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PROJECT :- UPCOMING POWERPLANT PROJECTS

PURCHASE SPECIFICATION
FOR
STEAM & WATER ANALYSIS SYSTEM

C O P

REVISIONS :	APPROVED (Punit P Singh)		
	PREPARED	ISSUED	DATE
	PRK	416	04-01-2021

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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.

Evaluation methodology: BHEL shall open Bidder's technical offers for evaluation. Commercial bids of only accepted/ technically qualified Bidders by BHEL/ Customers, shall be considered by BHEL for further processing.

Bidders are required to submit offers as detailed below:

A. 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-I Bid.

B. 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 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:- Technical clarifications w.r.t specifications (if any) shall be discussed with only those vendors who quote for this tender. Bidder shall furnish Clause-wise compliance / deviation list along with the offer, which is mandatory for evaluating the offer. The deviations to be clearly mentioned in the offer and acceptance of these deviations will be subject to customer approval. If Bidder incurs any additional cost for the withdrawal of any deviation, the same shall be borne by the bidder without any cost implication to BHEL.

SECTION- B

AA. General Requirements/documents to be submitted for reference:

1. Original Equipment (Sample Handling System) 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. Not Applicable for Indian SHS Manufacturers.
2. Analysers / SHS OEM shall furnish an undertaking that in case of change in Indian representative / agent / System Integrator, OEM shall continue to support supplies made by previous representatives/agents / System Integrator w.r.t to field service and supply of spare parts.
3. Bidder to note that the below mentioned clauses are deemed to be complied. In case of non-compliance/deviation, offer may be liable for rejection:
   i. Bidder shall have optimum inventory of critical components like sensors/ electronic modules.
   ii. BHEL shall issue call for service / commissioning with 07 days' notice. Bidder shall agree to visit BHEL project sites within above notice period.
4. Vendor shall provide a detailed BOM in the document submitted after receipt of Purchase order. In addition, the packing list during dispatch of the items to project site shall include each loose item required in the complete system.
5. Vendor shall depute his representative to site for verification of material after receipt at site, with respect to approved BOM / documents. A MOM shall be made with BHEL site in-charge for completeness of supplies. Material shall be repacked and handed over to BHEL site in-charge.
6. Submit Reference List of Projects wherein offered system is supplied & commissioned with details like Customer Name, supply & commissioning date as available on date (if available).
7. Technical literature / Manuals of offered Sensors/ System/ Accessories. In the event of technical specification not indicated in Technical literature, confirmation from Analyzer OEM is acceptable. Certificates like Type test / Routine test certificates shall suitably support such confirmations.

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SCOPE OF SUPPLY

SECTION C

REVISIONS :	APPROVED (Punit P Singh)		
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SECTION C

SCOPE OF SUPPLY FOR SWAS

SL NO	ITEM DESCRIPTION	UNITS	QTY PER SET	TOTAL QTY
1	**ANALYSERS - MICROPROCESSOR BASED WITH DIGITAL COMMUNICATION FACILITY LIKE RS485/Modbus/Profibus and HART (Selection of Communication details will be finalised during detailed Engg)**			
a	CONDUCTIVITY(SPECIFIC, CATION) ANALYSER - SINGLE CHANNEL	NOS.	21	21
b	CONDUCTIVITY(SPECIFIC) ANALYSER FOR HOTWELL - SINGLE CHANNEL	NOS.	4	4
c	CONDUCTIVITY ANALYSER (LCR50CQ201) - LOOSE SUPPLY FOR HOTWELL MAKE-UP WATER	NO	1	1
d	pH ANALYSER- SINGLE CHANNEL	NO	12	12
e	DISSOLVED OXYGEN ANALYSER- SINGLE CHANNEL	NOS.	7	7
f	SODIUM ANALYSER(MULTI CHANNEL- 3 CHANNEL)	NO	1	1
g	SILICA ANALYSER (MULTI CHANNEL- 3 CHANNEL)	NO	2	2
h	HYDRAZINE ANALYSER - SINGLE CHANNEL	NO	3	3
i	AMMONIA ANALYSER	NO	2	2
j	TURBIDITY ANALYSER	NO	1	1
k	CHLORIDE ANALYSER	NO	2	2
l	RESIDUAL CHLORINE ANALYSER	NO	1	1
m	SALINITY ANALYSER	NO	1	1
2	Special Cables between wet and dry panel . (for each cell / analyser Combination)	ST	30Mtr/Run	30Mtr/Run
3	COMMISSIONING SPARES- Reagents /Calibrators/Standard solutions as required for commissioning & Handing over of System to Owner	ST	1	1
4	CONSUMABLES OTHER THAN CHEMICAL REAGENTS LIKE PH CELL , DO Sensors ,ETC	ST	1	1
5	CONSUMABLES I.E. CHEMICAL REAGENTS FOR 1 YEAR OPERATION	ST	1	1
6	Following activities will be in Vendor's scope :-			
	i. Supervision of erection, Total commissioning & Handing over of the system to the End user.			
	v. BHEL shall issue call for service / commissioning with 07 days' notice. Bidder shall agree to visit BHEL project site within above notice period.			
	vi. BIDDER TO SEND O & M MANUALS / DOCUMENTATION ALONG WITH CONSIGNMENT.			
	vii. BIDDER TO SUBMIT TEST, CALIBRATION & GUARANTEE CERTIFICATES AS PER APPROVED QUALITY CHECKLIST/ PLAN ONCE MATERIALS ARE MADE READY.			
7	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.			

REF.: CE/416/SWAS/PS

SECTION D

TECHNICAL REQUIREMENTS & ANALYSER SPECIFICATIONS

SAMPLE HANDLING SYSTEM(SHS) SPECIFICATION IS PROVIDED ALONG WITH ANALYSER SPECIFICATION FOR REFERENCE AND TO OFFER THE SUITABLE ANALYSERS FOR THE PROCESS CONDITIONS/SHS ARRANGEMENTS.

STEAM AND WATER ANALYSIS SYSTEM

2.3.5 SWAS System

2.3.5.1 General Requirements

a) 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.

b) Separate Steam and Water Analysis System shall be furnished for continuous monitoring and control of water and steam purity in the plant 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.

c) The sampling system shall obtain samples from steam and water system, which shall be adequately conditioned and fed to analysers for continuous analysis and provide parallel facility for grab sampling as specified.

d) The analyser outputs from SWAS shall be used for providing

i) Continuous monitoring of various parameters using SWAS OS as specified herein with additional 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.

e) 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.

f) The Bidder shall furnish all analysers / 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 analysers furnished by him even though this may not be specifically stated in other clauses of this specification.

g) The system shall be furnished complete with sample conditioning devices and monitoring instruments (for temperature, pressure, flow & sample), analysers, transmitters, indicators, alarm initiating devices, interlocks, isolated 4-20mA 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.

h) The system shall be designed in accordance with the recommendations in ASME PTC 19.11 Part II, Water and Steam in Power Cycle, ASTM standards - 31 water and ASTM D1066-69 standard method of sampling steam.

i) 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.

j) 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.

k) All parts subject to high pressure or temperature or other severe duty shall be of materials suitable for the service.

l) All piping, tubing, fittings, valves, filters and other wetted parts in the sampling and analysing system shall be of type 316 stainless steel or other suitable material for the service approved by the Owner. No plastics or rubber shall be permitted except within analysers as furnished by the manufacturer.

m) All SWAS system components and accessories shall be from the latest proven product range of qualified manufacturers. The SWAS components and accessories shall be of specified makes and models or other owner approved makes and models, 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.

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

o) 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 DDCMIS 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 elsewhere in the specification. Work Station in BHEL Scope

p) All the analysers should work with sample temperature of 40-45 deg.C without chilled water requirement.

2.3.5.2 Alarm Annunciation:

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

2.3.5.3 Sample Conditioning System

i) General

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 analysers 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 analysers or specified herein.

The sample conditioning system shall provide samples at 25°C or a preset temperature required by the analyser within tolerance of + 1°C, at a pressure of about 2 kg / cm2 and at flow rates as required by individual analysers / streams.

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

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 isothermal bath.

The cooling / chilled water header shall be provided with pressure gauge, temperature gauge and flow switch and isolating valves.

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.

ii) 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.

iii) Sample Cooler

All samples having a temperature in excess of 45°C shall be cooled by use of sample cooler.

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 20°C to 40°C. A maximum cooling water temperature of 40°C shall be considered for design of sample cooling system. Capacity of cooler shall be adequate to cool the sample within 5°C of cooling water inlet temperature considering the combined flow of each analyser connected to sample cooler and one manual grab sample at flow rate of 500 cc per minute assuming adequate flowing factor. Cooler capacity calculations shall be submitted by bidder.

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 tubing and fittings, other components shall be constructed of type 316 stainless steel. Cooler design shall conform to requirements of ASTM D1192-64 (Equipment for sampling industrial water and steam). IBR certificate is required wherever applicable. The shell relief valve shall be built in type.

iv) Isothermal Bath Not Applicable, Individual cooler shall be provided along with chiller

In isothermal bath each sample stream shall be finally cooled to the required temperature as specified by the analyser 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 isothermal bath by counter current heat exchange of each sample against the flow of chilled water at 20 Deg. C. The chilled water for isothermal bath shall be provided by package refrigeration unit (chillers).

Sufficient heat exchange capacity shall be provided to obtain the required temperature at sample outlet for maximum flow rate required by the analysers and grab samples requirements considering adequate fouling factor at both ends of the coils. Capacity calculations shall be furnished. Provision shall be made of adjusting each sample temperature individually. Temperature control shall be provided to maintain the isothermal bath

temperature at the required value.

Temperature control system shall be provided to maintain the isothermal bath temperature at the required value as mentioned below:-

a. A Temperature control system shall maintain the isothermal bath temperature at 20 drg C + 1 deg C and sufficient heat exchanger capacity shall be provided to maintain the temperature of all sample stream at 25 deg C + 1 deg.C under all operating conditions with adequate margin for future expansion.

b. Isothermal bath temperature shall be maintained by a local Temperature controller modulating a three way mixing valve, which mix the chilled water from the chiller with the recirculate water from the isothermal bath.

c. The chilled water isothermal bath shall include the following:-

1. Automatic water makeup
2. Bath Temperature Gauge
3. Bath water level Gauge
4. Drain and overflow connection for bath
5. Chilled water Recirculation System

d. Temperature switch shall be provided to annunciate high chilled water temperature on the Dry panel and in DDCMIS.

v) Chiller

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

Chiller Tank shall be SS316 material

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

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

Suitable temperature monitoring and control systems 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 along with 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.

vi) 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 downstream 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.

vii) High 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 as per requirement of analysers. These pressures reducing element shall be conveniently located for removal and cleaning.

viii) Pressure regulating valves

The pressure regulating valves shall be furnished for all samples to maintain constant sample flow at a preset sample pressure. Variation in sample flow to individual analyser

shall not exceed 5% when total sample flow is increased or decreased due to change in number of individual analysers utilizing a particular sample. Valve shall be back pressure regulating type.

ix) Sample system ~~thermal shutoff valve~~, 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 for installation in wet panel. It shall include contacts of adequate current rating. The contacts shall be multiplied by a relay and relay contacts to be used for alarm.

~~Thermal shut-off valve shall be provided for shut down of high temp. sample and to protect the analysers.~~ 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 SS float body.

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 ± 2 %. Make & model of flow switches shall be of Owners approved one. Temperature switches shall be provided on the sample lines as indicated in the drawings for SWAS. All switches shall be repeatable within ± 1.0% of full scale range.

x) Grab samples

Grab sample valves 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 tubing shall be furnished to allow sample collection without splashing.

xi) Sample table

All steam and water analysers 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 hot well, direct mounting type conductivity cells shall be used. 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 makeup 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 signalling contact for

alarm and protection (to operate solenoid valves) at high temperature shall be provided in this temperature gauge. The required contact multiplication shall be done through relays mounted inside the analyser 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 analysers. The flow of sample to individual analysers 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 signalling loss of cooling water flow at each cooler outlet. During collection of grab samples, flow of sample to analysers shall not be affected.

2.3.5.4 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 analyser 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, analyser, 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 blow down connection and suitable blow down valve shall be furnished upstream of each isolating valve. Blow down valves shall be manifold 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, analyser 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 header 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 Analyser Panel (Dry Panel) 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.

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 Amirah / cabinet sheet shall be 18 gauges. All items shall be placed in SWAS air conditioned room.

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 panel & chiller unit. Necessary exhaust fans with louvers shall be provided by bidder in SWAS wet panel room.

2.3.5.5 Piping, Tubing and Accessories

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.

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.

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.

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.

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.

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.

All piping and tubing shall be blown with oil free compressed air after installation and before attachment to equipment at either end.

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.

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.

All sample piping shall be three fourth inch NB seamless type of material ASTM A213 TP316H, conforming to ANSI 36.19.

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

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.

2.3.5.6 Material Specifications for Pipe Lines

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

S.No	Piping System	Material
1	Piping from the sample inlet bulk-head fittings the shut-off valve for low pressure samples	Stainless Steel, ASTM A-213 Type 316, 16 BWG tubing
2	Piping from the sample inlet bulk-head fittings to the pressure reducing valves for high pressure samples and sample blow down piping	Stainless Steel, ASTM A-213 Type 316H, 14 BWG tubing
3	Blow down header	Stainless Steel, ASTM A-312 Type 316, Sch. 160
4	Miscellaneous drains receiver header	Stainless Steel, ASTM A-312 Type 316, 16 BWG tubing
5	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 and the closed cooling water grab sample piping	Stainless Steel, ASTM A-312 Type 316, 16 BWG tubing
6	Closed cooling water piping except grab sample	Stainless Steel, ASTM A-312 Type 316, Sch. 40
7	Sample through drain piping and waste header piping	Carbon Steel, ASTM A-53 Gr. A, Sch. 40

2.3.5.7 Valves and Fittings

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 ASTMA 182 F316H conforming to ANSI B16.11.

2.3.5.8 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.

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.

2.3.5.9 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.
Static Switch Shall be provided for Power supply.

2.3.5.10 Lighting and Receptacles

Sample table and analyser 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 panel.

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

2.3.5.11 Grounding

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

2.3.5.11.1 Technical Specifications of Analyser Pl. also Refer Annexure D for Analyser Specifications

All analysers shall have Digital communication facility like RS 485 / HART/Modbus/ Profibus. One of the communication method is finalised during detailed Engg.

	ANNEXURE - D ANALYSER SPECIFICATIONS	
SPEC NO.	**REQUIREMENT**	
5.11.00	**Technical Specifications of Conductivity Analyser/Salinity Analyser**	
a)	Applicable standard	ASME PTC 19.11-1970 except as modified in this specification.
b) T	ype:	
	i) Cell	Flow through type/ removable type (with drawable with sealing valve)
	ii) Monitors	Electronic(Microprocessor based) indicating type with multi range facility
c)	Material :	
	i) Cell	Epoxy resin/ SS316
	ii) Electrode	Platinised / PEEK body
	iii) Monitors body	Carbon steel / Polycarbonate
d)	Monitor output:	
	i) 4-20 mA D.C.	
	ii) 4-20mA DC for DDCMIS Output load : 500Ω	
e)	Power supply	240V, AC, 50 Hz / 85 - 265 VAC
f)	Accuracy	+ 1% of full scale span/ Linearity: ±0.6% of reading /+/- 0.1% FS / ±1 % of measured value
g)	Stability	+ 1% of full scale per month non-cumulative / 0.5% FS/Month.
h)	Repeatability	+0.3% of span / 0.1% of range
i) Annunciation	contacts for monitors	
	i) Number	2SPDT / 3 SPDT
	ii) Type	Snap action micro switch / 4 wire micro processor based
	iii) Rating	5 amp, 240 V, 0.2 Amp, 220V DC / 1C, 250VAC, 3 Amp
	vi) Cell	On line/pipe mounted (ON LINE in sample table)
	v) Monitors	flush panel mounting
j) 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.
	ii) Process	1/4 (Quarter) inch NPT(F) SCRD for on-line type Three quarter (3/4) inch NPT (M) SCRD for pipe mounted / 3/4"NPT(M) with SS316 gland fitting with Teflon Ferrule
k)	Electrical	Half (1/2) inch NPT (F) SCRD
l)	Accessories (As part of Sample Handling system as	i) Automatic temperature compensation in the range 0- 100°C

	applicable)	
		ii) Ammonia (NH3) removal equipment.
		iii) Sample coolers
		iv) Flow and pressure regulators
		v) SS 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.
m)	Range	As per sample stream detail table
n)	Other particulars	Cell shall be suitable for maximum pressure of 7 kg/cm2 and maximum temp. of 100°C
o)	cation Resin column	color changing resine
p)	Response Time	< 3 seconds / < 5 Sec
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
	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 f low 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 / Teflon® / Silver Chloride
	ii) Electrode	pH glass
	iii) Monitor body	Carbon steel/ Aluminum Polycarbonate / Polycarbonate / Beige Polycarbonate / Noryl® resin
d)	d) Monitor output	i)4-20 mAmp D.C.
		ii)4-20mA DC for DDCMIS Output load : 500Ω
e)	Power supply	240V AC, 50 Hz / 85 - 265 VAC
f)	Accuracy/repeatability	+ 0.03 pH/+0.02PH / 0.02 pH / 0.01 pH /
g)	Resolution	+ 0.01 pH or 1 mV. 1C

h)	Stability	0.02 pH per week / ±0.001 PH/Week / 0.01 pH
i) Annunciation contacts for monitors:		
		i) Number 2 SPDT 'Hi' and 'Lo' / 3 SPDT
		ii) Type Snap action micro switch
		iii) Rating 5 amp, 240V AC, 0.2 Amp, 220V DC or 5.0 A 230 Vac,5.0 A115 Vac or Contact Rating 1C, 250VAC, 3 Amp
j) Connection:		
	i) Process	One-quarter (1/4)inch NPT(F) SCRD ON-LINE or Front facing: 3/4″ and 1″ MNPT Rear facing: 1″ MNPT
	ii) Electrical	Half (1/2) inch NPT(F) SCRD / Conduit openings: 1/2 in. or PG 13.5 conduit fittings
k) Mounting:		
	i) Cell	Pipe Mounted / in Flow chamber
	ii) Monitors	Flush panel mounting
	l) Accessories (As part of Sample Handling system as applicable)	i) Automatic temperature compensation with fast response integral temperature sensors in the range 0-100°C
		ii) Co-axial cable as required
		iii) Sample coolers
		iv) Flow and pressure regulators
		v) Standard pH solutions
		vi) SS 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
m)	Ranges	As per sample stream detail table.
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 Electro-chemical / amperometric type
c)	Material	Die-cast aluminum /SS/Polycarbonate / Noryl® resin
d)	Output	i) 4-20 mAmp DC spare output
		ii) 4-20 m Amp, DC Isolated output for DCS.
e)	Supply	240V AC, 50 Hz / 85 - 265 VCA

f)	Accuracy	.+ 5 % of reading / 0.1% FS or 0.3%, if cal temp. = measurement temp 1.5%, at +/- 10°C deviation to cal temp
g) Response:		
	i) Sensitivity	+ two (2) per cent overall / 0.1 ppb
	ii) Time (sensor)	Less than 30 seconds for 90% step change. Or <20 sec to 90% of final reading at 77 °F (25 °C)
h) Connection:		
	i) Process	One quarter (1/4) inch NPT(F)SCRD
	ii) Electrical	Half (1/2) inch NPT (F) SCRD / Conduit openings: 1/2 in. or PG 13.5 conduit fittings
i)	Accessories (As part of Sample Handling system as applicable)	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 including chillier.
		v) Calibration device.
j)	Ranges	As per sample stream detail table
k) Mounting		Flush
l)	Annunciation contacts:	
	i) Number	2 SPDT / 3 SPDT
	ii) Type	Snap action micro switch
	iii) Rating	5 Amp 240V AC, 0.2 amp 220V DC or 5.0 A 230 Vac,5.0 A115 Vac
5.14.00	**Technical Specification of Silica Analyzer (Sl OX)**	
a)	Applicable standard	ASME PTC 19.11-197 except as modified in this specification
b)	Type	Multi Channel (max of each Three channel) Colorimetric Analyzer (with auto reagent shut off feature in case of sample loss or power loss) built in phosphate inhibition feature. Micro processor based.
c) Material:		
	i) Case	Die cast aluminium / POLYCARBONATE
d)	Cycle Time	Less than 15 minutes per analysis
e)	Analyser output	i) 4 to 20 m Amp DC for spare output
		ii) 4 to 20 m Amp DC Isolated output for DCS
f)	Power supply	240V AC, 50 Hz
g)	Accuracy	+ 1% of span Or Less than 5% of reading or ±0.5ppb, whichever is greater, from 0 to300ppb. Less than 10% of reading from 300 to 5000ppb. Or ±1% or ±1 µg/L of reading upto 500µg/L Or 1 ppb or 5%, whichever is greater

h)	Repeatability	+ 2% of full scale Or Less than ±2% of reading or ±0.5ppb, whichever is greater from 0 to300 ppb. Less than ±5% of reading from 300 to 5000ppb. Or ± 0.5 µg/L or ± 1 % of reading, whichever is greater Or 1 ppb or 5%, whichever is greater
i) Sensitivity		0.2 micrograms/litre Or Resolution 0.5ppb in all ranges Or 0.5 µg/L Or 1 ppb
j) Connection:		
	i) Process	Quarter (1/4) inch NPT(F) SCRD / 1/4 in. O.D. flexible tubing,
	ii) Electrical	Half (1/2) inch NPT (F) SCRD
k)	Ranges	As per sample stream detail table
l)	Mounting	Flush / WALL MOUNTING
m)	Annunciation contacts:	
	i) Number	2 SPDT / Four SPDT, 5A at 240V Programmable
	ii) Type	Snap action micro switch
	iii) Rating	5 amp 240V AC 0.2 Amp 220V DC
n)	Accessories (As part of Sample Handling system as applicable)	
		ii) Automatic temperature compensation between 5 to 50°C / Not applicable for Colorimetric Analzyer
		iii) Automatic zeroing provision
		iv) SS tubing & vessels
		v) All chemical reagents for 12 months operation of the analyzer
		vi) Sample rate set values
		vii) Comprehensive diagnostic and alarm features.
		viii) Auto sampling facility with necessary valves & solenoids in the sample lines shall be provided.
5.15.00	**Technical Specification of Hydrazine Analyzer**	
i) T	ype	Microprocessor based Electrochemical

ii)	Case material	Die-cast aluminum/SS/Polycarbonate
iii)	Analyzer output	i) 4-20 mA DC for spare output
		ii) 4-20 mA DC isolated output for DDCMIS
iv)	Power supply	240V AC, 50 Hz
v)	Accuracy	+2% of full scale Or 2 % or 1 ppb whichever is greater
vi)	Sensitivity	1.0 microgram/litre / 2ppb / 1 ppb / 0.1 ppb
vii)	Annunciation contacts:	
	Number	2 SPDT / 3 Relay Outputs; Relay Load: 250VAC; 30VDC; 5A / Four electromechanical SPDT(Form C) contacts, 1200 W,5A
	Type	Snap action microswitch
	Rating	5A 240V AC, 0.2 A, 220V DC Or Relay Load: 250VAC; 30VDC; 5A
	Mounting	Flush Mounting / WALL MOUNT
viii)	Accessories (As part of Sample Handling system as applicable)	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
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)
ii)	Case material	Die-cast aluminum/SS/Polycarbonate / ABS WITH SS FRAME ENCLOSURE
iii)	Analyzer power supply	240V AC, 50 Hz
iv)	Analyzer output	i) 4-20 mA DC for spare output
		ii) 4-20 mA DC isolated output for DDCMIS
v)	Accuracy	Better than +5% of full scale / ±5% or 0.01ppb – whichever is greater / Less than 0.02 ppb or 1.5% reading
vi)	Response Time	6 minutes. Max / 95% within 2 minutes
vii)	Sensitivity	0.1 ppb / 0.01 ppb
viii)	Annunciation contacts:	
	Number	2 SPDT / 3 Relay Outputs; Relay Load: 250VAC; 30VDC; 5A / 4 X Relay (Connection)
	Type	Snap action micro switch
	Rating	5A 240V AC, 0.2 A, 220V DC

		Or Relay Load: 250VAC; 30VDC; 5A
	Mounting	Flush Mounting / WALL MOUNT
viii)	Terminal points	All components piped & wired to terminal points
ix)	Accessories (As part of Sample Handling system as applicable)	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
5.18.00	**Technical Specification of Chloride analyser**	
i)	Type	Microprocessor based Continuous flow through sample type. Or The chloride monitor shall measure chloride concentrations using ion selective, solid state sensing electrodes. Or Microprocessor based ION Selective Method.
iii)	Analyzer power supply	240V AC, 50 Hz
iv)	Analyzer output	i) 4-20 mA DC for spare output
		ii) 4-20 mA DC isolated output for DDCMIS
v)	Accuracy	Better than 5 micro gram / litre. Or 10% of reading or ± 5 ppb, whichever is greater, within ± 5°C of calibration temperature, whichever is greater
vi)	Sensitivity	Better than +4% of full scale Or 0.1 ppb from 5 to 999.9 ppb range
	Range	As per Requirements
vii)	Annunciation contacts:	
Number		2 SPDT
	Type	Snap action microswitch
	Rating	5A 240V AC, 0.2 A, 220V DC / Or Relay Load: 250VAC; 30VDC; Or 5A / 5A @ 220V AC/0.2 A @ 220VDC
	Mounting	Flush Mounting / WALL MOUNT
viii)	Terminal points	All components piped & wired to terminal points
ix)	Accessories (As part of Sample Handling system as applicable)	i) Flow regulator
		ii) Flow gauges
		iii) Sample rate set valves
		iv) Other accessories as required to make the system complete
5.20.00	**Technical Specification of Residual chlorine analyser**	
Sensor		

	Method	Amperometric
	Electrodes	Gold Cathode/Silver Anode
	Cell Material	PVC
	Electrolyte	Potassium Bromide / Potassium iodide
Trans mitter		
	Type	Microprocessor Based with self diagnostic features
	Transmitter Output	4 – 20 mA
	Enclosure Protection	IP65 / NEMA 4X IP66
	Enclosure Material	Polyester coated Al./ Beige Polycarbonate
	Electrical Connection	½" NPT (F)
	Mounting FIELD	
	Display Type	LCD
	Display Details	digit backlit LCD matrix
	Diagnostics	Required
	Meter Range	0-1 mg/l Or 0 to 10 ppm (mg/L) as CL2.
	Resolution	0.01 ppm Or 0.001 ppm or 0.01 ppm – selectable Or 0.00 to 5.00 mg/l
	Sensitivity 0.01	ppm Or +/- 0.01 ppm
	Area Classification	safe
	Electromagnetic Compatibility	BUILT – IN
	Temp. Compensator	AUTO – BUILT – IN
	Temp. Compensating element	PT 100
5.21.00	**Turbidity Analyser**	
Sensor		Reference Type
	Operating Principle	Alternating light source Or near infrared LED
	Cleaning	Self cleaning
	Electrode holder-type	Flow through
	Body material	CPVC
	Process connection	½" NPT (F)
	Preamplifier	Built-in

Trans mitter		
	Type	Microprocessor Based with self diagnostic
	Enclosure Protection	IP65 Or NEMA 4X IP66
	Enclosure Material	Polycarbonate / Beige Polycarbonate
	electrical connection ½"	NPT (F)
	load indicator	Provided (LCD Display)
	accuracy	0.2 NTU or ± 2% of reading Or Accuracy after calibration at 20.0 NTU:0 1 NTU: Or .± 2% of reading Or ± 0.001 FNU/NTU or 1% of reading
	Repeatability	±0.1 of span Or 0.1% of range Or ± 0.001 FNU/NTU or 1% of reading
	Stability	
	RESPONSE TIME	
	Linearity	
	Temperature compensator	Built – in
	Cable between transmitter & Sensor	To be provided
	Technical Specification of Ammonia Analyzer	
	SOFTWARE FEATURES	Software Features Self-test & diagnostics: YES Real time clock: YES Meter serial number: YES Programmable alarms: High, low, error, calibration/ Offline Password protection: YES Reset function: YES Or Self-test & diagnostics, Real time clock, Meter serial number, Password protection, Programmable alarms: High, low, error, calibration/ offline, Reset function.
	ENCLOSURE PROTECTION CLASS	Weatherproof enclosure: IP66 & NEMA 4X
	INSTRUMENT RANGE MEASUREMENTS RANGE	Instrument Rang:- 0 to 10 ppm Measurement Range:-0 to 10 ppm
	AMBIENT TEMPERATURE	Ambient operating temperature: 5 to 45 ℃
	ACCURACY	Accuracy (with DKA cal): ± 5% or 0.03 ppm, whichever is greater, at 20 °C and 35 °C Or ± 5% or 0.03 ppm
	RESPONSE TIME	Initial response within 15 seconds, reach 90% of reading within 1 minute of injecting a standard solution
	UNITS DISPLAYED	ppb, ppm (auto ranging), mV, temperature
	TEMPERATURE MEASUREMENT RANGE	Range: - 10 to 120 ℃
	FLOW RATE	Flow rate: 40 mL/min nominal set by pressure

		regulator
	RELATIVE HUMIDITY	Relative humidity: 5 to 95% non-condensing
	STORAGE TEMEPRATURE	Storage temperature: - 20 to 60 ℃
	POWER SUPPLY	Input: 85-132 or 170-264 VAC Or 170-264 VAC Or 85 to 132VAC
	OUTPUT SELECTION	Analog output: Galvanically isolated Number of analog outputs: 2, one dedicated to ammonia, one to temperature; shared ground Or 4-20 MA AND RS485
	Resolution	Resolution: 2, 3 or 4 digits mV Measurement Range: ± 1999.9 mV Resolution: 0.1 mV

REF:- NC/416/SWAS/TR

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

I N D E X :-

	Sl.No.	TITLE	Sht.No.
	1.	TITLE	01
	2.	INDEX	1A
	3.	LEGEND	02
	4.	NOTES	2A
	5.	DMCW SCHEME FOR PRIMARY COOLERS	03
	6.	DMCW SCHEME FOR PRIMARY COOLERS	04
	7.	CHILLED WATER SCHEME FOR SECONDARY COOLERS	05
	8.	FEED WATER TO ECONOMISER	06
	9.	SH/MAIN STEAM	07
	10.	SEPARATOR OUTLET	08
	11.	SAT STEAM	09
	12.	HRH STEAM	10
	13.	DEAERATOR I/L	11
	14.	DEAERATOR DIS HEADER	12
	15.	HOTWELL–A	13
	16.	HOTWELL–B	14
1	17.	VOID	15
	18.	CONDENSATE POLISHER O/L	16
	19.	CONDENSATE AT CEP DISCHARGE	17
	19.	DMCW FOR TG AUX	18
	20.	DMCW FOR SG AUX	19
	21.	CW DISCH O/L	20
1	22.	ACW PUMP DISCH	21
2	23.	BLR BLOW DOWN TO COND DRAIN FROM BLR CONDENSATE PUMPS	22

LEGEND :


ISOLATING VALVE
(NORMALLY OPEN)


ISOLATING VALVE
(NORMALLY CLOSED)


PRESS REDUCING VALVE


BACK PRESS REGULATOR

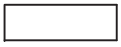
SOLENOID OPERATED VALVE


SAFETY RELIEF VALVE


3 WAY NEEDLE VALVE


SAMPLE COOLER


SAMPLE FILTER


EXPANDER


FLOW INDICATOR
WITH REGULATING VLV

QDV — QUICK DISCONNECTION VALVE

CATION COLUMN

CONDUCTIVITY ELEMENT

pH ELEMENT

DISSOLVED O2 ELEMENT

DOT — DISSOLVED O2 TRANSMITTER

CT — CONDUCTIVITY TRANSMITTER

CCT — CAT. CONDUCTIVITY TRANSMITTER

pHT — pH TRANSMITTER

SiT — SILICA ANALYSER TRANSMITTER

NaT — SODIUM ANALYSER TRANSMITTER

NH3T — AMMONIA TRANSMITTER

CIT — CHLORINE ANALYSER TRANSMITTER

SaIT — SALINITY ANALYSER TRANSMITTER

ANALYSER IN DRY PANEL

PRESSURE GAUGE

TEMPERATURE GAUGE

TEMPERATURE SWITCH

FLOW SWITCH

FLOW INDICATOR

LEVEL INDICATOR

IMPULSE LINE

CABLE

CR — CONTROL ROOM

DDCMIS — DISTRIBUTED DIGITAL CONTROL MONITORING & INFORMATION SYSTEM

OWS ALARM — ALARM ON OWS IN CONTROL ROOM


INDICATES RESPECTIVE SCOPE

EDN — BHEL–EDN

B(T) — BHEL–TRICHY

CUST — CUSTOMER

HYDRAZINE TRANSMITTER

THERMAL SHUT–OFF VALVE
(NORMALLY OPEN)

CLDT — CHLORIDE ANALYSER TRANSMITTER

Important Notes Indicated below, Vendor read carefully and incorporate the same

NOTES :

1. ONE SET OF ALARM CONTACTS OF 2SPDT TYPE SHALL BE PROVIDED WITH EACH ANALYSER/MONITOR. 4–20 mA SIGNAL FROM ALL ANALYSERS SHALL BE HOOKED–UP TO DDCMIS FOR MONITORING PURPOSE AS WELL AS ALARMS.

2. ALL FIELD SAMPLING LINE SHALL BE OF ANNEALED SEAMLESS SS316H AND 3/4" (i.e. 20NB).

3. ALL PRIMARY COOLERS SHALL BE LOCATED IN THE FIELD.

4. SAMPLE TEMP SHALL BE AROUND 45 DEG C AT PRIMARY COOLER OUTLET AND SAMPLE TEMP AT SECONDARY COOLER OUTLET SHALL BE 25°C.

5. SAMPLE ENTRY IN PANEL SHALL BE FROM ''TOP'' AND CABLE ENTRY FROM ''BOTTOM''. IN ADDITION, PROVISION OF CABLE ENTRY FROM SIDE SHALL ALSO BE MADE AVAILABLE.

6. SAMPLE TEMP HIGH ALARM SHALL BE PROVIDED IN DDCMIS AND SWAS ALARM ANNUNCIATOR (WITH MINIMUM 80 POINTS).

7. THE SAMPLE CONDITIONING SYSTEM SHALL PROVIDE SAMPLES AT A PRESSURE OF ABOUT 2 KG/CM2 AND AT FLOW RATES AS REQUIRED BY INDIVIDUAL ANALYZERS/STREAMS AS PER TECHNICAL SPECIFICATION.

8. WET PANEL SHALL BE OF FREE STANDING "CLOSED TYPE". DRY PANEL SHALL BE OF FREE STANDING " CLOSED TYPE " WITH WITH BACK DOORS. THE SAME SHALL SHALL BE CONSTRUCTED AS PER TECHNICAL SPECIFICATION

9. ONE OWS WITH A4 SIZED B&W LASER JET PRINTER SHALL BE PROVIDED FOR SWAS SYSTEM AS PER TECHNICAL SPECIFICATION. (SHALL BE PART OF HMI SUPPLIER). OWS BHEL scope of supply

10. FITTINGS IN THE FIELD FOR SAMPLE PIPING SHALL BE SOCKET WELDING TYPE.

11. THE SYSTEM SHALL BE DESIGNED TO PROVIDE 20% MORE THAN THE MAXIMUM SAMPLE FLOW REQUIREMENT AS PER TECHNICAL SPECIFICATION.

12. SAMPLE EXTRACTION PUMPS SHALL BE PROVIDED FOR SAMPLE STREAMS WITH PRESSURE LESS THAN 2KG/CM2.

13. TWO NOS. CATION EXCHANGE COLUMNS(ONE WORKING AND ONE STAND–BY) SHALL BE PROVIDED WITH MANUAL SWITCHING FOR EACH CATION CONDUCTIVITY MEASUREMENT.

14. ALL PIPING, TUBING, FITTINGS, VALVES, FILTERS AND OTHER WETTED PARTS IN THE SAMPLING AND ANALYZING SYSTEM SHALL BE OF TYPE SS316 OR OTHER SUITABLE MATERIAL FOR THE SERVICE APPROVED BY THE OWNER. NO PLASTICS OR RUBBER SHALL BE PERMITTED EXCPET WITHIN ANALYZERS AS FURNISHED BY THE MANUFACTURER AS PER TECHNICAL SPECIFICATION.

15. COMPLETE SET OF FURNITURE FOR SWAS ROOM SHALL BE PROVIDED AS PER TECHNICAL SPECIFICATION.

△1 16. 1 No. CONDUCTIVITY ANALYSER (LCR50CQ201) AS PER HOTWELL MAKE–UP WATER SYSTEM P&ID SHALL BE SUPPLIED AS LOOSE ITEM. IN LINE WITH MOM DTD: 14.09.2017 & 15.09.2017 AT TANGENCO OFFICE FOR HOTWELL MAKE–UP P&ID.

△3 17. COMPLETE PIPING, TUBING, FITTINGS, VALVES, BLOW DOWN VALVES, SAMPLE RELIEF VALVES, SHELL RELIEF VALVES, FILTERS AND OTHER WETTED PARTS IN THE SAMPLING AND ANALYZING SYSTEM SHALL BE OF SWAGELOK, DR THIEDIG OR PARKER MAKE ONLY.

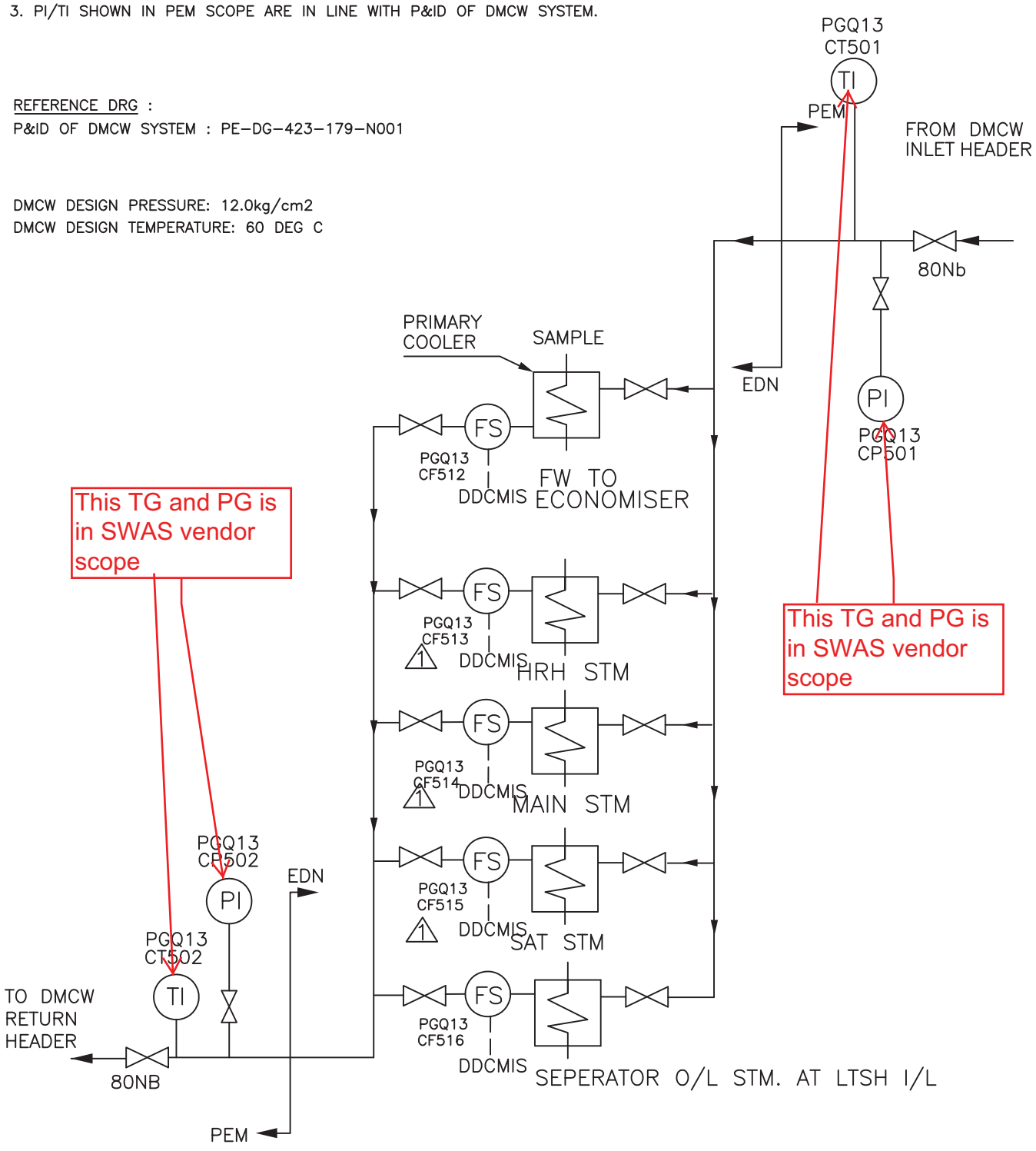
△3 18. ALL THE ANALYZERS WILL BE UNDER ONE COMMUNICATION FACILITY(RS485) TO DCS. THE SAME SHALL BE PROVIDED CONSIDERING ANALYZERS INTO TWO(02) GROUPS AND IN ADDITION TO 4–20 mA HARDWIRED SIGNALS FROM EACH ANALYZER TO DCS.

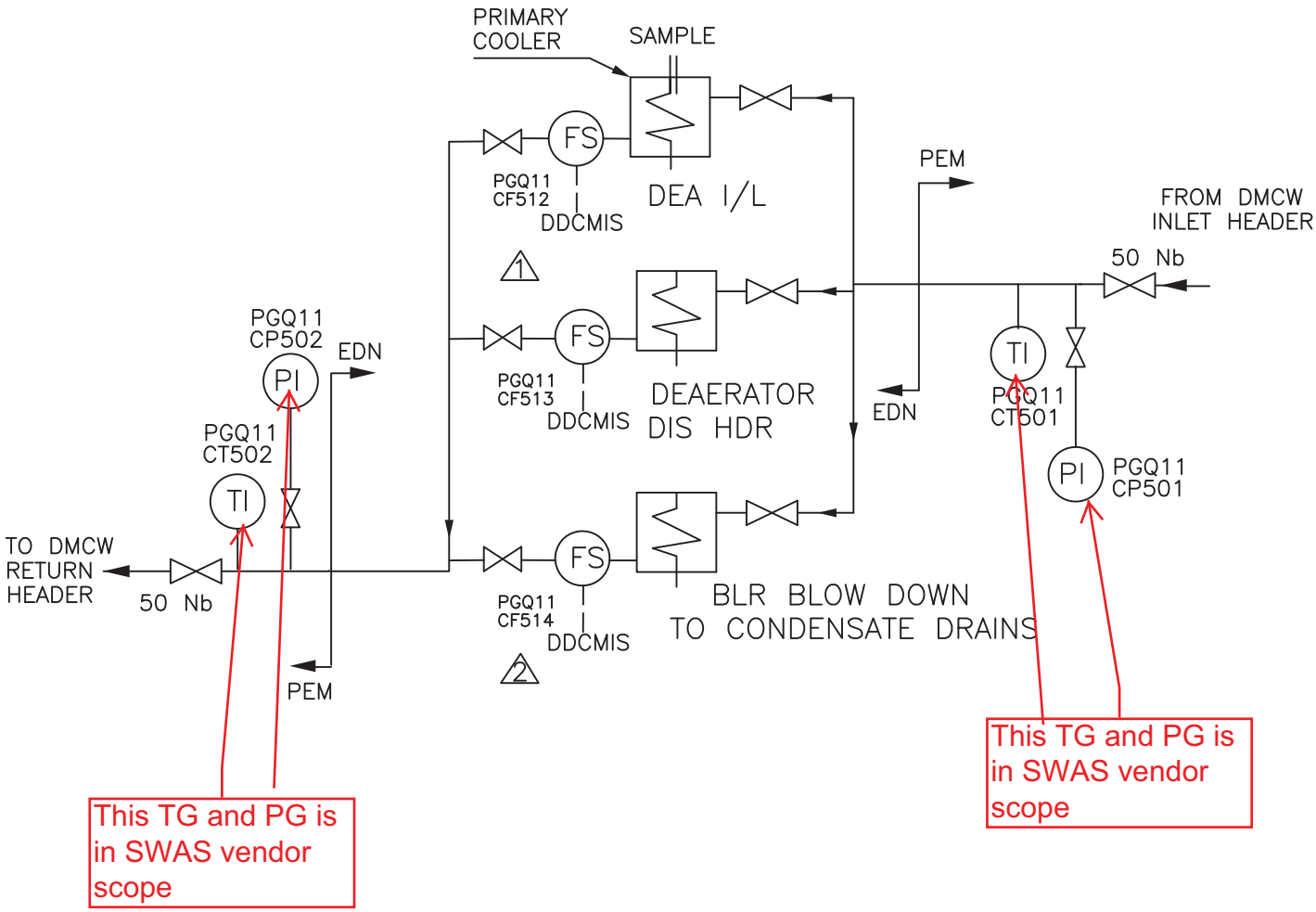
NOTES:

1. SUITABLE EXPANDER(S) SHALL BE PROVIDED TO ERECT THE TEMPERATURE GAUGE.
2. PRIMARY COOLERS SHALL BE LOCATED AT FIELD.
3. PI/TI SHOWN IN PEM SCOPE ARE IN LINE WITH P&ID OF DMCW SYSTEM.

REFERENCE DRG :
P&ID OF DMCW SYSTEM : PE-DG-423-179-N001

DMCW DESIGN PRESSURE: 12.0kg/cm2
DMCW DESIGN TEMPERATURE: 60 DEG C





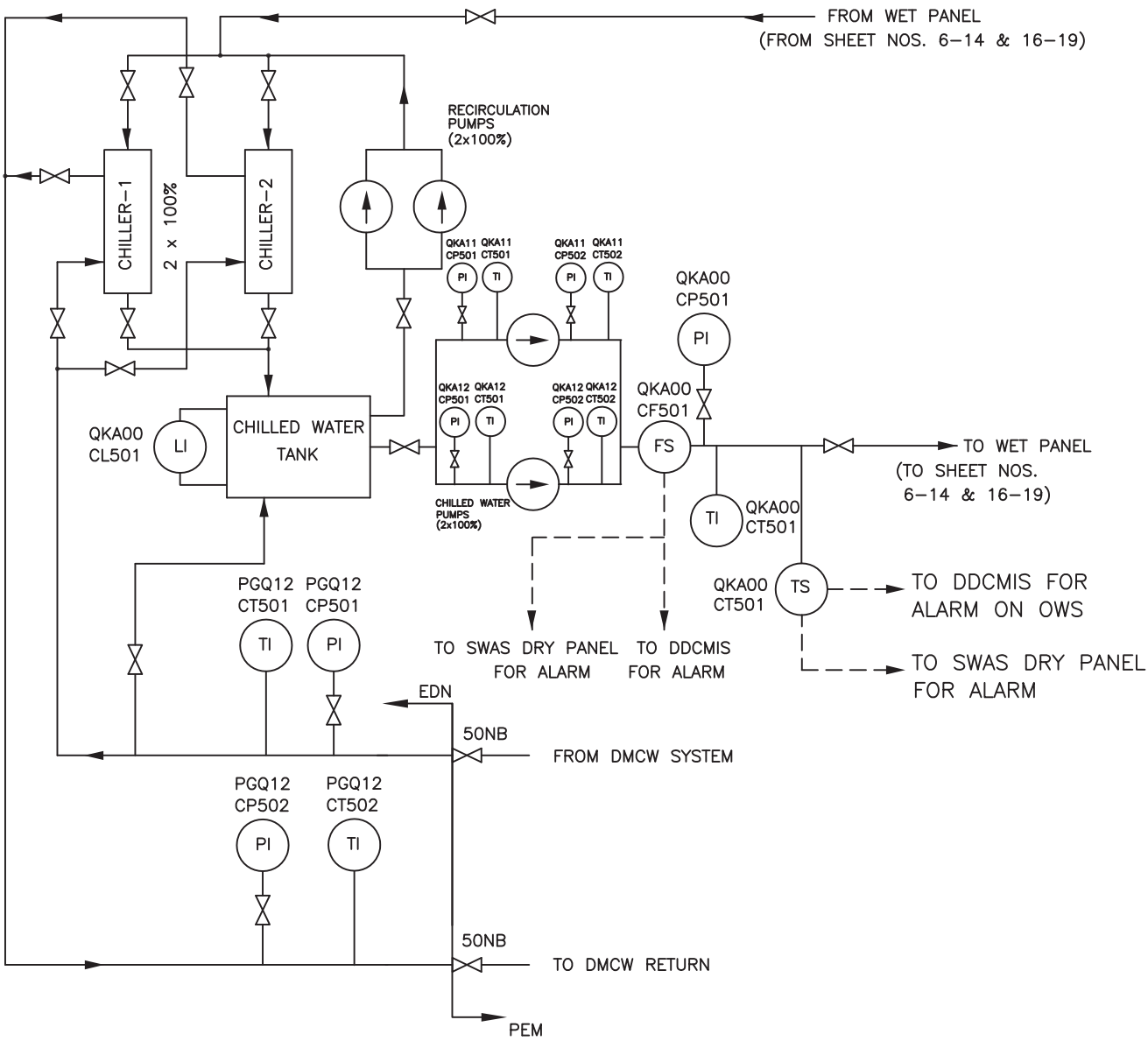
NOTES:

1. SUITABLE EXPANDER(S) SHALL BE PROVIDED TO ERECT THE TEMPERATURE GAUGE.
2. PRIMARY COOLERS SHALL BE LOCATED IN FIELD.
3. PI/TI SHOWN IN PEM SCOPE ARE IN LINE WITH P&ID OF DMCW SYSTEM.

REFERENCE DRG :

P&ID OF DMCW SYSTEM : PE-DG-423-179-N001

DMCW DESIGN PRESSURE: 12.0kg/cm2
DMCW DESIGN TEMPERATURE: 60 DEG C



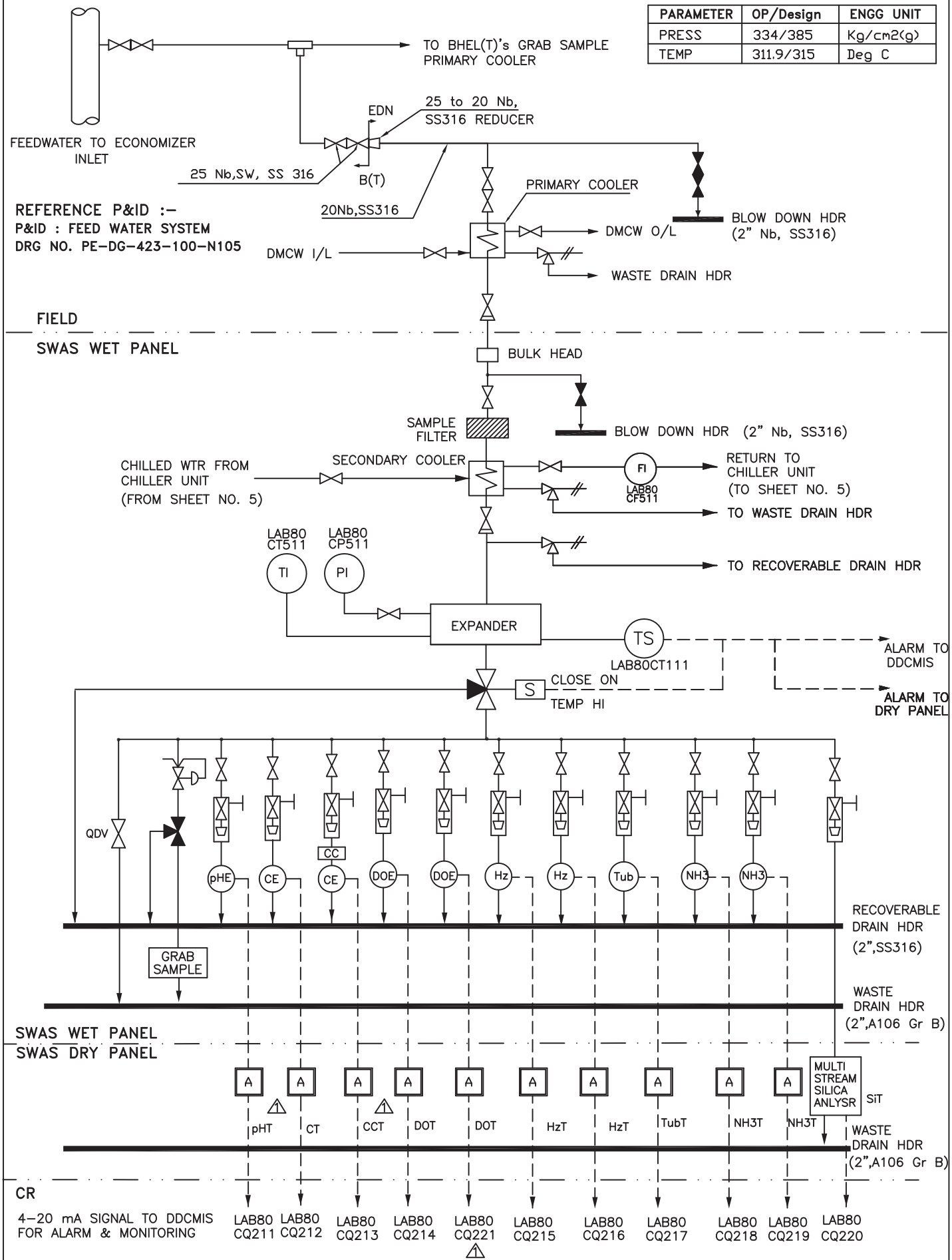
NOTES

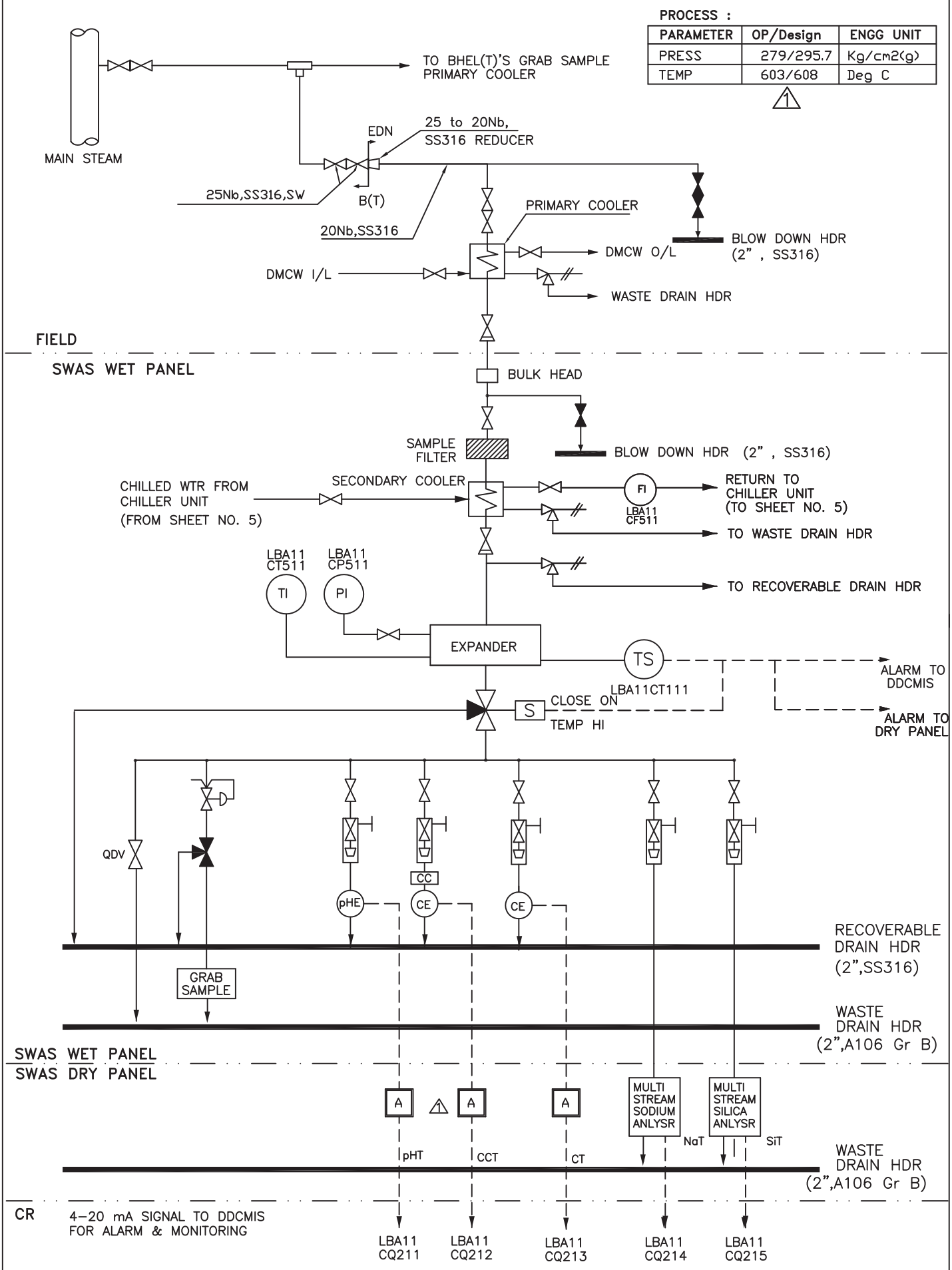
NOTES

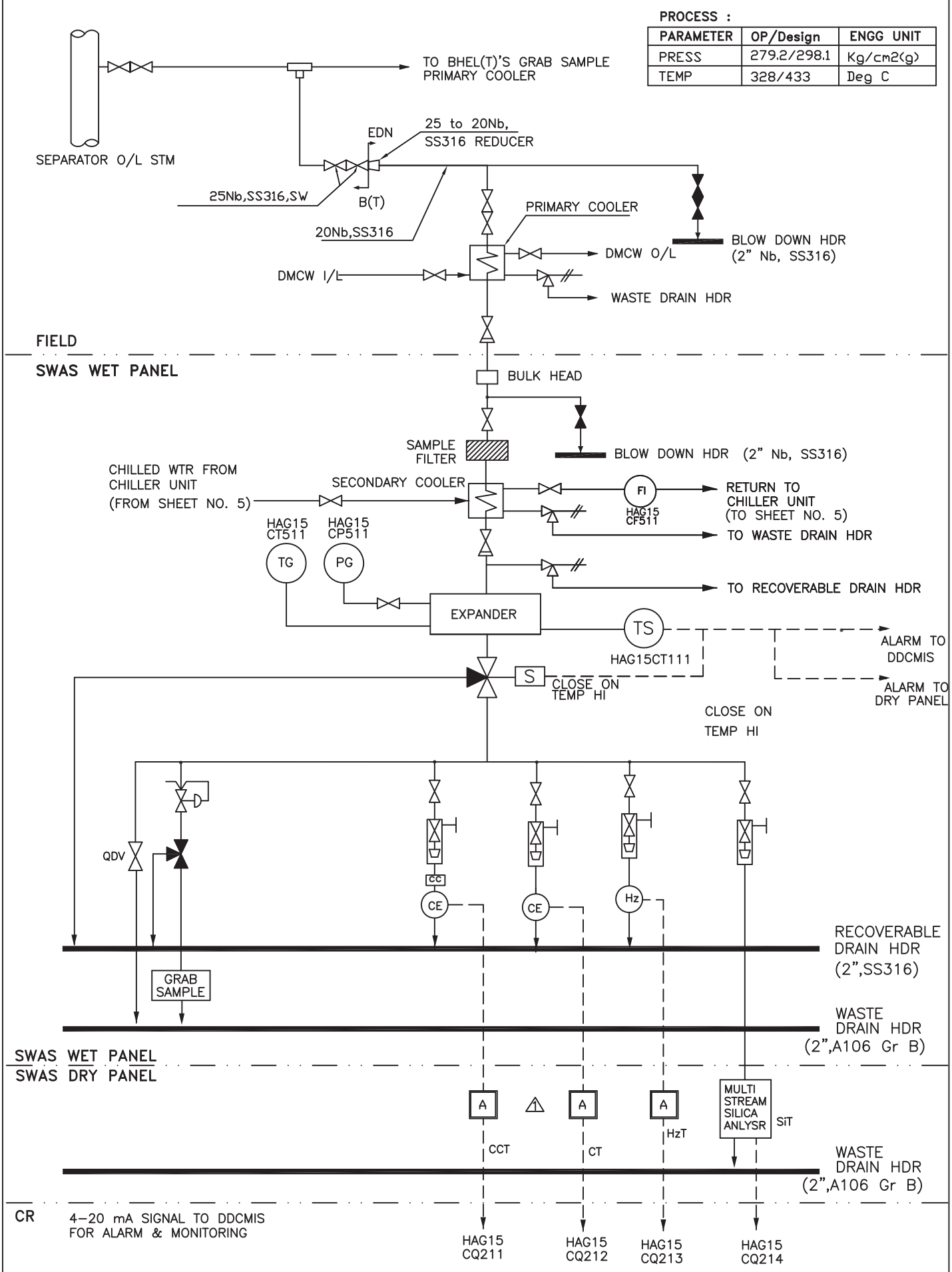
1. ALL SECONDARY COOLERS ARE LOCATED IN SWAS WET PANELS.

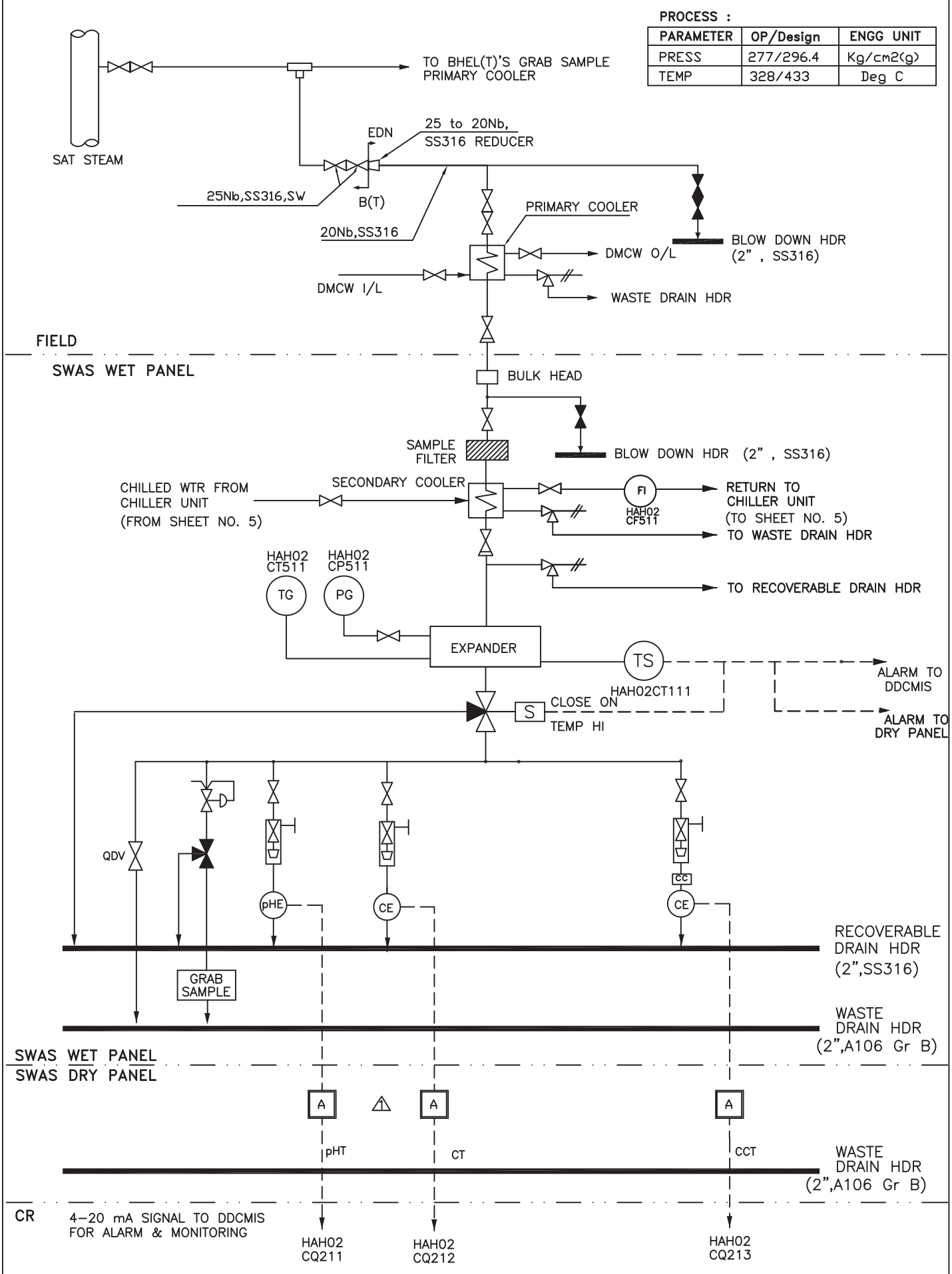
PROCESS :

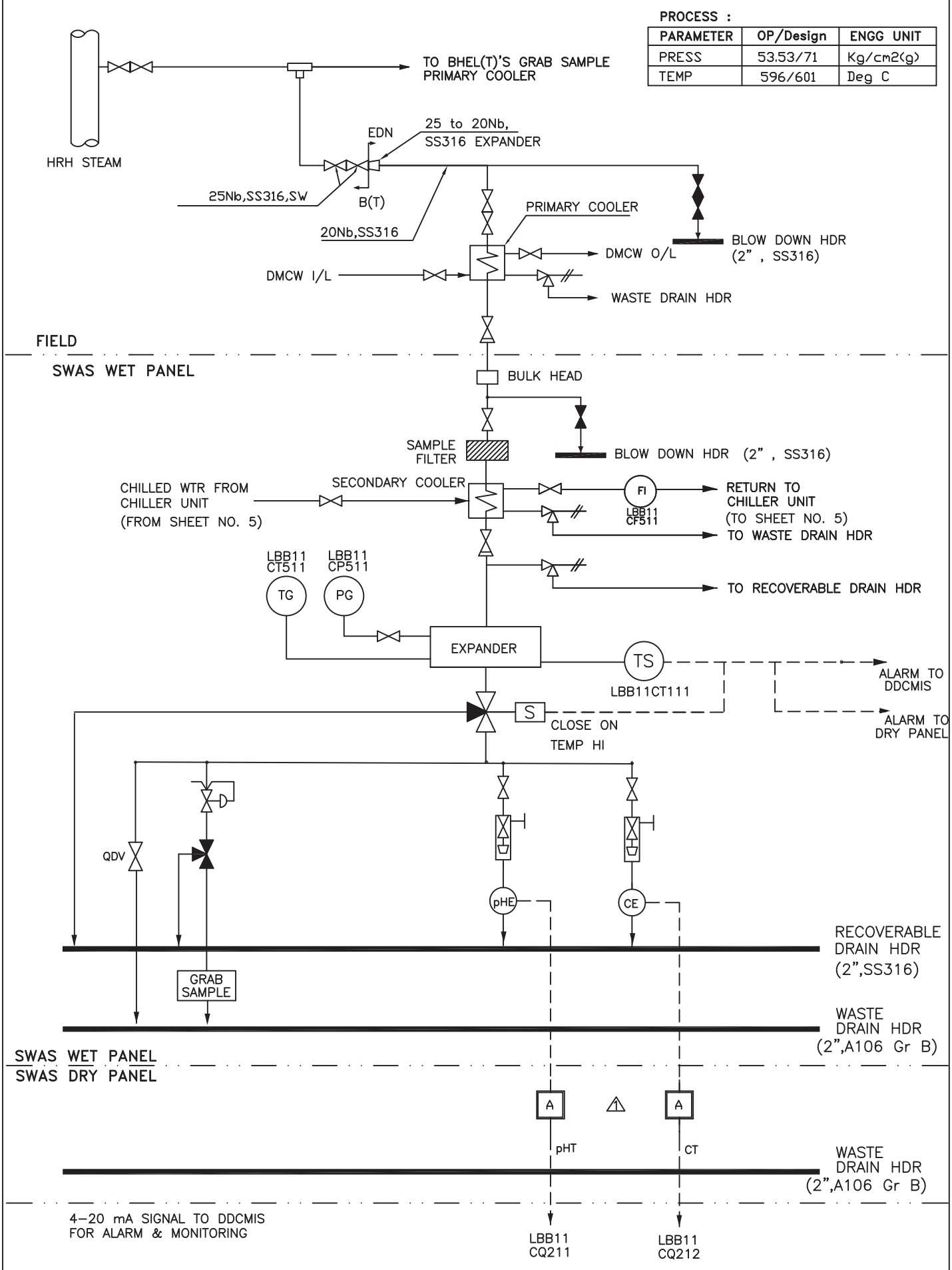
PARAMETER	OP/Design	ENGG UNIT
PRESS	334/385	Kg/cm2(g)
TEMP	311.9/315	Deg C

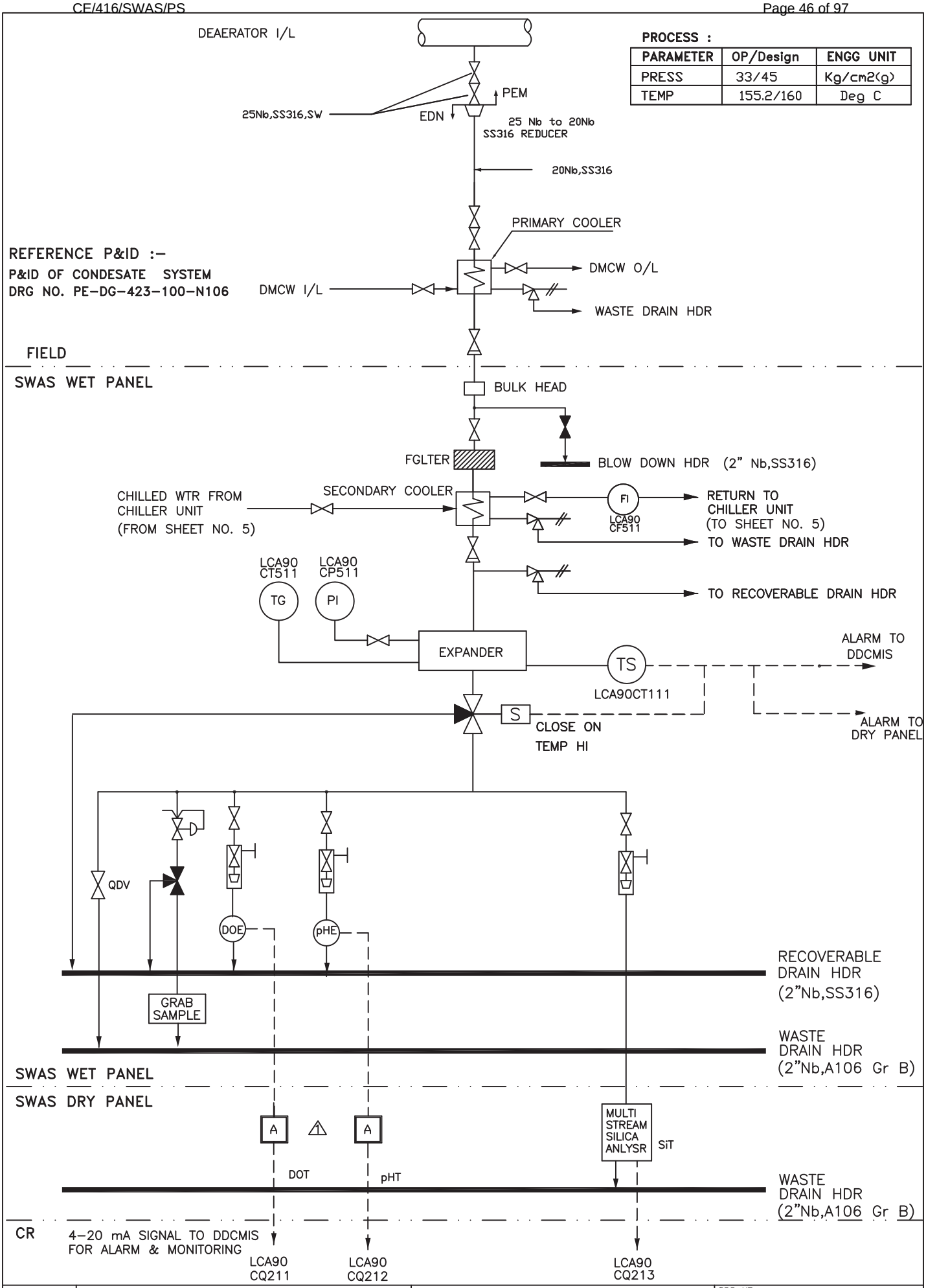


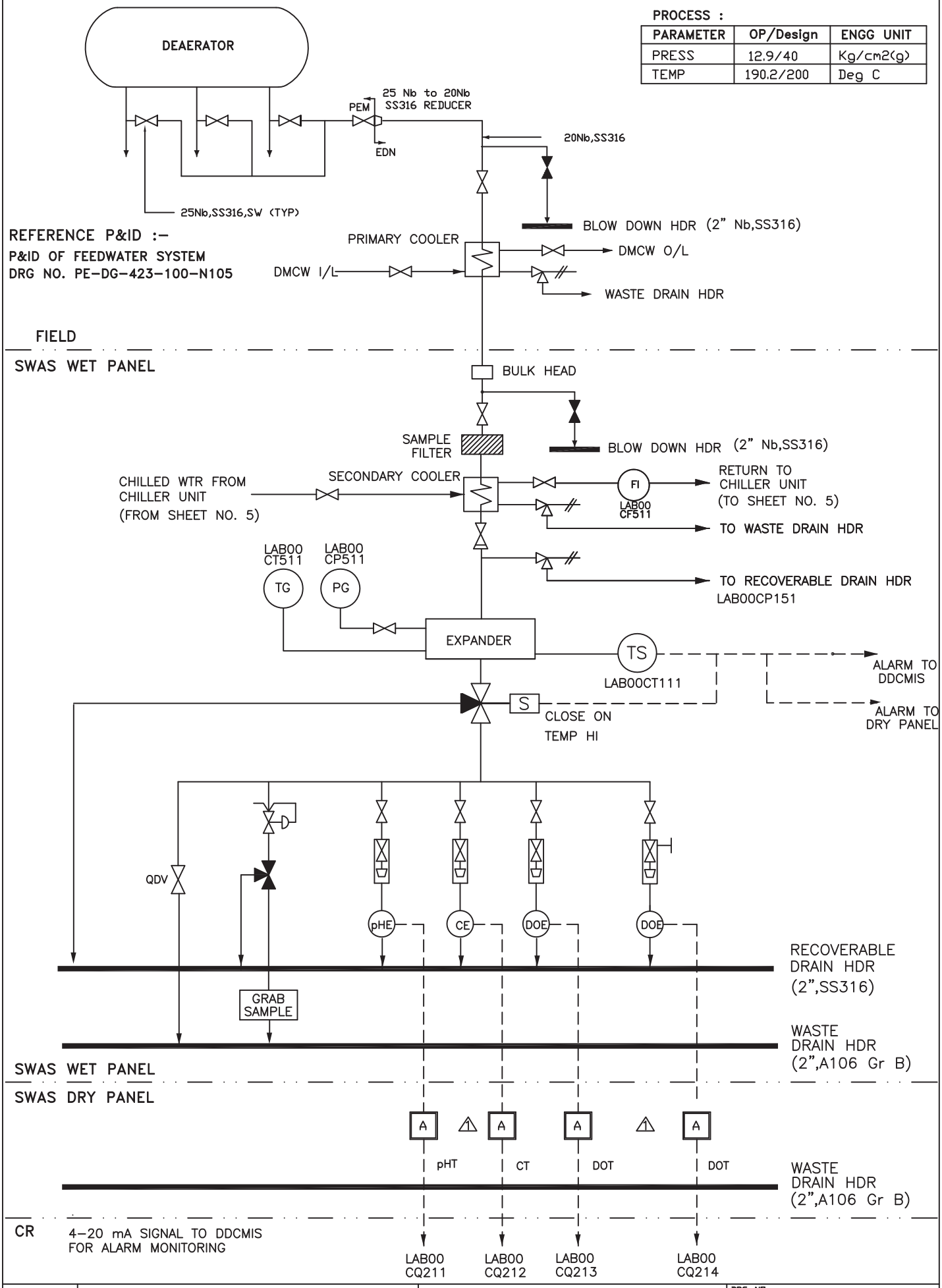

PROCESS :
PARAMETER | OP/Design | ENGG UNIT
PRESS | 279/295.7 | Kg/cm2(g)
TEMP | 603/608 | Deg C
1
TO BHEL(T)'S GRAB SAMPLE PRIMARY COOLER
MAIN STEAM
EDN
25 to 20Nb, SS316 REDUCER
25Nb,SS316,SW
B(T)
20Nb,SS316
PRIMARY COOLER
BLOW DOWN HDR (2" , SS316)
DMCW O/L
DMCW I/L
WASTE DRAIN HDR
FIELD
SWAS WET PANEL
BULK HEAD
SAMPLE FILTER
BLOW DOWN HDR (2" , SS316)
CHILLED WTR FROM CHILLER UNIT (FROM SHEET NO. 5)
SECONDARY COOLER
FI
LBA11 CF511
RETURN TO CHILLER UNIT (TO SHEET NO. 5)
TO WASTE DRAIN HDR
LBA11 CT511
TI
LBA11 CP511
PI
TO RECOVERABLE DRAIN HDR
EXPANDER
TS
LBA11CT111
ALARM TO DDCMIS
S
CLOSE ON TEMP HI
ALARM TO DRY PANEL
QDV
CC
pHE
CE
CE
RECOVERABLE DRAIN HDR (2",SS316)
GRAB SAMPLE
WASTE DRAIN HDR (2",A106 Gr B)
SWAS WET PANEL
SWAS DRY PANEL
A
1
A
A
MULTI STREAM SODIUM ANLYSR
MULTI STREAM SILICA ANLYSR
NaT
SiT
pHT
CCT
CT
WASTE DRAIN HDR (2",A106 Gr B)
CR
4–20 mA SIGNAL TO DDCMIS FOR ALARM & MONITORING
LBA11 CQ211
LBA11 CQ212
LBA11 CQ213
LBA11 CQ214
LBA11 CQ215


PROCESS :
PARAMETER | OP/Design | ENGG UNIT
PRESS | 279.2/298.1 | Kg/cm2(g)
TEMP | 328/433 | Deg C
TO BHEL(T)'S GRAB SAMPLE PRIMARY COOLER
SEPARATOR O/L STM
EDN
25 to 20Nb, SS316 REDUCER
25Nb,SS316,SW
B(T)
20Nb,SS316
PRIMARY COOLER
BLOW DOWN HDR (2" Nb, SS316)
DMCW O/L
DMCW I/L
WASTE DRAIN HDR
FIELD
SWAS WET PANEL
BULK HEAD
SAMPLE FILTER
BLOW DOWN HDR (2" Nb, SS316)
CHILLED WTR FROM CHILLER UNIT (FROM SHEET NO. 5)
SECONDARY COOLER
FI
HAG15 CF511
RETURN TO CHILLER UNIT (TO SHEET NO. 5)
TO WASTE DRAIN HDR
HAG15 CT511
HAG15 CP511
TG
PG
TO RECOVERABLE DRAIN HDR
EXPANDER
TS
HAG15CT111
ALARM TO DDCMIS
ALARM TO DRY PANEL
S
CLOSE ON TEMP HI
CLOSE ON TEMP HI
QDV
CC
CE
CE
Hz
RECOVERABLE DRAIN HDR (2",SS316)
GRAB SAMPLE
WASTE DRAIN HDR (2",A106 Gr B)
SWAS WET PANEL
SWAS DRY PANEL
A
A
A
MULTI STREAM SILICA ANLYSR
SiT
HzT
CCT
CT
WASTE DRAIN HDR (2",A106 Gr B)
CR
4–20 mA SIGNAL TO DDCMIS FOR ALARM & MONITORING
HAG15 CQ211
HAG15 CQ212
HAG15 CQ213
HAG15 CQ214


PROCESS :
PARAMETER | OP/Design | ENGG UNIT
PRESS | 277/296.4 | Kg/cm2(g)
TEMP | 328/433 | Deg C
TO BHEL(T)'S GRAB SAMPLE PRIMARY COOLER
SAT STEAM
EDN
25 to 20Nb, SS316 REDUCER
25Nb,SS316,SW
B(T)
20Nb,SS316
PRIMARY COOLER
BLOW DOWN HDR (2" , SS316)
DMCW O/L
DMCW I/L
WASTE DRAIN HDR
FIELD
SWAS WET PANEL
BULK HEAD
SAMPLE FILTER
BLOW DOWN HDR (2" , SS316)
CHILLED WTR FROM CHILLER UNIT
(FROM SHEET NO. 5)
SECONDARY COOLER
FI
HAH02 CF511
RETURN TO CHILLER UNIT
(TO SHEET NO. 5)
TO WASTE DRAIN HDR
HAH02 CT511
HAH02 CP511
TG
PG
TO RECOVERABLE DRAIN HDR
EXPANDER
TS
HAH02CT111
ALARM TO DDCMIS
CLOSE ON TEMP HI
S
ALARM TO DRY PANEL
QDV
pHE
CE
CC
CE
RECOVERABLE DRAIN HDR (2",SS316)
GRAB SAMPLE
WASTE DRAIN HDR (2",A106 Gr B)
SWAS WET PANEL
SWAS DRY PANEL
A
1
A
A
pHT
CT
CCT
WASTE DRAIN HDR (2",A106 Gr B)
CR
4-20 mA SIGNAL TO DDCMIS FOR ALARM & MONITORING
HAH02 CQ211
HAH02 CQ212
HAH02 CQ213


PROCESS :
PARAMETER | OP/Design | ENGG UNIT
PRESS | 53.53/71 | Kg/cm2(g)
TEMP | 596/601 | Deg C
TO BHEL(T)'S GRAB SAMPLE PRIMARY COOLER
HRH STEAM
EDN
25 to 20Nb, SS316 EXPANDER
25Nb,SS316,SW
B(T)
20Nb,SS316
PRIMARY COOLER
BLOW DOWN HDR (2" , SS316)
DMCW O/L
DMCW I/L
WASTE DRAIN HDR
FIELD
SWAS WET PANEL
BULK HEAD
SAMPLE FILTER
BLOW DOWN HDR (2" , SS316)
CHILLED WTR FROM CHILLER UNIT (FROM SHEET NO. 5)
SECONDARY COOLER
FI
LBB11 CF511
RETURN TO CHILLER UNIT (TO SHEET NO. 5)
TO WASTE DRAIN HDR
LBB11 CT511
LBB11 CP511
TG
PG
TO RECOVERABLE DRAIN HDR
EXPANDER
TS
LBB11CT111
ALARM TO DDCMIS
S
CLOSE ON TEMP HI
ALARM TO DRY PANEL
QDV
pHE
CE
RECOVERABLE DRAIN HDR (2",SS316)
GRAB SAMPLE
WASTE DRAIN HDR (2",A106 Gr B)
SWAS WET PANEL
SWAS DRY PANEL
A
A
pHT
CT
WASTE DRAIN HDR (2",A106 Gr B)
4–20 mA SIGNAL TO DDCMIS FOR ALARM & MONITORING
LBB11 CQ211
LBB11 CQ212


DEAERATOR I/L
PROCESS :
PARAMETER | OP/Design | ENGG UNIT
PRESS | 33/45 | Kg/cm2(g)
TEMP | 155.2/160 | Deg C
PEM
25Nb,SS316,SW
EDN
25 Nb to 20Nb SS316 REDUCER
20Nb,SS316
PRIMARY COOLER
REFERENCE P&ID :-
P&ID OF CONDESATE SYSTEM
DRG NO. PE-DG-423-100-N106
DMCW I/L
DMCW O/L
WASTE DRAIN HDR
FIELD
SWAS WET PANEL
BULK HEAD
FGLTER
BLOW DOWN HDR (2" Nb,SS316)
CHILLED WTR FROM CHILLER UNIT
(FROM SHEET NO. 5)
SECONDARY COOLER
FI
LCA90 CF511
RETURN TO CHILLER UNIT
(TO SHEET NO. 5)
TO WASTE DRAIN HDR
LCA90 CT511
LCA90 CP511
TG
PI
TO RECOVERABLE DRAIN HDR
EXPANDER
TS
LCA90CT111
ALARM TO DDCMIS
S
CLOSE ON TEMP HI
ALARM TO DRY PANEL
QDV
DOE
pHE
GRAB SAMPLE
RECOVERABLE DRAIN HDR (2"Nb,SS316)
WASTE DRAIN HDR (2"Nb,A106 Gr B)
SWAS WET PANEL
SWAS DRY PANEL
A
1
A
MULTI STREAM SILICA ANLYSR
SiT
DOT
pHT
WASTE DRAIN HDR (2"Nb,A106 Gr B)
CR
4-20 mA SIGNAL TO DDCMIS FOR ALARM & MONITORING
LCA90 CQ211
LCA90 CQ212
LCA90 CQ213

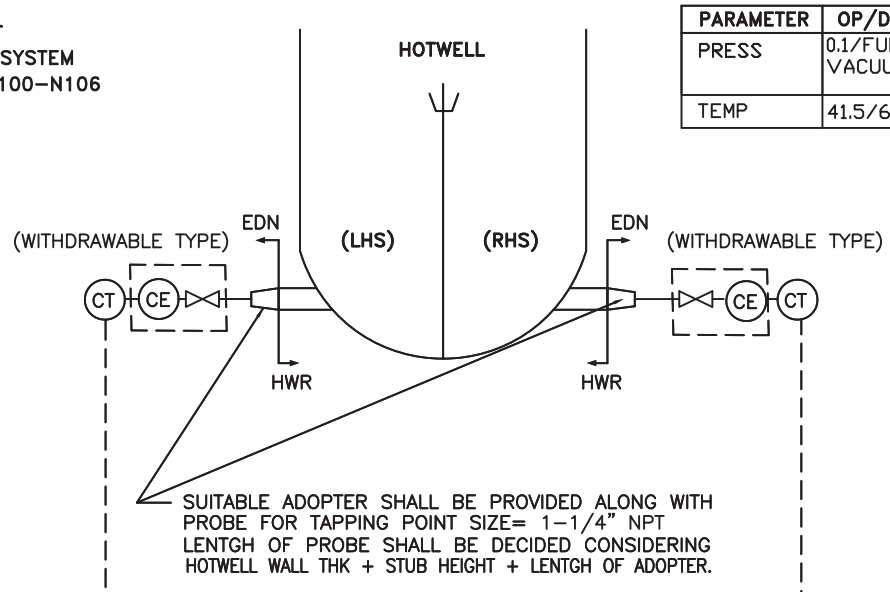

PROCESS :
PARAMETER | OP/Design | ENGG UNIT
PRESS | 12.9/40 | Kg/cm2(g)
TEMP | 190.2/200 | Deg C
DEAERATOR
25 Nb to 20Nb SS316 REDUCER
PEM
EDN
20Nb,SS316
25Nb,SS316,SW (TYP)
BLOW DOWN HDR (2" Nb,SS316)
REFERENCE P&ID :-
P&ID OF FEEDWATER SYSTEM
DRG NO. PE-DG-423-100-N105
PRIMARY COOLER
DMCW I/L
DMCW O/L
WASTE DRAIN HDR
FIELD
SWAS WET PANEL
BULK HEAD
SAMPLE FILTER
BLOW DOWN HDR (2" Nb,SS316)
CHILLED WTR FROM CHILLER UNIT
(FROM SHEET NO. 5)
SECONDARY COOLER
FI
LAB00 CF511
RETURN TO CHILLER UNIT
(TO SHEET NO. 5)
TO WASTE DRAIN HDR
LAB00 CT511
LAB00 CP511
TG
PG
TO RECOVERABLE DRAIN HDR
LAB00CP151
EXPANDER
TS
LAB00CT111
ALARM TO DDCMIS
S
CLOSE ON TEMP HI
ALARM TO DRY PANEL
QDV
pHE
CE
DOE
DOE
RECOVERABLE DRAIN HDR (2",SS316)
GRAB SAMPLE
WASTE DRAIN HDR (2",A106 Gr B)
SWAS WET PANEL
SWAS DRY PANEL
A
A
A
A
pHT
CT
DOT
DOT
WASTE DRAIN HDR (2",A106 Gr B)
CR
4-20 mA SIGNAL TO DDCMIS FOR ALARM MONITORING
LAB00 CQ211
LAB00 CQ212
LAB00 CQ213
LAB00 CQ214

REFERENCE P&ID :-

P&ID OF CONDENSATE SYSTEM
DRG NO. PE-DG-423-100-N106

PROCESS :

PARAMETER	OP/Design	ENGG UNIT
PRESS	0.1/FULL VACUUM & 2	Kg/cm2(a) & Kg/cm2(g)
TEMP	41.5/60	Deg C



SUITABLE ADOPTER SHALL BE PROVIDED ALONG WITH PROBE FOR TAPPING POINT SIZE= 1-1/4" NPT
LENTGH OF PROBE SHALL BE DECIDED CONSIDERING HOTWELL WALL THK + STUB HEIGHT + LENTGH OF ADOPTER.

FIELD

SWAS DRY PANEL

CR

4-20 mA SIGNAL
FOR ALARM &
MONITORING TO DDCMIS

MAG20
CQ211

MAG20
CQ212

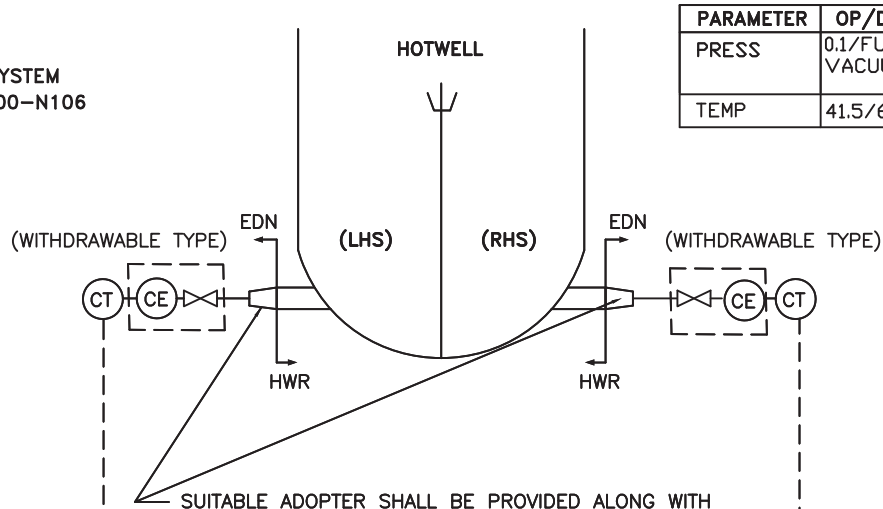
PROCESS :

PARAMETER	OP/Design	
PRESS	0.1/FULL VACUUM & 2	Kg/cm2(a) & Kg/cm2(g)
TEMP	41.5/60	Deg C

REFERENCE P&ID :-

P&ID OF CONDENSATE SYSTEM

DRG NO. PE-DG-412-100-N106



SUITABLE ADOPTER SHALL BE PROVIDED ALONG WITH PROBE FOR TAPPING POINT SIZE= 1-1/4" NPT
LENTGH OF PROBE SHALL BE DECIDED CONSIDERING HOTWELL WALL THK + STUB HEIGHT + LENTGH OF ADOPTER.

FIELD

SWAS DRY PANEL

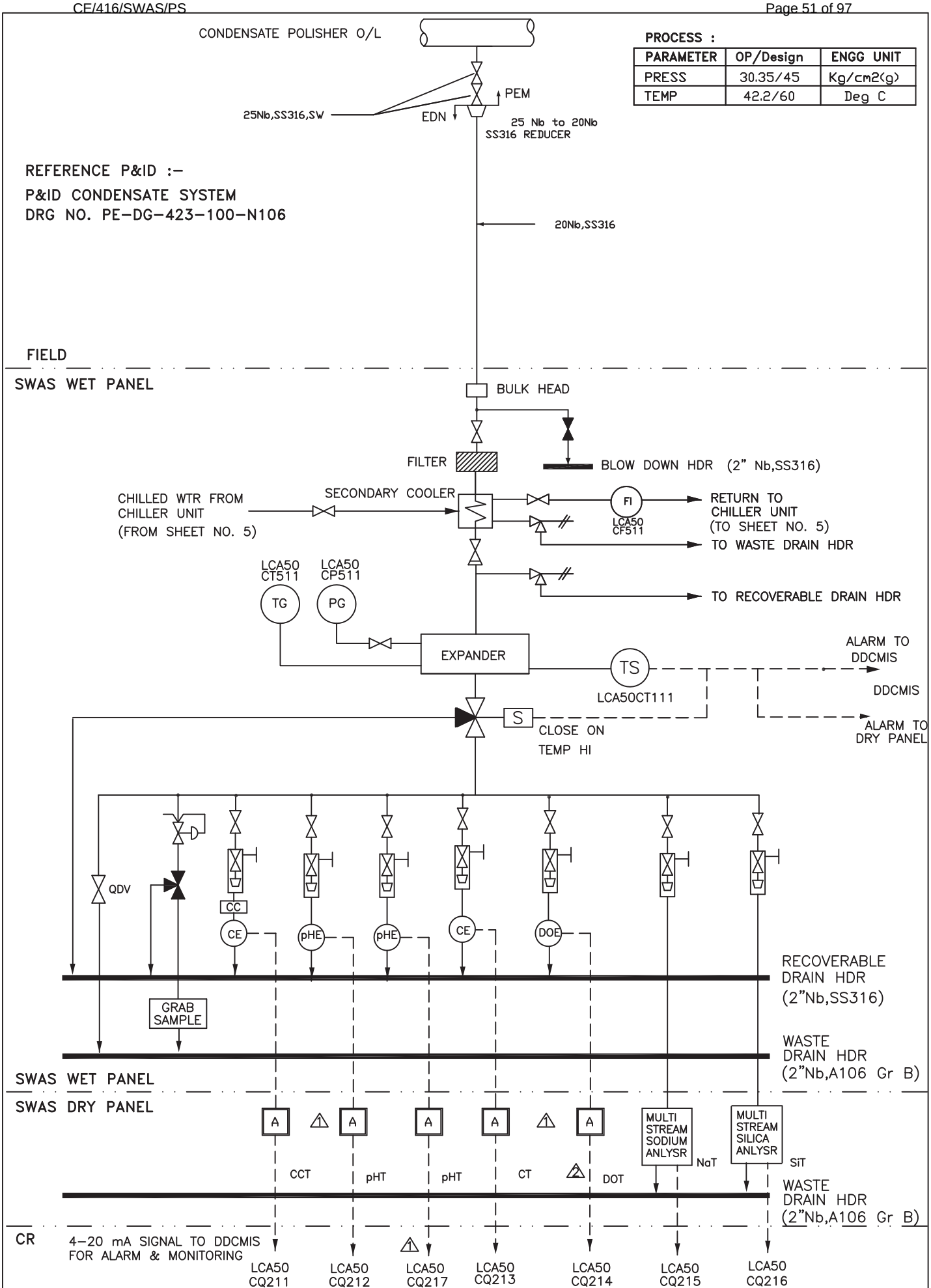
CR

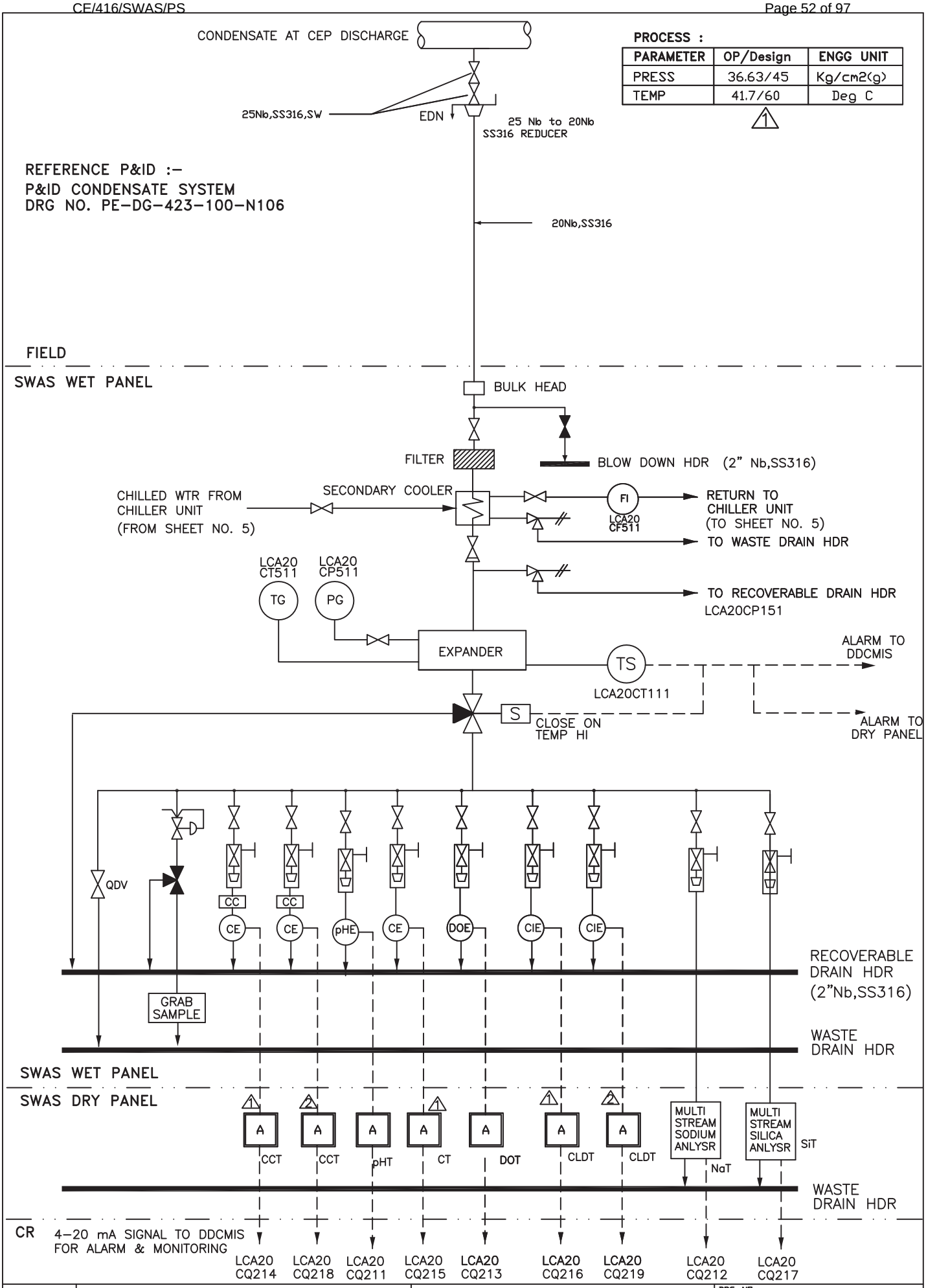
4-20 mA SIGNAL FOR ALARM & MONITORING TO DDCMIS

MAG10 CQ211

MAG10 CQ212

VOID


CONDENSATE POLISHER O/L
PROCESS :
PARAMETER | OP/Design | ENGG UNIT
PRESS | 30.35/45 | Kg/cm2(g)
TEMP | 42.2/60 | Deg C
PEM
25Nb,SS316,SW
EDN
25 Nb to 20Nb SS316 REDUCER
REFERENCE P&ID :-
P&ID CONDENSATE SYSTEM
DRG NO. PE-DG-423-100-N106
20Nb,SS316
FIELD
SWAS WET PANEL
BULK HEAD
FILTER
BLOW DOWN HDR (2" Nb,SS316)
CHILLED WTR FROM CHILLER UNIT
(FROM SHEET NO. 5)
SECONDARY COOLER
FI
LCA50 CF511
RETURN TO CHILLER UNIT
(TO SHEET NO. 5)
TO WASTE DRAIN HDR
LCA50 CT511
LCA50 CP511
TG
PG
TO RECOVERABLE DRAIN HDR
EXPANDER
TS
LCA50CT111
ALARM TO DDCMIS
DDCMIS
S
CLOSE ON TEMP HI
ALARM TO DRY PANEL
QDV
CC
CE
pHE
pHE
CE
DOE
RECOVERABLE DRAIN HDR (2"Nb,SS316)
GRAB SAMPLE
WASTE DRAIN HDR (2"Nb,A106 Gr B)
SWAS WET PANEL
SWAS DRY PANEL
A
A
A
A
A
MULTI STREAM SODIUM ANLYSR
NaT
MULTI STREAM SILICA ANLYSR
SiT
CCT
pHT
pHT
CT
DOT
WASTE DRAIN HDR (2"Nb,A106 Gr B)
CR
4-20 mA SIGNAL TO DDCMIS FOR ALARM & MONITORING
LCA50 CQ211
LCA50 CQ212
LCA50 CQ217
LCA50 CQ213
LCA50 CQ214
LCA50 CQ215
LCA50 CQ216

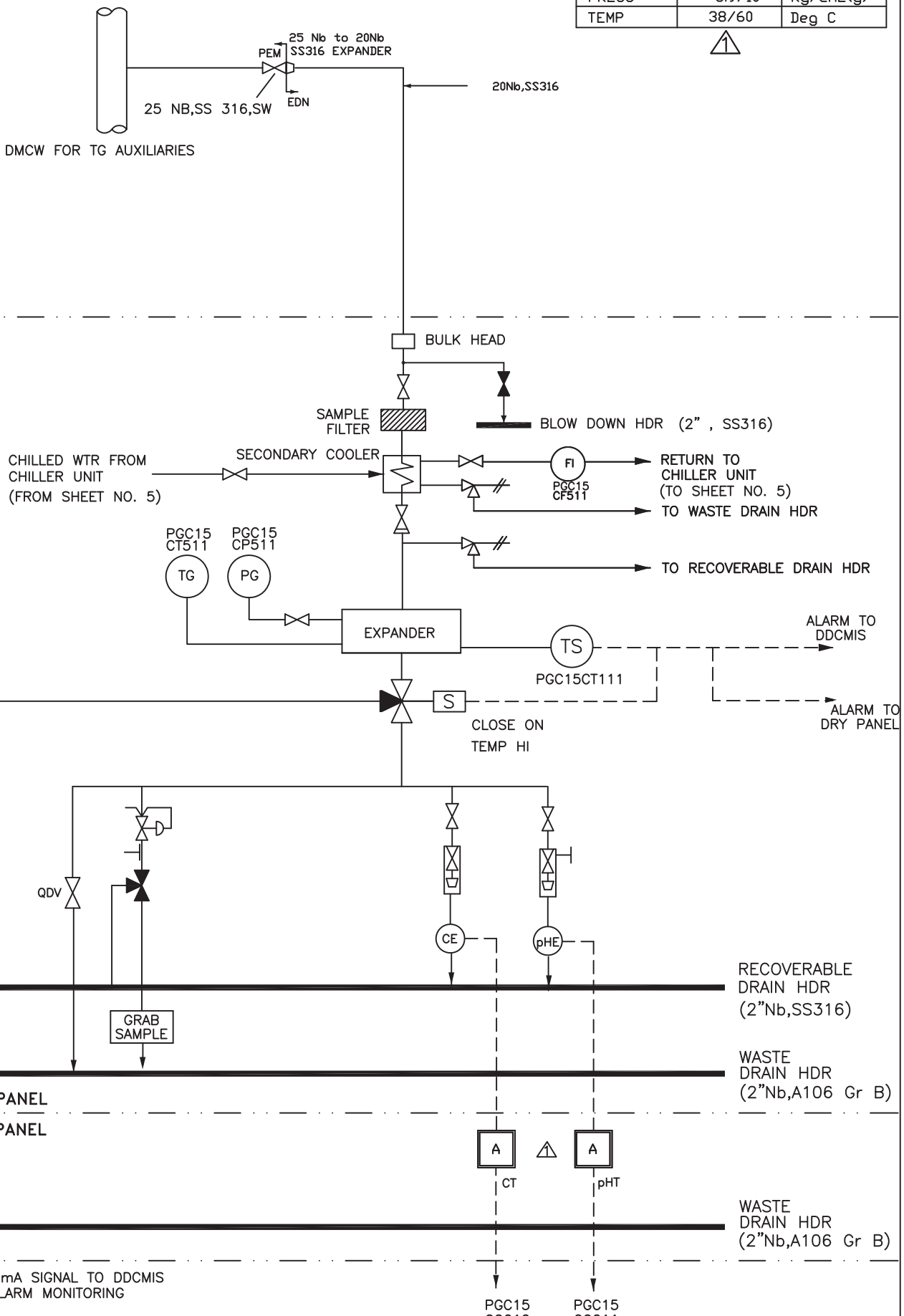

CONDENSATE AT CEP DISCHARGE
PROCESS :
PARAMETER | OP/Design | ENGG UNIT
PRESS | 36.63/45 | Kg/cm2(g)
TEMP | 41.7/60 | Deg C
1
25Nb,SS316,SW
EDN
25 Nb to 20Nb SS316 REDUCER
REFERENCE P&ID :-
P&ID CONDENSATE SYSTEM
DRG NO. PE-DG-423-100-N106
20Nb,SS316
FIELD
SWAS WET PANEL
BULK HEAD
FILTER
BLOW DOWN HDR (2" Nb,SS316)
CHILLED WTR FROM CHILLER UNIT
(FROM SHEET NO. 5)
SECONDARY COOLER
FI
LCA20 CF511
RETURN TO CHILLER UNIT
(TO SHEET NO. 5)
TO WASTE DRAIN HDR
LCA20 CT511
LCA20 CP511
TG
PG
TO RECOVERABLE DRAIN HDR
LCA20CP151
EXPANDER
TS
LCA20CT111
ALARM TO DDCMIS
S
CLOSE ON TEMP HI
ALARM TO DRY PANEL
QDV
CC
CE
pHE
DOE
CIE
GRAB SAMPLE
RECOVERABLE DRAIN HDR (2"Nb,SS316)
WASTE DRAIN HDR
SWAS WET PANEL
SWAS DRY PANEL
A
CCT
pHT
CT
DOT
CLDT
MULTI STREAM SODIUM ANLYSR
NaT
MULTI STREAM SILICA ANLYSR
SiT
WASTE DRAIN HDR
CR
4-20 mA SIGNAL TO DDCMIS FOR ALARM & MONITORING
LCA20 CQ214
LCA20 CQ218
LCA20 CQ211
LCA20 CQ215
LCA20 CQ213
LCA20 CQ216
LCA20 CQ219
LCA20 CQ212
LCA20 CQ217

REFERENCE P&ID :-
P&ID DMCW SYSTEM
DRG NO. PE-DG-423-179-N001

PROCESS :

PARAMETER	OP/Design	ENGG UNIT
PRESS	6.9/10	Kg/cm2(g)
TEMP	38/60	Deg C

1

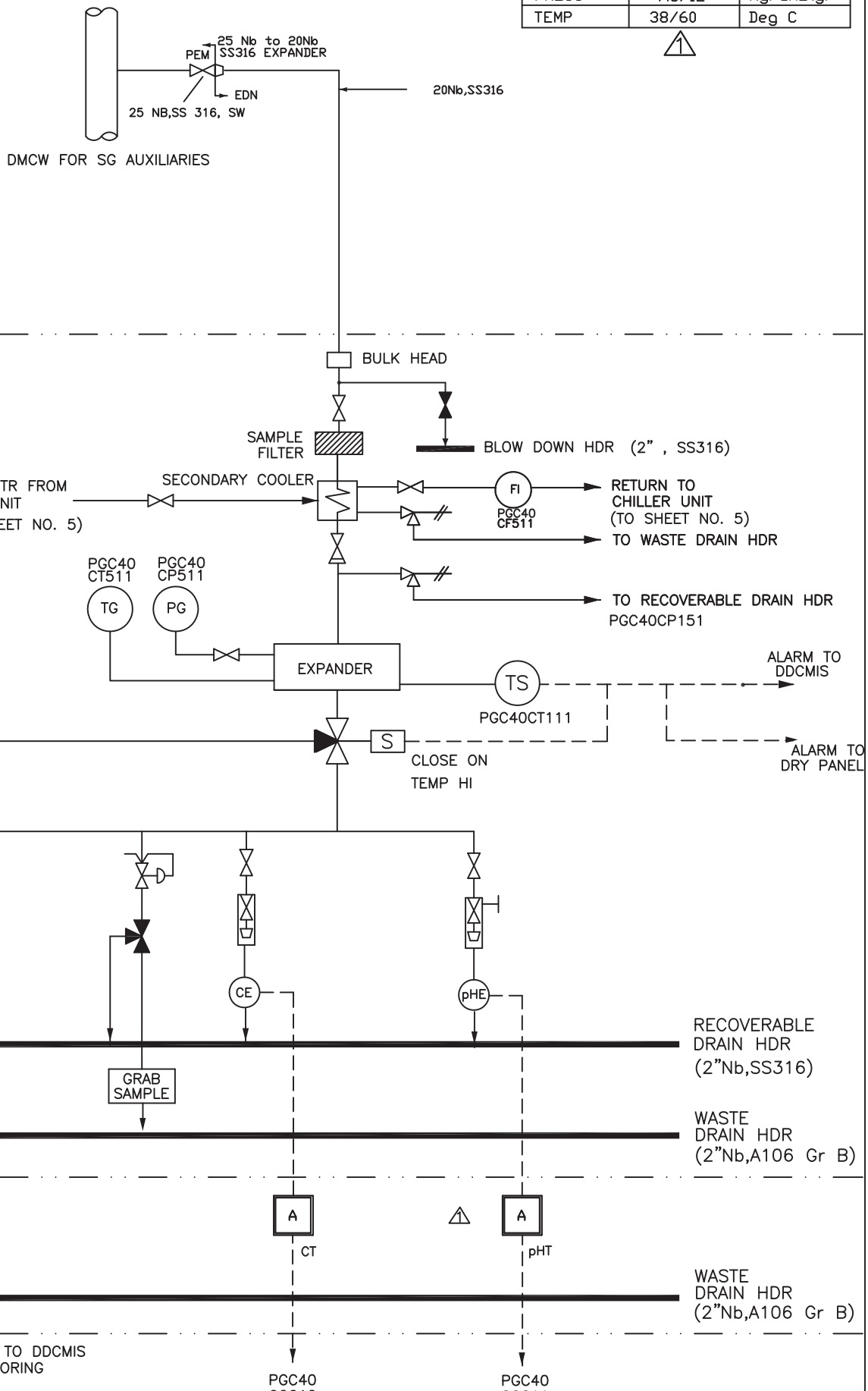


REFERENCE P&ID :-
DRG NO. PE-DG-423-179-N001

PROCESS :

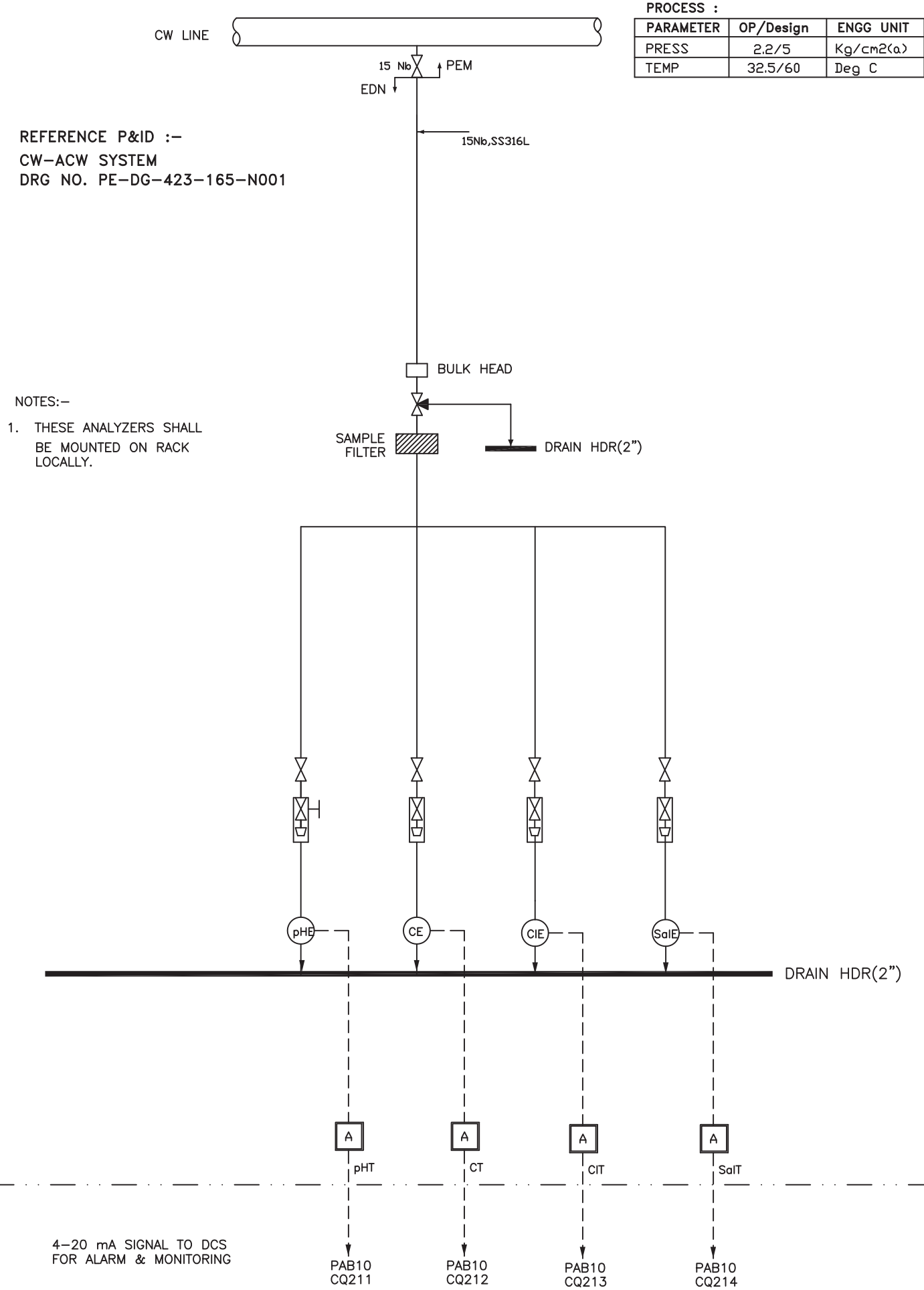
PARAMETER	OP/Design	ENGG UNIT
PRESS	7.8/12	Kg/cm2(g)
TEMP	38/60	Deg C

1



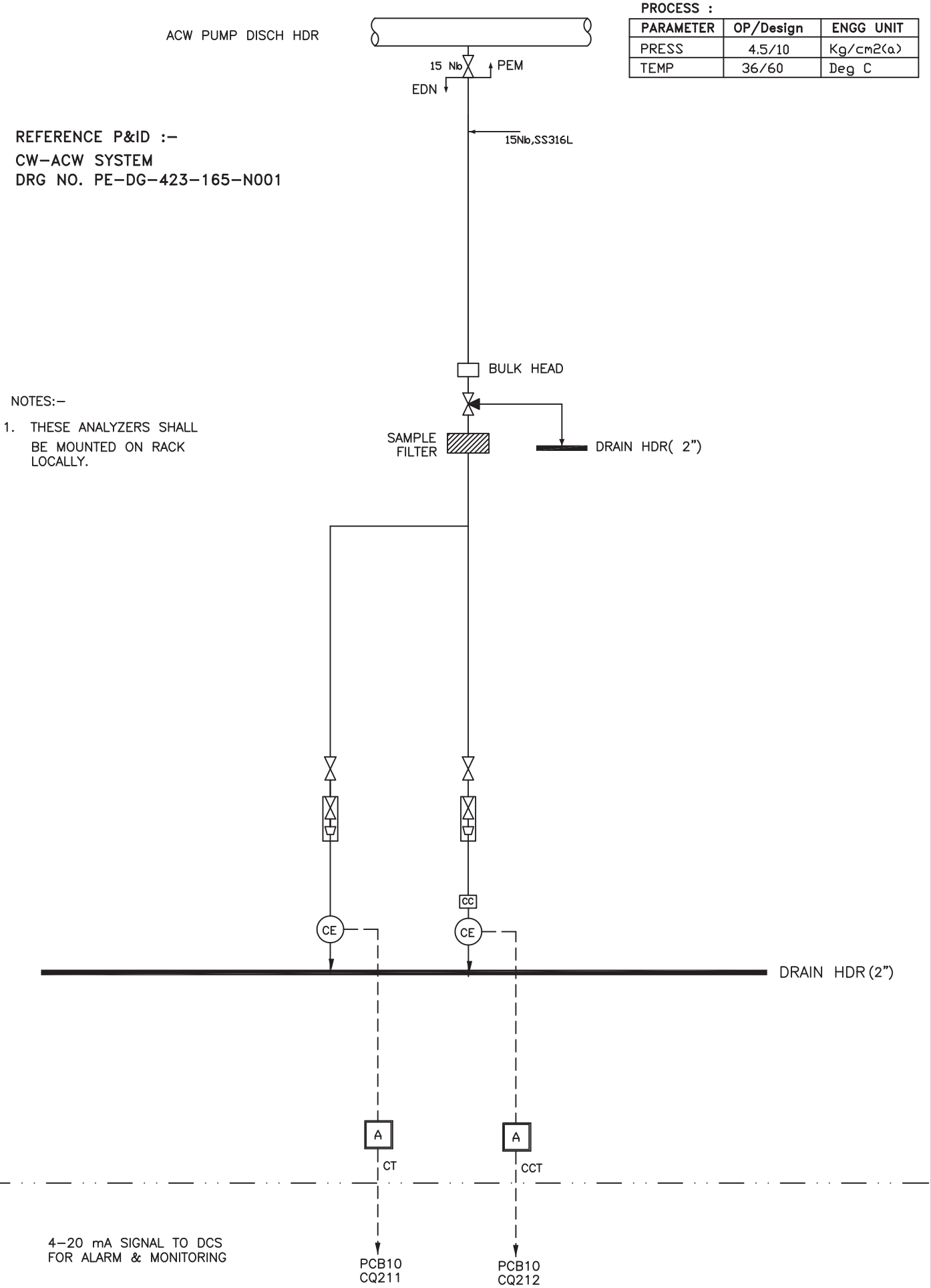
PROCESS :

PARAMETER	OP/Design	ENGG UNIT
PRESS	2.2/5	Kg/cm2(a)
TEMP	32.5/60	Deg C



PROCESS :

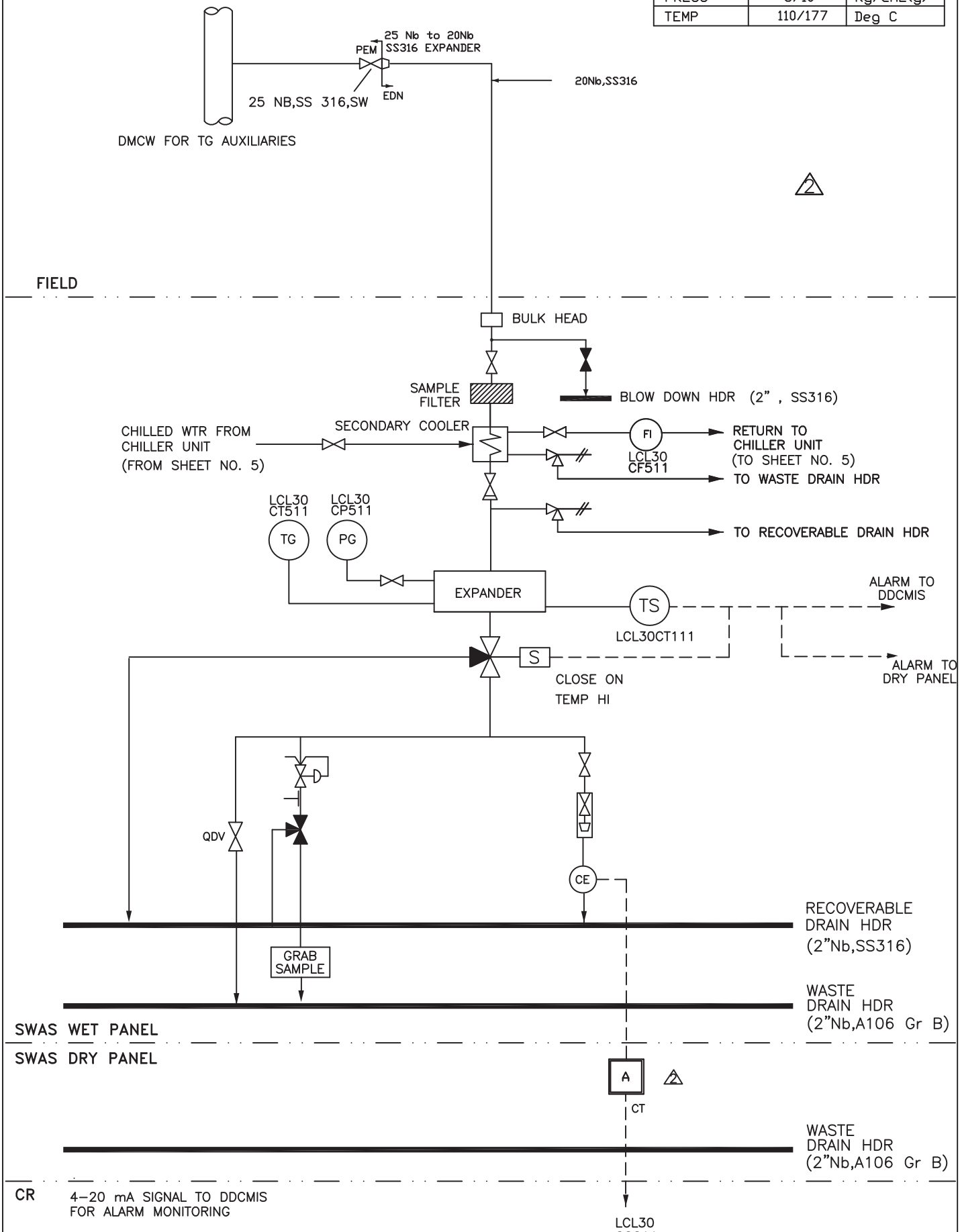
PARAMETER	OP/Design	ENGG UNIT
PRESS	4.5/10	Kg/cm2(a)
TEMP	36/60	Deg C



REFERENCE P&ID :-
P&ID DMCW SYSTEM
DRG NO. PE-DG-423-179-N001

PROCESS :

PARAMETER	OP/Design	ENGG UNIT
PRESS	3/10	Kg/cm2(g)
TEMP	110/177	Deg C



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./	P	V	V		
2.1	CHEMICAL	HEAT /	DATA SHEETS	P	V	V	✓	
2.2	PHYSICAL, HARDWARE	LOT						
3	PROOF PRESSURE TEST	5 RDM. SAMPLE		P	V	V	✓	
4	DISMANTLING RE-ASSEMBLY TEST	3 RDM. SAMPLE	MANUFACTURER'S STANDARD	P	V	V		
5	HYDRAULIC IMPULES & VIBRATION TEST	5 RDM. SAMPLE		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 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	√	
2	CHEMICAL PROPERTIES AND PHY. PROPERTIES AS PER RELEVANT ASTM. (GRADE SHALL BE AS PER APPROVED DATA SHEET)	FOR LOT		P	V	V	√	MANUFACTURER TO PROVIDE TEST CERT. AS PER RELEVANT ASTM STDS. MENTIONED IN SPECS.
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	✓	
2.0	SIZE , DIMENSIONS	REFER NOTE : 1 BELOW	AS PER APPROVED DATA SHEETS	P	V	V	✓	IN CASE OF IMPORTED ITEMS, CONTR. SHALL REVIEW TC's & NOT INSPECT.
3.0	REPEATABILITY			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 TEMPERTURE 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	✓	
2.0	DIMENSIONS CHECK	REFER NOTE : 1 BELOW	APPROVED SPECS./ DATA SHEETS	P	W	V	✓	IN CASE OF IMPORTED ITEMS, CONTR. SHALL REVIEW TC's & NOT INSPECT.
3.0	REPEATABILITY			P	W	V	✓	
4.0	SWITCHING DIFERENTIAL							
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 ' ' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION.

** M: MANUFACTUIRER/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

Electronics Division, BHEL-Bangalore.

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. /					
1.1	DIAL SIZE		APPROVED DATA	P	V	V	√	
1.2	MODEL NO/TAG NO		SHEETS	P	V	V	√	
1.3	RANGE/SCALE			P	V	V	√	
1.4	END CONNECTION	SEE		P	V	V	√	BY GO / NOGO
2.0	CALIBRATION	NOTE-1						GAUGE
2.1	ACCURACY	IN PAGE		P	V	V	√	
2.2	REPETABILITY	2 OF 2		P	V	V	√	
2.3	HYSTERISIS			P	V	V	√	MFR TO
3.0	OVER TEMEPRATURE TEST		DO	P	V	V	√	CARRY OUT ROUTINE
4.0	AMBIENT TEMP. COMPENSATION CHECK	1 OF TYPE		P	V	V	√	TEST ON 100 %
5.0	REVIEW OF T.C FOR MATERIALS OF-	FOR LOT						WHEN MAT'L CORELATION
5.1	SENSOR			V	V	V	√	ARE NOT
5.2	MOVEMENT			V	V	V	√	AVAILABLE
5.3	PROCESS CONNEC.			V	V	V	√	MFR'S
5.4	HOUSING			V	V	V	√	COMPLIANCE
6.0	REVIEW OF TC FOR DEGREE OF PROTEC.	TYPE TEST		V	V	V	√	TO BE PROVIDED
7.0	THERMOWELL							
7.1	HYD TEST ON THERMOWELL			P	V	V	√	IBR CERT. TO BE
7.2	MATERIAL T.C FOR THERMOWELL			V	V	V	√	PROVIDED IF CALLED IN
7.3	DIMENSIONAL CHECK		AS PER APPROVED DRAWING		V	V		SPECS.

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

Electronics Division, BHEL-Bangalore.

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

Electronics Division, BHEL-Bangalore.

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. /					
1.1	MODEL NO. TAG NO.		DATA SHEETS	P	V	V	√	
1.2	RANGE			P	V	V	√	
1.3	END CONNECTION			P	V	V	√	BY GO/ NO GO GAUGE
2.0	REPEATABILITY	SEE		P	V	V	√	
2.1	HYSTERISIS DIFFERENTIAL	NOTE-1 BELOW		P	V	V	√	
3.0	OVER PRESSURE AND LEAK TEST		DO	P	V	V	√	MFR. TO CARRY OUT
4.0	ELECTRICAL INSUL--ATION / H.V TEST							ROUTINE TEST ON
5.0	REVIEW OF T.C FOR MATERIALS OF-	FOR LOT		V	V	V	√	WHEN MAT'L CORELATION
5.1	SENSOR			V	V	V	√	ARE NOT
5.2	MOVEMENT			V	V	V	√	AVAILABLE
5.3	HOUSING			V	V	V	√	MFR'S
6.0	TC OF MICRO SWIT--CH			V	V	V	√	COMPLIANCE TO BE
7.0	REVIEW OF T.C FOR DEGREE OF PROTEC--TION.	TYPE TEST		V	V	V	√	PROVIDED.

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

Electronics Division, BHEL-Bangalore.

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

SECTION - "G"

- 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.

A4 - 15	**PLANT STANDARD**	ED 049 00 99 REV NO 10 PAGE 0 OF 28

REVISION HISTORY SHEET

REV NO.	DATE	NATURE OF CHANGE	REASONS	CHANGED BY	APPROVED BY
00	06/03/92	SUPERCEDS CN43000	-	VS MAS SHG	N.J
01	19/06/93	GENERAL	FEEDBACK FROM QUALITY	SHG	N.J
02	24/06/93	CL 3.4.10	FEEDBACK FROM QUALITY	SHG	N.J
03	01/07/93	SEMICONDUCTOR & PHTOVOLTAIC PANELS ADDED	FEEDBACK FROM DESPATCH	SHG	N.J
04	17/10/94	TOTALLY REVISED	FEEDBACK FROM QUALITY	SHG	N.J
05	08/06/95	ANNEXURE ADDED	FEEDBACK FROM QUALITY & ACCEPTANCE CRITERIA OF WOOD ADDED	SHG	N.J
06	17/11/95	CL 2.5.10 ALTERED	FEEDBACK FROM QUALITY & SHIPPING	SHG	N.J
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

REV-10.

APPROVED: M. Sivaramaiah

PREPARED: HRN

ISSUED: STDS GROUP DATE: 21/06/13

	PLANT STANDARD	ED 049 00 99 REV NO 10 PAGE 1 OF 28

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.

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$\pm$1 mm, thickness of tongue shall be 8 $\pm$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 shook'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 pent oxide, 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

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	$AS_2O_52H_2O$	12.5
Copper Sulphate	$CuSO_45H_2O$	37.5
Sodium Dichromate	$Na2Cr_2O_75H_2O$	50.0
Or		
Potassium Dichromate	$K2Cr_2O_7$	

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 planks 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$\pm$1 mm and thickness 0.6 $\pm$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 $\pm$1 mm and width 25$\pm$1 mm. The brackets shall be of "L" shape, the length of each side being 100$\pm$2 mm. Two holes shall be provided towards the end of each side for screwing /nailing.

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

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.O 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.

3.1.4 BITUMINISED WATER PROOF KRAFT PAPER: The inner surface of 4 sides of shook'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.

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 $\pm$2 mm. The size of the supporting battens at bottom shall be 75 $\pm$2 mm (width) and 100$\pm$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.

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 thrmocole 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 polyprophelene [PVC]/ corrugated Kraft paper cartons of suitable sizes and gram mage 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 :

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

A4 - 14	**PLANT STANDARD**	ED 049 00 99 REV NO 10 PAGE 13 OF 28

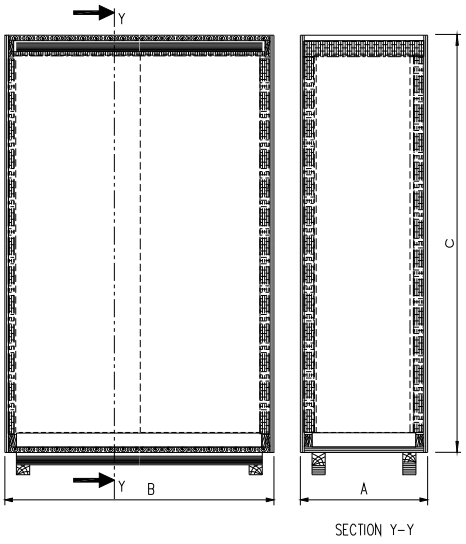

FIG-1 : DETAILS OF CUBICLE PACKING BOX.

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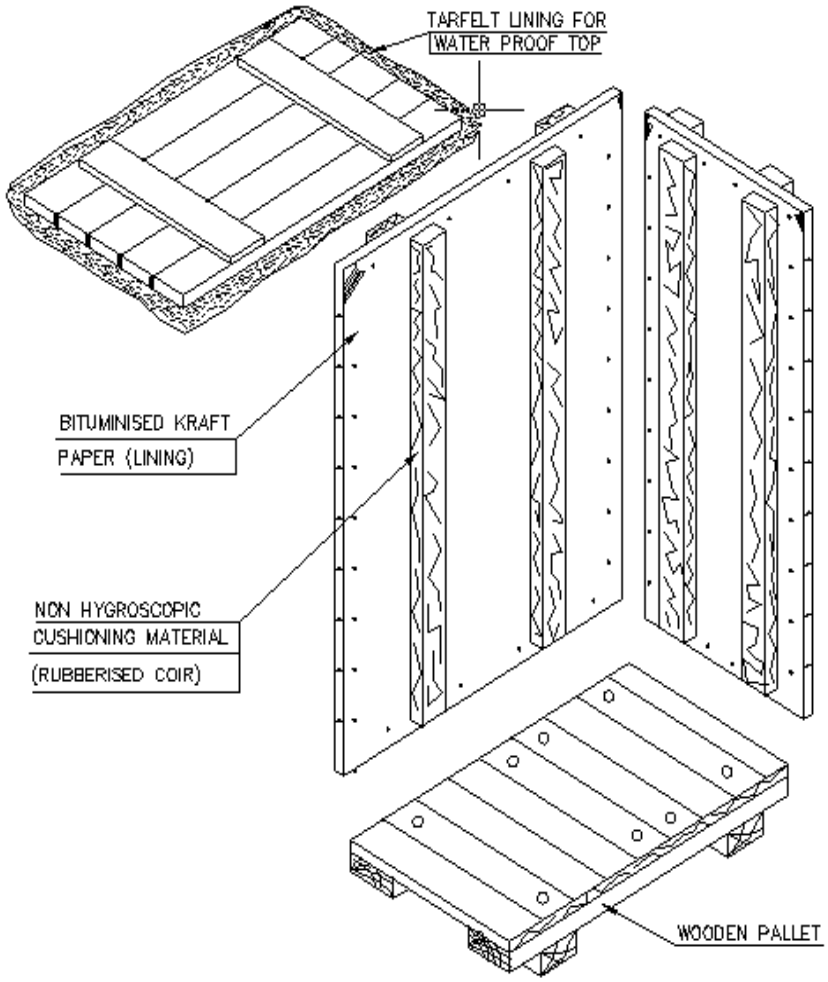

Fig. 2 : Binding of Panel

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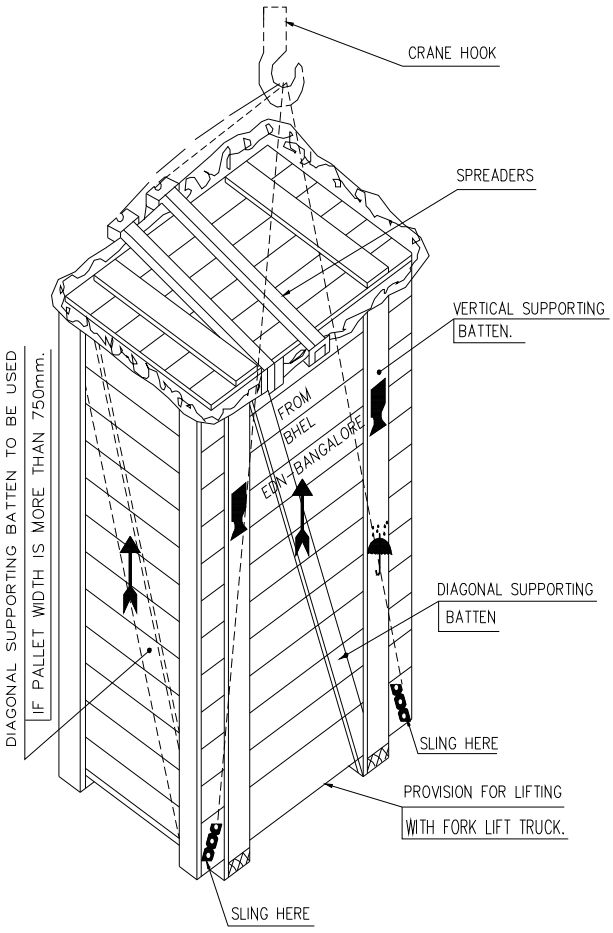

FIG–3 : LIFTING OF PACKED CASE.

A4 - 14	**PLANT STANDARD**	ED 049 00 99 REV NO 10 PAGE 16 OF 28

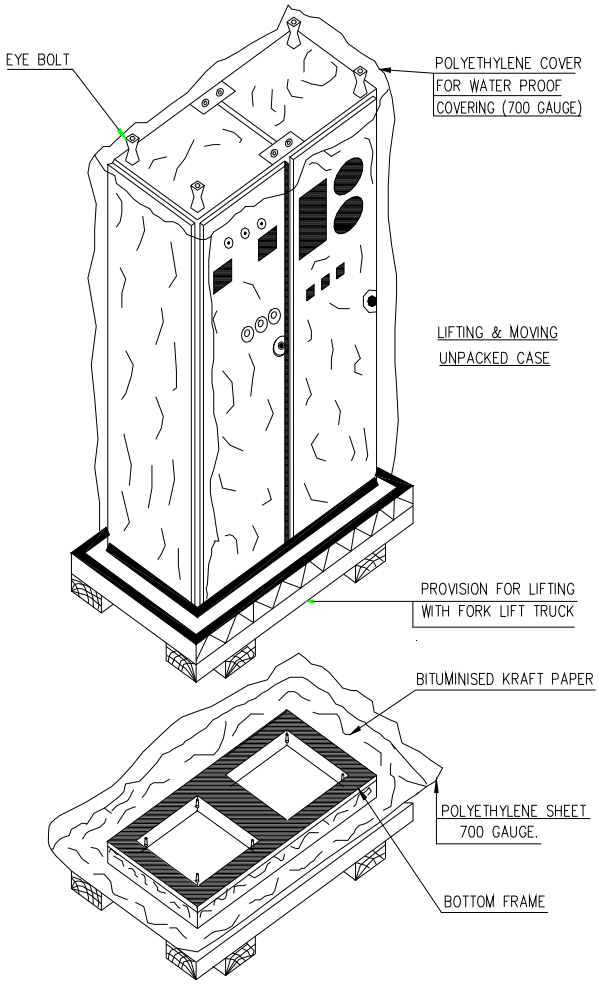

FIGURE-4

A4 - 14	**PLANT STANDARD**	ED 049 00 99 REV NO 10 PAGE 17 OF 28

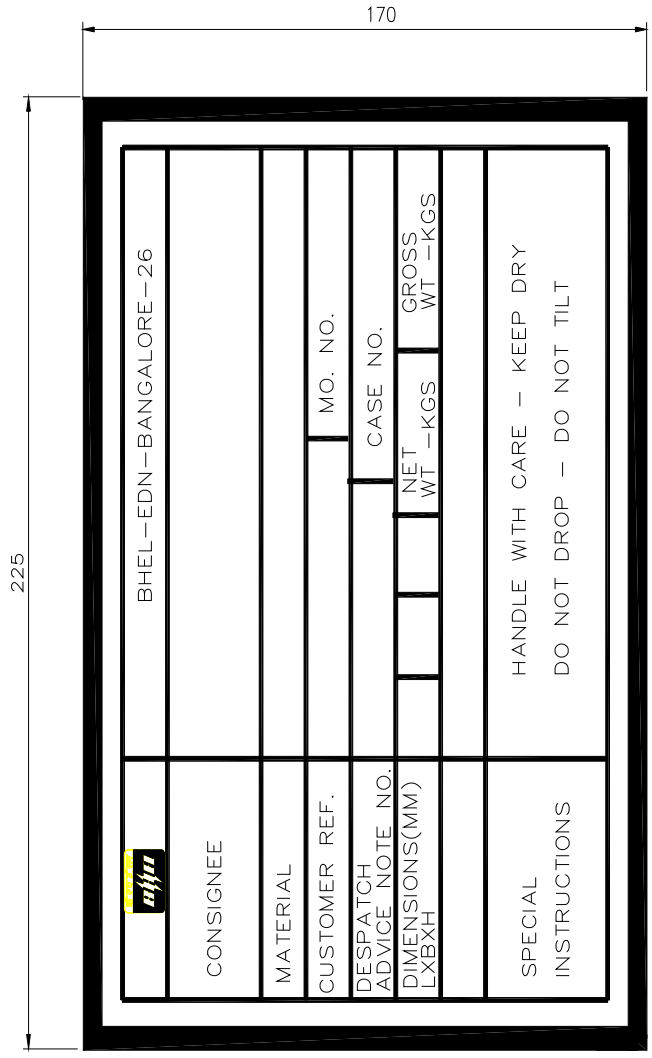

FIG-5 : MARKING PLATE.

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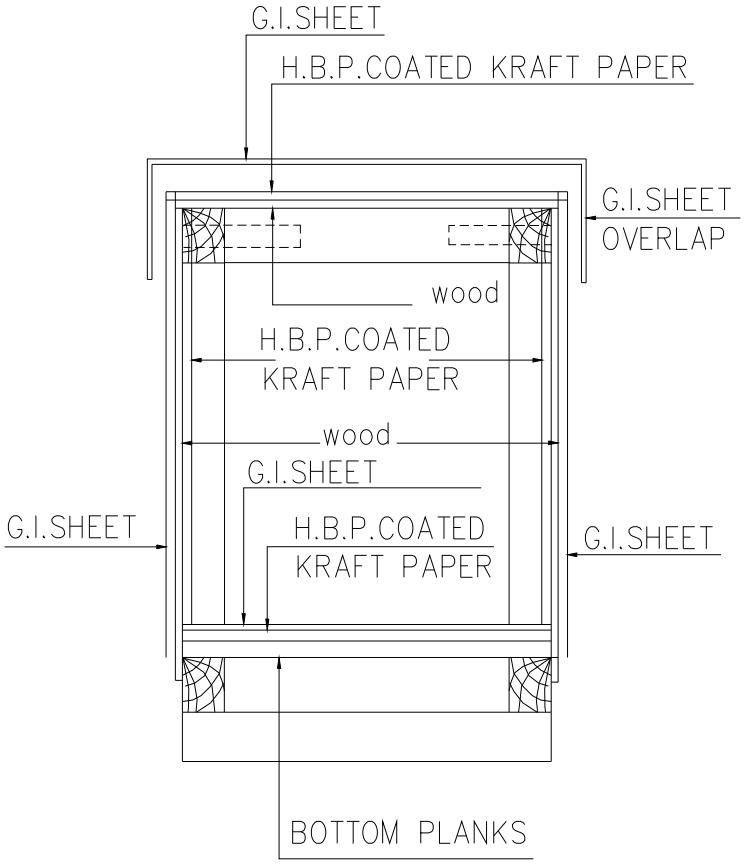
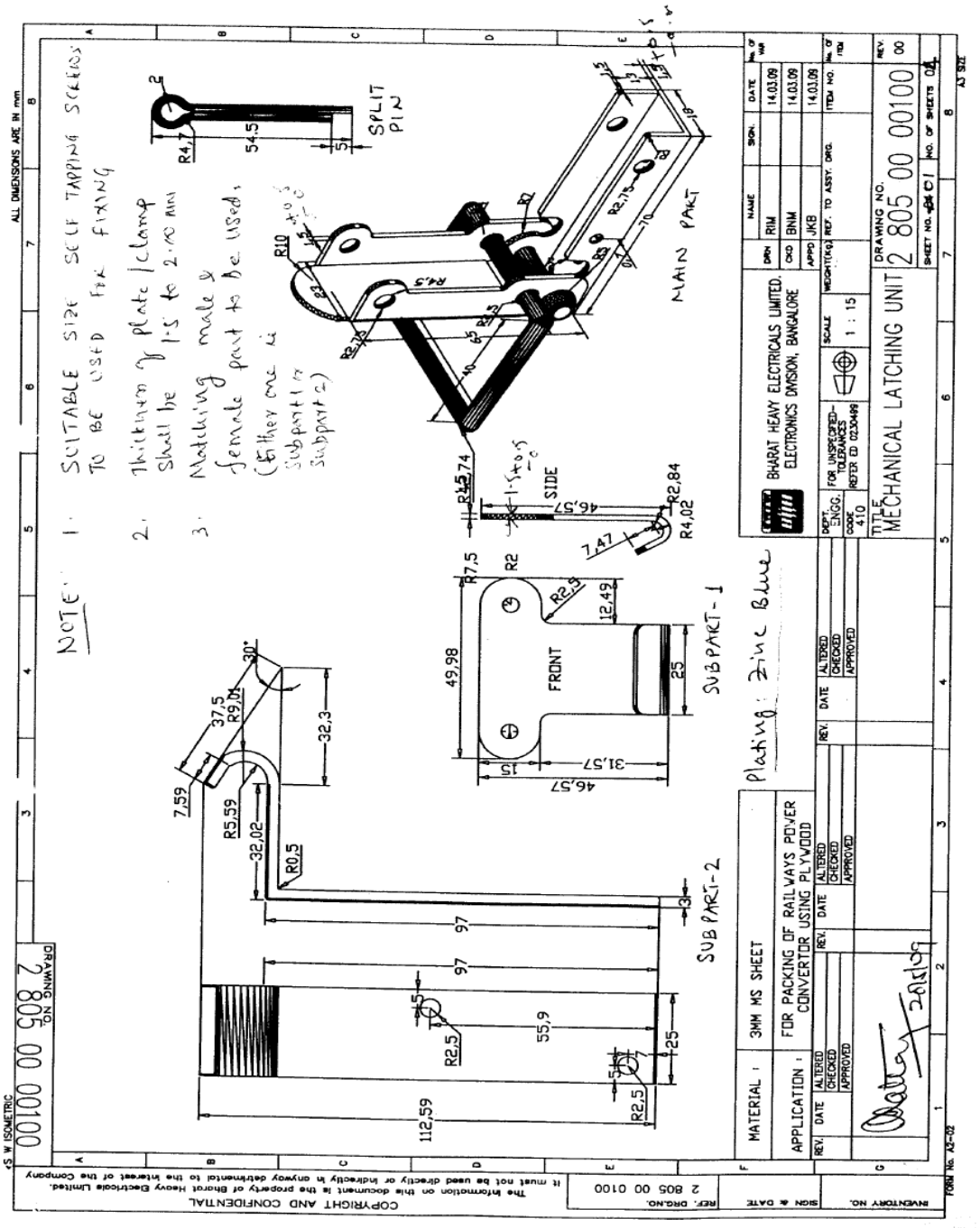


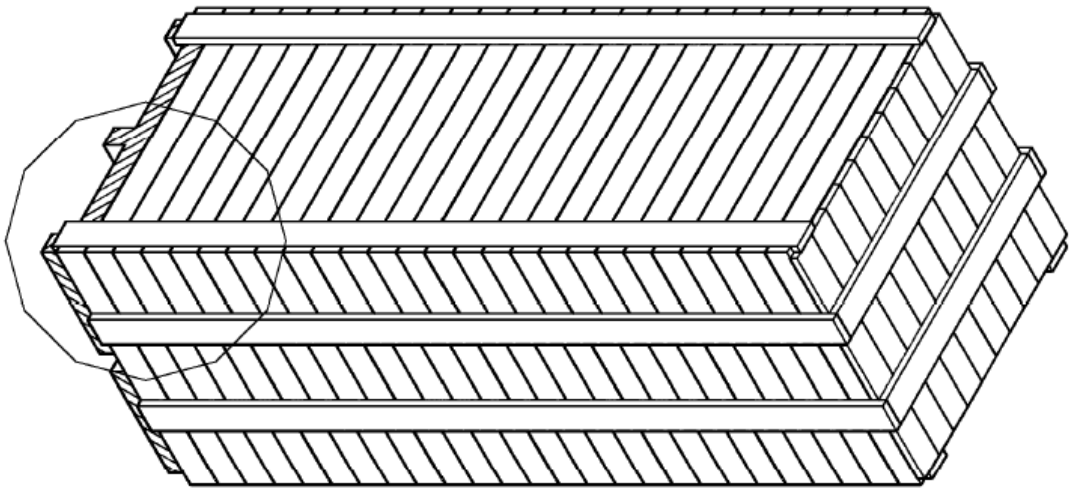
FIG–6 : CLOSED PACKING CASE WITH G.I.SHEET
SHOWING LAYERS OF PACKING MATERIALS.

A4 - 14	**PLANT STANDARD**	ED 049 00 99 REV NO 10 PAGE 19 OF 28



A4 - 14

Fig – 7 : Mechanical Latching Clamp



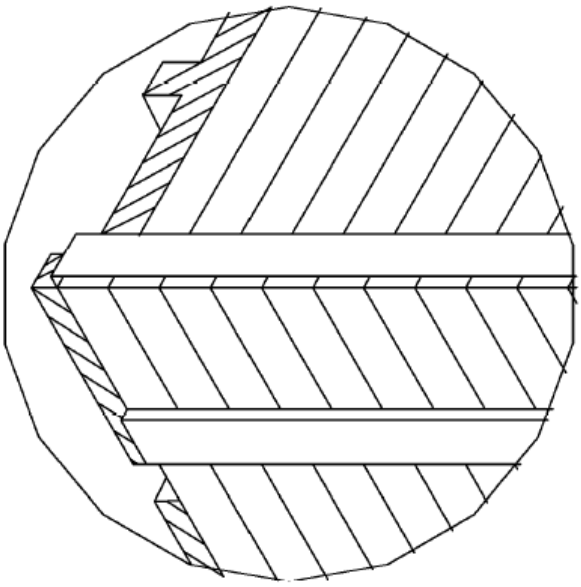


Fig – 8 : Single Suit Cubicle Packing View

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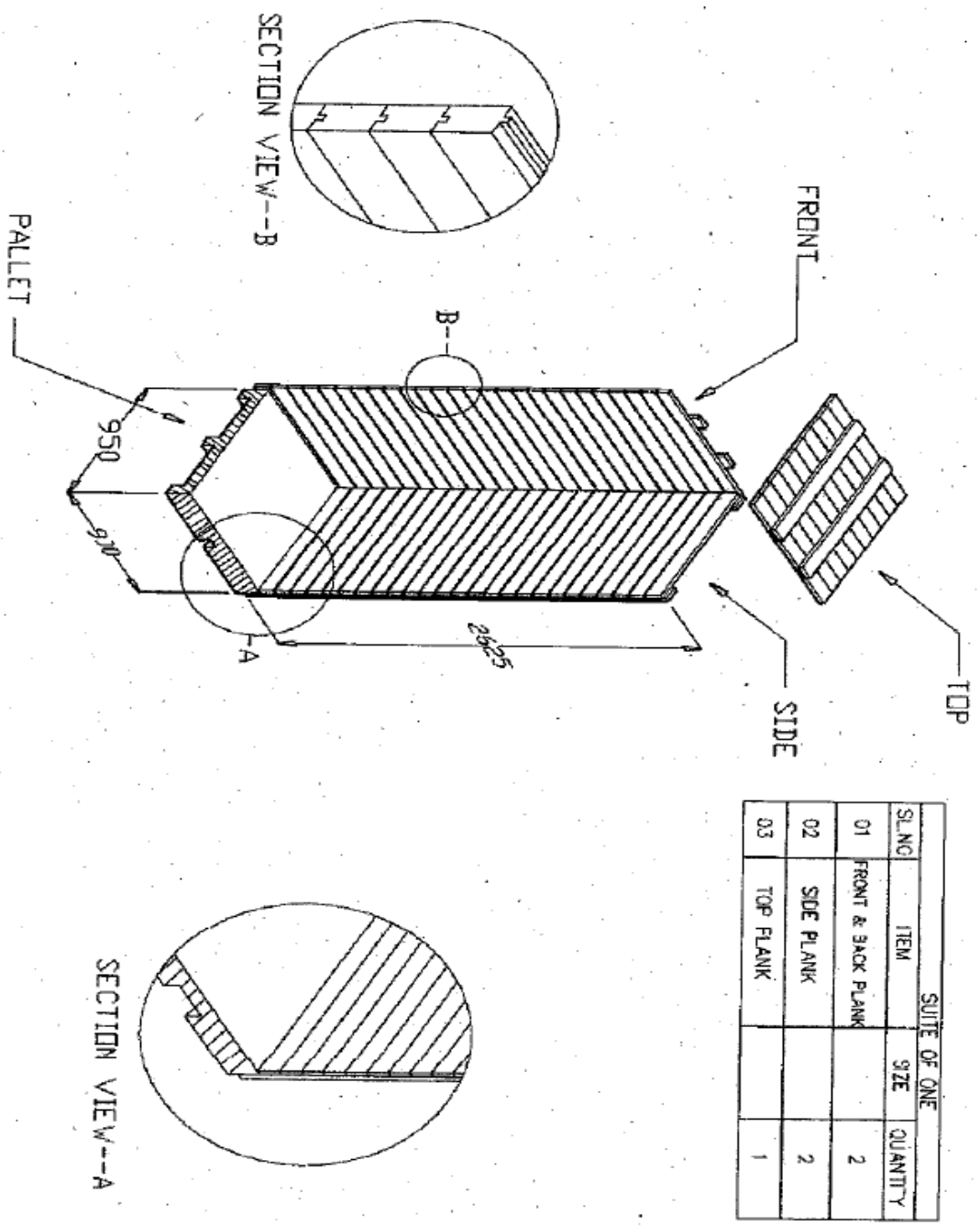

Fig – 9 : Single Suit Packing Assembly Drawing

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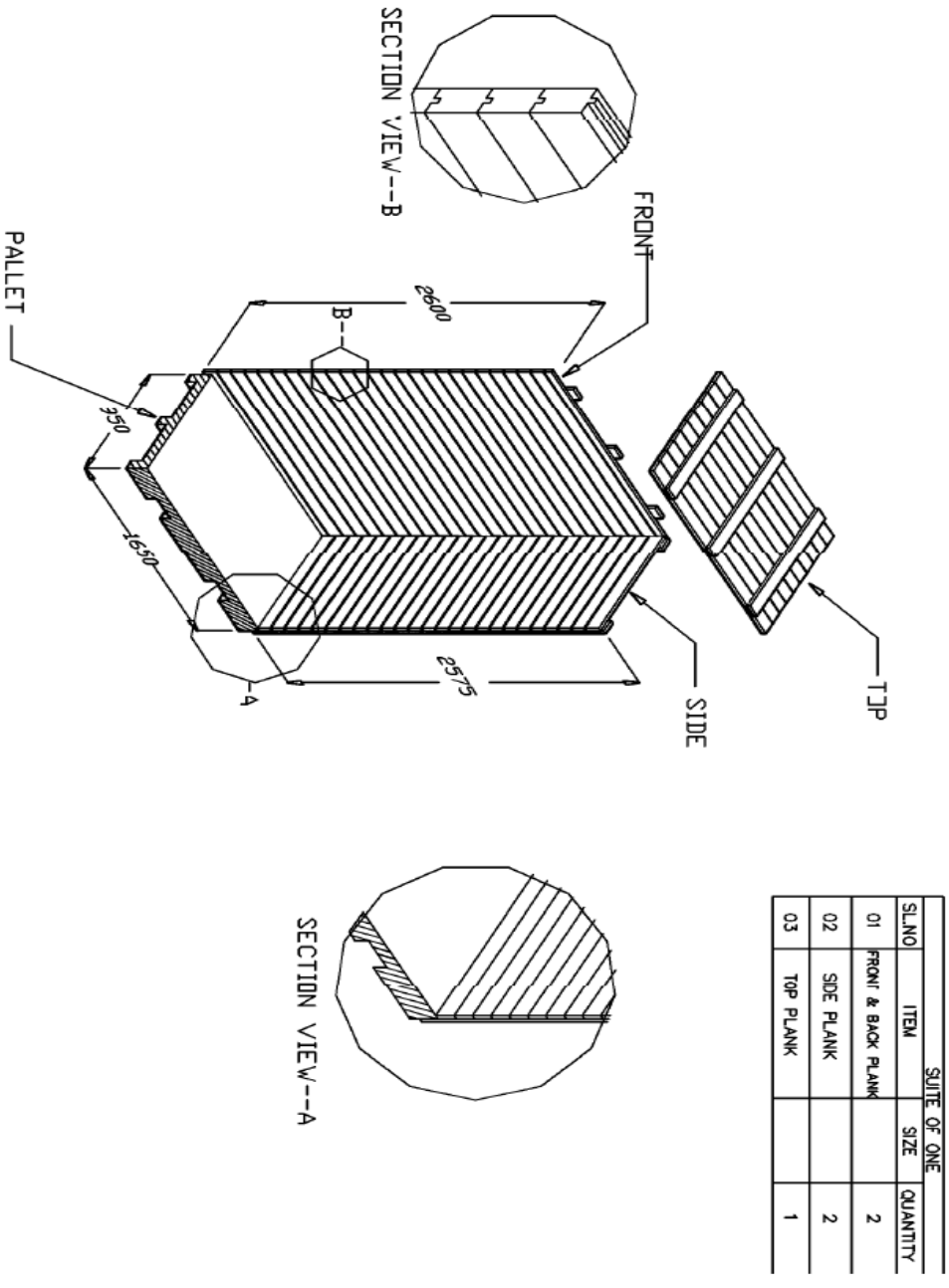


Fig – 10 : Two Suit Packing Assembly Details

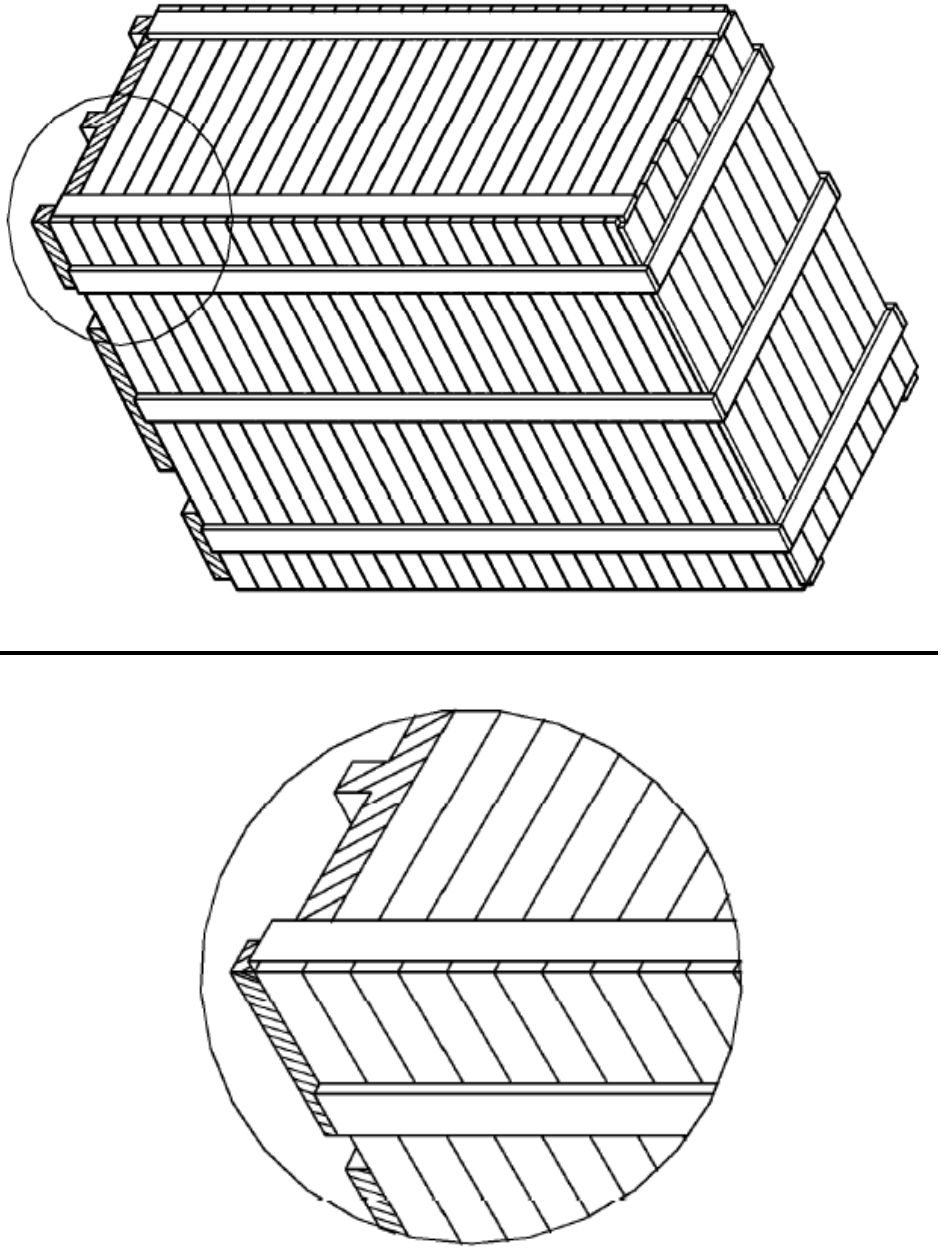
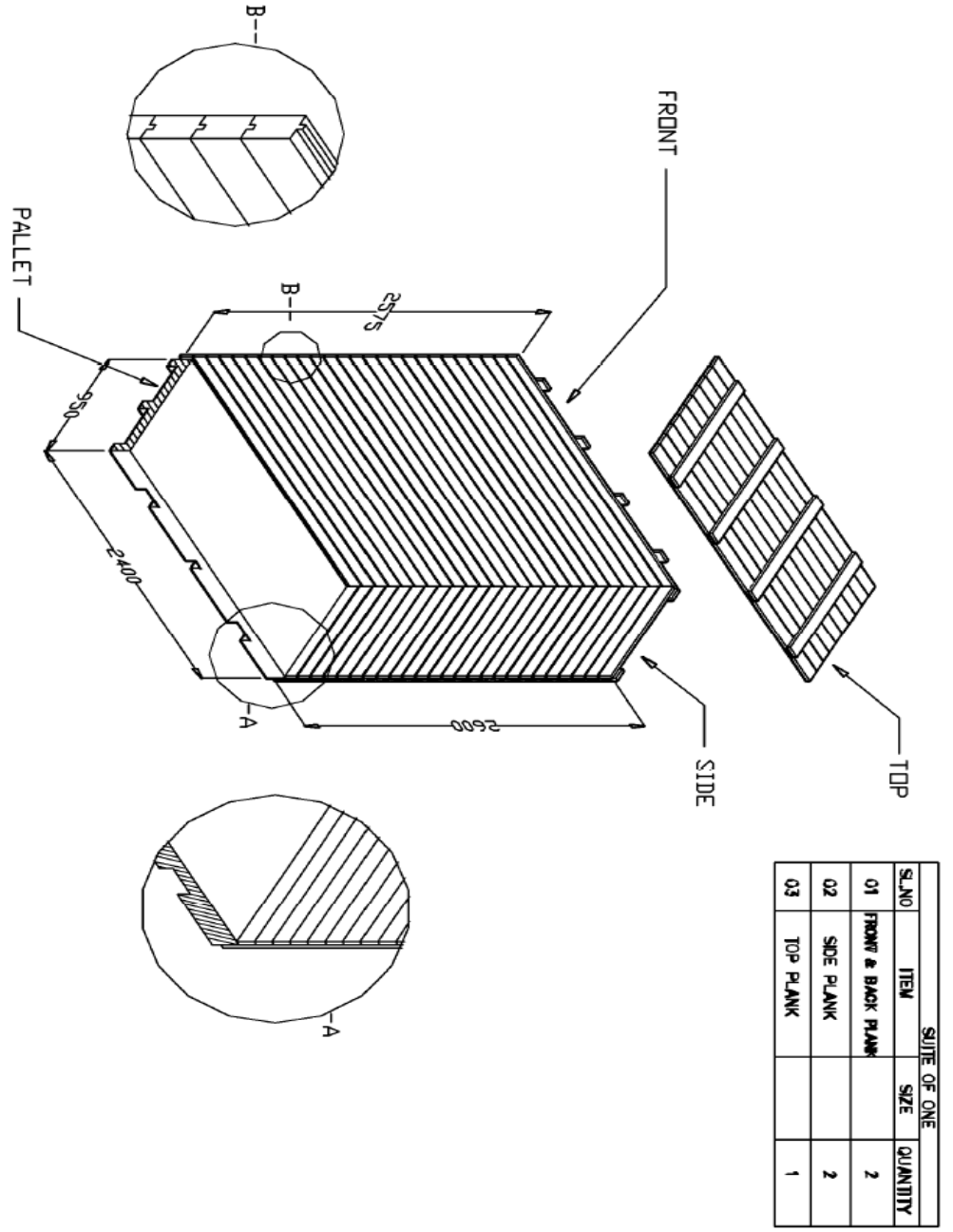


Fig – 11 : Two Suit Panel Packed view



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

Fig – 12 : Three Suit Panel Packing Assembly View

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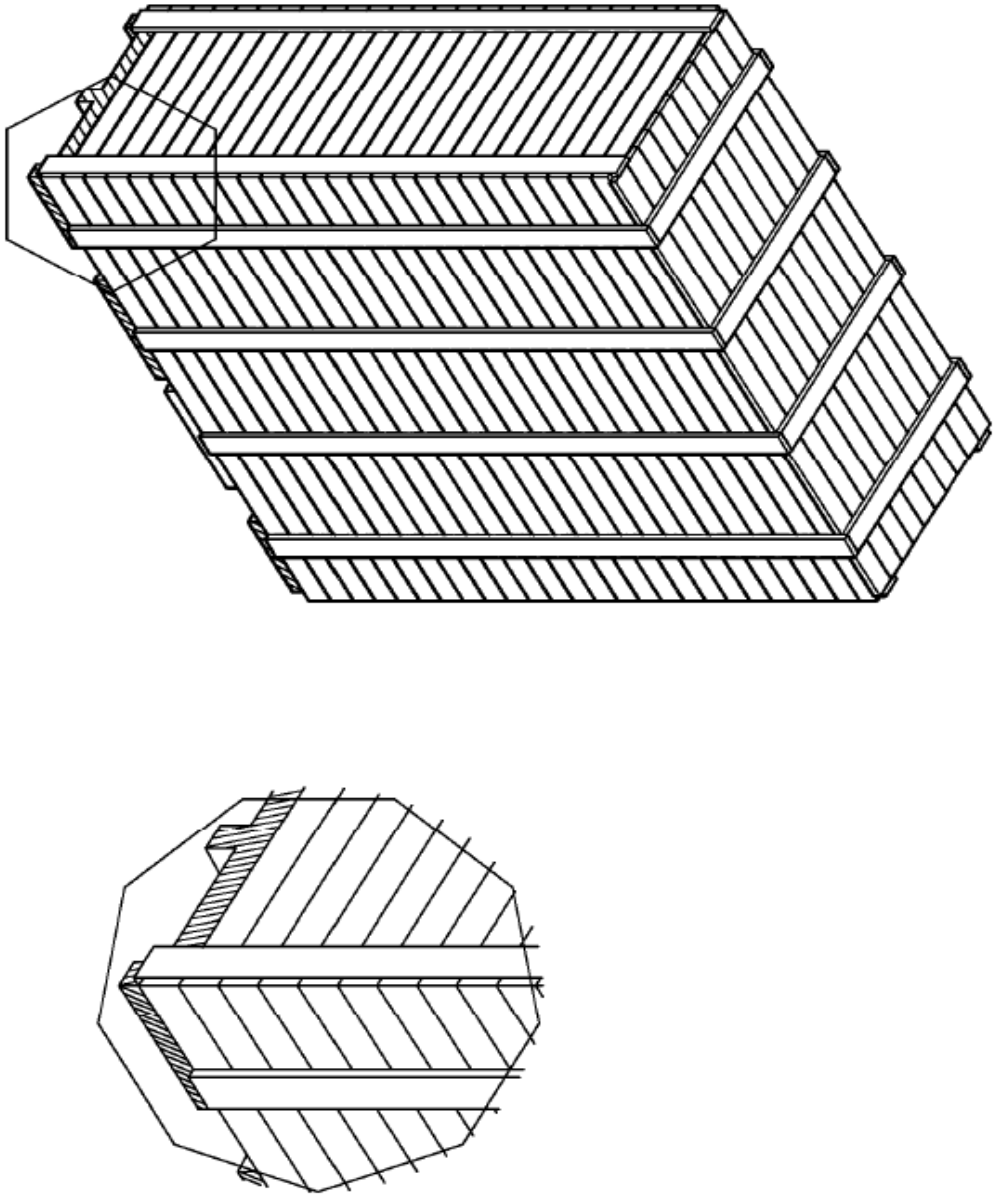
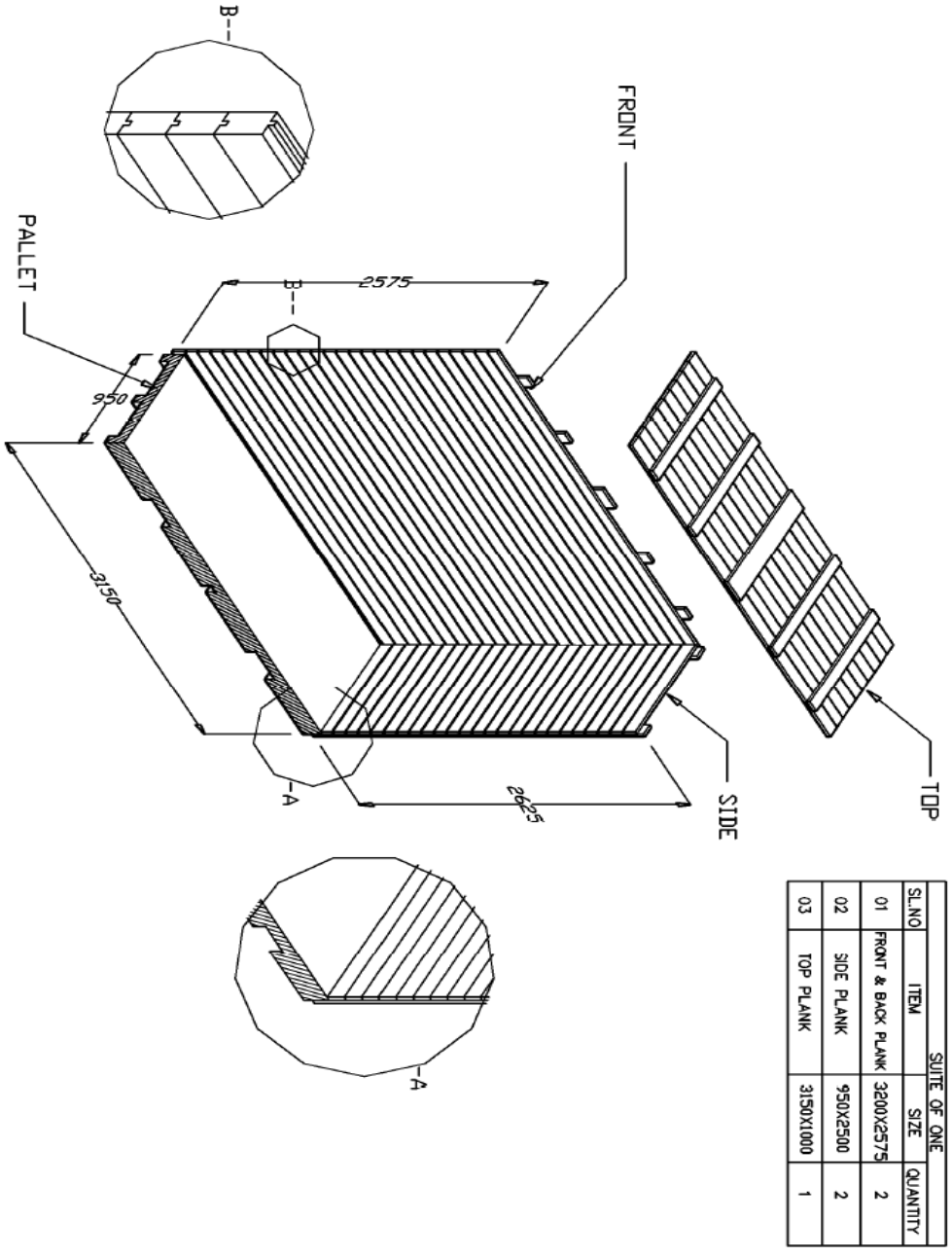


Fig -13 : Three Suit Panel Packed View



SUITE OF ONE		
SL.NO	ITEM	SIZE	QUANTITY
01	FRONT & BACK PLANK	3200X2575	2
02	SIDE PLANK	950X2500	2
03	TOP PLANK	3150X1000	1

Fig – 14 : Four Suit Panel Packing assembly Detail

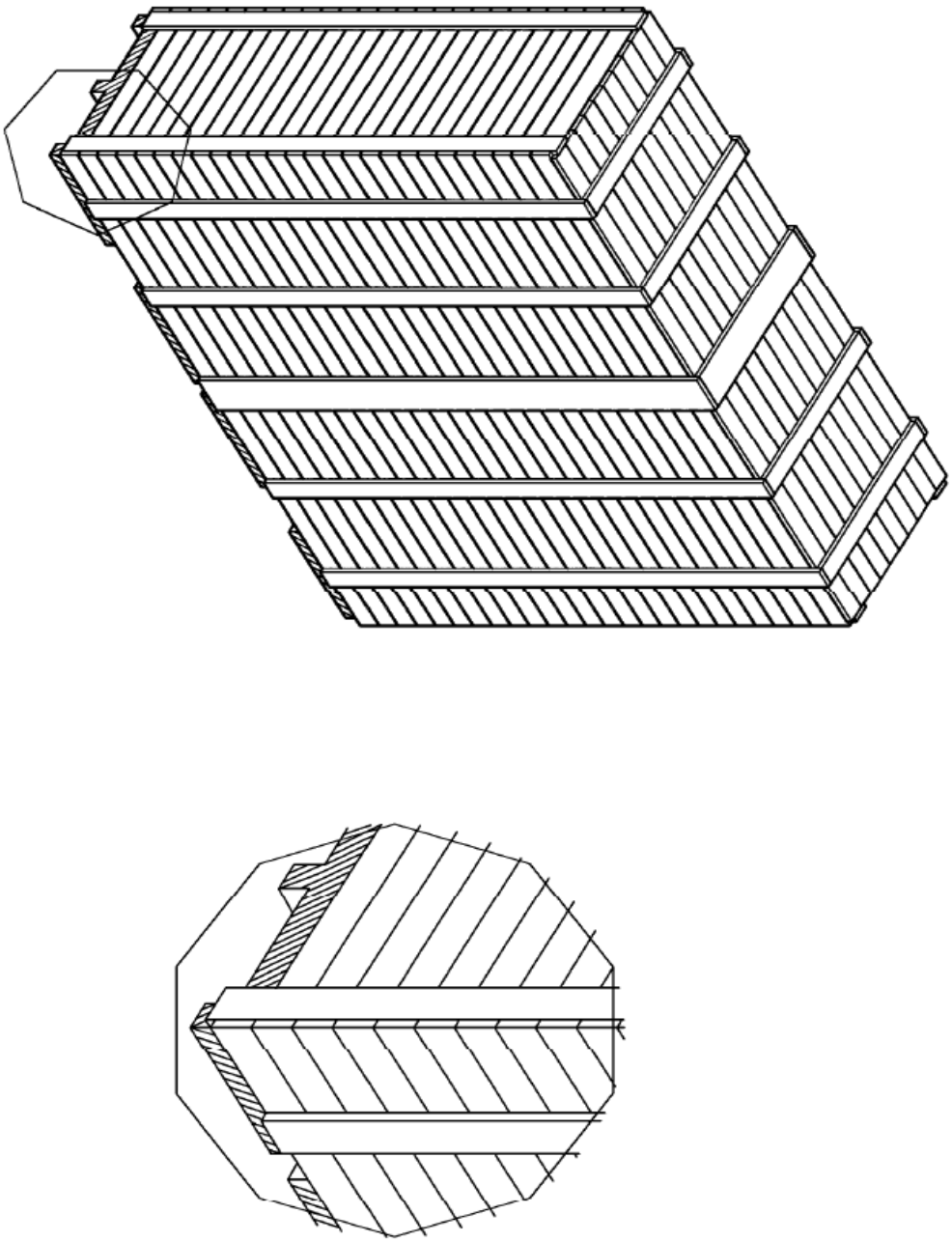


Fig -15 : Four Suit Panel Packing View

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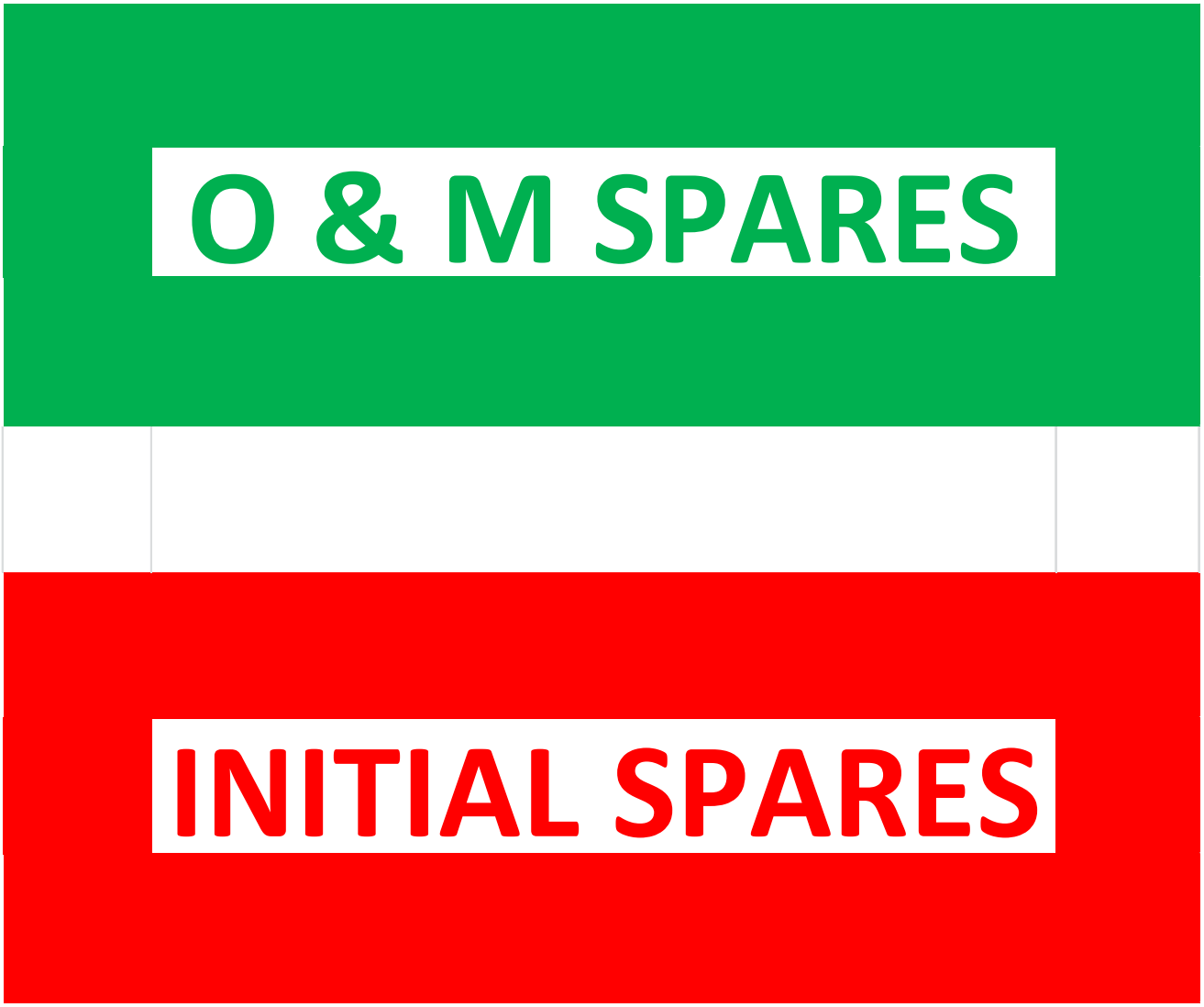
Easy spares [Initial and O&M] Traceability and Identification at units and as well as at sites:

Fig: 14



PID_NAME	PID_NO	KKS_TAG	DESC	SENSR_TYPE	RANGE	UNIT RANGE	OP_PRESS	DESN_PRESS	UNIT PRESS	DESN PR UNIT	OP_TEMP	DESN_TEMP	UNIT TEMP	Medium	REMARKS	REV	SCOPE	OP_OTHERS	DSN_OTHERS	UNIT OTHERS
SWAS SCHEMES	PE-DG-423-100-I110	HAG15CQ211	CAT COND AT SEPARATOR TANK DRN	CCT	(0-1),x10	uMho/cm	279.2	298.1	KG/CM2(a)	KG/CM2(g)	328	433	Deg C	WATER		00	EDN	< 0.2		uMho/cm
SWAS SCHEMES	PE-DG-423-100-I110	HAG15CQ212	SP COND AT SEPARATOR TANK DRN	CT	(0-10),x10	uMho/cm	279.2	298.1	KG/CM2(g)	KG/CM2(g)	328	433	Deg C	WATER		00	EDN			
SWAS SCHEMES	PE-DG-423-100-I110	HAG15CQ213	HYDRAZINE IN SEPARATOR TANK DRN	HzT	(0-50), X10	ppb	279.2	298.1	KG/CM2(a)	KG/CM2(g)	328	433	Deg C	WATER		00	EDN	--		ppb
SWAS SCHEMES	PE-DG-423-100-I110	HAG15CQ214	SILICA IN SEPARATOR TANK DRN	SiT	(0-50),x10	ppb	279.2	298.1	KG/CM2(g)	KG/CM2(g)	328	433	Deg C	WATER		00	EDN			
SWAS SCHEMES	PE-DG-423-100-I110	HAH02CQ211	PH AT SEP O/L STM	pHT	0-14		277	296	KG/CM2(g)	KG/CM2(g)	328	433	Deg C	STEAM		00	EDN			
SWAS SCHEMES	PE-DG-423-100-I110	HAH02CQ212	SP COND AT SEP O/L STM	CT	(0-1),x10	uMho/cm	277	296	KG/CM2(g)	KG/CM2(g)	328	433	Deg C	STEAM		00	EDN			
SWAS SCHEMES	PE-DG-423-100-I110	HAH02CQ213	CAT COND AT SEP O/L STM	CCT	(0-1),x10	uMho/cm	277	296	KG/CM2(a)	KG/CM2(g)	328	433	Deg C	STEAM		00	EDN	< 0.2		uMho/cm
SWAS SCHEMES	PE-DG-423-100-I110	LAB00CQ211	pH AT DEA O/L	pHT	0-14		12.9	20	KG/CM2(a)	KG/CM2(g)	190.2	200	Deg C	FW		00	EDN	8.5-9.0		N/A
SWAS SCHEMES	PE-DG-423-100-I110	LAB00CQ212	SP COND AT DEA O/L	CT	(0-10),x10	uMho/cm	12.9	20	KG/CM2(a)	KG/CM2(g)	190.2	200	Deg C	FW		00	EDN	2.5-10		uMho/cm
SWAS SCHEMES	PE-DG-423-100-I110	LAB00CQ213	DISSOLVED O2 AT DEA O/L	DOT	(0-20),x10	ppb	12.9	20	KG/CM2(a)	KG/CM2(g)	190.2	200	Deg C	FW		00	EDN	< 10ppb		ppb
SWAS SCHEMES	PE-DG-423-100-I110	LAB00CQ214	DISSOLVED O2 AT DEA O/L	DOT	(0-20),x10	ppb	12.9	20	KG/CM2(a)	KG/CM2(g)	190.2	200	Deg C	FW		00	EDN	< 10ppb		ppb
SWAS SCHEMES	PE-DG-423-100-I110	LAB80CQ211	FEED WTR TO ECO pH	pHT	0-14		334	385	KG/CM2(a)	KG/CM2(g)	311.9	315	Deg C	FW		00	EDN	8.5-9.0		N/A
SWAS SCHEMES	PE-DG-423-100-I110	LAB80CQ212	SP COND IN FEED WTR TO ECO	CT	(0-10),x10	uMho/cm	334	385	KG/CM2(a)	KG/CM2(g)	311.9	315	Deg C	FW		00	EDN	2.5-10		uMho/cm
SWAS SCHEMES	PE-DG-423-100-I110	LAB80CQ213	CAT COND IN FEED WTR TO ECO	CCT	(0-1),x10	uMho/cm	334	385	KG/CM2(a)	KG/CM2(g)	311.9	315	Deg C	FW		00	EDN	< 0.2		uMho/cm
SWAS SCHEMES	PE-DG-423-100-I110	LAB80CQ214	DISSOLVED O2 IN FEED WTR TO ECO	DOT	(0-20),x10	ppb	334	385	KG/CM2(a)	KG/CM2(g)	311.9	315	Deg C	FW		00	EDN	< 10ppb		ppb
SWAS SCHEMES	PE-DG-423-100-I110	LAB80CQ215	HYDRAZINE IN FEED WTR TO ECO	HzT	(0-50), X10	ppb	334	385	KG/CM2(a)	KG/CM2(g)	311.9	315	Deg C	FW		00	EDN	--		ppb
SWAS SCHEMES	PE-DG-423-100-I110	LAB80CQ216	HYDRAZINE IN FEED WTR TO ECO	HzT	(0-50), X10	ppb	334	385	KG/CM2(a)	KG/CM2(g)	311.9	315	Deg C	FW		00	EDN	2.5-10		ppb
SWAS SCHEMES	PE-DG-423-100-I110	LAB80CQ217	FEED WTR TO ECO TURBIDITY	TurbT	0-5	NTU	334	385	KG/CM2(a)	KG/CM2(g)	311.9	315	Deg C	FW		00	EDN	--		ppb
SWAS SCHEMES	PE-DG-423-100-I110	LAB80CQ218	AMMONIA IN FEED WTR TO ECO	NH3T	(0-200),X10	ppb	334	385	KG/CM2(a)	KG/CM2(g)	311.9	315	Deg C	FW		00	EDN	--		ppb
SWAS SCHEMES	PE-DG-423-100-I110	LAB80CQ219	AMMONIA IN FEED WTR TO ECO	NH3T	(0-200),X10	ppb	334	385	KG/CM2(a)	KG/CM2(g)	311.9	315	Deg C	FW		00	EDN	--		ppb
SWAS SCHEMES	PE-DG-423-100-I110	LAB80CQ220	SILICA IN FEED WTR TO ECO	SiT	(0-50),x10	ppb	334	385	KG/CM2(a)	KG/CM2(g)	311.9	315	Deg C	FW		00	EDN	< 20ppb		ppb
SWAS SCHEMES	PE-DG-423-100-I110	LAB80CQ221	DISSOLVED O2 IN FEED WTR TO ECO	DOT	(0-20),x10	ppb	334	385	KG/CM2(a)	KG/CM2(g)	311.9	315	Deg C	FW		01A	EDN	< 10ppb		ppb
SWAS SCHEMES	PE-DG-423-100-I110	LBA11CQ211	MAIN STEAM pH	pHT	0-14		279	295.7	KG/CM2(a)	KG/CM2(g)	603	608	Deg C	STEAM		00	EDN	8.5 - 9.0		N/A
SWAS SCHEMES	PE-DG-423-100-I110	LBA11CQ212	CAT COND IN MAIN STEAM	CCT	(0-1),x10	uMho/cm	279	295.7	KG/CM2(a)	KG/CM2(g)	603	608	Deg C	STEAM		00	EDN	< 0.2		uMho/cm
SWAS SCHEMES	PE-DG-423-100-I110	LBA11CQ213	SP COND IN MAIN STEAM	CT	(0-10),x10	uMho/cm	279	295.7	KG/CM2(a)	KG/CM2(g)	603	608	Deg C	STEAM		00	EDN	2.5 - 10		uMho/cm
SWAS SCHEMES	PE-DG-423-100-I110	LBA11CQ214	SODIUM IN MAIN STEAM	NaT	(0-10), X10	ppb	279	295.7	KG/CM2(a)	KG/CM2(g)	603	608	Deg C	STEAM		00	EDN	< 20 ppb		ppb
SWAS SCHEMES	PE-DG-423-100-I110	LBA11CQ215	SILICA IN MAIN STEAM	SiT	(0-50), X10	ppb	279	295.7	KG/CM2(a)	KG/CM2(g)	603	608	Deg C	STEAM		00	EDN	< 20 ppb		ppb
SWAS SCHEMES	PE-DG-423-100-I110	LBB11CQ211	HRH STEAM pH	pHT	0-14		53.53	71	KG/CM2(a)	KG/CM2(g)	600	601	Deg C	STEAM		00	EDN	8.5 - 9.0		N/A
SWAS SCHEMES	PE-DG-423-100-I110	LBB11CQ212	SP COND IN HRH STEAM	CT	(0-10),x10	uMho/cm	53.53	71	KG/CM2(a)	KG/CM2(g)	600	601	Deg C	STEAM		01M	EDN	< 0.2		uMho/cm
SWAS SCHEMES	PE-DG-423-100-I110	LCA20CQ211	CEP DISCH pH	pHT	0-14		30.62	47	KG/CM2(a)	KG/CM2(g)	43	60	Deg C	COND		00	EDN	8.5 - 9.0		N/A
SWAS SCHEMES	PE-DG-423-100-I110	LCA20CQ212	SODIUM IN COND AT CEP DISCH	NaT	(0-20),x10	ppb	30.62	47	KG/CM2(a)	KG/CM2(g)	43	60	Deg C	COND		00	EDN	< 5 ppb		ppb
SWAS SCHEMES	PE-DG-423-100-I110	LCA20CQ213	DISSOLVED O2 IN COND AT CEP DISCH	DOT	(0-20),x10	ppb	30.62	47	KG/CM2(a)	KG/CM2(g)	43	60	Deg C	COND		00	EDN			ppb
SWAS SCHEMES	PE-DG-423-100-I110	LCA20CQ214	CAT COND IN COND AT CEP DISCH	CCT	(0-1),x10	uMho/cm	30.62	47	KG/CM2(a)	KG/CM2(g)	43	60	Deg C	COND		00	EDN	< 0.2		uMho/cm
SWAS SCHEMES	PE-DG-423-100-I110	LCA20CQ215	SP COND IN COND AT CEP DISCH	CT	(0-10),x10	uMho/cm	30.62	47	KG/CM2(a)	KG/CM2(g)	43	60	Deg C	COND		00	EDN	2.5 - 10.0		uMho/cm
SWAS SCHEMES	PE-DG-423-100-I110	LCA20CQ216	CHLORIDE IN COND AT CEP DISCH	CldT	(0-10), X10	ppb	30.62	47	KG/CM2(a)	KG/CM2(g)	43	60	Deg C	COND		00	EDN	--		ppb
SWAS SCHEMES	PE-DG-423-100-I110	LCA20CQ217	SILICA IN COND AT CEP DISCH	SiT	(0-50),x10	ppb	30.62	47	KG/CM2(a)	KG/CM2(g)	43	60	Deg C	COND		00	EDN	< 20ppb		ppb
SWAS SCHEMES	PE-DG-423-100-I110	LCA50CQ211	CAT COND AT CPU O/L	CCT	(0-1),x10	uMho/cm	30.35	45	KG/CM2(a)	KG/CM2(g)	42.2	60	Deg C	COND		00	EDN	< 0.2		uMho/cm
SWAS SCHEMES	PE-DG-423-100-I110	LCA50CQ212	CPU O/L pH	pHT	0-14		30.35	45	KG/CM2(a)	KG/CM2(g)	42.2	60	Deg C	COND		00	EDN	8.5 - 9.0		N/A
SWAS SCHEMES	PE-DG-423-100-I110	LCA50CQ213	SP COND AT CPU O/L	CT	(0-10),x10	uMho/cm	30.35	45	KG/CM2(a)	KG/CM2(g)	42.2	60	Deg C	COND		00	EDN	--		uMho/cm
SWAS SCHEMES	PE-DG-423-100-I110	LCA50CQ214	DISSOLVED O2 AT CPU O/L	DOT	(0-20),x10	ppb	30.35	45	KG/CM2(a)	KG/CM2(g)	42.2	60	Deg C	COND		00	EDN			ppb

PID_NAME	PID_NO	KKS_TAG	DESC	SENSR_TYPE	RANGE	UNIT RANGE	OP_PRESS	DESN_PRESS	UNIT PRESS	DESN PR UNIT	OP_TEMP	DESN_TEMP	UNIT TEMP	Medium	REMARKS	REV	SCOPE	OP_OTHERS	DSN_OTHERS	UNIT OTHERS
SWAS SCHEMES	PE-DG-423-100-I110	LCA50CQ215	SODIUM AT CPU O/L	NaT	(0-10),x10	ppb	30.35	45	KG/CM2(a)	KG/CM2(g)	42.2	60	Deg C	COND		00	EDN	< 5 ppb		ppb
SWAS SCHEMES	PE-DG-423-100-I110	LCA50CQ216	SILICA AT CPU O/L	SiT	(0-50), x10	ppb	30.35	45	KG/CM2(a)	KG/CM2(g)	42.2	60	Deg C	COND		00	EDN	< 20 ppb		ppb
SWAS SCHEMES	PE-DG-423-100-I110	LCA50CQ217	CPU O/L pH	pHT	0-14		30.35	45	KG/CM2(a)	KG/CM2(g)	42.2	60	Deg C	COND		01	EDN	8.5 - 9.0		N/A
SWAS SCHEMES	PE-DG-423-100-I110	LCA90CQ211	DO2 AT DEA I/L	DOT	(0-20),x10	ppb	33	45	KG/CM2(a)	KG/CM2(g)	155.2	160	Deg C	COND		00	EDN	< 10ppb		ppb
SWAS SCHEMES	PE-DG-423-100-I110	LCA90CQ212	PH AT DEA I/L	pHT	0-14		33	45	KG/CM2(a)	KG/CM2(g)	155.2	160	Deg C	COND		00	EDN	8.5-9.0		N/A
SWAS SCHEMES	PE-DG-423-100-I110	LCA90CQ213	SILICA AT DEA I/L	SiT	(0-50),x10	ppb	33	45	KG/CM2(a)	KG/CM2(g)	155.2	160	Deg C	COND		00	EDN	< 20ppb		ppb
SWAS SCHEMES	PE-DG-423-100-I110	LCR50CQ201	SP COND IN DM M/U WTR TO CONDNSR	CT	(0-10),x10	uMho/cm	6.5	10	KG/CM2(a)	KG/CM2(g)	40	50	Deg C	DM WTR		00	EDN	< 0.1		uMho/cm
SWAS SCHEMES	PE-DG-423-100-I110	MAG10CQ211	SP COND IN HOTWELL-2 LEFT	CT	(0-10),x10	uMho/cm	0.1	2	KG/CM2(a)	KG/CM2(g)	41.5	60	Deg C	COND		00	EDN	2.5 - 10		uMho/cm
SWAS SCHEMES	PE-DG-423-100-I110	MAG10CQ212	SP COND IN HOTWELL-2 RIGHT	CT	(0-10),x10	uMho/cm	0.1	2	KG/CM2(a)	KG/CM2(g)	41.5	60	Deg C	COND		00	EDN	2.5 - 10		uMho/cm
SWAS SCHEMES	PE-DG-423-100-I110	MAG20CQ211	SP COND IN HOTWELL-1 LEFT	CT	(0-10),x10	uMho/cm	0.1	2	KG/CM2(a)	KG/CM2(g)	41.5	60	Deg C	COND		00	EDN	2.5 - 10		uMho/cm
SWAS SCHEMES	PE-DG-423-100-I110	MAG20CQ212	SP COND IN HOTWELL-1 RIGHT	CT	(0-10),x10	uMho/cm	0.1	2	KG/CM2(a)	KG/CM2(g)	41.5	60	Deg C	COND		00	EDN	2.5 - 10		uMho/cm
SWAS SCHEMES	PE-DG-423-100-I110	PAB10CQ211	pH IN CW	pHT	0-14		2.0	5.0	KG/CM2(g)	KG/CM2(g)	32.5	60	Deg C	CW(SEA WTR)		00	EDN			N/A
SWAS SCHEMES	PE-DG-423-100-I110	PAB11CQ212	SP COND IN CW	CT	0-10	Mho/cm	2.0	5.0	KG/CM2(g)	KG/CM2(g)	32.5	60	Deg C	CW(SEA WTR)		00	EDN			uMho/cm
SWAS SCHEMES	PE-DG-423-100-I110	PAB11CQ213	RESIDUAL CHLORINE IN CW	CIT	(0-500),x10	ppb	2.0	5.0	KG/CM2(g)	KG/CM2(g)	32.5	60	Deg C	CW(SEA WTR)		00	EDN			ppb
SWAS SCHEMES	PE-DG-423-100-I110	PAB11CQ214	SALINITY IN CONDENSER CW	SalT	0-100000	ppm	2.0	5.0	KG/CM2(g)	KG/CM2(g)	32.5	60	Deg C	CW(SEA WTR)		00	EDN			ppb
SWAS SCHEMES	PE-DG-423-100-I110	PCB10CQ211	SP CONDUCTIVTY IN ACW	CT	0-10	Mho/cm	4	10	KG/CM2(g)	KG/CM2(g)	36	60	Deg C	ACW(SEA WTR)		00	EDN			uMho/cm
SWAS SCHEMES	PE-DG-423-100-I110	PCB10CQ212	CAT CONDUCTIVTY IN ACW	CCT	(0-1),x10	µS/cm	4	10	KG/CM2(a)	KG/CM2(g)	36	60	Deg C	ACW(SEA WTR)		00	EDN	--		uMho/cm
SWAS SCHEMES	PE-DG-423-100-I110	PGC15CQ211	TG DMCW DISCH HDR pH	pHT	0-14		6.7	10	KG/CM2(g)	KG/CM2(g)	38	60	Deg C	DMCW		00	EDN	8.5 - 9.2		N/A
SWAS SCHEMES	PE-DG-423-100-I110	PGC15CQ212	SP COND AT TG DMCW DISCH HDR	CT	(0-10),x10	uMho/cm	6.7	10	KG/CM2(g)	KG/CM2(g)	38	60	Deg C	DMCW		00	EDN			uMho/cm
SWAS SCHEMES	PE-DG-423-100-I110	PGC40CQ211	SG DMCW DISCH HDR pH	PHT	0-14		6.7	12	KG/CM2(g)	KG/CM2(g)	38	60	Deg C	DMCW		00	EDN	8.5 - 9.2		N/A
SWAS SCHEMES	PE-DG-423-100-I110	PGC40CQ212	SP COND AT SG DMCW DISCH HDR	CT	(0-10),x10	uMho/cm	6.7	12	KG/CM2(g)	KG/CM2(g)	38	60	Deg C	DMCW		00	EDN			uMho/cm

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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: 003- Rev 02

SPECIAL COMMERCIAL CONDITIONS OF CONTRACT

Reference is brought to BHEL's Instructions to Bidders (Document Ref: CE: PR: 001- Rev 03) and General Commercial Conditions for Contract (Document Ref: CE: PR: 002- Rev 02).

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. : MGRM0000378

RFQ Date **:** 11/01/2021

RFQ Due Date **:** 22/01/2021

Customer **:** BHEL-EDN

Item Description **:** Analysers for Steam & Water Analysis System.

Kindly submit your quotation as **two part bid** (Techno-Commercial bid-1st part & Price bid-2nd Part) in E-Procurement System portal: https://eprocurebhel.co.in/nicgep/app within the Due- Date of 22/01/2021 before **13:30** hours IST and note that tenders will be opened on the same day at **13:35** hours IST.

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 kamathnk@bhel.in

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

Destination: For Indigenous scope of supply, items are to be directly despatched to BHEL stores located at BHEL-EDN premises, Mysore Road, Bangalore, Karnataka state, India. Detailed Consignee details will be issued by BHEL along with Despatch Clearance. However, destination may subject to change over a period of time.

Reverse Auction (RA) **:** Not applicable.

Terms of Delivery:

- **Indigenous scope of supply:** Ex-works, <indicate station of dispatch> (including Packing & Forwarding charges but excluding Taxes).

Under-mentioned details shall be provided against indigenous supplies & services:

a. GSTIN of place of supply : _____

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

c. GSTIN of place of supply of service : _____

d. SAC (Service Accounting Code) :_____
Applicable tax and Rate : _____&_____

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	**Delivery Period**	Within 16 weeks from the date of issue of Manufacturing clearance along with approved document. Delay in contractual delivery will attract Penalty as per GCC Clause no.:04.b.	AGREE …… weeks	
02	**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 (Main supply) :** a)Supply with Service(s) ~~b)Supply only~~ ~~**Imported Scope :**~~ ~~c)Supply with Service(s)~~ ~~d)Supply only~~ ~~**High Sea sales :**~~ ~~e)Supply with Service(s)~~ ~~f)Supply only~~ **Spares :** b) ~~and/or d)/f) depending upon the scope~~	AGREE	
03	**Declaration of local content :** The 'Class-I local supplier'/'Class-II local supplier' shall be required to indicate percentage of local content and provide self-certification that the item offered meets the local content requirement	'Local content' means the amount of value added in India which shall, unless otherwise prescribed by the Nodal Ministry, be the total value of the item procured (excluding net domestic indirect taxes) minus the value of imported content in the item (including all customs duties) as a proportion of the total value, in percent. {'Class-I local supplier' means a supplier or service provider, whose goods, services or works offered for procurement, has local content equal to or more than 50%, as defined under Public procurement order no.P-45021/2/2017-PP (BE-II) dt: 16.09.2020. 'Class-II local supplier' means a supplier or service provider, whose goods, services or works offered for procurement, has local content more than 20% but less than 50%, as defined under Public	Percentage of local content : _____% Details of the Location(s) at which the local value addition is made : _____	

	for 'Class-I local supplier'/'Class-II local supplier', as the case may be.	procurement order no.P-45021/2/2017-PP (BE-II) dt: 16.09.2020. In the event of any Nodal Ministry prescribing higher or lower margin of purchase preference and/or higher or lower percentage of local content in respect of this procurement, same shall be applicable}. (Refer Clause 'A' Sl. No. 12 of Instructions to Bidders).		
04	**Declaration as a compliance to Rule 144(xi) of GFR, 2017 amendment dt 23.07.2020 issued by Ministry of Finance, Govt. of India.**	The below declaration is to be submitted on Company Letter head duly signed and sealed by authorised signatory, for ascertaining the eligibility of offer in the tender. "I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India; I certify that our firm is not from such a country or, if from such a country, has been registered with the Competent Authority. I hereby certify that our firm fulfils all requirements in this regard and is eligible to be considered." (Refer Clause 'A' Sl. No. 13 of Instructions to Bidders).		

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 **03 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 90 days from the date of part-I bid opening and in case of Negotiation/ Counter-offer, price validity will apply afresh for a period of 30 days from the date of according final price by bidder (or) up to original validity period, whichever is later.

(3) **Warranty: 18** months from the date of dispatch of goods (or) 12 months from the date of commissioning, whichever is earlier.

(4) **Performance Bank Guarantee (PBG):** PBG will be applicable for a period of **18** months from the date of dispatch of goods + claim period of 03 months, for a value equal to 10% of the basic value of purchase order. It shall however be noted that PBG is not applicable against supply of Mandatory Spares.

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. Despatch documents shall include the following:

Invoice (01 original and 01 copy with original sign & seal / digitally signed invoice), Lorry Receipt (L/R), Packing List, NIL Short-Shipment Certificate, insurance intimation letter, E-way bill, original Performance Bank Guarantee (directly from issuing bank to BHEL) and original POD (Proof of Delivery) on L/R.

One set of Invoice, Packing List, Lorry Receipt & E-way bill shall be e-mailed immediately to BHEL-EDN at the time of despatch.

Note: Detailed Packing List should indicate package-wise content details and also Net & Gross weight of each package.

(6) **Freight Charges (for indigenous scope of supply):** Freight charges shall be to vendor's account. Bidder to quote reasonable Freight charges along with applicable tax, in price bid. It shall be noted that freight charge remains unchanged, in case of change in destination within India.

(7) **Erection Supervision and Commissioning charges:**
In case the quoted total Erection Supervision & Commissioning value is less than **05%** of the Main-supply value, BHEL shall evaluate Bidders Price deducting differential amount from supply price and apportioning towards Erection Supervision & Commissioning charges.
Refer Sl. no. 'h' under Clause 'F' of Instructions to Bidders for Payment terms of Erection Supervision & Commissioning charges.

(8) **Evaluation criteria to determine L1 bidder**:

- Only domestic manufacturers are eligible to quote.
- Items will not be split on item-wise lowest offer as Evaluation of the lowest bidder will be done as a combined package basis.

With this, we hereby confirm that all the terms & conditions as indicated in Instructions to Bidders (Document Ref: CE: PR: 001- Rev 03) & General Commercial Conditions for Contract (Document Ref: CE: PR: 002- Rev 02) are accepted without any deviation.

Vendor's Signature with Seal

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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 03

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 03), General Conditions of Contract (document reference: CE: PR: 002 - Rev 02) 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 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.

   The Bidder declares that they will not enter into any illegal or undisclosed agreement or understanding, whether formal or informal with other Bidder(s). This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process. In case, the Bidder is found having indulged in above activities, suitable action shall be taken by BHEL as per extant policies / guidelines.

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.

11. Offer is to be submitted in English language only.

12. For this procurement, the local content to categorize a supplier as a Class-I local supplier/ Class-II local supplier/ Non-local supplier and purchase preference to Class-I local supplier, is as defined in Public procurement (Preference to Make in India), Order 2017 dated 16.09.2020 issued by DPIIT.

    In case of subsequent Orders issued by the Nodal Ministry, changing the definition of local content for the items of the NIT, the same shall be applicable even if issued after issue of this NIT, but before opening of price bids against this NIT. Default margin of purchase preference shall be 20% for Class-I local supplier only.

13. The Bidder shall mandatorily submit Declaration as mentioned under Rule 144(xi) of General Financial Rules, 2017 amendment dt 23.07.2020 issued by Ministry of Finance, Govt. of India. Where applicable, evidence of valid registration by the Competent Authority shall be attached.

    The Competent Authority for the purpose of registration under this Order shall be the Registration Committee constituted by the Department for Promotion of Industry and Internal Trade (DPIIT). Refer Annexure-X for 'Restrictions under Rule 144(Xi) of General Financial Rules,2017 amendment dt: 23.07.2020'.

B. <u>GUIDELINES FOR PREPARATION OF OFFER:</u>

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) up to 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), documentation charges, testing Charges (type & routine), training charges etc. if & as applicable along with corresponding tax. The price summary must indicate all the elements clearly.
10. Wherever applicable, 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. <u>GUIDELINES FOR OFFER SUBMISSION:</u>

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. <u>PROCESSING OF OFFERS RECEIVED:</u>

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. 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.

6. 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.

7. 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.

8. 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.

   In the course of evaluation, if more than one bidder happens to occupy L-1 status, effective L-1 will be decided by soliciting discounts from the respective L-1 bidders.

   Incase more than one bidder happens to occupy the L-1 status even after soliciting discounts, the L-1 bidder shall be decided by a toss/draw of lots, in the presence of the respective L-1 bidder(s) or their representative(s).

   Ranking will be done accordingly. BHEL’s decision in such situations shall be final and binding.

9. The evaluation currency for this tender shall be INR. 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.

10. Ranking (L-1, L-2 etc.) shall be done only for the techno-commercially acceptable offers.
11. GeM Seller ID shall be mandatory before placement of order/award of contract for goods and services to the successful bidder(s), for orders exceeding Rs.25 lakhs (including all taxes etc.). Department of Expenditure (DoE) OM no.6/9/2020-PPD dated: 24.08.2020 may be referred in this regard.

E. <u>INFORMATION ON PAYMENT TERMS:</u>

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.

   A. 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.

   B. TDS deduction as per section 51 of CGST Act,2017 shall be applicable as per Gazette Notification No. 50/2018-Central Tax, Dated: 13th September 2018 and subsequent notification/s, as and when released by Govt. authorities.
4. Levy and Collection of TCS by the seller of goods u/s 206C (1H) shall be in compliance with Govt. norms. The seller shall raise the invoice including the amount of TCS in the Tax Invoice and no separate debit note will be entertained.

   The seller should indicate his PAN number and TAN number in the Invoice. The seller should remit the TCS so collected from BHEL and provide TCS certificate/s with invoice no., invoice date, Amount etc.

   If by any chance seller is not remitting /not able to submit TCS certificates to BHEL on time, then the TCS amount with penalty, if any applicable will be recovered from seller in the available bills.
5. 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:

PURCHASE ORDERS FOR:	SUPPLY WITH SERVICE(S)	SUPPLY ONLY
INDIGENOUS PROCUREMENT	a. 100% of basic 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. Note: In case PBG is not furnished, only 90% payment will be released against 100% 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. 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.
IMPORT PROCUREMENT	c. 100% of basic value will be paid against usance draft of 45 days from the date of AWB/BOL on submission of complete set of documents. Note: In case PBG is not furnished, only 90% payment will be released against 100% 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.	d. 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.
HIGH-SEA SALES PROCUREMENT	e. 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 Note: In case PBG is not furnished, only 90% payment will be released against 100% 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 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.

g. Erection and Commissioning:

Evaluation methodology: Unless and otherwise specified in SCC, E&C charges should not be less than 10% of the main supply value. In case the quoted total E&C value is less than 10% of the main supply value, BHEL shall

evaluate Bidders Price deducting differential amount from main supply price proportionally from all items and apportioning towards E&C charges.
Payment term: 100% E&C 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 E&C.

h. Erection Supervision and Commissioning:

Evaluation methodology: Unless and otherwise specified in SCC, E&C charges should not be less than 5% of the main supply value. In case the quoted total E&C value is less than 5% of the main supply value, BHEL shall evaluate Bidders Price deducting differential amount from main supply price proportionally from all items and apportioning towards E&C charges.
Payment term: 100% E&C 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 E&C.

i. 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 CAMC value should not be less than 20% of the main supply value. In case the quoted total CAMC value is less than 20% of the main supply value, BHEL shall evaluate Bidders Price deducting differential amount from main supply price proportionally from all items and apportioning towards CAMC charges.

Payment terms: 100% CAMC 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 CAMC on yearly basis.

j. 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.

k. 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.

l. Standard payment terms indicated in Clauses: F (a), (b), (c), (d), (e), (f), (g), (h), (i) & (j) 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, minimum % to be quoted for Services, wherever mentioned, will be of both purchase order values put together.

Note 2: In case of multiple packages/units in a power plant, payment of E&C charges will be processed on pro-rata basis.

Note 3: 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.

12. As per Notification 88/2020-Central Tax dated 10th November 2020 (applicable w.e.f. 01 January 2021), the turnover for applicability of E-invoicing provisions has been reduced from 500 crores to 100 crores. In other words, registered person [other than a SEZ unit and those referred in Rule 54(2), 54(3), 54(4) and 54(4A) of the CGST Rules], whose aggregate turnover in any preceding financial year from 2017-18 onwards exceeds 100 crores, is required to comply with the requirement of IRN and QR code in respect of supply of goods or services or both to a registered person or for exports.

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 PBGs will be returned only after expiry of the claim period.
10. PBG shall not be applicable for spares.

I. PROVISONS 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 the Udyog Aadhaar certificate along with attested copy of a CA certificate (Annexure VIII) or Udyam Registration certificate applicable for the relevant financial year (latest audited) along with the tender documents in the Part-I bid to avail the applicable benefits.

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:

In tender, participating MSEs quoting price within price band of L1+15 percent shall also be allowed to supply a portion of requirement by bringing down their price to L1 price in a situation where L1 price from someone other than a MSE and such MSE shall be allowed to supply at least 25% of total tendered value. In case of more than one such MSE, the supply shall be shared proportionately (to tendered quantity).

- 3% of the 25% will be earmarked for women owned MSEs.
- 25% of the 25% (i.e., 6.25% of the total enquired quantity) will be earmarked for SC/ST owned MSE firms provided conditions as mentioned in (1) & (2) are fulfilled.
- In case where no SC/ST category firms are meeting the conditions mentioned in (1) and (2) or have not participated in the tender, the 6.25% of earmarked quantity for SC/ST owned MSE firms will be distributed among the other eligible MSE vendors who have participated in the tender.

In case after the bid opening it is seen that no MSE has become L1, then depending on the nature of the item, if it is not possible to split the tendered items/quantities on account of reasons like customer contract requirements of supplying one make for a given project or technical reasons like the tendered item being a system etc., then BHEL would not counter offer the L1 prices even though there may be MSE bidders within the +15% band of L1. 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.
Following independent External Monitors (IEMs) on the present panel have been appointed by BHEL with the approval of CVC to oversee implementation of IP in BHEL.

1. Shri Arun Chandra Verma,IPS (Retd.)
   Email: acverma1@gmail.com
2. Shri Virendra Bahadur Singh,IPS (Retd.)
   Email: vbsinghips@gmail.com

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 any of the above IEM(s). All correspondence with the IEM/s shall be done through email only.

Note: No routine correspondence shall be addressed to the IEM (phone/ post/ email) regarding the clarifications, time extensions or any other administrative queries, etc. on the tender issued. All such clarification/ issues shall be addressed directly to the tender issuing (procurement) department's officials whose contact details are indicated in SCC document of tender.

Annexure I

Guidelines for Indian Agents

- **Definition of Indian Agent**: An Indian Agent of foreign prinicipal is an individual, a partnership, an association of persons, a private or pubile company, that carries our 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

Annexure-A

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.

—x—

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
DO6	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	JOHANNESBERG, 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 / transfering 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 Querry, 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.

ELECTRONICS DIVISION, BANGALORE

Annexure-VI

BHEL MEMBER BANKS (LIST OF CONSORTIUM BANKS)

Bank Guarantee (BG) shall be issued from the following banks only:

Sl. No.	Nationalised Banks	Sl. No.	Public Sector Banks
1	Allahabad Bank	18	IDBI
2	Andhra Bank		
3	Bank of Baroda	Sl. No.	**Foreign Banks**
4	Canara Bank	19	CITI Bank N.A
5	Corporation Bank	20	Deutsche Bank AG
6	Central Bank	21	The Hongkong and Shanghai Banking Corporation Ltd. (HSBC)
7	Indian Bank	22	Standard Chartered Bank
8	Indian Overseas Bank	23	J P Morgan
9	Oriental Bank of Commerce		
10	Punjab National Bank	**Sl. No.**	**Private Banks**
11	Punjab & Sindh Bank	24	Axis Bank
12	State Bank of India	25	The Federal Bank Limited
13	Syndicate Bank	26	HDFC Bank
14	UCO Bank	27	Kotak Mahindra Bank Ltd
15	Union Bank of India	28	ICICI Bank
16	United Bank of India	29	IndusInd Bank
17	Vijaya Bank	30	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 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.....dated .....[3] valued at Rs.....[4] (Rupees ----------)/FC.....(in words.....) for .....[5] (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 the .....bank further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Contract/satisfactory completion of the performance 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.

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

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

This Guarantee shall remain in force upto and including..... [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 the .....[8]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 to .....[7]
c) Unless the Bank is served a written claim or demand on or before _____[8] 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

Certificate by Chartered Accountant on letterhead

This is to certify that M/s _____ (hereinafter referred to as 'enterprise') having PAN Number _____and UDYAM Registration Number _____, registered office at _____ _____ is falling under the category _____ (**Micro / Small / Medium**) under MSMED Act 2006. (Copy of UDYAM Registration Certificate to be enclosed).

The said classification of _____ (**Micro / Small / Medium**) is arrived at based on the Notifications / guidelines / clarifications issued under Micro, Small and Medium Enterprises Development Act, 2006 including the notification S.O.2119 (E) dated 26th June 2020.

The Investment of the enterprise in Plant and Machinery or Equipment as at 31st March 2020 as per Clause 4 of the Notification is _____ (Rupees in Lakhs).

The turnover of the Enterprise for the period ending 31st March 2020 as per Clause 5 of the Notification is _____ (Rupees in Lakhs).

Date:

(Signature) Name-
Membership number-

Seal of Chartered Accountant with UDIN reference

Annexure-IX

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 Indian Penal Code (IPC) and Prevention of Corruption Act; further the Bidder(s)/ Contractor(s) will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.

2.1.4 Foreign Bidder(s)/ Contractor(s) shall disclose the name and address of agents and representatives in India and Indian Bidder(s)/ Contractor(s) to disclose their foreign principals or associates. The Bidder(s)/ Contractor(s) will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.

2.2 The Bidder(s)/ Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.

2.3 The Bidder(s)/ Contractor(s) shall not approach the Courts while representing the matters to IEMs and will await their decision in the matter.

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

If the Bidder(s)/ Contractor(s), before award or during execution has committed a transgression through a violation of Section 2 above, or acts in any other manner such as to put his reliability or credibility in question, the Principal is entitled to disqualify the Bidder(s)/ Contractor(s) from the tender process 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 Principal will enter into agreements with identical conditions as this one with all Bidders and Contractors. In case of sub-contracting, the Principal contractor shall be responsible for the adoption of IP by his sub-contractors and shall continue to remain responsible for any default by his sub-contractors.

6.2 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 /Subcontractors

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

Section 8 - Independent External Monitor(s)

8.1 The Principal appoints competent and credible 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 in line with Non- disclosure agreement.

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 The role of IEMs is advisory, would not be legally binding and it is restricted to resolving issues raised by an intending bidder regarding any aspect of the tender which allegedly restricts competition or bias towards some bidders. At the same time, it must be understood that IEMs are not consultants to the Management. Their role is independent in nature and the advice once tendered would not be subject to review at the request of the organization.

8.6 For ensuring the desired transparency and objectivity in dealing with the complaints arising out of any tendering process, the matter should be examined by the full panel of IEMs jointly as far as possible, who would look into the records, conduct an investigation, and submit their joint recommendations to the Management.

8.7 The IEMs would examine all complaints received by them and give their recommendations/ views to CMD, BHEL, at the earliest. They may also send their report directly to the CVO and the Commission, in case of suspicion of serious irregularities requiring legal/ administrative action. IEMs will tender their advice on the complaints within 10 days as far as possible.

8.8 The CMD, BHEL shall decide the compensation to be paid to the Monitor and its terms and conditions.

8.9 IEM should examine the process integrity, they are not expected to concern themselves with fixing of responsibility of officers. Complaints alleging mala fide on the part of any officer of the organization should be looked into by the CVO of the concerned organisation.

8.10 If the Monitor has reported to the CMD, BHEL, a substantiated suspicion of an offence under relevant Indian Penal Code/ Prevention of Corruption Act, and the CMD, BHEL has not, within reasonable time, taken visible action to proceed against such offence or reported it to the Vigilance Office, the Monitor may also transmit this information directly to the Central Vigilance Commissioner, Government of India.

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

8.12 The word `Monitor' would include both singular and plural.

Section 9 - Pact Duration

9.1 This Pact shall be operative from the date IP is signed by both the parties till the final completion of contract for successful bidder and for all other bidders 6 months after the contract has been awarded. Issues like warranty / guarantee etc. should be outside the purview of IEMs.

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

Section 10 - Other Provisions

10.1 This 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) _____

_____

Annexure-X

Restrictions under Rule 144(xi) of General Financial Rules, 2017 amendment dt: 23.07.2020

I. Any bidder from a country which shares a land border with India will be eligible to bid in this tender only if the bidder is registered with the Competent Authority.

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

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

a. An entity incorporated, established or registered in such a country; or

b. A subsidiary of an entity incorporated, established or registered in such a country; or

c. An entity substantially controlled through entities incorporated, established or registered in such a country; or

d. An entity whose *beneficial owner* is situated in such a country; or

e. An Indian (or other) agent of such an entity; or

f. A natural person who is a citizen of such a country; or

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

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

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

Explanation--

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

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

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

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

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

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

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

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 02

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.

a) '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.
b) '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.
c) '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.
d) '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:

a) words indicating one gender include all genders;
b) 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. BHEL reserves the right for conducting repeat test, if required.
   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 Phytosanitory/ 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.