMATION ON PAYMENT TERMS:

1. All payments will be through Electronic Fund transfer (EFT). Vendor has to furnish necessary details as per BHEL standard format (**Refer Annexure IV**) for receiving all payments through NEFT.(Applicable for Indian vendors only)
2. In case of High Sea Sales transaction, customs clearance of the consignment landed on Indian Sea/Air ports will be done by BHEL based on the original HSS documents provided by vendors. All warehousing charges due to delay in submission of complete and or correct HSS documents to BHEL will be to supplier's account only. Such recovery will be made out of any of the available bills (**Refer Annexure V**).
3. Statutory deductions, if any, will be made and the deduction certificate shall be issued. In case vendor does not provide PAN details, the TDS deduction shall be at the maximum percentage stipulated as per the provisions of Income Tax Act.

In addition to the above, Foreign vendors shall also submit relevant details of their bankers like Swift Code, Banker's Name &Address etc.

4. Incomplete documentation will not be accepted. Delayed submission of invoice / documents may result in corresponding delay in payment. In this connection, request to also refer clause: G about invoicing & payment formalities under GST regime. Applicable documents shall be submitted to the purchaser at the time of execution of supplies/services for availing GST input credits.

F. STANDARD PAYMENT TERMS OF BHEL-EDN:

<u>PURCHASE ORDERS FOR:</u>	<u>SUPPLY WITH ERECTION & COMMISSIONING</u>	<u>SUPPLY WITH ERECTION SUPERVISION & COMMISSIONING</u>	<u>SUPPLY ONLY</u>
<u>INDIGENOUS PROCUREMENT</u>	a. 90% of basic value + 100% of taxes and freight charges will be paid in 45 days from the date of dispatch or 15 days from the date of submission of complete set of documentation, whichever is later. Balance 10% of basic value (Retention money) will be paid in 15 days from the date of submission of supplementary invoice/documents against proof of completion of E&C. <u>Note:</u> In case PBG is not furnished, only 80% payment will be released against 90% claim without the consent of Vendor. This 10% basic amount withheld towards PBG will be paid either against submission of supplementary invoice & Original PBG (or) against supplementary invoice without PBG after expiry of Warranty period.	b. 95% of the basic value + 100% of taxes and freight charges will be paid in 45 days from the date of dispatch or 15 days from the date of submission of complete set of documentation, whichever is later. Balance 5% of basic value (Retention money) will be paid in 15 days from the date of submission of supplementary invoice/documents against proof of completion of commissioning. <u>Note:</u> In case PBG is not furnished, only 85% payment will be released against 95% claim without the consent of Vendor. This 10% basic amount withheld towards PBG will be paid either against submission of supplementary invoice & Original PBG (or) against supplementary invoice without PBG after expiry of Warranty period.	c. 100% of PO value with taxes and freight will be paid in 45 days from the date of dispatch or 15 days from the date of submission of complete set of documentation, whichever is later.

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<u>PURCHASE ORDERS FOR:</u>	<u>SUPPLY WITH ERECTION & COMMISSIONING</u>	<u>SUPPLY WITH ERECTION SUPERVISION & COMMISSIONING</u>	<u>SUPPLY ONLY</u>
<u>IMPORT PROCUREMENT</u>	d. 90% of the basic value will be paid on the 45th day, against usance draft of 45 days, from the date of AWB/BOL on submission of complete set of documents. Balance 10% of basic value (Retention money) will be paid in 15 days from the date of submission of supplementary invoice/documents against proof of completion of E&C. <u>Note:</u> In case PBG is not furnished, only 80% payment will be released against 90% claim without the consent of Vendor. This 10% basic amount withheld towards PBG will be paid either against submission of supplementary invoice & Original PBG (or) against supplementary invoice without PBG after expiry of Warranty period.	e. 95% of the basic value will be paid on the 45th day, against usance draft of 45 days, from the date of AWB/BOL on submission of complete set of documents. Balance 5% of basic value (Retention money) will be paid in 15 days from the date of submission of supplementary invoice/documents against proof of completion of commissioning. <u>Note:</u> In case PBG is not furnished, only 85% payment will be released against 95% claim without the consent of Vendor. This 10% basic amount withheld towards PBG will be paid either against submission of supplementary invoice & Original PBG (or) against supplementary invoice without PBG after expiry of Warranty period.	f. 100% of PO value will be paid against usance draft of 45 days from the date of AWB/BOL on submission of complete set of documents.
<u>HIGH-SEA SALES PROCUREMENT</u>	g. 90% of basic value will be paid in 45 days from the date of signing of High Sea Sale agreement or 15 days from the date of submission of complete set of documentation, whichever is later. Balance 10% of basic value (Retention money) will be paid in 15 days from the date of submission of supplementary invoice/documents against proof of completion of E&C. <u>Note:</u> In case PBG is not furnished, only 80% payment will be released against 90% claim without the consent of Vendor. This 10% basic amount withheld towards PBG will be paid either against submission of supplementary invoice & Original PBG (or) against supplementary invoice without PBG after expiry of Warranty period.	h. 95% of the basic value will be paid in 45 days from the date of signing of High Sea Sale agreement or 15 days from the date of submission of complete set of documentation, whichever is later. Balance 5% of basic value (Retention money) will be paid in 15 days from the date of submission of supplementary invoice/documents against proof of completion of commissioning. <u>Note:</u> In case PBG is not furnished, only 85% payment will be released against 95% claim without the consent of Vendor. This 10% basic amount withheld towards PBG will be paid either against submission of supplementary invoice & Original PBG (or) against supplementary invoice without PBG after expiry of Warranty period.	i. 100% of basic value will be paid in 45 days from the date of signing of High Sea Sale agreement or 15 days from the date of submission of complete set of documentation, whichever is later.



j. Comprehensive Annual Maintenance Contract:

Evaluation methodology: Unless and otherwise specified in SCC, CAMC will be applicable for a period of 04 years from the date of expiry of warranty period (or) from the date of completion of commissioning of equipment, whichever is later and the total AMC value should not be less than 20% of the main supply value. In case the quoted total AMC value is less than 20% of the main supply value, BHEL shall evaluate Bidders Price deducting differential amount from main supply price and apportioning towards AMC charges.

Payment terms: 100% AMC charges along with tax as applicable, will be paid in 15 days from the date of submission of supplementary invoice/documents against proof of completion of AMC on yearly basis.

k. Terms of Payment for Training: 100% payment will be made in 45 days from the date of completion of Training or 15 days from the date of submission of complete set of invoice along with documentary evidence, whichever is later.

LOADING FACTORS FOR DEVIATION IN PAYMENT TERMS (APPLICABLE FOR IMPORT PROCUREMENT ONLY):

- 1) For offers received with Sight draft payment term in place of Usance draft, loading applicable will be 1.0% of basic value.
- 2) For offers received with Letter of Credit payment term with Usance of 45 days, loading applicable will be 2.5% of basic value.
Additional loading of 2% will be applicable for payment term as Letter of Credit at Sight.
- l.** Any payment term with credit period of less than 45 days for indigenous supply/HSS and any other variation of payment terms are liable for rejection.
- m.** Standard payment terms indicated in Clauses: F (a), (b), (c), (d), (e), (f), (g), (h), (i), (j) & (k) will not attract any loading.

Note 1: Basic value of Purchase Order mentioned above will include all components of the purchase order and will exclude only taxes, duties, freight, training charges, E&C and AMC charges (wherever applicable). Wherever the Purchase Order is split into import portion and indigenous portion of supply, the retention money will be 10% (where scope includes E&C) or 05% (where scope includes Erection supervision & Commissioning) of both purchase order values put together.

Note 2: If the E&C could not be completed till the end of the Warranty period due to reasons not attributable to the supplier, BHEL will release the retention money to the supplier against Bank Guarantee for equivalent value valid for an initial period of one year.

Note 3: In case of Physical Export projects or wherever services are rendered by foreign suppliers in India, E&C charges (if quoted separately/extra by bidder) will be paid in 15 days from the date of submission of supplementary invoice/ documents against proof of completion of E&C.

Note 4: In case of multiple packages/units in a power plant, payment of retention money/E&C charges will be processed on pro-rata basis.

Note 5: No deviation will be permitted from the duration of Guarantee/Warranty and/or Comprehensive Annual Maintenance Contract period specified in SCC.



G. Terms & Conditions to be complied under GST regime:

1. All invoices to contain BHEL-EDN (buyer) GSTIN number: 29AAACB4146P1ZB. However for CGST +SGST/UGST billing outside the state of Karnataka, invoice has to be generated with BHEL's Nodal Agency GSTIN number. Address of Nodal Agency along with GSTIN number will be provided by BHEL at the time of issuing dispatch clearance.
2. The Bidder shall mention Bidder's GSTIN number in all quotations and Invoices submitted.
3. The Bidder shall also mention HSN (Harmonized System of Nomenclature) / SAC (Services Accounting Code) mandatorily in all quotations and invoices submitted.
4. Invoice submitted should be in the format as specified under GST Laws viz., all details as mentioned in Invoice Rules like GST registration number(GSTIN), invoice number with date of issue, quantity, rate, value, taxes with nomenclature – CGST, SGST, UGST,IGST mentioned separately, HSN Code / SAC Code etc. Invoice should be submitted in original for buyer plus duplicate for credit availment.
5. Payment of GST to Vendor will be made only if it is matching with data uploaded by the Vendor in GST portal.
6. For invoices paid on Reverse charge basis – “Tax payable on reverse charge basis” to be mentioned on the invoice.
7. In case GST credit is delayed/denied to BHEL due to non/delayed receipt of goods and/or tax invoice or expiry of timeline prescribed in GST law for availing such ITC, or any other reasons not attributable to BHEL, GST amount will be recoverable from vendor along with interest levied/ leviable on BHEL.
8. In case vendor delays declaring such invoice in his return and GST credit availed by BHEL is denied or reversed subsequently as per GST law, GST amount paid by BHEL towards such ITC reversal as per GST law will be recoverable from vendor/contractor along with interest levied/ leviable on BHEL.
9. Vendor should intimate BHEL immediately on the same date of invoicing without any delay.
10. In case of discrepancy in the data uploaded by supplier in the GSTN portal or in case of any shortages or rejection in the supply, then BHEL will not be able to avail the tax credit and will notify the supplier of the same. Supplier has to rectify the data discrepancy in the GSTN portal or issue credit note (details to be uploaded in GSTN portal) for the shortages or rejections in the supplies, within the calendar month notified by BHEL.
11. Bidders to note that Rules & Regulations pertaining to E-way bill system are to be strictly adhered to, as and when notified by Govt. authorities.

H. Performance bank guarantee (PBG):

Performance bank guarantee (PBG) will be applicable as called in the tender documents. Unless otherwise specified in the SCC, the PBG against performance of the contract shall be valid for a period of 24 months from the date of dispatch of goods + claim period of 03 months, for a value equal to 10 % of the basic value of the purchase order which will include all components of the purchase order and will exclude only taxes, duties, freight, training charges, E&C and AMC charges (wherever applicable).

1. The BG issued in Indian Rupees by Banks in India is to be executed on Non-Judicial Stamp paper/e-stamp paper of appropriate value as per Stamp Act prevailing in the State(s) where the BG is submitted or is to be acted upon or the rate prevailing in the State where the BG was executed, whichever is



higher. The Stamp Paper/e-stamp paper shall be purchased in the name of Vendor/Bank issuing the guarantee.

2. No deviation for the duration and value of PBG will be permitted.
3. PBG shall be from any of the BHEL consortium of bankers (**refer Annexure VI**).
4. PBGs from nationalized banks are also acceptable.
5. PBG should be sent directly by the bank to the dealing executive mentioned in the purchase order located at the address mentioned in the purchase order.
6. PBG should be in the format specified (**refer Annexure VII**). No deviation to this format will be allowed. However in case BHEL changes the PBG format, bidder shall honor the same.
7. Bank Guarantee should be enforceable in Bangalore.
8. In Case of Bank Guarantees submitted by Foreign Vendors-
 - a. From Nationalized/Public Sector / Private Sector/ Foreign Banks (BG issued by Branches in India) can be accepted subject to the condition that the Bank Guarantee should be enforceable in Bangalore.
 - b. From Foreign Banks (wherein Foreign Vendors intend to provide BG from local branch of the Vendor country's Bank)
 - b.1 Please note that Bank Guarantee issued by any of the Consortium Banks only will be accepted by BHEL. As such, Foreign Vendor needs to make necessary arrangements for issuance of Counter-Guarantee by Foreign Bank in favour of the Indian Bank's (BHEL's Consortium Bank) branch in India. It shall be noted that all charges for issuance of Bank Guarantee/ counter- Guarantee should be borne by the Foreign Vendor.
 - b.2 In case, Foreign Vendors intend to provide BG from Overseas Branch of our Consortium Bank (e.g. if a BG is to be issued by SBI Frankfurt), the same is acceptable. However, the procedure at sl.no. b.1 is required to be followed.
 - b.3 The BG issued may preferably be subject to Uniform Rules for Demand Guarantees (URDG) 758 (as amended from time to time).
9. Expired BGs / PBGs will be returned only after expiry of the claim period or on completion of the contractual obligation with respect to Purchase Order.
10. PBG shall not be applicable for spares.

I. PROVISIONS APPLICABLE FOR MSE VENDORS (MICRO AND SMALL ENTERPRISES) :

Benefits/facilities as applicable for Micro and Small Enterprises (MSEs) shall be available to MSEs registered with Government designated authorities as per the Purchase & Price Preference Policy of the Government subject to them becoming eligible otherwise.

Vendors who qualify as MSE vendors are requested to submit applicable certificates (as specified by the Ministry of Micro, Small and Medium Enterprises) at the time of vendor registration. Vendors have to submit any of the following documents along with the tender documents in the Part I / Technical bid to avail the applicable benefits:

- a. Attested copy of valid NSIC certificate or
- b. Attested copy of either Entrepreneur's Memorandum part II (EM II) certificate/Udyog Aadhar certificate having deemed validity (five years from the date of issue of acknowledgement in EM II/Udyog Aadhar) or
- c. EM II/ Udyog Aadhaar certificate along with attested copy of a CA certificate (Format enclosed at Annexure VIII where deemed validity of EM II certificate/ Udyog Aadhar certificate of five years have expired) applicable for the relevant financial year (latest audited).



Date to be reckoned for determining the deemed validity will be the date of bid opening (Part-I in case of two-part bid and three-part bid).

Documents have to be notarized/attested by a Gazetted officer and must be valid as on the date of part I bid opening for the vendors to be eligible for the benefits applicable for MSE vendors. Please note that no benefit shall be applicable if any deficiency in the above required documents are not submitted before the price bid opening/Reverse Auction. If the tender is to be submitted through e-procurement portal, then the above required documents are to be uploaded on the portal.

Bidders to however note the documents that shall be furnished in order to establish credentials as MSE vendor should be as per the extant statutory requirements specified by the Ministry of Micro, Small and Medium Enterprises.

PURCHASE PREFERENCE FOR MSE VENDORS:

- d. MSE vendors quoting within a price band of L1 + 15% shall be allowed to supply up to 20% of the requirement against this tender provided
 1. The MSE vendor matches the L1 price.
 2. L1 price is from a non MSE vendor.
 3. L1 price will be offered to the vendor nearest to L1 in terms of price ranking (L2 - nearest to L1). In case of non-acceptance by the MSE vendor (L2), next ranking MSE vendor will be offered who is within the L1 + 15% band (if L3 is also within 15% band).
 4. 20% of the 20% (i.e. 4% of the total enquired quantity) will be earmarked for SC/ST owned MSE firms provided conditions as mentioned in (1) and (2) are fulfilled.
 5. In case no vendor under SC / ST category firms are meeting the conditions mentioned in (1) and (2) or have not participated in the tender, in such cases the 4% quantity will be distributed among the other eligible MSE vendors who have participated in the tender.
 6. Serial no. 1 to 5 will not be applicable wherever it is not possible to split the tendered quantity/items on account of customer contract requirement, or the items tendered are systems. Such information that tendered quantity will not be split shall be indicated in the SCC.

J. INTEGRITY COMMITMENT IN THE TENDER PROCESS, AND EXECUTION OF CONTRACTS:

1. Commitment by BHEL: BHEL commits to take all measures necessary to prevent corruption in connection with the Tender process and execution of the Contract. BHEL will, during the tender process, treat all bidder / suppliers in a transparent and fair manner, and with equity.
2. Commitment by Bidder(s)/ Contractor(s):
 - a. The Bidder(s)/ Contractor(s) commit(s) to take all measures to prevent corruption and will not directly or indirectly try to influence any decision or benefit which he is not legally entitled to.
 - b. The Bidder(s)/ Contractor(s) will not enter with other Bidder(s) into any undisclosed agreement or understanding or any actions to restrict competition.
 - c. The Bidder(s)/ Contractor(s) will not commit any offence under the relevant Acts. The Bidder(s)/ Contractor(s) will not use improperly, for purposes of competition or personal gain or pass on to others, any information or document provided by BHEL as part of business relationship.
 - d. The Bidder(s)/ Contractor(s) will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract and shall adhere to the relevant guidelines issued from time to time by Government of India/ BHEL.



If the Bidder(s) / Contractor(s), before award or during execution of the Contract commit(s) a transgression of the above or in any other manner such as to put his reliability or credibility in question, BHEL is entitled to disqualify the Bidder(s) / Contractor (s) from the tender process or terminate the contract and/ or take suitable action as deemed fit.

K. Integrity Pact (IP):

- a) 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.

- b) Please refer Section-8 of the IP for Role and Responsibilities of IEMs (Annexure IX). 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.”



Annexure

Annexure I
Guidelines for Indian Agents

- **Definition of Indian Agent:** An Indian Agent of foreign principal is an individual, a partnership, an association of persons, a private or public company, that carries out specific obligation(s) towards processing of BHEL tender or finalization or execution of BHEL's contract on behalf of the foreign supplier.

In case of yes, vendor to note the following and reply accordingly:

- i. BHEL shall deal directly with foreign vendors, wherever required, for procurement of goods. However, if the foreign principal desires to avail of the services of an Indian agent, then the foreign principal should ensure compliance to regulatory guidelines - which require mandatory submission of an Agency Agreement.
- ii. It shall be incumbent on the Indian agent and the foreign principal to adhere to the relevant guidelines of Government of India, issued from time to time.
- iii. The Agency Agreement should specify the precise relationship between the foreign OEM / foreign principal and their Indian agent and their mutual interest in the business. All services to be rendered by agent/ associate, whether of general nature or in relation to the particular contract, must be clearly stated by the foreign supplier/ Indian agent. Any payment, which the agent or associate receives in India or abroad from the OEM, whether as commission or as a general retainer fee should be brought on record in the Agreement and be made explicit in order to ensure compliance to laws of the country.
- iv. Any agency commission to be paid by BHEL to the Indian agent shall be in Indian currency only.
- v. Tax deduction at source is applicable to the agency commission paid to the Indian agent as per the prevailing rules.
- vi. In the absence of any agency agreement, BHEL shall not deal with any Indian agent (authorized representatives / associate / consultant, or by whatever name called) and shall deal directly with the foreign principal only for all correspondence and business purposes.
- vii. The "Guidelines for Indian Agents of Foreign Suppliers" enclosed at annexure - 'A' shall apply in all such cases.

- viii. The supply and execution of the Purchase Order (including indigenous supplies/ service) shall be in the scope of the OEM/ foreign principal. The OEM/ foreign principal should submit their offer inclusive of all indigenous supplies/ services and evaluation will be based on 'total cost to BHEL'. In case OEM/ foreign principal recommends placement of order(s) towards indigenous portion of supplies/ services on Indian supplier(s)/ agent on their behalf, the credentials/ capacity/ capability of the Indian supplier(s)/ agent to make the supplies/ services shall be checked by BHEL as per the extant guidelines of Supplier Evaluation, Approval & Review Procedure (SEARP), before opening of price bids. In this regard, details may be checked as per Annexure-B (copy enclosed). It will be the responsibility of the OEM/ foreign principal to get acquainted with the evaluation requirements of Indian supplier/ agent as per SEARP available on www.bhel.com.

The responsibility for successful execution of the contract (including indigenous supplies/ services) lies with the OEM/ foreign principal. All bank guarantees to this effect shall be in the scope of the OEM/ foreign principal.

--X--

Vendor's Signature with Seal

Guidelines for Indian Agents of Foreign Suppliers

- 1.0 There shall be compulsory registration of agents for all Global (Open) Tender and Limited Tender. An agent who is not registered with BHEL shall apply for registration in the registration form in line with SEARP.
- 1.1 Registered agents will file an authenticated Photostat copy duly attested by a Notary Public/Original certificate of the Principal confirming the agency agreement and giving the status being enjoyed by the agent and the commission/ remuneration/ salary/ retainership being paid by the principal to the agent before the placement of order by BHEL.
- 1.2 Wherever the Indian representatives have communicated on behalf of their principals and the foreign parties have stated that they are not paying any commission to the Indian agents, and the Indian representative is working on the basis of salary or as retainer, a written declaration to this effect should be submitted by the party (i.e. Principal) before finalizing the order.
- 2.0 **Disclosure of particulars of agents/ representatives in India, if any.**
- 2.1 Tenderers of Foreign nationality shall furnish the following details in their offers:
 - 2.1.1 The Bidder(s)/ Contractor(s) of foreign origin shall disclose the name and address of the agents/ representatives in India if any and the extent of authorization and authority given to commit the Principals. In case the agent/ representative be a foreign Company, it shall be confirmed whether it is existing Company and details of the same shall be furnished.
 - 2.1.2 The amount of commission/ remuneration included in the quoted price(s) for such agents/ representatives in India.
 - 2.1.3 Confirmation of the Tenderer that the commission/ remuneration, if any, payable to his agents/ representatives in India, may be paid by BHEL in Indian Rupees only.
- 2.2 Tenderers of Indian Nationality shall furnish the following details in their offers:
 - 2.2.1 The Bidder(s)/ Contractor(s) of Indian Nationality shall furnish the name and address of the foreign principals, if any, indicating their nationality as well as their status, i.e. whether manufacturer or agents of manufacturer holding the Letter of Authority of the Principal specifically authorizing the agent to make an offer in India in response to tender either directly or through the agents/ representatives.
 - 2.2.2 The amount of commission/ remuneration included in the price (s) quoted by the Tenderer for himself.
 - 2.2.3 Confirmation of the foreign principals of the Tenderer that the commission/ remuneration, if any, reserved for the Tenderer in the quoted price(s), may be paid by BHEL in India in equivalent Indian Rupees on satisfactory completion of the Project or supplies of Stores and Spares in case of operation items.
- 2.3 In either case, in the event of contract materializing, the terms of payment will provide for payment of the commission/ remuneration, if any payable to the agents/ representatives in India in Indian Rupees on expiry of 90 days after the discharge of the obligations under the contract.
- 2.4 Failure to furnish correct and detailed information as called for in paragraph 2.0 above will render the concerned tender liable to rejection or in the event of a contract materializing, the same liable to termination by BHEL. Besides this there would be a penalty of banning business dealings with BHEL or damage or payment of a named sum.

ANNEXURE - II
LIST OF INTERNATIONAL GATEWAY AIRPORTS

For air based consignment, terms of delivery will be on FCA basis from following listed airports only. Vendors are requested to verify this list for use before submission of offer.

SCHEDULE NO	COUNTRY	CURRENCY CODE	AIRPORT
D01	UK	GBP	LONDON (HEATHROW)
D02	UK	GBP	NEW CASTLE
D03	UK	GBP	OXFORD. CHETLAM
D04	UK	GBP	BRISTOL. WELLINGBOROUGH
D05	UK	GBP	BIRMINGHAM
D06	UK	GBP	EAST MIDLANDS
D07	UK	GBP	MANCHESTER
D08	UK	GBP	LEEDS
D09	UK	GBP	GLASGOW
D10	FRANCE	EURO	PARIS (ROISSY) & LYON
D11	SWEDEN	EURO	STOCKHOLM
D12	SWEDEN	EURO	GOTHENBERG & MALMO
D13	ITALY	EURO	ROMA, MILAN
D14	ITALY	EURO	TURIN, BOLOGNA, FLORENCE
D15	NETHERLANDS	EURO	AMSTERDAM, ROTTERDAM
D16	AUSTRIA	EURO	VIENNA, LINZ, GRAZ
D17	BELGIUM	EURO	ANTWERP, BRUSSELS
D18	DENMARK	DKK	COPENHAGEN
D19	JAPAN	JPY	TOKYO, OSAKA
D20	SINGAPORE	SGD	SINGAPORE
D21	CANADA	CAD	TORONTO
D22	CANADA	CAD	MONTREAL
D23	USA	USD	NEW YORK, BOSTON
D24	USA	USD	CHICAGO
D25	USA	USD	SAN FRANCISCO, LOS ANGELES
D26	USA	USD	ALANTA, HOUSTON
D27	GERMANY	EURO	MUNICH, KOLN, DUSSELDORF, HANNOVER, HAMBURG, STUTTGART, DAMSTADT, MANIHIEM, NURUMBERG
D28	GERMANY	EURO	FRANKFURT
D29	GERMANY	EURO	BERLIN
D30	SWITZERLAND	SFR	BASLE, ZURICH, GENEVA
D31	SPAIN	EURO	BARCELONA
D32	AUSTRALIA	AUD	SYDNEY
D33	AUSTRALIA	AUD	MELBOURNE
D34	AUSTRALIA	AUD	PERTH
D35	CZECH	EURO	PRAGUE
D36	HONG KONG	HKD	HONG KONG
D37	NEW ZELAND	NZD	AUCKLAND
D38	RUSSIA	USD	MOSCOW
D39	SOUTH KOREA	USD	KIMPO INTERNATIONAL, INCHEON
D40	FINLAND	EURO	HELSINKI
D41	ROMANIA	EURO	BUCHAREST
D42	NORWAY	EURO	OSLO
D43	IRELAND	EURO	DUBLIN
D44	ISRAEL	USD	TEL AVIV
D45	UAE	USD	DUBAI
D46	OMAN	USD	MUSCAT
D47	EGYPT	USD	CAIRO
D48	TAIWAN	USD	TAIPEI
D49	UKRAINE	USD	KIEV
D50	CHINA	USD	SHANGHAI, SHENZHEN
D51	PHILIPINES	USD	MANILA
D52	MALAYSIA	USD	KUALALUMPUR, PE NANG
D53	CYPRUS	USD	LARNACA
D54	SOUTH AFRICA	USD	JOHANNESBURG, DURBAN
D55	SLOVAKIA	EURO	BARTISLOVA
D56	SAUDI ARABIA	SAR	RIYADH
D57	TURKEY	EURO	ISTANBUL
D58	THAILAND	USD	BANGKOK
D59	BRAZIL	USD	SAO PAULO, RIO DE JANEIRO

ANNEXURE – III
DISCREPANCY IN WORDS & FIGURES – QUOTED IN PRICE BID

Following guidelines will be followed in case of discrepancy in words & figures-quoted in price bid:

(a) If, in the price structure quoted for the required goods/services/works, there is discrepancy between the unit price and the total price (which is obtained by multiplying the unit price by the quantity), the unit price shall prevail and the total price corrected accordingly, unless in the opinion of the purchaser there is an obvious misplacement of the decimal point in the unit price, in which case the total price as quoted shall govern and the unit price corrected accordingly.

(b) If there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected; and

(c) If there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to (a) and (b) above.

(d) If there is such discrepancy in an offer, the same shall be conveyed to the bidder with target date upto which the bidder has to send his acceptance on the above lines and if the bidder does not agree to the decision of the purchaser, the bid is liable to be ignored.

ANNEXURE - IV
Electronic Funds Transfer (EFT) OR
Paylink Direct Credit Form

Please Fill up the form in CAPITAL LETTERS only.

TYPE OF REQUEST(Tick one): ☐ CREATE ☐ CHANGE

BHEL Vendor / Supplier Code:

Company Name :

Permanent Account Number(PAN):

Address

City:

PINCODE

STATE

Contact Person(s)

Telephone No:

Fax No:

e-mail id:

1 Bank Name:

2 Bank Address:

3 Bank Telephone No:

4 Bank Account No:

5 Account Type: Savings/Cash Credit

6 9 Digit Code Number of Bank and branch

appearing on MICR cheque issued by Bank

7 Bank IFSC Code(applicable for NEFT)

8 Bank IFSC code(applicable for RTGS)

(Indian Financial System Code)

- A I hereby certify that the particulars given above are true, correct and complete and that I, as a representative for the above named Company, hereby authorise BHEL, EDN, Bangalore to electronically deposit payments to the designated bank account.
- B If the transaction is delayed or not effected at all for reasons of incomplete or incorrect information, I would not hold BHEL / transferring Bank responsible.
- C This authority remains in full force until BHEL, EDN, Bangalore receives written notification requesting a change or cancellation.
- D I have read the contents of the covering letter and agree to discharge the responsibility expected of me as a participant under ECS / EFT.

Date:

Authorised Signatory:

Designation:

Telephone No. with STD Code

Company Seal

Bank Certificate

We certify that _____ has an Account No _____ with us and we confirm that the bank details given above are correct as per our records.

Date:

Place:

(.....)

Signature

Please return completed form along with a blank cancelled cheque or photocopy thereof to:

Bharath Heavy Electricals Ltd,

Attn:

Electronics Division, Mysore Road,

BANGALORE - 560 026

In case of any Query, please call concerned purchase executive.

ANNEXURE - V
PRESENT PROCEDURE FOR SALE IN TRANSIT (HIGH SEA SALES)

In case of High Sea Sales, vendor should submit following documents:

1. ORIGINAL HIGH SEA SALES AGREEMENT

- Sale agreement (on Rs. 200/- non-judicial stamp paper & notarised with 2 witnesses with identity) has to be signed between BHEL and the Party importing material. The date of the sale documents should be in between the date of House Air Way Bill / Bill of Lading and before landing of the goods in Indian origin.
- Following shall be included in the High Sea Sales Agreement:
"THE BUYER ALSO UNDERTAKE DISCHARGES, THE OBLIGATION AND FULFILLMENT OF CONDITIONS, IF ANY, ATTACHED TO THE IMPORTATION, ASSESSMENT AND CLEARANCE OF THE GOODS IN TERMS CUSTOMS TARIFF ACT 1975, THE CUSTOMS ACT 1962 & RULES & REGULATIONS MADE THERE UNDER AND OTHER RELEVANT ACTS, ORDERS, NOTIFICATIONS".

2. ORIGINAL INVOICES: INDIGENOUS RUPEE INVOICE & FOREIGN CURRENCY INVOICE

- Prices should be C.I.F., designated airport/seaport basis.
- I.E.C., C.S.T., K.S.T. Nos. to be mentioned.
- Description of item (Nomenclature), Unit & Quantity in both the Foreign Currency & the Indigenous Invoice in Rupee shall be exactly as per Purchase Order Description of item, Quantity and Unit. The Indigenous Invoice value shall be exactly as per Purchase Order value.
- Seller should give Foreign Currency Invoice from the original consignor. The Foreign Currency Invoice value should be at least 2% (two per cent) less than the Indigenous Rupee Invoice value in equivalent foreign currency.

4. ORIGINAL HOUSE AIR WAY BILL/ BILL OF LADING

- The sale agents should duly endorse House Air Way Bill (HAWB) for air shipments or original Bill of Lading (O.B.L.) for sea shipments and Foreign Currency Invoice in favour of BHEL-EDN.

5. ORIGINAL CARGO ARRIVAL NOTICE FROM FORWARDER.

6. ORIGINAL DELIVERY ORDER ISSUED IN NAME OF BHEL-EDN.

7. ORIGINAL PACKING LIST.

8. A LETTER TO THE COMMISSIONER OF CUSTOMS FOR EFFECTING ABOVE SALE.

9. A LETTER TO THE DEPUTY ASSESSOR (OCTROI) FOR EFFECTING ABOVE SALE IN FAVOUR OF BHEL.

REMARKS: In case vendor needs any clarifications on the above, the same may be sought in writing.

Annexure-VI
BHEL MEMBER BANKS (LIST OF CONSORTIUM BANKS)

BANK GUARANTEE (BG) SHALL BE ISSUED FROM THE FOLLOWING BANKS ONLY:

	Nationalised Banks		Nationalised Banks
1	Allahabad Bank	19	Vijaya Bank
2	Andhra Bank		Public Sector Banks
3	Bank of Baroda	20	IDBI
4	Canara Bank		Foreign Banks
5	Corporation Bank	21	CITI Bank N.A
6	Central Bank	22	Deutsche Bank AG
7	Indian Bank	23	The Hongkong and Shanghai Banking Corporation Ltd. (HSBC)
8	Indian Overseas Bank	24	Standard Chartered Bank
9	Oriental Bank of Commerce	25	J P Morgan
10	Punjab National Bank		
11	Punjab & Sindh Bank		Private Banks
12	State Bank of India	26	Axis Bank
13	State Bank of Hyderabad	27	The Federal Bank Limited
14	Syndicate Bank	28	HDFC Bank
15	State Bank of Travancore	29	Kotak Mahindra Bank Ltd
16	UCO Bank	30	ICICI Bank
17	Union Bank of India	31	IndusInd Bank
18	United Bank of India	32	Yes Bank

Note:

- All BGs must be issued from BHEL consortium banks listed above.
- This list is subject to changes. Hence vendors are requested to check this list every time before issuing BGs.
- Bank Guarantees issued by Co-Operative Banks/Financial Institutions cannot to be accepted under any circumstance.

Annexure-VII

BANK GUARANTEE FOR PERFORMANCE SECURITY

Bank Guarantee No:

Date:

To

NAME

& ADDRESSES OF THE BENEFICIARY

Dear Sirs,

In consideration of Bharat Heavy Electricals Limited (hereinafter referred to as the 'Employer' which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns) incorporated under the Companies Act, 1956 and having its registered office at _____¹ through its Unit at.....(name of the Unit) having awarded to (Name of the Vendor / Contractor / Supplier) with its registered office at _____² hereinafter referred to as the ' Vendor / Contractor / Supplier ', which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns), a contract Ref No.....dated³ valued at Rs.....⁴ (Rupees -----)/FC.....(in words.....) for⁵ (hereinafter called the 'Contract') and the Vendor / Contractor / Supplier having agreed to provide a Contract Performance Bank Guarantee, equivalent to% (.... Percent) of the said value of the Contract to the Employer for the faithful performance of the Contract,

we,, (hereinafter referred to as the Bank), having registered/Head office at and inter alia a branch at being the Guarantor under this Guarantee, hereby, irrevocably and unconditionally undertake to forthwith and immediately pay to the Employer any sum or sums upto a maximum amount of Rs -- -----⁶ (Rupees -----) without any demur, immediately on first demand from the Employer and without any reservation, protest, and recourse and without the Employer needing to prove or demonstrate reasons for its such demand.

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

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

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

We thebank further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Contract/satisfactory completion of the performance guarantee period as per the terms of the Contract and that it shall continue to be enforceable till

all the dues of the Employer under or by virtue of the said Contract have been fully paid and its claims satisfied or discharged.

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

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

This Guarantee shall remain in force upto and including.....⁷ and shall be extended from time to time for such period as may be desired by Employer.

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

Unless a demand or claim under this guarantee is made on us in writing on or before the⁸ we shall be discharged from all liabilities under this guarantee thereafter.

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

Notwithstanding anything to the contrary contained hereinabove:

- a) The liability of the Bank under this Guarantee shall not exceed.....⁶
- b) This Guarantee shall be valid up to⁷
- c) Unless the Bank is served a written claim or demand on or before⁸ all rights under this guarantee shall be forfeited and the Bank shall be relieved and discharged from all liabilities under this guarantee irrespective of whether or not the original bank guarantee is returned to the Bank.

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

For and on behalf of
(Name of the Bank)

Dated.....

Place of Issue.....

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

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

³ DETAILS ABOUT THE NOTICE OF AWARD/CONTRACT REFERENCE

⁴ CONTRACT VALUE

⁵ PROJECT/SUPPLY DETAILS

⁶ BG AMOUNT IN FIGURES AND WORDS

⁷ VALIDITY DATE

⁸ DATE OF EXPIRY OF CLAIM PERIOD

Annexure – VIII
(Applicable only for MSE suppliers)
Certificate by Chartered Accountant on Letter Head

This is to certify that M/s
.....(hereinafter referred to as 'Company')
having its registered office at is registered under MSMED Act 2006,
(Entrepreneur Memorandum No (Part-11 dtd
Category: (Micro/Small) (Copy enclosed).

Further verified from the Books of Accounts that the investment of the company as
per the latest audited financial year..... as per MSMED Act 2006 is as follows:

1. **For Manufacturing Enterprises:** Investment in plant and machinery (i.e. original
cost excluding land and building and the items specified by the Ministry of Small
Scale Industries vide its notification No.S.O.1722 (E) dated October 5, 2006:
Rs.....Lacs.
2. **For Service Enterprises:** Investment in equipment (original cost excluding land and
building and furniture, fittings and other items not directly related to the service
rendered or as may be notified under the MSMED Act, 2006:
Rs.Lacs.

The above investment of Rs.Lacs in within permissible limit of
Rs.....Lacs for.....Micro / Small (Strike off which is not
applicable) Category under MSMED Act 2006.

Or

The company has been graduated from its original category (Micro/ Small) (**Strike off which is
not applicable**) and the date of graduation of such enterprise from its original category is
..... (dd/mm/yyyy) which is within the period of 3 years from the date of graduation of
such enterprise from its original category as notified vide S.O. No. 3322(E) dated 01.11.2013
published in the gazette notification dated 04.11.2013 by Ministry of MSME.

Date:

(Signature)

Name:

Membership Number:

Seal of Chartered Accountant

INTEGRITY PACT

Between

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

and

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

Preamble

The Principal intends to award, under laid-down organizational procedures, contract/s for

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

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

Section 1 – Commitments of the Principal

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

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

- 2.1 The Bidder(s)/ Contractor(s) commit himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the tender process and during the contract execution.
 - 2.1.1 The Bidder(s)/ Contractor(s) will not, directly or through any other person or firm, offer, promise or give to the Principal or to any of the Principal's employees involved

in the tender process or the execution of the contract or to any third person any material, immaterial or any other benefit which he / she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.

- 2.1.2 The Bidder(s)/ Contractor(s) will not enter with other Bidder(s) into any illegal or undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.
- 2.1.3 The Bidder(s)/ Contractor(s) will not commit any penal offence under the relevant IPC/ PC Act; further the Bidder(s)/ Contractor(s) will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.
- 2.1.4 The Bidder(s)/ Contractor(s) will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.
- 2.2 The Bidder(s)/ Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.

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

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

Section 4 – Compensation for Damages

- 4.1 If the Principal has disqualified the Bidder from the tender process prior to the award according to Section 3, the Principal is entitled to demand and recover the damages equivalent Earnest Money Deposit/Bid Security.
- 4.2 If the Principal has terminated the contract according to Section 3, or if the Principal is entitled to terminate the contract according to section 3, the Principal shall be entitled to demand and recover from the Contractor liquidated damages equivalent to 5% of the contract value or the amount equivalent to Security Deposit/Performance Bank Guarantee, whichever is higher.

Section 5 – Previous Transgression

- 5.1 The Bidder declares that no previous transgressions occurred in the last 3 years with any other company in any country conforming to the anti-corruption approach or with any other Public Sector Enterprise in India that could justify his exclusion from the tender process.
- 5.2 If the Bidder makes incorrect statement on this subject, he can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason.

Section 6 – Equal treatment of all Bidders/ Contractors/ Sub-contractors

- 6.1 The Bidder(s)/ Contractor(s) undertake(s) to obtain from all subcontractors a commitment consistent with this Integrity Pact and report Compliance to the Principal. This commitment shall be taken only from those sub-contractors whose contract value is more than 20 % of Bidder's/ Contractor's contract value with the Principal. The Bidder(s)/ Contractor(s) shall continue to remain responsible for any default by his Sub-contractor(s).
- 6.2 The Principal will enter into agreements with identical conditions as this one with all Bidders and Contractors.
- 6.3 The Principal will disqualify from the tender process all bidders who do not sign this pact or violate its provisions.

Section 7 – Criminal Charges against violating Bidders/ Contractors /Sub-contractors

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

Section 8 –Independent External Monitor(s)

- 8.1 The Principal appoints competent and credible Independent External Monitor for this Pact. The task of the Monitor is to review independently and objectively, whether and to what extent the parties comply with the obligations under this agreement.

- 8.2 The Monitor is not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the CMD, BHEL.
- 8.3 The Bidder(s)/ Contractor(s) accepts that the Monitor has the right to access without restriction to all contract documentation of the Principal including that provided by the Bidder(s)/ Contractor(s). The Bidder(s)/ Contractor(s) will grant the monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his contract documentation. The same is applicable to Sub-contractor(s). The Monitor is under contractual obligation to treat the information and documents of the Bidder(s)/ Contractor(s) / Sub-contractor(s) with confidentiality.
- 8.4 The Principal will provide to the Monitor sufficient information about all meetings among the parties related to the contract provided such meetings could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the Monitor the option to participate in such meetings.
- 8.5 As soon as the Monitor notices, or believes to notice, a violation of this agreement, he will so inform the Management of the Principal and request the Management to discontinue or take corrective action, or heal the situation, or to take other relevant action. The Monitor can in this regard submit non-binding recommendations. Beyond this, the Monitor has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action.
- 8.6 The Monitor will submit a written report to the CMD, BHEL within 8 to 10 weeks from the date of reference or intimation to him by the Principal and, should the occasion arise, submit proposals for correcting problematic situations.
- 8.7 The CMD, BHEL shall decide the compensation to be paid to the Monitor and its terms and conditions.
- 8.8 If the Monitor has reported to the CMD, BHEL, a substantiated suspicion of an offence under relevant IPC / PC Act, and the CMD, BHEL has not, within reasonable time, taken visible action to proceed against such offence or reported it to the Vigilance Office, the

Monitor may also transmit this information directly to the Central Vigilance Commissioner, Government of India.

8.9 The number of Independent External Monitor(s) shall be decided by the CMD, BHEL.

8.10 The word 'Monitor' would include both singular and plural.

Section 9 – Pact Duration

9.1 This Pact begins and shall be binding on and from the submission of bid(s) by bidder(s). It expires for the Contractor 12 months after the last payment under the respective contract and for all other Bidders 6 months after the contract has been awarded.

9.2 If any claim is made / lodged during this time, the same shall be binding and continue to be valid despite the lapse of this pact as specified as above, unless it is discharged/ determined by the CMD, BHEL.

Section 10 – Other Provisions

10.1 This agreement is subject to Indian Laws and jurisdiction shall be registered office of the Principal, i.e. New Delhi.

10.2 Changes and supplements as well as termination notices need to be made in writing. Side agreements have not been made.

10.3 If the Contractor is a partnership or a consortium, this agreement must be signed by all partners or consortium members.

10.4 Should one or several provisions of this agreement turn out to be invalid, the remainder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.

10.5 Only those bidders/ contractors who have entered into this agreement with the Principal would be competent to participate in the bidding. In other words, entering into this agreement would be a preliminary qualification.

For & On behalf of the Principal

(Office Seal)

For & On behalf of the Bidder/ Contractor

(Office Seal)

Place-----

Date-----

Witness: _____

(Name & Address) _____

Witness: _____

(Name & Address) _____



ಭಾರತ್ ಹೆವಿ ಎಲೆಕ್ಟ್ರಿಕಲ್ಸ್ ಲಿಮಿಟೆಡ್
भारत हेवी इलेक्ट्रिकल्स लिमिटेड

Bharat Heavy Electricals Ltd.,
(A Government of India undertaking)
Electronics Division

PB 2606 , Mysore Road Bangalore , 560026 INDIA

CE: PR: 002- Rev 01

GENERAL COMMERCIAL CONDITIONS FOR CONTRACT

These 'General Commercial Conditions for Contract for Purchase' herein after referred to as GCC apply to all enquiries, tenders, requests for quotations, orders, contracts and agreements concerning the supply of goods and the rendering of related services (hereinafter referred to as "deliveries") to Bharat Heavy Electricals Limited and any of its units, regions or divisions (hereinafter referred to as "BHEL" or the Purchaser) or its projects/ customers.

Any deviations from or additions to these GCC require BHEL's express written consent. The general terms of business or sale of the vendor shall not apply to BHEL. Acceptance, receipt of shipments or services or effecting payment shall not mean that the general terms of business or sale of the vendor have been accepted.

Orders, agreements and amendments thereto shall be binding if made or confirmed by BHEL in writing. Only the Purchasing department of BHEL is authorized to issue the Purchase Order or any amendment thereof.

Definitions: Throughout these conditions and in the specifications, the following terms shall have the meanings assigned to them, unless the subject matter or the context requires otherwise.

- 'The Purchaser' means Bharat Heavy Electricals Limited, Electronics division, Mysore road, Bangalore 560 026, a Unit of Bharat Heavy Electricals Limited (A Govt. of India Undertaking) incorporated under the Companies Act having its registered office at BHEL House, Siri Fort, New Delhi-110049, India and shall be deemed to include its successors and assigns. It may also be referred to as BHEL.
- 'The vendor' means the person, firm, company or organization on whom the Purchase Order is placed and shall be deemed to include the vendor's successors, representative heirs, executors and administrator as the case may be. It may also be referred to as Seller, Contractor or Supplier.
- 'Contract' shall mean and include the Purchase Order incorporating various agreements, viz. tender/ RFQ, offer, letter of intent/acceptance/ award, the General Conditions of Contract and Special Conditions of Contract for Purchase, Specifications, Inspection/ Quality Plan, Schedule of Prices and Quantities, Drawings, if any enclosed or to be provided by BHEL or his authorized nominee and the samples or patterns if any to be provided under the provisions of the contract.
- 'Parties to the Contract' shall mean the 'The Vendor' and the Purchaser as named in the main body of the Purchase Order.

Order of Precedence:

In case of any inconsistency or contradiction between any of the documents, the order of precedence shall be Purchase Order, LOI / LOA, Special Conditions of Contract and General Conditions of Contract for commercial conditions; and specific agreement on technical conditions, RFQ/offer and specification for Technical Conditions.

Interpretation:

In the contract, except where the context requires otherwise:

- words indicating one gender include all genders;
- words indicating the singular also include the plural and words indicating the plural also include the singular;

- c) provisions including the word "agree", "agreed" or "agreement" require the agreement to be recorded in writing, and
- d) "Written" or "in writing" means hand-written, type-written, printed or electronically made, and resulting in a permanent record.

Applicable Conditions:

1. **Price Basis:** All prices shall be firm until the purchase order is executed / completed in all respects. No price variations / escalation shall be permitted.
2. **Ordering and confirmation of Order:** Vendor shall send the order acceptance on their company letter head/ through e-mail within a week from the date of receipt of Purchase Order or such other period as specified/ agreed by BHEL. BHEL reserves the right to revoke the order placed if the order confirmation differs from the original order placed. The acceptance of goods/services/supplies by BHEL as well as payments made in this regard shall not imply acceptance of any deviations.
The purchase order will be deemed to have been accepted if no communication to the contrary is received within one week (or the time limit as specified/agreed by BHEL) from the date of receipt of the purchase order.
3. **Documentation:** After receipt of Purchase Order, vendor should submit necessary documents (if & as applicable) like drawings specified, bill of materials, datasheets, catalogues, quality plan, test procedure, type test report, O & M Manuals and/or any other relevant documents as per Specification/Purchase Order, as and when required by BHEL/Customer.
At any stage within the contract period, the vendor shall notify of any error, fault or other defect found in BHEL's documents /specifications or any other items for reference. If and to the extent that (taking account of cost and time) any vendor exercising due care would have discovered the error, fault or other defect when examining the documents/specifications before submitting the tender, the time for completion shall not be extended. However if errors, omissions, ambiguities, inconsistencies, inadequacies or other defects are found in the vendor's documents, they shall be corrected at his cost, notwithstanding any consent or approval.
4. **Penalty:**
 - a. **For delay in documentation:** In the event of delay in submission of complete set of specified documents ((like drawings, bill of materials, datasheets, catalogues, quality plan etc. as called in tender specifications including soft copies wherever applicable) in required sets beyond two(02) weeks (or as agreed/indicated in the SCC/Purchase Order) from the date of receipt of Purchase Order (by email), penalty at 0.5% (half percent) per week or part thereof, limited to a maximum of 5% (five percent) of the basic material value of the Purchase Order will be applicable.

Penalty for delayed documentation if applicable, shall be deducted at the time of first supply payment. If penalty is applicable for duration of less than a week, penalty @ 0.5% (half percent) of the basic material value will be deducted. GST as applicable will be recovered along with penalty amount.

- b. **For delay in delivery:** In the event of delay in agreed contractual delivery as per Purchase Order, penalty @ 0.5 % (half percent) per week or part thereof but limited to a max of 10% (ten percent) value of undelivered portion (basic material cost) will be applicable. Delivery will commence from the date of issue of Manufacturing clearance along with approved document. The date for which Inspection call is issued by vendor along with test certificates / test reports /Certificate of Conformance / calibration reports, as proof of completion of manufacturing will be treated as date of deemed delivery for penalty calculation. In the absence of furnishing such document indicated above as proof of completion of manufacturing along with inspection call, actual date of inspection will be considered as date of deemed delivery and BHEL will not be responsible for delay in actual date of inspection.



Penalty for delayed delivery if applicable, shall be deducted at the time of first supply payment. If penalty is applicable for duration of less than a week, penalty @ 0.5% (half percent) of the basic material value will be deducted. GST as applicable will be recovered along with penalty amount.

5. Contract variations (Increase or decrease in the scope of supply): BHEL may vary the contracted scope as per requirements at site. If vendor is of the opinion that the variation has an effect on the agreed price or delivery period, BHEL shall be informed of this immediately in writing along with technical details. Where unit rates are available in the Contract, the same shall be the basis for such additional work. Vendor shall not perform additional work before BHEL has issued written instructions/ amendment to the Purchase Order to that effect. The work which the vendor should have or could have anticipated in terms of delivering the service(s) and functionality (i.e.) as described in this agreement, or which is considered to be the result of an attributable error on the vendor's part, shall not be considered additional work.
6. Inspection: Prior written notice of at least 10 days shall be given along with internal test certificates/COC and applicable test certificates. Materials will be inspected by BHEL-EDN-QS/CQS or BHEL nominated Third Party Inspection Agency (TPIA) or BHEL authorized Inspection Agency or Customer / Consultant or jointly by BHEL & Customer / consultant. All tests have to be conducted as applicable in line with approved Quality plan or QA Checklist or Purchase specification and original reports shall be furnished to BHEL-EDN, Bangalore for verification/acceptance for issue of dispatch clearance.
All costs related to inspections & re-inspections shall be borne by vendor. Whether the Contract provides for tests on the premises of the vendor or any of his Sub-contractor/s, vendor shall be responsible to provide such assistance, labour, materials, electricity, fuels, stores, apparatus, instruments as may be required and as may be reasonably demanded to carry out such tests efficiently. Cost of any type test or such other special tests shall be borne by BHEL only if specifically agreed to in the purchase order.
7. Transit Insurance: Transit insurance coverage between vendor's works and project site shall be to the account of BHEL, unless specifically agreed otherwise. However, vendor shall send intimation directly to insurance agency (as mentioned in dispatch instructions issued by BHEL) through fax/courier/e-mail, immediately on dispatch of goods for covering insurance. A copy of such intimation sent by vendor to insurance agency shall be given to BHEL along with dispatch documents. Dispatch documents will be treated as incomplete without such intimation copy. BHEL shall not be responsible for sending intimations to insurance agency on behalf of the vendor.
8. Mode of dispatch:
Indigenous Scope: By road on Door Delivery Consignee Copy attached basis through your approved transporter (unless otherwise indicated in Dispatch Instructions), only on receipt of Despatch Clearance from BHEL.
Imported Scope: By Air/Sea through BHEL approved Freight Forwarder/supplier approved Consolidator respectively as per agreed contractual terms, only on receipt of Dispatch Clearance from BHEL.
9. Changes in Statutory levies:
If any rates of Tax are increased or decreased, a new Tax is introduced, an existing Tax is abolished, or any change in interpretation or application of any Tax occurs in the course of the execution of Contract, which was or will be assessed on the bidder in connection with performance of the Contract, an equitable adjustment of the Contract Price shall be made to fully take into account any such change by addition to the Contract Price or deduction there from, as the case may be. However, these adjustments would be restricted to direct transactions between BHEL and the bidder /agent of foreign bidder (if applicable). These adjustments shall not be applicable on procurement of raw materials, intermediary components etc. by the bidder /agent.
10. Availing duty/tax exemption benefits by bidder, wherever applicable: BHEL shall issue the required Certificate/s, as per relevant policies of the Govt. of India, to facilitate the bidders to avail any such benefits under the Contract. In case of failure of the bidders to receive the benefits partly or fully from the Govt. of India and/or in case of any delay in receipt of such benefits, BHEL shall neither be liable nor responsible in any manner whatsoever.



11. Taxes against sub-vendor dispatches: All taxes/levies, as applicable in respect of all components, equipments and material to be despatched directly from the sub-vendor's works to Site irrespective of the fact whether such taxes and levies are assessable and chargeable on Vendor or the BHEL, shall be to the vendor's account and no separate claim in this regard will be entertained by BHEL.
12. High Sea Sales (HSS): Customs clearance of the consignment landed on Indian Sea/Air ports will be done by BHEL based on the original HSS documents provided by vendors.
Any delay in submission of complete/correct HSS documents to BHEL may incur demurrage charges. All demurrage charges on account of incomplete /incorrect HSS documents submission by vendor will be to vendor's account and all such charges will be recovered from any of the available vendor bills with BHEL.
13. Packaging and dispatch: The Seller shall package the goods safely and carefully and pack them suitably in all respects considering the peculiarity of the material for normal safe transport by Sea/ Air / Rail/ Road to its destination suitably protected against loss, damage, corrosion in transit and the effect of tropical salt laden atmosphere. The packages shall be provided with fixtures/ hooks and sling marks as may be required for easy and safe handling. If any consignment needs special handling instruction, the same shall be clearly marked with standard symbols / instructions. Hazardous material should be notified as such and their packing, transportation and other protection must conform to relevant regulations.
The packing, shipping, storage and processing of the goods must comply with the prevailing legislation and regulations concerning safety, the environment and working conditions. Any Imported/Physical Exports items packed with raw/ solid wood packing material should be treated as per ISPM – 15 (fumigation) and accompanied by Phytosanitary/ Fumigation certificate. If safety information sheets (MSDS – Material Safety Data Sheet) exist for an item or the packaging, vendor must provide this information without fail along with the consignment.
Each package must be marked with Consignee name, Purchase order number, Package number, Gross weight and net weight, dimensions (LxBxH) and Seller's name. Packing list of goods inside each package with PO item number and quantity must also be fixed securely outside the box to indicate the contents of each box. Total number of packages in the consignment must also be indicated in the packing list.
Separate packing & identification of items should be as follows.
 1. Main Scope - All items must be tagged with part no. & item description.
 2. Commissioning accessories/spares - All items must be tagged with part no. & item description.
 3. Mandatory spares - All items must be tagged with part no. & item description.
 Nevertheless, vendor shall adhere to dispatch & packing instructions issued by BHEL at the time of dispatch.
14. Assignment of Rights & Obligations; Subcontracting: Vendor is not permitted to subcontract the delivery or any part thereof to third party or to assign the rights and obligations resulting from this agreement in whole or in part to third parties without prior written permission from BHEL. Any permission or approval given by the BHEL shall, however, not absolve the vendor of the responsibility of his obligations under the Contract.
15. Progress report: Vendor shall render such report as to the progress of work and in such form as may be called for by the concerned purchase officer from time to time. The submission and acceptance of such reports shall not prejudice the rights of BHEL in any manner.
16. Non-disclosure and Information Obligations: Vendor shall provide with all necessary information pertaining to the goods as it could be of importance to BHEL. Vendor shall not reveal any specified confidential information that may be divulged by BHEL to Vendor's employees not involved with the tender/ contract & its execution and delivery or to third parties, unless BHEL has agreed to this in writing beforehand. Vendor shall not be entitled to use the BHEL name in advertisements and other commercial publications without prior written permission from BHEL.
17. Cancellation /Termination of contract: BHEL shall have the right to completely or partially terminate the agreement by means of written notice to that effect. Termination of the Contract, for whatever reason, shall be without prejudice to the rights of the parties accrued under the Contract up to the time of termination.
BHEL shall have the right to cancel/foreclose the Order/ Contract, wholly or in part, in case it is constrained to do so on account of any decline, diminution, curtailment or stoppage of the business.



18. Risk Purchase Clause: In case of failure of supplier, BHEL at its discretion may make purchase of the materials / services not supplied / rendered in time at the RISK & COST of the supplier. Under such situation, the supplier who fails to supply the goods in time shall be wholly liable to make good to BHEL any loss due to risk purchase.
In case of items demanding services at site like erection and commissioning, vendor should send his servicemen/representatives within 7 days from the service call. In case a vendor fails to attend to the service call, BHEL at its discretion may also make arrangements to attend such service by other parties at the **RISK & COST** of the supplier. Under such situation the supplier who fails to attend the service shall be wholly liable to make good to BHEL any loss due to risk purchase/service including additional handling charges due to the change.
19. Shortages: In the event of shortage on receipt of goods and/or on opening of packages at site, all such shortages, caused by supplier's act or omission, shall be made good at free of cost within a reasonable time that BHEL may allow from such intimation.
Transit Damages: In the event of receipt of goods in damaged condition or having found them so upon opening of packages at site, supplier shall make good of all such damages within a reasonable time from such intimation by BHEL. In case BHEL raises an insurance claim, the cost of material limited to insurance settled amount less handling charges will be reimbursed to supplier.
20. Remedial work: Notwithstanding any previous test or certification, BHEL may instruct the vendor to remove and replace materials/goods or remove and re-execute works/services which are not in accordance with the purchase order. Similarly BHEL may ask the vendor to supply materials or to execute any services which are urgently required for any safety reasons, whether arising out of or because of an accident, unforeseeable event or otherwise. In such an event, Vendor shall provide such services within a reasonable time as specified by BHEL.
21. Indemnity Clause: Vendor shall comply with all applicable safety regulations and take care for the safety of all persons involved. Vendor is fully responsible for the safety of its personnel or that of his subcontractor's men / property, during execution of the Purchase Order and related services. All statutory payments including PF, ESI or other related charges have to be borne by the vendor. Vendor is fully responsible for ensuring that all legal compliances are followed in course of such employment.
22. Product Information, Drawings and Documents: All specified drawings, technical documents or other technical information received by Vendor from BHEL or vice versa shall not, without the consent of the other party, be used for any other purpose than that for which they were provided. They may not, without the consent of the Disclosing party, otherwise be used or copied, reproduced, transmitted or communicated to third parties. All information and data contained in general product documentation, whether in electronic or any other form, are binding only to the extent that they are by reference expressly included in the contract.
Vendor, as per agreed date/s but not later than the date of delivery, provide free of charge information and drawings which are necessary to permit and enable BHEL to erect, commission, operate and maintain the product. Such information and drawings shall be supplied in as many numbers of copies as may be agreed upon.
All intellectual properties, including designs, drawings and product information etc. exchanged during the formation and execution of the Contract shall continue to be the property of the disclosing party.
23. Intellectual Property Rights, Licenses: If any Patent, design, Trade mark or any other intellectual property rights apply to the delivery (goods/related service) or accompanying documentation shall be the exclusive property of the Vendor and BHEL shall be entitled to the legal use thereof free of charge by means of a non-exclusive, worldwide, perpetual license. All intellectual property rights that arise during the execution of the Purchase Order/ contract for delivery by vendor and/or by its employees or third parties involved by the vendor for performance of the agreement shall belong to BHEL. Vendor shall perform everything necessary to obtain or establish the above mentioned rights. The Vendor guarantees that the delivery does not infringe on any of the intellectual property rights of third parties. The Vendor shall do everything necessary to obtain or establish the alternate acceptable arrangement pending resolution of any (alleged)



claims by third parties. The Vendor shall indemnify BHEL against any (alleged) claims by third parties in this regard and shall reimburse BHEL for any damages suffered as a result thereof.

24. Force Majeure: Notwithstanding anything contained in the purchase order or any other document relevant thereto, neither party shall be liable for any failure or delay in performance to the extent said failures or delays are caused by the "Act of God" and occurring without its fault or negligence, provided that, force majeure will apply only if the failure to perform could not be avoided by the exercise of due care and vendor doing everything reasonably possible to resume its performance.

A party affected by an event of force majeure which may include fire, tempest, floods, earthquake, riot, war, damage by aircraft etc., shall give the other party written notice, with full details as soon as possible and in any event not later than seven (7) calendar days of the occurrence of the cause relied upon. If force majeure applies, dates by which performance obligations are scheduled to be met will be extended for a period of time equal to the time lost due to any delay so caused.

Notwithstanding above provisions, in an event of Force Majeure, BHEL reserves for itself the right to cancel the order/ contract, wholly or partly, in order to meet the overall project schedule and make alternative arrangements for completion of deliveries and other schedules.

25. Warranty:

Wherever required, and so provided in the specifications/ Purchaser Order, the Seller shall ensure that the goods supplied shall comply with the specifications laid down, for materials, workmanship and performance.

Unless otherwise specified in SCC, warranty period shall be applicable for a period of 24 months from the date of delivery of goods or 18 months from the date of commissioning of goods, whichever is earlier.

The warranty period as described above shall apply afresh to replaced, repaired or re-executed parts of a delivery. Unless otherwise specifically provided in the Purchase Order, Vendor's liability shall be co terminus with the expiration of the applicable warranty period.

26. Limitation of Liability: Vendor's liability towards this contract is limited to a maximum of 100% of the contract value and consequential damages are excluded. However the limits of liability will have no effect in cases of criminal negligence or wilful misconduct.

The total liability of Vendor for all claims arising out of or relating to the performance or breach of the Contract or use of any Products or Services or any order shall not exceed the total Contract price.

27. Liability during warranty: Vendor shall arrange replacement / repair of all the defective materials / services under its obligation during the warranty period. The rejected goods shall be taken away by vendor and replaced / repaired. In the event of the vendor's failure to comply, BHEL may take appropriate action including disposal of rejections and replenishment by any other sources at the cost and risk of the vendor. In case, defects attributable to vendor are detected during Warranty period or where the commissioning call is issued within the warranty period, vendor shall be responsible for replacement/ repair of the goods as required by BHEL at vendor's cost even after expiry of warranty period.

Further if the equipment or any part thereof cannot be used by reason of such defect and/or making good of such defect, the warranty period of the equipment or such part, as the case may be, shall be extended by a period equal to the period during which the equipment or such part cannot be used by BHEL because of any of the aforesaid reasons. Upon correction of the defects in the facilities or any part thereof by repair/replacement, such repair/replacement shall have the warranty period for a period of twelve (12) months from the time such replacement/repair of the equipment or any part thereof has been completed.

28. Liability after warranty period: At the end of the warranty, the Vendor's liability ceases except for latent defects. For the purpose of this clause, latent defects shall be the defects inherently lying within the material or arising out of design deficiency which do not manifest themselves during the warranty Period, but later. The Contractor's liability for latent defects warranty for the equipment including spares shall be limited to a period of six months from the end of the warranty period of the respective equipment including spares or first time commissioning, whichever is later but not later than one (01) year from the date of expiry of warranty period.



29. Compliance with Laws: Vendor shall, in performing the contract, comply with all applicable laws. The vendor shall make all remittances, give all notices, pay all taxes, duties and fees, and obtain all permits, licences and approvals, as required by the laws in relation to the execution and completion of the contract and for remedying of any defects; and the Contractor shall indemnify and hold BHEL harmless against and from the consequences of any failure to do so.
30. Settlement of Disputes: Except as otherwise specifically provided in the Purchase Order, decision of BHEL shall be binding on the vendor with respect to all questions relating to the interpretation or meaning of the terms and conditions and instructions herein before mentioned and as to the completion of supplies/work/services, other questions, claim, right, matter or things whatsoever in any way arising out of or relating to the contract, instructions, orders or these conditions or otherwise concerning the supply or the execution or failure to execute the order, whether arising during the schedule of supply/work or after the completion or abandonment thereof. Any disputes or differences among the parties shall to the extent possible be settled amicably between the parties thereto, failing which the disputed issues shall be settled through arbitration. Vendor shall continue to perform the contract, pending settlement of dispute(s).
31. Arbitration Clause in case of Contract with vendors other than Public Sector Enterprise (PSE) or a Government Department:

ARBITRATION & CONCILIATION

The parties shall attempt to settle any disputes or difference arising out of the formation, breach, termination, validity or execution of the Contract; or, the respective rights and liabilities of the parties; or, in relation to interpretation of any provision of the Contract; or, in any manner touching upon the Contract, or in connection with this contract through friendly discussions. In case no amicable settlement can be reached between the parties through such discussions, in respect of any dispute; then, either Party may, by a notice in writing to the other Party refer such dispute or difference to the sole arbitration of an arbitrator appointed by Head of the BHEL–EDN. Such Sole Arbitrator appointed, shall conduct the arbitration in English language.

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

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

The cost of arbitration shall be borne as decided by the Arbitrator upon him entering the reference.

Subject to the Arbitration Clause as above, the Courts at Bangalore alone shall have exclusive jurisdiction over any matter arising out of or in connection with this Contract.

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

Arbitration Clause in case of Contract with a Public Sector Enterprise (PSE) or a Government Department:

In the event of any dispute or difference relating to the interpretation and application of the provisions of the Contract, such dispute or difference shall be referred by either party for Arbitration to the Sole Arbitrator in the Department of Public Enterprises to be nominated by the Secretary to the Government of India in-charge of the Department of Public Enterprises. The Arbitration and Conciliation Act, 1996 shall not be applicable to arbitration under this clause. The award of the Arbitrator shall be binding upon the parties to the dispute, provided, however, any Party aggrieved by such Award may make further reference for setting aside or revision of the Award to the Law Secretary, Department of Legal Affairs, Ministry of Law and Justice, Government of India. Upon such reference the dispute shall be decided by the Law Secretary or the Special Secretary or Additional Secretary when so authorized by the Law Secretary, whose decision shall bind the Parties hereto finally and conclusively. The Parties to the dispute will share equally the cost of arbitration as intimated by the Arbitrator.'



32. Applicable Laws and Jurisdiction of Courts: Prevailing Indian laws both substantive and procedural, including modifications thereto, shall govern the Contract. Subject to the conditions as aforesaid, the competent courts in Bangalore alone shall have jurisdiction to consider over any matters touching upon this contract.
33. General Terms: That any non-exercise, forbearance or omission of any of the powers conferred on BHEL and /or any of its authorities will not in any manner constitute waiver of the conditions hereto contained in these presents.

That the headings used in this agreement are for convenience of reference only.

That all notices etc., to be given under the Purchase order shall be in writing, type script or printed and if sent by registered post or by courier service to the address given in this document shall be deemed to have been served on the date when in the ordinary course, they would have been delivered to the addressee.

