

# **INDEX SHEET**

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# REQUEST FOR QUOTATION

	<b>BHARAT HEAVY ELECTRICALS LIMITED</b> Electronics Division PB No. 2606, Mysore Road Bangalore - 560026 INDIA	RFQ NUMBER: PKN0000187  RFQ DATE : 18.NOV.2015	<b>Due Date</b> <b>11.DEC.2015</b> <b>Time: 13:00 HRS</b>  VENUE : <b>NEW ENGG. BLDG</b>
MMI:PU:RF:003			

	(for all correspondence) Purchase Executive : P.K Nagaraj Phone : 2699 8179 Fax : 080 2698 9227 E-mail: nagarajpk@bheledn.co.in
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Please submit your lowest quotation subject to our terms and conditions attached for the material mentioned below. The quotation must be enclosed in a sealed envelope / Fax superscribed with RFQ no. and due date, should reach us on or before the due date by **13.00** hours IST and will be opened on the same day at **13.30** hours at the venue mentioned above. **PLEASE DROP THE OFFER IN THE BOX PROVIDED AT RECEPTION.**

SI No.	Description	Qty	Unit	Delivery qty	Delivery Date
1	PR0280000170 Conductivity Analyser	40	NO	10	22.FEB.2016
	Conductivity Analyser			10	22.FEB.2016
	Test Certificate			10	22.FEB.2016
2	PR0280000189 pH Analyser	32	NO	8	22.FEB.2016
	pH Analyser			8	22.FEB.2016
	Test Certificate			8	22.FEB.2016
				8	22.FEB.2016
3	PR0280000197 Dissolved Oxygen Analyser	12	NO	3	22.FEB.2016
	Dissolved Oxygen Analyser			3	22.FEB.2016
	Test Certificate			3	22.FEB.2016
				3	22.FEB.2016
4	PR0280000200 Silica Analyser	4	NO	1	22.FEB.2016
	Silica Analyser			1	22.FEB.2016
	Test Certificate			1	22.FEB.2016
				1	22.FEB.2016
5	PR0280000219 Sodium Analyser	16	NO	3	22.FEB.2016
	Sodium Analyser			1	22.FEB.2016
	Test Certificate			3	22.FEB.2016
				1	22.FEB.2016
				3	22.FEB.2016
				1	22.FEB.2016
				3	22.FEB.2016
				1	22.FEB.2016
6	PR0280000227 Hydrazine Analyser	4	NO	1	22.FEB.2016
	Hydrazine Analyser			1	22.FEB.2016
	Test Certificate			1	22.FEB.2016
				1	22.FEB.2016
7	PR0280000243 Conductivity analyser withdrawable type	8	NO	2	22.FEB.2016
	Conductivity analyser Withdrawable type			2	22.FEB.2016
	Test Certificate			2	22.FEB.2016
				2	22.FEB.2016
8	PR0280000251 Phosphate Analyser	4	NO	1	22.FEB.2016
	Phosphate Analyser			1	22.FEB.2016
	Test Certificate			1	22.FEB.2016
				1	22.FEB.2016
9	PR0280000260 SWAS Spares (Indigenou)	1	ST	1	22.FEB.2016
	SWAS Mandatory Spares indigenous sample handling system				
10	PR0280000278 SWAS Spares (analysers)	1	ST	1	22.FEB.2016
	SWAS Mandatory Spares for analysers				
	Test Certificate				

For and On behalf of BHEL.

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	<b>BHARAT HEAVY ELECTRICALS LIMITED</b> Electronics Division PB No. 2606, Mysore Road Bangalore - 560026 INDIA	RFQ NUMBER: PKN0000187  RFQ DATE : 18.NOV.2015	<b>Due Date</b> <b>11.DEC.2015</b> <b>Time: 13:00 HRS</b>  VENUE : <b>NEW ENGG. BLDG</b>
MMI:PU:RF:003			

**PURCHASE FILE COPY**

(for all correspondence)

Purchase Executive : P.K Nagaraj  
 Phone : 2699 8179  
 Fax : 080 2698 9227  
 E-mail: nagarajpk@bheledn.co.in

Please submit your lowest quotation subject to our terms and conditions attached for the material mentioned below. The quotation must be enclosed in a sealed envelope / Fax superscribed with RFQ no. and due date, should reach us on or before the due date by **13.00** hours IST and will be opened on the same day at **13.30** hours at the venue mentioned above. **PLEASE DROP THE OFFER IN THE BOX PROVIDED AT RECEPTION.**

SI No.	Description	Qty	Unit	Delivery qty	Delivery Date
11	PR0280000286 SWAS Primary Rack	8	ST	2	22.FEB.2016
	SWAS Primary Rack			2	22.FEB.2016
	Test Certificate			2	22.FEB.2016
				2	22.FEB.2016
12	PR0280000294 SWAS Loose supply Items	4	ST	1	22.FEB.2016
	SWAS Loose supply Items			1	22.FEB.2016
	Test Certificate			1	22.FEB.2016
				1	22.FEB.2016
13	PR0280000308 SWAS Commissioning Spares	4	ST	1	22.FEB.2016
	SWAS Commissioning Spares			1	22.FEB.2016
	Test Certificate			1	22.FEB.2016
				1	22.FEB.2016
14	PR0280000316 SWAS O&M Manuals	4	NO	1	22.FEB.2016
	SWAS O&M Manuals			1	22.FEB.2016
	Test Certificate			1	22.FEB.2016
				1	22.FEB.2016
				1	22.FEB.2016
15	PR0280000324 SWAS Supervision Erection Commissioning	4	ST	1	22.FEB.2016
	SWAS Supervision of Erection & Commissioning			1	22.FEB.2016
	Test Certificate			1	22.FEB.2016
				1	22.FEB.2016
16	PR0280000332 SWAS Sample handling system wet panel	4	ST	1	22.FEB.2016
	SWAS Sample handling system wet panel			1	22.FEB.2016
	Test Certificate			1	22.FEB.2016
				1	22.FEB.2016
17	PR0280000340 SWAS Sample handling system dry panel	4	ST	1	22.FEB.2016
	SWAS Sample handling system dry panel			1	22.FEB.2016
	Test Certificate			1	22.FEB.2016
				1	22.FEB.2016
18	PR0280000359 Chiller 100% Redundant	4	ST	1	22.FEB.2016
	Chiller 100% Redundant			1	22.FEB.2016
	Test Certificate			1	22.FEB.2016
				1	22.FEB.2016
19	PR0900004690 Consumables for SWAS	4	ST	1	29.FEB.2016
	Consumables/ Items with limited shelf Life			1	29.FEB.2016
	for use in Steam & Water Analysis System			1	29.FEB.2016
				1	29.FEB.2016

**Total Number of Items - 19**


Please note that the tender will be opened in the presence of the bidders or his authorised representatives (maximum two per organisation) who choose to be present with authorisation letters. Refer annexure for the terms and conditions.

Preference will be given to vendors who accepts our standard payment terms.

For and On behalf of BHEL.

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# REQUEST FOR QUOTATION

	<b>BHARAT HEAVY ELECTRICALS LIMITED</b> Electronics Division PB No. 2606, Mysore Road Bangalore - 560026 INDIA	RFQ NUMBER: PKN0000187  RFQ DATE : 18.NOV.2015	<b>Due Date</b> <b>11.DEC.2015</b> <b>Time: 13:00 HRS</b>  VENUE : <b>NEW ENGG. BLDG</b>
MMI:PU:RF:003	<b>PURCHASE FILE COPY</b>	(for all correspondence) Purchase Executive : P.K Nagaraj Phone : 2699 8179 Fax : 080 2698 9227 E-mail: nagarajpk@bheledn.co.in	
Please submit your lowest quotation subject to our terms and conditions attached for the material mentioned below. The quotation must be enclosed in a sealed envelope / Fax superscribed with RFQ no.and due date, should reach us on or before the due date by <b>13 .00</b> hours IST and will be opened on the same day at <b>13 .30</b> hours at the venue mentioned above. <b>PLEASE DROP THE OFFER IN THE BOX PROVIDED AT RECEPTION.</b>			
Please specify Terms of delivery, Excise duty, sales tax, Ex-BHEL, Ex-works surcharge, Insurance,P&F, Freight and other taxes very clearly . For evaluation,exchange rate(TT selling rate of SBI) as on scheduled date of tender opening (Part-I bid incase of two part bid) shall be considered. The offers of the bidders who are on the banned list as also the offer of the bidders, who engage the services of the banned firms, shall be rejected.The list of banned firms is available on BHEL web site <a href="http://www.bhel.com">www.bhel.com</a>			
i). This is only RFQ not an order. ii). In all correspondence quote RFQ No. & due date. iii). In Quotation BHEL material code / RFQ Sl. No. should be mentioned clearly. iv). Quotation Envelope / Fax not superscribed with RFQ No.and due date is liable for rejection. v). Quotation should remain valid for a minimum peiod of 120 days from date of TBO. vi). In case of non-receipt of Quotation or regret letter for 3 consecutive RFQs you are liable to be removed from our vendors list. vii). All Prices should be written in words and numbers. viii). Excise Chapter Heading should be mentioned for all items where VAT is applicable .			
Vendors list to DEDEwhom RFQ has been sent: 1. FORBES MARSHALL PVT. LTD. (X415374) - 6400056983			

For and On behalf of BHEL.



ಭಾರತ್ ಹವಿ 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: 003- Rev 00

**SPECIAL COMMERCIAL CONDITIONS OF CONTRACT**

Reference is brought to BHEL's Instructions to Bidders (Document Ref: CE: PR: 001- Rev 00) and General Commercial Conditions for Contract (Document Ref: CE: PR: 002- Rev 00). These documents along with required annexures are available in our website: \_\_\_\_\_ . 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: PKN0000187

RFQ Date: 18.11.2015

Due Date: 11.12.2015

Project: BHADRADRI TPS (4X270 MW)

Item Description: SWAS

**Purchase Executives:** In cases where tender documents are bulky, or due to some reasons tender documents are required to be submitted by hand, the offers are to be handed over to either of the following Purchase Officers:

**NAGARAJ P K/Sr.Engineer/CE-MM-PR or Ponnuguru Packiam G/Sr.DGM/CE-MM-PR**

**E-mail IDs:** In case offers are sent through E-mail, please send the offers to both of the following email IDs:

nagarajpk@bheledn.co.in & ponnuguru@bheledn.co.in

**E-tendering:** **Applicable** ( Please refer for details)

Type of Bid: Three part Bid system (Please refer ITB for details)

**Reverse Auction:** Will be intimated during commercial clarifications to technically acceptable vendors.

In case BHEL does not resort to Reverse Auction, the price bids and price impacts (if any) shall be opened as per BHEL's standard practice.

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

**Destination:** Items are to be directly despatched to BHEL's Site Office or Stores/Customer's Stores located at/near BHADRADRI TPS, TELAGANA State. Road Permit, if applicable, will be issued by BHEL along with Despatch Clearance. For import port of Discharge will be Chennai seaport and port of delivery shall be ICD, Bangalore.

**Project Benefits: Reimbursements is not applicable for this project.**

• **Indigenous scope of supply: For Indigenous portion:**

- Project is Mega Power Project or Ultra Mega Power Project: Eligible for "NIL" Excise Duty. Necessary documents for availing Excise Duty exemption by suppliers will be furnished by BHEL.
- Physical Export project: Eligible for complete exemption of Excise Duty & Sales Tax. Necessary documents for availing such benefits will be furnished by BHEL to suppliers.
- Nuclear Power Project under a special category: Eligible for claiming Terminal Excise Duty benefit from DGFT as per present EXIM policy. Confirm submission of following in original:
  - Disclaimer Certificate (Annexure -XI)
  - Copy of Excise Invoice attested by Suptd of Central Excise authorities with signature and seal, in blue ink, to enable BHEL to claim terminal Excise duty benefit from DGFT.

• **Imported scope of supply:**

- Project is Mega Power Project or Ultra Mega Power Project: Eligible for "NIL" Customs Duty.
- Physical Export project: Eligible for complete exemption of Customs Duty.

**Terms of Delivery:**

Indicate station of despatch: \_\_\_\_\_

Indicate place of manufacturing (wherever applicable): \_\_\_\_\_

- **Indigenous scope of supply:** Ex-works (including Packing & Forwarding charges but excluding Taxes & Duties): \_\_\_\_\_
- **Imported scope of supply:** C.I.P/Bangalore Airport. (for air consignments) /C.I.F. (for sea consignments) (Including Packing, Forwarding, Handling, Ancillary charges like processing of Sight Draft/ Letter of Credit, negotiation of bank Documents, Export declaration, Country of Origin etc): \_\_\_\_\_

S NO.	TERMS	BHEL ACCEPTABLE TERM	BIDDER'S CONFIRMATION	DEVIATION IF ANY
01	<b>Validity</b>	The offer will be valid for a period of <b>120</b> days from the date of technical bid opening.	<b>AGREE</b>	
02	<b>Excise Duty &amp; Cess</b>	<p>If applicable, indicate current rate of Excise Duty and maximum rate of Excise Duty (against proof of Excise Invoice).</p> <p>However, for calculation purpose and arriving at "Total Cost to BHEL" maximum rate of Excise Duty will be considered. In case Excise Duty remains firm throughout the contract, the same shall be specifically indicated. Otherwise, maximum Excise Duty will be considered for arriving at lowest bidder.</p> <p>However, reimbursement of Excise Duty shall be at actuals against proof of Excise Invoice only. (Within contractual delivery).</p> <p><del>Physical export contract eligible for complete exemption of Excise duty against submission of necessary documents by BHEL like ARE 1/CT 1 form.</del></p>	<p><b>APPLICABLE / NOT APPLICABLE</b></p> <p>Present rate of Excise Duty with CESS .....%</p> <p>Maximum rate of Excise Duty with CESS .....%</p>	
03	<b>Central Sales Tax (CST)</b>	<p>If applicable, indicate current rate of sales tax against form "C".</p> <p>For issue of original form "C", vendor has to furnish "E1/E2" form. To enable vendor give E1/E2 form, photocopy of C form will be issued by BHEL.</p> <p>Please confirm submission of "E1/E2 Sale form".</p> <p><del>For physical export project, Sales Tax is exempted against necessary documents furnished by BHEL.</del></p>	<p><b>APPLICABLE / NOT APPLICABLE</b></p> <p>Present Sales Tax rate against form "C" ..... %</p> <p><b>CONFIRMED</b></p>	
04	<b>Value Added Tax (VAT)</b>	<p>If applicable, indicate current rate of VAT.</p> <p>When VAT is applicable, BHEL ROD's/ Nodal Agency's Name, TIN No. and address to be indicated in invoice. (Note that two original invoice and one tax invoice should be submitted to BHEL).</p>	<p><b>APPLICABLE / NOT APPLICABLE</b></p> <p>VAT rate at present ..... %</p> <p><b>NOTED</b></p>	
05	<b>Octroi</b>	If applicable, indicate current rate of octroi.	<p><b>AGREE</b></p> <p>Present Octroi rate .....%</p>	
06	<b>Freight Charges (for indigenous scope of supply)</b>	<p>Freight charges shall be to vendor's account.</p> <p>Quote lump sum reasonable Freight charges separately in priced offer, plus service tax if any.</p> <p>Vendor's offer will be evaluated on "Total cost basis" including freight charges.</p> <p>Vendor shall book the consignment through their approved Road carriers on "Freight pre-paid" and door delivery consignee copy attached basis. Freight charges to be claimed from BHEL along with POD (Proof of Delivery) on original L/R.</p>	<p><b>AGREED</b></p> <p>and quoted as lump sum amount in price bid.</p> <p>Service Tax ____% (extra /inclusive in freight charges)</p>	
07	<b>Service Tax on E&amp;C and Training Charges</b>	<p>If applicable, indicate current rate of Service Tax ____% .</p> <p>Service Tax Regn. No. _____</p> <p>Confirmation that Service Tax register is maintained.</p>	<p><b>APPLICABLE / NOT APPLICABLE</b></p> <p><b>CONFIRMED</b></p>	

08	<del>Parting of license for imported raw materials</del>	<p>In case of Mega project, Ultra Mega project and Physical Export project where Custom Duty and Excise Duty are NIL and vendor is importing any raw materials / components for the enquired item, same are eligible for Zero Customs duty. As per EXIM policy, BHEL will part the import licence with the vendors to obtain import licence by themselves and custom clear the raw materials/ components by availing zero customs duty. Hence, please furnish list of raw materials / components to be imported by you with Quantity and CIF value (for which BHEL has to share import licence). The benefit due to the above shall be passed on to BHEL and confirmed in the quotation.</p> <p>If there are no imported raw materials/components, same shall be confirmed in the offer.</p>	<p><b>AGREE</b></p> <p>—CIF value .....</p> <p><b>Yes, benefit passed on to BHEL in the priced quotation.</b></p> <p><b>We confirm that there are no imported components.</b></p>	
09	<b>Delivery Period</b>	Within 12 weeks from the date of issue of approved documents or manufacturing clearance by BHEL, whichever is later.	<p><b>AGREE</b></p> <p>..... weeks</p>	
10	<b>Guarantee/ Warranty</b>	36 months from the date of delivery of goods or 30 months from the date of commissioning of goods, whichever is earlier.	<b>AGREE</b>	
11	<b>Inspection agency</b>	<p>Materials will be inspected by :</p> <ul style="list-style-type: none"> <li>• BHEL</li> <li>• Customer/Consultant/BHEL nominated Third Party Inspection Agency (TPIA)</li> </ul>	<b>AGREE</b>	
12	<b>Terms of Payment at the time of material supply</b>	<p>Refer Clause "F" of Instructions to Bidder for BHEL standard Payment terms and loading factors applicable for non-compliance against payment terms:</p> <p><b>Indigenous Scope:</b>  a) <del>Supply with E&amp;C</del>  <b>b) Supply with Supervision of E&amp;C</b>  c) <del>Supply only</del>  <b>Imported Scope:</b>  d) <del>Supply with E&amp;C</del>  <b>e) Supply with Supervision of E&amp;C</b>  f) <del>Supply only</del></p> <p>Note: Kindly indicate if High Sea Sales will be operated. If yes, confirm submission of relevant documents as per Annexure V.</p>	<p><b>AGREE</b></p> <p><b>YES / NO</b></p> <p><b>CONFIRMED</b></p>	
13	<b>Performance Bank Guarantee (PBG)</b>	<p>PBG will be applicable for a period of 36 months + claim period of 6 months for a value equal to 10% of the basic value of the purchase order.</p> <p>Refer Clause "G" of Instructions to Bidders.</p>	<b>AGREE</b>	
14	<b>Terms of Payment not related to material supply</b>	<p><del><b>For Training:</b> 100% will be paid in 45 days from the date of completion of Training or 15 days from the date of submission of complete set of documentation, whichever is later. Separate invoice shall be submitted for Training charges along with documentary evidence.</del></p> <p><del><b>For Engineering &amp; Documentation Charges:</b> 100% will be paid in 45 days from the date of approval of final documents or 15 days from the date of submission of invoice, whichever is later. Separate invoice to be submitted for Engineering &amp; documentation charges.</del></p>	<b>AGREE</b>	
15	<b>Mode of despatch</b>	<p><b>Indigenous Scope:</b> By Road on Door Delivery Consignee Copy attached basis through your approved transporter (unless otherwise indicated in Despatch Instructions), only on receipt of Despatch Clearance from BHEL.</p> <p><b>Imported Scope:</b> By air through supplier approved Consolidator/Freight Forwarder, only on receipt of Despatch Clearance from BHEL.</p>	<b>AGREE</b>	

16	<b>Despatch Documents</b>	<p>Complete set of despatch documents (original + 1 photocopy set) as per Purchase Order shall be forwarded to BHEL directly.</p> <p>Depending upon the project/customer demands, despatch documents may include one or more documents from the following: Commercial Invoice, Excise Invoice (if ED is applicable), Lorry Receipt (L/R), Packing List, Air Way Bill (AWB), Country of origin certificate, Warranty Certificate, Insurance Intimation letter, NIL Short Shipment Certificate, Original Performance Bank Guarantee (directly from issuing bank to BHEL), POD (Proof of Delivery) on original L/R, Disclaimer Certificate (as per BHEL format attached as Annexure XI) along with ER-1 form &amp; attested excise invoice (as per project demands like Nuclear Power plant) etc.</p> <p><b>The precise list of despatch documents needed for a particular project will be specified in the Purchase Order.</b></p> <p>One set of Invoice, Packing List and L/R or AWB shall be e-mailed/faxed immediately to BHEL-EDN after despatch.</p>	<b>AGREE</b>	
17	<b>O &amp; M Manuals</b>	<p>As built Drawings, O &amp; M Manuals and other approved documents shall be furnished in required no. of sets as per Specification/Purchase Order.</p> <p>Note: Supply of above documents (O&amp;M) in required no. of sets along with material shall be indicated in packing list. If not mentioned BHEL may insist for submission in required sets once again.</p>	<b>AGREE</b>	
18	<b>Quantity Tolerance</b>	<p>If applicable, indicate Quantity tolerance for each of the line item.</p> <p><del>For impulse/seamless/ GI pipes one random length applicable for each variety of pipes.</del></p>	<b>CONFIRMED</b>	Quantity Tolerance ..... % Per Variety
19	<b>Evaluation criteria for tendered item (Please refer below clause 'B')</b>	<p>Item wise evaluation of tendered item i.e. entire Analyser requirement will be one package &amp; SHS will be another package.</p> <p>_____OR</p> <p>Items will not be split on item wise lowest offer. Items to be evaluated and procured as a package.</p>	<b>AGREE</b>	
20	<b>Integrity Commitment</b>	Integrity commitment will be applicable in the tender process and execution of contracts as mentioned in clause "I" of Instructions to Bidders.	<b>AGREE</b>	

*With this, it is inferred that vendor has understood and accepts all terms & conditions as indicated in Instructions to Bidders (Document Ref: CE: PR: 001- Rev 00) & General Commercial Conditions for Contract (Document Ref: CE: PR: 002- Rev 00).*

**VENDOR'S SIGNATURE WITH SEAL**

**NOTE: The above filled-in and signed-sealed document (in original) shall be furnished as part of Part-I Bid without fail. If no deviations are brought, it will be treated as if all terms and conditions of this enquiry are accepted by vendor without any deviation.**

**A. \*.Delivery shall be as mentioned below.**

**For Imported portion:** Within 12(Twelve) weeks from the date of issue of approved documents or manufacturing clearance by BHEL, whichever is later. 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. Supplier is supposed to arrange AWB within one weeks of dispatch clearance.

**For Indigenous Portion:** Within 12(Twelve) weeks from the date of issue of approved documents or manufacturing clearance by BHEL, whichever is later.

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. Supplier is supposed to arrange LR within one weeks of dispatch clearance.

**B. Evaluation criteria for tendered item:**

This project is having Customer approved vendors. If the quoted vendor, is not approved by ultimate Customer, such bidder will be referred to customer with credentials for their approval. Efforts will be made with Customer to get the approval. In case the customer does not approve a bidder for a project, then such bidder's offer will not be considered for opening of price bid.

Offers of customer approved vendor only will be evaluated and will be processed further. Priced offers of vendors, not approved by customer will not be opened.

## 1. Registration of Suppliers and Flow.

**Unregistered Supplier:** Supplier visits EPS at <https://bheleps.buyjunction.in>

- a. Supplier visits EPS at <https://bheleps.buyjunction.in>
- b. Clicks "REGISTER" for registration
- c. Fills up the Registration Page form
- d. MJ will ensure Authentication of Registration <sup>1</sup>
- e. Supplier logs in with the ID and password
- f. Supplier Maps the signing Certificate
- g. MJ will ensure the authentication the signing certificate <sup>1</sup>.
- h. Supplier Logs in to the system again and views the RFQ
- i. Supplier Attaches himself to the RFQ by clicking the Interested button
- j. Supplier fills the bid template and makes necessary attachments
- k. Supplier submits his bid by clicking CONFIRM.

NB:-

<sup>1</sup> -- BHEL Administrator or user will have no role for approving Registration and Open Tenders and DSC for Any supplier who has registered himself from the front END which is in case of OT.

- **For registered Supplier:**
  - Supplier visits EPS home page
  - Supplier signs in with his/her user id and password
  - Selects the RFQ Code and views it.
  - Attaches himself to the RFQ by clicking the Interested button
  - Supplier fills the bid template and makes necessary attachments
  - Supplier submits his bid by clicking CONFIRM.

2. Open Tender Process For all units with data transfer Mechanism – Template based Bid submission mechanism

• BID SUBMISSION

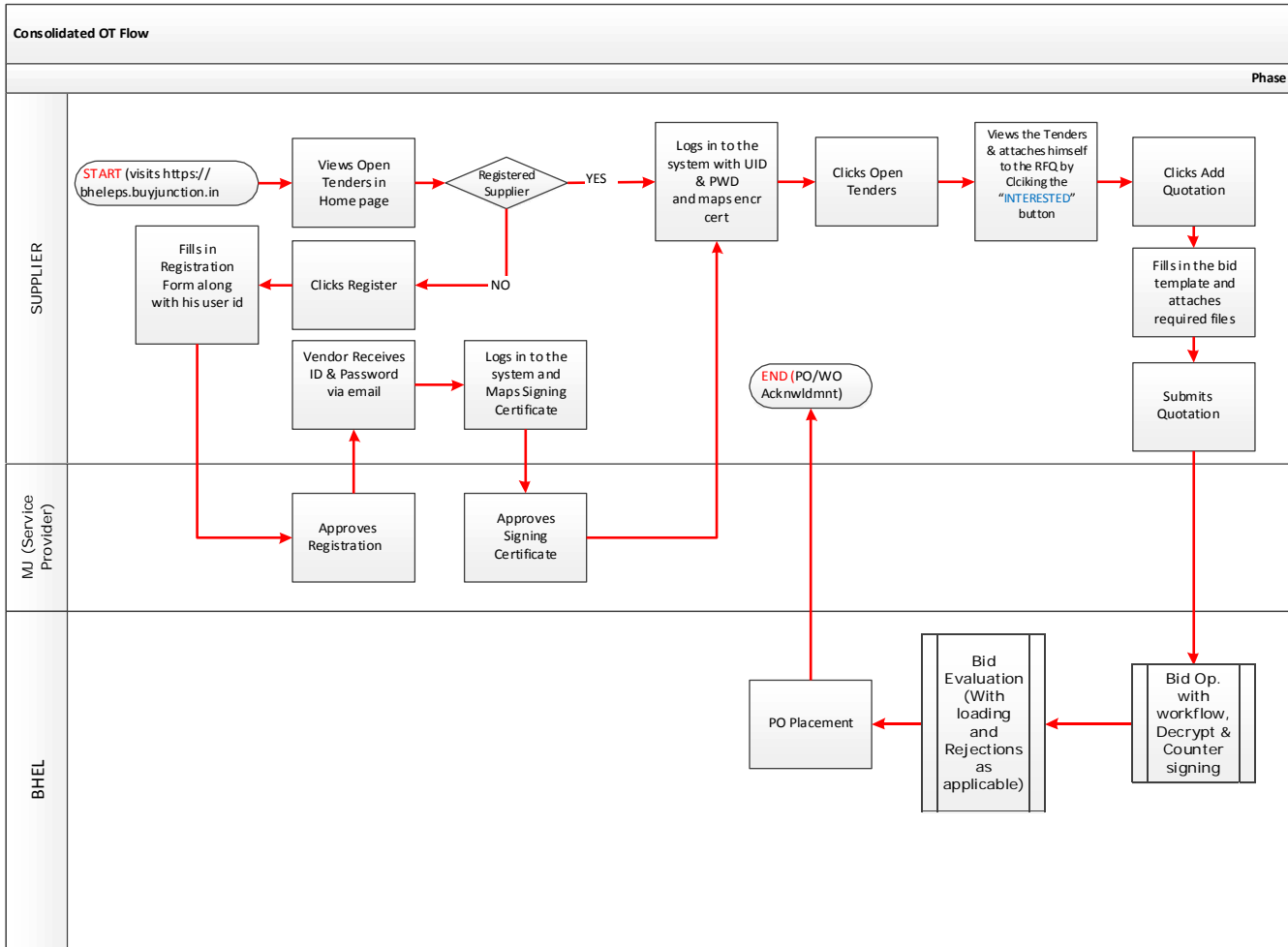
Supplier Login - Select RFQ & view it - Show INTEREST to participate - Respond to RFQ - Add Quotation – Upload proof of TENDER FEE & EMD with the valid document proof (as attachment) – Uploads Pre-qualification docs, Fills Techno-commercial & Price template – Submits Quotation.

NB:

<sup>2</sup> - ADD Intimation is mechanism by which RFQ owner adds Supplier/Contractor i.e known sources' email ids for intimation that an OT has been Issued. This is for information sake only. This does not mean that unintimated supplier cannot participate in OTs. Intimations can be issued by RFQ owner only, both during Tender publication in draft mode and after tender publication till the tender is still live and is viewable by RFQ owner and Approvers only in View Intimation list link in RFQ. This is not to be printed in any report, including chronological report

EPS will only trigger intimation email to all the email ids in the Intimation list.

3. Consolidated Flow Diagram of OT process





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 00

**GENERAL COMMERCIAL CONDITIONS FOR CONTRACT**

These 'General Commercial Conditions for Contract for Purchase' hereinafter 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.

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 unless otherwise such variations / escalations are provided for and agreed by BHEL in writing in the purchase order.
2. **Validity:** The offer will be valid for a period of 120 days from the date of technical bid opening date. Validity beyond 120 days, if required, will be specified in the SCC (special conditions of contract).
3. **Ordering and confirmation of Order:** Vendor shall send the order acceptance on their company letter head within two weeks from the date 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 two weeks (or the time limit as specified / agreed by BHEL) from the date of the purchase order.
4. **Documentation:** After receipt of Purchase Order, vendor should submit required documents like 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.  
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.
5. **Penalty:**  
**For delay in documentation:** In the event of delay in submission of complete set of 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 three weeks (or as agreed/indicated in the Purchase Order) from the date of Purchase Order, 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.  
  
**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 document approval by customer / BHEL or date of issue of manufacturing clearance, whichever is later. 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 documentation/delayed delivery, if applicable, shall be deducted at the time of first 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.
6. **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 applied to 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.

7. **Reverse Auction:** BHEL reserves the right to follow REVERSE AUCTION PROCEDURE (ONLINE BIDDING ON NETWORK) before finalising the Purchase order on technically competent bidders, as per the guidelines given in Annexure III. In case BHEL does not resort to Reverse Auction, the price bids and price impacts (if any) already submitted and available with BHEL shall be opened as per BHEL's standard practice.
8. **Inspection:** Prior written notice of at least 10 days shall be given along with internal test certificates / COC and applicable test certificates. Materials will be inspected by BHEL-EDN-QS/CQS or BHEL nominated Third Party Inspection Agency (TPIA) or BHEL authorized Inspection Agency or Customer / Consultant or jointly by BHEL & Customer / consultant. All tests have to be conducted as applicable in line with approved Quality plan or QA Checklist or Purchase specification and original reports shall be furnished to BHEL-EDN, Bangalore for verification / acceptance for issue of dispatch clearance.  
All costs related to inspections & re-inspections shall be borne by vendor. Whether the Contract provides for tests on the premises of the vendor or any of his Sub-contractor/s, vendor shall be responsible to provide such assistance, labour, materials, electricity, fuels, stores, apparatus, instruments as may be required and as may be reasonably demanded to carry out such tests efficiently. Cost of any type test or such other special tests shall be borne by BHEL only if specifically agreed to in the purchase order.
9. **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.
10. **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.
11. **Packaging and dispatch:** The Seller shall package the goods safely and carefully and pack them suitably in all respects considering the peculiarity of the material for normal safe transport by Sea / Air / Rail / Road to its destination suitably protected against loss, damage, corrosion in transit and the effect of tropical salt laden atmosphere. The packages shall be provided with fixtures / hooks and sling marks as may be required for easy and safe handling. If any consignment needs special handling instruction, the same shall be clearly marked with standard symbols / instructions. Hazardous material should be notified as such and their packing, transportation and other protection must conform to relevant regulations.  
The packing, shipping, storage and processing of the goods must comply with the prevailing legislation and regulations concerning safety, the environment and working conditions. Any Imported/Physical Exports items packed with raw / solid wood packing material should be treated as per ISPM – 15 (fumigation) and accompanied by Phytosanitary / Fumigation certificate. If safety information sheets (MSDS – Material Safety Data Sheet) exist for an item or the packaging, vendor must provide this information without fail along with the consignment.  
Each package must be marked with Consignee name, Purchase order number, Package number, Gross weight and net weight, dimensions (L x B x H) 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.  
Separate packing & identification of items should be as follows.
  1. Main Scope - All items must be tagged with part no. & item description.
  2. Commissioning spares - All items must be tagged with part no. & item description.
  3. Mandatory spares - All items must be tagged with part no. & item description.

12. 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.
13. 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.
14. 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 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.
15. 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.
16. 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.
17. Shortages: In the event of shortage on receipt of goods and/or on opening of packages at site, all such shortages shall be made good within a reasonable time that BHEL may allow from such intimation and free of cost. In case BHEL raises an insurance claim, the cost of material limited to insurance settled amount less handling charges will have to be reimbursed by the Supplier.  
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.
18. 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.
19. 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.

20. Product Information, Drawings and Documents: 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.

21. 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.

22. 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.

23. Guarantee / Warranty: Wherever required, and so provided in the specifications / Purchaser Order, the Seller shall guarantee that the stores supplied shall comply with the specifications laid down, for materials, workmanship and performance. Unless otherwise specified, guarantee / warranty period shall be 30 months after the date of delivery of goods or 24 months from the date of commissioning of goods whichever is earlier. The guarantee / 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 guarantee / warranty period.
24. 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.

25. Liability during guarantee / warranty: Vendor shall arrange replacement / repair of all the defective materials / services under its obligation under the guarantee / 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 first time commissioning or use, vendor shall be responsible for replacement / repair of the goods as required by BHEL at vendor's cost. In all such cases expiry of guarantee / warranty will not be applicable.
26. Liability after guarantee / warranty period: At the end of the guarantee / warranty, the Vendor's liability ceases except for latent defects (latent defects are defects / performance issues notices after the guarantee / warranty has expired). The Contractor's liability for latent defects warranty for the plant and equipment including spares shall be limited to a period of six months from the end of the guarantee / warranty period of the respective plant and equipment including spares or first time commissioning whichever is later but not later than 3 (three) years from the date of shipment.
27. 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.
28. 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).
29. Arbitration Clause: In case amicable settlement is not reached in the event of any dispute or difference arising out of the execution of the Contract or the respective rights and liabilities of the parties or in relation to interpretation of any provision in any manner touching upon the Contract, such dispute or difference shall (except as to any matters, the decision of which is specifically provided for therein) be referred by either party to the sole arbitration of an Arbitrator appointed by the Executive Director/ General Manager of the purchasing unit/ region/ division of BHEL. Vendor shall have no objection even if the Arbitrator so appointed is an employee of BHEL or has ever dealt/ had to deal with any matter relating to this Contract.  
Subject as aforesaid the provisions of the Arbitration and Conciliation Act, 1996 of India or any statutory modification or re-enactment thereof and the rules made there under and for the time being in force shall apply to the arbitration proceedings under this clause. It is a term of contract that the party initiating arbitration shall specify the dispute or disputes to be referred to arbitration under this clause together with the amount or amounts claimed in respect of each such dispute. The venue for the arbitration shall be Bangalore, India. The award of the arbitrator shall be a speaking award and shall be final, conclusive and binding on all parties to this contract.  
The cost of arbitration shall be borne equally by the parties. Notwithstanding the existence of any dispute or difference or any reference for the arbitration, the vendor shall proceed with and continue without hindrance the performance of the work under the contract with due diligence and expedition in a professional manner.
30. 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.

31. 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.



ಭಾರತ್ ಹವಿ 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: 001- Rev 00

## **INSTRUCTIONS TO BIDDERS (Common for all RFQs)**

**Bidder is requested to read the instructions carefully and submit their quotation covering 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 00), General Conditions of Contract (document reference: CE: PR: 002 - Rev 00) 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. Bidders (also includes the term suppliers / contractors wherever used in this document) are instructed to quote their most competitive price and best delivery, etc. in the offer. Prices should be indicated in both figures & words. **(Please also refer clause 11 under section B)**
4. Regret letter (either through post or by mail) indicating reasons for not quoting must be submitted without fail, in case of non-participation in this tender. If a bidder fails to respond against 3 consecutive tenders for the same item, he will be liable for removal as a registered vendor of BHEL.
5. Procurement directly from the manufacturers shall be 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. In case bids are received from the manufacturer / supplier and his agent, bid received from the agent shall be ignored.
6. 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.
7. If an Indian representative / associate / liaison office quotes on behalf of a foreign based bidder, such representative shall furnish compulsorily 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 system is commissioned and handed over to customer will be the sole responsibility of the Indian representative / associates / agent / liaison office.
  - d. Refer **Annexure X** on “Guidelines for Indian Agents”.
8. 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 recovered from the supplier's bill. All offers for imported scope of supply must be made from any of the gateway ports (within the country) indicated. **(Refer Annexure I)**

9. 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: **www.bhel.com**
10. 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.

#### **B. GUIDELINES FOR PREPARATION OF OFFER:**

1. Quotation shall be submitted in Single Part Bid, Two Part Bid or Three Part Bid, as called for in the tender:
  - **SINGLE PART BID:** Technical and Commercial Bid with prices along with price summary & filled in BHEL Standard Commercial terms and conditions in a single sealed envelope.
  - **TWO PART BID:** Unpriced offer i.e. "Techno-commercial Bid" with filled in BHEL Standard Commercial terms and conditions in a sealed envelope **along with the copy of the "Price Bid" without the prices** should be enclosed in one cover and the cover must be super scribed "**Techno-commercial offer**" and Priced offer i.e. "Price Bid" containing price summary in a separate sealed envelope and must be super scribed "**Price Bid**". Both these envelopes shall be enclosed in a single sealed envelope super scribed 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 super scribed 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 super scribe 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. Xerox copy will not be accepted.
4. 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.
5. 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.
6. 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.
7. "Price Bid" shall be complete in all respects containing price break-up of all components along with all

applicable taxes and duties, packing & forwarding charges (if applicable), 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.

8. In addition, bidder shall also quote for erection & commissioning charges (E&C charges), documentation charges, service charges, testing Charges (type & routine), training charges, service tax, etc. wherever applicable. The price summary must indicate all the elements clearly.
9. Vendors should indicate "lump sum" charges (including To & Fro Fare, Boarding, Lodging, Local Conveyance etc.) for Supervision of Erection, Commissioning and handing over to customer. The quotation shall clearly indicate scope of work, likely duration of commissioning, pre-commissioning checklist and service tax (if any).
10. Wherever bidders require PAC (Project Authority Certificate) for import of raw materials, components required for Mega 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.
11. All quotations shall be free from corrections /overwriting. Corrections if any should be authenticated with signature and seal. Any typographical error, totaling mistakes, currency mistake, multiplication mistake, summing mistakes etc. observed in the price bids will be evaluated as per **Annexure II** "Guidelines for dealing with Discrepancy in Words & Figures – quoted in price bid". BHEL decision will be final.

### **C. GUIDELINES FOR OFFER SUBMISSION:**

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. **(This clause will not be applicable for e-tenders)**
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 of the tender. (Refer to SCC document of tender)
3. 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 officers whose names are mentioned in the RFQ. (Refer to SCC document of tender)
4. 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. In case of e-procurement, bidders can see tender results till seven days after due date and time.
5. Vendor 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.
  - e. In case of e-tender, all required documents should be uploaded before due date and time. Availability of power, internet connections, etc. will be the sole responsibility of the vendor. Wherever assistance is

needed for submission of e-tenders, help line numbers and executives of service provider of BHEL may be contacted.

Service provider: M-junction

Website address: <https://bheleps.buyjunction.in/>

Helpline no.: 033-66106426/6217/6013/6046/6176 (9:30 am to 5:30 pm)

9163348283/9163348284/9163348285/9163348286/8584008116 (5:30 pm to 8:30 pm)

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

#### **D. PROCESSING OFFERS RECEIVED:**

1. Any discount / revised offer submitted by the supplier on its own shall be accepted provided it is received on or before the due date and time of offer submission (i.e. Part-I bid). The discount shall be applied on pro-rata basis to all items unless specified otherwise by the bidder.
2. Changes in offers or Revised offers given after Part-I bid opening shall not be considered as a part of the original offer unless such changes / revisions are requested by BHEL.
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 vendors, all techno-commercially acceptable bidders shall be asked by BHEL (after freezing the scope, technical specifications and commercial terms & conditions) to submit the impact of such changes on their price bid. Impact price will be applicable only for changes in technical specification / commercial conditions by BHEL. The impact price must be submitted on or before the cut-off date specified by BHEL and the original price bid and the price impact bid will be opened together at the time of price bid opening.
5. BHEL EDN reserves the right to adopt Reverse Auction or standard Price Bid Opening procedure for price evaluation, at its discretion. This will be decided after completion of technical evaluation of tender. **(Refer Annexure III for Guidelines for Reverse Auction).**
6. Un-opened bids (including price bids) will be returned to the respective bidders after release of PO and receipt of order acknowledgement from the successful bidder.
7. After receipt of Purchase Order, supplier should submit required documents like drawings, bill of materials, datasheets, catalogues, quality plan, test procedure, type test report , O & M Manuals and / or any other relevant documents as per Specification / Purchase Order, as and when required by BHEL / Customer.
8. Any deviation to the terms and conditions not mentioned in the quotation by supplier in response to this enquiry will not be considered, if put forth subsequently or after issue of Purchase Order, unless clarification is sought for by BHEL EDN and agreed upon in the Purchase Order.
9. Evaluation shall be on the basis of delivered cost (i.e. "Total Cost to BHEL").  
 "Total Cost to BHEL" shall include total basic cost, packing & forwarding charges, taxes and duties, freight charges, insurance, service tax for services, any other cost indicated by vendor 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 Mega Projects, Physical Imports or such 100% exemptions (statutory benefits), customer reimbursements of statutory duties (like Excise Duty, CST, VAT) will also be taken into account at the time of tender evaluation. (wherever applicable and as indicated in SCC document of tender)

10. For evaluation of offers in foreign currency, the exchange rate (TT selling rate of SBI) shall be taken as under:
- |                      |                            |
|----------------------|----------------------------|
| Single part bids:    | Date of tender opening     |
| Two/three part bids: | Date of Part-I bid opening |
| Reverse Auction:     | Date of Part-I bid opening |
- In case of Performance Bank Guarantee (PBG) also, exchange rate will be considered as mentioned above for converting foreign currency to Indian currency and vice versa.
- If the relevant day happens to be a bank holiday, then the exchange rate as on the previous working day of the bank (SBI) shall be taken.
11. Ranking (L-1, L-2 etc.) shall be done only for the techno-commercially acceptable offers.

#### **E. INFORMATION ON PAYMENT TERMS:**

- 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)
- 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 suppliers account only. Such recovery will be made out of any of the available bills. (**Refer Annexure V**).
- Statutory deductions, if any, will be made and the deduction certificate shall be issued. In case vendor does not provide PAN details, the TDS deduction shall be at the maximum percentage stipulated as per the provisions of Income Tax Act. (Applicable for Indian vendors only).  
Foreign vendors shall submit relevant details of their bankers like Swift Code, Banker's Name & Address etc.
- Vendors must submit bills & invoices along with required supporting documents in time. Incomplete documentation / delayed submission of invoice / documents will result in corresponding delay in payment.

#### **F. STANDARD PAYMENT TERMS OF BHEL-EDN**

##### Purchase Orders for indigenous procurement

##### **(a) SUPPLY WITH E&C:**

- 85% of basic value (excluding E&C charges) + 100% of taxes, duties and freight charges will be paid in 45 days from the date of dispatch or 15 days from the date of submission of complete set of documentation whichever is later.
- 15% of basic value (retention money), (excluding E&C charges) will be paid in 15 days from the date of submission of documents against supplementary invoice with proof of completion of E&C along with E & C charges (if any)

##### **(b) SUPPLY WITH SUPERVISION OF E&C:**

- 90% basic value (excluding E&C charges) + 100% of taxes, duties and freight charges will be paid in 45 days from the date of dispatch or 15 days from the date of submission of complete set of documentation whichever is later.
- 10% of basic value (retention money), (excluding E&C charges) will be paid in 15 days from the date of completion of erection and commissioning against supplementary invoice with proof of completion of E&C along with supervision charges (if any)

##### **(c) SUPPLY ONLY:**

- 100% of PO value with taxes, duties 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.

Purchase orders for import procurement:**(d) SUPPLY WITH E&C:**

- 1) 85% of the basic value (excluding E&C charges) will be paid in 45 days, against usance draft of 45 days, from the date of AWB/BOL on submission of complete set of documents.
- 2) 15% of basic value (retention money), (excluding E&C charges) will be paid in 15 days from the date of completion of E&C along with E & C charges against supplementary invoice with proof of completion of E&C (if any).

**(e) SUPPLY WITH SUPERVISION OF E&C:**

- 1) 90% of the value of the order will be paid on the 45th day, against usance draft of 45 days, from the date of AWB/BOL on submission of complete set of documents.
- 2) 10% of basic value (retention money) will be paid in 15 days from the date of completion of erection and commissioning against supplementary invoice with proof of completion of E&C along with supervision charges (if any).

**(f) SUPPLY ONLY:**

- 1) 100% of PO value will be paid against usance draft of 45 days from the date of dispatch or 15 days from the date of submission of complete set of documents whichever is later.

**LOADING FACTORS FOR PAYMENT TERMS:**

- 1) For offers received with requests for negotiation of documents through bank loading will be 15% of basic value (all bank charges to be borne by the seller).  
**(This loading factor is applicable only for purchase orders for indigenous supply).**
- 2) In all cases where credit period is 30 days but not in line with the above mentioned standard payment terms offered loading applicable will be 5% of basic value.  
**(This loading factor is applicable only for purchase orders for indigenous supply).**
- 3) For offers received with Letter of Credit payment term in place of sight draft payment term, loading applicable will be 5% of basic value. Additional loading of 5% will be applicable for payment terms as Letter of Credit with usance of less than 45 days.  
**(This loading factor is applicable only for purchase orders for imported supply).**
- 4) For offers received with Sight Draft payment terms with usance of less than 45 days, loading of 5% will be applicable.  
**(This loading factor is applicable only for purchase orders for imported supply).**
- 5) All payment terms with credit period of less than 30 days for indigenous supply and any other variation of payment terms are liable for rejection.
- 6) Standard payment terms indicated in para F (a), (b), (c), (d), (e) and (f) 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 and E&C charges (wherever applicable).

Wherever the Purchase Order is split into import portion and indigenous portion of supply the retention money will be 15% or 10% (as applicable) of both purchase order values put together.

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

**G. Bank guarantee (BG) / Performance bank guarantee (PBG):**

1. Bank guarantee (BG) / Performance bank guarantee (PBG) will be applicable as called in the tender documents. Such PBG shall be valid for a period of 36 months + claim period of 6 months for a value equal to 10 % of the basic value of the purchase order. No deviation for the duration of PBG / BG will be permitted.
  - a. PBG shall be from any of the BHEL consortium of bankers (**refer Annexure VI**).
  - b. PBGs from nationalized banks are also acceptable.
  - c. 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. PBG should be in the format indicated. (**Refer annexures VII & VIII respectively**). No deviation to these formats will be allowed.
  - d. Confirmation from any of the BHEL consortium of banks or any of the Indian Public Sector Banks is essential for the acceptance of PBGs issued by foreign banks (located outside India).
  - e. Expired BGs / PBGs will be returned only after expiry of the claim period or on completion of the contractual obligation.
  - f. **Non acceptance for submission of PBG will attract loading as indicated below**
    - i. Loading will be equal to the percentage of value for which BG / PBG is not provided. (Ex: if PBG / BG is given for 3 % of the basic value against 10% specified, loading applicable will be 7% (10 – 3 = 7 %). This value will be added to the quoted price while evaluating the lowest offer.

**H. PROVISIONS APPLICABLE FOR MSE VENDORS (MICRO AND SMALL ENTERPRISES)**

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

- a. Valid NSIC certificate or
- b. Entrepreneur's Memorandum part II (EM II) certificate (deemed valid for 2 years).
- c. EM II certificate with CA certificate (**in the prescribed format given in Annexure IX**) applicable for the year certifying that the investment in plant and machinery of the vendor is within permissible limits as per the MSME Act 2006 for relevant status where the deemed validity is over.
- d. Documents submitted for establishing the credentials of MSE vendors must be valid as on the date of part I / technical bid opening for the vendors to be eligible for the benefits applicable for MSE vendors. Documents submitted after the Part I / Technical bid opening date will not be considered for this tender.

**PURCHASE PREFERENCE FOR MSE VENDORS:**

- e. MSE vendors quoting within a price band of L1 + 15% shall be allowed to supply up to 20% of the requirement against this tender provided
  1. The MSE vendor matches the L1 price
  2. L1 price is from a non MSE vendor
  3. L1 price will be offered to the nearest vendor nearest to L1 in terms of price ranking (L2 - nearest to L1). In case of non-acceptance by the MSE vendor (L2) next ranking MSE vendor will be offered who is within the L1 + 15% band (if L3 is also within 15% band).
  4. 20% of the 20% (i.e. 4% of the total enquired quantity) will be earmarked for SC/ST owned MSE firms provided conditions as mentioned in (1) and (2) are fulfilled.

5. In case no vendor under SC / ST category firms are meeting the conditions mentioned in (1) and (2) or have not participated in the tender, in such cases the 4% quantity will be distributed among the other eligible MSE vendors who have participated in the tender.
6. Serial no. 1 to 5 will not be applicable wherever it is not possible to split the tendered quantity / items on account of customer contract requirement, or the items tendered are systems. Such information that tendered quantity will not be split will be indicated in the SCC.

**I. 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.

**PURCHASE EXECUTIVE**

**ANNEXURE - I**  
**LIST OF INTERNATIONAL GATEWAY AIRPORTS**

For airbased consignment, terms of delivery will be on FCA basis from following listed airports only. This list is valid from 01.03.2013 to 28.02.2015. Vendors are requested to verify this list for use after 28.02.2015.

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 – II**  
**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-III**  
**GUIDELINES FOR REVERSE AUCTION PROCEDURE**

Against this enquiry for the subject item/ system with detailed scope of supply as per enquiry specifications, BHEL may resort to “REVERSE AUCTION PROCEDURE” i.e., ON LINE BIDDING (THROUGH A SERVICE PROVIDER). The philosophy followed for reverse auction shall be English Reverse (No ties).

1. For the proposed reverse auction, technically and commercially acceptable bidders only shall be eligible to participate.
2. Those bidders who have given their acceptance for Reverse Auction (quoted against this tender enquiry) will have to necessarily submit “online sealed bid” in the Reverse Auction. Non-submission of “online sealed bid” by the bidder for any of the eligible items for which techno-commercially qualified, will be considered as tampering of the tender process and will invite action by BHEL as per extant guidelines in vogue.
3. BHEL will engage the services of a service provider who will provide all necessary training and assistance before commencement of on line bidding on internet.
4. In case of reverse auction, BHEL will inform the bidders the details of Service Provider to enable them to contact & get trained.
5. Business rules like event date, time, bid decrement, extension etc. also will be communicated through service provider for compliance.
6. Bidders have to fax the Compliance form before start of Reverse auction. Without this, the bidder will not be eligible to participate in the event.
7. In line with the NIT terms, BHEL will provide the calculation sheet (e.g., EXCEL sheet) which will help to arrive at “Total Cost to BHEL” like Packing & forwarding charges, Taxes and Duties, Freight charges, Insurance, Service Tax for Services and loading factors (for non-compliance to BHEL standard Commercial terms & conditions) for each of the bidder to enable them to fill-in the price and keep it ready for keying in during the Auction.
8. Reverse auction will be conducted on scheduled date & time.
9. At the end of Reverse Auction event, the lowest bidder value will be known on auction portal.
10. The lowest bidder has to fax/e-mail the duly signed and filled-in prescribed format for price breakup including that of line items, if required, as provided on case-to-case basis to Service provider within two working days of Auction without fail.
11. In case BHEL decides not to go for Reverse Auction procedure for this tender enquiry, the Price bids and price impacts, if any, already submitted and available with BHEL shall be opened as per BHEL’s standard practice.
12. Bidders shall be required to read the “Terms and Conditions” section of the auctions site of Service provider, using the Login IDs and passwords given to them by the service provider before reverse auction event. Bidders should acquaint themselves of the “Business Rules of Reverse Auction”, which will be communicated before the Reverse Auction.
13. If the Bidder or any of his representatives are found to be involved in Price manipulation/ cartel formation of any kind, directly or indirectly by communicating with other bidders, action as per extant BHEL guidelines, shall be initiated by BHEL and the results of the RA scrapped/ aborted.
14. The Bidder shall not divulge either his Bids or any other exclusive details of BHEL to any other party.
15. In case BHEL decides to go for reverse auction, the H1 bidder (whose quote is highest in online sealed bid) may not be allowed to participate in further RA process.

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

Please Fill up the form in **CAPITAL LETTERS** only.

TYPE OF REQUEST(Tick one): \_\_\_\_\_ CREATE \_\_\_\_\_ CHANGE

BHEL Vendor / Supplier Code:	
Company Name :	
Permanent Account Number(PAN):	
Address	

City:	PINCODE		STATE	
-------	---------	--	-------	--

Contact Person(s)	
Telephone No:	
Fax No:	
e-mail id:	

1 Bank Name:	
2 Bank Address:	

3 Bank Telephone No:	
4 Bank Account No:	

5 Account Type: Savings/Cash Credit

6 9 Digit Code Number of Bank and branch appearing on MICR cheque issued by Bank

7 Bank IFSC Code(applicable for NEFT )

8 Bank IFSC code(applicable for RTGS) (Indian Financial System Code)

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

Date:

Authorised Signatory:  
Designation: Telephone No. with STD Code

Company Seal

**Bank Certificate**

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

Date: \_\_\_\_\_  
Place: \_\_\_\_\_ Signature

Please return completed form **along with a blank cancelled cheque or photocopy** thereof to:  
Bharath Heavy Electricals Ltd,  
Attn:  
Electronics Division, Mysore Road,  
BANGALORE - 560 026  
In case of any Query, please call concerned purchase executive.

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

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

**1. ORIGINAL HIGH SEA SALES AGREEMENT**

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

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

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

**4. ORIGINAL HOUSE AIR WAY BILL/ BILL OF LADING**

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

**5. ORIGINAL CARGO ARRIVAL NOTICE FROM FORWARDER.**

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

**7. ORIGINAL PACKING LIST.**

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

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

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

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

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

	<b>Nationalised Banks</b>		<b>Nationalised Banks</b>
1	Allahabad Bank	19	Vijaya Bank
2	Andhra Bank		<b>Public Sector Banks</b>
3	Bank of Baroda	20	IDBI
4	Canara Bank		<b>Foreign Banks</b>
5	Corporation Bank	21	CITI Bank N.A
6	Central Bank	22	Deutsche Bank AG
7	Indian Bank	23	The Hongkong and Shanghai Banking Corporation Ltd. (HSBC)
8	Indian Overseas Bank	24	Standard Chartered Bank
9	Oriental Bank of Commerce	25	The Royal Bank of Scotland N.V.
10	Punjab National Bank	26	J P Morgan
11	Punjab & Sindh Bank		<b>Private Banks</b>
12	State Bank of India	27	Axis Bank
13	State Bank of Hyderabad	28	The Federal Bank Limited
14	Syndicate Bank	29	HDFC Bank
15	State Bank of Travancore	30	Kotak Mahindra Bank Ltd
16	UCO Bank	31	ICICI Bank
17	Union Bank of India	32	IndusInd Bank
18	United Bank of India	33	Yes Bank

**Note:**

- All BGs must be issued from BHEL consortium banks listed above.
- BHEL may accept BG from other Nationalised Banks also which are not listed above.
- BG will not be accepted from Scheduled Banks and Co-operative Banks.
- In case BG is issued from a bank located outside Indian territory and is issued in foreign currency, the BG must be routed through and confirmed by any one of the above mentioned consortium banks or any of the Indian Public Sector Banks.
- This list is subject to changes. Hence vendors are requested to check this list every time before issuing BGs.

**ANNEXURE-VII**  
**PROFORMA OF PERFORMANCE BANK GUARANTEE**  
**(For Bank Guarantees issued in Indian Rupees by Banks in India)**

**Note:**

- To be executed in Rs. 100/- Non-Judicial stamp paper.
- To be submitted by issuing bank to Purchase Dept. directly. Please give BHEL address to banker.
- Do not enclose with Bank document.
- Modifications and additions/deletions to this BG format are not permitted.

**PERFORMANCE GUARANTEE (PROFORMA OF BANK GUARANTEE)**

Ref no: (BG No.) \_\_\_\_\_

THIS DEED OF GUARANTEE made and executed on the \_\_\_\_\_ day of \_\_\_\_\_ (month & year), by the \_\_\_\_\_ (Bank), registered under the Companies Act 1956/Nationalised Bank constituted under the Banking Companies (acquisition and transfer of undertakings) Act constituted under the **State Bank of India Act / Subsidiary Banks Act**, having its registered / head office at \_\_\_\_\_ represented herein by its Branch Manager / authorised representatives Sri. \_\_\_\_\_ & Sri. \_\_\_\_\_ (Hereinafter called 'guarantor' which term shall mean and include its successors and assigns)

**IN FAVOUR OF BHARAT HEAVY ELECTRICALS LIMITED**

\_\_\_\_\_ (Buyer's Name), a company registered under the companies Act, 1956 having its registered office at BHEL House at Siri Fort, New Delhi-110 049 and its Electronics Division at Mysore Road, Bangalore - 26 (hereinafter referred to as the 'Company' Which term shall include its successors and assigns):

Whereas the company has placed an order on \_\_\_\_\_ (State the name of the company / firm and its address) (hereinafter referred to as the 'Supplier' which term shall mean and include its liquidators, successors and assign) for the supply of system under order / Contract No \_\_\_\_\_ Dtd \_\_\_\_\_.

AND WHEREAS the supplier has agreed to supply the materials and carryout the works as detailed and in accordance with the terms set out in the said order / contract.

AND WHEREAS the company is not required to pay to the supplier a sum of Rupees \_\_\_\_\_ being the 10% of the value of the goods supplied / Works performed / Services rendered under the said order / contract between the supplier and the company, till the company is satisfied with the mechanical Warranties and the performance standards stipulated in the said order / contract between the company and the supplier has been duly fulfilled, except, against a Bank Guarantee for the said sum of Rs. \_\_\_\_\_ in favour of the company by reputed Bank, in which case the company has agreed to make payment to the supplier of the said sum of Rupees \_\_\_\_\_ being (10%) of the value of the goods supplied / Works performed / Services rendered under the agreement between the supplier and the company and the Guarantor has at the request of the supplier, agreed to furnish this Guarantee subject to the terms and conditions stated below :

NOW THIS DEED WITNESSES THAT IN pursuance of the above said agreement, the guarantor hereby agrees and covenants with company is as follows:

- 1) That during the period this contract of Guarantee remains effectual, the guarantor shall be liable in respect of the amount due and owing to the company in respect of the payments to the extent of Rs \_\_\_\_\_ (in words) \_\_\_\_\_ against any loss or damage caused to or suffered by the company by reasons of any breach of the terms of the said order / contract / Agreement by the supplier
- 2) The Guarantor hereby undertakes to pay the amounts and payable under this guarantee without any demur, merely on demand from the company intimating that the amount claimed is due by way of loss or damage caused to or suffered or would be caused or suffered by any terms contained in the said order/contract. Any such demand made on the guarantor shall be conclusive as regards the amount due and payable by the Guarantor irrespective of the fact whether the contractor/supplier admits or denies.
- 3) The Guarantor further agrees that the agreement herein contained shall remain in force and effect till all supplies to be made /works to be performed / services to be rendered under the said order /contract /agreement are completed to the entire satisfaction of the company or till company certifies that the terms and conditions of the said order / contract agreement have been fully and

properly carried out by the said supplier and accordingly discharges the Guarantee. Unless a demand or claim under this guarantee is made on the guarantor in writing on or before the expiry of claim period indicated in clause 6 below, the guarantor shall be discharged from all the liability under this guarantee thereafter.

- 4) The guarantor further agrees with the company that the company shall have the fullest liberty without the consent of the guarantor and without effecting in any manner the obligations of the guarantor hereunder to vary any of the terms of the said order / contract / agreement or extend the time of performance by the said supplier from time to time or refrain from exercising the power exercisable by the company against the said supplier or to forebear or omit to enforce any of the terms and conditions relating to the said order / contract / agreement, and the guarantor shall not be relieved of its liability in whole or in part, by reason of any act, commission or forbearance on the part of the company or by reason of any such variation, or extension being granted to the said supplier or by reason of any such matter or thing whatsoever which under the law relating to sureties would but for this provision have effect of so relieving the guarantor.
- 5) The guarantor undertakes not to revoke this guarantee during its currency except with the previous consent of the company in writing.
- 6) Notwithstanding anything herein above obtained, the liability of the guarantor under these presents is restricted to Rs.\_\_\_\_\_. The guarantee shall be in force till its expiry on \_\_\_\_\_ unless a demand is made on the guarantor within SIX months from the date of expiry, all the liability of the guarantor under this guarantee shall stand fully discharged. The decision of the claimant in regard to breach of contract is final and binding on the Bank.

IN WITNESS whereof, the guarantor, acting through it authorised representative has executed this deed of Guarantee on the day, month and year first above written.

**(Seal of the Bank to be affixed)**  
**For & On behalf of \_\_\_\_\_ Bank**  
**Signature of authorized person with**  
**seal & designation**

**WITNESS:**

1.

2.

**ANNEXURE-VIII**  
**PROFORMA OF PERFORMANCE BANK GUARANTEE**  
**(For Bank Guarantees issued in Foreign Currency by Banks located outside India)**

**BANK NAME AND ADDRESS**

Electronics Division  
Bharat Heavy Electrical Limited (B.H.E.L.),  
Mysore Road, P.B. No. 2606,  
Bangalore- 560 026

Dear Sir,

**Sub : CONTRACT PERFORMANCE GUARANTEE      Ref no. ....      Dtd.....**

WHEREAS you have entered into a contract reference No & PO NO. \_\_\_\_\_  
Date \_\_\_\_\_ with M/s \_\_\_\_\_ having its registered office at  
\_\_\_\_\_ for the supply of \_\_\_\_\_ as detailed in your purchase  
order No. \_\_\_\_\_ which is hereinafter referred to as "the said contract" and WHEREAS M/s  
\_\_\_\_\_ has undertaken to produce a Bank Guarantee for **10% (Ten Percent)**  
of the contract price amounting to \_\_\_\_\_  
(\_\_\_\_\_) to secure its obligations to Electronics Division, BHEL  
having its registered office at New Delhi for the performance of the contract including the warranty of the  
equipment supplied, We \_\_\_\_\_ Bank,  
\_\_\_\_\_ hereby expressly, irrevocably and unreservedly undertake and  
guarantee as principal obligors on behalf of M/s \_\_\_\_\_ that in the event Bharat  
Heavy Electricals Ltd. (B.H.E.L.) declares to us in writing that M/s \_\_\_\_\_  
has not fulfilled any obligations according to the contractual obligation of the said contract, to pay you on  
demand and without demur to Bharat Heavy Electricals Ltd., Electronics Division, Mysore Road, P.B.No.  
2606, Bangalore - 560 026., India an amount of \_\_\_\_\_  
(in words \_\_\_\_\_) subject to  
as may be determined below :

1. Notwithstanding any right M/s. \_\_\_\_\_ may have directly against or any  
disputes raised by M/s. \_\_\_\_\_, Your written demand shall be conclusive  
evidence to us that repayment is due under the terms of the said contract and shall be binding on  
us.

2. We shall not be discharged or released from this undertaking and Guarantee by any arrangements, variations made between you and M/s. \_\_\_\_\_ with or without our consent and knowledge or by any alteration in the obligations of M/s. \_\_\_\_\_ by any forbearance whether as to payment, time, performance or otherwise.
3. This guarantee shall remain valid until the end of six months after the close of the warranty period or until the same is reported by BHEL to us whichever is earlier.
4. We agree and undertake not to revoke this guarantee during its validity unless discharged in writing by you subject to the provision of clause (7) below :
5. This guarantee shall be a continuing guarantee subject to the foregoing and shall not be discharged by any change in the constitution of the Bank or M/s. \_\_\_\_\_ .
6. This guarantee shall be governed by and constructed in accordance with the Laws of India.
7. At any time \_\_\_\_\_ Bank may render this guarantee null and void by paying to Bharat Heavy Electricals Ltd. the full amount being \_\_\_\_\_ ( in words \_\_\_\_\_ )  
\_\_\_\_\_ )

**For and On behalf of Bank  
By its Authorised Signatory**

**Annexure - IX**  
**Certificate by Chartered Accountant on Letter Head**

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

Further verified from the Books of Accounts that the investment of the company as  
on date..... **as per MSMED Act 2006 is as follows:**

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

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

Date:

(Signature)

Name -

Membership Number -

Seal of Chartered Accountant

**Guidelines for Indian Agents**  
**ANNEXURE - X**

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

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

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

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

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

--X--

Vendor's Signature with Seal

**Guidelines for Indian Agents of Foreign Suppliers**

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

## **Disclaimer Certificate For Deemed Export Benefits**

I, (Name & Designation) .....on behalf of M/s. .... (Name and address of the supplier) hereby certify that we have supplied the following goods to M/s..... (Name and address of the recipient):

S.No.	Inv. No. & date	Description of goods	Unit	Qty.	Value

1. We are the manufacturer exporters/suppliers and are registered/not registered with Central Excise and have not availed and will not avail CENVAT facility in respect of the input/components used in aforesaid supplies. We have also not availed and will not avail rebate on the inputs/components used in aforesaid supplies.

OR



We are the suppliers and our supporting manufacturer(s) is/are registered/not registered with Central Excise and have not availed and will not avail CENVAT facility in respect of the inputs/components used in aforesaid supplies.

2. We also certify that we have not been issued any Advance Authorization/Duty Free Import Authorization in respect of the aforesaid supplied goods and have not availed any benefit thereon.

3. We further state that we have not drawn nor will draw any benefit for deemed export and we have no objection if M/s..... (Name and address of the recipient) draws the deemed export benefits on the supplies mentioned above. (Required to be given in case benefits are claimed by recipient of goods).

OR

We have not given disclaimer certificate to M/s..... (Name and address of the recipient) and will not give disclaimer certificate, in future, in respect of these supplies for claiming deemed export benefits (Required to be given in case benefits are claimed by DTA suppliers).

		 <p>A4-10</p>	CE/416/SWAS/SHS/PS	
			REV NO : 00	
			Page 1 of 2	
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">COPY RIGHT AND CONFIDENTIAL</p> <p style="writing-mode: vertical-rl; transform: rotate(180deg);">The information on this document is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in anyway detrimental to the interest of the company.</p>				
			<b>PROJECT : TSGENCO BHADRADRI 4 X 270 MW</b>	
			<b>PURCHASE SPECIFICATION FOR</b>	
			<b>SWAS SAMPLE HANDLING SYSTEM</b>	
			<b>APPROVED BY</b>  <b>(R.PRABHU)</b>	
			<b>PREPARED BY</b>  <b>PPS</b>	<b>ISSUED</b>  <b>416</b>
			<b>28-10-15</b>	



**PURCHASE SPECIFICATION  
FOR  
SWAS SAMPLE HANDLING SYSTEM**

CE/416/SWAS/SHS/PS  
REV.NO.: 00

**CONTENTS**

SECTION	DESCRIPTION
A	GENERAL INSTRUCTIONS TO BIDDERS
B	PRE-QUALIFICATION REQUIREMENTS
C	SCOPE OF SUPPLY FOR SWAS SAMPLE HANDLING SYSTEM
D	TECHNICAL REQUIREMENTS FOR SWAS SAMPLE HANDLING SYSTEM
E	SWAS SCHEMES
F	LIST OF MANDATORY SPARES
G	LIST OF LOOSE SUPPLY ITEMS
H	LIST OF FURNITURE FOR SWAS ROOM
I	PACKING STANDARD
J	QUALITY CHECKLISTS
K	LIST OF VENDORS FOR ITEMS OF SWAS SAMPLE HANDLING SYSTEM



**PURCHASE SPECIFICATION  
FOR  
SWAS SAMPLE HANDLING SYSTEM**

CE/416/SWAS/SHS/PS  
REV.NO.: 00

**SECTION- A**

GENERAL INSTRUCTIONS TO BIDDERS:

- 1.0 ALL REQUIRED DOCUMENTS AGAINST THIS TENDER/SPECIFICATION SHALL BE SUBMITTED IN ENGLISH ONLY.
  - 2.0 Introduction: Bidders are required to offer Sample Handling Systems used for SWAS in Power Plant applications.
  - 3.0 In order to accept the Technical offers / proposals from Bidders for the project mentioned in this Specification ( refer Sections C,D & E ), certain Pre-qualification criteria are required to be met by Bidder.
  - 4.0 Pre-qualification requirements are clearly mentioned in Section-B of this Specification. Bidder to read the same carefully and submit the details required for BHEL's acceptance.
  - 5.0 In case Bidder does not include the details or meet the requirements of Pre-qualification requirements, their offer will be summarily rejected and Bidder's Technical offers will not be evaluated.
  - 6.0 Evaluation methodology: BHEL shall initially open Bidder's PQR documents only as per Section B of this specification for review & acceptance. Only after acceptance of PQR documents, BHEL shall open Bidder's Technical offers as per CI 2.0 of above for evaluation. In the event of acceptance of Bidder's technical offers, the names of such Bidders along with details provided by them for PQR and details of Technical offers , shall be submitted to End users/Customers for their acceptance/approval. Commercial bids of only accepted/approved Bidders by End users/Customers, shall be considered by BHEL for further processing.
  - 7.0 Bidders are required to submit offers as detailed below :
    - aa. Documents pertaining to Pre-Qualification requirement ( CI AA of Section B of this Specification) shall be in a Separate cover with reference no. " CI AA of Section B" marked on it.
    - bb. Documents pertaining to Pre-Qualification requirement ( CI BB of Section B of this Specification) shall be in a Separate cover with reference no "CI BB of Section B" marked on it.
    - cc. Technical offers/proposals for the Project, whose requirements are mentioned in Sections C ,D & E will be submitted in a separate cover with Project name & Reference marked on it.
  - 8.0 Whenever required during evaluation of PQR and Technical offers/bids, vendor is required to be present at BHEL Electronic Division, Bangalore, for discussions. Further in the event of order, during approval of the Vendor documents by End users/Customers, Vendor shall accompany BHEL representative for discussions.
-



**PURCHASE SPECIFICATION  
FOR  
SWAS SAMPLE HANDLING SYSTEM**

CE/416/SWAS/SHS/PS  
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**SECTION- B**

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

1. The bidder should have executed/ completed work of “Design, supply, supervision of erection & commissioning of complete SWAS sample handling package in 200 MW or above capacity for at least **2 units of SWAS within preceding five (5) years** as on the date of bid opening.
  2. **Original Equipment Manufacturers based outside India, who are making offer for this tender shall have authorized representatives in India for support related to Documentation, Erection, Commissioning & any other co-ordination work.**
  3. Submit Reference List of Projects wherein offered system is supplied & commissioned, along with details of critical components like Coolers, High Pressure Reducer/regulator, Back Pressure regulator and Year of Commissioning.
  4. Bidder should have sufficient strength of Engineering, Manufacturing facility to execute the SWAS package. He should be able to demonstrate the thermal calculation of sample coolers.
  5. If Bidder is procuring Chiller from a subcontractor, he should declare subcontractor name & location. Bidder to certify that Chiller subcontractor meets required Quality standards for the product. Bidder should have supplied & commissioned Chiller from offered subcontractor for min. three systems.
  6. Bidder should be authorized and he should have capacity to commission the SHS at various BHEL sites all across the country. The bidder should have the team of experienced service engineers **on payroll located at various parts of INDIA.**
  7. Bidder shall have optimum inventory of critical components like Coolers, Pressure Regulators etc to meet site failures.
  8. **BHEL shall provide operating parameters like sample flow, pressure and temperature requirement for correct functioning of analysers, being procured**
-



**PURCHASE SPECIFICATION  
FOR  
SWAS SAMPLE HANDLING SYSTEM**

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- by BHEL. Bidders shall design Sample Handling System(SHS) suitable for such parameters at minimum.
9. BHEL shall issue call for service / commissioning with 15 days notice. Bidder shall agree to visit BHEL project sites jointly with Analyser vendors within above notice period

**BB. Along with the documents related to PQR above, following details shall also be included in the Offer:**

- i. Technical literature / Manuals of offered Pressure reducers, coolers, back pressure regulators, thermal shutoff valve / solenoid valves.
- ii. Un priced Purchase Order copies
- iii. Reports of successful erection & commissioning Protocols & Minutes of the meetings for handing over of SWAS.
- iv. Submit List of Projects ( rating of > or = 200 MW Power Plants ) for which Erection & Commissioning has been carried out by Subsidiary / Authorized Indian representative for last three year & minimum three system.
- v. Name & registered address of the Indian branch office or Indian representative for support of E&C and after sales service with Organization chart.
- vi. Bidder shall have facility in India for Engineering activities, preparation of Documents, Manufacturing, testing & inspection. Submit these details.
- vii. If Bidder is not Original Equipment Manufacturer (OEM), than Bidder to include Authorization letter from OEM for Design, Engineering, Manufacture, Testing, supply, Erection, Commissioning and Servicing of the offered System. This Authorization letter provided by OEM to Bidder shall indicate the Type and Duration of the agreement.

Important note : In case Bidder does not submit details mentioned in above clauses or meet the requirements of Pre-qualification requirements, Offers will be summarily rejected and Bidder's Technical offers/proposals will not be Evaluated. Please read carefully the General instructions in Section A of this specifications.

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**SECTION- C****SCOPE OF SUPPLY**

SL NO	ITEM DESCRIPTION	UNITS	TSGENCO BHADRADRI - 4 X 270 MW	
			QTY/ UNIT	TOTAL QTY
<b>SWAS PACKAGE EACH SET CONSISTING OF ;</b>				
1	SAMPLE HANDLING SYSTEM - CONSISTING OF:-			
a	PRIMARY RACKS WITH IBR CERTIFIED VALVES(ISOLATION & BLOWDOWN) & IBR CERTIFIED COOLER/COOLER COILS	NO.	2	8
b	WET PANEL - ENCLOSED TYPE WALKTHROUGH PANEL	NO.	1	4
c	DRY PANEL	NO.	1	4
d	CHILLER UNIT - 100% REDUNDANT	NO.	1	4
2	LOOSE SUPPLY ITEMS AS PER SECTION G	ST	1	4
3	MANDATORY SPARES AS PER SECTION F	ST	1	1
4	COMMISSIONING SPARES- Consumables required for commissioning & Handing over of System to Owner	ST	1	4
5	ANNUNCIATOR - Microprocessor based 84 Points	ST	1	4
6	SWAS ROOM FURNITURE AS PER SECTION H	ST	1	4
7	CONSUMABLES LIKE Cation Column ,etc.	ST	1	4
9	O & M MANUALS / DOCUMENTATION CHARGES	LOT	1	4
10	TEST, CALIBRATION & GUARANTEE CERTIFICATES AS PER APPROVED QUALITY CHECKLIST/ PLAN	LOT	1	4
11	SUPERVISION OF ERECTION, TOTAL COMMISSIONING AND HANDING OVER OF SWAS SYSTEM	ST	1	4
12	Price for one line of High Pressure & High Temp. - Primary & Secondary cooling to be considered along with other instruments as per P&ID applicable for the project.	ST	1	1
13	Price for one line of Low Pressure & Low Temp. - Secondary cooling to be considered along with other instruments as per P&ID applicable for the project.	ST	1	1
14	Flow switch for Primary rack (FW, SH, Drum Water, RH, HRH services) - Suitable for return Cooling water line of individual Primary cooler	No.	1	20
15	<p>Following activities will be in Vendor's scope :-</p> <ul style="list-style-type: none"> <li>i. Supervision of erection, Total commissioning &amp; Handing over of the system to the End user.</li> <li>ii. Erection of inter connecting cabling / tubing between wet &amp; dry panel, chiller &amp; wet panel etc.</li> <li>iii. Complete Erection of Chiller system including proper insulation of pipes between chiller &amp; wet panel.</li> <li>iv. Vendor to also consider 1 no. of Gas filling at Site for Chiller during Commissioning/Handing over. This shall be in addition to Gas filling done at OEM works for inspection.</li> <li>v. Vendors to confirm that System offered shall be suitable for working with the analysers being procured by BHEL .BHEL shall indicate analyser data like flow rates, pressure &amp; temperature requirements. In case, Vendor does not confirm as above, Offer shall be technically rejected.</li> <li>vi. Vendor shall be required to visit site jointly with Analyser Vendor for commissioning activity.BHEL shall inform with 7 days prior notice for the visit.</li> </ul>			
16	<p>Note:-</p> <ul style="list-style-type: none"> <li>1.0 Vendors to quote unit rates for all above items individually.</li> <li>2.0 Vendors who do not quote prices as per pt. 1, shall be disqualified.</li> </ul>			

**SECTION – D**

**TECHNICAL REQUIRMENTS**

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1.00.00      **INTENT OF SPECIFICATION**

This section intended to cover scope of design, engineering, supply, erection, testing and commissioning of the Steam and Water Analysis System (SWAS) for the Power Generating Unit.

2.00.00      **GENERAL**

2.01.00      The typical monitoring and analysis requirement for plant steam and water system is furnished below. Bidders shall however determine the analysis requirement based on the criticality of major equipment.

2.02.00      Steam and Water Analysis System shall be furnished for continuous monitoring of water and steam purity in the plant cycle and at other important points. The system shall enable the plant chemist and operators to make adjustments in the water and steam conditioning system or to modify the plant operating procedure to minimize equipment damage due to corrosion, scaling etc.

2.03.00      Bidder shall provide necessary main process line tapping along with isolation/root valves up to SWAS system.

2.04.00      The system shall conform to the following standards and requirements specified here in:

<b>STANDARD</b>	<b>GUIDELINES</b>
ASTM PTC 19.11	Standard Practice for Steam and water sampling, conditioning and analysis in power plant
ASTM D3370	Standard practice for sampling water from closed conduits
ASTM D1066	Standard practice for sampling steam
ASTM D5540	Standard Practice for flow control and temperature control for on-line water sampling and analysis
BS 6739	Code practice for instrumentation in process control system: Installation, Design and Practice

3.00.00


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- 3.01.00 The sampling system shall obtain samples from steam and water lines, which shall be adequately conditioned and led to Analyzers for continuous analysis and also to provide facility for grab (manual) sampling.
- 3.02.00 The system shall include complete Sample Conditioning system, Analyzers, Converters / Transmitters, Indicators, alarm initiating devices, Annunciators, interlocks for sample protection, hardware interface with DDCMIS, interface with dozing system for remote closed loop control, all necessary pipes, tubes, fittings and valves etc. and other conditioning and protective devices to integrate into a completely assembled system.
- 3.03.00 Bidder shall be responsible for proper engineering, selection of hardware, manufacture, testing, commissioning and satisfactory functioning of complete and fully operational steam and water analysis system, meeting the intent of the specification.
- 3.04.00 System components shall be assembled, piped, wired and tested at the factory as a complete unit and shall be ready for installation at the project site.
- 3.05.00 Parts subject to high pressure or temperature or severe duty shall be of materials suitable for the service.

Sample Piping System shall be as follows:

APPLICATION	PIPING MATERIAL
Sample tapping point to primary cooler (including root valves and fittings)	SS316
All the sample pipe after primary cooler	ASTM A213 TP316H
Blow down header and drain receiver holder	ASTM A312 Type 304
Closed Cooling Water piping except grab sample and water purge line, sample through drain piping and waste header piping	ASTM A53 Gr. A
Purge air piping/ tubing and fitting valves	Brass / copper

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- Size and schedule number of sample pipe shall be suitable for particular application. Pressure reducing valves, isolation valves before primary sample cooler and all the isolation valves for pressure and flow indicators shall be needle valves. Cooling water and chilled water supply and return valves shall be block valves. All fitting shall be socket welded type and of material ASTM A182 F316H confirming to ANSI B16.11. The valves to be used in sample piping shall be of globe type, forged construction and stainless steel confirming to ASTM A182 with pressure and temperature ratings as per ANSI B16.34.
- 3.06.00 The grab sample valves shall allow grab sample feed to be directed to grab sample nozzles to the sample trough.
- 3.07.00 SWAS System components and accessories shall be from the latest proven product range of qualified manufacturers. Components and accessories shall be proven for SWAS application in power plant of comparable size.
- 3.08.00 Analysers shall be microprocessor based, drift free and auto compensating type.
- 3.09.00 Sample coolers shall be designed for the maximum allowable water pressure drop, from inlet connection to outlet connection of 0.7 Kg/Sq. cm
- 3.10.00 Consumables up to guarantee period shall be in bidder's scope.
- 3.11.00 Self-regulating type devices shall be provided to maintain constant sample flow through analyzers at a preset sample pressure. Variations in sample flow to individual analyzer shall not exceed 5%.
- 3.12.00 Bidder shall provide necessary isolated 4-20 mA DC outputs from analyzers at separate terminal block for DDCMIS.
- 3.13.00
- 3.14.00 Analyzers shall be powered from the unit UPS system.
- 3.15.00 Furniture
- a) Bidder shall include a complete set of furniture for the SWAS Room of ergonomic design suitable for industrial application. Furniture shall include but shall not be limited to Operator's chairs, work benches for calibration and testing purpose, cabinets for storage of manuals / booklets, storage racks for special tools / chemicals / reagents etc.
  - b) Table top surfaces and other surfaces which are likely to come into contact of chemicals and reagents shall be suitably coated / treated.
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4.00.00      **SWAS PANEL AND ACCESSORIES**

4.01.00      SWAS panels shall be of modular construction and comprising of :

- a)      A wet section consisting of a sample conditioning panel housing components for processing samples and grab sample.
- b)      A dry sections housing all the transmitters and corresponding annunciators and monitors. The dry section shall be physically separate from the sample conditioning panel, so that the electrical equipment are kept dry and away from process fluids. Dry panel shall be kept in air condition environment.

4.02.00      The wet section shall be a vertical panel housing various sample lines, primary coolers, instruments such as sight flow indicators, Pressure / Temperature Gauges, Pressure Control Valves, Rota meter, Pressure / Temperature Switch, Solenoid Valves, NRVs, Secondary heat exchangers, Strainers, Isolation Valves, Drain Headers, Grab Sampling Pans etc. The panel shall be provided with bulkhead connection to connect sample pipes drawn from tapping points.

4.03.00      The Chiller Unit shall be kept near the Wet Panel to supply chilling water to the secondary heat exchangers in Wet Panel. Capacity of chiller unit shall not be less than 5 TR (Tonnage refrigeration capacity) & refrigerant shall be eco friendly type.

4.04.00      Sample conditioning components shall be mounted on the front of the wet section with easily accessible operating handles, levers and dials etc. All components shall be suitably supported to the panel and shall be clearly labeled.

4.05.00      The physical arrangement of the tubing and wiring shall permit easy access for maintenance.

4.06.00      Bidder shall keep provision of 25% spare capacity in coolers for future addition of analyzers. Sample coolers shall have removable SS coil. Coolers shall be designed to achieve the required sample temperature at the specified maximum flow rate of the Analyzers with an assumed fouling factor of 0.2 and at maximum cooling water temperature.

4.07.00      Piping and tubing shall be neatly installed and securely braced to ensure mechanical rigidity. The complete SWAS panel and accessories shall be suitable for continuous operation under ambient temperature condition of 8 Deg C to 50 Deg C and relative humidity of 100%.

5.00.00      **ALARM ANNUNCIATION SYSTEM**

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5.01.00 Alarms shall be available in the local monitor in the dry room for each unit covering the entire SWAS system, with repeat facility in DDCMIS. Alarm Annunciator shall be micro processor based with window size of 70 mm x 50 mm.

### **ANALYZERS Specifications - For reference use only , Analysers are not to be considered in scope of supply**

All Analyzers shall be of microprocessor based design. The general technical specification of the analyzers is provided in this section. Bidder in his offer shall indicate the sample flow requirement of each analyzer and the total quantity of cooling water required for the system.

#### **CONDUCTIVITY ANALYZER**

##### **A. Sensor**

1. Type of Cell : Flow thru'
2. Conductivity Range : As per process
3. Cell Constant : 0.01 / 0.1 / 1.0 depending upon range
4. Temp. Compensation : Manual and Automatic (Integral) 0-100°C
5. Process Connection : Screwed
6. Wetted Parts : Electrodes-SS 316L/ Insulators KYNAR/ Viton
7. Pressure Rating : 10 kg/cm<sup>2</sup>
8. Accessories : Vessel ( SS 316) with ½" NPT connection
9. Cable : Upto transmitter in flexible conduct

##### **B. Transmitter**

1. Type : Microprocessor based, Single stream
  2. Mounting : 2" pipe
  3. Protection Class : IP-65 or better
  4. Output : 4-20 mA DC (isolated)
  5. Display : Digital Display in Engineering Unit , Alarm Status.
  6. Zero/Span Adjustment : Front Panel Membrane type Keyboard
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- 7. Temp. Compensation : Automatic
  - 8. Diagnostic : Self diagnostic for electronics, electrode etc
  - 9. Alarm : Dual set point, hysteresis and time delay adjustable
  - 10. Enclosure : Die cast aluminum, epoxy coated
  - 11. Cable Termination : Internal (cable entry through conduit)
  - 12. Accuracy :  $\pm 1.0$  % of measured range
  - 13. Response time : Less than 5 sec
  - 14. Stability :  $\pm 1.0$  % of output range / month non-cumulative
  - 15. Accessories : a. 2" pipe mounting bracket, Sensor cable with flexible conduit (as required), 1/2" NPT Cable Gland, SS Tag plate, For cation conductivity- Dual Ion-Exchange column, resin, etc. (minimum 12 months' requirements).  
b. Retractable type conductivity sensor along with flow chamber and other accessories shall be provided for vacuum application. Transmitter (local) along with 4-20 mA output to S WAS room & DDCMIS shall also be provided.

6.02.00 **pH ANALYZER**

**A. Sensor**

- 1. Type of Cell : Flow thru'
  - 2. Range : 0-14 pH
  - 3. Type of measurement : Combination electrode
  - 4. Temp. Compensation : Manual and Automatic (Integral) 0-100°C
  - 5. Process Connection : Screwed
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- 6. Measuring Electrode : Glass, high independence, thin electrode in one housing
  - 7. Pressure Rating : 10 kg/cm<sup>2</sup>
  - 8. Accessories : Vessel ( SS 316) with ½” NPT connection
  - 9. Cable : Upto transmitter in flexible conduct
  - 10. Preamplifier : Integral or separate
  - 11. Liquid Junction : Ceramic / Kyner or equivalent

**B. Transmitter**

- 1. Type : Microprocessor based, Single stream
  - 2. Mounting : 2” pipe
  - 3. Protection Class : IP-65 or better
  - 4. Output : 4-20 mA DC (isolated)
  - 5. Display : Digital Display in Engineering Unit, Alarm Status.
  - 6. Accuracy : ± 0.2% of FSD or better
  - 7. Response time : Less than 5 sec
  - 8. Stability : ± 0.001 pH /week
  - 9. Repeatability : ± 1% or better
  - 10. Temp. Compensation : Automatic (Pt-100 sensor)
  - 11. Diagnostic : Self diagnostic for “Calibration required”/ “Calibration O.K.”, electrode checking etc.
  - 12. Alarm : Dual set point, hysteresis and time delay adjustable
  - 13. Enclosure : Die cast aluminum, epoxy coated
  - 14. Cable Termination : Internal (cable entry through conduit)
  - 15. Accessories : 2” pipe mounting bracket, Sensor cable
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with flexible conduit ( as required), 1/2" NPT Cable Gland, S S Tag plate, , Ultrasonic Electrode Cleaner, Buffer solution tablets

6.03.00 **SILICA ANALYZER**

1. Type : Colorimetric monitor, gravity / pumped feed Microprocessor based
2. No. of Streams : Multi-stream with at least one stream as spare
3. Output : 4-20 mA DC (isolated) into 600 ohms
4. Readout : Digital Indicating meter for direct readout
5. Accuracy : ± 1% of F.S.D or better
6. Reproducibility : ± 2% of F.S.D. or better
7. Calibration : Manual & automatic
8. Cycle time : Less than 10 min or better
9. Operating temperature : 0-50 ° C
10. Temperature Compensation : (Pt-100 Sensor)
11. Mounting : 2" pipe
12. Life of light source : 10,000 hours (approx.)
13. Alarm Facility : 2 HI & 2 LO independently adj. over span.
14. Enclosure Protection : IP-65
15. Accessories : Reagent cabinet , Sample strainer, Reagent Reservoir etc., Phenolic name plate, Reagents & consumables, Special cables.

6.04.00 **SODIUM ANALYZER ASSEMBLY**

1. Type of Cell : Flow Through ion-selection electrode
  2. Flow Chamber : Plexi Glass Body or equivalent
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3.	Measuring Electrode	:	Sodium Selective Glass Electrode
4.	Output	:	4-20 mA DC (isolated) into 600 ohms
5.	Temp. Compensation	:	Automatic upto 45 deg.C
6.	Read Out	:	Digital Indicating meter
7.	Accuracy	:	< 5% of reading
8.	Response Time	:	2 minutes or better
9.	Mounting	:	Flush Panel
10.	Calibration	:	Automatic
11.	Alarm Facility	:	2 HI and 2 LO independently a dj. o ver span.
12.	Enclosure Protection	:	IP-65 or better
13.	Accessories	:	Phenolic tag plate, Sa mple f ilter, Pressure regulator & flo w meter, Automatic calibra tion kit, Reagents and consumables, S pecial cables, ½" NPT cable gland.

6.05.00      **HYDRAZINE ANALYZER**

1.	Type	:	Electrochemical
2.	Output	:	4-20 mA DC linear
3.	Readout	:	Digital Indicating Meter, linear read-out
4.	Accuracy	:	± 2% of FSD or better
5.	Reproducibility	:	2% of FSD or better
6.	Drift	:	2 ppb/month or better
7.	Temp. Compensation	:	Automatic up to 45 ° C
8.	Response Time	:	1 minutes or better
9.	Mounting	:	Flush Panel
10.	Alarm Facility	:	2 HI and 2 LO independently a dj. o ver span

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- 11. Preferred Feature : 2 HI and LO alarm LED visible from front, Power supply on/failure LED
  - 12. Enclosure Protection : IP-65/ NEMA 4 or better
  - 13. Accessories : Sample Conditioning kit, Phenolic nameplate, Special cable upto transmitter with flexible conduit Chemical reagents for 12 months, 1/2" NPT Cable Glands

6.06.00 **DISSOLVED OXYGEN ANALYZER**

- 1. Type : Electro-chemical, Microprocessor based.
- 2. Range : As per process.
- 3. Type of Cell : Flow through sampling type (continuous)
- 4. Enclosure : IP-65 or better
- 5. Output : 4-20 mA DC isolated to a load of 600 Ohms (minimum)
- 6. Temp.Compensation : Automatic up to 45°C
- 7. Readout : Digital Indicating meter
- 8. Accuracy : Better than  $\pm 2$  % of full scale for Transmitter
- 9. Sensor Response Time : 90% in 30 seconds or better
- 10. Mounting : Flush panel
- 11. Alarm Facility : 2 HI & 2 LO independently adjustable over span.
- 12. Preferred Feature : HI & LO Alarm LED visible from front, Power supply on/failure LED, In-built calibration facility.
- 13. Accessories : Phenolic nameplate, Special cable upto transmitter with flexible conduit, 1/2" NPT Cable Glands

6.07.00 **CHLORIDE ANALYZER**

- 1. Type : Electro-chemical, Microprocessor based.
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2.	Type of cell	:	Chloride ion selective electrode
3.	Enclosure	:	IP-65 or better
4.	Output	:	4-20 mA DC isolated to a load of 600 Ohms (minimum)
5.	Temp. Compensation	:	Automatic with Pt 100
6.	Ambient temperature	:	45°C
7.	Readout	:	Digital Indicating meter
8.	Accuracy	:	Better than $\pm 2\%$
9.	Reproducibility	:	<3%
10.	Detection limit	:	0.5 mg/ L or better
11.	Analysis time	:	5 minutes ( max).
12.	Cycle time	:	Adjustable
13.	Calibration	:	Manual or automatic
14.	Mounting	:	Flush panel
15.	Alarm	:	1 HI, 1 LO & 1 system alarm
16.	Control accessories	:	Sample level detector, Reagent level detector, Calibration solution level detector, Automatic sample, rinse and drain valve, Pump for calibration solution, Pump for reagent solution.
17.	Accessories	:	Reagent solution tank, Calibration solution tank

6.08.00 **TURBIDITY ANALYZER**

1.	Type	:	Nephelometric ( Light reflection principle)
2.	Range	:	0.001-100 NTU
3.	Body	:	Corrosion resistant polystyrene
4.	Enclosure	:	IP-65 or better

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|----|---------------|---|--|
| 5. | Output        | : | 4-20 mA DC iso lated to a load of 600 Ohms (minimum)   |
| 6. | Readout       | : | LCD Display  |
| 7. | Accuracy      | : | Better than $\pm 2\%$ of full scale  |
| 8. | Repeatability | : | $\pm 1\%$ of re ading or $\pm 0.002$ NTU (wh ich ever is greater)  |
| 9. | Accessories   | : | Phenolic nameplate, Special cable upto transmitter with flexible conduit, $\frac{1}{2}$ " NPT Cable Glands, 2" pipe mounting bracket, Calibration kit & standard solution etc. |

6.09.00 **IRON ANALYZER**

- |    |                       |   |   |
|----|-----------------------|---|---|
| 1. | Type                  | : | Colorimetric  |
| 2. | Range                 | : | 0-100 ppb, 0-2 ppm  |
| 3. | Material              | : | Kynar (Probe), Hastelloy C ( Reflector)                               |
| 4. | Enclosure             | : | IP-65 or better   |
| 5. | Output                | : | 4-20 mA DC iso lated to a load of 600 Ohms (minimum), 2NO+NC Contacts |
| 6. | Readout               | : | LCD Display   |
| 7. | Operating Temperature | : | 45 Deg. C   |
| 8. | Accessories           | : | As required.  |

6.10.00 **SAMPLE CONDITIONING SYSTEM**

Sample conditioning system shall be designed and constructed to receive and condition all samples as required by the respective analyzers. This shall include all conditioning equipment mentioned herein:

- a) Sample filtering
  - b) Primary and final sample cooling and temperature control
  - c) Pressure reduction and control, as required
  - d) Flow rate control
  - e) Pressure and Temperature Protection
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- f) Other treatment as required by individual analyzers or mentioned herein.

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

6.11.00 **SAMPLE FILTER / STRAINER**

Sample particulate removal shall be accomplished by passing samples through cartridge type filters with 316 stainless steel body or Y-Strainer. The filter elements shall be capable of retaining particulates of 40 micron and larger. The filter elements shall be installed immediately after the sample shut off valve.

6.12.00 **PRIMARY SAMPLE COOLER**

- a) Primary cooling of samples having temperature in excess of 45 °C shall be accomplished by passing each sample through one or more individual sample coolers of shell and tube heat exchanger type.
- b) The primary coolers shall use plant closed cycle cooling water.
- c) The overall capacity (flow rate and heat transfer capacity) of cooler / coolers in cascade shall be adequate to cool all samples to within  $\pm 5$  °C of the cooling water inlet temperature for the combined flows of each required analyzer sample plus a manual grab sample flow rate of 500 cc/min.
- d) Sample coolers shall be of submerged helical coil type of shell and tube design with removable coil meeting the intent of ASTM D1192-64 (Equipment for Sampling Industrial Water and Steam). Sample tubing shall be seamless type with no welded or other joints inside the cooling jacket. Unions shall be provided to facilitate removal of coils.
- e) All sample tubing, fittings and other components wetted by the samples shall be constructed of type 316 stainless steel.
- f) Primary cooler shall be protected on the cooling water side by relief valve on the water header. The cooling water header is provided with pressure gauge and isolating valves.
- g) Provision shall be made for draining the heat exchanger shell. The drain line shall be valved and piped to waste drain header.

6.13.00 **SECONDARY HEAT EXCHANGERS**

- a) Each sample stream shall be finally cooled to  $25 \text{ °C} \pm 1 \text{ °C}$ , in a secondary shell and tube heat
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exchanger similar to the primary coolers with chilled water at about 20°C.

- b) Chilled water shall be produced in a packaged refrigeration unit (chiller).
- c) Sufficient heat exchange capacity (flow rate and heat transfer capacity) shall be provided to obtain 25 °C ± 1 °C sample outlet temperature at the maximum flow rate required by all analyzers and grab sample requirements of all sample streams. Additionally, 25% spare coils / capacity shall be provided for samples/analyzers added in future.
- d) Provision shall be made for adjusting each sample temperature individually.
- e) The heat exchanger coils shall be of stainless steel (SS 316). Heat exchanger coils shall be provided with unions to facilitate easy removal. A removable cover shall be provided for the isothermal bath.
- f) Adequate space shall be provided for maintenance.

6.14.00

6.15.00 **CHILLER**

- a) A pair of 100% capacity redundant water-cooled chillers each with sufficient refrigeration capacity to ensure desired isothermal bath temperature under all operating conditions shall be provided.
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- b) The compressor shall be readily accessible for service and shall include low noise, hermetically sealed motors. Compressor assembly shall also include crank case heater, suction and discharge valves, oil sight glasses, forced feed lubrication system and an integrated motor protection system.
  - c) The condenser shall be water cooled and of the cleanable shell and tube design and constructed in accordance with the ASME code for Unfired Pressure Vessels. A condenser water-regulating valve shall be included.
  - d) Chiller shall be of the direct expansion type with refrigerant tubes inside a shell. The chiller is to be completely insulated and to be constructed in accordance with the ASME code for Unfired Pressure Vessels.
  - e) Refrigerant circuit shall be complete with thermostatic expansion valve, liquid line solenoid valve, sight glasses, filter-dryer, refrigerant shut-off and charging valves.
  - f) Chilled water pumps with suction and discharge gauges and the thermometers shall be provided, mounted with the packaged chiller on the channel base. Chiller water tanks shall have level indication and auto level control.
  - g) 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.
  - h) Vibration dampeners, mounted between the chiller and the base channel shall be provided.
  - i) Cooling water and chilled water piping shall be provided with block valves.

6.16.00

**SAMPLE PRESSURE CONDITIONING**

- a) Pressure reduction of samples shall be accomplished by using high pressure reducing element.
  - b) All samples below 40 kg/cm<sup>2</sup> pressure shall be provided with back-pressure (upstream pressure) regulating valves (PCV).
  - c) Each sample line shall have Pressure Indicator and Temperature Indicator upstream of pressure reducer. The gauges shall be 100 mm dial with suitable stainless steel wetted parts. Casing shall be stainless steel construction.
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- d) Each sample line shall include a safety relief valve set at about 3 kg/cm<sup>2</sup>g, upstream of the rate set valve, having stainless steel wetted parts.

6.17.00 **HIGH PRESSURE REDUCING ELEMENTS (HPRE)**

- a) Pressure reductions shall be accomplished by means of a "variable rod-in-tube capillary" valve.
- b) The devices shall be designed for inlet pressure of 350 kg/cm<sup>2</sup>g, temperatures of 65°C and flow rate of not less than 2000 milliliters per minute. The device shall be sized for maximum required sample flow rate.
- c) The pressure-reducing elements shall be conveniently located for removal and periodic cleaning.

6.18.00 **FLOW RESTRICTING ELEMENT (FRE)**

Flow Restricting Element for grab sample line shall be provided for all samples to maintain constant sample flow at a preset sample inlet pressure.

6.19.00 **TEMPERATURE SWITCH AND SOLENOID VALVE**

Thermostat and Solenoid Valves shall be provided in the sample line. The thermostat shall be a bimetallic sensor to operate a micro-switch to close the Solenoid Valve when sample temperature is above preset value or cooling flow to primary cooler is low.

6.20.00 **TEMPERATURE GAUGES**

Temperature gauges shall be of 100 mm size gas filled type with stainless steel armored capillary tubing. Gauges shall be provided after primary coolers and outlet sample lines. Each gauge shall have a dial engraving or separate phenolic nameplate to identify the service. All wetted parts, internal and casing shall be stainless steel.

6.21.00 **PRESSURE GAUGES**

Pressure gauges shall be 100 mm size, stainless steel movements and bourdon tubes and nylon bearings. Gauges shall be provided after primary cooler and outlet sample lines. Each gauge shall have a dial engraving or separate phenolic nameplate to identify the service. All wetted parts, internal and casing shall be stainless steel.

6.22.00 **FLOW INDICATORS**

Rotameters shall be provided for sample flow rate indication (to be located in individual branch line to Analyzer Cell) with 75 mm scale length, panel mounting bezel, and stainless steel float and body.

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6.23.00      **FLOW SWITCHES**

Flow switch shall be provided on the primary cooler cooling water outlet. The switch shall be equipped with alarm contacts for annunciation and interlocking. Wetted parts shall be stainless steel.

6.24.00      **GRAB SAMPLES**

Grab sample valves on the panel front shall be furnished to allow grab sample flow to be directed grab sample nozzles to the sample trough. Approximately 300 mm of flexible tubing shall be furnished for each sample to allow grab sample collection and prevent splashing. Valve body and trim shall be of SS-316.

6.25.00      **SAMPLE SINK**

A continuous sink for Grab Sample Analysis shall be provided. The sink shall be made of stainless steel. Sink shall have drain to a header.

Cleaning water connection shall be provided for cleaning of sample containers.

7.00.00

8.00.00      **DRAWINGS AND DOCUMENTS**

8.01.00      Bidder shall furnish following drawings and documents, as a minimum along with bid:

- a) SWAS scheme along with write up
  - b) BOM & datasheet
  - c) SWAS room layout (tentative) along with room & equipment dimension
  - d) Power supply and other utility details
  - e) Data/ information as per bid proposal sheet (Technical particulars)
  - f) Conformance to or deviation from the specification, if any
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## SECTION D

A4 - 11

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### 8.0.2. In the event of order :-

- a) Vendor shall submit drawings, data sheets, Technical literature, detailed BOM for complete system for approval by BHEL/End user
- b) Vendor shall depute his representative to site for verification of material received at site, with respect to approved BOM / documents. A MOM shall be made with BHEL site incharge for completeness of supplies. Material shall be repacked and Handed over to BHEL site incharge.
- c) Quality plan .Vendor to note that following Tests are to be conducted as minimum:
  - Hydraulic pressure Tests for all fittings tubing, etc.
  - Functionality Tests for all components.
  - Calibration & Accuracy Test for all measuring instruments.
  - IR & HV Tests for all electrical components.
  - Material TC's to be furnished for verification.
- e ) Item No. of BOM as approved or Item No. of BOM issued along with MC shall be put on the respective Boxes & Packing list by the vendor for easy correlation & identification at the time of MRC.
- f ) Items shall be supplied ,post inspection, in sturdy wooden packing. Packing shall be designed such that materials can be stored in open environment for 2/3 years. BHEL packing standard is enclosed for reference & compliance.




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**SECTION – E**



















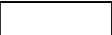











**SWAS SCHEMES**

TELANGANA STATE POWER GENERATION CORPORATION LTD  
 4x270 MW, BHADRADRI THERMAL POWER PROJECT

# SWAS SCHEMES

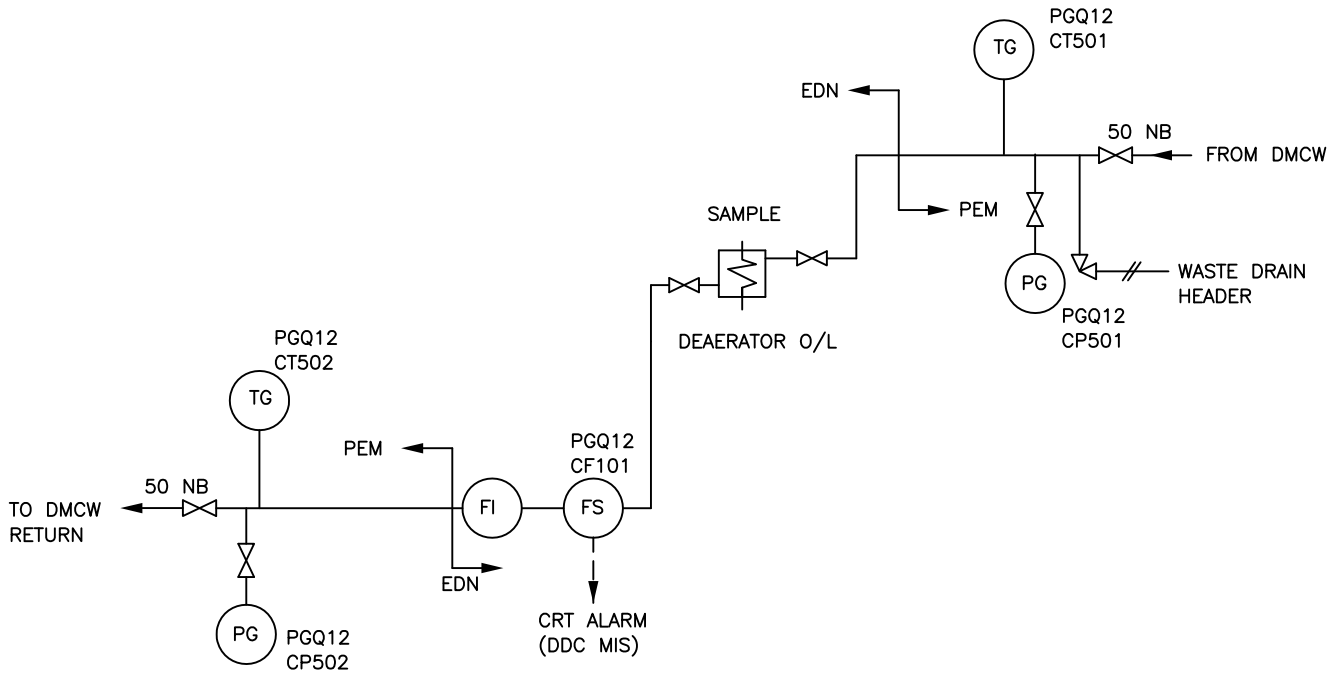
						<b>DESEIN PRIVATE LIMITED</b>			
PROJECT:						4x270 MW BHADRADRI THERMAL POWER STATION			
CUSTOMER:						TELANGANA STATE POWER GENERATION CORPORATION LTD			
									
1. THE DDC IS REVISED IN LINE WITH MDM B/W BHEL AND TSGENCO DTD 23.09.15.						<b>BHARAT HEAVY ELECTRICALS LTD</b> POWER SECTOR PROJECT ENGINEERING MANAGEMENT NOIDA			
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						DEPT	NAME	SIGN	DATE
						DRN	NtJ	-sd-	15.06.15
						DESN	NtJ	-sd-	15.06.15
CHD	SS	-sd-	15.06.15						
APPD	SSB	-sd-	15.06.15						
TITLE						<b>SWAS SCHEMES</b>			
						DEPT.	SCALE	DRAWING NO.	
						SIGN		PE-DG-411-145-I110	
								SHEET 1 OF 15	REV. 02

# LEGEND :

	ISOLATING VALVE (NORMALY OPEN)		ANALYSER DRY PANEL
	ISOLATING VALVE (NORMALY CLOSED)		PRESSURE GAUGE
	PRESS REDUCING VALVE		TEMPERATURE GAUGE
	BACK PRESS REGULATOR		TEMPERATURE SWITCH
	SOLENOID OPERATED VALVE		FLOW SWITCH
	SAFETY RELIEF VALVE		FLOW INDICATOR (Sight Glass Type)
	3 WAY NEEDLE VALVE		LEVEL GAUGE
	SAMPLE COOLER		IMPULSE LINE
	SAMPLE FILTER		CABLE
	EXPANDER	UCR	UNIT CONTROL ROOM
	FLOW INDICATOR WITH REGULATING VLV	DDCMIS	DDC SYS, UNIT CONTROL ROOM
QDV	QUICK DISCONNECTION VALVE	CRT ALARM	ALARM ON CRT IN UCR
	CATION COLUMN		INDICATES RESPECTIVE SCOPE
	CONDUCTIVITY ELEMENT	EDN	BHEL-EDN
	CONDUCTIVITY TRANSMITTER	B(T)	BHEL-TRICHY
	pH ELEMENT	PC	BHEL-PIPING CENTRE
	pH TRANSMITTER	HWR	BHEL-HARDWAR
	DISSOLVED O2 ELEMENT	PEM	BHEL-PEM
	DISSOLVED O2 TRANSMITTER		
	HYDRAZINE MEAS.		
	PHOSPHATE MEAS.		

## NOTES :

1. ONE SET OF ALARM CONTACTS OF SPDT TYPE SHALL BE PROVIDED WITH EACH ANALYSER/MONITOR. 4-20 mA SIGNAL FROM ALL ANALYSERS SHALL BE HOOKED-UP TO DDCMIS FOR MONITORING PURPOSE AS WELL AS ALARMS.
2. ALL FIELD SAMPLING LINE SHALL BE 15 NB SS316 AND SAMPLING LINE SHALL BE OF 1/4" OD TUBING INSIDE PRIMARY RACKS, WET PANEL & DRY PANEL.
3. KKS TAG NOS. ARE TO BE USED AS ANALYSER TAG NUMBERS.
4. ALL PRIMARY COOLERS SHALL BE LOCATED IN FIELD.
5. SAMPLE OUTLET TEMP SHALL BE AROUND 45 DEG C AT PRIMARY COOLER OUTLET AND SAMPLE TEMP AT SECONDARY COOLER OUTLET SHALL BE 25°C.
6. SAMPLE ENTRY IN PANEL SHALL BE FROM "TOP" AND CABLE ENTRY FROM "BOTTOM".
7. SAMPLE TEMP HI(COMMON) GROUP ALARM SHALL BE PROVIDED IN DCS.
8. DRAIN AND OVERFLOW CONNECTION SHALL BE GIVEN FOR CHILLER WTR TNK.
9. DEDICATED PC FOR SWAS SYSTEM SHALL BE PROVIDED.
10. CHILLER SHALL HAVE 25% SPARE CAPACITY FOR FUTURE ADDITION.
11. SAMPLE COOLER SHALL BE OF SUBMERGED HELICAL COIL TYPE OF SHELL AND TUBE DESIGN SHALL BE OF REMOVABLE TYPE.
12. IN LINE WITH "KTPS 1X800 MW SPEC- V-VI/S-VI/SS-M:6 , CL # 3.10.00, CONSUMABLES UPTO GUARANTEE PERIOD" SHALL BE SUPPLIED ALONG WITH SWAS EQUIPMENT.
13. HAND HELD INSTRUMENT 1 NUMBER FOR MEASURING CATION CONDUCTIVITY SHALL BE INCLUDED WITH THE MAIN SUPPLY OF SWAS SYSTEM.



SUITABLE EXPANDER(S) SHALL BE PROVIDED TO ERECT THE TEMP/PRESS GAUGES.

REFERENCE DRG :  
 P&ID DMCW SYSTEM  
 DRG No. PE-DG-411-179-N001



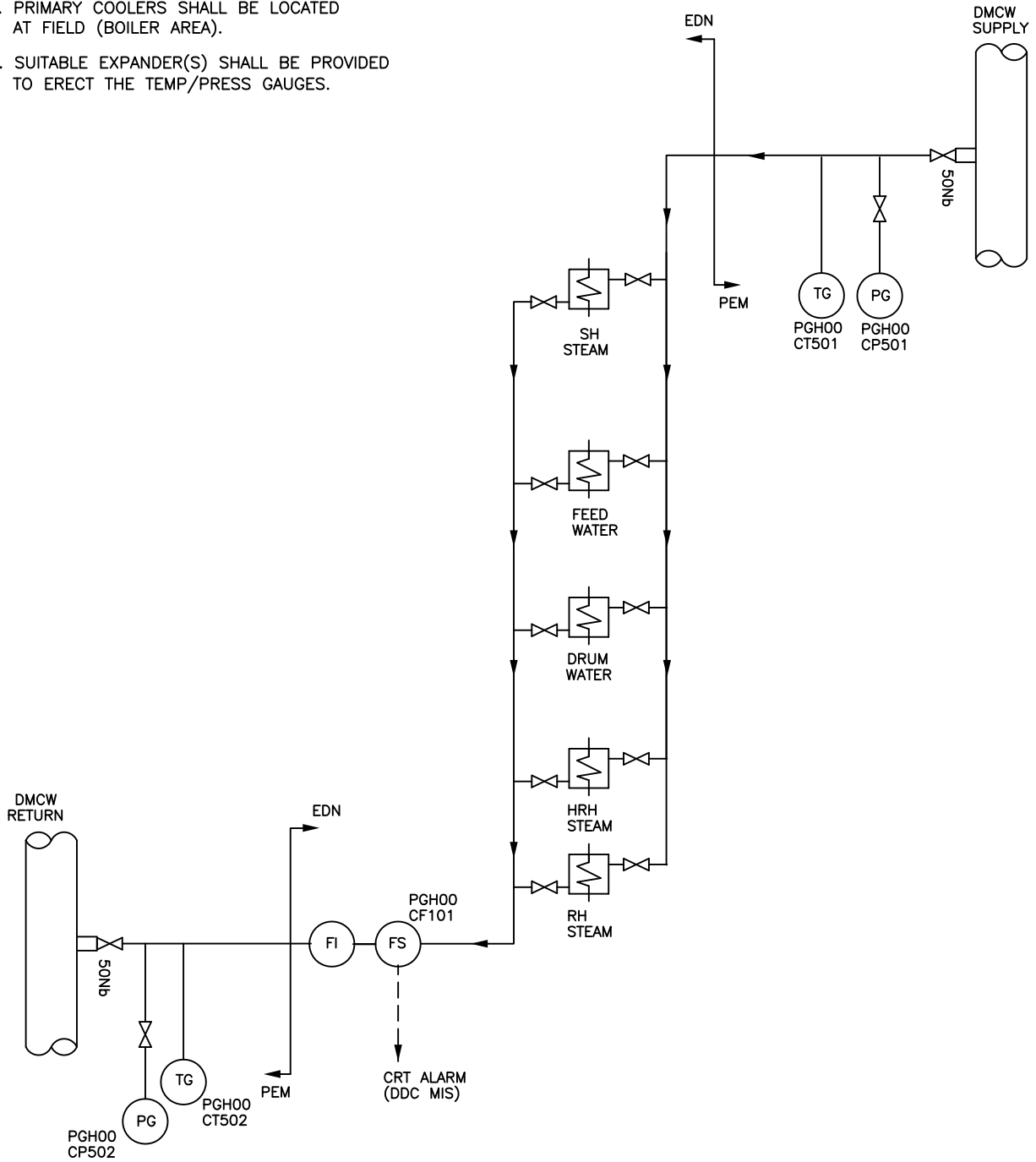
TELANGANA STATE POWER GENERATION CORPORATION LTD  
 4x270 MW, BHADRADRI

TITLE  
**SWAS SCHEMES  
 ECW SCHEME FOR PRIMARY COOLERS  
 (EDN SCOPE)**

DRG. NO. <b>PE-DG-411-145-1110</b>
SHEET 3 OF 15    REV 00

**NOTE:**

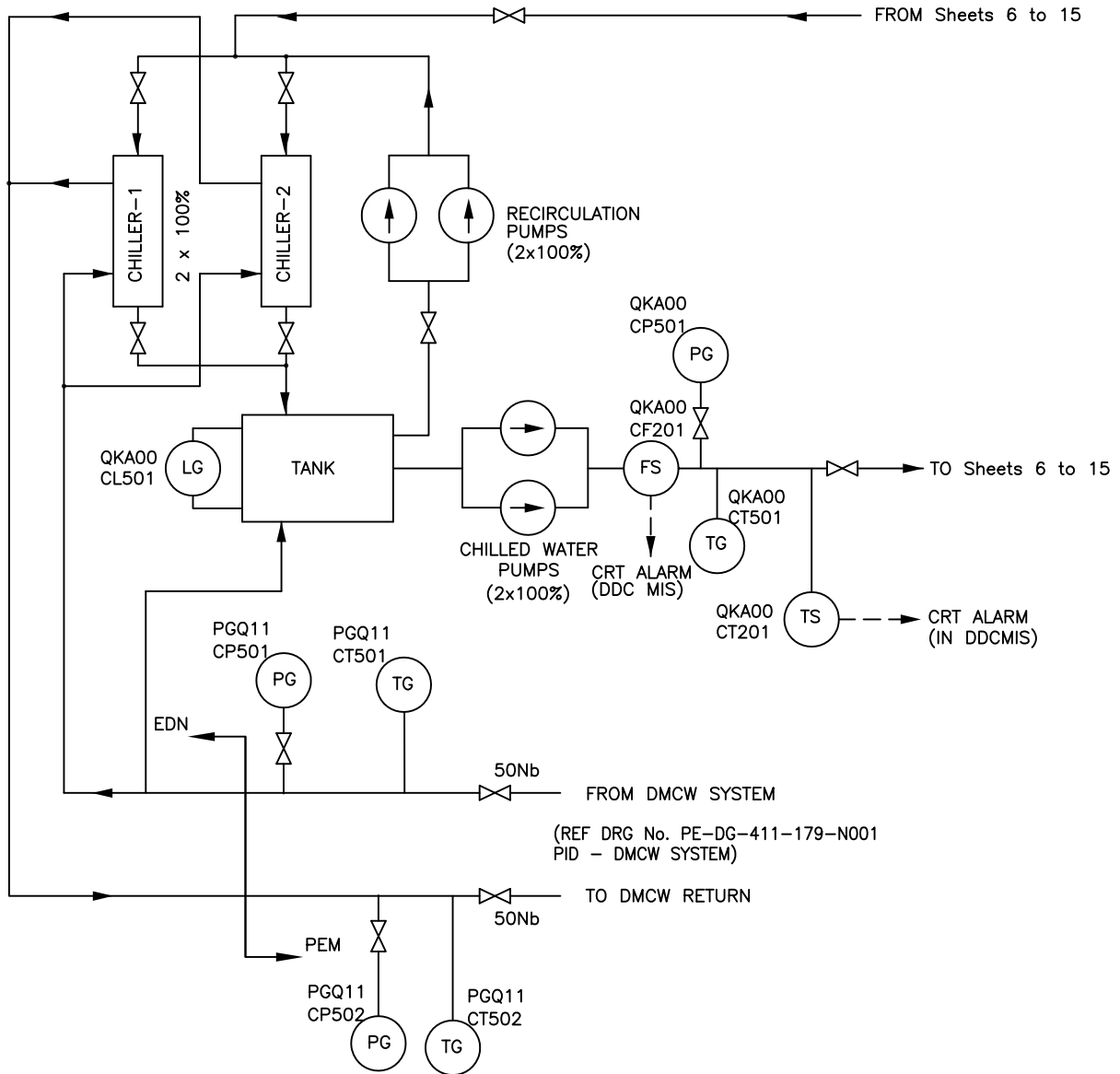
1. REFERENCE DRAWING—PID OF DMCW SYSTEM DRG No. PC-DG-411-179-N001
2. PRIMARY COOLERS SHALL BE LOCATED AT FIELD (BOILER AREA).
3. SUITABLE EXPANDER(S) SHALL BE PROVIDED TO ERECT THE TEMP/PRESS GAUGES.



TELANGANA STATE POWER GENERATION CORPORATION LTD  
4x270 MW, BHADRADRI

TITLE  
**SWAS SCHEMES  
ECW SCHEME FOR PRIMARY COOLERS  
(EDN SCOPE)**

DRG. NO. <b>PE-DG-411-145-I110</b>
SHEET 4 OF 15    REV 00



(REF DRG No. PE-DG-411-179-N001  
PID - DMCW SYSTEM)

**NOTES**

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



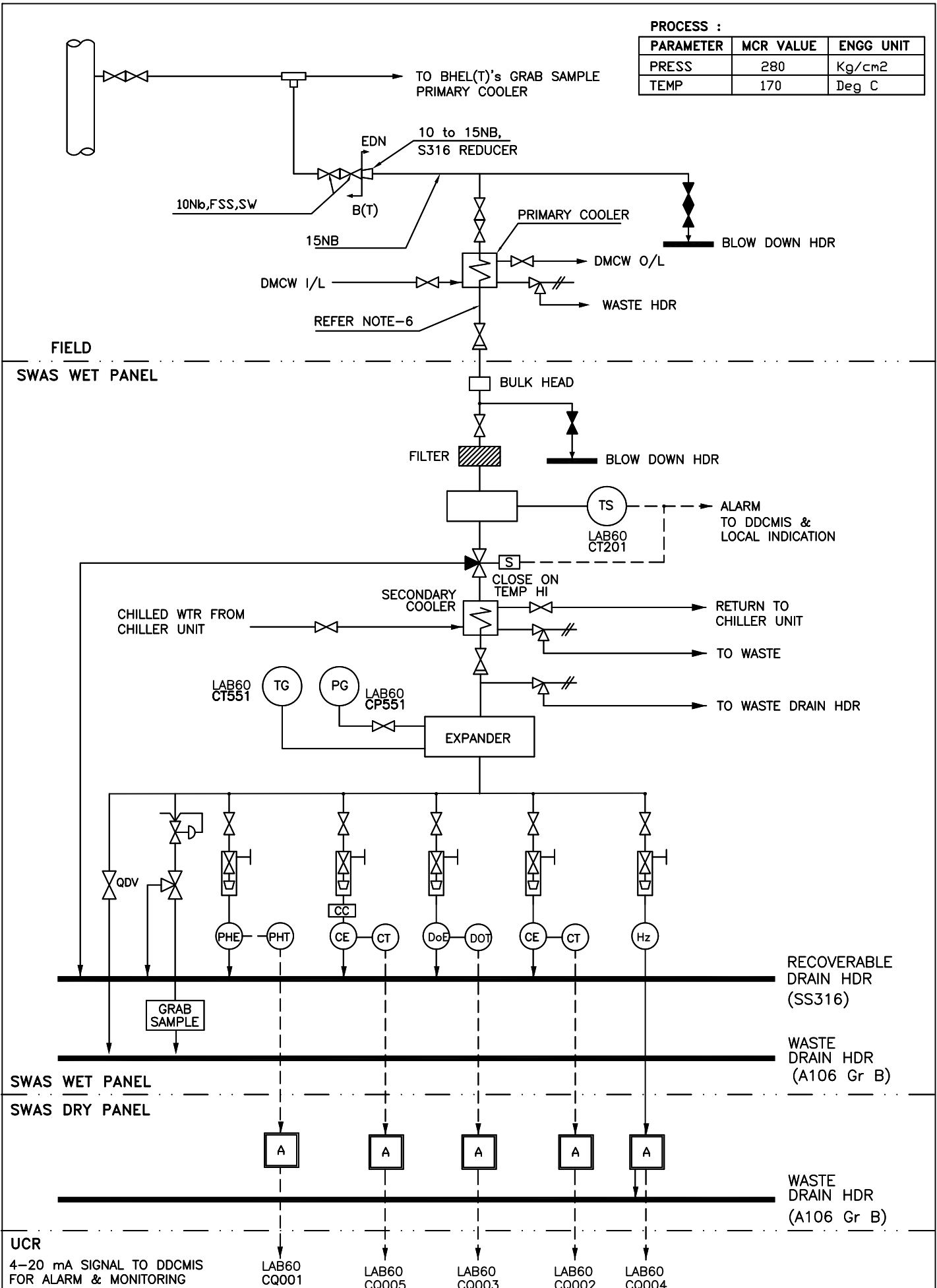
TELANGANA STATE POWER GENERATION  
CORPORATION LTD  
4x270 MW, BHADRADRI

TITLE  
**SWAS SCHEMES  
CHILLED WATER SCHEME  
FOR SECONDARY COOLERS**

DRG. NO. <b>PE-DG-411-145-I110</b>
SHEET 5 OF 15   REV 00

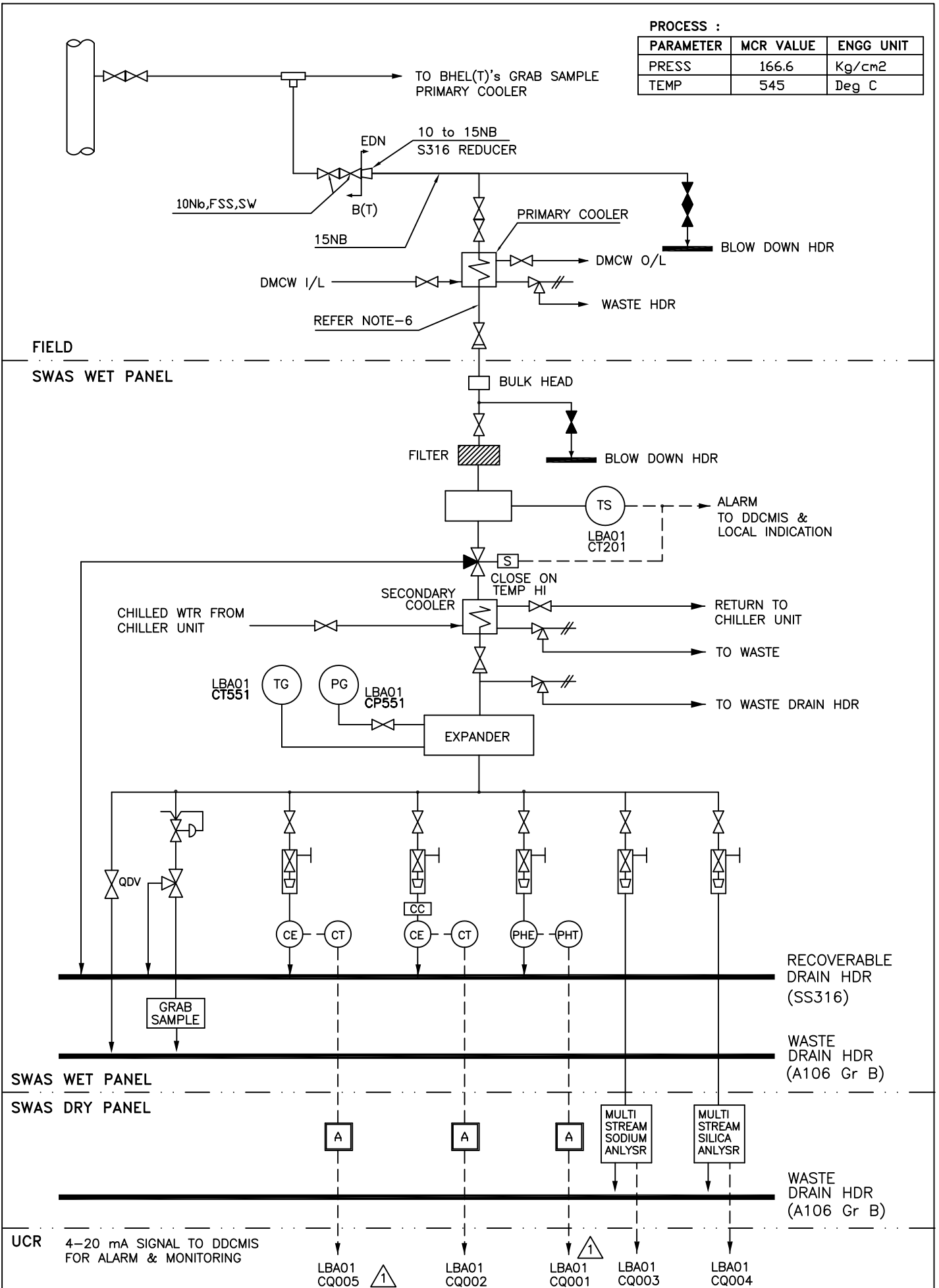
**PROCESS :**

PARAMETER	MCR VALUE	ENGG UNIT
PRESS	280	Kg/cm <sup>2</sup>
TEMP	170	Deg C



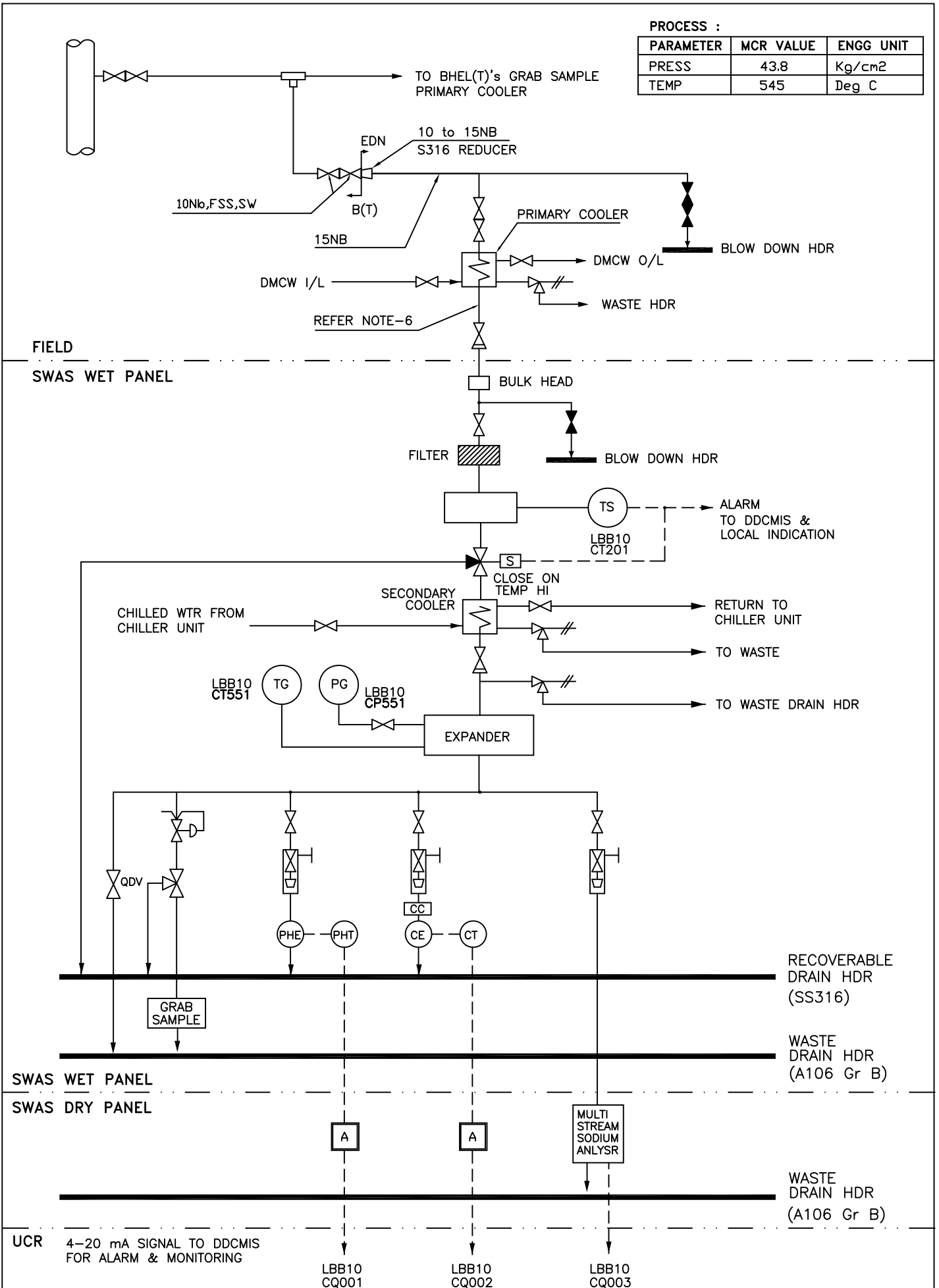
PROCESS :

PARAMETER	MCR VALUE	ENGG UNIT
PRESS	166.6	Kg/cm <sup>2</sup>
TEMP	545	Deg C



PROCESS :

PARAMETER	MCR VALUE	ENGG UNIT
PRESS	43.8	Kg/cm <sup>2</sup>
TEMP	545	Deg C



UCR 4-20 mA SIGNAL TO DDCMIS FOR ALARM & MONITORING

LBB10 CQ001

LBB10 CQ002

LBB10 CQ003



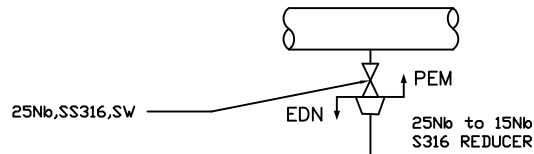
TELANGANA STATE POWER GENERATION CORPORATION LTD  
4x270 MW, BHADRADRI

TITLE SWAS SCHEMES SAT/HRH STEAM

DRG. NO. PE-DG-411-145-1110  
SHEET 8 OF 15 REV 00

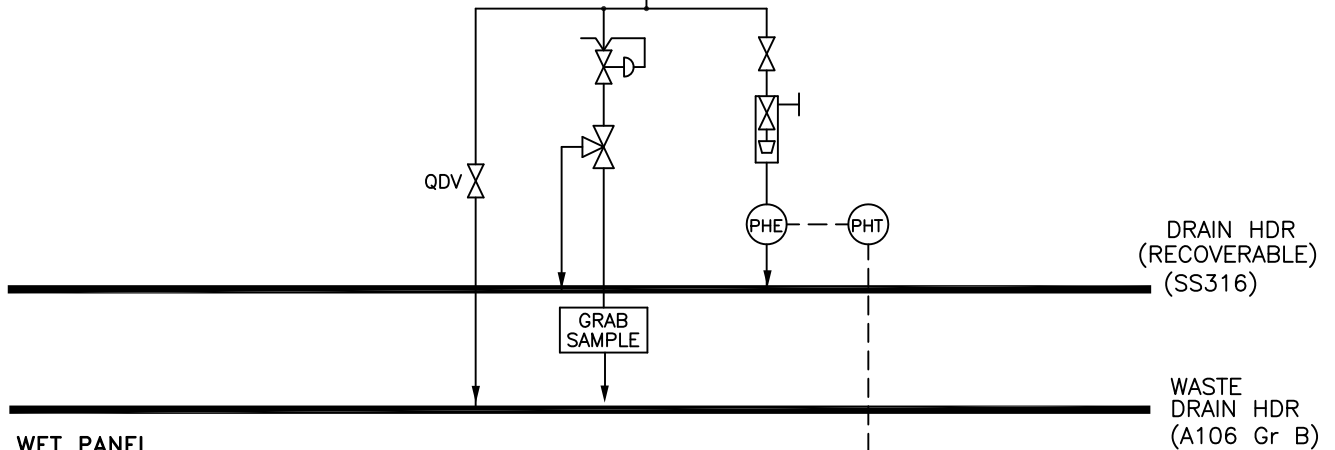
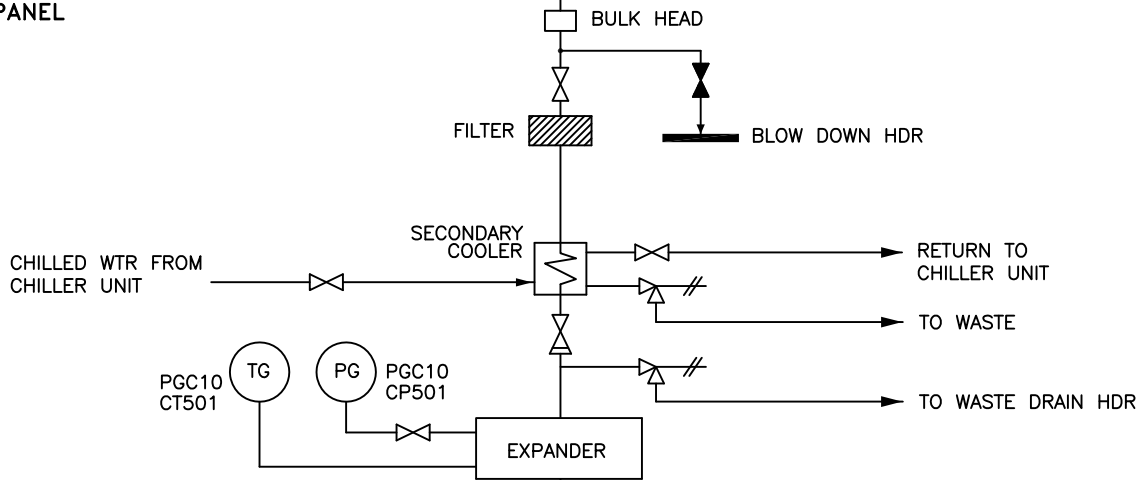
PROCESS :

PARAMETER	MCR/DESGN	ENGG UNIT
PRESS	9.5/12	Kg/cm <sup>2</sup>
TEMP	45/50	Deg C



FIELD

SWAS WET PANEL



SWAS WET PANEL

SWAS DRY PANEL

UCR 4-20 mA SIGNAL FOR ALARM & MONITORING TO DDCMIS

PGC10 CQ001



TELANGANA STATE POWER GENERATION CORPORATION LTD  
4x270 MW, BHADRADRI

TITLE

SWAS SCHEMES  
DMCW PUMP DISCH HDR

DRG. NO.

PE-DG-411-145-1110

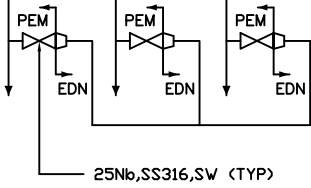
SHEET 9 OF 15

REV 00

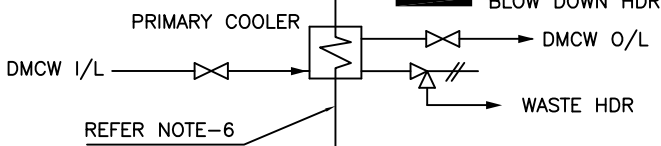


PROCESS :

PARAMETER	MCR/DESGN	ENGG UNIT
PRESS	6.8 / 11	Kg/cm <sup>2</sup>
TEMP	163 / 170	Deg C



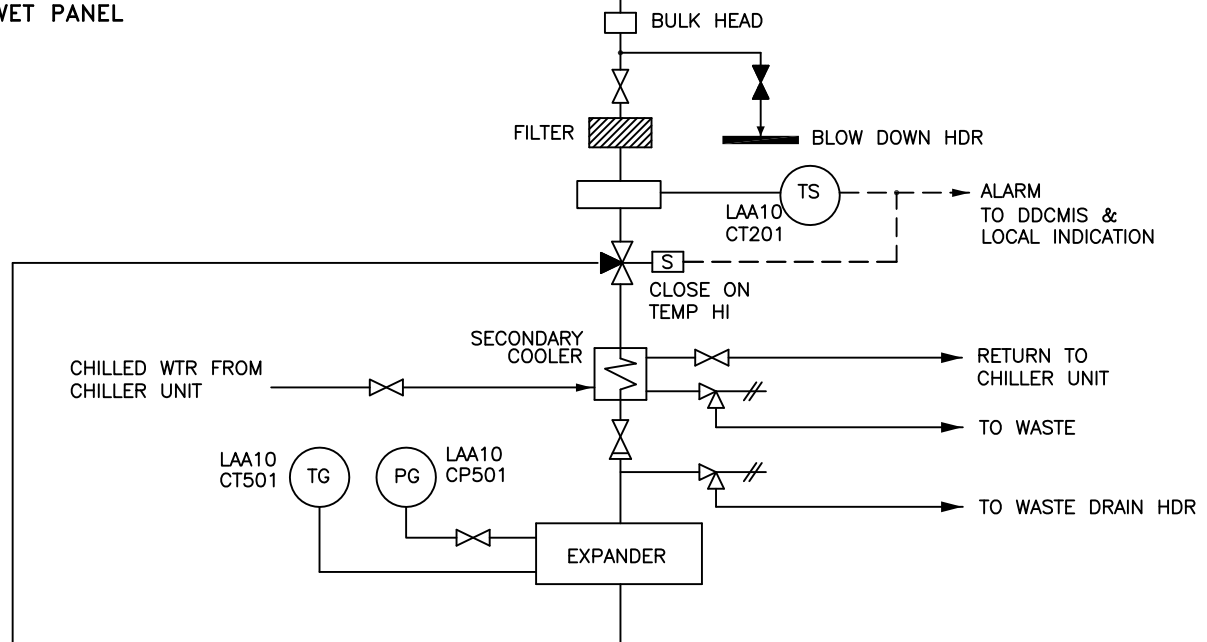
15NB



REFER NOTE-6

FIELD

SWAS WET PANEL



CHILLED WTR FROM CHILLER UNIT

SECONDARY COOLER

EXPANDER

LAA10 CT501 (TG)

LAA10 CP501 (PG)

ALARM TO DDCMIS & LOCAL INDICATION

CLOSE ON TEMP HI

RETURN TO CHILLER UNIT

TO WASTE

TO WASTE DRAIN HDR

QDV

GRAB SAMPLE

DOE (DOE) DOT (DOT)

RECOVERABLE DRAIN HDR (SS316)

WASTE DRAIN HDR (A106 Gr B)

SWAS WET PANEL

SWAS DRY PANEL

A

WASTE DRAIN HDR (A106 Gr B)

UCR 4-20 mA SIGNAL TO DDCMIS FOR ALARM MONITORING

LAA10 CQ011



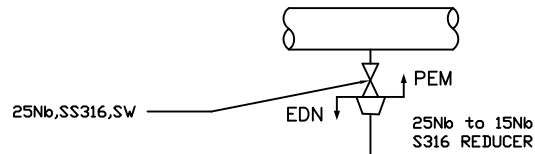
TELANGANA STATE POWER GENERATION CORPORATION LTD  
4x270 MW, BHADRADRI

TITLE SWAS SCHEMES  
DEAERATOR OUTLET

DRG. NO. PE-DG-411-145-1110  
SHEET 10 OF 15 REV 00

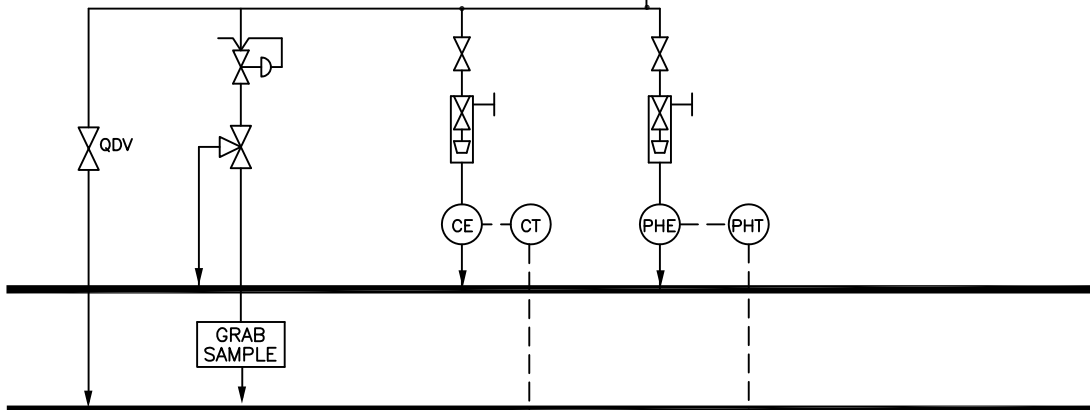
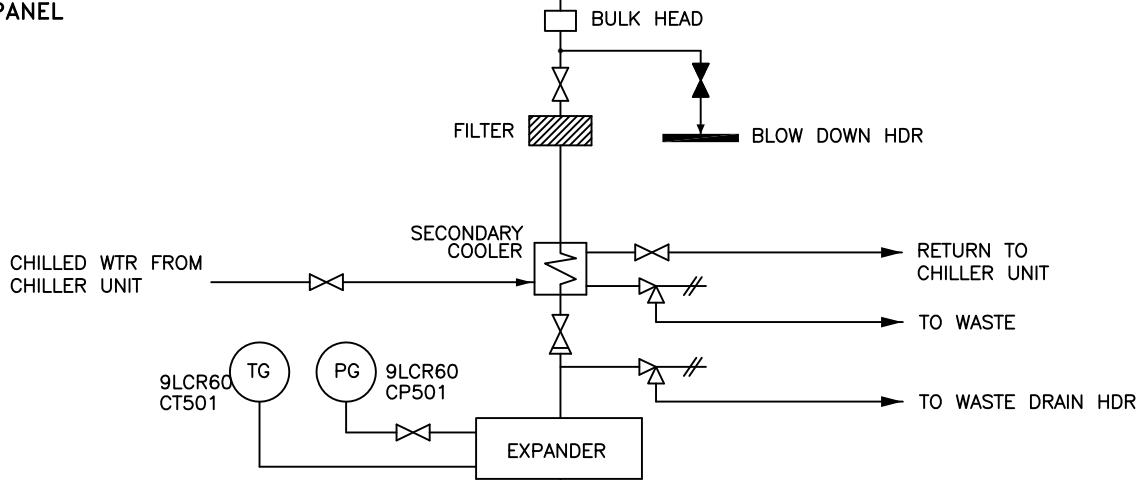
PROCESS :

PARAMETER	MCR/DESIGN	ENGG UNIT
PRESS	10	Kg/cm <sup>2</sup>
TEMP	55	Deg C



FIELD

SWAS WET PANEL



SWAS WET PANEL

SWAS DRY PANEL



RECOVERABLE  
DRAIN HDR  
(SS316)

WASTE  
DRAIN HDR  
(A106 Gr B)

WASTE  
DRAIN HDR  
(A106 Gr B)

UCR 4-20 mA SIGNAL TO DDCMIS  
FOR ALARM & MONITORING

9LCR60  
CQ001

9LCR60  
CQ002



TELANGANA STATE POWER GENERATION  
CORPORATION LTD  
4x270 MW, BHADRADRI

TITLE

SWAS SCHEMES  
DM MAKE-UP WATER

DRG. NO.

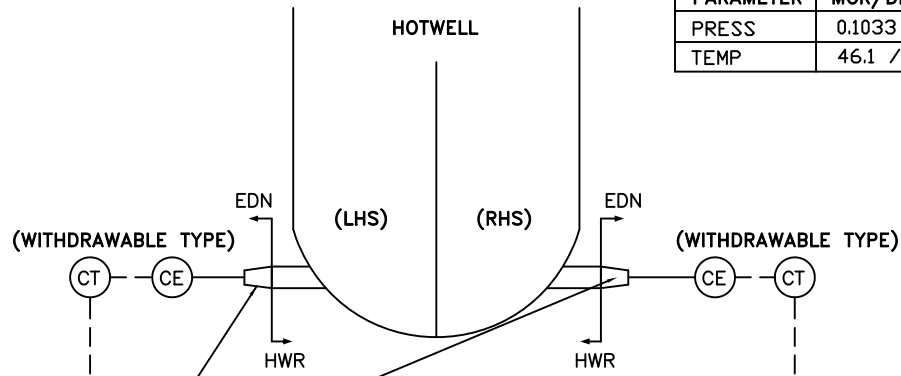
PE-DG-411-145-1110

SHEET 11 OF 15

REV 00

PROCESS :

PARAMETER	MCR/DESIGN	ENGG UNIT
PRESS	0.1033 / 7	Kg/cm <sup>2</sup>
TEMP	46.1 / 55	Deg C



SUITABLE ADAPTER SHALL BE PROVIDED ALONG WITH PROBE FOR TAPPING POINT SIZE= 1 1/4" (SCREWED)  
 LENGTH OF PROBE SHALL BE DECIDED CONSIDERING HOTWELL WALL THK + STUB HEIGHT + LENGTH OF ADAPTER.

FIELD

SWAS DRY PANEL



UCR

4-20 mA SIGNAL  
 FOR ALARM &  
 MONITORING TO DDCMIS

MAG11  
 CQ001

MAG12  
 CQ001



TELANGANA STATE POWER GENERATION  
 CORPORATION LTD  
 4x270 MW, BHADRADRI

TITLE

SWAS SCHEMES  
 HOTWELL

DRG. NO.

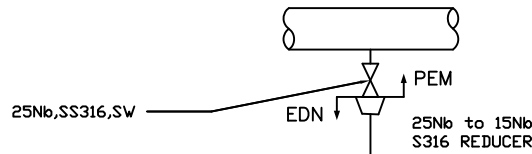
PE-DG-411-145-1110

SHEET 12 OF 15

REV 00

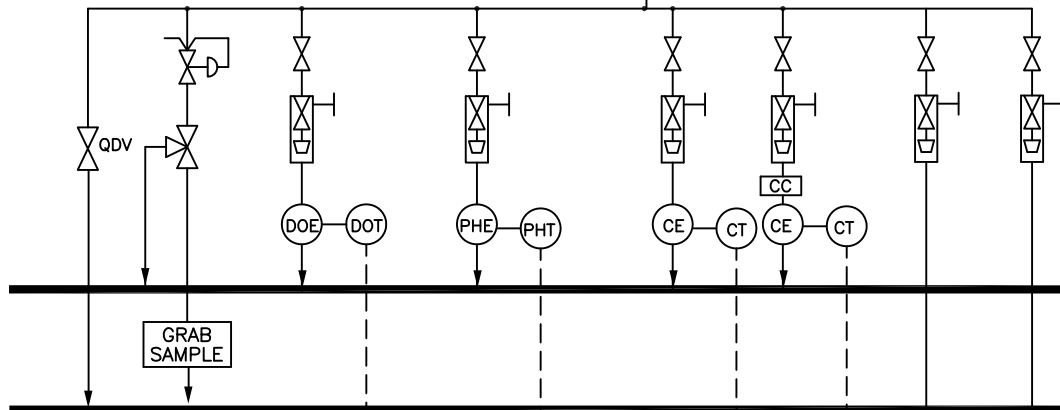
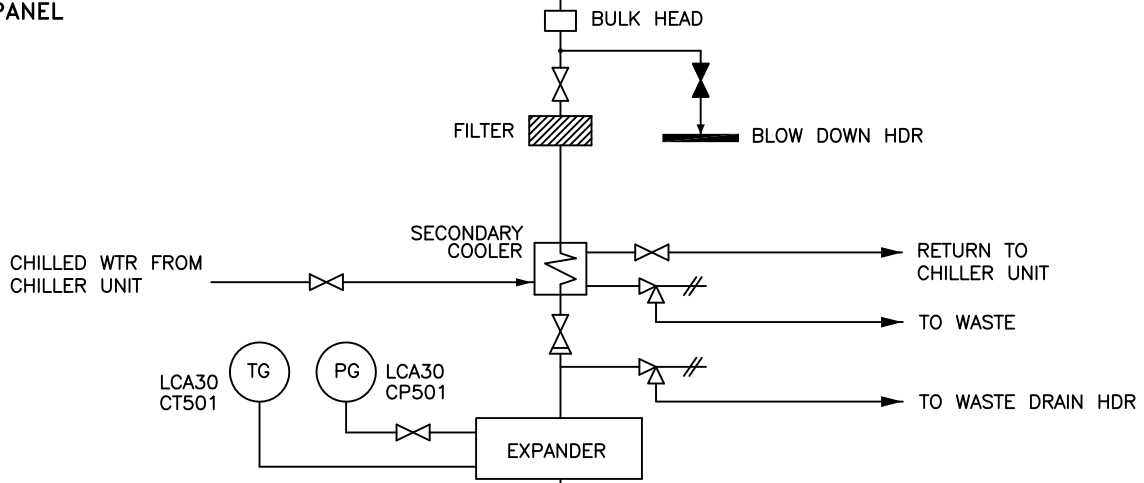
PROCESS :

PARAMETER	MCR/DESIGN	ENGG UNIT
PRESS	18.3/ 28	Kg/cm <sup>2</sup>
TEMP	46.3/ 60	Deg C



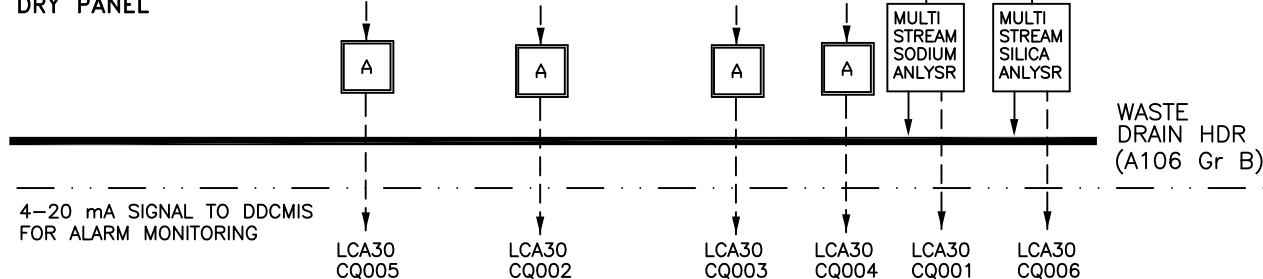
FIELD

SWAS WET PANEL



SWAS WET PANEL

SWAS DRY PANEL



UCR 4-20 mA SIGNAL TO DDCMIS FOR ALARM MONITORING



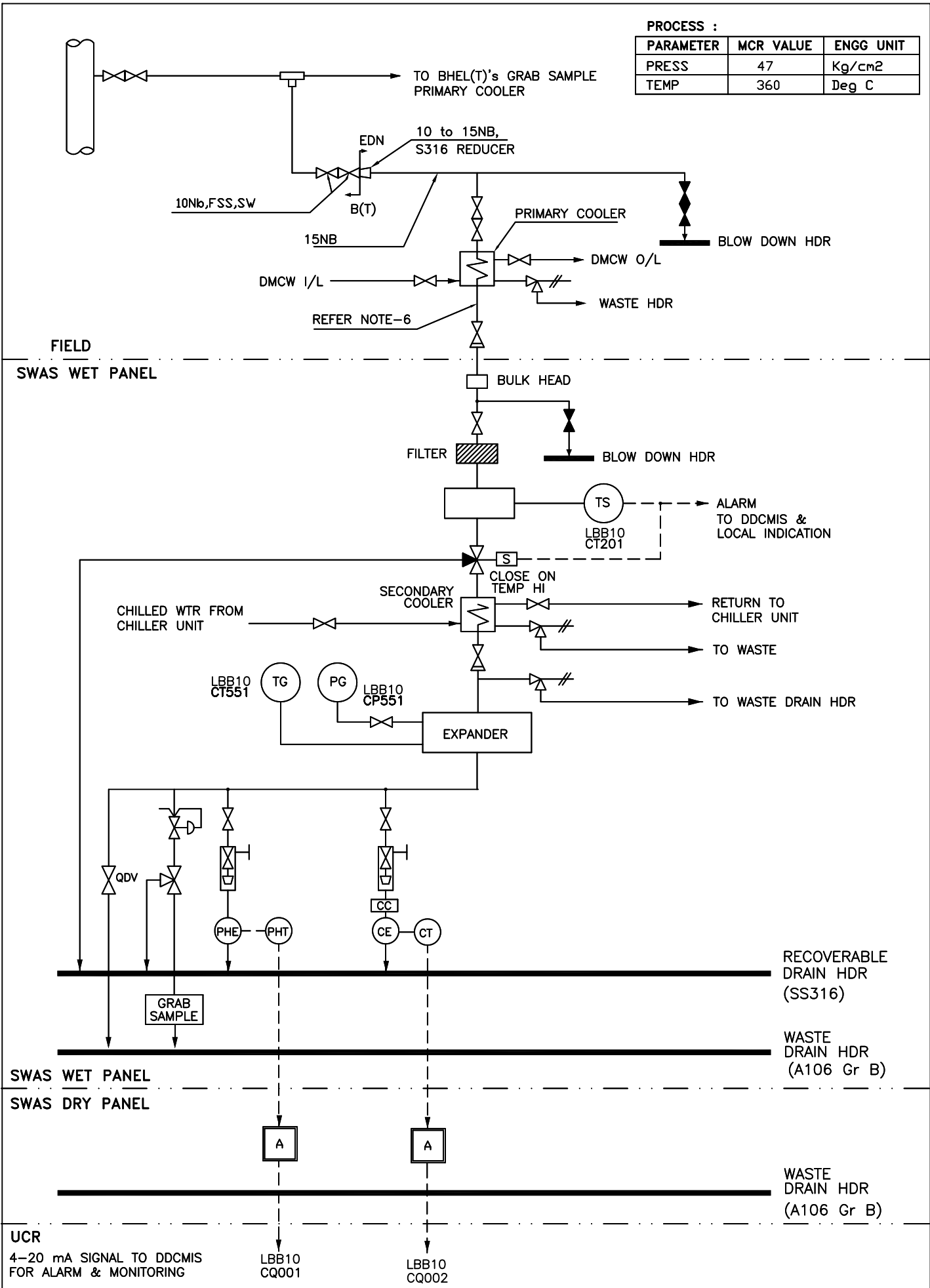
TELANGANA STATE POWER GENERATION CORPORATION LTD  
4x270 MW, BHADRADRI

TITLE  
SWAS SCHEMES  
CONDENSATE DISCHARGE

DRG. NO.  
PE-DG-411-145-1110  
SHEET 13 OF 15 REV 00

PROCESS :

PARAMETER	MCR VALUE	ENGG UNIT
PRESS	47	Kg/cm <sup>2</sup>
TEMP	360	Deg C



UCR  
4-20 mA SIGNAL TO DDCMIS  
FOR ALARM & MONITORING

LBB10 CQ001  
LBB10 CQ002



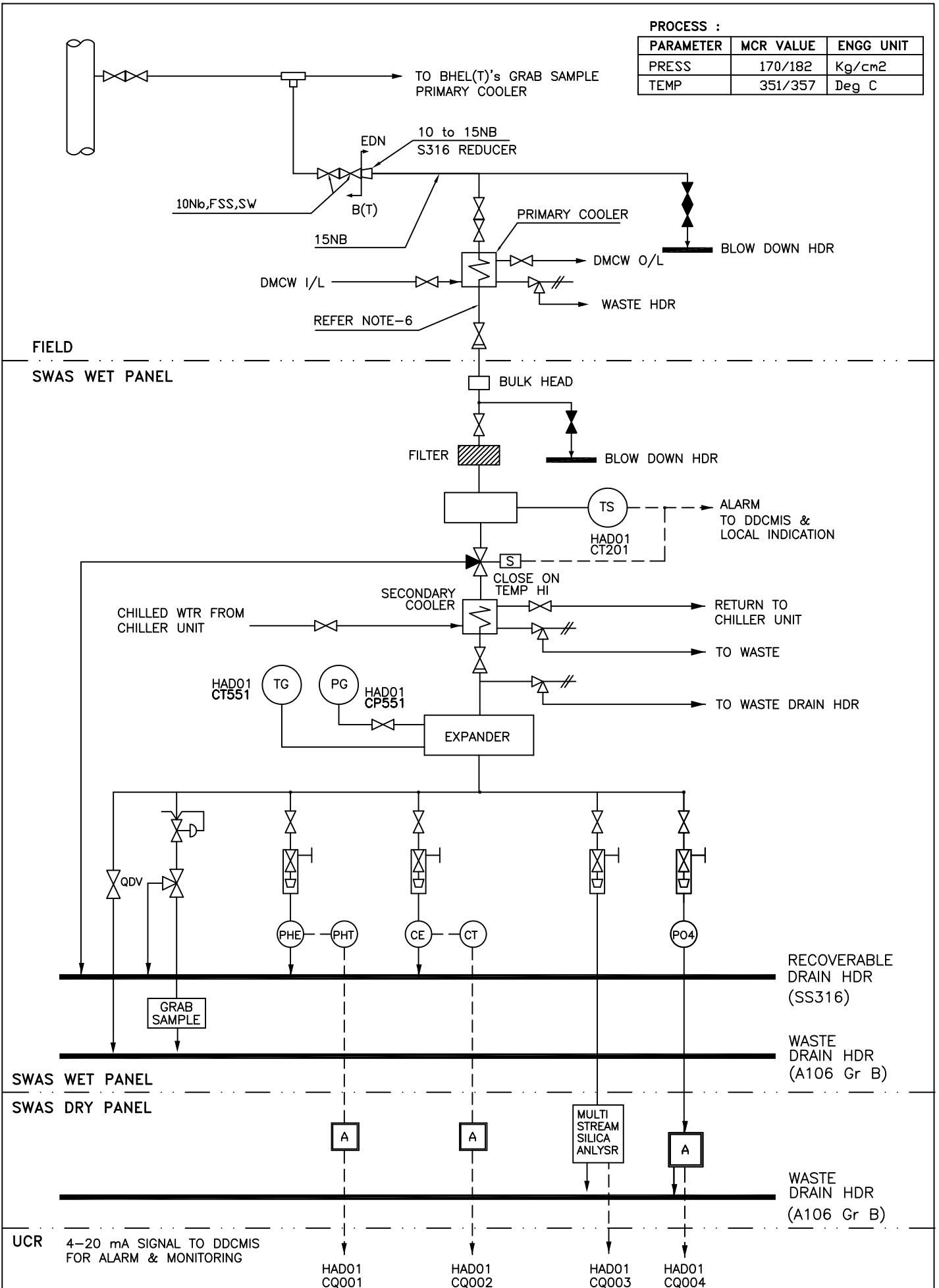
TELANGANA STATE POWER GENERATION CORPORATION LTD  
4x270 MW, BHADRADRI

TITLE  
SWAS SCHEMES  
RH STEAM

DRG. NO.  
PE-DG-411-145-1110  
SHEET 14 OF 15 REV 00

PROCESS :

PARAMETER	MCR VALUE	ENGG UNIT
PRESS	170/182	Kg/cm <sup>2</sup>
TEMP	351/357	Deg C



**SECTION - F**

**MANDAORY SPARES FOR SWAS - BHADRADRI**

SL.NO.	DESCRIPTION	TOTAL QTY FOR FOUR UNITS
1	SWAS Hardware	
(i)	High Pressure Reducing Valve	20 nos.
(ii)	Primary Cooler	2 nos. of each type
(iii)	Filter element	60 nos.
(v)	Pressure Gauge, Pressure Switch, Temperature Gauge, Temperature Switch, Sample Relief Valve, Back Pressure regulating valves, blow down valves, 3 way grab sample valves, Solenoid Valve,	4 nos. of each item and type/rating used in the system

Note :-

- 1.0 Vendors to quote unit rates for all items individually.
- 2.0 Vendors who do not quote prices as per pt. 1, shall be disqualified.

## SECTION G

### LOOSE SUPPLY ITEMS FOR SWAS

SL. NO	DESCRIPTION	QTY / UNIT(Boiler)
1	Power Cable to SWAS panels	25 Meter
2	Power Cable to Chiller	25 Meter
3	Special Cables between wet and dry panel . (for each cell / analyser Combination)	30 Meter/ run
4	All cabling and Tubing between wet and dry panel	20 Meter / run
5	Cooling water header, A 106 Gr. B, 2 " NB Sch 40 (between nearest tapping point & chiller and chiller & Wet panel )+ Elbows (20 Nos) and Bends(10 Nos) .	60 Meter
6	Waste drain header (Wet panel ) , A 106 Gr. B , 2" NB SCH 40 + Elbows ( 3 Nos)	20 Meter
7	Blow down header(Primary Racks) , SS 304 , 2" NB SCH 160 + Elbows (3 Nos)	20 Meter
8	Blow down header(Wet Panel) , SS 304 , 2" NB SCH 40 + Elbows (3 Nos)	20 Meter
9	Recoverable drain header , SS 316 , 2" NB SCH 40 + Elbows ( 3 Nos. )	20 Meter
10	Waste Drain header (analyser Panel) A 106 Gr. B , 2" NB SCH 40 + Elbows ( 6 Nos. )	20 Meter
11	Waste drain header( Primary Racks)) , A 106 Gr. B , 2" NB SCH 40 + Elbows ( 3 Nos)	20 Meter

Note :-

- 1.0 Vendors to quote unit rates for all items individually.
- 2.0 Vendors who do not quote prices as per pt. 1, shall be disqualified.

## SECTION - H

### FURNITURE FOR SWAS ROOM

<b>Sl. No.</b>	<b>Item</b>	<b>Quantity per Unit(Boiler)</b>
1	STEEL ALMIRAH	2 Nos.
2	STEEL CABINET	2 Nos.
3	TABLE	2 Nos.
4	OPERATOR CHAIRS	4 Nos.

**SECTION – I**

**PACKING STANDARD**



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## PLANT STANDARD

ED 049 00 99

REV NO 10

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## REVISION HISTORY SHEET

REV NO.	DATE	NATURE OF CHANGE	REASONS	CHANGED BY	APPROVED BY
00	06/03/92	SUPERCEDES 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.

REV-10

APPROVED: M. Sivaramaiah

PREPARED: HRN

ISSUED: STDS GROUP

DATE: 21/06/13



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## PLANT STANDARD

ED 049 00 99

REV NO 10

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- 2.2.8 Distance between any 2 binding planks shall be less than 750 mm. As shown in Fig-3, diagonal planks shall be used in between vertical binding planks when distance between inner to inner of vertical planks is more than 750 mm
- 2.2.9 Distance of the outer edges of these planks from the edge of case shall be less than 250 mm.
- 2.2.10 Diagonal planks are not required for top planks and width side also, if the width of pallet is less than 750 mm.
- 2.2.11 **Jointing of planks:** Single length planks shall be used for cubicles whose overall length is less than 2400 mm. For cubicles of length more than 2400 mm, jointing is permitted. The jointing shall be done with one single or maximum of 2 planks of wood same as other planks of width 250 mm (minimum) with two rows of nails on either side of the joint in zigzag manner. From the joint along height side it shall be of lap joint with over lap of at least the width of plank.
- 2.2.12 **Tongue and Groove joints:** Two Consecutive planks shall be joined by tongue and groove joint. Depth of tongue shall be  $12 \pm 1$  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



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## PLANT STANDARD

ED 049 00 99

REV NO 10

PAGE 3 OF 28

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

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

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

Arsenic Pent oxide	$AS_2O_5 \cdot 2H_2O$	12.5
Copper Sulphate	$CuSO_4 \cdot 5H_2O$	37.5
Sodium Dichromate	$Na_2Cr_2O_7 \cdot 5H_2O$	50.0
Or		
Potassium Dichromate	$K_2Cr_2O_7$	

### 2.5 OTHER MATERIALS:

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



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2.5.6 FASTENERS: Bolts, double nuts, spring washers will have to be used for packing of some special items like transformers, reactors, breakers, etc., to hold the job to the bottom plank of the box. The bolts, nuts, washers will be provided by BHEL. However, drilling of holes will have to be done using contractor's tools.

2.5.7 POLYETHYLENE SHEET: The polyethylene sheets are used to make covers to the jobs individually. The material shall have a thickness of 0.175 mm (175 microns). The polyethylene sheet shall be clear and transparent.

2.5.8 BITUMINISED WATER PROOF KRAFT PAPER: This is used for lining the inside of shoots of cubicles.

2.5.9 BITUMEN COATED HESSIAN POLYETHYLENE KRAFT PAPER: This is used for lining the inside of top planks of cubicles and for lining of all inner sides of boxes.

2.5.10 RUBBERISED COIR: The rubberized coir is used as cushioning material. For the packing of loose items, items are to be arrested by using rubberized coir. For the packing of cubicles rubberized coir of thickness 25mm and width 75mm shall be used.

2.5.11 FOAM RUBBER / 'U' FOAM: This is used for covering the delicate items. This material is normally provided by BHEL.

2.5.12 THERMOCOL (EXPANDED POLYSTYRENE) SHEETS: This is used for covering delicate items. This material is normally provided by BHEL.

2.5.13 MARKING PLATE: This shall be of anodized aluminum sheet. Details and specifications are given in Fig-5.

2.5.14 PACKING SLIP HOLDER: This shall be of galvanized iron /tinned

2.5.15 SILICA GEL: This shall be of indicating type.

2.5.16 COTTON BAGS: These are used for holding silica gel. The bags shall have the following matter indicated them:

-----  
BHEL-EDN, BANGALORE - 5 60 026

SILICA GEL INDICATING TYPE

BLUE : ACTIVE

ROSE : REDUCED ACTIVITY

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



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

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

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

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

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

**3. 0 PACKING SPECIFICATIONS:** Different types of packing are used as follows:

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

**3.1 PACKING OF CUBICLES WITH RUBBER WOOD:**

3.1.1 The packing is to be done as per clause 2.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.



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



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

Wood shall be Silver oak/ Pine wood instead of rubber wood.

- Double polyethylene petticoat instead of one.

- Fumigation may have to be done if required ( BHEL Scope).

3.3 Different types of Cubicles with sizes for Packing

-----  
SL TYPE OF CUBICLE VARIANT DIMENSIONS [Internal sizes]  
-----

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

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

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

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

3.4.3 Chemical treatment as per clause 2.4 to be done.

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

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

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

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

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



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

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

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

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

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

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

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

3.4.15 Loose items to be kept inside the cubicle

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



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

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

3.6 **PACKING OF PHOTO VOLTAIC PANELS, ETC.USING RUBBER WOOD:**

Same as 3.4 above except for the following changes:

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

3.7 **PACKING USING BITUMEN COATED HESSIAN POLYETHYLENE KRAFT PAPER:**

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

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

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

3.8 **SUPPLY OF RUBBER WOOD PALLETS FOR EMPTY CUBICLES:**

3.8.1. The wood shall be rubber wood.

3.8.2. Thickness of planks shall be  $25 \pm 2$  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.

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

### 3.9 PACKING OF SEMICONDUCTOR DEVICES

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

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

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

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

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

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

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

**Additional points to be taken care for :**

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

(Recommendations from Corporate Systems & IT)

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

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

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



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### 5.0 DETAILS OF DRAWINGS/FIGURES ENCLOSED

FIG-1: Details Of Cubicle Packing Box

FIG-2: Binding Of Panel

FIG-3: Lifting Of Packed Case

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

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

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

FIG-4: Lifting And Moving Un Packed Case

FIG-5: Marking Plate

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

FIG-7: Mechanical Latching Clamp

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



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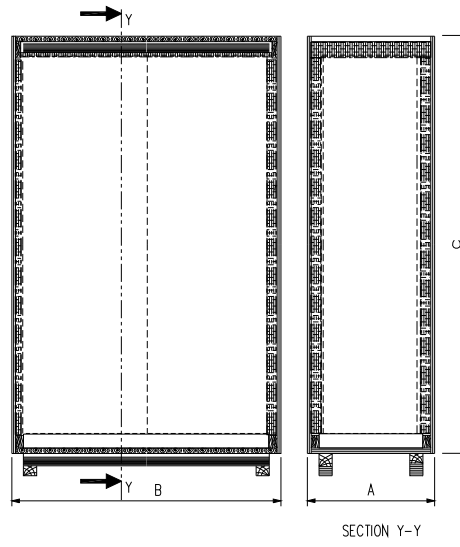


FIG-1 : DETAILS OF CUBICLE PACKING BOX.



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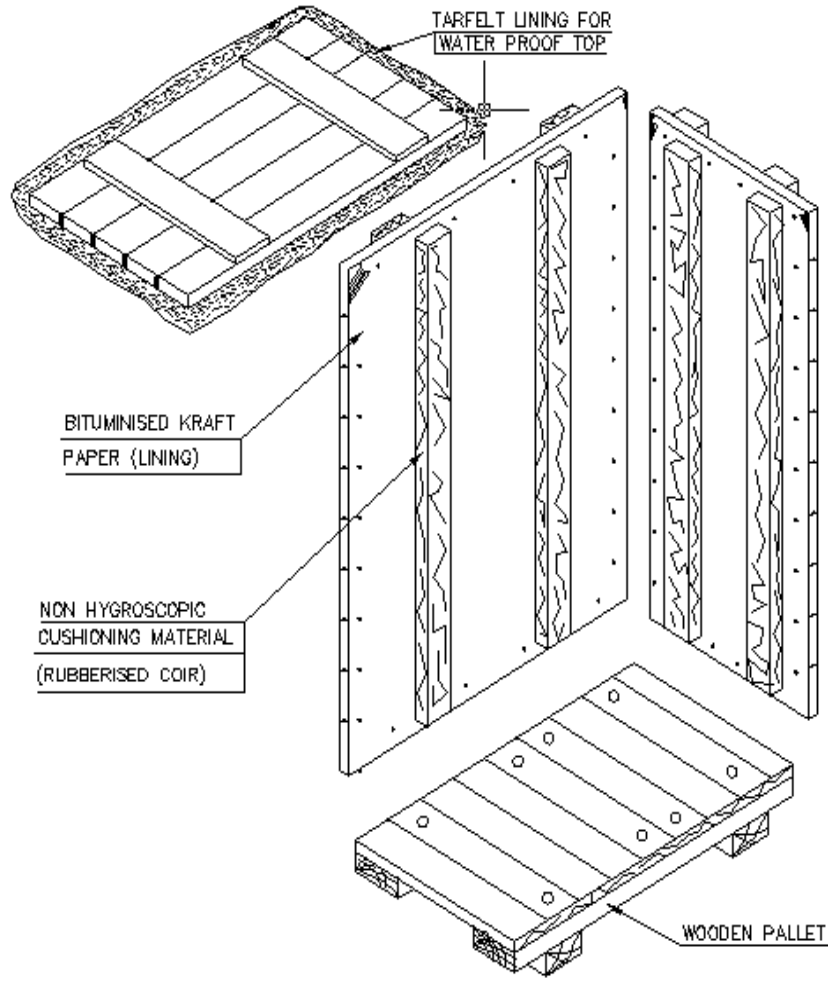


Fig. 2 : Binding of Panel

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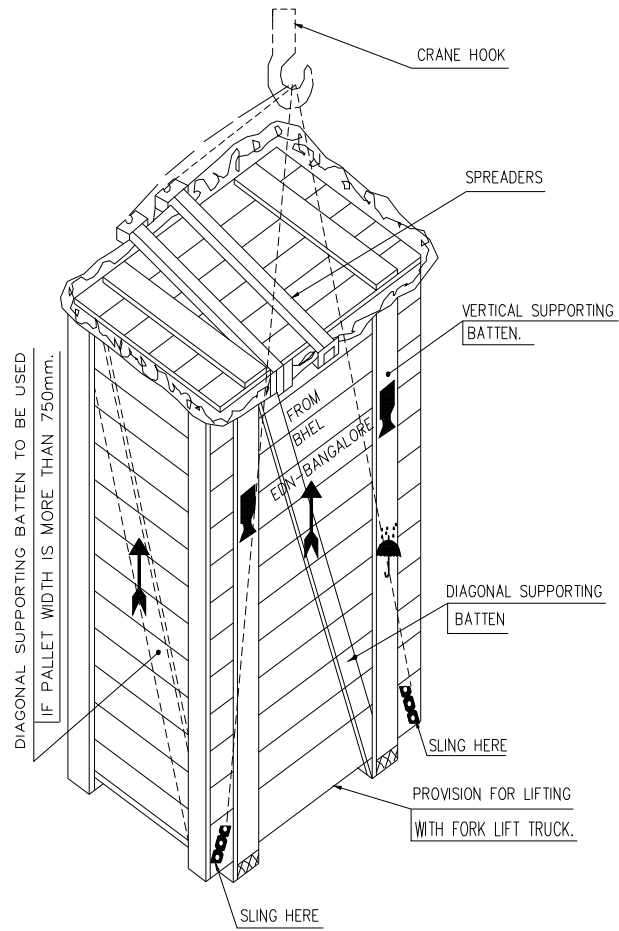


FIG-3 : LIFTING OF PACKED CASE.



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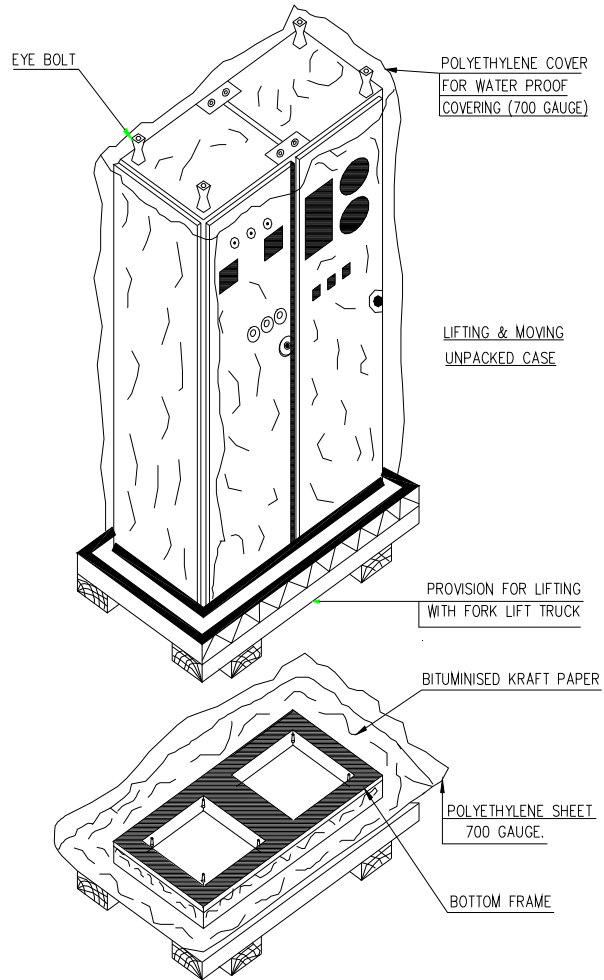


FIGURE-4

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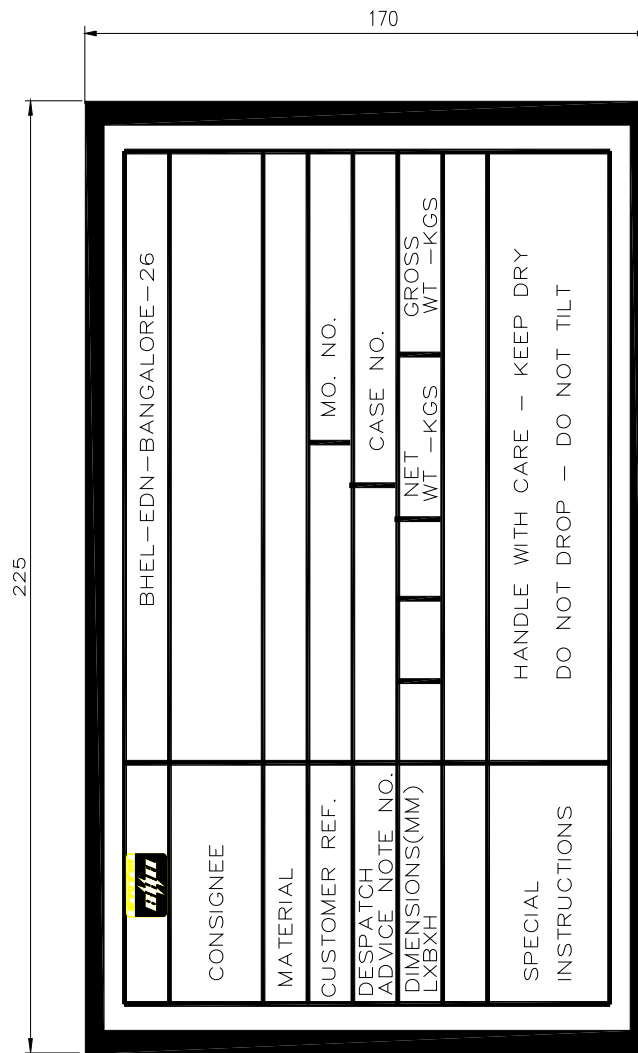


FIG-5 : MARKING PLATE.



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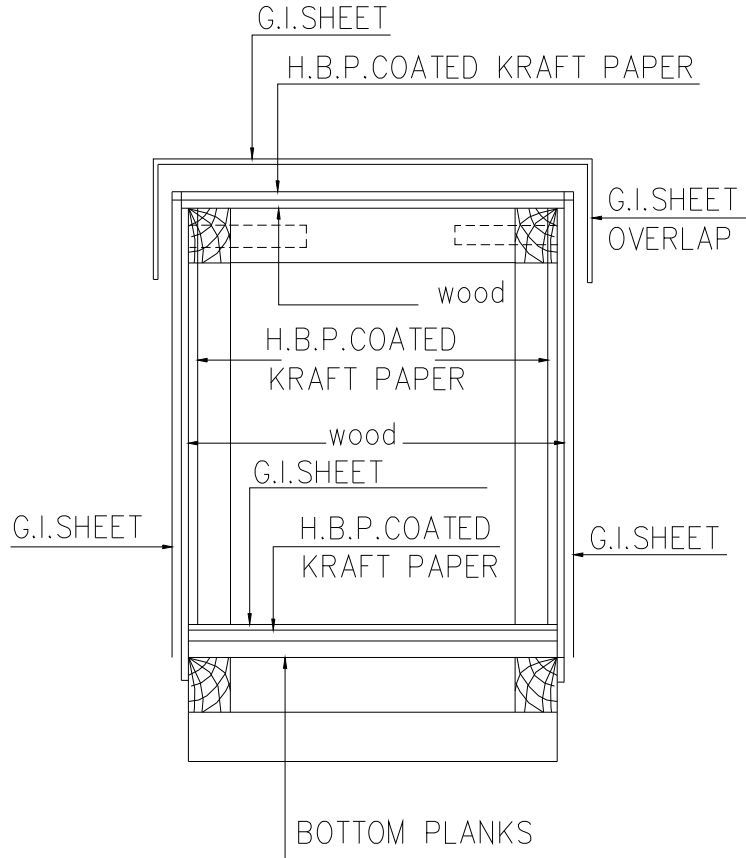


FIG-6 : CLOSED PACKING CASE WITH G.I.SHEET  
SHOWING LAYERS OF PACKING MATERIALS.

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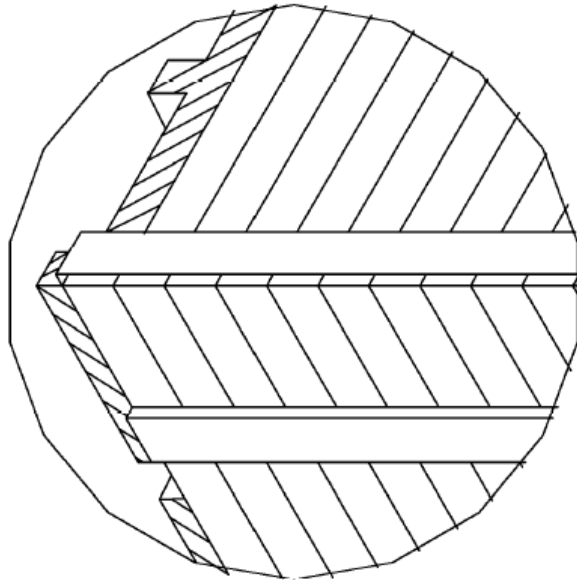
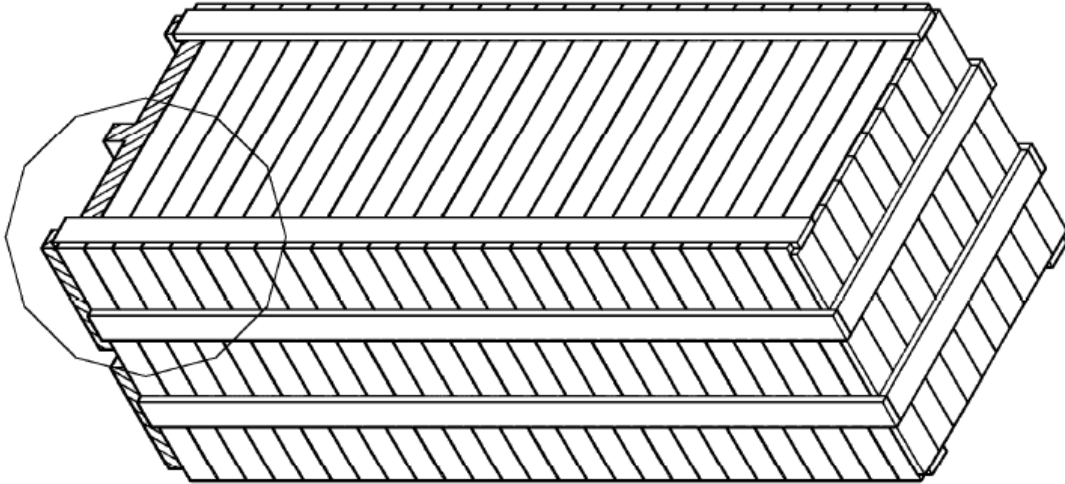


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**Fig – 8 : Single Suit Cubicle Packing View**

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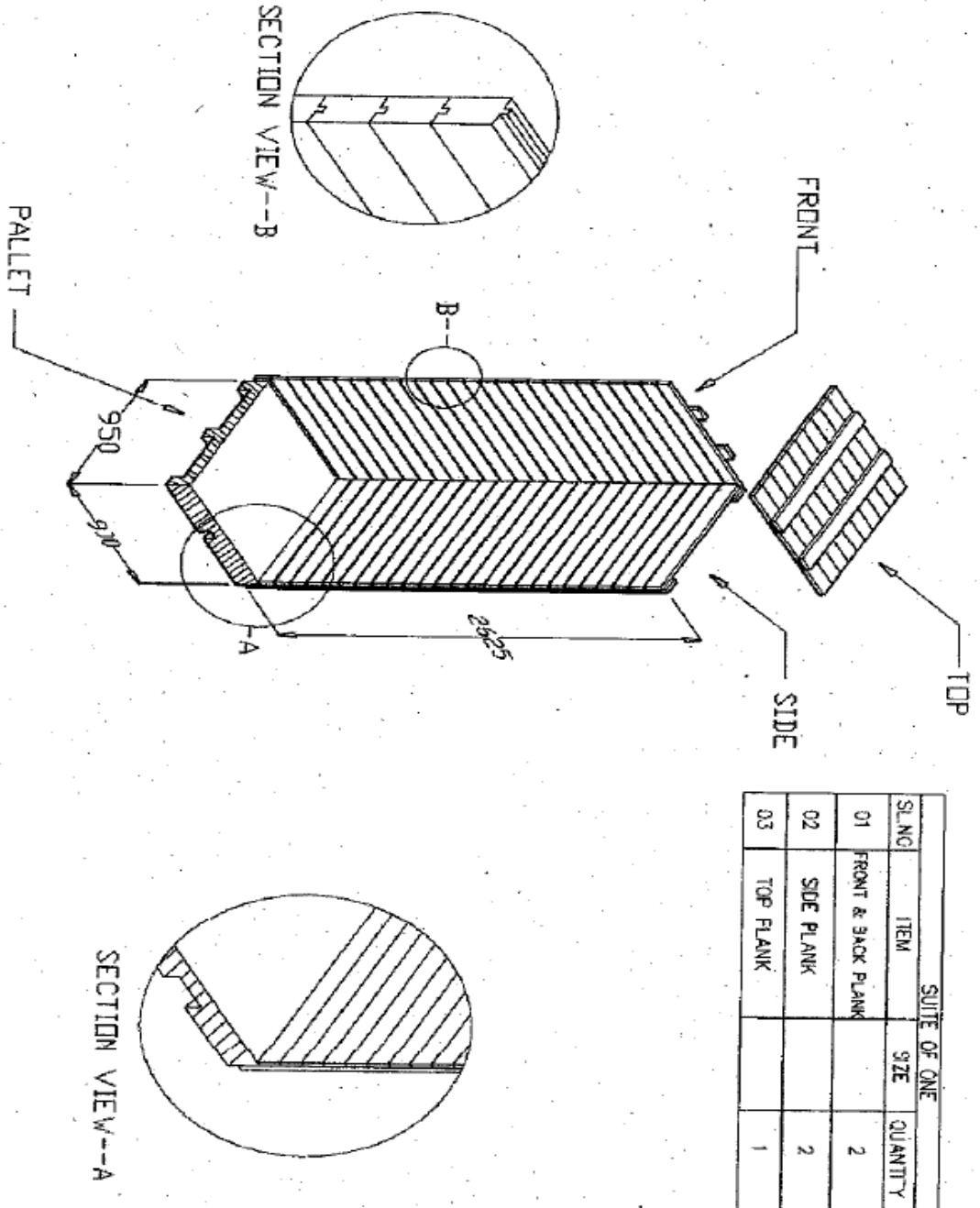
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**Fig - 9 : Single Suit Packing Assembly Drawing**



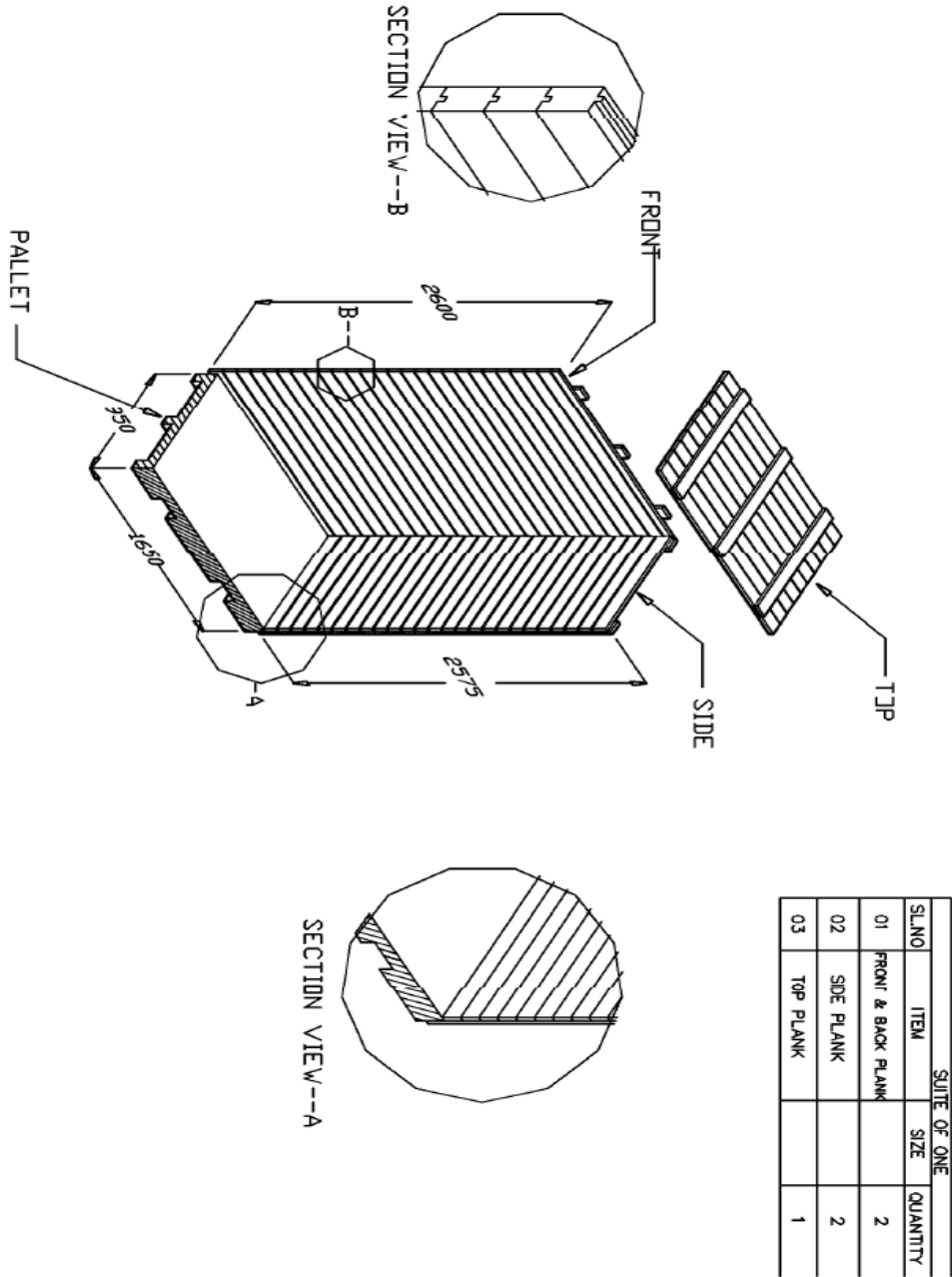
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**Fig – 10 : Two Suit Packing Assembly Details**



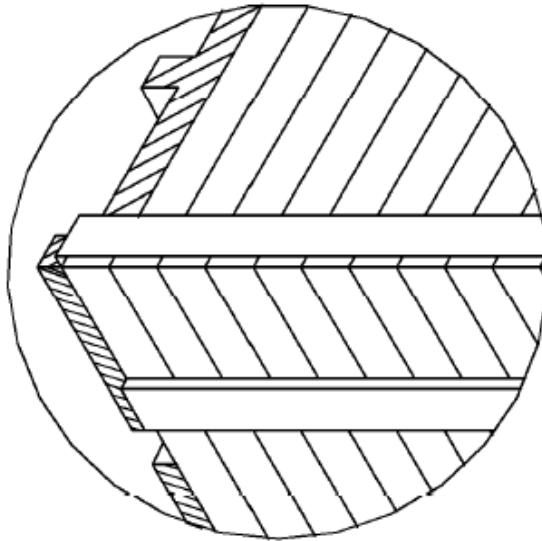
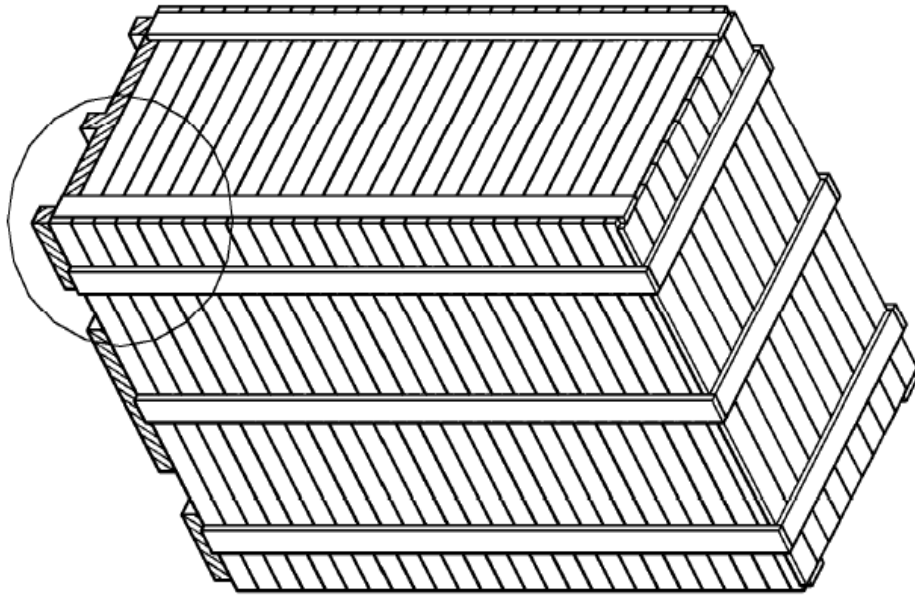
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**Fig – 11 : Two Suit Panel Packed view**



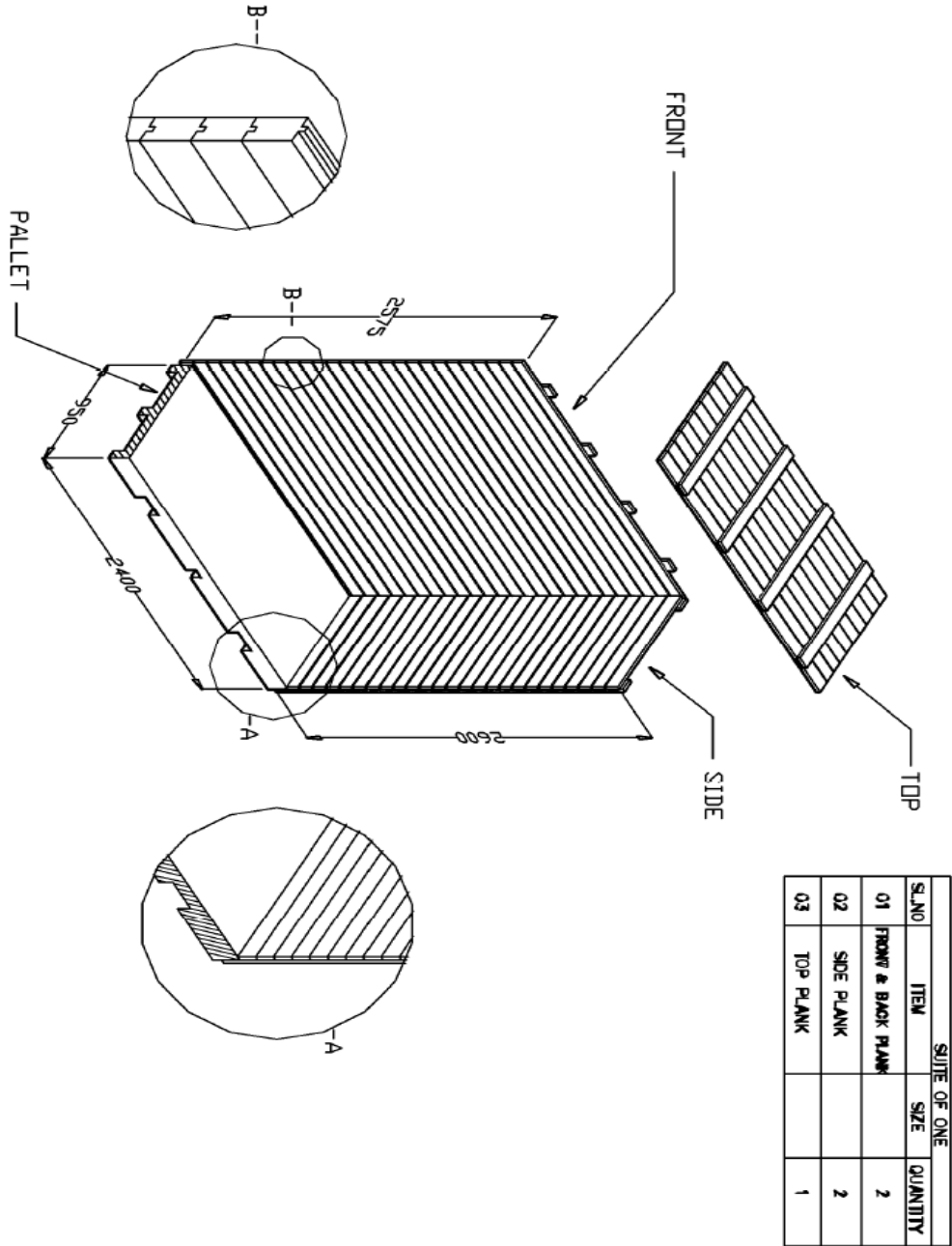
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**Fig – 12 : Three Suit Panel Packing Assembly View**

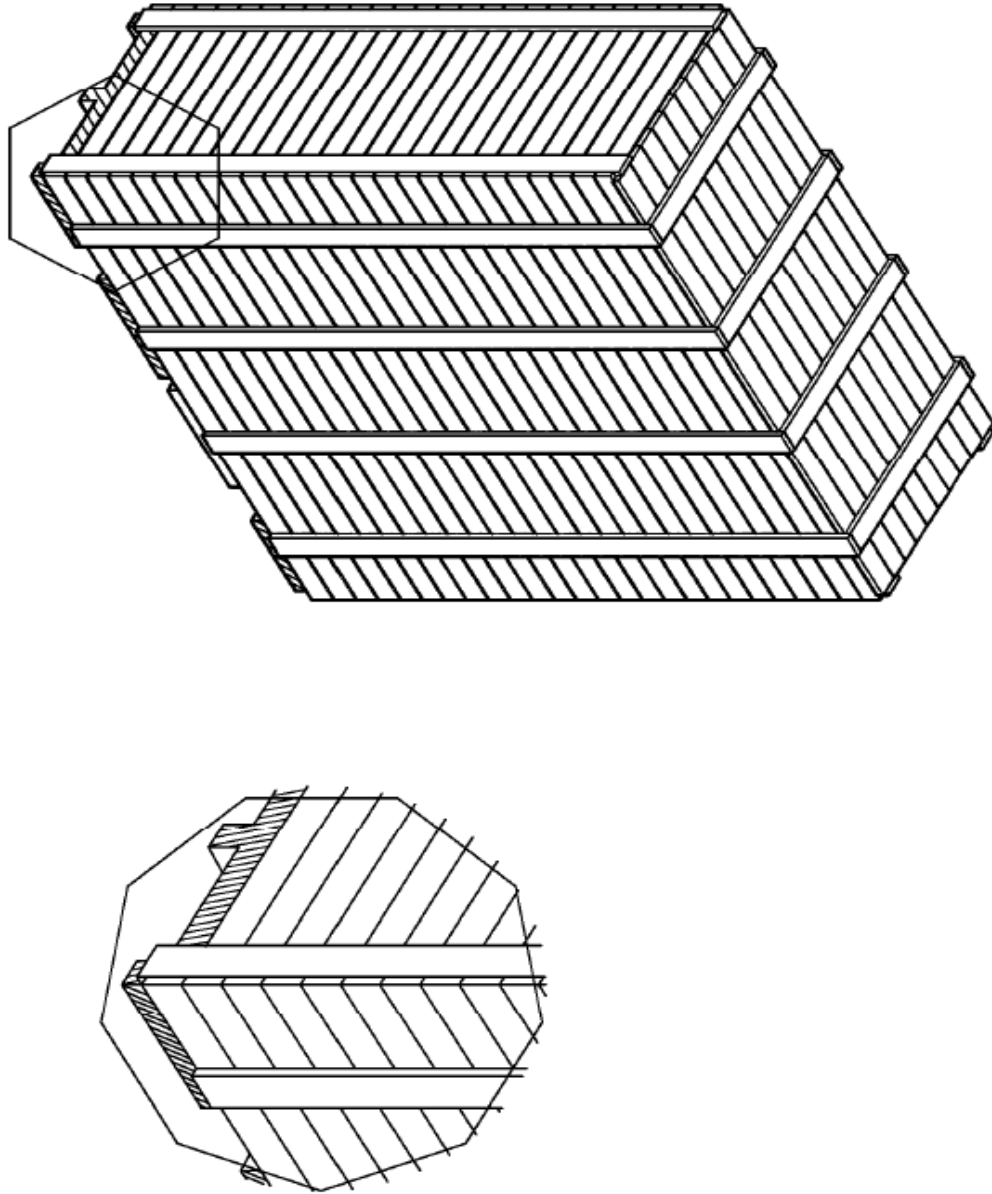


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**Fig -13 : Three Suit Panel Packed View**



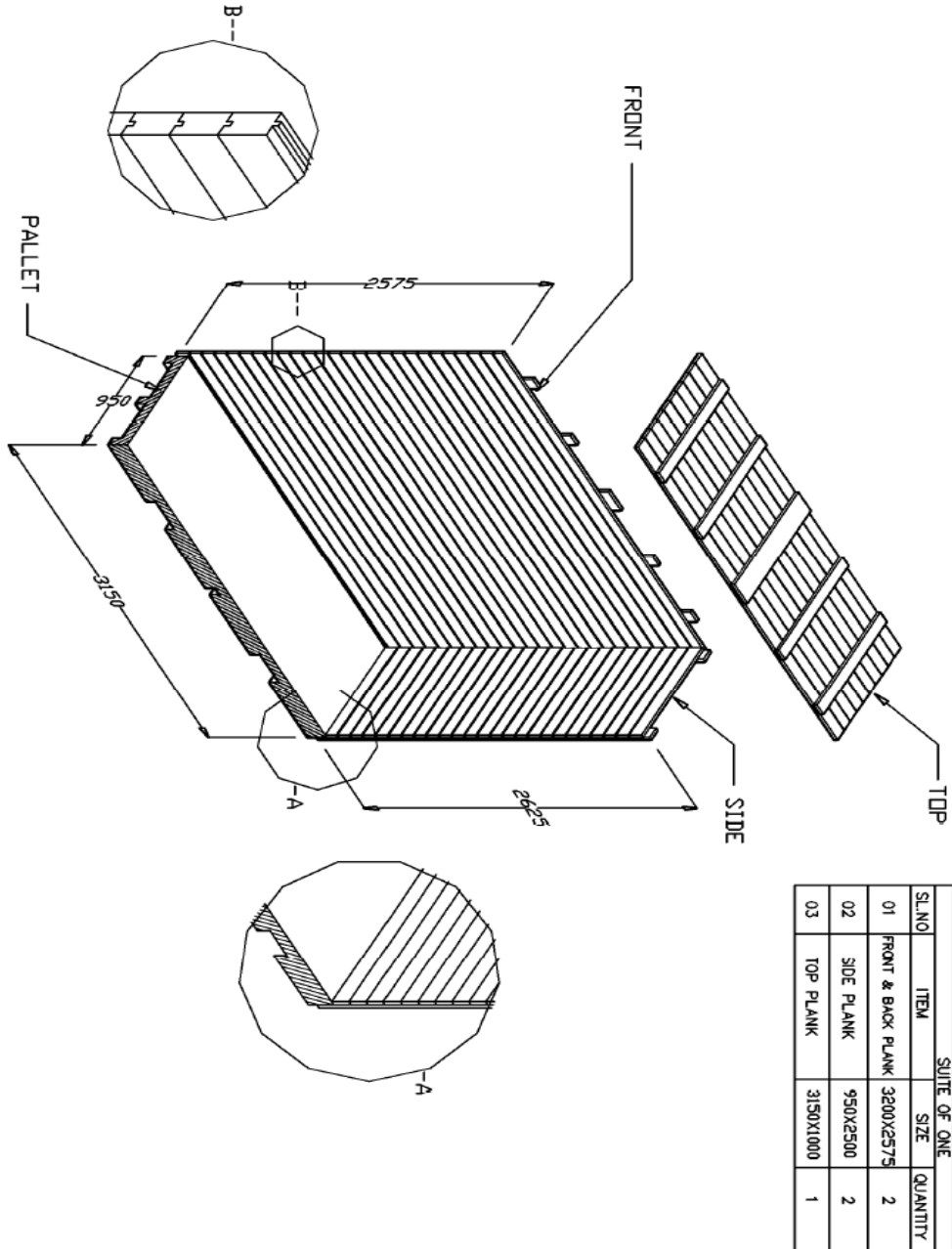
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**Fig – 14 : Four Suit Panel Packing assembly Detail**

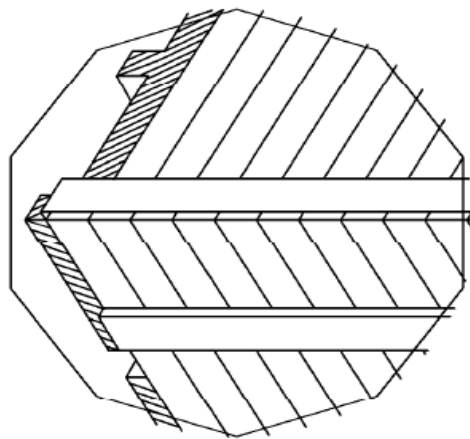
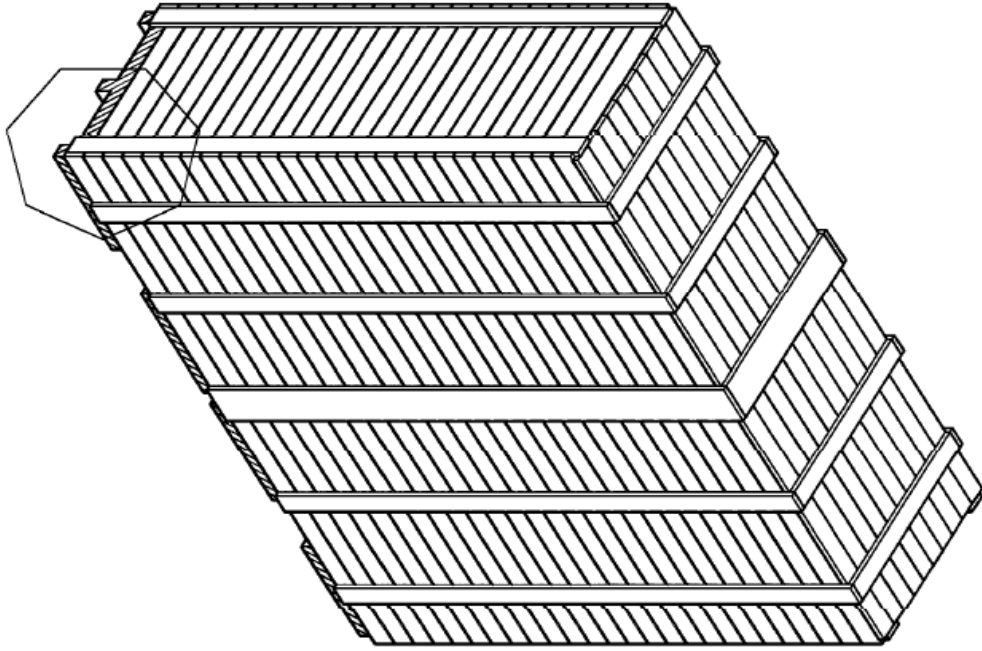


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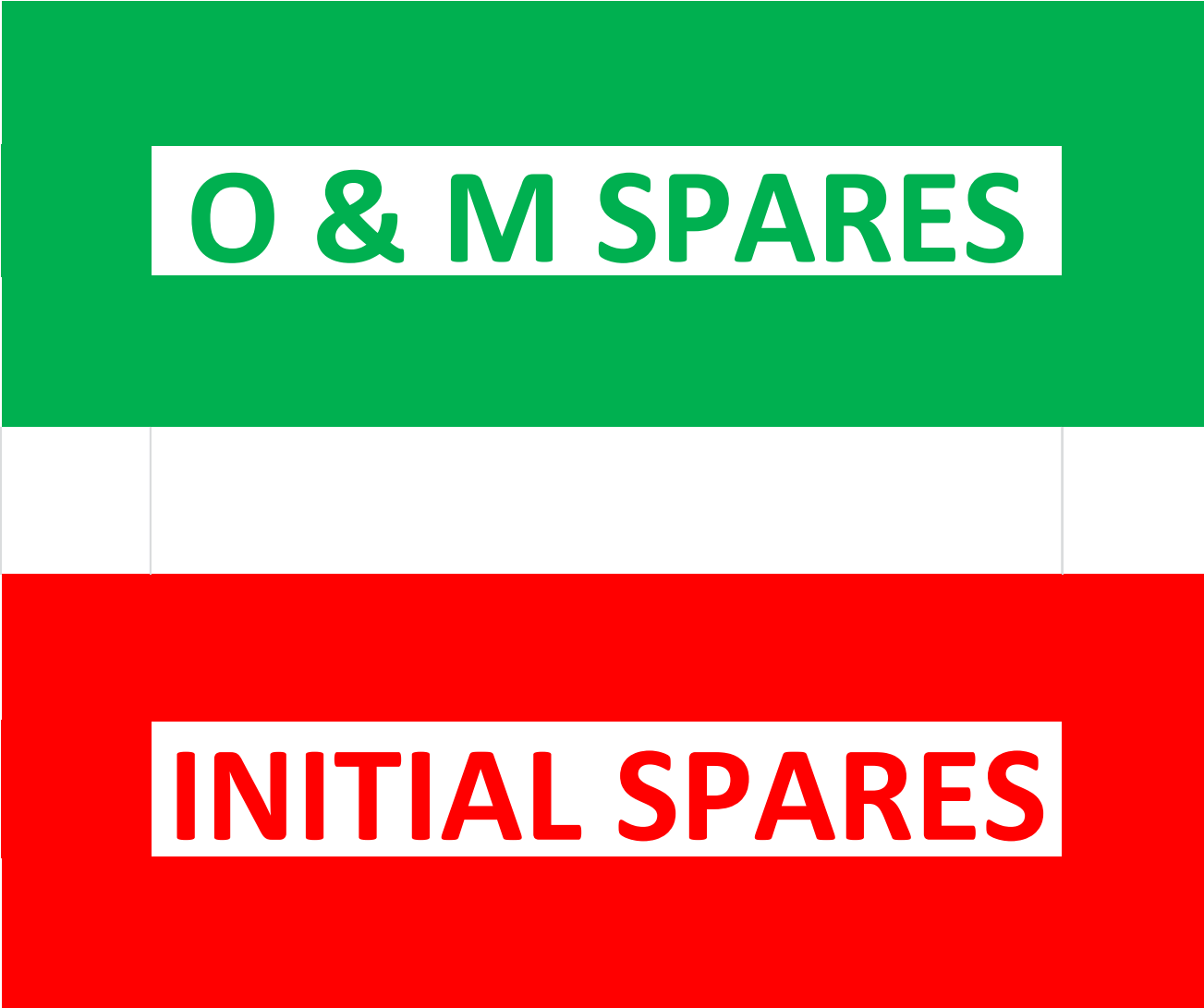
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**Fig -15 : Four Suit Panel Packing View**

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

Fig: 14



**CHECK LIST FOR TEMPERTURE SWITCH**

NUMBER : CE/416/SWAS/TS/CL REVISION : 00 DATE : 17-10-13

PROJECT : SWAS - SHS

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.	↑	APPROVED SPECS./ DATA SHEETS	P	W	V	✓	IN CASE OF IMPORTED ITEMS, CONTR. SHALL REVIEW TC's & NOT INSPECT.
2.0	DIMENSIONS CHECK	REFER NOTE : 1		P	W	V	✓	
3.0	REPEATABILITY	BELOW		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: END USER "P" PERFORM "W" WITNESS "V" VERIFICATION

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

- 100 % - BY MANUFACTURER.
- NIL - BY CONTRACTOR.
- NIL - BY END USER

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



**SECTION – J**

**QUALITY CHECKLISTS**

**CHECK LIST FOR TEMPERTURE SWITCH**

NUMBER : CE/416/SWAS/TS/CL REVISION : 00 DATE : 2-10-15

PROJECT : SWAS - SHS

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.	↑	APPROVED SPECS./ DATA SHEETS	P	W	V	✓	IN CASE OF IMPORTED ITEMS, CONTR. SHALL REVIEW TC's & NOT INSPECT.
2.0	DIMENSIONS CHECK	REFER NOTE : 1		P	W	V	✓	
3.0	REPEATABILITY	BELOW		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: END USER "P" PERFORM "W" WITNESS "V" VERIFICATION

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

- 100 % - BY MANUFACTURER.
- NIL - BY CONTRACTOR.
- NIL - BY END USER

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



**PREPARED BY :**  
M/S BHEL



**CHECK LIST FOR TEMPERATURE GAUGE / PAGE 1 OF 2**

NUMBER : CE/416/SWAS/TG/CL REVISION : 00 DATE : 27-10-15

PROJECT : SWAS - SHS

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



**CHECK LIST FOR TEMPERATURE GAUGE / PAGE 2 OF 2**

NUMBER : CE/416/SWAS/TG/CL      REVISION : 00      DATE : 27-10-15

PROJECT : SWAS - SHS

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-EDN.  
NIL - BY M/s END USER

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 STAINLESS STEEL COMPRESSION FITTINGS**

NUMBER : CE/416/SWAS/SSF/CL REVISION : 00 DATE : 27-10-15  
 PROJECT : SWAS - SHS  
 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/	↑	P	V	V		
2.1	CHEMICAL	HEAT /	APPROVED SPECS./	P	V	V	✓	
2.2	PHYSICAL, HARDWARE	LOT	↓	P	V	V		
3	PROOF PRESSURE TEST	5 RDM. SAMPLE	↑	P	V	V	✓	
4	DISMANTLING RE-ASSEMBLY TEST	3 RDM. SAMPLE	↑	P	V	V		
5	HYDRAULIC IMPULES & VIBRATION TEST	5 RDM. SAMPLE	↓	P	V	V	✓	

**LEGEND :**

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

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

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

- 100% - BY MANUFACTURER
- NIL -BY M/s BHEL-EDN
- NIL -BY M/s END USER

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



**PREPARED BY**  
**M/S BHEL**



**CHECK LIST FOR PRESSURE & DIFFERENTIAL PRESSURE SWITCH**

NUMBER : CE/416/SWAS/PS/CL REVISION : 00 DATE : 27-10-15

PROJECT : SWAS - SHS

CONTRACTOR : M/s B H E L - EDN

SL NO.	TESTS/CHECKS	QUANTUM OF CHECK	REFERENCE DOC. ACCEPTANCE NORMS.	AGENCY**				REMARKS
				M	C	N	D*	
1.0	CHECK FOR	↑	APPROVED SPECS. / DATA SHEETS	P	V	V	✓	BY GO/ NO GO GAUGE
1.1	MODEL NO. TAG NO.			P	V	V	✓	
1.2	RANGE			P	V	V	✓	
1.3	END CONNECTION							
2.0	REPEATABILITY	SEE	DO	P	V	V	✓	MFR. TO CARRY OUT ROUTINE TEST ON WHEN MAT'L CORELATION ARE NOT AVAILABLE MFR'S COMPLIANCE TO BE PROVIDED.
2.1	HYSTERISIS	NOTE-1		P	V	V	✓	
3.0	OVER PRESSURE	BELOW		P	V	V	✓	
4.0	AND LEAK TEST	↓						
5.0	ELECTRICAL INSUL- -ATION / H.V TEST	FOR		V	V	V	✓	
5.1	REVIEW OF T.C FOR	LOT		V	V	V	✓	
5.2	SENSOR			V	V	V	✓	
5.3	MOVEMENT		V	V	V	✓		
6.0	HOUSING		V	V	V	✓		
7.0	TC OF MICRO SWIT- -CH		V	V	V	✓		
	REVIEW OF T.C FOR	TYPE						
	DEGREE OF PROTEC- -TION.	TEST						

LEGEND:

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

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

- NOTE : 1) QUANTUM OF CHECK SHALL BE AS BELOW : 100 % - BY MANUFACTURER  
NIL - BY CONTRACTOR.  
NIL - BY END USER
- 2) MANUFACTURER TO MAINTAIN CALIBRATED INSTRUMENT HAVING BETTER ACCURACY THAN THE ITEM UNDER TEST. INSPECTING ENGINEER SHALL CHECK THE SAME.
- 3) IN CASE OF IMPORTED PRESSURE SWITCHES DP SWITCHES BHEL SHALL REVIEW TC AND SHALL NOT INSPECT.



PREPARED BY :  
M/S BHEL

**CHECK LIST FOR PRESSURE GAUGE & DIFFERENTIAL PRESSURE GAUGE**

NUMBER : CE/416/SWAS/PG/CL REVISION : 00 DATE : 27-10-15

PROJECT : SWAS - SHS

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	<p style="text-align: center;">↑</p> <p style="text-align: center;">SEE NOTE-1 BELOW</p> <p style="text-align: center;">↓</p>	<p style="text-align: center;">APPROVED SPECS. / DATA SHEETS</p> <p style="text-align: center;">↑</p> <p style="text-align: center;">DO</p> <p style="text-align: center;">↓</p>	P	V	V	✓	<p>MFR TO CARRY OUT ROUTINE TEST ON 100 % . WHEN MAT'L CORRELATION ARE NOT AVAILABLE MFR'S COMPLIANCE TO BE PROVIDED</p>	
1.1	DIAL SIZE			P	V	V	✓		
1.2	MODEL NO/TAG NO			P	V	V	✓		
1.3	RANGE/SCALE			P	V	V	✓		
1.4	END CONNECTION			P	V	V	✓		
2.0	CALIBRATION								
2.1	ACCURACY			P	V	V	✓		
2.2	REPETABILITY			P	V	V	✓		
2.3	HYSTERISIS			P	V	V	✓		
3.0	OVER PRESSURE AND LEAK TEST			P	V	V	✓		
4.0	OPERATION OF PR. RELIEF DEVICE.			# ONE	P	V	V		✓
5.0	REVIEW OF T.C FOR MATERIALS OF-			FOR LOT	V	V	V		✓
5.1	SENSOR				V	V	V		✓
5.2	MOVEMENT				V	V	V		✓
5.3	PROCESS CONNEC.		V	V	V	✓			
5.4	HOUSING		V	V	V	✓			
6.0	REVIEW OF TC FOR DEGREE OF PROTEC.	TYPE TEST	V	V	V	✓			
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: END USER "P" PERFORM "W" WITNESS "V" VERIFICATION

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

100 % - BY MANUFACTURER.

10 % - BY M/s BHEL-EDN.

NIL - BY END USER

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

**CHECK LIST FOR IMPULSE PIPES AND TUBES**

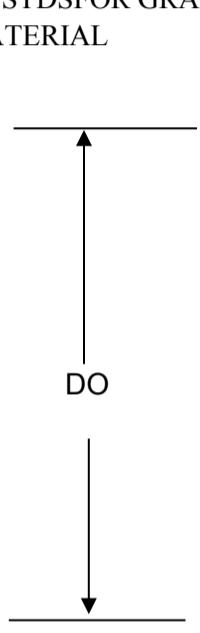
NUMBER : CE/416/SWAS/SP/CL

REVISION : 00

DATE : 27-10-15

PROJECT : SWAS - SHS

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	✓	 <p>MANUFACTURER TO PROVIDE TEST CERT. AS PER RELEVANT ASTM STDS. MENTIONED IN SPECS.</p>
2	CHEMICAL PROPERTIES AND PHY. PROPERTIES AS PER RELEVANT ASTM. (GRADE SHALL BE AS PER APPROVED DATA SHEET)	FOR LOT		P	V	V	✓	
3	FLATTENING TEST.		DO	P	V	V	✓	
4	FLARING TEST	##		P	V	V	✓	
5	BENDING TEST.	**		P	V	V	✓	
6	HYDRAULIC TEST OR EDDY CURRENT TEST			P	V	V	✓	
7	HARDNESS CHECK	##		P	V	V	✓	

**LEGEND :**

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

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

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

100% - BY MANUFACTURER.

NIL -BY M/s BHEL-EDN

NIL - BY END USER

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/SWAS/FS/CL REVISION : 00 DATE: 27-10-15  
 PROJECT : SWAS -SHS  
 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.	↑	AS PER APPROVED DATA SHEETS	P	V	V	✓	IN CASE OF IMPORTED ITEMS, CONTR. SHALL REVIEW TC's & NOT INSPECT.
2.0	SIZE , DIMENSIONS	REFER NOTE : 1		P	V	V	✓	
3.0	REPEATABILITY	BELOW ↓		P	V	V	✓	
4.0	HV / IR	100%		P	V	V	✓	
5.0	CONTACT RATNG / NO. OF CONTACTS	RANDOM		P	V	V	✓	
6.0	MATL. T.C. FOR BODY, WET PARTS.	ONE/LOT		P	V	V	✓	
7.0	ACCESSORIES AS APPLICABLE	100%		P	V	V	✓	

**LEGEND :**  
 \* RECORDS, IDENTIFIED WITH ✓ ' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION.  
 \*\* M: MANUFACTURER/SUB CONTRACTOR, C:CONTRACTOR/NOMINATED INSP.AGENCY  
 N: END USER "P" PERFORM "W" WITNESS "V" VERIFICATION

**NOTE :** 1) QUANTUM OF CHECK SHALL BE AS BELOW :  
 100 % - BY MANUFACTURER.  
 NIL - BY CONTRACTOR.  
 NIL -BY END USER  
 2) MANUFACTURER TO MAINTAIN CALIBRATED INSTRUMENT HAVING BETTER ACCURACY THAN THE ITEM UNDER TEST.

  
**PREPARED**  
**M/S BHEL**



## SECTION - K



### APPROVED VENDOR LIST

**SS TUBES AND PIPES** : Trouvay & Cauvin, Dubai, TPS Technitube Germany, ISMT India(CS Pipes), Ratnamani Ahmedabad, Sumitomo /Nippon/KawasakiJapan, BHEL-Trichy, , Maneesmann Germany , Jindal Saw Pipes India, Heavy Metals Ahmedabad, Suraj pipes Mahalaxmi Seamless

**PRESSURE GAUGES** : ANI Kolkatta, WIKA ,India,Goa Thermostatic,Goa , Manometer India Gauges Bourdon Mumbai, H.GURU, B'LORE , Forbes Marshall Hyderabad Baumer Mumbai, Ashcroft India

**TEMPERATURE GAUGES** : Gen Instruments consortium, WIKA, INDIA, H.GURU, B'LORE, ,Goa Thermostatic,Goa, Baumer Dadra, Ashcroft India, Forbes Marshall Hyd ANI Chennai, Goa Insts. Goa,

**PRESSURE SWITCH** : Indfoss Ghaziabad, Switzer Chennai, SOR-USA , Baumer Vapi Gauges Bourdon Mumbai, Trafag Ranipet, Ashcroft Ahmedabad

**TEMPERATURE SWITCH** : Switzer Madras, Indfoss-Ghaziabad, GIC Goa

**Terminals** : Wago Noida , Phoenix, Noida,




**INSTRUMENT VALVES** : BHEL - TRICHY, Baldota Mumbai, IL PALGHAT, Hyd Air Lonavala Excel Hydro Pneumatics Mumbai, Metpress Engg. Kolkata, Prime Mumbai Precision Engg. Mumbai,AURA INC, NEW DELHI, HP Valves Chennai Shalimar Valves Mumbai, Forbes Marshall Pune

**Compression Fittings** : Excel Hydro Pneumatics Mumbai, Metpress Engg. Kolkata Precision Engg. Mumbai, Swagelock USA, Parker Hanifin USA, Astec Thane Aura Inc. Delhi, Fluid Controls Mumbai, HP Valves, Chennai, Panam Engg. Mumbai, Arya Craft Mumbai

**Furniture :-** Godrej , Feather lite,COSMOS MEDIA PRODUCTS PVT LTD ,NOIDA PYROTECH LTD , UDAIPUR , HARMONY SYSTEMS ,NEW DELHI ADARSHA CONTROLS LTD ,BANGALORE , OTS ,BANGALORE

**Note:-**

1. Vendors to note that for major components of Sample Handling System, above indicated vendors only will be acceptable.
2. Vendors to note that BHEL has submitted list of same set of vendors,as above, to various customers for approval. If there is a change in list of vendors based on Customers Approval, for any item (from Your quoted vendors), Items shall be supplied as per Customer approved vendors only. This shall be done without any commercial implications.

		 <p>बि एच ई एल A4-10</p>		CE/416/SWAS/ANALYSER/PS	
		<b>PROJECT : BULK TENDER</b>			
<p><b>COPY RIGHT AND CONFIDENTIAL</b></p> <p>The information on this document is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in anyway detrimental to the interest of the company.</p>		<b>PURCHASE SPECIFICATION</b>			
		<b>FOR</b>			
		<b>SWAS ANALYSERS</b>			
				<b>APPROVED BY</b>  <b>(R.PRABHU)</b>	
			<b>PREPARED BY</b>  <b>PPS</b>	<b>ISSUED</b>  <b>415</b>	  <b>18-10-2013</b>



**PURCHASE SPECIFICATION  
FOR  
SWAS ANALYSERS**

CE/416/SWAS/ANALYSER/PS  
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**CONTENTS**

SECTION	DESCRIPTION
A	GENERAL INSTRUCTIONS TO BIDDERS
B	PRE-QUALIFICATION REQUIREMENTS
C	SCOPE OF SUPPLY FOR SWAS ANALYSERS
D	TECHNICAL REQUIREMENTS FOR SWAS ANALYSERS
E	LIST OF MANDATORY SPARES
F	PACKING INSTRUCTIONS

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**PURCHASE SPECIFICATION  
FOR  
SWAS ANALYSERS**

CE/416/SWAS/ANALYSER/PS  
REV.NO.: 00  
Page 3 of 17

**SECTION- A**

**GENERAL INSTRUCTIONS TO BIDDERS:**

- 1.0 All required documents against this Tender/Specification shall be submitted in English only.
  - 2.0 Introduction: Bidders are required to offer Analysers used for SWAS in Power Plant applications.
  - 3.0 In order to accept the Technical offers / proposals from Bidders for the project mentioned in this Specification ( refer Sections C & D ), certain Pre-qualification criteria are required to be met by Bidder.
  - 4.0 Pre-qualification requirements are clearly mentioned in Section-B of this Specification. Bidder to read the same carefully and submit the details required for BHEL's acceptance.
  - 5.0 In case Bidder does not include the details or meet the requirements of Pre-qualification requirements, their offer will be summarily rejected and Bidder's Technical offers will not be evaluated.
  - 6.0 Evaluation methodology\_: BHEL shall initially open Bidder's PQR documents only as per Section B of this specification for review & acceptance. Only after acceptance of PQR documents, BHEL shall open Bidder's Technical offers as per CI 2.0 of above for evaluation. In the event of acceptance of Bidder's technical offers, the names of such Bidders along with details provided by them for PQR and details of Technical offers , shall be submitted to Endusers/Customers for their acceptance/approval. Commercial bids of only accepted/approved Bidders by Endusers/Customers, shall be considered by BHEL for further processing.
  - 7.0 Bidders are required to submit offers as detailed below :
    - aa. Documents pertaining to Pre-Qualification requirement ( CI AA of Section B of this Specification) shall be in a Separate cover with reference no. " CI AA of Section B" marked on it.
    - bb. Documents pertaining to Pre-Qualification requirement ( CI BB of Section B of this Specification) shall be in a Separate cover with reference no "CI BB of Section B" marked on it.
    - cc. Technical offers/proposals for the Project, whose requirements are mentioned in Sections C &D will be submitted in a separate cover with Project name & Reference marked on it.
  - 8.0 Whenever required during evaluation of PQR and Technical offers/bids, vendor is required to be present at BHEL Electronic Division, Bangalore, for discussions. Further in the event of order, during approval of the Vendor documents by End users/Customers, Vendor shall accompany BHEL representative for discussions.
-



**PURCHASE SPECIFICATION  
FOR  
SWAS ANALYSERS**

CE/416/SWAS/ANALYSER/PS  
REV.NO.: 00  
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**SECTION- B**

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

1. The bidder should have executed/ completed work of "Design, supply, supervision of erection & commissioning of complete SWAS package in 200 MW or above capacity for at least 2 units of SWAS within preceding five (5) years as on the date of bid opening.
  2. Original Equipment Manufacturers based outside India, who are making offer for this tender shall have authorized representatives in India for support related to Documentation, Erection, Commissioning & any other co-ordination work.
  3. Submit Reference List of Projects wherein offered system is supplied & commissioned, along with details of analyzers. If bidder is offering a combination of makes, PQR of respective OEMs shall be considered for evaluation.
  4. For Vendors offering upgraded / latest models, PQR of equivalent previous models is acceptable. OEM shall certify that offered model is upgraded version of previous existing model.
  5. OEM shall furnish an undertaking that in case of change in Indian representative / agent, OEM shall continue to support supplies w.r.t to field service, supply of reagents and spare parts
  6. For analyzers Bidder should be authorized and he should have capacity to commission the analyzers all across the country. The bidder should have the team of experienced service engineers on pay role located at various parts of INDIA.
  7. Bidder shall have optimum inventory of critical components like analyser sensors/ electronic modules.
  8. Bidders shall provide the operating parameters like sample flow, pressure and temperature requirement for correct functioning of the offered analysers. Bidders shall confirm that Analysers shall function with Sample Handling System(SHS) procured from any vendor meeting above sample requirements.
  9. BHEL shall issue call for service / commissioning with 15 days notice. Bidder shall agree to visit BHEL project sites jointly with SHS vendors within above notice period.
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**BB. Along with the documents related to PQR above, following details shall also be included in the Offer:**

1. Technical literature / Manuals of offered Analysers, Sensors.
2. In the event of technical specification not indicated in Technical literature, confirmation from OEM is acceptable. Such confirmations shall be supported by type test certificates.
3. Un priced Purchase Order copies
4. Reports of successful erection & commissioning Protocols & Minutes of the meetings for handing over of SWAS analysers.
5. Submit List of Projects ( rating of > or = 200 MW Power Plants ) for which Erection & Commissioning has been carried out by Subsidiary / Authorized Indian representative for last three year & minimum three system.
6. Name & registered address of the Indian branch office or Indian representative for support of E&C and after sales service with Organization chart.
7. Bidder shall have facility in India for Engineering activities, preparation of Documents, trouble shooting and calibration of analysers. Submit these details.
8. If Bidder is not Original Equipment Manufacturer (OEM), than Bidder to include Authorization letter from OEM for Design, Engineering, Manufacture, Testing, supply, Erection, Commissioning and Servicing of the offered System. This Authorization letter provided by OEM to Bidder shall indicate the Type and Duration of the agreement.

Important note : In case Bidder does not submit details mentioned in above clauses or meet the requirements of Pre-qualification requirements, Offers will be summarily rejected and Bidder's Technical offers/proposals will not be Evaluated. Please read carefully the General instructions in Section A of this specifications.

**SECTION - C****SCOPE OF SUPPLY FOR TSGENCO BHADRADRI - 4 X 270 MW**

SL NO	ITEM DESCRIPTION	UNITS	QTY PER SET	TOTAL QUANTITY
1	<b>ANALYSERS CONSISTING OF THE FOLLOWING:-</b>	ST	1	4
a	CONDUCTIVITY ANALYSER (SPECIFIC, CATION )	NOS.	10	40
b	CONDUCTIVITY ANALYSER FOR HOTWELL	NOS.	2	8
c	pH ANALYSER	NO	8	32
d	DISSOLVED OXYGEN ANALYSER	NOS.	3	12
e	SODIUM ANALYSER(MULTI CHANNEL- 3 stream)	NO	1	4
f	SODIUM ANALYSER(SINGLE CHANNEL)	NO	3	12
g	SILICA ANALYSER (MULTI CHANNEL- 4 stream)	NO	1	4
h	HYDRAZINE ANALYSER	NO	1	4
i	PHOSPHATE ANALYSER	NOS.	1	4
	<b>Note :- Dual input analysers are not acceptable for Conductivity , pH &amp; DO Analysers.</b>			
2	MANDATORY SPARES AS PER SECTION E	ST	1	1
3	COMMISSIONING SPARES- Reagents required for commissioning & Handing over of System to Owner	ST	1	4
4	CONSUMABLES OTHER THAN CHEMICAL REAGENTS LIKE PH CELL , DO Sensors ,etc	ST	1	4
5	CONSUMABLES I.E. CHEMICAL REAGENTS FOR 1 YEAR OPERATION	ST	1	4
6	O & M MANUALS / DOCUMENTATION CHARGES	LOT	1	4
7	TEST, CALIBRATION & GUARANTEE CERTIFICATES AS PER APPROVED QUALITY CHECKLIST/ PLAN	LOT	1	4
8	SUPERVISION OF ERECTION, TOTAL COMMISSIONING AND HANDING OVER OF SWAS SYSTEM	ST	1	4
9	Sample/Metering Pump with MCB & Starting panel - Suitable for metering sample from DM Make up to SWAS Room	No.	1	4
10	Ultrasonic pH Cleaner	No.	1	1
11	Following activities will be in Vendor's scope :-			
	i Supervision of erection, Total commissioning & Handing over of the analysers to the owner (M/s TSGENCO).			
	ii Coordination / Site support to Sample Handling System Vendor, as & when required.Specifications attached are for the complete SWAS including specification for Sample Handling system, which shall be procured separately. Analysers offered shall be suitable for working with the specifications indicated for sample handling system.In case, Vendor does not confirm as above, Offer shall be technically rejected Vendor shall be required to visit site jointly with Sample Handling System Vendor for commissioning activity. BHEL shall inform with 15 days prior notice for the visit.			
12	Note:-			
	i Vendors to quote unit rates for all above items individually.			
	ii Vendors who do not quote prices as per pt. 1, shall be disqualified.			
	iii BHEL shall use unit rates indicated above for quantity addition/deletion required during execution.			



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**SECTION- D**

A	General Requirement of Analysers:-
	<ul style="list-style-type: none"><li>- All analysers, cells, monitors etc. as offered shall be field proven, Microprocessor based analyser with self-diagnostic feature. The Bidder shall furnish along with his proposals all the required details in respect of each and every type of analysers/cells/monitors to establish that the offered analytical instruments are well proven for the similar applications.</li><li>- The Bidder shall indicate in the offer the exact chemical composition of each and every reagent.</li><li>- The make, type, model etc. of various analytical instruments shall be subjected to the Owner's approval.</li><li>- The Bidder shall provide 2 x 4-20 mA linear isolated current output signals from analysers.</li><li>- All analysers / monitors shall be furnished with all required accessories for proper functioning.</li><li>- All sensors shall be supplied with 30 meter/run cable along with analysers.</li><li>- Alarm contacts shall be furnished with the analysers/monitors for annunciation of high or / and low alarms as indicated in list of analysers. The contact rating shall be 5A at 240 V AC./ 0.5 A at 220V DC.</li><li>- All analysers shall have Digital communication facility like RS 485 / HART/Modbus/Profibus.</li><li>- Item No. of BOM as approved or Item No. of BOM issued along with MC shall be put on the respective Boxes &amp; Packing list by the vendor for easy correlation &amp; identification at the time of MRC.</li><li>- Items shall be supplied, post inspection, in containers as per instructions in Section F.</li><li>- All sensors/consumables/reagents with limited shelf life are to be supplied during commissioning only.</li></ul>

6.00.00      **ANALYZERS**

All Analyzers shall be of microprocessor based design. The general technical specification of the analyzers is provided in this section. Bidder in his offer shall indicate the sample flow requirement of each analyzer and the total quantity of cooling water required for the system.

6.01.00      **CONDUCTIVITY ANALYZER**

**A.    Sensor**

1.    Type of Cell                    :    Flow thru'
2.    Conductivity Range            :    As per process
3.    Cell Constant                 :    0.01 / 0.1 / 1.0 depending upon range
4.    Temp. Compensation            :    Manual and Automatic (Integral) 0-100°C
5.    Process Connection            :    Screwed
6.    Wetted Parts                    :    Electrodes-SS 316L/ Insulators KYNAR/Viton
7.    Pressure Rating                :    10 kg/cm<sup>2</sup>
8.    Accessories                    :    Vessel ( SS 316) with ½" NPT connection
9.    Cable                            :    Upto transmitter in flexible conduct

**B.    Transmitter**

1.    Type                             :    Microprocessor based, Single stream
2.    Mounting                        :    2" pipe
3.    Protection Class                :    IP-65 or better
4.    Output                          :    4-20 mA DC (isolated)
5.    Display                         :    Digital Display in Engineering Unit , Alarm Status.
6.    Zero/Span Adjustment           :    Front Panel Membrane type Keyboard

- 
- |     |                    |   |  |
|-----|--------------------|---|--|
| 7.  | Temp. Compensation | : | Automatic  |
| 8.  | Diagnostic         | : | Self diagnostic for electronics, electrode etc   |
| 9.  | Alarm              | : | Dual set point, hysteresis and time delay adjustable   |
| 10. | Enclosure          | : | Die cast aluminum, epoxy coated  |
| 11. | Cable Termination  | : | Internal (cable entry through conduit)   |
| 12. | Accuracy           | : | $\pm 1.0$ % of measured range  |
| 13. | Response time      | : | Less than 5 sec  |
| 14. | Stability          | : | $\pm 1.0$ % of output range / month non-cumulative   |
| 15. | Accessories        | : | <p>a. 2" pipe mounting bracket, Sensor cable with flexible conduit (as required), 1/2" NPT Cable Gland, SS Tag plate, For cation conductivity- Dual Ion-Exchange column, resin, etc. (minimum 12 months' requirements).</p> <p>b. Retractable type conductivity sensor along with flow chamber and other accessories shall be provided for vacuum application. Transmitter (local) along with 4-20 mA output to SWAS room &amp; DDCMIS shall also be provided.</p> |

#### 6.02.00 pH ANALYSER

##### A. Sensor

- |    |                     |   |   |
|----|---------------------|---|---|
| 1. | Type of Cell        | : | Flow thru'                              |
| 2. | Range               | : | 0-14 pH                                 |
| 3. | Type of measurement | : | Combination electrode                   |
| 4. | Temp. Compensation  | : | Manual and Automatic (Integral) 0-100°C |
| 5. | Process Connection  | : | Screwed                                 |
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- 6. Measuring Electrode : Glass, high independence, thin electrode in one housing
  - 7. Pressure Rating : 10 kg/cm<sup>2</sup>
  - 8. Accessories : Vessel ( SS 316) with ½” NPT connection
  - 9. Cable : Upto transmitter in flexible conduct
  - 10. Preamplifier : Integral or separate
  - 11. Liquid Junction : Ceramic / Kyner or equivalent

**B. Transmitter**

- 1. Type : Microprocessor based, Single stream
  - 2. Mounting : 2” pipe
  - 3. Protection Class : IP-65 or better
  - 4. Output : 4-20 mA DC (isolated)
  - 5. Display : Digital Display in Engineering Unit, Alarm Status.
  - 6. Accuracy : ± 0.2% of FSD or better
  - 7. Response time : Less than 5 sec
  - 8. Stability : ± 0.001 pH /week
  - 9. Repeatability : ± 1% or better
  - 10. Temp. Compensation : Automatic (Pt-100 sensor)
  - 11. Diagnostic : Self diagnostic for “Calibration required”/ “Calibration O.K.”, electrode checking etc.
  - 12. Alarm : Dual set point, hysteresis and time delay adjustable
  - 13. Enclosure : Die cast aluminum, epoxy coated
  - 14. Cable Termination : Internal (cable entry through conduit)
  - 15. Accessories : 2” pipe mounting bracket, Sensor cable
-

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with flexible conduit ( as required), ½”  
NPT Cable Gland, S S Tag plate, ,  
Ultrasonic Electrode Cleaner, Buffer  
solution tablets

6.03.00 **SILICA ANALYZER**

1. Type : Colorimetric monitor, gravity / pumped feed Microprocessor based
2. No. of Streams : Multi-stream with at least one stream as spare
3. Output : 4-20 mA DC (isolated) into 600 ohms
4. Readout : Digital Indicating meter for direct readout
5. Accuracy : ± 1% of F.S.D or better
6. Reproducibility : ± 2% of F.S.D. or better
7. Calibration : Manual & automatic
8. Cycle time : Less than 10 min or better
9. Operating temperature : 0-50 ° C
10. Temperature Compensation : (Pt-100 Sensor)
11. Mounting : 2” pipe
12. Life of light source : 10,000 hours (approx.)
13. Alarm Facility : 2 HI & 2 LO independently adj. over span.
14. Enclosure Protection : IP-65
15. Accessories : Reagent cabinet , Sample strainer, Reagent Reservoir etc., Phenolic name plate, Reagents & consumables, Special cables.

6.04.00 **SODIUM ANALYZER ASSEMBLY**

1. Type of Cell : Flow Through ion-selection electrode
  2. Flow Chamber : Plexi Glass Body or equivalent
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3.	Measuring Electrode	:	Sodium Selective Glass Electrode
4.	Output	:	4-20 mA DC (isolated) into 600 ohms
5.	Temp. Compensation	:	Automatic upto 45 deg.C
6.	Read Out	:	Digital Indicating meter
7.	Accuracy	:	< 5% of reading
8.	Response Time	:	2 minutes or better
9.	Mounting	:	Flush Panel
10.	Calibration	:	Automatic
11.	Alarm Facility	:	2 HI and 2 LO independently adjustable over span.
12.	Enclosure Protection	:	IP-65 or better
13.	Accessories	:	Phenolic tag plate, Sample filter, Pressure regulator & flow meter, Automatic calibration kit, Reagents and consumables, Special cables, ½" NPT cable gland.

6.05.00      **HYDRAZINE ANALYZER**

1.	Type	:	Electrochemical
2.	Output	:	4-20 mA DC linear
3.	Readout	:	Digital Indicating Meter, linear read-out
4.	Accuracy	:	± 2% of FSD or better
5.	Reproducibility	:	2% of FSD or better
6.	Drift	:	2 ppb/month or better
7.	Temp. Compensation	:	Automatic up to 45 ° C
8.	Response Time	:	1 minutes or better
9.	Mounting	:	Flush Panel
10.	Alarm Facility	:	2 HI and 2 LO independently adjustable over span

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- 
- 11. Preferred Feature : 2 HI and LO alarm LED visible from front , Power supply on/failure LED
  - 12. Enclosure Protection : IP-65/ NEMA 4 or better
  - 13. Accessories : Sample Conditioning kit, Phenolic nameplate, Special cable upto transmitter with flexible conduit Chemical reagents for 12 months, 1/2" NPT Cable Glands

#### 6.06.00 DISSOLVED OXYGEN ANALYZER

- 1. Type : Electro-chemical, Microprocessor based.
  - 2. Range : As per process.
  - 3. Type of Cell : Flow through sampling type (continuous)
  - 4. Enclosure : IP-65 or better
  - 5. Output : 4-20 mA DC isolated to a load of 600 Ohms (minimum)
  - 6. Temp.Compensation : Automatic up to 45°C
  - 7. Readout : Digital Indicating meter
  - 8. Accuracy : Better than  $\pm 2$  % of full scale for Transmitter
  - 9. Sensor Response Time : 90% in 30 seconds or better
  - 10. Mounting : Flush panel
  - 11. Alarm Facility : 2 HI & 2 LO independently adjustable over span.
  - 12. Preferred Feature : HI & LO Alarm LED visible from front, Power supply on/failure LED, In-built calibration facility.
  - 13. Accessories : Phenolic nameplate, Special cable upto transmitter with flexible conduit, 1/2" NPT Cable Glands
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**6.09.00 PHOSPHATE ANALYZER**

1. Type : Colorimetric
  2. Range : As per process
  3. Enclosure : IP-65 or better
  4. Output : 4-20 mA DC iso lated to a load of 600 Ohms (minimum), 2NO+NC Contacts
  5. Readout : LCD Display
  6. Operating Temperature : 45 Deg. C
  7. Accessories : As required.
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Note:-	
	<p>1. Vendors to clearly bring out deviations, if any, wrt specifications indicated above.</p> <p>2. Vendors to note that Deviations shall be discussed with only those vendors who quote for this tender.</p> <p>3. Vendors to note that response time/cycle time of offered analysers shall be in line with industry standards/ as indicated for proven approved models by end users.</p> <p>4. Typical range requirement of analysers is indicated in Table I below. Any change in ranges as per the requirement of specific project shall be incorporated without commercial implication to BHEL.</p> <p>5. Vendors to quote Models which meet Technical Requirements in Toto. If during evaluation of offer/detailed Engg., it is found that Model offered does not meet technical requirements &amp; a different model is available in Vendor Product range which meets technical requirements, then new Model has to be supplied without any commercial implication to BHEL.</p> <p>6. Purchase order for all analyser will be placed on one vendor only. BHEL will make efforts to obtain approval of quoted make and models with all customers. In the event any of the customer does not accept quoted makes, then vendor shall offer customer approved make and models at the quoted rates only, without any additional cost implication to BHEL.</p>

**Table I**

SI NO	Analyser	Typical Range
1	Conductivity Analyser	Specific:- 0- 10 / 0-100 / 0-1000 $\mu$ S/cm, freely programmable Cation:- 0- 1 / 0-10 / 0-100 $\mu$ S/cm, freely programmable
2	pH Analyser	0-14 pH
3	Dissolved Oxygen Analyser	0-20 / 0-200 ppb, freely programmable
4	Hydrazine Analyser	0-20 / 0-200 ppb, freely programmable
5	Silica Analyser	0-100 / 0-1000 ppb, freely programmable
6	Sodium analyser	0-20 / 0-1000 ppb, freely programmable
7	Phosphate Analyser	0-10 / 0- 50 ppm, freely programmable

**ANNEXURE - "E"****BHADRADRI - MANDATORY SPARES FOR SWAS ANALYSERS**

SL. NO.	DESCRIPTION	Total Qty.
1	Electronic modules/cards of each type	2 no each type for each type of analyser
2	Conductivity cells of each type	4 no. of each type & range
3	Ion exchange columns with resin as utilised with cation conductivity analyser	8 nos.
4	pH cells	8 nos.
5	Chemical reagents for DO Analysers - For One Year Supply	2 lots
6	Chemical reagents for Hydrazine Analysers - For One Year Supply	2 lots
7	Chemical reagents for Silica Analysers - For One Year Supply	2 lots
8	HAND HELD CATION CONDUCTIVITY ANALYSER	1 no.

Note:-

1. Vendors to quote individual prices for all items above. The prices shall be on per unit basis.
2. Vendors who do not comply pt. no. 1 will be disqualified from the tender.
3. If exact items, as above, are not available , Vendors to quote functionally equivalent items for each of the items above.



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**SECTION - "F"**

- Analysers & Spares shall be packed unit wise in lockable Metal Container suitable for outside storage at project site. Typical requirements are as below:-
  - Type: Standard Outdoor type Metallic 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 & Unit Name.
-