



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

**Tender Documents – Temperature Elements (M/s MAHAGENCO
Bhusawal Project)**

Sl. No.	Description	Remarks/Dates
1.	Tender RFQ Reference	PRV0000025
2.	RFQ Date	As per NIT @ https://eprocurebhel.co.in website
3.	RFQ Due Date	
4.	Tender Documents Available on	https://eprocurebhel.co.in website
List of Tender Documents		
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CE:PR:001- Rev 03

INSTRUCTIONS TO BIDDERS

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

A. GENERAL INSTRUCTIONS:

1. Any Purchase Order resulting from this enquiry shall be governed by the Instructions to Bidders (document reference: CE: PR: 001 – Rev 03), General Conditions of Contract (document reference: CE: PR: 002 - Rev 02) and Special Conditions of Contract, if any, of the enquiry.
2. Any deviations from or additions to the “General Conditions of Contract” or “Special Conditions of Contract” require BHEL’s express written consent. The general terms of business or sale of the bidder shall not apply to this tender.
3. Regret letter (either through post or by mail or by EPS) indicating reasons for not quoting must be submitted without fail, in case of non-participation in this tender.

Supplier shall be liable for removal as a registered vendor of BHEL when the supplier fails to quote against four consecutive tender enquiries for the same item or all enquiries in last two years for the same item, whichever is earlier.

4. Procurement directly from the manufacturers is preferred. However, if the OEM/ Principal insist on engaging the services of an agent, such agent shall not be allowed to represent more than one manufacturer/ supplier in the same tender.

Moreover, either the agent could bid on behalf of the manufacturer/ supplier or the manufacturer/ supplier could bid directly but not both. Agent/Representative authorized by the OEM/Principal in turn cannot further sub authorize any other firm for submitting the offer or for placement of order.

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

5. Consultant / firm (and any of its affiliates) shall not be eligible to participate in the tender/s for the related goods for the same project if they were engaged for consultancy services for the same project.
6. If an Indian representative/associate/liaison office quotes on behalf of a foreign based bidder, such representative shall furnish the following documents:
 - a. Authorization letter to quote and negotiate on behalf of such foreign-based bidder.
 - b. Undertaking from such foreign based bidder that such contract will be honored and executed according to agreed scope of supply and commercial terms and conditions.
 - c. Undertaking shall be furnished by the Indian representative stating that the co-ordination and smooth execution of the contract and settlement of shortages/damages/replacement/repair of imported scope

till the equipment is commissioned and handed over to customer will be the sole responsibility of the Indian representative/associates/agent/liaison office.

d. Refer **Annexure I** on “Guidelines for Indian Agents”.

7. In case of imported scope of supply, customs clearance & customs duty payment will be to BHEL account after the consignment is received at Indian Airport /Seaport. Bidders must provide all original documents required for completing the customs clearance along with the shipment.

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

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

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

10. The bidder along with its associate/collaborators/sub-contractors/sub-vendors/consultants/service providers shall strictly adhere to BHEL Fraud Prevention Policy displayed on BHEL website <http://www.bhel.com> and shall immediately bring to the notice of BHEL Management about any fraud or suspected fraud as soon as it comes to your notice.
11. Offer is to be submitted in English language only.
12. For this procurement, the local content to categorize a supplier as a Class-I local supplier/ Class-II local supplier/ Non-local supplier and purchase preference to Class-I local supplier, is as defined in Public procurement (Preference to Make in India), Order 2017 dated 16.09.2020 issued by DPIIT.

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

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

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

B. GUIDELINES FOR PREPARATION OF OFFER:

1. Quotation shall be submitted in Single Part Bid, Two Part Bid or Three Part Bid, as called for in the tender:
 - **SINGLE PART BID:** Technical and Commercial Bid with prices along with price summary & filled in BHEL Standard Commercial terms and conditions in a single sealed envelope.
 - **TWO PART BID:** Unpriced offer i.e. “Techno-commercial Bid” with filled in BHEL Standard Commercial terms and conditions in a sealed envelope **along with the copy of the “Price Bid” without the prices** should be enclosed in one cover and the cover must be super scribed **“Techno-commercial offer)** and Priced offer i.e. “Price Bid” containing price summary in a separate sealed envelope and must be super scribed **“Price Bid”**.

Both these envelopes shall be enclosed in a single sealed envelope superscribed with enquiry number, due date of tender and any other details as called for in the tender document.

- **THREE PART BID:** Pre-qualification Bid (Part-I), Techno Commercial Bid with filled in BHEL Standard Commercial terms and conditions (Part-II), and Price Bid (Part-III). All three envelopes shall be enclosed in a single sealed envelope superscribed with enquiry number, due date of tender and any other details as called for in the tender document.

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

2. Supplier shall ensure to superscribe each envelope with RFQ number, RFQ Date, RFQ Due date and time, Item Description and Project clearly & boldly. Also mention on the envelope whether it is “Techno Commercial Bid” or “Price Bid” or “Pre-Qualification Bid”.

Please ensure complete address, department name and purchase executive name is mentioned on the envelope (before dropping in the tender box or handing over) so that the tender is available in time for bid opening.

3. BHEL standard Commercial Terms and Conditions (duly filled, signed & stamped) must accompany Technical-Commercial offer without fail and should be submitted in original only.

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

4. Validity: Unless otherwise specified in SCC (special commercial conditions of contract), the offer will be valid for a period of 90 days from the date of part-I bid opening and in case of Negotiation/Counter-offer/Reverse Auction, price validity will apply afresh for a period of 60 days from the date of according final price by bidder (or) up to original validity period, whichever is later.
5. Any of the terms and conditions not acceptable to supplier, shall be explicitly mentioned in the Techno-Commercial Bid.

If no deviations are brought out in the offer it will be treated as if all terms and conditions of this enquiry are accepted by the supplier without deviation.

6. Deviation to this specification/item description, if any, shall be brought out clearly indicating “DEVIATION TO BHEL SPECIFICATION” without fail, as a part of Techno-Commercial Bid.

If no deviations are brought out in the offer it will be treated as if the entire specification of this enquiry is accepted without deviation.

7. Suppliers shall submit one set of original catalogue, datasheets, bill of materials, dimensional drawings, mounting details and/or any other relevant documents called in purchase specification as part of Technical Bid.
8. "Price Bid" shall be complete in all respects containing price break-up of all components along with all applicable taxes and duties, freight charges (if applicable) etc. Once submitted no modification / addition / deletion will be allowed in the "Price Bid." Bidders are advised to thoroughly check the unit price, total price to avoid any discrepancy.
9. In addition, bidder shall also quote for erection & commissioning charges/erection supervision & commissioning charges (E&C service charges), documentation charges, testing Charges (type & routine), training charges etc. if & as applicable along with corresponding tax. The price summary must indicate all the elements clearly.
10. Wherever applicable, bidders should indicate "lumpsum" Erection and Commissioning (or) Erection Supervision and Commissioning charges, as applicable (including To & Fro Fare, Boarding, Lodging, Local Conveyance etc.) for carrying out E&C activity and further handing over to customer.
The quotation shall clearly indicate scope of work, likely duration of commissioning, pre-commissioning checklist (if any).
11. Wherever bidders require PAC (Project Authority Certificate)/applicable certificates for import of raw materials, components required for DECC,EPCG Power Projects, Export Projects or other similar projects wherein supplies are eligible for customs duty benefits, lists and quantities of such items and their values (CIF) has to be mentioned in the offer. Prices must be quoted taking into account of such benefits.
12. Prices should be indicated in both figures & words. Bid should be free from correction/overwriting, using corrective fluid, etc. Any interlineation, cutting, erasure or overwriting shall be valid only if they are attested under full signature(s) of person(s) signing the bid else bid shall be liable for rejection.
Any typographical error, totalling mistakes, currency mistake, multiplication mistake, summing mistakes etc. observed in the price bids will be evaluated as per **Annexure III** "Guidelines for dealing with Discrepancy in Words & Figures – quoted in price bid" and BHEL decision will be final.
13. Documents submitted with the offer shall be signed and stamped in each page by authorized representative of the bidder. However, this requirement is not mandatory for offers uploaded through E-Procurement System (EPS).

C. GUIDELINES FOR OFFER SUBMISSION:

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

1. Offers / Quotations must be dropped in tender box before 13.00 Hrs. on or before due date mentioned in RFQ. The offers are to be dropped in the proper slot of the Tender Box kept in our reception area with caption "CE, SC&PV, DEFENCE".

Tenders are opened on 3 days in a week (Monday/Wednesday/Friday). Tender must be deposited in the slot corresponding to the day (Monday - Box no.4/Wednesday - Box no. 6 /Friday - Box no.8) while depositing the offer.
2. E-Mail/ Internet/EDI offers received in time shall be considered only when such offers are complete in all respects. In case of offers received through E-mail, please send the offer to the email ID specified in the SCC document of the tender.
3. Offers of Vendors who already have a valid Technical/Commercial MOU with BHEL-EDN for the items of the RFQ shall mention the relevant MOU reference no. and give only such other details not covered in the MOU.

4. In cases where tender documents are bulky, or due to some reasons tender documents are required to be submitted by hand or through posts/couriers, the offers are to be handed over either of the two purchase officers whose names are mentioned in the SCC document of tender RFQ.
5. Tenders will be opened on due date, time and venue as indicated in the RFQ in the presence of bidders at the venue indicated in the RFQ. For EPS tenders, e-mail notifications will be automatically generated and forwarded to registered e-mail ID/s of bidders during opening of tenders.
6. Bidder will be solely responsible:
 - a. For submission of offers before due date and time. Offers submitted after due date and time will be treated as "Late offers" and will be rejected.
 - b. For submission of offers in the correct compartment of the tender box based on the day of due date (Monday/Wednesday/Friday). Please check before dropping your offer in the correct tender box.
 - c. For depositing offers in proper sealed condition in the tender box. If the bidder drops the tender in the wrong tender box (or) if the tender document is handed over to the wrong person, BHEL will not be responsible for any such delays.
 - d. For offers received through email etc., suppliers are fully responsible for lack of secrecy on information and ensuring timely receipt of such offers in the tender box before due date & time (This clause will not be applicable for EPS tenders).

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

- e. In case of e-tender, all required documents should be uploaded before due date and time. Availability of power, internet connections, system/software requirements etc. will be the sole responsibility of the bidder.

Wherever assistance is needed for submission of e-tenders, help-line numbers as available in the website of service provider of BHEL may be contacted.

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

D. PROCESSING OF OFFERS RECEIVED:

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

and it accounts for price implications from bidders, all techno-commercially acceptable bidders shall be asked by BHEL (after freezing the scope, technical specifications and commercial terms & conditions) to submit the impact of such changes on their price bid.

Impact price will be applicable only for changes in technical specification / commercial conditions by BHEL. The impact price must be submitted on or before the cut-off date specified by BHEL and the original price bid and the price impact bid will be opened together at the time of price bid opening.

5. Un-opened bids (including price bids) will be returned to the respective bidders after release of Purchase order.

Regarding Offers for EPS tenders that get rejected on PQC/ techno-commercial grounds, the bids for the subsequent parts will not be opened i.e., both technical bid and price bid (Parts-II & III) will not be opened in case of rejection on PQC ground and price bid (Part-II/Part-III, as applicable) will not be opened in case of rejection on techno-commercial ground.

6. After receipt of Purchase Order, supplier should submit required documents viz., specified drawings, bill of materials, datasheets, catalogues, quality plan, test procedure, type test report, O & M Manuals and/or any other relevant documents as per Specification/Purchase Order, as and when required by BHEL/ Customer.
7. Any deviation to the terms and conditions not mentioned in the quotation by supplier in response to this enquiry will not be considered, if put forth subsequently or after issue of Purchase Order, unless clarification is sought for by BHEL and agreed upon in the Purchase Order.
8. Evaluation shall be on the basis of delivered cost (i.e. "Total Cost to BHEL").

"Total Cost to BHEL" shall include total basic cost, packing & forwarding charges, taxes and/or duties (as applicable), freight charges, taxes on Services, customs clearance charges for imported items, any other cost indicated by bidder for execution of the contract and loading factors (for non-compliance to BHEL Standard Commercial Terms & Conditions).

Benefits arising out of Nil Import Duty on DEEC, EPCG, DFIA Projects, Physical Exports or such 100% exemptions (statutory benefits), project imports, customer reimbursements of statutory duties (like Basic Customs Duty and cess on customs duty), Input tax credits as applicable will also be taken into account for arriving at the Total cost to BHEL (wherever applicable and as indicated in SCC document of tender).

For EPS tenders, it shall be noted that the prices (including discounts) vis-a-vis currency quoted in EPS portal only will be considered as Final for the purpose of evaluation of the lowest bidder.

Bidder shall ensure to indicate the applicable taxes against each line item in online portal, failing to which the same will be considered as inclusive/NIL.

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

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

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

9. The evaluation currency for this tender shall be INR. For evaluation of offers in foreign currency, the exchange rate (TT selling rate of SBI) shall be taken as under:

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

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

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

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

E. INFORMATION ON PAYMENT TERMS:

1. All payments will be through Electronic Fund transfer (EFT). Vendor has to furnish necessary details as per BHEL standard format (**Refer Annexure IV**) for receiving all payments through NEFT.(Applicable for Indian vendors only).
2. In case of High Sea Sales transaction, customs clearance of the consignment landed on Indian Sea/Air ports will be done by BHEL based on the original HSS documents provided by vendors.
All warehousing charges due to delay in submission of complete and or correct HSS documents to BHEL will be to supplier's account only. Such recovery will be made out of any of the available bills (**Refer Annexure V**).
3. Statutory deductions, if any, will be made and the deduction certificate shall be issued.
 - A. In case vendor does not provide PAN details, the TDS deduction shall be at the maximum percentage stipulated as per the provisions of Income Tax Act.
In addition to the above, Foreign vendors shall also submit relevant details of their bankers like Swift Code, Banker's Name &Address etc.
 - B. TDS deduction as per section 51 of CGST Act,2017 shall be applicable as per Gazette Notification No. 50/2018-Central Tax, Dated: 13th September 2018 and subsequent notification/s, as and when released by Govt. authorities.
4. Levy and Collection of TCS by the seller of goods u/s 206C (1H) shall be in compliance with Govt. norms. The seller shall raise the invoice including the amount of TCS in the Tax Invoice and no separate debit note will be entertained.
The seller should indicate his PAN number and TAN number in the Invoice. The seller should remit the TCS so collected from BHEL and provide TCS certificate/s with invoice no., invoice date, Amount etc.
If by any chance seller is not remitting /not able to submit TCS certificates to BHEL on time, then the TCS amount with penalty, if any applicable will be recovered from seller in the available bills.
5. Incomplete documentation will not be accepted. Delayed submission of invoice / documents may result in corresponding delay in payment. In this connection, request to also refer clause: G about invoicing & payment formalities under GST regime.

Applicable documents shall be submitted to the purchaser at the time of execution of supplies/services for availing GST input credits.

F. STANDARD PAYMENT TERMS OF BHEL-EDN:

<u>PURCHASE ORDERS FOR:</u>	<u>SUPPLY WITH SERVICE(S)</u>	<u>SUPPLY ONLY</u>
<u>INDIGENOUS PROCUREMENT</u>	a. 100% of basic value with taxes and freight will be paid in 45 days from the date of dispatch or 15 days from the date of submission of complete set of documentation, whichever is later. <u>Note:</u> In case PBG is not furnished, only 90% payment will be released against 100% claim without the consent of Vendor. This 10% basic amount withheld towards PBG will be paid either against submission of supplementary invoice & Original PBG (or) against supplementary invoice without PBG after expiry of Warranty period.	b. 100% of PO value with taxes and freight will be paid in 45 days from the date of dispatch or 15 days from the date of submission of complete set of documentation, whichever is later.
<u>IMPORT PROCUREMENT</u>	c. 100% of basic value will be paid against usance draft of 45 days from the date of AWB/BOL on submission of complete set of documents. <u>Note:</u> In case PBG is not furnished, only 90% payment will be released against 100% claim without the consent of Vendor. This 10% basic amount withheld towards PBG will be paid either against submission of supplementary invoice & Original PBG (or) against supplementary invoice without PBG after expiry of Warranty period.	d. 100% of PO value will be paid against usance draft of 45 days from the date of AWB/BOL on submission of complete set of documents.
<u>HIGH-SEA SALES PROCUREMENT</u>	e. 100% of basic value will be paid in 45 days from the date of signing of High Sea Sale agreement or 15 days from the date of submission of complete set of documentation, whichever is later <u>Note:</u> In case PBG is not furnished, only 90% payment will be released against 100% claim without the consent of Vendor. This 10% basic amount withheld towards PBG will be paid either against submission of supplementary invoice & Original PBG (or) against supplementary invoice without PBG after expiry of Warranty period.	f. 100% of basic value will be paid in 45 days from the date of signing of High Sea Sale agreement or 15 days from the date of submission of complete set of documentation, whichever is later.

g. Erection and Commissioning:

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

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

Payment term: 100% E&C charges along with tax as applicable, will be paid in 15 days from the date of submission of supplementary invoice/documents against proof of completion of E&C.

h. Erection Supervision and Commissioning:

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

Payment term: 100% E&C charges along with tax as applicable, will be paid in 15 days from the date of submission of supplementary invoice/documents against proof of completion of E&C.

i. Comprehensive Annual Maintenance Contract:

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

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

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

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

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

Note 1: Basic value of Purchase Order mentioned above will include all components of the purchase order and will exclude only taxes, duties, freight, training charges, E&C and AMC charges (wherever applicable). Wherever the Purchase Order is split into import portion and indigenous portion of supply, minimum % to be quoted for Services, wherever mentioned, will be of both purchase order values put together.

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

Note 3: No deviation will be permitted from the duration of Guarantee/Warranty and/or Comprehensive Annual Maintenance Contract period specified in SCC.

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

1. All invoices to contain BHEL-EDN (buyer) GSTIN number: 29AAACB4146P1ZB. However for CGST +SGST/UGST billing outside the state of Karnataka, invoice has to be generated with BHEL's Nodal Agency GSTIN number. Address of Nodal Agency along with GSTIN number will be provided by BHEL at the time of issuing dispatch clearance.
2. The Bidder shall mention Bidder's GSTIN number in all quotations and Invoices submitted.
3. The Bidder shall also mention HSN (Harmonized System of Nomenclature) / SAC (Services Accounting Code) mandatorily in all quotations and invoices submitted.
4. Invoice submitted should be in the format as specified under GST Laws viz., all details as mentioned in Invoice Rules like GST registration number(GSTIN), invoice number with date of issue, quantity, rate, value, taxes with nomenclature – CGST, SGST, UGST,IGST mentioned separately, HSN Code / SAC Code etc. Invoice should be submitted in original for buyer plus duplicate for credit availment.
5. Payment of GST to Vendor will be made only if it is matching with data uploaded by the Vendor in GST portal.
6. For invoices paid on Reverse charge basis – “Tax payable on reverse charge basis” to be mentioned on the invoice.
7. In case GST credit is delayed/denied to BHEL due to non/delayed receipt of goods and/or tax invoice or expiry of timeline prescribed in GST law for availing such ITC, or any other reasons not attributable to BHEL, GST amount will be recoverable from vendor along with interest levied/ leviable on BHEL.
8. In case vendor delays declaring such invoice in his return and GST credit availed by BHEL is denied or reversed subsequently as per GST law, GST amount paid by BHEL towards such ITC reversal as per GST law will be recoverable from vendor/contractor along with interest levied/ leviable on BHEL.
9. Vendor should intimate BHEL immediately on the same date of invoicing without any delay.
10. In case of discrepancy in the data uploaded by supplier in the GSTN portal or in case of any shortages or rejection in the supply, then BHEL will not be able to avail the tax credit and will notify the supplier of the same. Supplier has to rectify the data discrepancy in the GSTN portal or issue credit note (details to be uploaded in GSTN portal) for the shortages or rejections in the supplies, within the calendar month notified by BHEL.
11. Bidders to note that Rules & Regulations pertaining to E-way bill system are to be strictly adhered to, as and when notified by Govt. authorities.
12. As per Notification 88/2020-Central Tax dated 10th November 2020 (applicable w.e.f. 01 January 2021), the turnover for applicability of E-invoicing provisions has been reduced from 500 crores to 100 crores. In other words, registered person [other than a SEZ unit and those referred in Rule 54(2), 54(3), 54(4) and 54(4A) of the CGST Rules], whose aggregate turnover in any preceding financial year from 2017-18 onwards exceeds 100 crores, is required to comply with the requirement of IRN and QR code in respect of supply of goods or services or both to a registered person or for exports.

H. Performance bank guarantee (PBG):

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

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

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

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

Vendors who qualify as MSE vendors are requested to submit applicable certificates (as specified by the Ministry of Micro, Small and Medium Enterprises) at the time of vendor registration. Vendors have to submit the Udyog Aadhaar certificate along with attested copy of a CA certificate (Annexure VIII) or Udyam Registration certificate applicable for the relevant financial year (latest audited) along with the tender documents in the Part-I bid to avail the applicable benefits.

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

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

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

PURCHASE PREFERENCE FOR MSE VENDORS:

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

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

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

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

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

and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract and shall adhere to the relevant guidelines issued from time to time by Government of India/ BHEL.

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

K. Integrity Pact (IP):

- a) IP is a tool to ensure that activities and transactions between the Company and its Bidders/ Contractors are handled in a fair, transparent and corruption free manner.

Following independent External Monitors (IEMs) on the present panel have been appointed by BHEL with the approval of CVC to oversee implementation of IP in BHEL.

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

- b) Please refer Section-8 of the IP for Role and Responsibilities of IEMs (Annexure IX). In case of any complaint arising out of the tendering process, the matter may be referred to any of the above IEM(s). All correspondence with the IEM/s shall be done through email only.

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

Annexure

Annexure I
Guidelines for Indian Agents

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

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

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

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

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

—X—

Vendor's Signature with Seal

Guidelines for Indian Agents of Foreign Suppliers

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

ANNEXURE - II
LIST OF INTERNATIONAL GATEWAY AIRPORTS

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

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

ANNEXURE – III

DISCREPANCY IN WORDS & FIGURES – QUOTED IN PRICE BID

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

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

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

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

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

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

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

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

BHEL Vendor / Supplier Code:

Company Name :

Permanent Account Number(PAN):

Address

City:

PINCODE

STATE

Contact Person(s)

Telephone No:

Fax No:

e-mail id:

1 Bank Name:

2 Bank Address:

3 Bank Telephone No:

4 Bank Account No:

5 Account Type: Savings/Cash Credit

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

7 Bank IFSC Code(applicable for NEFT)

8 Bank IFSC code(applicable for RTGS)

(Indian Financial System Code)

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

Date:

Authorised Signatory:

Designation:

Telephone No. with STD Code

Company Seal

Bank Certificate

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

Date:

Place:

(.....)

Signature

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

Bharath Heavy Electricals Ltd,

Attn:

Electronics Division, Mysore Road,

BANGALORE - 560 026

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

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

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

1. ORIGINAL HIGH SEA SALES AGREEMENT

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

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

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

4. ORIGINAL HOUSE AIR WAY BILL/ BILL OF LADING

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

5. ORIGINAL CARGO ARRIVAL NOTICE FROM FORWARDER.

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

7. ORIGINAL PACKING LIST.

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

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

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



ELECTRONICS DIVISION, BANGALORE

Annexure-VI

BHEL MEMBER BANKS (LIST OF CONSORTIUM BANKS)

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

Sl. No.	Nationalised Banks	Sl. No.	Public Sector Banks
1	Allahabad Bank	18	IDBI
2	Andhra Bank		
3	Bank of Baroda	Sl. No.	Foreign Banks
4	Canara Bank	19	CITI Bank N.A
5	Corporation Bank	20	Deutsche Bank AG
6	Central Bank	21	The Hongkong and Shanghai Banking Corporation Ltd. (HSBC)
7	Indian Bank	22	Standard Chartered Bank
8	Indian Overseas Bank	23	J P Morgan
9	Oriental Bank of Commerce		
10	Punjab National Bank	Sl. No.	Private Banks
11	Punjab & Sindh Bank	24	Axis Bank
12	State Bank of India	25	The Federal Bank Limited
13	Syndicate Bank	26	HDFC Bank
14	UCO Bank	27	Kotak Mahindra Bank Ltd
15	Union Bank of India	28	ICICI Bank
16	United Bank of India	29	IndusInd Bank
17	Vijaya Bank	30	Yes Bank

Note:

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

Annexure-VII

BANK GUARANTEE FOR PERFORMANCE SECURITY

Bank Guarantee No:

Date:

To

NAME

& ADDRESSES OF THE BENEFICIARY

Dear Sirs,

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

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

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

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

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

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

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

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

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

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

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

Unless a demand or claim under this guarantee is made on us in writing on or before the⁸we shall be discharged from all liabilities under this guarantee thereafter.

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

Notwithstanding anything to the contrary contained hereinabove:

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

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

For and on behalf of
(Name of the Bank)

Dated.....

Place of Issue.....

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

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

³ DETAILS ABOUT THE NOTICE OF AWARD/CONTRACT REFERENCE

⁴ CONTRACT VALUE

⁵ PROJECT/SUPPLY DETAILS

⁶ BG AMOUNT IN FIGURES AND WORDS

⁷ VALIDITY DATE

⁸ DATE OF EXPIRY OF CLAIM PERIOD

Certificate by Chartered Accountant on letterhead

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

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

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

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

Date:

(Signature) Name-
Membership number-

Seal of Chartered Accountant with UDIN reference

INTEGRITY PACT**Between**

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

and

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

Preamble

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

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

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

Section 1- Commitments of the Principal

1.1 The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles:-

1.1.1 No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.

1.1.2 The Principal will, during the tender process treat all Bidder(s) with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential/ additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.

1.1.3 The Principal will exclude from the process all known prejudiced persons.

1.2 If the Principal obtains information on the conduct of any of its employees which is a penal offence under the Indian Penal Code 1860 and Prevention of Corruption Act 1988 or any other statutory penal enactment, or if there be a substantive suspicion in this regard, the Principal will inform its Vigilance Office and in addition can initiate disciplinary actions:

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

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

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

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

Section 4 - Compensation for Damages

- 4.1 If the Principal has disqualified the Bidder from the tender process prior to the award according to Section 3, the Principal is entitled to demand and recover the damages equivalent Earnest Money Deposit/ Bid Security.
- 4.2 If the Principal has terminated the contract according to Section 3, or if the Principal is entitled to terminate the contract according to section 3, the Principal shall be entitled to

demand and recover from the Contractor liquidated damages equivalent to 5% of the contract value or the amount equivalent to Security Deposit/ Performance Bank Guarantee, whichever is higher.

Section 5 - Previous Transgression

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

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

- 6.1 The Principal will enter into agreements with identical conditions as this one with all Bidders and Contractors. In case of sub-contracting, the Principal contractor shall be responsible for the adoption of IP by his sub-contractors and shall continue to remain responsible for any default by his sub-contractors.
- 6.2 The Principal will disqualify from the tender process all bidders who do not sign this pact or violate its provisions.

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

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

Section 8 - Independent External Monitor(s)

- 8.1 The Principal appoints competent and credible Independent External Monitor for this Pact. The task of the Monitor is to review independently and objectively, whether and to what extent the parties comply with the obligations under this agreement.
- 8.2 The Monitor is not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the CMD, BHEL.
- 8.3 The Bidder(s)/ Contractor(s) accepts that the Monitor has the right to access without restriction to all contract documentation of the Principal including that provided by the Bidder(s)/ Contractor(s). The Bidder(s)/ Contractor(s) will grant the monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his contract documentation. The same is applicable to Sub-contractor(s). The Monitor is under contractual obligation to treat the information and documents of the Bidder(s)/ Contractor(s) / Sub-contractor(s) with confidentiality in line with Non- disclosure agreement.
- 8.4 The Principal will provide to the Monitor sufficient information about all meetings among the parties related to the contract provided such meetings could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the Monitor the option to participate in such meetings.

- 8.5 The role of IEMs is advisory, would not be legally binding and it is restricted to resolving issues raised by an intending bidder regarding any aspect of the tender which allegedly restricts competition or bias towards some bidders. At the same time, it must be understood that IEMs are not consultants to the Management. Their role is independent in nature and the advice once tendered would not be subject to review at the request of the organization.
- 8.6 For ensuring the desired transparency and objectivity in dealing with the complaints arising out of any tendering process, the matter should be examined by the full panel of IEMs jointly as far as possible, who would look into the records, conduct an investigation, and submit their joint recommendations to the Management.
- 8.7 The IEMs would examine all complaints received by them and give their recommendations/ views to CMD, BHEL, at the earliest. They may also send their report directly to the CVO and the Commission, in case of suspicion of serious irregularities requiring legal/ administrative action. IEMs will tender their advice on the complaints within 10 days as far as possible.
- 8.8 The CMD, BHEL shall decide the compensation to be paid to the Monitor and its terms and conditions.
- 8.9 IEM should examine the process integrity, they are not expected to concern themselves with fixing of responsibility of officers. Complaints alleging mala fide on the part of any officer of the organization should be looked into by the CVO of the concerned organisation.
- 8.10 If the Monitor has reported to the CMD, BHEL, a substantiated suspicion of an offence under relevant Indian Penal Code/ Prevention of Corruption Act, and the CMD, BHEL has not, within reasonable time, taken visible action to proceed against such offence or reported it to the Vigilance Office, the Monitor may also transmit this information directly to the Central Vigilance Commissioner, Government of India.
- 8.11 The number of Independent External Monitor(s) shall be decided by the CMD, BHEL.
- 8.12 The word 'Monitor' would include both singular and plural.

Section 9 - Pact Duration

- 9.1 This Pact shall be operative from the date IP is signed by both the parties till the final completion of contract for successful bidder and for all other bidders 6 months after the contract has been awarded. Issues like warranty / guarantee etc. should be outside the purview of IEMs.
- 9.2 If any claim is made/ lodged during currency of IP, the same shall be binding and continue to be valid despite the lapse of this pact as specified above, unless it is discharged/ determined by the CMD, BHEL.

Section 10 - Other Provisions

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

- 10.2 Changes and supplements as well as termination notices need to be made in writing. Side agreements have not been made.
- 10.3 If the Contractor is a partnership or a consortium, this agreement must be signed by all partners or consortium members.
- 10.4 Should one or several provisions of this agreement turn out to be invalid, the remainder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.
- 10.5 Only those bidders / contractors who have entered into this agreement with the Principal would be competent to participate in the bidding. In other words, entering into this agreement would be a preliminary qualification.

For & On behalf of the Principal

(Office Seal)

Place-----

Date-----

Witness:_____

(Name & Address) _____

For & On behalf of the Bidder/

Contractor

(Office Seal)

Witness:_____

(Name & Address) _____

Annexure-X

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

- I. Any bidder from a country which shares a land border with India will be eligible to bid in this tender only if the bidder is registered with the Competent Authority.
- II. "Bidder" (including the term 'tenderer', 'consultant' or 'service provider' in certain contexts) means any person or firm or company, including any member of a consortium or joint venture (that is an association of several persons, or firms or companies), every artificial juridical person not falling in any of the descriptions of bidders stated hereinbefore, including any agency branch or office controlled by such person, participating in a procurement process.
- III. "Bidder from a country which shares a land border with India" for the purpose of this Order means :-
 - a. An entity incorporated, established or registered in such a country; or
 - b. A subsidiary of an entity incorporated, established or registered in such a country; or
 - c. An entity substantially controlled through entities incorporated, established or registered in such a country; or
 - d. An entity whose *beneficial owner* is situated in such a country; or
 - e. An Indian (or other) agent of such an entity; or
 - f. A natural person who is a citizen of such a country; or
 - g. A consortium or joint venture where any member of the consortium or joint venture falls under any of the above
- IV. The *beneficial owner* for the purpose of (iii) above will be as under:
 1. In case of a company or Limited Liability Partnership, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person, has a controlling ownership interest or who exercises control through other means.

Explanation--

 - a. "Controlling ownership interest" means ownership of or entitlement to more than twenty-five per cent of shares or capital or profits of the company;
 - b. "Control" shall include the right to appoint majority of the directors or to control the management or policy decisions including by virtue of their shareholding or management rights or shareholders agreements or voting agreements;
 2. In case of a partnership firm, the beneficial owner is the natural person(s) who, whether acting alone or together, or through one or more juridical person, has ownership of entitlement to more than fifteen percent of capital or profits of the partnership;

3. In case of an unincorporated association or body of individuals, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person, has ownership of or entitlement to more than fifteen percent of the property or capital or profits of such association or body of individuals;
4. Where no natural person is identified under (1) or (2) or (3) above, the beneficial owner is the relevant natural person who holds the position of senior managing official;
5. In case of a trust, the identification of beneficial owner(s) shall include identification of the author of the trust, the trustee, the beneficiaries with fifteen percent or more interest in the trust and any other natural person exercising ultimate effective control over the trust through a chain of control or ownership.

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



ಭಾರತ್ ಹೆವಿ ಎಲೆಕ್ಟ್ರಿಕಲ್ಸ್ ಲಿಮಿಟೆಡ್
भारत हेवी इलेक्ट्रिकल्स लिमिटेड

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

PB 2606 , Mysore Road Bangalore , 560026 INDIA

CE: PR: 002- Rev 02

GENERAL COMMERCIAL CONDITIONS FOR CONTRACT

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

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

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

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

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

Order of Precedence:

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

Interpretation:

In the contract, except where the context requires otherwise:

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

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

Applicable Conditions:

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

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

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

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

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

18. Risk Purchase Clause: In case of failure of supplier, BHEL at its discretion may make purchase of the materials / services not supplied / rendered in time at the RISK & COST of the supplier. Under such situation, the supplier who fails to supply the goods in time shall be wholly liable to make good to BHEL any loss due to risk purchase.

In case of items demanding services at site like erection and commissioning, vendor should send his servicemen/representatives within 7 days from the service call. In case a vendor fails to attend to the service call, BHEL at its discretion may also make arrangements to attend such service by other parties at the **RISK & COST** of the supplier. Under such situation the supplier who fails to attend the service shall be wholly liable to make good to BHEL any loss due to risk purchase/service including additional handling charges due to the change.

19. Shortages: In the event of shortage on receipt of goods and/or on opening of packages at site, all such shortages, caused by supplier's act or omission, shall be made good at free of cost within a reasonable time that BHEL may allow from such intimation.

Transit Damages: In the event of receipt of goods in damaged condition or having found them so upon opening of packages at site, supplier shall make good of all such damages within a reasonable time from such intimation by BHEL. In case BHEL raises an insurance claim, the cost of material limited to insurance settled amount less handling charges will be reimbursed to supplier.

20. Remedial work: Notwithstanding any previous test or certification, BHEL may instruct the vendor to remove and replace materials/goods or remove and re-execute works/services which are not in accordance with the purchase order. Similarly BHEL may ask the vendor to supply materials or to execute any services which are urgently required for any safety reasons, whether arising out of or because of an accident, unforeseeable event or otherwise. In such an event, Vendor shall provide such services within a reasonable time as specified by BHEL.

21. Indemnity Clause: Vendor shall comply with all applicable safety regulations and take care for the safety of all persons involved. Vendor is fully responsible for the safety of its personnel or that of his subcontractor's men / property, during execution of the Purchase Order and related services. All statutory payments including PF, ESI or other related charges have to be borne by the vendor. Vendor is fully responsible for ensuring that all legal compliances are followed in course of such employment.

22. Product Information, Drawings and Documents: All specified drawings, technical documents or other technical information received by Vendor from BHEL or vice versa shall not, without the consent of the other party, be used for any other purpose than that for which they were provided. They may not, without the consent of the Disclosing party, otherwise be used or copied, reproduced, transmitted or communicated to third parties. All information and data contained in general product documentation, whether in electronic or any other form, are binding only to the extent that they are by reference expressly included in the contract.

Vendor, as per agreed date/s but not later than the date of delivery, provide free of charge information and drawings which are necessary to permit and enable BHEL to erect, commission, operate and maintain the product. Such information and drawings shall be supplied in as many numbers of copies as may be agreed upon.

All intellectual properties, including designs, drawings and product information etc. exchanged during the formation and execution of the Contract shall continue to be the property of the disclosing party.

23. Intellectual Property Rights, Licenses: If any Patent, design, Trade mark or any other intellectual property rights apply to the delivery (goods/related service) or accompanying documentation shall be the exclusive property of the Vendor and BHEL shall be entitled to the legal use thereof free of charge by means of a non-exclusive, worldwide, perpetual license. All intellectual property rights that arise during the execution of the Purchase Order/ contract for delivery by vendor and/or by its employees or third parties involved by the vendor for performance of the agreement shall belong to BHEL. Vendor shall perform everything necessary to obtain or establish the above mentioned rights. The Vendor guarantees that the delivery does not infringe on any of the intellectual property rights of third parties. The Vendor shall do everything necessary to obtain or establish the alternate acceptable arrangement pending resolution of any (alleged)

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

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

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

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

25. Warranty:

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

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

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

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

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

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

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

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

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

Arbitration & Conciliation:

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

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

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

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

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

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

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

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

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

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

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



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

Page 1 of 5

CE: PR: 003- Rev 02

PB 2606 , Mysore Road Bangalore , 560026 INDIA

SPECIAL COMMERCIAL CONDITIONS OF CONTRACT

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

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

RFQ No. : PRV0000025

RFQ Date : } As per NIT @ <https://eprocurebhel.co.in> website

RFQ Due Date :

Customer/Project : M/s. MAHAGENCO/Bhusawal (1X660 MW) TPP

Scope Description : Temperature Elements

Kindly submit your quotation as ~~single~~/**two**/~~three-part bid~~ (PQR+Techno-Commercial bid-1st part & Price bid-2nd Part) in E-Procurement System portal: <https://eprocurebhel.co.in> within the Due- Date of as per NIT before 13.00 hours IST and note that tenders will be opened on the same day at 13.30 hours IST.

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

praviirajp@bhel.in or saravanababu@bhel.in

Splitting of tendered quantity to MSE vendors: ~~The tendered quantity will be split to MSE vendor/s subject to submission of relevant document/s by vendors. Refer clause-I of Instructions to Bidders for conditions applicable and for information on document/s to be submitted.~~

Destination: For Indigenous scope of supply, items are to be directly despatched to BHEL site office/stores located at Bhusawal TPP project site in Maharashtra state, India. Detailed Consignee details will be issued by BHEL along with Despatch Clearance.

Terms of Delivery:

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

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

a. GSTIN of place of supply : _____

- b. HSN (Harmonized System of Nomenclature) code : _____
 Applicable tax and Rate : _____ & _____
- c. GSTIN of place of supply of service :
- d. SAC (Service Accounting Code) : _____
 Applicable tax and Rate : _____ & _____
- e. GeM Seller ID mandatorily required for PO placement: _____

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

SL N O.	TERMS	BHEL ACCEPTABLE TERM	BIDDER'S CONFIRMATION	REMARKS, if any
01	Reverse Auction (RA)	BHEL shall be resorting to Reverse Auction (Guidelines as available on http://www.bhel.com/index.php/vendor) for this tender. RA shall be conducted among all the techno-commercially qualified bidders. Price bids of all techno-commercially qualified bidders shall be opened and same shall be considered as initial bids of bidders in RA. In case any bidder(s) do(es) not participate in online Reverse Auction, their sealed envelope price bid along with applicable loading, if any, shall be considered for ranking.	AGREE	
02	Parting of license for imported raw materials	In case of projects where Basic Custom Duty is NIL and vendor is importing any raw materials / components for the enquired item, same are eligible for Zero Customs duty. As per EXIM policy, BHEL will part the import licence with the vendors to obtain import licence by themselves and custom clear the raw materials/ components by availing zero customs duty. Hence, please furnish list of raw materials / components to be imported by you with Quantity and CIF value (for which BHEL has to share import licence). The benefit due to the above shall be passed on to BHEL and confirmed in the quotation. If there are no imported raw materials/ components, same shall be confirmed in the offer.	AGREE CIF value Yes, benefit passed on to BHEL in the priced quotation. (or) We confirm that there are no imported components	
03	Delivery Period	Within 12 weeks from the date of issue of Manufacturing clearance along with approved document.	AGREE 	

		Delay in contractual delivery will attract Penalty as per GCC Clause no.: 04.b. Manufacturing clearance for spares will be provided later as per site delivery schedule of spares. Delivery schedule of spares : June 2023	weeks	
04	Terms of Payment at the time of material supply	Refer Clause “F” of Instructions to Bidder for BHEL standard Payment terms and loading factors applicable for non-compliance against payment terms: Indigenous Scope : Supply Only – (b) Mandatory Spares : Supply Only – (b)	AGREE	
05	Declaration of local content : The ‘Class-I local supplier’/‘Class-II local supplier’ shall be required to indicate percentage of local content and provide self-certification that the item offered meets the local content requirement for ‘Class-I local supplier’/‘Class-II local supplier’, as the case may be.	‘Local content’ means the amount of value added in India which shall, unless otherwise prescribed by the Nodal Ministry, be the total value of the item procured (excluding net domestic indirect taxes) minus the value of imported content in the item (including all customs duties) as a proportion of the total value, in percent. {‘Class-I local supplier’ means a supplier or service provider, whose goods, services or works offered for procurement, has local content equal to or more than 50%, as defined under Public procurement order no.P-45021/2/2017-PP (BE-II) dt: 16.09.2020. ‘Class-II local supplier’ means a supplier or service provider, whose goods, services or works offered for procurement, has local content more than 20% but less than 50%, as defined under Public procurement order no.P-45021/2/2017-PP (BE-II) dt: 16.09.2020. In the event of any Nodal Ministry prescribing higher or lower margin of purchase preference and/or higher or lower percentage of local content in respect of this procurement, same shall be applicable}. (Refer Clause ‘A’ Sl. No. 12 of Instructions to Bidders). Non-Local Suppliers are also eligible to participate in the tender.	Percentage of local content : _____% Details of the Location(s) at which the local value addition is made : _____	

06	Declaration as a compliance to Rule 144(xi) of GFR, 2017 amendment dt 23.07.2020 issued by Ministry of Finance, Govt. of India.	The below declaration is to be submitted on Company Letter head duly signed and sealed by authorised signatory, for ascertaining the eligibility of offer in the tender. “I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India; I certify that our firm is not from such a country or, if from such a country, has been registered with the Competent Authority. I hereby certify that our firm fulfils all requirements in this regard and is eligible to be considered.” (Refer Clause ‘A’ Sl. No. 13 of Instructions to Bidders).		
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II. Bidder to note that Deviations shall not be permitted for the below mentioned terms and are deemed to be complied. In case of non-compliance/deviation, offer shall be liable for rejection:

- (1) **Submission of documents post PO viz., drawings /data sheet etc. as indicated in Cl: 04 of GCC:** Within _02_ weeks from the date of receipt of Purchase Order. Delay in submission of complete set of specified documents in NIT, will attract Penalty as per GCC Clause no.04.a.
- (2) **Validity:** The offer will be valid for a period of _90_ days from the date of part-I bid opening and in case of Negotiation/ Counter-offer, price validity will apply afresh for a period of _30_ days from the date of according final price by bidder (or) up to original validity period, whichever is later.

- (3) **Warranty:** 24 months from the date of dispatch of goods.

- (4) **Despatch Documents:** Complete set of despatch documents (original + 1 photocopy set) as per Purchase Order shall be forwarded to Purchase Executive/BHEL directly. Despatch documents shall include the following:

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

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

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

- (5) **Freight Charges (for indigenous scope of supply):** Freight charges shall be to vendor's account. Bidder to quote Lump sum reasonable Freight charges along with applicable tax, in price bid for both main supply and mandatory spares separately.

- (6) **Evaluation criteria to determine L1 bidder:** Items will not be split on item-wise lowest offer. Evaluation of the lowest bidder will be done as a combined package basis.
- (7) **Erection Supervision and Commissioning charges:** Not Applicable.
- (8) **PBG:** Not Applicable.

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

Vendor's Signature with
Seal



**SPECIFICATION
FOR
TEMPERATURE ELEMENTS**

CE/416/BHUSAWAL/TE/PS
CE/416/BHUSAWAL/TE/PS
REV. NO.: 00
PROJECT: BHUSAWAL 1X660 MW

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PROJECT: BHUSAWAL 1X660 MW

CUSTOMER: M/S. MAHAGENCO

CONSULTANT: M/S. DCPL

CONTRACTOR: M/S. BHEL

**PURCHASE SPECIFICATIONS
FOR
TEMPERATURE ELEMENTS**

REVISION : 00

APPROVED

(PPS)

PREPARED

(PRK)

ISSUED

416

DATE

06/04/2021

Pre-Qualification Requirements (PQR) of Bidders for Temperature Elements:

1. "Bidder shall have successfully completed design, engineering, manufacturing, testing and supply of Temperature Elements in not less than two (2) different Thermal Powerplants of unit size not less than 500 MW before last two (2) years as on bid opening date. To qualify to this point, Bidders shall furnish details of supplies made with applications covering the Mediums Steam and Water. Details should include PO copies and Supply documents.
Performance certificates from end user (if available) can also be furnished.
2. Manufacturers based outside India, who are making offer for this tender, shall have authorized representatives in India for support related to Documentation.
3. All required documents against this Tender/Specification shall be submitted in English only.
4. Whenever required during evaluation of 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 if required.
5. BHEL shall submit filled Proforma for Vendor approval format (shall be filled by bidder Which is part of this specification) and credentials/details furnished by Bidder with their offers to customer and await customer's decision for a maximum of (30) Thirty Days from the date of submission to customer. If Vendor approval not received within above period, BHEL shall treat the offer as "Not Meeting PQR" criteria and offer shall be rejected.
6. In case Bidder does not include the details or meet the Pre-qualification requirements their offer will summarily be rejected.

SUPPLY REQUIREMENTS: Vendor shall quote for the following items indicated below. Without this, the offer shall be treated as incomplete and shall be rejected. All the Elements below shall be provided with CERAMIC Terminal Blocks and Nickel Plated Brass Screw type with Silver coated and spring loaded Connectors. Br Ni plated Double compression 1/2" NPT (M) Cable Gland shall be provided.

1.0 PROJECT REQUIREMENT :

A) SCOPE: The offer for the following items shall be as per Instrument Schedule & related Tapping point Drgs.

SL · N O	Material Code	Description	Unit 1 Qty	Mandatory Spares Qty	GRAND TOTAL (Nos)
1	PR0190000333	T/C K type threaded Barstock thermowell IBR	79	30	109
2	PR0190000341	T/C K type with flanged thermowell	38	4	42
3	PR0190000350	T/C R type with flanged Inconel 600 thermowell	8	2	10
4	PR0190000368	T/C K Type with 25mtr Flexible MI extension cable and Barstock Thermowell	25	4	29
5	PR0190000376	T/C K type Metal Temperature Measurement 30 Mtr MI cable.	1	2	3
6	PR0190000384	T/C K type with Tungsten carbide thermowell	16	2	18

SL · N O	Material Code	Description	Unit 1 Qty	Mandatory Spares Qty	GRAND TOTAL (Nos)
7	PR0190000392	T/C K type with flanged Inconel 600 thermowell	28	3	31
8	PR0200000330	RTD with threaded Barstock thermowell	36	10	46
9	PR0200000349	RTD with flanged thermowell	28	3	31
10	PR0200000357	RTD for HFO /LFO with Threaded Barstock Thermowell	10	2	12
11	PR0200000365	RTD with threaded Barstock thermowell IBR	8	4	12
12	PR0200000373	RTD with flanged Inconel 600 thermowell	12	2	14
		Total Qty (Nos)	289	68*	357

B) Mandatory Spares:

*Minimum mandatory spares qty indicated in the table above, Actual Qty shall be as indicated below.

Mandatory spares shall be 10 % of Total Qty for each type, Each Process Connection Size and Each Thermowell size(IL&EL) OR Minimum 2 Number of each type, Each Process Connection Size and Each Thermowell size(IL&EL) whichever is higher shall be included as mandatory spares.

Note: It is responsibility of bidder to calculate mandatory spares correctly, vendor can chose the length of IL and EL to optimize the mandatory spares qty without affecting the specification requirement. No commercial implication will be allowed for change in mandatory spares quantity due to calculation of WFC. During datasheets submission if BHEL finds that Thermowell length has to be corrected as per ASME PTC 19.3 2016 and if it results in change of qty in mandatory spares then no commercial implication will be allowed. However, if change of IL is due to inputs such as Operating and design parameters furnished by BHEL, then commercial implications due to those changes will be allowed.

Note: Verification of WFC(Includes Thermowell Insertion and Extension Lengths) will be done as per ASME PTC 19.3 2016 only after PO placement.

Vendors shall submit Mandatory spares list for reference in excel copy.

Vendors shall submit Quality Plan for RTD and Thermocouple for approval along with datasheets for approval.

Instrument Schedule & Tapping Point Drg. References.

1. Instrument Sch. Ref. CE/416/BHUSAWAL/TE/SCH

2. Tapping Point Drgs Ref:
PE-DG-415-145-I101
Bhusawal-TEMP-METAL-01
4-97-288-94296
3-55-335-02053
4-97-288-94302

4-97-288-94298
4-97-288-94305

2.0 Technical Requirements :

Tag number shall be engraved on thermowell, service engraved in stainless steel tag plate and tied to Temperature Element with SS chain.

2.1 RTD (PT-100) shall have Duplex - Ungrounded elements, Four wire, 100 Ohm platinum at 0 DegC and shall Conform to DIN-43760. Accuracy of +/-0.5% of span as per IEC-60751 or Class A accuracy as per DIN 43760, whichever is better, Terminal Head shall be IP-65 or better universal screw type. Terminal head cover shall be provided with gaskets and SS 316 captive chain. Terminal head shall be of Die cast aluminium or better. Terminal block shall be constructed of High Temperature ceramic. Head shall be designed for positive connection and for a terminal temperature Difference of not more than 0.05 deg.C. Sheathing of RTD's shall be 8 mm OD SS 316 seamless tubes with Magnesium oxide (MgO) (Purity 99.4%) insulation. Element lead size shall be 18 AWG. The insulation resistance at 540 deg.C. shall not be less than 5 mega ohms.

Cable Entry through Br Ni plated Double compression 1/2" NPT(M) Cable Gland.

150mm SS304 Nipple union Nipple shall be provided with 1/2" Sch 80 pipe with 1/2" NPT(M) connection size for all Barstok Thermowells and Tungsten Carbide Thermowells.

Characteristics shall be linear with respect to temperature within +/-0.5% of top range.

Response time for RTD shall be <20 Sec.

2.2 Thermocouples shall have Dual / Duplex Ungrounded elements, 16 AWG wire for Chromel - Alumel (Type K) and 24 AWG wire for Pt-Rhodium Pt (Type R). Vendor to furnish the test reports for verification of wire gauges during inspection. Sheathing of K-Type Thermocouple shall be 8 mm OD SS 316 seamless tubes with magnesium oxide packing for insulation and for R-Type thermocouple, sheathing shall be 8mm OD of Inconel 600 with magnesium oxide packing for insulation (purity 99.4% above). Insulation Resistance at 540 DegC shall not be less than 5 Mega Ohms.

Thermocouple Assembly Terminal head shall be IP-65 or better, universal screw type. Terminal head cover shall be provided with gaskets and SS 316 captive chain. Terminal head shall be of Die cast aluminium or better. Terminal block shall be constructed of High Temperature ceramic base with Brass screw type terminals, spring loaded Mineral insulated thermocouples. Thermocouple Head shall be designed for positive connection and for a terminal Temperature Difference of not more than 0.05 DegC. Cable Entry through Br Ni plated Double compression 1/2" NPT(M) Cable Gland.

Thermocouples shall conform to Standard ANSI MC 96.1- Special Limits of error / IEC60584.

Characteristics shall be linear with respect to temperature within +/-0.5% of top range.

150mm SS304 Nipple union Nipple shall be provided with 1/2" Sch 80 pipe with 1/2" NPT(M) connection size for all Barstock Thermowells and Tungsten Carbide Thermowells.

Response time for Thermocouple shall be <20 Sec.

2.3 Metal temperature Thermocouples shall be provided as per the following specification:-

Measuring medium: Metal

Material of thermocouple element: Chromel - Alumel- Type K

Type of Thermocouple: Duplex with separate hot junctions ungrounded type.
Insulation Packing: Mineral insulation of magnesium oxide
Thermocouple wire gauge: 16 AWG
Protective sheath: SS 321
Protective sheath dia: 8 mm O.D
Characteristics of thermocouple: Special limits of error as in ANSI C 96.1
Mounting accessories: ½" BSP SS sliding end connector weld pad welded on clamping of heat resistance SS310.
Cold end sealing: SS pot seal with colour coded PTFE headed sleeve insulated flexible tails. Sealing Component Epoxy Resin.
Minimum bending radius: 30 mm
Length of T/C: 30mtr.

2.4 Thermowell for above shall conform to following requirements:

2.4.1 R1" & M33x2 threaded thermowell shall be Single piece SS316 material, tapered, drilled from Barstock threaded Thermowells shall have 25 mm Tip Dia.
R1.5" threaded thermowell shall be Single piece SS316/SS316H/Inconel600 material (As identified in Ins. Sch), tapered, drilled from Barstock threaded Thermowells shall have 35 mm Tip Dia.

Thermowell Design shall conform to Standard per ASME PTC 19.3-2016 or latest. IBR certification shall be furnished for thermowells, as applicable.
Bore Concentricity +5% of wall thickness
Vendor shall quote IL and EL lengths in multiple of 5mm only.
Maximum Insertion Length of the Threaded Thermowell shall not exceed 400mm.

Vendor shall explain the criteria to accept / select "Insertion length" as per ASME PTC 19.3, 2016 & shall have the software to size the Thermowell as per ASME PTC 19.3 2016 or latest, along with the offer vendor has to submit the correct calculations for Reynolds number, Strouhal number, Vortex Frequency Shredding, Resonance Frequency, Inline Resonance Velocity, Cyclic Stress, Steady state Stress (LHS & RHS), Dynamic Stress (LHS & RHS), Pressure Limit etc.

Note: Verification of Wake Frequency calculation (Includes Thermowell Insertion and Extension Lengths) will be done as per ASME PTC 19.3 2016 only after PO placement.

2.4.2 For Mill classifier outlet (i.e. Medium is Coal/Air mixture), long life Solid Sintered Tungsten Carbide material of high abrasion resistance shall be provided Tungsten Carbide Thermowell size= 24mm OD x 9mm ID. Insertion length 160 mm, Extension Length 150mm.

2.4.3 For Flue gas services, Adjustable SS316 flange, Inconel 600 Thermowell protection tube of Tip Diameter of 26.7 mm with welded cap at the end (of 100 mm min. length from tip) shall be fabricated from 3/4" Sch 80 Seamless Pipes as identified in the Instrument schedule.

For Air services, Adjustable SS316 flange, SS316 Thermowell protection tube of Tip Diameter of 26.7 mm with welded cap at the end (of 100 mm min. length from tip) shall be fabricated from 3/4" Sch 80 Seamless Pipes as identified in the Instrument schedule.

For Furnace zone(R Type T/C), Adjustable SS316 flange, Inconel 600 Thermowell with additional overprotection by Tungsten carbide coating. Inconel 600 tube shall be fabricated from 3/4" Sch 80 seamless pipe with welded cap at the end (of 100 mm min. length from tip). This construction would ensure thermowell should not break due to any shock.

For flanged connections; Studs, nuts and gaskets of suitable material with Cadmium plated shall be provided. Flanges shall be as per ANSI-B 16.5.

3.0 Documents to be furnished in the event of Tendering stage:

- 3.1 Technical offer
- 3.2 Point wise compliance to Purchase specification with company seal and signature on Purchase specification.
- 3.3 Technical Literature / Catalogues.
- 3.4 Engineering Checklist to be fill and submitted with seal and signature.
- 3.5 Mandatory spares list as per specification.

4.0 Documents to be furnished, for Approval by BHEL / Owner or End-User, in the event of order:

- 4.1 Datasheets / Assembly Drawings
 - 4.2 Technical Literature / Catalogues
 - 4.3 Quality Plan ** for Thermocouples, RTD's and Thermowells
 - 4.4 Thermowell Design Calculations as per ASME PTC 19.3-2016 or latest.
- Above documents shall be submitted in Soft copy as one PDF file and 6 sets of Hardcopies for approval.
- 4.5 Test Certificates / Reports as per approved Quality plan.
 - 4.6 Copy of Approved Data sheet (Two sets with supply to Site + 1 Copy to BHEL- EDN)

**** NOTE:** The Quality Plan shall include the following as minimum in addition to tests called by relevant standards (ANSI 96.1 & DIN 43760); Dimension Check, Process/Electrical connections Checks, Calibration Tests (100 % by Vendor & 10 % by BHEL / Owner), Ultrasonic/Radiography Test for bore concentricity of Thermowell, Insulation Resistance Tests, IBR Certificates (as Applicable), Hydro tests, all Material Test Certificates etc.

Inspection shall be carried out based on the Approved Quality plan.

Important Note:

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

PROJECT: BHUSAWAL 11650 MM
 CUSTOMER: M/s MAHAGENCO
 CONTRACTOR: M/s BHEL
 Ref: CE/416/BHUSAWAL/TE/SCN

SL NO	KKS_TAG	DESCRIPTION	SENSR_TYPE	OP. PRESS	DGN. PRESS	Unit of Pressure	OP. TEMP (Deg.C)	DGN. TEMP (Deg.C)	MEDIUM	PPE SIZE (Dia x Tth) (mm.)	VELOCITY (Meter/Sec)	INSUL. THICK (mm.)	RANGE (Deg.C)	IRR Required for Thermowell	STUB DETAIL / PROCESS / THERMOWELL DRG REF	PROCESS CONNECTION SIZE	Stub Height (mm)	REMARKS	SS304 Nipple Union Nipple Length (mm)	Qty	Input unit	MATERIAL CODE
1	LB11CT011	HPBP-1 D/S TEMP	Cr-Al	31.99	66.2	Kg/cm2(g)	344	360	STEAM	457x25	143.58	225	0-500	Yes	PE-DG-415-145-H101	Rc 1.5"	45	BARSTOCK THERMOWELL MATERIAL SHALL BE INCONEL 600	150	1	P	PR0190000333
2	LB11CT012	HPBP-1 D/S TEMP	Cr-Al	31.99	66.2	Kg/cm2(g)	344	360	STEAM	457x25	143.58	225	0-500	Yes	PE-DG-415-145-H101	Rc 1.5"	45	BARSTOCK THERMOWELL MATERIAL SHALL BE INCONEL 600	150	1	P	PR0190000333
3	LB11CT013	HPBP-1 D/S TEMP	Cr-Al	31.99	66.2	Kg/cm2(g)	344	360	STEAM	457x25	143.58	225	0-500	Yes	PE-DG-415-145-H101	Rc 1.5"	45	BARSTOCK THERMOWELL MATERIAL SHALL BE INCONEL 600	150	1	P	PR0190000333
4	LB21CT011	HPBP-2 D/S TEMP	Cr-Al	31.99	66.2	Kg/cm2(g)	344	360	STEAM	457x25	143.58	225	0-500	Yes	PE-DG-415-145-H101	Rc 1.5"	45	BARSTOCK THERMOWELL MATERIAL SHALL BE INCONEL 600	150	1	P	PR0190000333
5	LB21CT012	HPBP-2 D/S TEMP	Cr-Al	31.99	66.2	Kg/cm2(g)	344	360	STEAM	457x25	143.58	225	0-500	Yes	PE-DG-415-145-H101	Rc 1.5"	45	BARSTOCK THERMOWELL MATERIAL SHALL BE INCONEL 600	150	1	P	PR0190000333
6	LB21CT013	HPBP-2 D/S TEMP	Cr-Al	31.99	66.2	Kg/cm2(g)	344	360	STEAM	457x25	143.58	225	0-500	Yes	PE-DG-415-145-H101	Rc 1.5"	45	BARSTOCK THERMOWELL MATERIAL SHALL BE INCONEL 600	150	1	P	PR0190000333
7	LAB8CT011	FW TEMP TO ECO	Cr-Al	309.67	330	KG/CM2(g)	299.8	300	FW	588X72	5.63 m/s	175	0-400	Yes	PE-DG-415-145-H101	Rc 1.5"	45		150	1	P	PR0190000333
8	LAB8CT012	FW TEMP TO ECO	Cr-Al	309.67	330	KG/CM2(g)	299.8	300	FW	588X72	5.63 m/s	175	0-400	Yes	PE-DG-415-145-H101	Rc 1.5"	45		150	1	P	PR0190000333
9	LBG1CT011	MAN STM TEMP TO APRDS	Cr-Al	247	269.3	KG/CM2(g)	555	573	STEAM	219.1x52	35.16 m/s	345	0-700	Yes	PE-DG-415-145-H101	Rc 1.5"	45	BARSTOCK THERMOWELL MATERIAL SHALL BE SS316H	150	1	P	PR0190000333
10	LBG2CT011	CRH STM TEMP TO APRDS	Cr-Al	57.2	66.2	KG/CM2(g)	338.4	360	STEAM	114.3x6.02	21.89 m/s	155	0-500	Yes	PE-DG-415-145-H101	Rc 1.5"	64		150	1	P	PR0190000333
11	LBG3CT011	AUX STM HDR TEMP	Cr-Al	16	20	KG/CM2(g)	290	360	STEAM	457x9.53	43.91 m/s	225	0-400	Yes	PE-DG-415-145-H101	Rc 1"	45		150	1	P	PR0190000333
12	LBG3CT012	AUX STM HDR TEMP	Cr-Al	16	20	KG/CM2(g)	290	360	STEAM	457x9.53	43.91 m/s	225	0-400	Yes	PE-DG-415-145-H101	Rc 1"	45		150	1	P	PR0190000333
13	LA01CT011	DEAERATOR FST TEMP	PRT-100	12.5	15.5	Kg/cm2(g)	188.4	210	COND	Ø 4800x28	--	150	0-200	Yes	--	M3X2	45		150	1	P	PR0200000365
14	LC02CT011	COND TEMP AT GSC IL	PRT-100	30.1	47	Kg/cm2(g)	45.5	55	COND	457x12.7	2.94 m/s	--	0-80		PE-DG-415-145-H101	Rc 1.5"	45		150	1	P	PR0200000330
15	LC02CT012	COND TEMP AT GSC OIL	PRT-100	30.1	47	Kg/cm2(g)	45.5	55	COND	457x12.7	2.94 m/s	--	0-80		PE-DG-415-145-H101	Rc 1.5"	45		150	1	P	PR0200000330
16	LC02CT011	LPH-2 COND IL TEMP	PRT-100	30.1	47	Kg/cm2(g)	69.8	80	COND	457x12.7	2.97 m/s	25	0-100		PE-DG-415-145-H101	Rc 1.5"	45		150	1	P	PR0200000330
17	LC02CT011	LPH-2 COND OIL TEMP	PRT-100	30.1	47	Kg/cm2(g)	94.7	105	COND	457x12.7	3.03 m/s	40	0-100		PE-DG-415-145-H101	Rc 1.5"	45		150	1	P	PR0200000330
18	LC02CT011	LPH-3 COND OIL TEMP	PRT-100	30.1	47	Kg/cm2(g)	116.6	130	COND	457x12.7	3.09 m/s	50	0-100		PE-DG-415-145-H101	Rc 1.5"	45		150	1	P	PR0200000330
19	PAB1CT011	CW TEMP AT COND ILL	PRT-100	2.4	5	KG/CM2(g)	35	60	CW	230x18	2.5 m/s	--	0-60		PE-DG-415-145-H101	Rc 1"	45		150	1	P	PR0200000330
20	PGC12CT011	DMCW TEMP AT PHE-B OIL(TG)	PRT-100	5.25	10	KG/CM2(g)	38	60	DMCW	508x6	2.5 m/s	--	0-80		PE-DG-415-145-H101	Rc 1"	45		150	1	P	PR0200000330
21	PGC13CT011	DMCW TEMP AT PHE-C OIL(TG)	PRT-100	5.25	10	KG/CM2(g)	38	60	DMCW	508x6	2.5 m/s	--	0-80		PE-DG-415-145-H101	Rc 1"	45		150	1	P	PR0200000330
22	PGC08CT011	DMCW TEMP AT PHE(B) OIL	PRT-100	7.95	12	KG/CM2(g)	38	60	DMCW	323.9x6	2.5 m/s	--	0-80		PE-DG-415-145-H101	Rc 1"	45		150	1	P	PR0200000330
23	LB061CT011	EXT STM TEMP AT HPH-6 DESH IL	Cr-Al	25.18	30	Kg/cm2(g)	478.5	490	STEAM	323.9x9.53	46.15	310	0-600	Yes	PE-DG-415-145-H101	Rc 1.5"	45		150	1	P	PR0190000333
24	LBQ71CT011	EXT STM TEMP AT HPH-7 IL	Cr-Al	57.2	66.2	Kg/cm2(g)	338.4	360	STEAM	355.6X15.89	32.44	210	0-500	Yes	PE-DG-415-145-H101	Rc 1.5"	45		150	1	P	PR0190000333
25	LBQ81CT011	EXT STM TEMP AT HPH-8 IL	Cr-Al	55.26	65	Kg/cm2(g)	394.7	400	STEAM	273x15.89	27.69	225	0-500	Yes	PE-DG-415-145-H101	Rc 1.5"	45		150	1	P	PR0190000333
26	LB521CT011	EXT STM TEMP AT LPH-2 IL	PRT-100	0.966	3.5	Kg/cm2(g)	99.5	100	STEAM	914x10	46.31	40	0-100		PE-DG-415-145-H101	Rc 1"	45		150	1	P	PR0200000330
27	LB531CT011	EXT STM TEMP AT LPH-3 IL	PRT-100	2.09	3.5	Kg/cm2(g)	167.6	170	STEAM	610x10	58.01	80	0-200		PE-DG-415-145-H101	Rc 1"	45		150	1	P	PR0200000330
28	LB541CT011	EXT STM TEMP AT LPH-4 IL	Cr-Al	5.81	7	Kg/cm2(g)	276.5	280	STEAM	509x10	59.06	135	0-400	Yes	PE-DG-415-145-H101	Rc 1"	45		150	1	P	PR0190000333
29	LB551CT011	EXT STM TEMP TO DEA	Cr-Al	12.83	15	Kg/cm2(g)	382.7	400	STEAM	406.4x9.53	50.48	235	0-500	Yes	PE-DG-415-145-H101	Rc 1.5"	45		150	1	P	PR0190000333

PROJECT: BHUSAWAL 11650 MM
 CUSTOMER: M/s MAHAGENCO
 CONTRACTOR: M/s BHEL
 Ref: CE/416/BHUSAWAL/TE/SCN

SL NO	KKS_TAG	DESCRIPTION	SENSR_TYPE	OP. PRESS	DGN. PRESS	Unit of Pressure	OP. TEMP (Deg.C)	DGN. TEMP (Deg.C)	MEDIUM	PPE SIZE (Dia x Tth) (mm.)	VELOCITY (Meter/Sec)	INSUL. THICK (mm.)	RANGE (Deg.C)	IR Required for Thermowell	STUB DETAIL / PROCESS / THERMOWELL DRG REF	PROCESS CONNECTION SIZE	Stub Height (mm)	REMARKS	SS304 Nipple Union Nipple Length (mm)	Qty	Input unit	MATERIAL CODE
30	LCH10CT011	HPH-6 NORM DRN TEMP	PRT-100	25.18	30	Kg/cm2(g)	208.2	210	COND	323.9x8.53	1.93 m/s	90	0-200	Yes	PE-DG-415-145-H01	Rc 1"	45		150	1	P	PR0200000335
31	LCH30CT011	HPH-7 NORM DRN TEMP	Cr-Al	55.63	66.2	Kg/cm2(g)	226.4	240	COND	323.9x12.7	1.67 m/s	110	0-300	Yes	PE-DG-415-145-H01	Rc 1.5"	45		150	1	P	PR0190000333
32	LCH50CT011	HPH-8 NORM DRN TEMP	Cr-Al	82.82	88	Kg/cm2(g)	274.9	285	COND	219.1x10.31	1.89 m/s	135	0-400	Yes	PE-DG-415-145-H01	Rc 1.5"	45		150	1	P	PR0190000333
33	LCJ40CT011	LPH-4 NORM DRN TEMP	PRT-100	5.81	7	Kg/cm2(g)	123.5	135	COND	168.3x7.11	1.48 m/s	40	0-100		PE-DG-415-145-H01	Rc 1"	64		150	1	P	PR0200000330
34	LCJ50CT011	DRN COOLER DRAIN TEMP	PRT-100	0.1	3.5	Kg/cm2(g)	51.6	60	COND	323.9x8.53	1.05 m/s	--	0-100		PE-DG-415-145-H01	Rc 1"	45		150	1	P	PR0200000330
35	LBFI0CT011	MS TEMP BEF HPBP-1	Cr-Al	247	269.3	Kg/cm2(g)	565	573	STEAM	323.9x48	59.17 m/s	380	0-700	Yes	PE-DG-415-145-H01	Rc 1.5"	45	BARSTOCK THERMOWELL MATERIAL SHALL BE SS316H	150	1	P	PR0190000333
36	LBF20CT011	MS TEMP BEF HPBP-2	Cr-Al	247	269.3	Kg/cm2(g)	565	573	STEAM	323.9x48	59.17 m/s	380	0-700	Yes	PE-DG-415-145-H01	Rc 1.5"	45	BARSTOCK THERMOWELL MATERIAL SHALL BE SS316H	150	1	P	PR0190000333
37	LBA10CT011	MS TEMP AT SH OIL-LEFT	Cr-Al	247	269.3	Kg/cm2(g)	565	573	STEAM	ID 340x57	42.92 m/s	410	0-700	Yes	PE-DG-415-145-H01	Rc 1.5"	45	BARSTOCK THERMOWELL MATERIAL SHALL BE SS316H	150	1	P	PR0190000333
38	LBA10CT012	MS TEMP AT SH OIL-LEFT	Cr-Al	247	269.3	Kg/cm2(g)	565	573	STEAM	ID 340x57	42.92 m/s	410	0-700	Yes	PE-DG-415-145-H01	Rc 1.5"	45	BARSTOCK THERMOWELL MATERIAL SHALL BE SS316H	150	1	P	PR0190000333
39	LBA10CT013	MS TEMP AT SH OIL-LEFT	Cr-Al	247	269.3	Kg/cm2(g)	565	573	STEAM	ID 340x57	42.92 m/s	410	0-700	Yes	PE-DG-415-145-H01	Rc 1.5"	45	BARSTOCK THERMOWELL MATERIAL SHALL BE SS316H	150	1	P	PR0190000333
40	LBA10CT011	MS HDR TEMP	Cr-Al	247	269.3	Kg/cm2(g)	565	573	STEAM	ID 450x75	49 m/s	450	0-700	Yes	PE-DG-415-145-H01	Rc 1.5"	45	BARSTOCK THERMOWELL MATERIAL SHALL BE SS316H	150	1	P	PR0190000333
41	LBA10CT012	MS HDR TEMP	Cr-Al	247	269.3	Kg/cm2(g)	565	573	STEAM	ID 450x75	49 m/s	450	0-700	Yes	PE-DG-415-145-H01	Rc 1.5"	45	BARSTOCK THERMOWELL MATERIAL SHALL BE SS316H	150	1	P	PR0190000333
42	LBA20CT011	MS TEMP AT SH OIL-RIGHT	Cr-Al	247	269.3	Kg/cm2(g)	565	573	STEAM	ID 340x57	42.92 m/s	410	0-700	Yes	PE-DG-415-145-H01	Rc 1.5"	45	BARSTOCK THERMOWELL MATERIAL SHALL BE SS316H	150	1	P	PR0190000333
43	LBA20CT012	MS TEMP AT SH OIL-RIGHT	Cr-Al	247	269.3	Kg/cm2(g)	565	573	STEAM	ID 340x57	42.92 m/s	410	0-700	Yes	PE-DG-415-145-H01	Rc 1.5"	45	BARSTOCK THERMOWELL MATERIAL SHALL BE SS316H	150	1	P	PR0190000333
44	LBA20CT013	MS TEMP AT SH OIL-RIGHT	Cr-Al	247	269.3	Kg/cm2(g)	565	573	STEAM	ID 340x57	42.92 m/s	410	0-700	Yes	PE-DG-415-145-H01	Rc 1.5"	45	BARSTOCK THERMOWELL MATERIAL SHALL BE SS316H	150	1	P	PR0190000333
45	LB801CT011	HRH STM TEMP AT RH OIL - LEFT	Cr-Al	52.67	60.8	Kg/cm2(g)	593	601	STEAM	ID 675x33	49.27 m/s	490	0-800	Yes	PE-DG-415-145-H01	Rc 1.5"	45	BARSTOCK THERMOWELL MATERIAL SHALL BE SS316H	150	1	P	PR0190000333
46	LB801CT012	HRH STM TEMP AT RH OIL - LEFT	Cr-Al	52.67	60.8	Kg/cm2(g)	593	601	STEAM	ID 675x33	49.27 m/s	490	0-800	Yes	PE-DG-415-145-H01	Rc 1.5"	45	BARSTOCK THERMOWELL MATERIAL SHALL BE SS316H	150	1	P	PR0190000333
47	LB801CT013	HRH STM TEMP AT RH OIL - LEFT	Cr-Al	52.67	60.8	Kg/cm2(g)	593	601	STEAM	ID 675x33	49.27 m/s	490	0-800	Yes	PE-DG-415-145-H01	Rc 1.5"	45	BARSTOCK THERMOWELL MATERIAL SHALL BE SS316H	150	1	P	PR0190000333
48	LB802CT011	HRH STM TEMP AT RH OIL - RIGHT	Cr-Al	52.67	60.8	Kg/cm2(g)	593	601	STEAM	ID 675x33	49.27 m/s	490	0-800	Yes	PE-DG-415-145-H01	Rc 1.5"	45	BARSTOCK THERMOWELL MATERIAL SHALL BE SS316H	150	1	P	PR0190000333
49	LB802CT012	HRH STM TEMP AT RH OIL - RIGHT	Cr-Al	52.67	60.8	Kg/cm2(g)	593	601	STEAM	ID 675x33	49.27 m/s	490	0-800	Yes	PE-DG-415-145-H01	Rc 1.5"	45	BARSTOCK THERMOWELL MATERIAL SHALL BE SS316H	150	1	P	PR0190000333
50	LB802CT013	HRH STM TEMP AT RH OIL - RIGHT	Cr-Al	52.67	60.8	Kg/cm2(g)	593	601	STEAM	ID 675x33	49.27 m/s	490	0-800	Yes	PE-DG-415-145-H01	Rc 1.5"	45	BARSTOCK THERMOWELL MATERIAL SHALL BE SS316H	150	1	P	PR0190000333
51	LB810CT011	HRH STM HDR TEMP	Cr-Al	52.67	60.8	Kg/cm2(g)	593	601	STEAM	ID 850x48	62.15 m/s	525	0-800	Yes	PE-DG-415-145-H01	Rc 1.5"	45	BARSTOCK THERMOWELL MATERIAL SHALL BE SS316H	150	1	P	PR0190000333
52	LBC01CT011	CRH STM TEMP AT RH IL-LEFT	Cr-Al	57.2	66.2	Kg/cm2(g)	338.4	360	STEAM	762x23	25.72 m/s	240	0-600	Yes	PE-DG-415-145-H01	Rc 1.5"	45		150	1	P	PR0190000333
53	LBC02CT011	CRH STM TEMP AT RH IL-RIGHT	Cr-Al	57.2	66.2	Kg/cm2(g)	338.4	360	STEAM	762x23	25.72 m/s	240	0-600	Yes	PE-DG-415-145-H01	Rc 1.5"	45		150	1	P	PR0190000333
54	LAB10CT011	TDSFP-A BP SUC TEMP	PRT-100	12.88	20	KG/CM2(g)	189.6	200	FW	406.4x5.53	2.77 m/s	90	0-200	Yes	PE-DG-415-145-H01	Rc 1"	45		150	1	P	PR0200000365
55	LAB61CT011	FW TEMP AT HPH-6 IL	PRT-100	309.67	330	KG/CM2(g)	195.6	200	FW	509x72	4.74 m/s	100	0-200	Yes	PE-DG-415-145-H01	Rc 1.5"	45		150	1	P	PR0200000365
56	LAB62CT011	FW TEMP AFT HPH-6	Cr-Al	309.67	330	KG/CM2(g)	220.6	230	FW	509X72	4.91 m/s	115	0-300	Yes	PE-DG-415-145-H01	Rc 1.5"	45		150	1	P	PR0190000333
57	LAB50CT011	BFP DISCH HDR TEMP	PRT-100	309.67	470	KG/CM2(g)	195.6	200	FW	600x116	4.14 m/s	100	0-200	Yes	PE-DG-415-145-H01	Rc 1.5"	45		150	1	P	PR0200000365

PROJECT: BHUSAWAL 11650 MM
 CUSTOMER: M/s MAHAGENCO
 CONTRACTOR: M/s BHEL
 Ref: CE/416/BHUSAWAL/TE/SCN

SL NO	KKS_TAG	DESCRIPTION	SENSR_L TYPE	OP. PRESS	DGN. PRESS	Unit of Pressure	OP TEMP (Deg.C)	DGN. TEMP (Deg.C)	MEDIUM	PPE SIZE (Dia x TH) (mm.)	VELOCITY (Meter/Sec)	INSUL. THICK (mm.)	RANGE (Deg.C)	IR Required for Thermowell	STUB DETAIL / PROCESS / THERMOWELL DRG REF	PROCESS CONNECTION SIZE	Stub Height (mm)	REMARKS	SS304 Nipple Union Nipple Length (mm)	Qty	Input unit	MATERIAL CODE
58	LCJ30CT011	LPH-3 NORM DRN TEMP	PRT-100	2.09	3.5	Kg/cm2(g)	100.1	110	COND	218.1x8.35	1.32 m/s	40	0-100		PE-DG-415-145-H101	Rc 1"	45		150	1	P	PR0200000330
59	LBA10CT013	MS HDR TEMP	Cr-Al	247	269.3	Kg/cm2(g)	565	573	STEAM	ID 459x75	49 m/s	450	0-700	Yes	PE-DG-415-145-H101	Rc 1.5"	45	BARSTOCK THERMOWELL MATERIAL SHALL BE SS316H	150	1	P	PR0190000333
60	LCJ20CT011	LPH-2 NORM DRN TEMP	PRT-100	0.966	3.5	Kg/cm2(g)	75.2	85	COND	273x8.35	1.15 m/s	25	0-120		PE-DG-415-145-H101	Rc 1"	45		150	1	P	PR0200000330
61	LAB20CT011	TDBFP-B BP SUC TEMP	PRT-100	12.68	20	KG/CM2(g)	189.6	200	FW	406.4x8.53	2.77 m/s	90	0-200	Yes	PE-DG-415-145-H101	Rc 1"	45		150	1	P	PR0200000365
62	PAB21CT011	CW TEMP AT COND IL-R	PRT-100	2.4	5	KG/CM2(g)	36	60	CW	233x18	2.5 m/s	--	0-60		PE-DG-415-145-H101	Rc 1"	45		150	1	P	PR0200000330
63	LAB30CT011	MDBFP-C BP SUC TEMP	PRT-100	12.68	20	KG/CM2(g)	189.6	200	FW	323.9x8.53	2.89 m/s	85	0-200	Yes	PE-DG-415-145-H101	Rc 1"	45		150	1	P	PR0200000365
64	PCB20CT011	ACW TEMP AFT SC5	PRT-100	4.0	7.5	KG/CM2(g)	36	60	ACW	813x8	2.5 m/s	--	0-60		PE-DG-415-145-H101	Rc 1"	45		150	1	P	PR0200000330
65	LAB63CT012	FW TEMP AFT HPH-7	Cr-Al	309.67	330	KG/CM2(g)	268.1	280	FW	509x72	5.3 m/s	165	0-400	Yes	PE-DG-415-145-H101	Rc 1.5"	45		150	1	P	PR0190000333
66	LAB64CT011	FW TEMP AFT HPH-8	Cr-Al	309.67	330	KG/CM2(g)	295	300	FW	509x72	5.58 m/s	175	0-400	Yes	PE-DG-415-145-H101	Rc 1.5"	45		150	1	P	PR0190000333
67	LBG30CT013	AUX STM HDR TEMP	Cr-Al	16	20	KG/CM2(g)	290	360	STEAM	457x12.7	43.91 m/s	225	0-400	Yes	PE-DG-415-145-H101	Rc 1"	45		150	1	P	PR0190000333
68	PGC10CT011	TG DMCW PUMP DISCH HDR TEMP	PRT-100	6.25	10	KG/CM2(g)	46.6	60	DMCW	711x7	2.5 m/s	--	0-60		PE-DG-415-145-H101	Rc 1"	45		150	1	P	PR0200000330
69	PGC40CT011	SG DMCW PUMP DISCH HDR TEMP	PRT-100	8.95	12	KG/CM2(g)	44.4	60	DMCW	323.9x6	2.5 m/s	--	0-60		PE-DG-415-145-H101	Rc 1"	45		150	1	P	PR0200000330
70	LCAB2CT011	COND TEMP TO DEA	PRT-100	30.1	47	Kg/cm2(g)	154	160	COND	457x12.7	3.18 m/s	75	0-200		PE-DG-415-145-H101	Rc 1.5"	45		150	1	P	PR0200000330
71	LBQ91CT011	EXT STM TEMP AT HPH-6 IL	Cr-Al	25.18	30	Kg/cm2(g)	307.3	310	STEAM	273x8.35	46.92	165	0-600	Yes	PE-DG-415-145-H101	Rc 1"	45		150	1	P	PR0190000333
72	LBA40CT011	MDBFP-D BP SUC TEMP	PRT-100	12.68	20	KG/CM2(g)	189.6	200	FW	323.9x8.53	2.89 m/s	85	0-200	Yes	PE-DG-415-145-H101	Rc 1"	45		150	1	P	PR0200000365
73	PAB11CT012	CW TEMP AT COND OIL-L	PRT-100	2.3	5	KG/CM2(g)	45	60	CW	233x18	2.5 m/s	--	0-60		PE-DG-415-145-H101	Rc 1"	45		150	1	P	PR0200000330
74	PAB21CT012	CW TEMP AT COND OIL-R	PRT-100	2.3	5	KG/CM2(g)	45	60	CW	233x18	2.5 m/s	--	0-60		PE-DG-415-145-H101	Rc 1"	45		150	1	P	PR0200000330
75	LCA60CT011	DRN CLR IL TEMP	PRT-100	30.1	47	Kg/cm2(g)	45.5	55	COND	457x12.7	2.84 m/s	--	0-60		PE-DG-415-145-H101	Rc 1.5"	45		150	1	P	PR0200000330
76	LAB65CT012	FW TEMP AFT HPH-6 DESH	Cr-Al	309.67	330	KG/CM2(g)	299.5	300	FW	509x72	5.63 m/s	165	0-400	Yes	PE-DG-415-145-H101	Rc 1.5"	45		150	1	P	PR0190000333
77	PGC11CT011	DMCW TEMP AT PHE-A OIL(TG)	PRT-100	5.25	10	KG/CM2(g)	38	60	DMCW	508x6	2.5 m/s	--	0-60		PE-DG-415-145-H101	Rc 1"	45		150	1	P	PR0200000330
78	LBQ10CT011	GRH STM TO DEA TEMP BEF CV	Cr-Al	31.89	66.2	Kg/cm2(g)	344	360	STEAM	355.6x15.09	46.83	210	0-600	Yes	PE-DG-415-145-H101	Rc 1.5"	45		150	1	P	PR0190000333
79	LBQ70CT011	EXT STM TEMP AT HPH-7 BEF HRV	Cr-Al	67.2	66.2	Kg/cm2(g)	338.4	360	STEAM	355.6x15.09	32.44	210	0-600	Yes	PE-DG-415-145-H101	Rc 1.5"	45		150	1	P	PR0190000333
80	LCM30CT011	FLASH TANK-A TEMP	Cr-Al	0.1	3.5	Kg/cm2(g)	46	210	COND	ID 3000 X 16	--	--	0-300	Yes	PE-DG-415-145-H101	Rc 1"	45		150	1	P	PR0190000333
81	LCM20CT011	FLASH TANK-B TEMP	Cr-Al	0.1	3.5	Kg/cm2(g)	46	210	COND	ID 3000 X 16	--	--	0-300	Yes	PE-DG-415-145-H101	Rc 1"	45		150	1	P	PR0190000333
82	LCA80CT011	CEP SUC HDR TEMP	PRT-100	0.0992	1.1	Kg/cm2(g)	45.2	55	COND	680x10	1.34 m/s	--	0-60		PE-DG-415-145-H101	Rc 1"	45		150	1	P	PR0200000330
83	PGC41CT011	DMCW TEMP AT PHE-B(SG) OIL	PRT-100	7.95	12	KG/CM2(g)	38	60	DMCW	323.9x6	2.5 m/s	--	0-60		PE-DG-415-145-H101	Rc 1"	45		150	1	P	PR0200000330
84	PGC42CT011	DMCW TEMP AT PHE-B(SG) OIL	PRT-100	7.95	12	KG/CM2(g)	38	60	DMCW	323.9x6	2.5 m/s	--	0-60		PE-DG-415-145-H101	Rc 1"	45		150	1	P	PR0200000330
85	LBQ20CT001	HPH-6 DESUPH LINE DRAIN TO FLASH TANK METAL TEMP	Cr-Al	1		Kg/cm2(g)		475	METAL	60.3x5.94	--	--	0-600		Bhusawal TEMP-METAL-01	As per Drg		Metal Temperature Measurement Thermocouple with 30 mtr M cable	--	1	P	PR0190000376
86	QHX10 CT011	COOLING WATER SUPPLY HEADER TEMPERATURE	PRT-100	6	12	KG/CM2	38	60	Water	NB 300	1.42	--	0-100		--	M3X2	45		150	1	PC	PR0200000330

PROJECT: BHUSAWAL 11650 MM
 CUSTOMER: M/s MAHAGENCO
 CONTRACTOR: M/s BHEL
 Ref: CE/416/BHUSAWAL/TE/SCN

SL NO	KKS_TAG	DESCRIPTION	SENSR_TYPE	OP. PRESS	DGN. PRESS	Unit of Pressure	OP. TEMP (Deg.C)	DGN. TEMP (Deg.C)	MEDIUM	PPE SIZE (Dia x TYP) (mm.)	VELOCITY (Meter/Sec)	INSULN THICK (mm.)	RANGE (Deg.C)	IRR Required for Thermowell	STUB DETAIL / PROCESS / THERMOWELL DRO REF	PROCESS CONNECTION SIZE	Stub Height (mm)	REMARKS	SS304 Nipple Union Nipple Length (mm)	Qty	MATERIAL CODE
87	QHX11 CT011	COOLING WATER RETURN HEADER TEMPERATURE	PRT-100	5.5	12	KG/CM2	40	60	Water	NB 300	1.42	--	0-100		--	M3X2	45		150	1	PC PR0200000330
88	QHX16 CT011	COOLING WATER TEMPERATURE AT SAMPLE COOLERS INLET	PRT-100	6	12	KG/CM2	38	60	Water	NB 80 x 4.8	1.69	--	0-100		--	M3X2	45		150	1	PC PR0200000330
89	QHX16 CT012	COOLING WATER TEMPERATURE AT SAMPLE COOLERS OUTLET	PRT-100	6	12	KG/CM2	38	60	Water	NB 80 x 4.8	1.69	--	0-100		--	M3X2	45		150	1	PC PR0200000330
90	LB070 CT001	SCAPH SYSTEM INLET TEMPERATURE	Cr-Al	16	20	KG/CM2	290	350	STEAM	Ø273x6.35	46.93		0-400°C	Yes		Rc 1"	45		150	1	PC PR0190000333
91	LB077 CT001	SECONDARY SCAPH DRAIN TO FT	Cr-Al	16	20	KG/CM2	290	350	STEAM	Ø114.3x6.02	2.03		0-400°C	Yes		Rc 1"	45		150	1	PC PR0190000333
92	HAN11 CT001	FLASH TANK DRAIN TANK DRAIN LINE TEMPERATURE	PRT-100	1.1	7	KG/CM2	100	177	Water	Ø355.6x5.53	1.42		0-200°C			Rc 1"	45		150	1	PC PR0200000330
93	LCL20 CT001	FLASH TANK DRAIN TANK TEMPERATURE	PRT-100	1.1	7	KG/CM2	100	177	Water	ØØ 2743 x 16mm; TL-TL 920mm	-		0-200°C			Rc 1"	45		150	1	PC PR0200000330
94	QHX10 CT001	COOLING WATER SUPPLY TEMPERATURE	PRT-100	6	12	KG/CM2	38	60	Water	NB 350	2		0-100°C			Rc 1"	45		150	1	PC PR0200000330
95	QHX11 CT001	COOLING WATER RETURN TEMPERATURE	PRT-100	4	12	KG/CM2	44	60	Water	NB 350	2		0-100°C			Rc 1"	45		150	1	PC PR0200000330
96	HBK40CT001	FG TEMP AT FINISH SH OIL -L	PI-Rh-Pi	-24	-35	mmWC	675		FLUE GAS	--	12	240	0-1200		4-97-289-94296	As per Drg		Total Thermowell Length below Head 1500mm, Thermowell Material Inconel 600 with Tungsten Carbide Coating on Thermowell	Not Applicable	1	T PR0190000350
97	HLB10CT001	FD FAN-A SUCTION TEMP	PRT-100	-25	-34	mmWC	27	47	SEC AIR	--	16 m/s	200 mm	0-80		3-55-335-02053	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T PR0200000349
98	HLB15CT001	FD FAN-B SUCTION TEMP	PRT-100	-25	-34	mmWC	27	47	SEC AIR	--	16 m/s	200 mm	0-80		3-55-335-02053	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T PR0200000349
99	HLA10CT001	FD FAN-A OUTLET TEMP	PRT-100	322	441	mmWC	30	50	SEC AIR	4150 X 4080	16	200	0-100		4-97-289-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T PR0200000349
100	HLA23CT002	AH-B SEC AIR INLET TEMP	PRT-100	297	408	mmWC	30	50	SEC AIR	4150 X 4080	16	200	0-100		4-97-289-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T PR0200000349
101	HLA30CT004	AH-B SEC AIR OUTLET TEMP	Cr-Al	208	292	mmWC	317	317	SEC AIR	6394 X 7905	16	140	0-600		4-97-289-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T PR0190000341
102	HHL15CT002	HOT SEC. AIR TEMP. -RIGHT	Cr-Al	189	268	mmWC	317	317	SEC AIR	5850 X 4460	16	140	0-600		4-97-289-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T PR0190000341
103	HFE15CT001	PA FAN-B SUCTION TEMP	PRT-100	-15	-36	mmWC	27	47	PA	--	16 m/s	200 mm	0-80		3-55-335-02053	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T PR0200000349
104	HFE30CT001	AH-A PY AIR INLET TEMP	PRT-100	1043	1389	mmWC	35	55	PA	2500 X 3330	16	140	0-100		4-97-289-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T PR0200000349
105	HFE40CT003	AH-A PY AIR OUTLET TEMP	Cr-Al	1009	1324	mmWC	314	317	PA	3200 X 3200	16	140	0-600		4-97-289-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T PR0190000341
106	HBK25CT001	FG TEMP AT PSH FRONT OIL -R	PI-Rh-Pi	-4	-6	mmWC	1066		FLUE GAS	--	12	240	0-1600		4-97-289-94296	As per Drg		Total Thermowell Length below Head 1500mm, Thermowell Material Inconel 600 with Tungsten Carbide Coating on Thermowell	Not Applicable	1	T PR0190000350
107	HBK30CT001	FG TEMP AT FINISH RH OIL -R	PI-Rh-Pi	-6	-9	mmWC	940		FLUE GAS	--	12	240	0-1500		4-97-289-94296	As per Drg		Total Thermowell Length below Head 1500mm, Thermowell Material Inconel 600 with Tungsten Carbide Coating on Thermowell	Not Applicable	1	T PR0190000350
108	HBK45CT001	FG TEMP AT FINISH SH OIL -R	PI-Rh-Pi	-24	-35	mmWC	675		FLUE GAS	--	12	240	0-1200		4-97-289-94296	As per Drg		Total Thermowell Length below Head 1500mm, Thermowell Material Inconel 600 with Tungsten Carbide Coating on Thermowell	Not Applicable	1	T PR0190000350
109	HBK55CT001	FG TEMP AT ECO IL-R	PI-Rh-Pi	-46	-66	mmWC	515		FLUE GAS	--	12	240	0-800		4-97-289-94296	As per Drg		Total Thermowell Length below Head 1500mm, Thermowell Material Inconel 600 with Tungsten Carbide Coating on Thermowell	Not Applicable	1	T PR0190000350
110	HNA25CT003	FG TEMP AT ECO OIL-R	Cr-Al	-79	-114	mmWC	345		FLUE GAS	6050 X 9200	13	160	0-600		4-97-289-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material Inconel 600.	Not Applicable	1	T PR0190000392
111	HNA30CT004	FG TEMP AT AH-A OIL	PRT-100	-360	-521	mmWC	128	150	FLUE GAS	4300 X 5200	13	40	0-200		4-97-289-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material Inconel 600.	Not Applicable	1	T PR0200000373
112	HNC10CT029	ID FAN-A SUCTION TEMP	PRT-100	-503	-755	mmWC	128	150	FLUE GAS	--	13 m/s	40 mm	0-200		3-55-335-02053	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material Inconel 600.	Not Applicable	1	T PR0200000373
113	HNA70CT001	ID FAN-A OIL TEMP	PRT-100	310	500	mmWC	128	150	FLUE GAS	5600 X 6600	13	40	0-200		4-97-289-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material Inconel 600.	Not Applicable	1	T PR0200000373
114	HBK20CT001	FG TEMP AT PSH FRONT OIL -L	PI-Rh-Pi	-4	-6	mmWC	1066		FLUE GAS	--	12	240	0-1600		4-97-289-94296	As per Drg		Total Thermowell Length below Head 1500mm, Thermowell Material Inconel 600 with Tungsten Carbide Coating on Thermowell	Not Applicable	1	T PR0190000350
115	HBK30CT001	FG TEMP AT FINISH RH OIL -L	PI-Rh-Pi	-6	-9	mmWC	940		FLUE GAS	--	12	240	0-1500		4-97-289-94296	As per Drg		Total Thermowell Length below Head 1500mm, Thermowell Material Inconel 600 with Tungsten Carbide Coating on Thermowell	Not Applicable	1	T PR0190000350

PROJECT: BHUSAWAL 11650 MM
 CUSTOMER: M/s MAHAGENCO
 CONTRACTOR: M/s BHEL
 Ref: CE/416/BHUSAWAL/TE/SCN

SL NO	KKS_TAG	DESCRIPTION	SENSR. TYPE	OP. PRESS	DGN. PRESS	Unit of Pressure	OP. TEMP (Deg.C)	DGN. TEMP (Deg.C)	MEDIUM	PPE SIZE (Dia X Tth) (mm.)	VELOCITY (Meter/Sec)	INSUL. THICK (mm.)	RANGE (Deg.C)	IR Required for Thermowell	STUB DETAIL / PROCESS / THERMOWELL DRG REF	PROCESS CONNECTION SIZE	Stub Height (mm)	REMARKS	SS304 Nipple Union Nipple Length (mm)	Qty	Input unit	MATERIAL CODE
116	HBK50CT001	FG TEMP AT ECO I.L.L	PLRth-Pt	-46	-46	mmWC	516		FLUE GAS	--	12	240	0-600		4-97-288-94296	As per Drg		Total Thermowell Length below head 1500mm, Thermowell material Inconel 600 with Tungsten Carbide Coating on Thermowell	Not Applicable	1	T	PR0190000330
117	HFE10CT001	PA FAN-A SUCTION TEMP	PRT-100	-15	-36	mmWC	27	47	PA	--	16 m/s	200 mm	0-60		3-55-335-02053	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0200000348
118	HFE30CT001	AH-B PY AIR INLET TEMP	PRT-100	1043	1389	mmWC	35	55	PA	2300 X 3330	16	140	0-100		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0200000349
119	HFE40CT001	AH-A PY AIR OUTLET TEMP	Cr-AI	1009	1324	mmWC	314	317	PA	3200 X 3200	16	140	0-500		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0190000341
120	HFE40CT004	AH-A PY AIR OUTLET TEMP	Cr-AI	1009	1324	mmWC	314	317	PA	3200 X 3200	16	140	0-500		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0190000341
121	HFE40CT002	AH-A PY AIR OUTLET TEMP	Cr-AI	1009	1324	mmWC	314	317	PA	3200 X 3200	16	140	0-500		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0190000341
122	HFE40CT001	AH-B PY AIR OUTLET TEMP	Cr-AI	1009	1324	mmWC	314	317	PA	3200 X 3200	16	140	0-500		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0190000341
123	HFE40CT004	AH-B PY AIR OUTLET TEMP	Cr-AI	1009	1324	mmWC	314	317	PA	3200 X 3200	16	140	0-500		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0190000341
124	HFE40CT003	AH-B PY AIR OUTLET TEMP	Cr-AI	1009	1324	mmWC	314	317	PA	3200 X 3200	16	140	0-500		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0190000341
125	HFE40CT002	AH-B PY AIR OUTLET TEMP	Cr-AI	1009	1324	mmWC	314	317	PA	3200 X 3200	16	140	0-500		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0190000341
126	HHL10CT001	HOT SEC. AIR TEMP - LEFT	Cr-AI	189	268	mmWC	317	317	SEC AIR	5850 X 4450	16	140	0-500		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0190000341
127	HHL10CT002	HOT SEC. AIR TEMP - LEFT	Cr-AI	189	268	mmWC	317	317	SEC AIR	5850 X 4450	16	140	0-500		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0190000341
128	HHL10CT003	HOT SEC. AIR TEMP - RIGHT	Cr-AI	189	268	mmWC	317	317	SEC AIR	5850 X 4450	16	140	0-500		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0190000341
129	HHL10CT001	HOT SEC. AIR TEMP - RIGHT	Cr-AI	189	268	mmWC	317	317	SEC AIR	5850 X 4450	16	140	0-500		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0190000341
130	HHL10CT003	HOT SEC. AIR TEMP - LEFT	Cr-AI	189	268	mmWC	317	317	SEC AIR	5850 X 4450	16	140	0-500		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0190000341
131	HLA10CT001	FD FAN-B OUTLET TEMP	PRT-100	322	441	mmWC	30	50	SEC AIR	4150 X 4080	16	200	0-100		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0200000349
132	HLA20CT001	AH-A SEC AIR INLET TEMP	PRT-100	297	408	mmWC	30	50	SEC AIR	4150 X 4080	16	200	0-100		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0200000349
133	HLA20CT003	AH-B SEC AIR INLET TEMP	PRT-100	297	408	mmWC	30	50	SEC AIR	4150 X 4080	16	200	0-100		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0200000349
134	HLA20CT004	AH-B SEC AIR INLET TEMP	PRT-100	297	408	mmWC	30	50	SEC AIR	4150 X 4080	16	200	0-100		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0200000349
135	HLA20CT001	AH-B SEC AIR INLET TEMP	PRT-100	297	408	mmWC	30	50	SEC AIR	4150 X 4080	16	200	0-100		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0200000349
136	HLA20CT004	AH-A SEC AIR INLET TEMP	PRT-100	297	408	mmWC	30	50	SEC AIR	4150 X 4080	16	200	0-100		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0200000349
137	HLA20CT003	AH-A SEC AIR INLET TEMP	PRT-100	297	408	mmWC	30	50	SEC AIR	4150 X 4080	16	200	0-100		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0200000349
138	HLA20CT002	AH-A SEC AIR INLET TEMP	PRT-100	297	408	mmWC	30	50	SEC AIR	4150 X 4080	16	200	0-100		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0200000349
139	HLA30CT002	AH-B SEC AIR OUTLET TEMP	Cr-AI	208	292	mmWC	317	317	SEC AIR	6394 X 7985	16	140	0-500		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0190000341
140	HLA30CT001	AH-B SEC AIR OUTLET TEMP	Cr-AI	208	292	mmWC	317	317	SEC AIR	6394 X 7985	16	140	0-500		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0190000341
141	HLA30CT004	AH-A SEC AIR OUTLET TEMP	Cr-AI	208	292	mmWC	317	317	SEC AIR	6394 X 7985	16	140	0-500		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0190000341
142	HLA30CT003	AH-A SEC AIR OUTLET TEMP	Cr-AI	208	292	mmWC	317	317	SEC AIR	6394 X 7985	16	140	0-500		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0190000341
143	HLA30CT002	AH-A SEC AIR OUTLET TEMP	Cr-AI	208	292	mmWC	317	317	SEC AIR	6394 X 7985	16	140	0-500		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0190000341
144	HLA30CT001	AH-A SEC AIR OUTLET TEMP	Cr-AI	208	292	mmWC	317	317	SEC AIR	6394 X 7985	16	140	0-500		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0190000341
145	HLA30CT003	AH-B SEC AIR OUTLET TEMP	Cr-AI	208	292	mmWC	317	317	SEC AIR	6394 X 7985	16	140	0-500		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0190000341
146	HNA20CT002	FG TEMP AT ECO O.L.R	Cr-AI	-79	-114	mmWC	345		FLUE GAS	6050 X 9200	13	160	0-500		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material Inconel 600.	Not Applicable	1	T	PR0190000332
147	HNA10CT001	FG TEMP AT ECO O.L.L	Cr-AI	-79	-114	mmWC	345		FLUE GAS	6050 X 9200	13	160	0-500		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material Inconel 600.	Not Applicable	1	T	PR0190000332
148	HNA20CT001	FG TEMP AT ECO O.L.R	Cr-AI	-79	-114	mmWC	345		FLUE GAS	6050 X 9200	13	160	0-500		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material Inconel 600.	Not Applicable	1	T	PR0190000332
149	HNA20CT004	FG TEMP AT ECO O.L.R	Cr-AI	-79	-114	mmWC	345		FLUE GAS	6050 X 9200	13	160	0-500		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material Inconel 600.	Not Applicable	1	T	PR0190000332

PROJECT: BHUSAWAL 16500 MW
 CUSTOMER: M/s MAHAGENCO
 CONTRACTOR: M/s BHEL
 Ref: CE/416/BHUSAWAL/TE/SCN

SL NO	KKS_TAG	DESCRIPTION	SENSR_L TYPE	OP. PRESS	DGN. PRESS	Unit of Pressure	OP. TEMP (Deg.C)	DGN. TEMP (Deg.C)	MEDIUM	PPE SIZE (Dia x THK) (mm.)	VELOCITY (Meter/Sec)	INSUL. THICK (mm.)	RANGE (Deg.C)	IR Required for Thermowell	STUB DETAIL / PROCESS / THERMOWELL DRG REF	PROCESS CONNECTION SIZE	Stub Height (mm)	REMARKS	SS304 Nipple Union Nipple Length (mm)	Qty	Input unit	MATERIAL CODE
150	HNA19CT003	FG TEMP AT ECO OIL-L	Cr-Al	-79	-114	mmWC	345		FLUE GAS	6050 X 9200	13	160	0-600		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material Inconel 600.	Not Applicable	1	T	PR0190000392
151	HNA19CT002	FG TEMP AT ECO OIL-L	Cr-Al	-79	-114	mmWC	345		FLUE GAS	6050 X 9200	13	160	0-600		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material Inconel 600.	Not Applicable	1	T	PR0190000392
162	HNA19CT004	FG TEMP AT ECO OIL-L	Cr-Al	-79	-114	mmWC	345		FLUE GAS	6050 X 9200	13	160	0-600		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material Inconel 600.	Not Applicable	1	T	PR0190000392
153	HNA30CT003	FG TEMP AT AH-A OIL	PRT-100	-360	-521	mmWC	128	150	FLUE GAS	4300 X 9200	13	40	0-200		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material Inconel 600.	Not Applicable	1	T	PR0200000373
154	HNA30CT004	FG TEMP AT AH-B OIL	PRT-100	-360	-521	mmWC	128	150	FLUE GAS	4300 X 9200	13	40	0-200		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material Inconel 600.	Not Applicable	1	T	PR0200000373
155	HNA30CT003	FG TEMP AT AH-B OIL	PRT-100	-360	-521	mmWC	128	150	FLUE GAS	4300 X 9200	13	40	0-200		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material Inconel 600.	Not Applicable	1	T	PR0200000373
156	HNA30CT002	FG TEMP AT AH-B OIL	PRT-100	-360	-521	mmWC	128	150	FLUE GAS	4300 X 9200	13	40	0-200		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material Inconel 600.	Not Applicable	1	T	PR0200000373
157	HNA30CT001	FG TEMP AT AH-B OIL	PRT-100	-360	-521	mmWC	128	150	FLUE GAS	4300 X 9200	13	40	0-200		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material Inconel 600.	Not Applicable	1	T	PR0200000373
158	HNA30CT002	FG TEMP AT AH-A OIL	PRT-100	-360	-521	mmWC	128	150	FLUE GAS	4300 X 9200	13	40	0-200		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material Inconel 600.	Not Applicable	1	T	PR0200000373
159	HNA30CT001	FG TEMP AT AH-A OIL	PRT-100	-360	-521	mmWC	128	150	FLUE GAS	4300 X 9200	13	40	0-200		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material Inconel 600.	Not Applicable	1	T	PR0200000373
160	HNA19CT029	ID FAN-B SUCTION TEMP	PRT-100	-503	-755	mmWC	128	150	FLUE GAS	--	13 m/s	40 mm	0-200		3-55-335-62053	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material Inconel 600.	Not Applicable	1	T	PR0200000373
161	HNA70CT001	ID FAN-B OIL TEMP	PRT-100	310	500	mmWC	128	150	FLUE GAS	5800 X 6800	13	40	0-200		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material Inconel 600.	Not Applicable	1	T	PR0200000373
162	HFE30CT002	AH-A PY AIR INLET TEMP	PRT-100	1043	1389	mmWC	35	55	PA	2500 X 3330	16	140	0-100		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0200000349
163	HFE30CT003	AH-A PY AIR INLET TEMP	PRT-100	1043	1389	mmWC	35	55	PA	2500 X 3330	16	140	0-100		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0200000349
164	HFE30CT002	AH-B PY AIR INLET TEMP	PRT-100	1043	1389	mmWC	35	55	PA	2500 X 3330	16	140	0-100		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0200000349
165	HFE30CT003	AH-B PY AIR INLET TEMP	PRT-100	1043	1389	mmWC	35	55	PA	2500 X 3330	16	140	0-100		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0200000349
166	HFE20CT001	PA FAN-A OUTLET TEMP	PRT-100	1052	1409	mmWC	35	55	PA	3150 X 3330	16	200	0-100		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0200000349
167	HFE25CT001	PA FAN-B OUTLET TEMP	PRT-100	1052	1409	mmWC	35	55	PA	3150 X 3330	16	200	0-100		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0200000349
168	HNA70CT001	FG TEMP AT AH-A IL	Cr-Al	-259	-376	mmWC	345		FLUE GAS	4700 X 11820	13	160	0-600		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material Inconel 600.	Not Applicable	1	T	PR0190000392
169	HNA70CT002	FG TEMP AT AH-A IL	Cr-Al	-259	-376	mmWC	345		FLUE GAS	4700 X 11820	13	160	0-600		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material Inconel 600.	Not Applicable	1	T	PR0190000392
170	HNA70CT003	FG TEMP AT AH-A IL	Cr-Al	-259	-376	mmWC	345		FLUE GAS	4700 X 11820	13	160	0-600		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material Inconel 600.	Not Applicable	1	T	PR0190000392
171	HNA70CT004	FG TEMP AT AH-A IL	Cr-Al	-259	-376	mmWC	345		FLUE GAS	4700 X 11820	13	160	0-600		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material Inconel 600.	Not Applicable	1	T	PR0190000392
172	HNA28CT001	FG TEMP AT AH-B IL	Cr-Al	-259	-376	mmWC	345		FLUE GAS	4700 X 11820	13	160	0-600		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material Inconel 600.	Not Applicable	1	T	PR0190000392
173	HNA28CT002	FG TEMP AT AH-B IL	Cr-Al	-259	-376	mmWC	345		FLUE GAS	4700 X 11820	13	160	0-600		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material Inconel 600.	Not Applicable	1	T	PR0190000392
174	HNA28CT003	FG TEMP AT AH-B IL	Cr-Al	-259	-376	mmWC	345		FLUE GAS	4700 X 11820	13	160	0-600		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material Inconel 600.	Not Applicable	1	T	PR0190000392
175	HNA28CT004	FG TEMP AT AH-B IL	Cr-Al	-259	-376	mmWC	345		FLUE GAS	4700 X 11820	13	160	0-600		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material Inconel 600.	Not Applicable	1	T	PR0190000392
176	HAC19CT001	ECO. INLET BOILER FEED WATER TEMPERATURE	Cr-Al	302	318.3	kg/cm ²	300	347	WATER	Ø58mm X 70mm	10	110	0-600	Yes	4-97-288-94298	M3X2	65		150	1	T	PR0190000333
177	HAC19CT002	ECO. INLET BOILER FEED WATER TEMPERATURE	Cr-Al	302	318.3	kg/cm ²	300	347	WATER	Ø58mm X 70mm	10	110	0-600	Yes	4-97-288-94298	M3X2	65		150	1	T	PR0190000333

PROJECT: BHUSAWAL 16500 MW
 CUSTOMER: M/s MAHAGENCO
 CONTRACTOR: M/s BHEL
 Ref: CE/416/BHUSAWAL/TE/SCN

SL NO	KKS_TAG	DESCRIPTION	SENSR_TYPE	OP. PRESS	DGN. PRESS	Unit of Pressure	OP. TEMP. (Deg.C)	DGN. TEMP. (Deg.C)	MEDIUM	PPE SIZE (Dia. x THK) (mm.)	VELOCITY (Meter/Sec)	INSUL. THICK (mm.)	RANGE (Deg.C)	IRI Required for Thermowell	STUB DETAIL / PROCESS / THERMOWELL DRD REF	PROCESS CONNECTION SIZE	Stub Height (mm)	REMARKS	SS304 Nipple Union Nipple Length (mm)	Qty	Input unit	MATERIAL CODE
178	HAC20CT001	ECO. OUTLET LINK TEMPERATURE	Cr-Al	291.1	311.9	kg/cm ²	347	347	WATER	D487mm X 65mm	10	130	0-600	Yes	4-97-288-94298	M3X2	65	BARSTOCK THERMOWELL MATERIAL SHALL BE SS316. Thermocouple with Flexible Mineral Insulated extension Cable 25 mtr length With Head and Thermowell shall be Provided	Not Applicable	1	T	PR0190000368
179	HAC20CT002	ECO. OUTLET LINK TEMPERATURE	Cr-Al	291.1	311.9	kg/cm ²	347	347	WATER	D487mm X 65mm	10	130	0-600	Yes	4-97-288-94298	M3X2	65	BARSTOCK THERMOWELL MATERIAL SHALL BE SS316. Thermocouple with Flexible Mineral Insulated extension Cable 25 mtr length With Head and Thermowell shall be Provided	Not Applicable	1	T	PR0190000368
180	HAC20CT003	ECO. OUTLET LINK TEMPERATURE	Cr-Al	293	312.9	kg/cm ²	347	347	WATER	D600mm X 65mm	10	130	0-600	Yes	4-97-288-94298	M3X2	65	BARSTOCK THERMOWELL MATERIAL SHALL BE SS316. Thermocouple with Flexible Mineral Insulated extension Cable 25 mtr length With Head and Thermowell shall be Provided	Not Applicable	1	T	PR0190000368
181	HAG19CT001	WATER STORAGE DOWNCOMER TEMPERATURE	Cr-Al	276.8	293.5	kg/cm ²	348	375	WATER	D508mm X 65mm	5	130	0-600	Yes	4-97-288-94298	M3X2	65		150	1	T	PR0190000333
182	HAG19CT004	FLASH TANK INLET TEMPERATURE	Cr-Al	276.8	293.5	kg/cm ²	348	375	WATER	D508mm X 65mm	5	130	0-600	Yes	4-97-288-94298	M3X2	65		150	1	T	PR0190000333
183	HAG19CT005	FLASH TANK INLET TEMPERATURE	Cr-Al	276.8	293.5	kg/cm ²	348	375	WATER	D508mm X 65mm	5	130	0-600	Yes	4-97-288-94298	M3X2	65		150	1	T	PR0190000333
184	HAG19CT002	BWCP INLET TEMPERATURE.	Cr-Al	302.9	318.3	kg/cm ²	300	375	WATER	D508mm X 65mm	5	110	0-600	Yes	4-97-288-94298	M3X2	65		150	1	T	PR0190000333
185	HAG19CT003	BWCP INLET TEMPERATURE.	Cr-Al	302.9	318.3	kg/cm ²	300	375	WATER	D508mm X 65mm	5	110	0-600	Yes	4-97-288-94298	M3X2	65		150	1	T	PR0190000333
186	HAH01CT001	WATER SEPARATOR 'A' OUTLET TEMPERATURE	Cr-Al	275.3	291.1	kg/cm ²	426	460	STEAM	D323.8mm X 60mm	30	100	0-700	Yes	4-97-288-94298	M3X2	65		150	1	T	PR0190000333
187	HAH01CT002	WATER SEPARATOR 'A' OUTLET TEMPERATURE	Cr-Al	275.3	291.1	kg/cm ²	426	460	STEAM	D323.8mm X 60mm	30	100	0-700	Yes	4-97-288-94298	M3X2	65		150	1	T	PR0190000333
188	HAH02CT001	WATER SEPARATOR 'B' OUTLET TEMPERATURE	Cr-Al	275.3	291.1	kg/cm ²	426	460	STEAM	D323.8mm X 60mm	30	100	0-700	Yes	4-97-288-94298	M3X2	65		150	1	T	PR0190000333
189	HAH02CT002	WATER SEPARATOR 'B' OUTLET TEMPERATURE	Cr-Al	275.3	291.1	kg/cm ²	426	460	STEAM	D323.8mm X 60mm	30	100	0-700	Yes	4-97-288-94298	M3X2	65		150	1	T	PR0190000333
190	HAN26CT001	LINK TO SH PLATEN INLET HDR-LEFT & RIGHT	Cr-Al	268.8	283.7	kg/cm ²	448	462	STEAM	D406.4mm X 60mm	35	100	0-700	Yes	4-97-288-94298	M3X2	65	BARSTOCK THERMOWELL MATERIAL SHALL BE SS316. Thermocouple with Flexible Mineral Insulated extension Cable 25 mtr length With Head and Thermowell shall be Provided	Not Applicable	1	T	PR0190000368
191	HAN26CT002	LINK TO SH PLATEN INLET HDR-LEFT & RIGHT	Cr-Al	268.8	283.7	kg/cm ²	448	462	STEAM	D406.4mm X 60mm	35	100	0-700	Yes	4-97-288-94298	M3X2	65	BARSTOCK THERMOWELL MATERIAL SHALL BE SS316. Thermocouple with Flexible Mineral Insulated extension Cable 25 mtr length With Head and Thermowell shall be Provided	Not Applicable	1	T	PR0190000368
192	HAH71CT001	SH PLATEN TO SH DSH-A INLET TEMPERATURE	Cr-Al	264	278.8	kg/cm ²	506	522	STEAM	D508mm X 60mm	30	100	0-800	Yes	4-97-288-94298	M3X2	65	BARSTOCK THERMOWELL MATERIAL SHALL BE SS316. Thermocouple with Flexible Mineral Insulated extension Cable 25 mtr length With Head and Thermowell shall be Provided	Not Applicable	1	T	PR0190000368
193	HAH71CT002	SH PLATEN TO SH DSH-A INLET TEMPERATURE	Cr-Al	264	278.8	kg/cm ²	506	522	STEAM	D508mm X 60mm	30	100	0-800	Yes	4-97-288-94298	M3X2	65	BARSTOCK THERMOWELL MATERIAL SHALL BE SS316. Thermocouple with Flexible Mineral Insulated extension Cable 25 mtr length With Head and Thermowell shall be Provided	Not Applicable	1	T	PR0190000368
194	HAH72CT001	SH PLATEN TO SH DSH-B INLET TEMPERATURE	Cr-Al	264	278.8	kg/cm ²	506	522	STEAM	D508mm X 60mm	30	100	0-800	Yes	4-97-288-94298	M3X2	65	BARSTOCK THERMOWELL MATERIAL SHALL BE SS316. Thermocouple with Flexible Mineral Insulated extension Cable 25 mtr length With Head and Thermowell shall be Provided	Not Applicable	1	T	PR0190000368
195	HAH72CT002	SH PLATEN TO SH DSH-B INLET TEMPERATURE	Cr-Al	264	278.8	kg/cm ²	506	522	STEAM	D508mm X 60mm	30	100	0-800	Yes	4-97-288-94298	M3X2	65	BARSTOCK THERMOWELL MATERIAL SHALL BE SS316. Thermocouple with Flexible Mineral Insulated extension Cable 25 mtr length With Head and Thermowell shall be Provided	Not Applicable	1	T	PR0190000368
196	HAH71CT003	SH DSH-A OUTLET TEMPERATURE	Cr-Al	262.5	278.8	kg/cm ²	487	498	STEAM	D508mm X 60mm	25	100	0-700	Yes	4-97-288-94298	M3X2	65	BARSTOCK THERMOWELL MATERIAL SHALL BE SS316. Thermocouple with Flexible Mineral Insulated extension Cable 25 mtr length With Head and Thermowell shall be Provided	Not Applicable	1	T	PR0190000368
197	HAH71CT004	SH DSH-A OUTLET TEMPERATURE	Cr-Al	262.5	278.8	kg/cm ²	487	498	STEAM	D508mm X 60mm	25	100	0-700	Yes	4-97-288-94298	M3X2	65	BARSTOCK THERMOWELL MATERIAL SHALL BE SS316. Thermocouple with Flexible Mineral Insulated extension Cable 25 mtr length With Head and Thermowell shall be Provided	Not Applicable	1	T	PR0190000368
198	HAH71CT005	SH DSH-A OUTLET TEMPERATURE	Cr-Al	262.5	278.8	kg/cm ²	487	498	STEAM	D508mm X 60mm	25	100	0-700	Yes	4-97-288-94298	M3X2	65	BARSTOCK THERMOWELL MATERIAL SHALL BE SS316. Thermocouple with Flexible Mineral Insulated extension Cable 25 mtr length With Head and Thermowell shall be Provided	Not Applicable	1	T	PR0190000368
199	HAH72CT003	SH DSH-B OUTLET TEMPERATURE	Cr-Al	262.5	278.8	kg/cm ²	487	498	STEAM	D508mm X 60mm	25	100	0-700	Yes	4-97-288-94298	M3X2	65	BARSTOCK THERMOWELL MATERIAL SHALL BE SS316. Thermocouple with Flexible Mineral Insulated extension Cable 25 mtr length With Head and Thermowell shall be Provided	Not Applicable	1	T	PR0190000368
200	HAH72CT004	SH DSH-B OUTLET TEMPERATURE	Cr-Al	262.5	278.8	kg/cm ²	487	498	STEAM	D508mm X 60mm	25	100	0-700	Yes	4-97-288-94298	M3X2	65	BARSTOCK THERMOWELL MATERIAL SHALL BE SS316. Thermocouple with Flexible Mineral Insulated extension Cable 25 mtr length With Head and Thermowell shall be Provided	Not Applicable	1	T	PR0190000368

PROJECT: BHUSAWAL 11650 MW
CUSTOMER: M/s MAHAGENCO
CONTRACTOR: M/s BHEL
Ref: CE/416/BHUSAWAL/TE/PS

SL NO	KVS_TAG	DESCRIPTION	SENSR_TYPE	OP. PRESS	DGN. PRESS	Unit of Pressure	OP. TEMP. (Deg.C)	DGN. TEMP. (Deg.C)	MEDIUM	PPE SIZE (Dia x THK) (mm.)	VELOCITY (Meter/Sec)	INSUL. THICK (mm.)	RANGE (Deg.C)	IR Required for Thermowell	STUB DETAIL / PROCESS / THERMOWELL DRG REF	PROCESS CONNECTION SIZE	Stub Height (mm)	REMARKS	SS304 Nipple Union Nipple Length (mm)	Qty	Input unit	MATERIAL CODE
201	HAH72CT006	SH DSH-B OUTLET TEMPERATURE	Cr-Al	262.5	278.8	kg/cm ²	487	488	STEAM	D58mm X 60mm	25	100	0-700	Yes	4-97-288-94298	M3X2	65	BARSTOCK THERMOWELL MATERIAL SHALL BE SS316. Thermocouple with Flexible Mineral Insulated extension Cable 25 mtr length With Head and Thermowell shall be Provided	Not Applicable	1	T	PR0190000368
202	LAET1CT001	SH DSH-A SPRAY WATER TEMPERATURE AFTER CONTROL VALVE	Cr-Al	269	318	kg/cm ²	299	347	WATER	D114.33mm X 17.12mm	10	50	0 - 500	Yes	4-97-288-94298	M3X2	130		150	1	T	PR0190000333
203	LAET2CT001	SH DSH-B SPRAY WATER TEMPERATURE AFTER CONTROL VALVE	Cr-Al	269	318	kg/cm ²	299	347	WATER	D114.33mm X 17.12mm	10	50	0 - 500	Yes	4-97-288-94298	M3X2	130		150	1	T	PR0190000333
204	HAJ21CT001	RHDvSH INLET TEMPERATURE -A	Cr-Al	53.9	64.3	kg/cm ²	509	520	STEAM	D762mm X 40mm	50	100	0-800	Yes	4-97-288-94298	M3X2	65	BARSTOCK THERMOWELL MATERIAL SHALL BE SS316. Thermocouple with Flexible Mineral Insulated extension Cable 25 mtr length With Head and Thermowell shall be Provided	Not Applicable	1	T	PR0190000368
205	HAJ21CT002	RHDvSH INLET TEMPERATURE -A	Cr-Al	53.9	64.3	kg/cm ²	509	520	STEAM	D762mm X 40mm	50	100	0-800	Yes	4-97-288-94298	M3X2	65	BARSTOCK THERMOWELL MATERIAL SHALL BE SS316. Thermocouple with Flexible Mineral Insulated extension Cable 25 mtr length With Head and Thermowell shall be Provided	Not Applicable	1	T	PR0190000368
206	HAJ22CT001	RHDvSH INLET TEMPERATURE -B	Cr-Al	53.9	64.3	kg/cm ²	509	520	STEAM	D762mm X 40mm	50	100	0-800	Yes	4-97-288-94298	M3X2	65	BARSTOCK THERMOWELL MATERIAL SHALL BE SS316. Thermocouple with Flexible Mineral Insulated extension Cable 25 mtr length With Head and Thermowell shall be Provided	Not Applicable	1	T	PR0190000368
207	HAJ22CT002	RHDvSH INLET TEMPERATURE -B	Cr-Al	53.9	64.3	kg/cm ²	509	520	STEAM	D762mm X 40mm	50	100	0-800	Yes	4-97-288-94298	M3X2	65	BARSTOCK THERMOWELL MATERIAL SHALL BE SS316. Thermocouple with Flexible Mineral Insulated extension Cable 25 mtr length With Head and Thermowell shall be Provided	Not Applicable	1	T	PR0190000368
208	HAJ21CT003	RHDvSH OUTLET TEMPERATURE -A	Cr-Al	53.5	64.3	kg/cm ²	499	510	STEAM	D762mm X 40mm	50	100	0-800	Yes	4-97-288-94298	M3X2	65	BARSTOCK THERMOWELL MATERIAL SHALL BE SS316. Thermocouple with Flexible Mineral Insulated extension Cable 25 mtr length With Head and Thermowell shall be Provided	Not Applicable	1	T	PR0190000368
209	HAJ21CT004	RHDvSH OUTLET TEMPERATURE -A	Cr-Al	53.5	64.3	kg/cm ²	499	510	STEAM	D762mm X 40mm	50	100	0-800	Yes	4-97-288-94298	M3X2	65	BARSTOCK THERMOWELL MATERIAL SHALL BE SS316. Thermocouple with Flexible Mineral Insulated extension Cable 25 mtr length With Head and Thermowell shall be Provided	Not Applicable	1	T	PR0190000368
210	HAJ21CT005	RHDvSH OUTLET TEMPERATURE -A	Cr-Al	53.5	64.3	kg/cm ²	499	510	STEAM	D762mm X 40mm	50	100	0-800	Yes	4-97-288-94298	M3X2	65	BARSTOCK THERMOWELL MATERIAL SHALL BE SS316. Thermocouple with Flexible Mineral Insulated extension Cable 25 mtr length With Head and Thermowell shall be Provided	Not Applicable	1	T	PR0190000368
211	HAJ22CT003	RHDvSH OUTLET TEMPERATURE -B	Cr-Al	53.5	64.3	kg/cm ²	499	510	STEAM	D762mm X 70mm	50	100	0-800	Yes	4-97-288-94298	M3X2	65	BARSTOCK THERMOWELL MATERIAL SHALL BE SS316. Thermocouple with Flexible Mineral Insulated extension Cable 25 mtr length With Head and Thermowell shall be Provided	Not Applicable	1	T	PR0190000368
212	HAJ22CT004	RHDvSH OUTLET TEMPERATURE -B	Cr-Al	53.5	64.3	kg/cm ²	499	510	STEAM	D762mm X 70mm	50	100	0-800	Yes	4-97-288-94298	M3X2	65	BARSTOCK THERMOWELL MATERIAL SHALL BE SS316. Thermocouple with Flexible Mineral Insulated extension Cable 25 mtr length With Head and Thermowell shall be Provided	Not Applicable	1	T	PR0190000368
213	HAJ22CT005	RHDvSH OUTLET TEMPERATURE -B	Cr-Al	53.5	64.3	kg/cm ²	499	510	STEAM	D762mm X 70mm	50	100	0-800	Yes	4-97-288-94298	M3X2	65	BARSTOCK THERMOWELL MATERIAL SHALL BE SS316. Thermocouple with Flexible Mineral Insulated extension Cable 25 mtr length With Head and Thermowell shall be Provided	Not Applicable	1	T	PR0190000368
214	LAET1CT001	RHDvSH SPRAY WATER TEMPERATURE AFTER CONTROL VALVE -A	Cr-Al	55	210	kg/cm ²	190	200	WATER	D68.3mm X 15.24mm	10	50	0 - 300	Yes	4-97-288-94298	M3X2	130		150	1	T	PR0190000333
216	LAET2CT001	RHDvSH SPRAY WATER TEMPERATURE AFTER CONTROL VALVE -B	Cr-Al	55	210	kg/cm ²	190	200	WATER	D68.3mm X 15.24mm	10	50	0 - 300	Yes	4-97-288-94298	M3X2	130		150	1	T	PR0190000333
216	HCB01CT001	SB STEAM TEMPERATURE AFTER SBPRV	Cr-Al	40	40	kg/cm ²	373	460	STEAM	D127mm X 12.5mm	120	50	0-700	Yes	4-97-288-94298	M3X2	130	BARSTOCK THERMOWELL MATERIAL SHALL BE INCONEL 600	150	1	T	PR0190000333
217	HCB20CT001	LR BLOWER DRAIN TEMPERATURE-RIGHT	Cr-Al	40	40	kg/cm ²	373	460	WATER	D68.3mm X 5.54mm	120	50	0-600	Yes	4-97-288-94298	M3X2	130	BARSTOCK THERMOWELL MATERIAL SHALL BE INCONEL 600	150	1	T	PR0190000333
218	HCB20CT002	LR BLOWER DRAIN TEMPERATURE-RIGHT	Cr-Al	40	40	kg/cm ²	373	460	WATER	D68.3mm X 5.54mm	120	50	0-600	Yes	4-97-288-94298	M3X2	130	BARSTOCK THERMOWELL MATERIAL SHALL BE INCONEL 600	150	1	T	PR0190000333
219	HCB30CT001	WALL BLOWER DRAIN TEMPERATURE-RIGHT & FRONT	Cr-Al	40	40	kg/cm ²	373	460	WATER	D68.3mm X 5.54mm	120	50	0-600	Yes	4-97-288-94298	M3X2	130	BARSTOCK THERMOWELL MATERIAL SHALL BE INCONEL 600	150	1	T	PR0190000333
220	HCB30CT002	WALL BLOWER DRAIN TEMPERATURE-RIGHT & FRONT	Cr-Al	40	40	kg/cm ²	373	460	WATER	D68.3mm X 5.54mm	120	50	0-600	Yes	4-97-288-94298	M3X2	130	BARSTOCK THERMOWELL MATERIAL SHALL BE INCONEL 600	150	1	T	PR0190000333
221	HCB40CT001	WALL BLOWER DRAIN TEMPERATURE-LEFT & REAR	Cr-Al	40	40	kg/cm ²	373	460	WATER	D68.3mm X 5.54mm	120	50	0-600	Yes	4-97-288-94298	M3X2	130	BARSTOCK THERMOWELL MATERIAL SHALL BE INCONEL 600	150	1	T	PR0190000333
222	HCB40CT002	WALL BLOWER DRAIN TEMPERATURE-LEFT & REAR	Cr-Al	40	40	kg/cm ²	373	460	WATER	D68.3mm X 5.54mm	120	50	0-600	Yes	4-97-288-94298	M3X2	130	BARSTOCK THERMOWELL MATERIAL SHALL BE INCONEL 600	150	1	T	PR0190000333
223	HCB10CT001	LR BLOWER DRAIN TEMPERATURE-LEFT	Cr-Al	40	40	kg/cm ²	373	460	WATER	D68.3mm X 5.54mm	120	50	0-600	Yes	4-97-288-94298	M3X2	130	BARSTOCK THERMOWELL MATERIAL SHALL BE INCONEL 600	150	1	T	PR0190000333
224	HCB10CT002	LR BLOWER DRAIN TEMPERATURE-LEFT	Cr-Al	40	40	kg/cm ²	373	460	WATER	D68.3mm X 5.54mm	120	50	0-600	Yes	4-97-288-94298	M3X2	130	BARSTOCK THERMOWELL MATERIAL SHALL BE INCONEL 600	150	1	T	PR0190000333
225	HCB30CT001	AH-B SB DRAIN TEMPERATURE	Cr-Al	40	40	kg/cm ²	373	460	WATER	D68.3mm X 5.54mm	120	50	0-600	Yes	4-97-288-94298	M3X2	130	BARSTOCK THERMOWELL MATERIAL SHALL BE INCONEL 600	150	1	T	PR0190000333
226	HCB30CT002	AH-B SB DRAIN TEMPERATURE	Cr-Al	40	40	kg/cm ²	373	460	WATER	D68.3mm X 5.54mm	120	50	0-600	Yes	4-97-288-94298	M3X2	130	BARSTOCK THERMOWELL MATERIAL SHALL BE INCONEL 600	150	1	T	PR0190000333
227	HCB30CT003	AH-A SB DRAIN TEMPERATURE	Cr-Al	40	40	kg/cm ²	373	460	WATER	D68.3mm X 5.54mm	120	50	0-600	Yes	4-97-288-94298	M3X2	130	BARSTOCK THERMOWELL MATERIAL SHALL BE INCONEL 600	150	1	T	PR0190000333
228	HCB30CT004	AH-A SB DRAIN TEMPERATURE	Cr-Al	40	40	kg/cm ²	373	460	WATER	D68.3mm X 5.54mm	120	50	0-600	Yes	4-97-288-94298	M3X2	130	BARSTOCK THERMOWELL MATERIAL SHALL BE INCONEL 600	150	1	T	PR0190000333
229	HFE79CT001	MIXED AIR BEFORE MILL E TEMP	Cr-Al	793	1009	mmWC	253	317	HOT PA	2000 x 1000	16	140	0-400		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0190000341
230	HFC09CT016	MILL F OUTLET TEMP	Cr-Al	339	443	mmWC	90	100	COAL+ AIR	--	--	--	0-150		4-97-288-94305	Rc 1.5"		Tungsten Carbide Thermowell size= 24mm OD x 9mm ID, Insertion length 160 mm, Extension Length 150mm.	150	1	T	PR0190000334
231	HFC09CT016	MILL E OUTLET TEMP	Cr-Al	339	443	mmWC	90	100	COAL+ AIR	--	--	--	0-150		4-97-288-94305	Rc 1.5"		Tungsten Carbide Thermowell size= 24mm OD x 9mm ID, Insertion length 160 mm, Extension Length 150mm.	150	1	T	PR0190000334
232	HFC09CT016	MILL E OUTLET TEMP	Cr-Al	339	443	mmWC	90	100	COAL+ AIR	--	--	--	0-150		4-97-288-94305	Rc 1.5"		Tungsten Carbide Thermowell size= 24mm OD x 9mm ID, Insertion length 160 mm, Extension Length 150mm.	150	1	T	PR0190000334
233	HFC04CT016	MILL D OUTLET TEMP	Cr-Al	339	443	mmWC	90	100	COAL+ AIR	--	--	--	0-150		4-97-288-94305	Rc 1.5"		Tungsten Carbide Thermowell size= 24mm OD x 9mm ID, Insertion length 160 mm, Extension Length 150mm.	150	1	T	PR0190000334

PROJECT: BHUSAWAL 16800 MW
CUSTOMER: M/s MAHAGENCO
CONTRACTOR: M/s BHEL
Ref: CE/416/BHUSAWAL/TE/PS

SL NO	KVS_TAG	DESCRIPTION	SENSR_TYPE	OP_PRESS	DGN_PRESS	Unit of Pressure	OP_TEMP (Deg.C)	DGN_TEMP (Deg.C)	MEDIUM	PPE SIZE (Dia x Tth) (mm.)	VELOCITY (Meter/Sec)	INSULK THICK (mm.)	RANGE (Deg.C)	IR Required for Thermowell	STUB DETAIL / PROCESS / THERMOWELL DRG REF	PROCESS CONNECTION SIZE	Stub Height (mm)	REMARKS	SS304 Nipple Union Nipple Length (mm)	Qty	Input unit	MATERIAL CODE
224	HF084CT016	MLL D OUTLET TEMP	Cr-AI	339	443	mmWC	90	100	COAL+ AIR	--	--	--	0-150	4-97-288-94305		Rc 1.5"		Tungsten Carbide Thermowell size= 24mm OD x 9mm ID, Insertion length 160 mm, Extension Length 150mm.	150	1	T	PR0190000384
235	HF093CT016	MLL C OUTLET TEMP	Cr-AI	339	443	mmWC	90	100	COAL+ AIR	--	--	--	0-150	4-97-288-94305		Rc 1.5"		Tungsten Carbide Thermowell size= 24mm OD x 9mm ID, Insertion length 160 mm, Extension Length 150mm.	150	1	T	PR0190000384
236	HF083CT015	MLL C OUTLET TEMP	Cr-AI	339	443	mmWC	90	100	COAL+ AIR	--	--	--	0-150	4-97-288-94305		Rc 1.5"		Tungsten Carbide Thermowell size= 24mm OD x 9mm ID, Insertion length 160 mm, Extension Length 150mm.	150	1	T	PR0190000384
237	HF082CT016	MLL B OUTLET TEMP	Cr-AI	339	443	mmWC	90	100	COAL+ AIR	--	--	--	0-150	4-97-288-94305		Rc 1.5"		Tungsten Carbide Thermowell size= 24mm OD x 9mm ID, Insertion length 160 mm, Extension Length 150mm.	150	1	T	PR0190000384
238	HF082CT015	MLL B OUTLET TEMP	Cr-AI	339	443	mmWC	90	100	COAL+ AIR	--	--	--	0-150	4-97-288-94305		Rc 1.5"		Tungsten Carbide Thermowell size= 24mm OD x 9mm ID, Insertion length 160 mm, Extension Length 150mm.	150	1	T	PR0190000384
239	HF091CT016	MLL A OUTLET TEMP	Cr-AI	339	443	mmWC	90	100	COAL+ AIR	--	--	--	0-150	4-97-288-94305		Rc 1.5"		Tungsten Carbide Thermowell size= 24mm OD x 9mm ID, Insertion length 160 mm, Extension Length 150mm.	150	1	T	PR0190000384
240	HF091CT015	MLL A OUTLET TEMP	Cr-AI	339	443	mmWC	90	100	COAL+ AIR	--	--	--	0-150	4-97-288-94305		Rc 1.5"		Tungsten Carbide Thermowell size= 24mm OD x 9mm ID, Insertion length 160 mm, Extension Length 150mm.	150	1	T	PR0190000384
241	HF086CT016	MLL F OUTLET TEMP	Cr-AI	339	443	mmWC	90	100	COAL+ AIR	--	--	--	0-150	4-97-288-94305		Rc 1.5"		Tungsten Carbide Thermowell size= 24mm OD x 9mm ID, Insertion length 160 mm, Extension Length 150mm.	150	1	T	PR0190000384
242	HF097CT015	MLL G OUTLET TEMP	Cr-AI	339	443	mmWC	90	100	COAL+ AIR	--	--	--	0-150	4-97-288-94305		Rc 1.5"		Tungsten Carbide Thermowell size= 24mm OD x 9mm ID, Insertion length 160 mm, Extension Length 150mm.	150	1	T	PR0190000384
243	HF097CT016	MLL G OUTLET TEMP	Cr-AI	339	443	mmWC	90	100	COAL+ AIR	--	--	--	0-150	4-97-288-94305		Rc 1.5"		Tungsten Carbide Thermowell size= 24mm OD x 9mm ID, Insertion length 160 mm, Extension Length 150mm.	150	1	T	PR0190000384
244	HF07CT002	MIXED AIR BEFORE MLL G TEMP	Cr-AI	793	1009	mmWC	253	317	HOT PA	2000 x 1500	16	140	0-400	4-97-288-94302		As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0190000341
245	HF07CT001	MIXED AIR BEFORE MLL G TEMP	Cr-AI	793	1009	mmWC	253	317	HOT PA	2000 x 1500	16	140	0-400	4-97-288-94302		As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0190000341
246	HF076CT002	MIXED AIR BEFORE MLL F TEMP	Cr-AI	793	1009	mmWC	253	317	HOT PA	2000 x 1500	16	140	0-400	4-97-288-94302		As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0190000341
247	HF076CT001	MIXED AIR BEFORE MLL F TEMP	Cr-AI	793	1009	mmWC	253	317	HOT PA	2000 x 1500	16	140	0-400	4-97-288-94302		As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0190000341
248	HF076CT002	MIXED AIR BEFORE MLL E TEMP	Cr-AI	793	1009	mmWC	253	317	HOT PA	2000 x 1500	16	140	0-400	4-97-288-94302		As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0190000341
249	HF071CT001	MIXED AIR BEFORE MLL A TEMP	Cr-AI	793	1009	mmWC	253	317	HOT PA	2000 x 1500	16	140	0-400	4-97-288-94302		As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0190000341
250	HF074CT001	MIXED AIR BEFORE MLL D TEMP	Cr-AI	793	1009	mmWC	253	317	HOT PA	2000 x 1500	16	140	0-400	4-97-288-94302		As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0190000341
251	HF073CT002	MIXED AIR BEFORE MLL C TEMP	Cr-AI	793	1009	mmWC	253	317	HOT PA	2000 x 1500	16	140	0-400	4-97-288-94302		As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0190000341
252	HF073CT001	MIXED AIR BEFORE MLL C TEMP	Cr-AI	793	1009	mmWC	253	317	HOT PA	2000 x 1500	16	140	0-400	4-97-288-94302		As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0190000341
253	HF072CT002	MIXED AIR BEFORE MLL B TEMP	Cr-AI	793	1009	mmWC	253	317	HOT PA	2000 x 1500	16	140	0-400	4-97-288-94302		As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0190000341
254	HF072CT001	MIXED AIR BEFORE MLL B TEMP	Cr-AI	793	1009	mmWC	253	317	HOT PA	2000 x 1500	16	140	0-400	4-97-288-94302		As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0190000341
255	HF071CT002	MIXED AIR BEFORE MLL A TEMP	Cr-AI	793	1009	mmWC	253	317	HOT PA	2000 x 1500	16	140	0-400	4-97-288-94302		As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0190000341
256	HF074CT002	MIXED AIR BEFORE MLL D TEMP	Cr-AI	793	1009	mmWC	253	317	HOT PA	2000 x 1500	16	140	0-400	4-97-288-94302		As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0190000341
257	HF076CT001	MIXED AIR BEFORE MLL H TEMP	Cr-AI	793	1009	mmWC	253	317	HOT PA	2000 x 1500	16	140	0-400	4-97-288-94302		As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0190000341
258	HF076CT002	MIXED AIR BEFORE MLL H TEMP	Cr-AI	793	1009	mmWC	253	317	HOT PA	2000 x 1500	16	140	0-400	4-97-288-94302		As per Drg		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	T	PR0190000341
259	HF08CT015	MLL H OUTLET TEMP	Cr-AI	339	443	mmWC	90	100	COAL+ AIR	--	--	--	0-150	4-97-288-94305		Rc 1.5"		Tungsten Carbide Thermowell size= 24mm OD x 9mm ID, Insertion length 160 mm, Extension Length 150mm.	150	1	T	PR0190000384
260	HF08CT016	MLL H OUTLET TEMP	Cr-AI	339	443	mmWC	90	100	COAL+ AIR	--	--	--	0-150	4-97-288-94305		Rc 1.5"		Tungsten Carbide Thermowell size= 24mm OD x 9mm ID, Insertion length 160 mm, Extension Length 150mm.	150	1	T	PR0190000384
261	HJF26CT001	TEMPERATURE AT PUMP HOUSE INLET	PRT-100	0		kg/cm ²	67		HFO	D323.3mm x 6.35mm		50	0-100			M33 x 2, STUB LENGTH FROM PIPE CENTER 160mm.			150	1	T	PR0200000357
262	HJF26CT001	TEMPERATURE AT HFO HEATER INLET	PRT-100	29.5		kg/cm ²	67		HFO	D114.3mm X 6.02 mm	3	50	0-100			M33 x 2, STUB LENGTH FROM PIPE CENTER 160mm.			150	1	T	PR0200000357
263	HJF36CT001	TEMPERATURE AT HFO HEATER COMMON OUTLET	PRT-100	28		kg/cm ²	125		HFO	D168.3mm X 7.11 mm	3	50	0 - 200			M33 x 2, STUB LENGTH FROM PIPE CENTER 160mm.			150	1	T	PR0200000357
264	HJF36CT002	TEMPERATURE AT HFO HEATER COMMON OUTLET	PRT-100	28		kg/cm ²	125		HFO	D168.3mm X 7.11 mm	3	50	0 - 200			M33 x 2, STUB LENGTH FROM PIPE CENTER 160mm.			150	1	T	PR0200000357
265	HJF36CT003	TEMPERATURE AT HFO HEATER COMMON OUTLET	PRT-100	28		kg/cm ²	125		HFO	D168.3mm X 7.11 mm	3	50	0 - 200			M33 x 2, STUB LENGTH FROM PIPE CENTER 160mm.			150	1	T	PR0200000357
266	HJF76CT001	COOLER OUTLET HFO TEMPERATURE	PRT-100	3		kg/cm ²	67		HFO	D114.3mm X 6.02 mm			0-100			M33 x 2, STUB LENGTH FROM PIPE CENTER 160mm.			150	1	T	PR0200000357
267	HJF76CT002	COOLER OUTLET HFO TEMPERATURE	PRT-100	3		kg/cm ²	67		HFO	D114.3mm X 6.02 mm			0-100			M33 x 2, STUB LENGTH FROM PIPE CENTER 160mm.			150	1	T	PR0200000357
268	HJF7CT001	DRAIN OIL TANK TEMPERATURE	PRT-100	0		kg/cm ²	67		HFO	Tank	--	--	0-500			M33 x 2, STUB LENGTH FROM PIPE CENTER 160mm.			150	1	T	PR0200000357
269	HJF96CT002	HFO HEADER TEMPERATURE	PRT-100	5.9	17.9	kg/cm ²	120		HFO	D114.3mm X 6.02 mm	3	50	0-200			M33 x 2, STUB LENGTH FROM PIPE CENTER 160mm.			150	1	T	PR0200000357
270	HJF76CT001	DRAIN OIL TANK TEMPERATURE	PRT-100	0		kg/cm ²	67		HFO	Tank	--	--	0-500			M33 x 2, STUB LENGTH FROM PIPE CENTER 160mm.			150	1	T	PR0200000357
271	HSA11CT001	SCR REACTOR A INLET DUCT TEMPERATURE	Cr-AI	-101	-150	mmWC	344	427	FLUE GAS	3300 X 16772	13	160	0 - 500	4-97-288-94302		As per Drg		Total Thermowell Length below head 1000mm, Thermowell material Inconel 600.	Not Applicable	1	T	PR0190000392
272	HSA11CT002	SCR REACTOR A INLET DUCT TEMPERATURE	Cr-AI	-101	-150	mmWC	344	427	FLUE GAS	3300 X 16772	13	160	0 - 500	4-97-288-94302		As per Drg		Total Thermowell Length below head 1000mm, Thermowell material Inconel 600.	Not Applicable	1	T	PR0190000392
273	HSA11CT003	SCR REACTOR A INLET DUCT TEMPERATURE	Cr-AI	-101	-150	mmWC	344	427	FLUE GAS	3300 X 16772	13	160	0 - 500	4-97-288-94302		As per Drg		Total Thermowell Length below head 1000mm, Thermowell material Inconel 600.	Not Applicable	1	T	PR0190000392
274	HSA11CT006	SCR REACTOR A OUTLET DUCT TEMPERATURE	Cr-AI	-269	-376	mmWC	344	427	FLUE GAS	4700 X 11820	13	160	0 - 500	4-97-288-94302		As per Drg		Total Thermowell Length below head 1000mm, Thermowell material Inconel 600.	Not Applicable	1	T	PR0190000392

PROJECT: BHUSAWAL 11650 MW
 CUSTOMER: M/s MAHAGENCO
 CONTRACTOR: M/s BHEL
 Ref: CE/416/BHUSAWAL/TE/PS/CH

SL NO	KKS_TAG	DESCRIPTION	SENSR. TYPE	OP. PRESS	DGN. PRESS	Unit of Pressure	OP TEMP (Deg.C)	DGN. TEMP (Deg.C)	MEDIUM	PPE SIZE (Dia x THK) (mm.)	VELOCITY (Meter/Sec)	INSUL. THICK (mm.)	RANGE (Deg.C)	IRR Required for Thermowell	STUB DETAIL / PROCESS / THERMOWELL DRG REF	PROCESS CONNECTION SIZE	Stub Height (mm)	REMARKS	SS304 Nipple Union Nipple Length (mm)	Qty	Input unit	MATERIAL CODE
275	HSA11CT007	SCR REACTOR A OUTLET DUCT TEMPERATURE	Cr-Al	-259	-376	mmWC	344	427	FLUE GAS	4700 X 11820	13	160	0 - 500		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material Inconel 600.	Not Applicable	1	T	PR0190000392
276	HSA11CT008	SCR REACTOR A OUTLET DUCT TEMPERATURE	Cr-Al	-259	-376	mmWC	344	427	FLUE GAS	4700 X 11820	13	160	0 - 500		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material Inconel 600.	Not Applicable	1	T	PR0190000392
277	HSA21CT001	SCR REACTOR B INLET DUCT TEMPERATURE	Cr-Al	-101	-150	mmWC	344	427	FLUE GAS	3300 X 16772	13	160	0 - 500		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material Inconel 600.	Not Applicable	1	T	PR0190000392
278	HSA21CT002	SCR REACTOR B INLET DUCT TEMPERATURE	Cr-Al	-101	-150	mmWC	344	427	FLUE GAS	3300 X 16772	13	160	0 - 500		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material Inconel 600.	Not Applicable	1	T	PR0190000392
279	HSA21CT003	SCR REACTOR B INLET DUCT TEMPERATURE	Cr-Al	-101	-150	mmWC	344	427	FLUE GAS	3300 X 16772	13	160	0 - 500		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material Inconel 600.	Not Applicable	1	T	PR0190000392
280	HSA21CT006	SCR REACTOR B OUTLET DUCT TEMPERATURE	Cr-Al	-259	-376	mmWC	344	427	FLUE GAS	4700 X 11820	13	160	0 - 500		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material Inconel 600.	Not Applicable	1	T	PR0190000392
281	HSA21CT007	SCR REACTOR B OUTLET DUCT TEMPERATURE	Cr-Al	-259	-376	mmWC	344	427	FLUE GAS	4700 X 11820	13	160	0 - 500		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material Inconel 600.	Not Applicable	1	T	PR0190000392
282	HSA21CT008	SCR REACTOR B OUTLET DUCT TEMPERATURE	Cr-Al	-259	-376	mmWC	344	427	FLUE GAS	4700 X 11820	13	160	0 - 500		4-97-288-94302	As per Drg		Total Thermowell Length below head 1000mm, Thermowell material Inconel 600.	Not Applicable	1	T	PR0190000392
283	19HTA01CT011	Unit -1 Absorber Inlet temperature element 1	PRT-100	3			130	300	Flue Gas	Duct Size 5.6 m x 5.6 m			0 - 350			2" stub with ANSI 150 Flange		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	R	PR0200000349
284	19HTA01CT012	Unit -1 Absorber Inlet temperature element 2	PRT-100	3			130	300	Flue Gas	Duct Size 5.6 m x 5.6 m			0 - 350			2" stub with ANSI 150 Flange		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	R	PR0200000349
285	19HTA01CT013	Unit -1 Absorber Inlet temperature element 3	PRT-100	3			130	300	Flue Gas	Duct Size 5.6 m x 5.6 m			0 - 350			2" stub with ANSI 150 Flange		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	R	PR0200000349
286	19HTA01CT021	Unit -1 Absorber Outlet temperature element 1	PRT-100	0.5			54.2	70	Flue Gas	Duct Size 5.6 m x 13.2 m			0 - 350			2" stub with ANSI 150 Flange		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	R	PR0200000349
287	19HTA01CT022	Unit -1 Absorber Outlet temperature element 2	PRT-100	0.5			54.2	70	Flue Gas	Duct Size 5.6 m x 13.2 m			0 - 350			2" stub with ANSI 150 Flange		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	R	PR0200000349
288	19HTA01CT023	Unit -1 Absorber Outlet temperature element 3	PRT-100	0.5			54.2	70	Flue Gas	Duct Size 5.6 m x 13.2 m			0 - 350			2" stub with ANSI 150 Flange		Total Thermowell Length below head 1000mm, Thermowell material SS316.	Not Applicable	1	R	PR0200000349
289	19HTD01CT071	Unit-1 Oxidation Blower common discharge to JAS Inlet temperature Transmitter	PRT-100	95			100	300	Air	450NB Pipe			0 - 350			2" stub with ANSI 150 Flange		Barstock Thermowell with 2" Welded Flange Insertion Length 300mm AND Extension Length 150mm.	150	1	R	PR0200000330
																			Total Main Qty	289		
																			Minimum Spares Qty (Refer Note 2)	70		
																			Minimum Total Qty	359		

Notes :

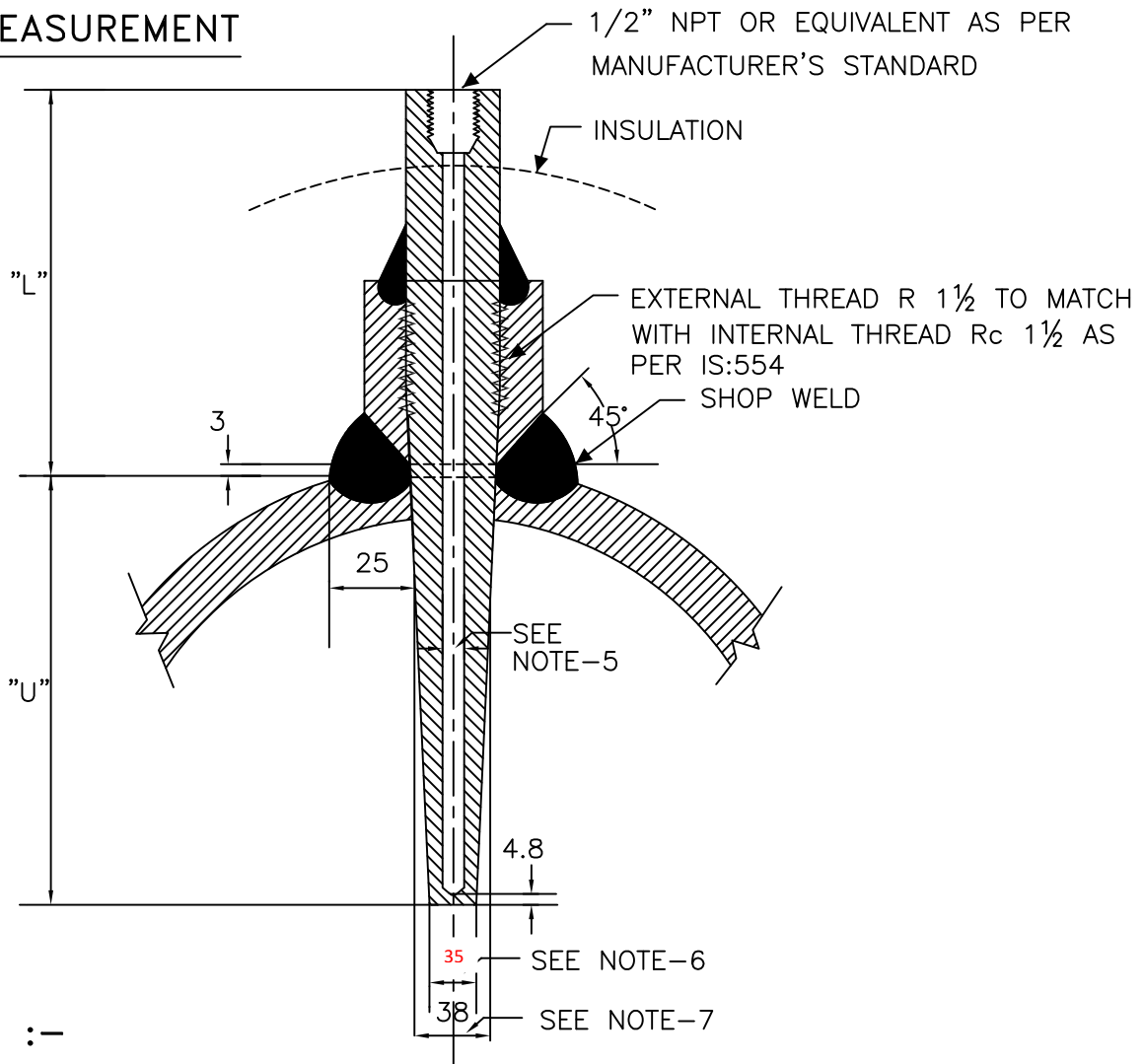
1.0

For Barstock Thermowell, Extension Length shall be Minimum 30mm above the Insulation on pipe and Minimum 30 mm when there is no insulation on pipe.
 Minimum number spares qty indicated in specification, actual Mandatory spares qty shall be 10% of Total Qty for each type. Each Process Connection Size and Each Thermowell size (L&EL) OR Minimum Two Numbers of each type. Each Process Connection Size and Each Thermowell size (L&EL) whichever is Higher shall be included as mandatory spares.

2.0

Note: It is responsibility of bidder to calculate mandatory spares correctly, vendor can chose the length of IL and EL to optimize the mandatory spares qty without affecting the specification requirement. No commercial implication will be allowed for change in mandatory spares quantity due to calculation of WFC. During datasheets submission if BHEL finds that Thermowell length has to be corrected as per ASME PTIC 19.3 2018 and if it results in change of qty in mandatory spares then no commercial implication will be allowed. However, if change of IL is due to inputs such as Operating and design parameters furnished by BHEL, then commercial implications due to those changes will be allowed.

TEMP. MEASUREMENT



NOTES :-

1. THIS TYPE OF TEMPERATURE BOSS SHALL BE USED FOR THE PROCESS PRESS EQUAL/ ABOVE 40 KG/CM2(g).
2. THE MATERIAL OF THE BOSS SHALL BE SIMILAR TO PIPING MATERIAL.
3. MATERIAL OF THE THERMOWELL SHALL BE OF 316SS.
4. THERMOWELL SHALL BE DRILLED BAR STOCK TYPE.
5. INTERNAL BORE OF THE THERMOWELL SHOULD BE SELECTED BASED ON THE NORMAL SIZE OF THE SENSING ELEMENT AS PER ASME PTC-19.3.
6. THE BOTTOM DIAMETER OF THE THERMOWELL TYPICALLY SHOWN HERE SHALL BE SUBJECT TO VARIATION BASED ON THE INTERNAL BORE OF THERMOWELL AND THICKNESS OF THERMOWELL MATERIAL TO WITHSTAND THE PROCESS PRESS AND TEMP AS PER ASME PTC-19.3.
7. THERMOWELL SHALL BE SUITABLE TO MATCH THE STUB DIMENSIONS AS PER Rc 1 1/2.
8. THE 'U' & 'L' DIMENSIONS SHALL BE SELECTED BASED ON PARTICULAR APPLICATION.
9. ORIENTATION OF STUB ON VERTICAL/ HORIZONTAL PIPES SHALL BE 90° TO THE CENTRE LINE OF THE PIPES, FOR PIPE SIZE LARGER THAN 4". HEIGHT OF STUB SHALL BE 64mm FOR PIPE OD < 200Nb AND 45mm FOR PIPE OD ≥ 200Nb.
10. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE INDICATED

TITLE :

DRG. NO.



INSTRUMENT STUB DETAILS (TEMP)
(APPLICABLE FOR PIPE SIZE ABOVE 4")

PE-DG-415-145-I101

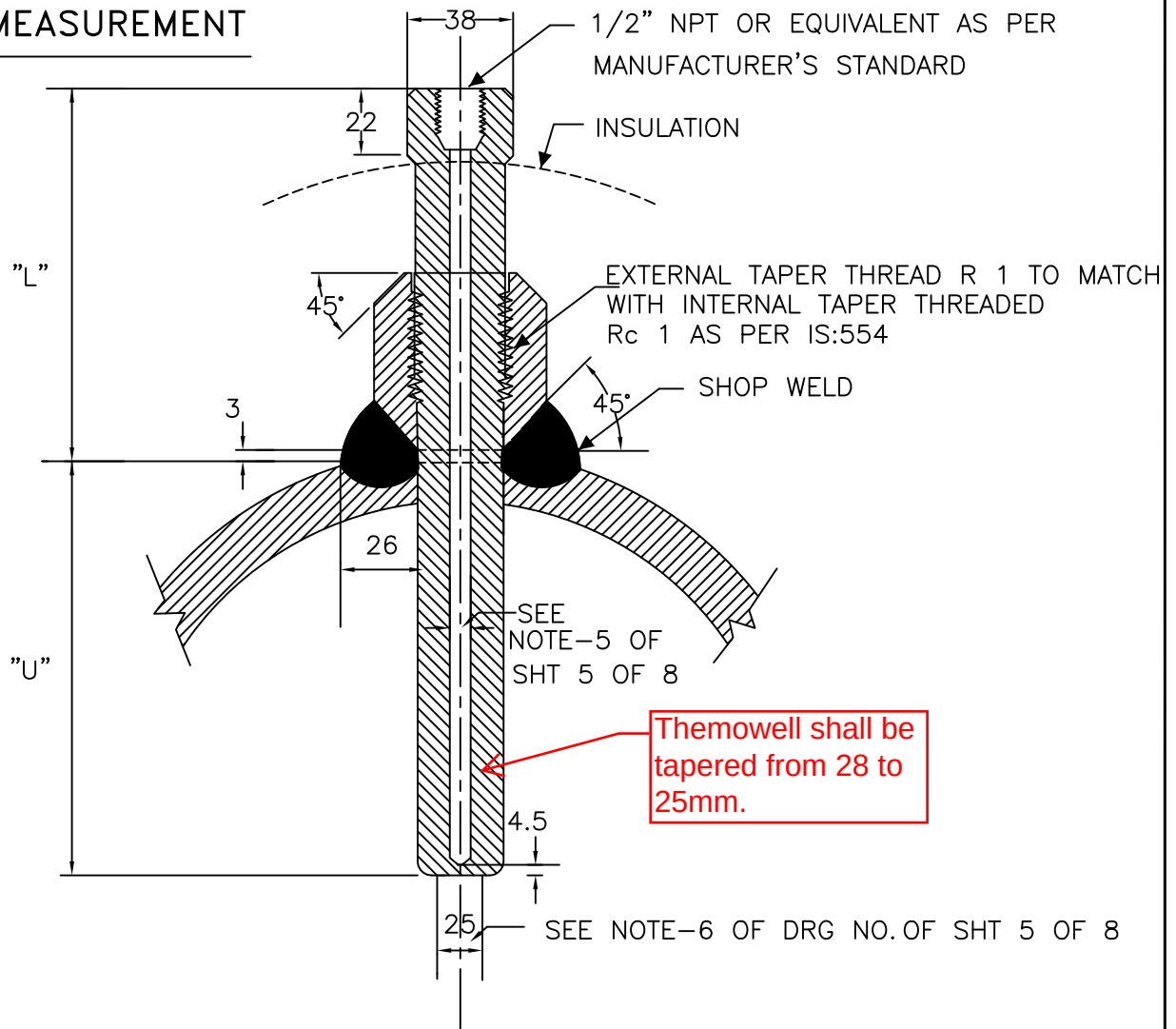
REV. 01

[(i) PROCESS PRESS EQUAL/> 40 Kg/Cm2 (g)&

SH. 05 OF 8

(ii) PROCESS PRESS < 40 Kg/Cm2(g), TEMP. EQUAL/> 400DEGC]

TEMP. MEASUREMENT



NOTES :-

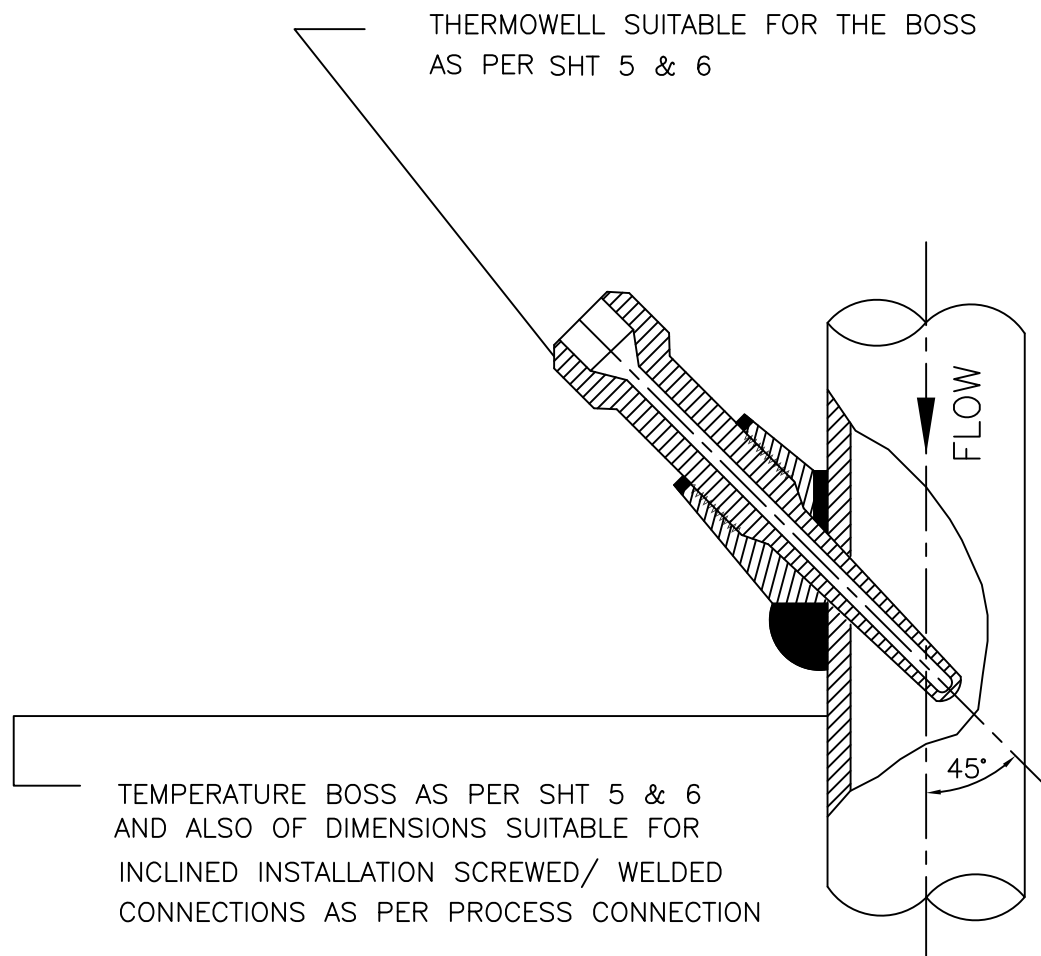
1. THIS TYPE OF TEMPERATURE BOSS IS APPLICABLE FOR THE PROCESS PRESS/ TEMP. BELOW 40 KG/CM²(g)/400°C.
2. FOR PRESS. TIGHT JOINTS THE BOSS SHOULD HAVE INTERNAL TAPERED PIPE THREAD Rc 1 AS PER IS:554. THE LENGTH OF THREAD ENGAGEMENT SHOULD BE AS PER ABOVE STANDARD.
3. SEE NOTES-2 TO 9 IN SHT. 5 OF 8 OF THIS DRG.
4. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE INDICATED



TITLE :
INST. STUB DETAILS (TEMP)
 (APPLICABLE FOR PIPE SIZE ABOVE 4")

DRG. NO.
PE-DG-415-145-I101
 REV. 01

[PROCESS PRESS < 40 Kg/Cm² (g), TEMP < 400 °C] SH. 06 OF 8



NOTES :-

1. INCLINED INSTALLATION OF THERMOWELL SHALL BE APPLICABLE FOR 4" AND SMALLER LINE SIZE BUT LIMITED TO MIN. 3" LINE SIZE.
2. FOR 2" AND SMALLER LINE SIZE NECESSARY EXPANDER OF MIN. 3" SIZE OF MAIN PIPING SPECIFICATION SHALL BE USED.
3. THIS TYPE OF INSTALLATION IS APPLICABLE FOR HORIZONTAL AND VERTICAL PIPE SECTION.
4. FOR STEAM SERVICES EXPANDER SECTION TO BE USED ONLY IN VERTICAL RUN.
5. THE EXPANDER SECTION SHALL BE OF ADEQUATE LENGTH (AT LEAST 3-4 TIMES DIA OF THE MAIN PROCESS PIPE AT BOTH SIDES OF THE INSTALLED THERMOWELL).



TITLE :

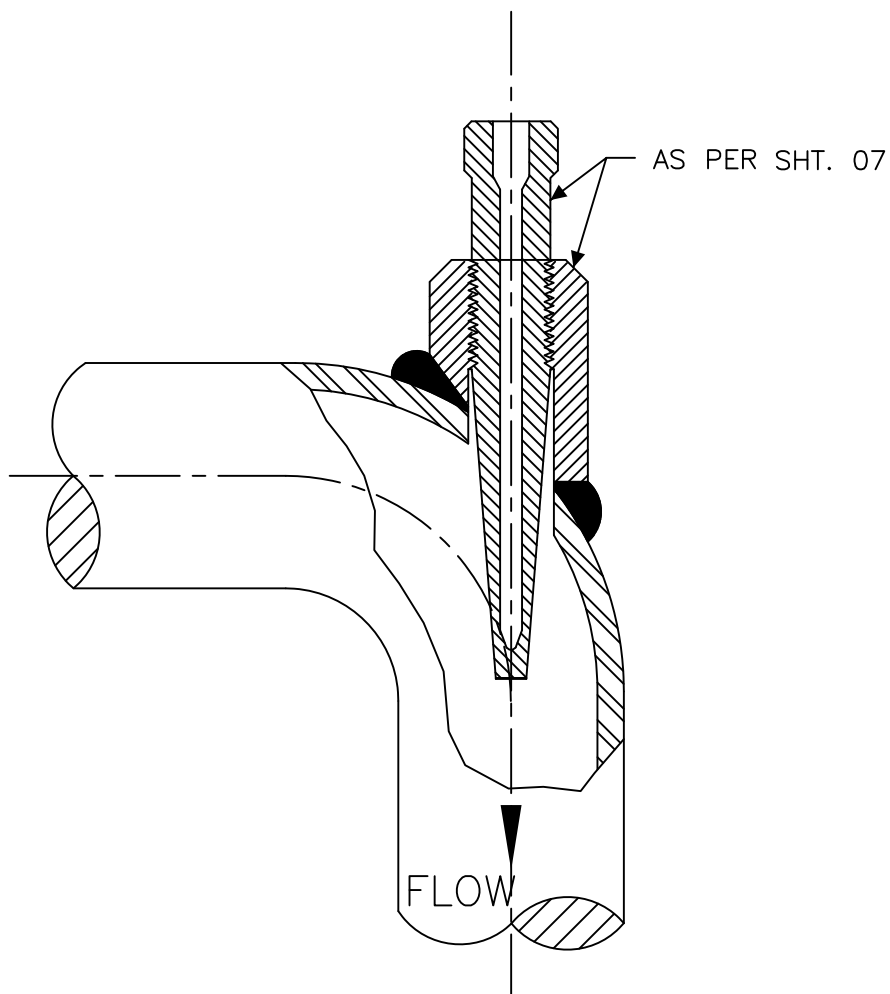
THERMOWELL INSTALLATION

DRG. NO.

PE-DG-415-145-I101

REV. 01

SH. 07 OF 8



NOTES :-

1. FLOW INSTALLATION OF THERMOWELL SHALL BE APPLICABLE FOR 4" AND SMALLER LINE SIZE BUT LIMITED TO MINIMUM 3" LINE SIZE.
2. FOR 2" AND SMALLER LINE SIZE NECESSARY EXPANDER OF ELBOW FORM (AS SHOWN) OF MINIMUM 3" SIZE SHALL BE USED.
3. ELBOW EXPANDER SECTION IN HORIZONTAL PLANE TO BE USED FOR LIQUID SERVICE. FOR STEAM SERVICES EXPANDER SECTION TO BE USED IN VERTICAL PLANE.



TITLE :

THERMOWELL INSTALLATION

DRG. NO.

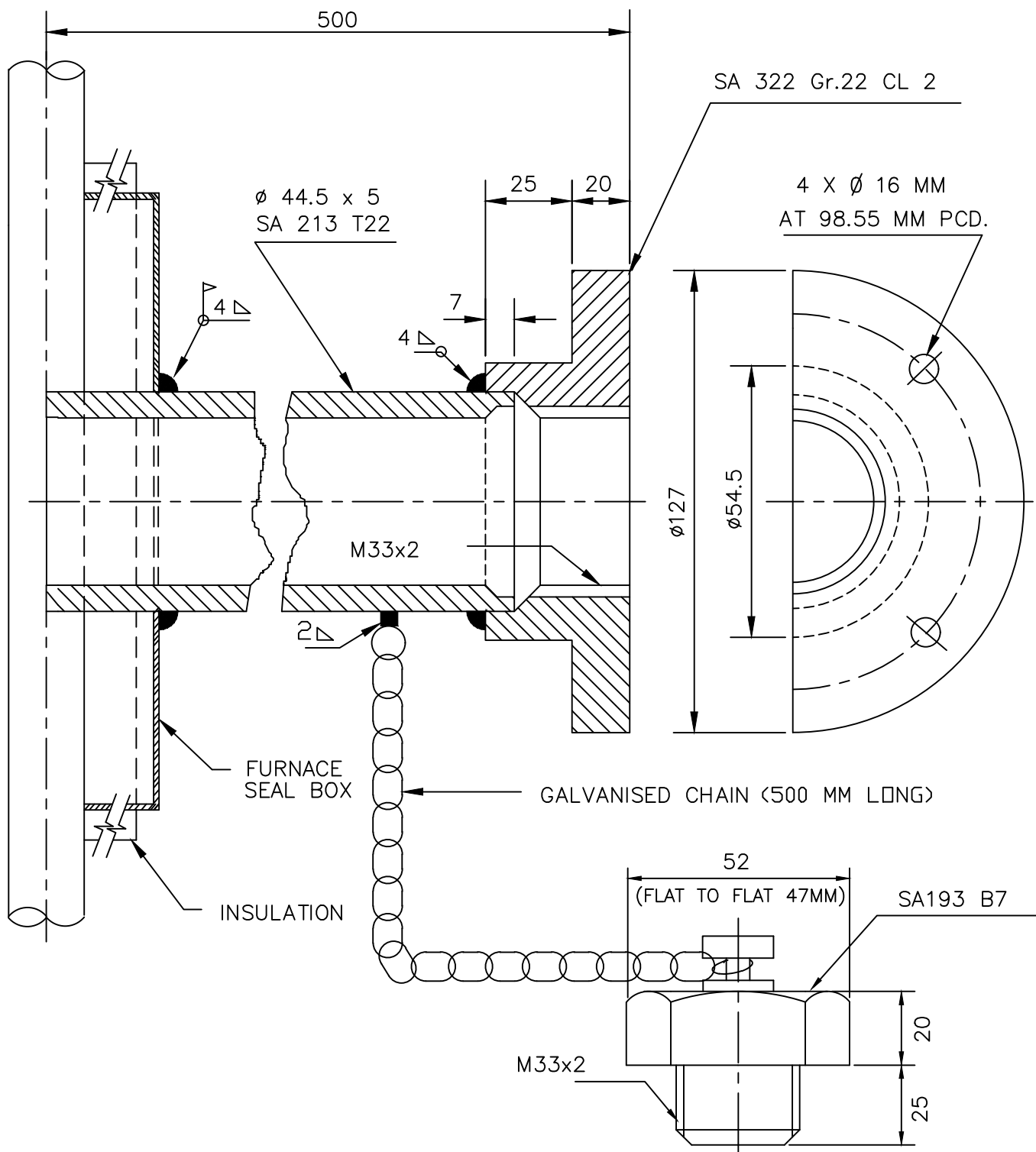
PE-DG-415-145-I101

REV. 01

SH. 08 OF 8



PROJECT : 1x660 MW BHUSAWAL TPS UNIT-6
TITLE : TEMPERATURE MEASUREMENT IN FURNACE



NOTES :

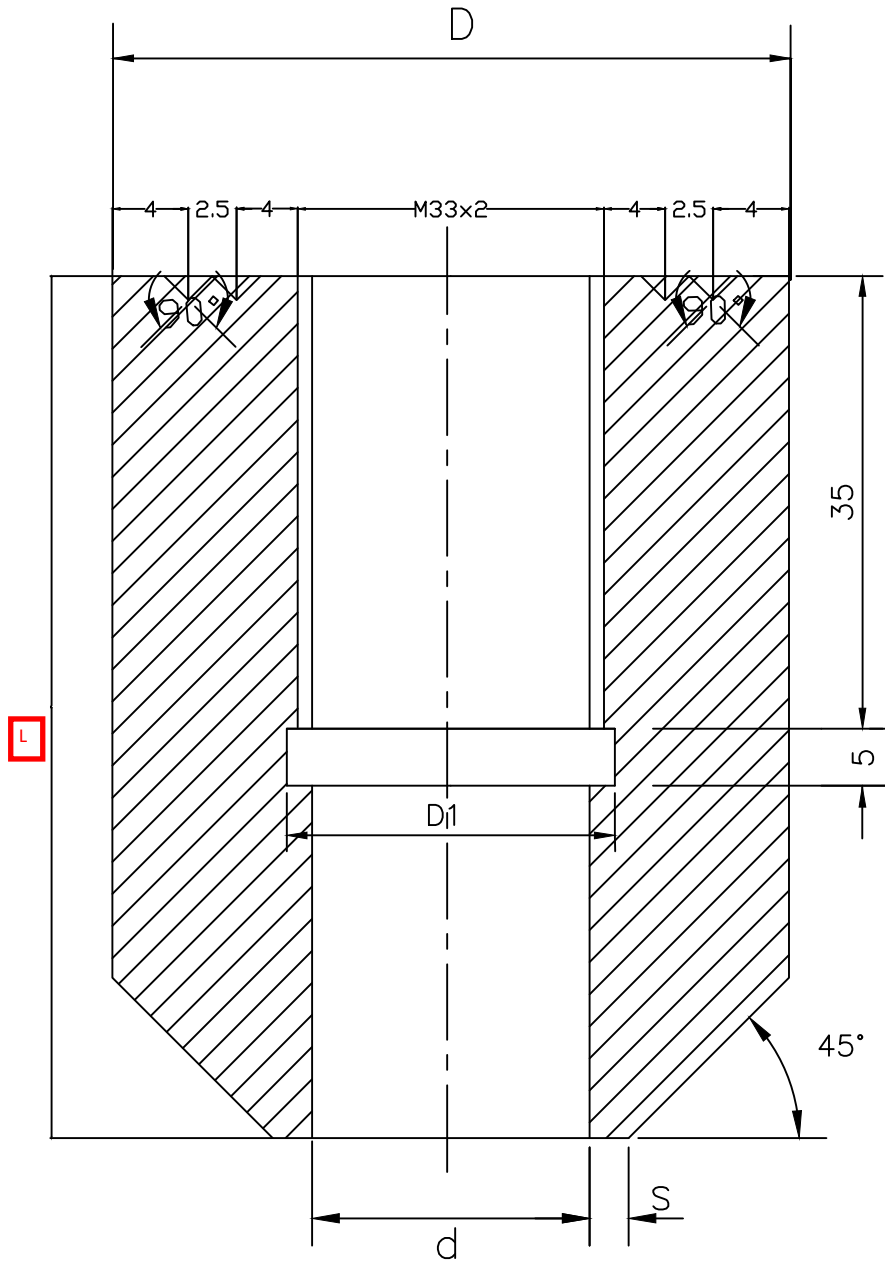
1. FURNACE SEAL BOX DEPTH (~150MM) SHALL BE TAKEN CARE WHILE DECIDING THERMOCOUPLE LENGTH.
2. FLANGE DIMENSIONS EXCEPT BORE ARE AS PER ANSI B16.5 CLASS 150 NPS 1-1/2 INCH.
3. TOLERANCE FOR ALL MEASUREMENT(LINEAR AND ANGULAR): ISO 2768-C.
4. TOLERANCE FOR TUBE THICKNESS AS PER A450 OF ASTM.

ALL DIMENSIONS ARE IN MM

PREPARED	KV	APPROVED	DR	DRG. NO.	REV.
CHECKED	SN	DATE	21-09-2018	4-97-288-94296	00



PROJECT : 1x660 MW BHUSAWAL TPS UNIT-6
TITLE : TEMPERATURE STUB FOR PRESSURE PARTS



BELOW NB 150	29	86	33.5	1.5	130
NB 150 & ABOVE	29	86	33.5	1.5	65
MAIN PIPE SIZES	d	D	D1	S	L

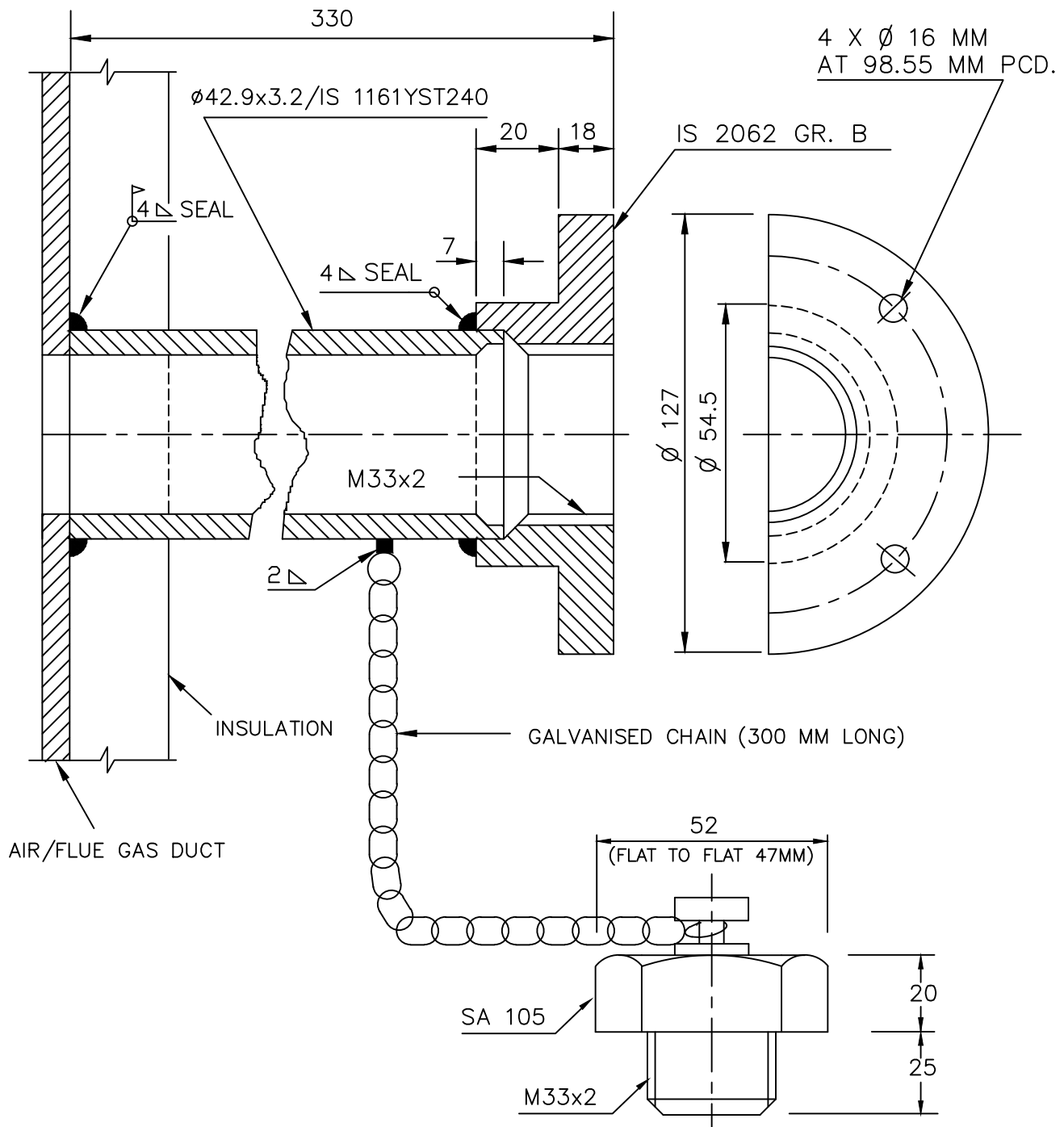
ALL DIMENSIONS ARE IN MM

PREPARED	KV	APPROVED	DR	DRG. NO.	REV.
CHECKED	SN	DATE	21.09.2018	4-97-288-94298	00



PROJECT : 1x660 MW BHUSAWAL TPS UNIT-6

TITLE : TEMP. MEASUREMENT IN AIR & FLUE GAS DUCT



NOTES :

1. FLANGE DIMENSIONS EXCEPT BORE AS PER ANSI B16.5, CLASS 150 NPS 1-1/2 INCH.
2. TOLERANCE FOR ALL MEASUREMENT: COARSE CLASS AS PER IS 2102.
3. TOLERANCE FOR LIGHT PIPE THICKNESS AS PER IS 1161 STEEL TUBES.

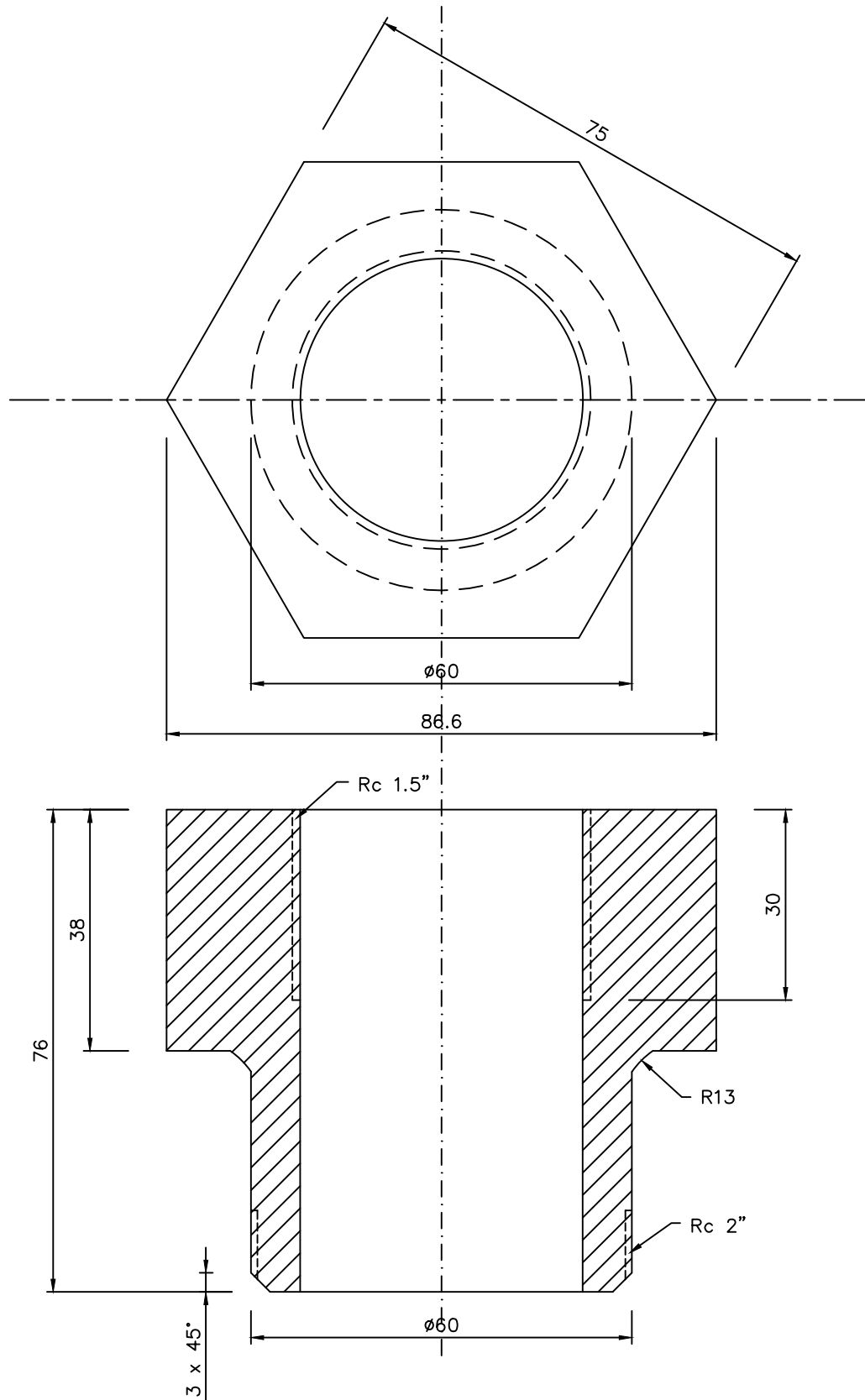
ALL DIMENSIONS ARE IN MM

PREPARED	KV	APPROVED	DR	DRG. NO.	REV.
CHECKED	SN	DATE	21.09.2018	4-97-288-94302	00



PROJECT : 1x660 MW BHUSAWAL TPS UNIT-6

TITLE : MILL COAL AIR TEMPERATURE MEASUREMENT STUB



ALL DIMENSIONS ARE IN MM

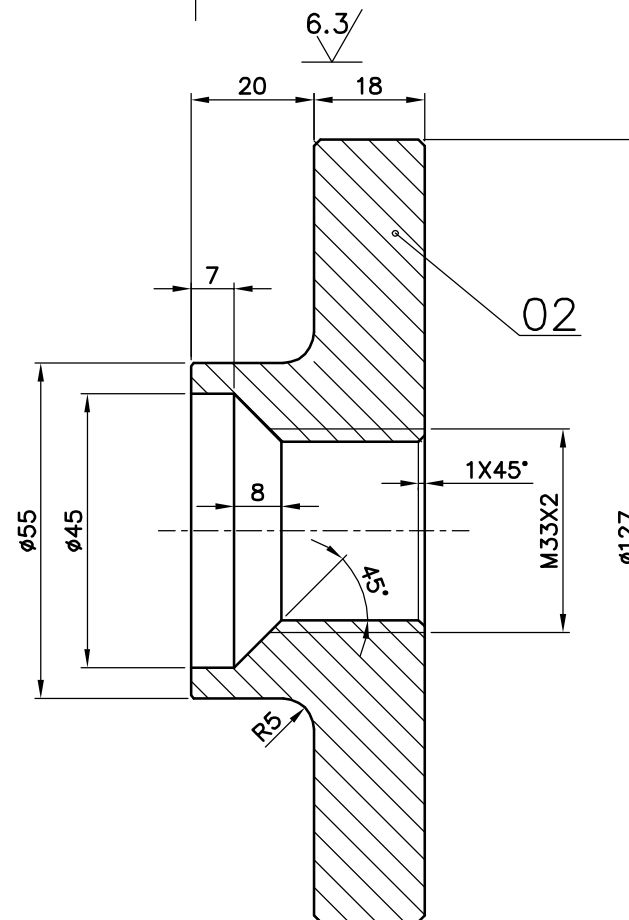
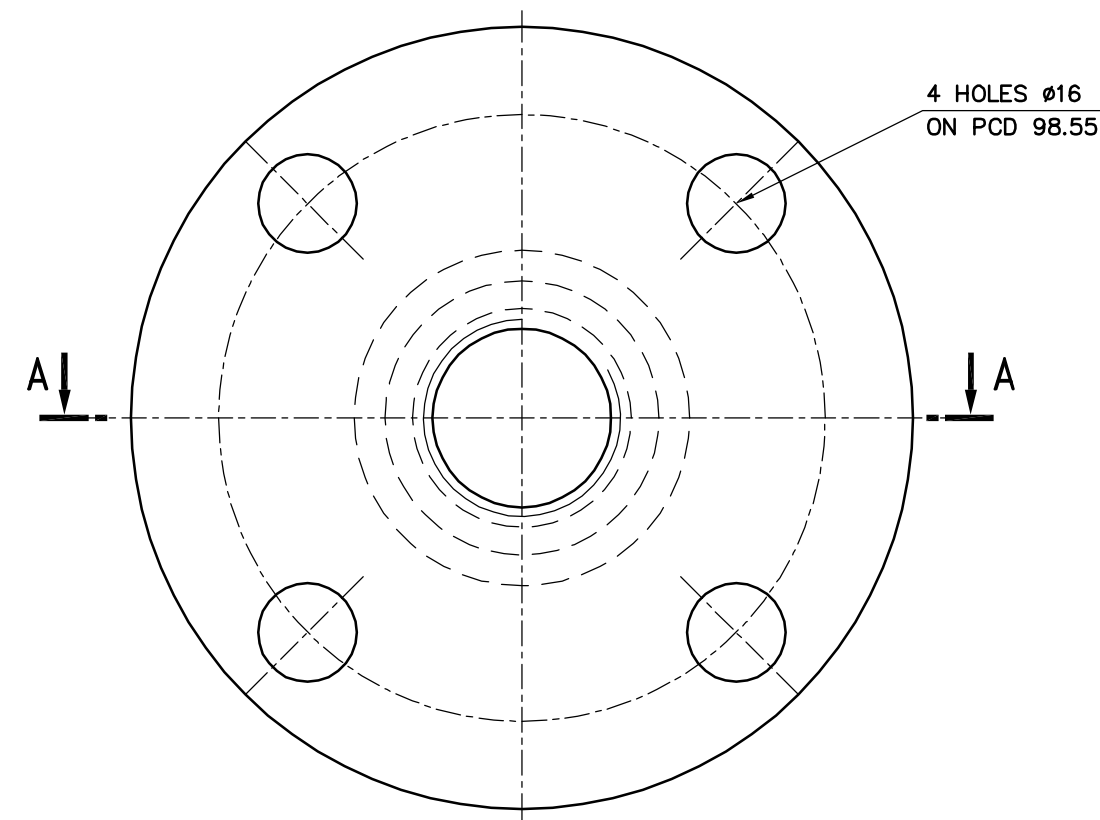
PREPARED	KV	APPROVED	DR	DRG. NO.	REV.
CHECKED	SN	DATE	21.09.2018	4-97-288-94305	00

3-55-335-02053
DRAWING NO.

ALL DIMENSIONS ARE IN MILLIMETRES

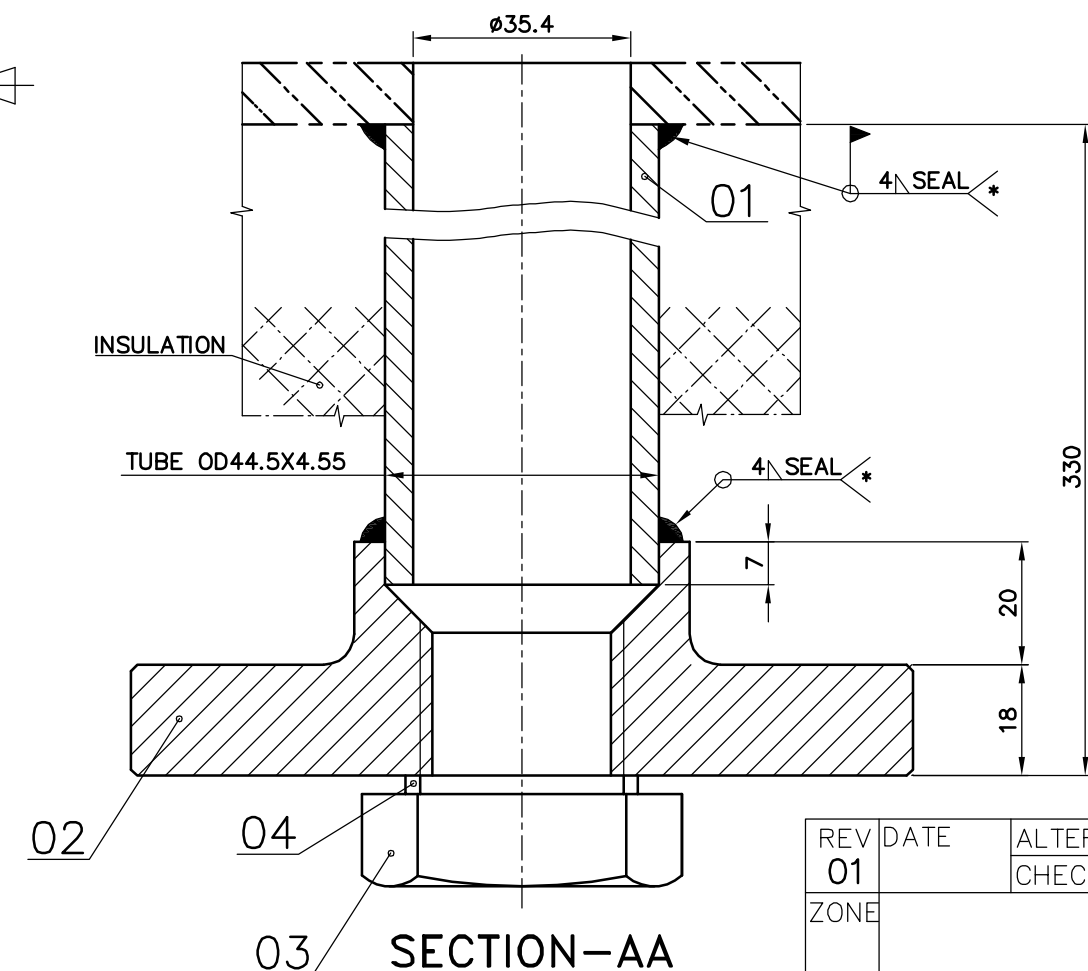
FOR PRODUCTION
REF. PR:QA:590 FOR PAINTING
REF. PR:QA:500 FOR UNTOL. DIMNS.
REF. APPLICABLE GMS FOR MATCODE&SPEC.

6.3/
~ /



NOTES:

01. * MARKED WELDS ARE TO BE CHECKED BY LPI OR MPI
02. SHARP EDGES ARE TO BE CHAMFERED BY 0.5X45°



04	CU FLAT SEALING RING 33X39	S		220208350000			0.006		
03	SCREW PLUG M33X2			971620640000			0.200		
02	PL 45XD135			150111090000			1.900		
01	TUBE D44.5X4.55;L-299			150860630000			1.340		
				ASTM A210 GRA1			1		
VAR NO	ITEM NO	DESCRIPTION	CAT	DRAWING No.	ITEM NO VAR NO	MATL CODE MATL SPECN	A P L C UNIT DI	UNIT WT QTY	GS ZONE

CAUTION: The information on this document is the property of BHARAT HEAVY ELECTRICALS LTD. It must not be used directly or indirectly in any way detrimental to the interest of the company.

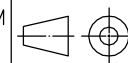
TYPE OF PRODUCT
OR NAME OF
CUSTOMER/PROJECT



BHARAT HEAVY ELECTRICALS LTD.,
UNIT: BOILER AUXILIARIES PLANT,
RANIPET - 632 406.

DEPT
FANS
CODE
864

GRADE OF
UNTOL. DIM
PR:QA:500



SCALE
N.T.S

WEIGHT (KG).
3.446

REF. TO ASSY/OLD DRG.

ITEM NO.
NO. OF
ITEMS

TITLE

STUDS FOR TEMP.
SENSOR

CARD
CODE
U 01

DRAWING NO.

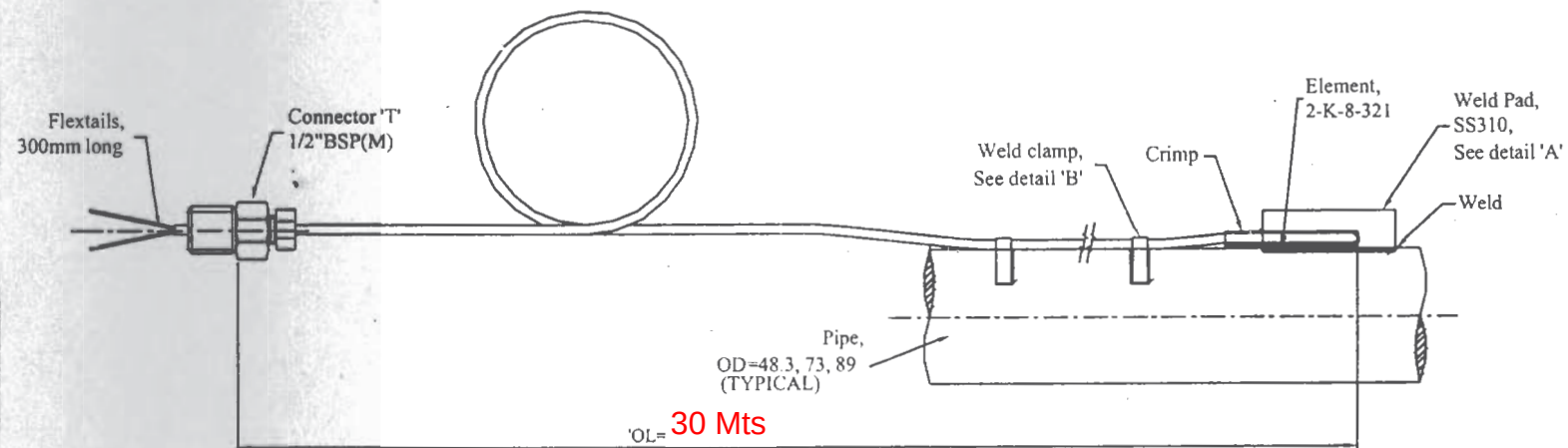
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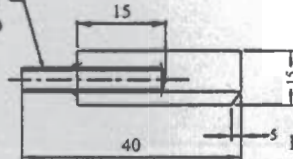
TYPICAL DIAGRAM

THERMOCOUPLE INSTALLATION DIAGRAM

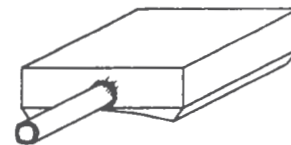
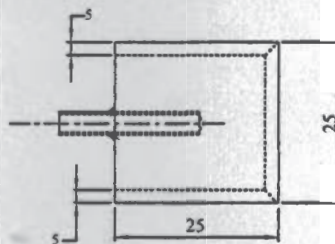
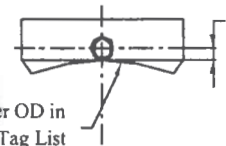
Bhusawal-TEMP-METAL-01



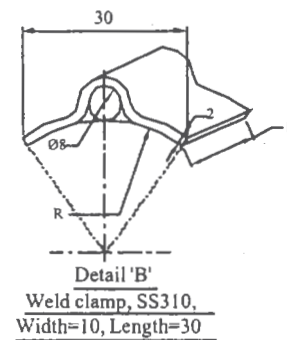
Tube, 10mm OD x 8.2mm ID



R=As per OD in Tag List



DETAIL 'A' - WELD PAD DETAILS



All dimension are in mm

**ENGINEERING CHECKLIST
TEMPERATURE ELEMENTS**

PROJECT: Bhusawal 1X660 MW

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

Sl. No.	DESCRIPTION	CONFIRMED (If applicable Please Tick Mark 'V')	Not CONFIRMED (If applicable Please Tick Mark 'V')
1	"Bidder shall have successfully completed design, engineering, manufacturing, testing and supply of Temperature Elements in not less than two (2) different Thermal Powerplants of unit size not less than 500 MW before last two (2) years as on bid opening date. To qualify to this point, Bidders shall furnish details of supplies made with applications covering the Mediums Steam and Water. Details should include PO copies and Supply documents.		
2	All the Elements below shall be provided with CERAMIC Terminal Blocks and Silver Plated Brass Screw type with Nickel coated and spring loaded Connectors. Br Ni plated Double compression ½" NPT (M) Cable Gland shall be provided.		
3	Minimum number spares qty indicated in specification, actual Mandatory spares qty shall be 10 % of Total Qty for each type, Each Process Connection Size and Each Thermowell size(IL&EL) OR Minimum Two Numbers of each type, Each Process Connection Size and Each Thermowell size(IL&EL) whichever is higher shall be included as mandatory spares. Note: It is responsibility of bidder to calculate mandatory spares correctly, vendor can chose the length of IL and EL to optimize the mandatory spares qty without affecting the specification requirement. No commercial implication will be allowed for change in mandatory spares quantity due to calculation of WFC. During datasheets submission if BHEL finds that Thermowell length has to be corrected as per ASME PTC 19.3 2010 and if it results in change of qty in mandatory spares then no commercial implication will be allowed. However, if change of IL is due to inputs such as Operating and design parameters furnished by BHEL, then commercial implications due to those changes will be allowed.		
4	Thermocouple and RTD shall be Duplex Type		
5	RTD shall be 4 wired		
6	Element size for RTD shall be 18 AWG		
7	Element size for K Type Thermocouple shall be 16 AWG		
8	Element size for R Type Thermocouple shall be 24 AWG		
9	Response time for Temperature Elements shall be <20sec.		
10	For Thermocouple with Barstock Thermowell, Wherever Design Temperature is More that 573 DegC. Barstock Thermowell Material shall be SS316H		
11	150mm SS304 Nipple union Nipple shall be provided with ½" Sch 80 pipe with ½" NPT(M) connection size for all Barstock Threaded and Tunsten carbide Thermowells.		
12	Head of Temperature Elements shall be Die Cat Aluminium or better.		
13	Sheath Material for R Type Thrmocouple shall be Inconel 600		
14	K Type Thermocouple, R Type Thermocouple and RTD shall be Mgo Mineral Insulated (Purity 99.4%)		
15	For Steam and Water related mediums Thermowell shall be made from Solid Barstock.		
16	For Coal+Air Mixture Services, Solid Sintered Tungsten Carbide Thermowell shall be Offered.		
17	For Barstock Thermowell, Extension Length shall be Minimum 30mm above the Insulation on pipe and Minimum 30 mm when there is no insulation on pipe.		
18	For Material Code PR0190000368, K Type Thermocouple shall be with 25Mtr Flexible MI Extension cable along with Mounting plate for Head.		
19	For R Type Thermocouple, Inconel 600 Thermowell with additional overprotection by Tungsten carbide. Inconel 600 tube shall be fabricated from 3/4" Sch 80 seamless pipe with welded Barstock cap at the end (of 100 mm min. length from tip). This construction would ensure thermowell should not break due to any shock.		
20	For flanged connections; Studs, nuts and gaskets of suitable material with Cadmium plated shall be provided. Flanges shall be as per ANSI-B 16.5.		
21	Mandatory Spares shall be sent in pre-decided lots in secure boxes distinctly marked in Red colour with boldly written "S" mark on each face of the secure boxes.		
22	Pl. confirm that There is no deviation w.r.t Purchase Spcifications.		
23	At later stage if it is found that vendor offer is not in line with tender specification then vendor to supply material in line with tender specification without any price impact to BHEL.		
24	Mandatory spares list to be submitted as per specification.		

(Company seal and Signature)

Maharashtra State Power Generation Company Limited			
Civil Construction Circle, Parli - Vaijnath			
Proforma of Vendor Approval			
Sr. No.	Information/ Particulars required	Details furnished along with documents thereof	Remarks if any
1	Name of the Project	1 X 660MW Bhusawal Thermal Power Plant	
2	Name of agency on whom order for the main work is placed	BHEL	
3	Approval for (Name of construction material)		
4	Name of the vendors specified in contract document for this material		
5	Vendor Name		
6	Reasons for asking new vendor		
7	Details of supporting documents in lieu of above reasons		
8	Specific requirement of material in terms of dia, size, quantity etc.		
9	When the material is required & for which structure		
10	Whether vendor is Partnership/ Pvt./Public Ltd. Company		
11	Particular of registration with Government		
	i) GST registration No.		
	ii) Sale Tax/ registration No.		
	iii) Central Excise registration No.		
	iv) Pan No.		
12	Address of vendor's factory		
13	Contact No. of vendor's representative for additional information		
14	Facilities of factory		
	i) Technology of production		
	ii) Type of machineries in possession with quantity and make		
	iii) Testing facilities		
	iv) Manpower deployed		
	v) Monthly production		
	vi) Electrical Power Capacity Installed		
15	Financial standing as per bank Certificate		
16	Average annual turnover for last three years as per CA's Certificate		
17	Name of Companies where the vendor is registered		
18	Details of orders completed last 3 years (Quantity & amount)		

19	Details of orders in hand (Quantity & amount)		
20	Maximum value & quantity of work executed during last 3 years		
21	Name of the reputed, well known clients to whom the vendor has supplied the material		
22	End users Performance Certificate (Name & documents)		
23	Any additional information		
24	Recommendation		

	Annex B						
A)	Purchase orders						
	Order No	Placed on	Project name	Project capacity	Item serial number in PO	Dated	Year of commissioning of plant/ System
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
B)	Performance certificate	Issued by	Authority signed by	Date of comissioning			
1							
2							
C	Financial statements						
	FY 19-20						
	FY 18-19						
	FY 17-18						