
 <b>BHEL</b> Tenders		Government eProcurement System	
		Tender Details	
		Date : 26-Apr-2022 03:53 PM	
		 Print	
<b>Basic Details</b>			
<b>Organisation Chain</b>	Bharat Heavy Electricals Limited  BAP - Ranipet  Purchase		
<b>Tender Reference Number</b>	7720096E		
<b>Tender ID</b>	2022_BHEL_11504_1		
<b>Tender Type</b>	Open Tender	<b>Form of contract</b>	Supply
<b>Tender Category</b>	Goods	<b>No. of Covers</b>	2
<b>General Technical Evaluation Allowed</b>	No	<b>ItemWise Technical Evaluation Allowed</b>	No
<b>Payment Mode</b>	Not Applicable	<b>Is Multi Currency Allowed For BOQ</b>	No
<b>Is Multi Currency Allowed For Fee</b>	No	<b>Allow Two Stage Bidding</b>	No
<b>Cover Details, No. Of Covers - 2</b>			
<b>Cover No</b>	<b>Cover</b>	<b>Document Type</b>	<b>Description</b>
1	Fee/PreQual/Technical	.pdf	Techno-Commercial offer along with PQR documents
2	Finance	.xls	Price Bid
<b>Tender Fee Details, [Total Fee in ₹ * - 0.00]</b>		<b>EMD Fee Details</b>	
<b>Tender Fee in ₹</b>	0.00	<b>EMD Amount in ₹</b>	0.00
<b>Fee Payable To</b>	Nil	<b>EMD through BG/ST or EMD Exemption Allowed</b>	No
<b>Tender Fee Exemption Allowed</b>	No	<b>EMD Fee Type</b>	fixed
<b>Fee Payable At</b>	Nil	<b>EMD Percentage</b>	NA
		<b>EMD Payable To</b>	Nil
		<b>EMD Payable At</b>	Nil
<b>Work /Item(s)</b>			
<b>Title</b>	GRP PIPES and FITTINGS		
<b>Work Description</b>	DESIGN, MANUFACTURE, SUPPLY, ERECTION AND COMMISSIONING OF GRP PIPES and FITTINGS ALONG WITH REQUIRED ACCESSORIES AS PER TECH. SPEC. NO. ROS9084, REV00 FOR TANGEDCO - UDANGUDI STPP 2 X 660 MW PROJECT		
<b>Pre Qualification Details</b>	as per Tender Documents		
<b>Independent External Monitor/Remarks</b>	NA		
<b>Tender Value in ₹</b>	NA	<b>Product Category</b>	Miscellaneous Goods
<b>Contract Type</b>	Tender	<b>Sub category</b>	NA
<b>Location</b>	UDANGUDI	<b>Bid Validity(Days)</b>	120
<b>Pre Bid Meeting Address</b>	NA	<b>Period Of Work (Days)</b>	180
<b>Should Allow NDA Tender</b>	No	<b>Pincode</b>	628203
		<b>Pre Bid Meeting Date</b>	NA
		<b>Pre Bid Meeting Place</b>	NA
		<b>Bid Opening Place</b>	RANIPET
		<b>Allow Preferential Bidder</b>	No
<b>Critical Dates</b>			
<b>Publish Date</b>	26-Apr-2022 03:45 PM	<b>Bid Opening Date</b>	17-May-2022 05:00 PM

<b>Document Download / Sale Start Date</b>	26-Apr-2022 03:50 PM	<b>Document Download / Sale End Date</b>	17-May-2022 11:00 AM
<b>Clarification Start Date</b>	26-Apr-2022 04:00 PM	<b>Clarification End Date</b>	16-May-2022 04:00 PM
<b>Bid Submission Start Date</b>	26-Apr-2022 04:00 PM	<b>Bid Submission End Date</b>	17-May-2022 11:00 AM

### **Tender Documents**

<b>NIT Document</b>	<b>S.No</b>	<b>Document Name</b>	<b>Description</b>	<b>Document Size (in KB)</b>
	1	Tendernotice_1.pdf	GRP PIPES and FITTINGS	594.12

<b>Work Item Documents</b>	<b>S.No</b>	<b>Document Type</b>	<b>Document Name</b>	<b>Description</b>	<b>Document Size (in KB)</b>
	1	Tender Documents	CommercialDocument.pdf	Commercial Document	7107.13
	2	Tender Documents	PQR.pdf	Pre Qualification Requirement	61.26
	3	Tender Documents	TechSpec.pdf	Technical Specifications	8140.84
	4	Tender Documents	QualityRequirement.pdf	Quality Requirement	3134.00
	5	BOQ	BOQ_12138.xls	Price Bid Format	255.50

### **Tender Inviting Authority**

<b>Name</b>	SACHIN SAINI
<b>Address</b>	Dy Manager Purchase BHEL BAP Ranipet 04172283132

**OPEN TENDER ENQUIRY CHECKLIST**  
**DESIGN, MANUFACTURE, SUPPLY, ERECTION AND COMMISSIONING OF GRP  
PIPES & FITTINGS ALONG WITH REQUIRED ACCESSORIES AS PER TECH.  
SPEC. NO. ROS:9084, REV:00 FOR TANGEDCO - UDANGUDI STPP 2 X 660 MW  
PROJECT**

**Enquiry No. 7720096E Dated 26-April-2022**

Sl. No.	Document Name	<b>Vendor Confirmation</b> (Filled and Signed copy to be submitted along with Techno Commercial Offer)
01	<b>Annexure A</b> COVERING LETTER	Submitted <input type="checkbox"/> Not Submitted <input type="checkbox"/>
02	<b>Annexure B</b> GENERAL TERMS & CONDITIONS (FOR GUIDANCE TO THE SUPPLIERS)	Submitted <input type="checkbox"/> Not Submitted <input type="checkbox"/>
03	<b>Annexure C</b> COMMERCIAL TERMS AND CONDITIONS - INDIGENOUS	Submitted <input type="checkbox"/> Not Submitted <input type="checkbox"/>
04	<b>Annexure D</b> Confirmation to CEBG & PBG format	Submitted <input type="checkbox"/> Not Submitted <input type="checkbox"/>
05	<b>Annexure E</b> SPECIFICATION DEVIATION DISPOSITION REPORT	Submitted <input type="checkbox"/> Not Submitted <input type="checkbox"/>
06	<b>Annexure F</b> UN PRICED /PRICE OFFER FORMAT	Submitted <input type="checkbox"/> Not Submitted <input type="checkbox"/>
07	<b>Annexure G</b> Online SRF (optional)	Submitted <input type="checkbox"/> Not Submitted <input type="checkbox"/>
08	<b>Annexure H</b> Make In India declaration Format	Submitted <input type="checkbox"/> Not Submitted <input type="checkbox"/>
09	<b>Annexure I</b> PAYMENT MECHANISM	Submitted <input type="checkbox"/> Not Submitted <input type="checkbox"/>
10	<b>Annexure J</b> INTEGRITY PACT	Submitted <input type="checkbox"/> Not Submitted <input type="checkbox"/>
11	<b>Annexure K</b> PQR – FINANCIAL SOUNDNESS	Submitted <input type="checkbox"/> Not Submitted <input type="checkbox"/>
12	<b>Annexure L</b> Land Sharing countries GFR 2017 Rules amendment declaration form	Submitted <input type="checkbox"/> Not Submitted <input type="checkbox"/>
13	<b>Annexure M</b> Supply Bill of Quantity	Submitted <input type="checkbox"/> Not Submitted <input type="checkbox"/>
14	<b>Technical PRE-QUALIFICATION REQUIREMENT – REF:- RWT11134 &amp; RWT11135 Rev 00 dt 08.03.2022 (3 pages)</b>	Submitted <input type="checkbox"/> Not Submitted <input type="checkbox"/>
15	<b>TECHNICAL SPECIFICATION NO. SPEC. NO. ROS:9084, REV:00 (Total No. of Pages – 61)</b>  <b>DESIGN, MANUFACTURE, SUPPLY, ERECTION AND COMMISSIONING OF GRP PIPES &amp; FITTINGS ALONG WITH REQUIRED ACCESSORIES</b>	Submitted <input type="checkbox"/> Not Submitted <input type="checkbox"/>
16	<b>Quality evaluation requirements and QAP / QP / MQP Customer Sample Format / ANNEXURE – Q, INSPECTION CHECK LIST</b>	Submitted <input type="checkbox"/> Not Submitted <input type="checkbox"/>



# Bharat Heavy Electricals Limited

Boiler Auxiliaries Plant  
RANIPET – 632 406, Tamil Nadu, India  
PURCHASE – WATER SYSTEM

## ANNEXURE - A

### DESIGN, MANUFACTURE, SUPPLY, ERECTION AND COMMISSIONING OF GRP PIPES & FITTINGS ALONG WITH REQUIRED ACCESSORIES AS PER TECH. SPEC. NO. ROS:9084, REV:00 FOR TANGEDCO - UDANGUDI STPP 2 X 660 MW PROJECT

**Enquiry No. 7720096E Dated 26-April-2022**

To All Bidders

Dear Sir,

Please submit your MOST COMPETITIVE quotation on FIRM PRICE basis, subject to our terms & conditions in the various annexures attached herein for the below listed materials so as to uploaded on or before the due date and time.

[Requirement with Delivery date- for MAIN SUPPLY \(Order will be released by BHEL BAP Ranipet\):](#)

Enquiry Sl. No.	Description & material Code	Unit	Qty.	Delivery Date
001	RWT111340001 to RWT111340103 DESIGN, MANUFACTURE AND SUPPLY OF GRP PIPES & FITTINGS ALONG WITH REQUIRED ACCESSORIES AS PER TECH. SPEC. NO. ROS:9084, REV:00 (One Set of 102 items as per Annexure M Supply Bill of Quantity)	ST	1.00	Within 06 Months from the date of CAT-I Approval of all Documents / Manufacturing clearance, whichever is Later.

[Requirement with Delivery date - for SERVICES \(Order will be released by BHEL PSSR Chennai\):](#)

Enquiry Sl. No.	Description & material Code	Unit	Qty.	Delivery Date
002	RWT111350001 ERECTION & COMMISSIONING OF GRP PIPES & FITTINGS AS PER TECH SPEC NO. ROS:9084, REV:00.	ST	1.00	Complete within 06 months from Site Readiness which will be informed by BHEL.

***Both Items will be compared as a single PACKAGE Basis & Order will be placed on a Single vendor who is the lowest (L1) on PACKAGE basis.***

**BIDDERS SHALL CAREFULLY READ THE FOLLOWING ANNEXURES / NOTES AND SHALL QUOTE THEIR BEST COMPETITIVE PRICE.**

**PLEASE REFER TO,**

- 01 Annexure A COVERING LETTER***
- 02 Annexure B GENERAL TERMS & CONDITIONS (FOR GUIDANCE TO THE SUPPLIERS)***
- 03 Annexure C COMMERCIAL TERMS AND CONDITIONS - INDIGENOUS***
- 04 Annexure D Confirmation to CEBG & PBG format***
- 05 Annexure E SPECIFICATION DEVIATION DISPOSITION REPORT***
- 06 Annexure F UN PRICED /PRICE OFFER FORMAT***
- 07 Annexure G Online SRF***



# Bharat Heavy Electricals Limited

Boiler Auxiliaries Plant  
RANIPET – 632 406, Tamil Nadu, India  
PURCHASE – WATER SYSTEM

- 08 Annexure H Make In India declaration Format*
- 09 Annexure I PAYMENT MECHANISM*
- 10 Annexure J INTEGRITY PACT*
- 11 Annexure K PQR – FINANCIAL SOUNDNESS*
- 12 Annexure L Land Sharing countries GFR 2017 Rules amendment declaration form*
- 13 Annexure M Supply Bill of Quantity*

## **TECHNICAL ENCLOSURES AS PER FOLLOWINGS:**

*14 Technical PRE-QUALIFICATION REQUIREMENT – REF:- RWT11134 & RWT11135 Rev 00 dt 08.03.2022 (3 pages)*

*15 TECHNICAL SPECIFICATION NO. ROS:9084, REV:00 (Total No. of Pages – 61) DESIGN, MANUFACTURE, SUPPLY, ERECTION AND COMMISSIONING OF GRP PIPES & FITTINGS ALONG WITH REQUIRED ACCESSORIES*

*16 Quality evaluation requirements and QAP / QP / MQP Customer Sample Format / ANNEXURE – Q , INSP CHK 001 REV 00*

## **Important Instruction to Bidders:**

- 1. All the items will be procured from a single vendor only & all the Items will be compared on PACKAGE Basis & Order will be placed on a Single vendor who is the lowest (L1) on package basis. Hence please quote for all the items including services. Incomplete offers will be rejected.**
- 2. Vendors shall go through the “Pre-Qualification Requirement” & furnish Qualification Data sheet duly filled in along with Techno-Commercial offer. Offers received without this requirement will be summarily rejected & such offers will not be processed further.**
- 3. Price bid opening will be considered subject to techno commercial confirmation and acceptance by BHEL, Ranipet & also approval from our customer: M/s. TANGEDCO - UDANGUDI STPP 2 X 660 MW PROJECT**
- 4. Price Bid opening will be done through Reverse Auction method (English method).**

**Name of the Project - TANGEDCO - UDANGUDI STPP 2 X 660 MW PROJECT**

**Site Location - 2X660 MW UDANGUDI STPP STAGE – I TAMILNADU GENERATION & DISTRIBUTION CORPORATION, UDANGUDI, THOOTHUKUDI (DT) TAMILNADU - 628203.**



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

**A] Submission of Offer**

***a) Invitation for bid***

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

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

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

Bids shall be submitted through BHEL's e-procurement portal developed by NIC (<https://eprocurebhel.co.in/>) only.

In case of any difficulty faced while registering on ***BHEL's e-Procurement portal*** developed by NIC, queries may be addressed to 0120-4001002, 0120-4001005 and 0120-6277787; email: [support-eproc@nic.in](mailto:support-eproc@nic.in) These details are also available on 'Contact Us' page of the portal.

To participate in a tender, you need to login to the portal. You must be an approved registered user. If you are not a registered user, you can register yourself by clicking upon the "Register" link. You need to have a valid login id and password to login to the portal. Enter your login id, password and click on Login button after Login, you need to select your digital signing and encryption certificates certificate.

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

- a) ***Complete technical Offer*** with details, catalogues, as applicable.
- b) ***Un-priced bid*** (i.e. Bid without the Price) as per given format, if any.
- c) ***Filled-in BHEL's Standard Terms & Conditions*** as per Annexure enclosed with the Tender Document,
- d) ***Deviation summary*** submitted in two parts – giving the summary of technical deviations separately and the commercial deviations separately, if any and
- e) ***Supporting documents*** to substantiate equivalent material specifications / sections, where quoted for.
- f) Where asked for, ***Client list*** with their full address including detail of contact person with phone no., fax no. & e-mail ID (if any) to whom the same / similar items are supplied in the past two years. The date of supply may also be indicated, against each client.
- g) Suppliers can also upload their credentials by way of submission of Performance certificate/s issued by their customer/s detailing the quantity supplied and specification along with the un-priced PO copies and proof of supply along with the offer.

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

- h) ***Bidders who are not already registered with BHEL Ranipet*** are requested to submit the Supplier Registration Form (SRF) online (<http://supplier.bhel.in/>) for evaluating and registering as an approved vendor. The Supplier Development Cell (SDC) of BHEL, Ranipet would process the SRF for evaluation /



registering the Supplier. Don't send hardcopies of SRF to BHEL-Ranipet, **only** online submission is accepted. This registration process is a separate / parallel activity, not a mandatory one and do not mix-up with submission offers.

**Note**

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

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

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

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

- (iv) The un-priced bid shall be used to indicate relevant commercial terms such as scope of freight and insurance, applicability of duties and taxes etc. All Commercial terms are to be indicated clearly in the offer.
- (v) No changes shall be entertained once the bid is opened unless otherwise specifically agreed to in writing by BHEL.
- (vi) Money values other than for those items appearing in the un-priced bid template shall not be indicated anywhere in the un-priced bid.
- (vii) Time required for inspection (at Supplier's works), should be clearly given in terms of numbers of working days.
- (viii) **Offers sent by FAX / E-mail:** would not be entertained.
- (ix) 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.
- (x) Registration process for items required by BHEL is always open at <https://supplier.bhel.in>. Prospective suppliers (including MSEs & owned by SCs/STs) may visit this site and apply for registration in the respective Unit.

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

**Note**

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



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

## **B] Opening of Offers**

- a) **Tenders can be submitted up to time and date as mentioned in the enquiry document or subsequent corrigendum (if any). Part I will be opened on the scheduled day and time. Part II opening will be informed to techno-commercially qualified vendors.**
- b) Price Bid opening will be done through e-mode / Reverse Auction method (English method) as mentioned in the enquiry commercial terms. All tenderers would have to specifically give their acceptance for this in their bid/s.

### **Note**

- (i) Bids including all enclosures and supporting documents like catalogues, pamphlets, etc., shall be provided in ENGLISH language only.
- (ii) In exceptional circumstances, at its option, BHEL may consider extending the due date/s for the tender openings for reasons such as (but not limited to) paucity of offers etc. However, sufficient notice would be given by BHEL for such extension.
- (iii) Deviations shall be summarized and provided in a "Deviation Statement", listing the points and the deviation against each point.



(iv) BHEL reserves the right to increase or decrease the tendered quantity and to order on more than one vendor at the lowest acceptable price to BHEL. In ordering on more than one source, the ratio of quantity split will be as specified in the tender terms.

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

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

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

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

#### **C] Evaluation of Offers**

##### **Note: The evaluation currency for this tender shall be INR.**

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

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

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

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

f) Deleted.



- g) BHEL reserves the right to reject without assigning any reasons / load any offer with factors other than already specified for such offers having deviations to BHEL Specifications, Standard Terms & Conditions at its discretion. The decision of BHEL in this regard shall be final.
- h) BHEL reserves the right to reject an offer due to unsatisfactory performance during tender finalisation / execution of a contract at any of BHEL projects / units in the past or if unsatisfactory performance report is received from the party/s referenced by the supplier at any time during tender finalisation.
- i) BHEL reserves the right to operate Purchase / Price preference to Government of India Undertakings, which shall be given as per the guidelines of Government of India given from time to time and / or relax the Terms and Conditions of the tender.
- j) For the purpose of comparing prices, tender prices shall be converted to Indian rupees and the conversion shall be made by using the TT Selling rate of State Bank of India (SBI) prevailing on the date of opening of Techno-Commercial / Unpriced bids. If the relevant day happens to be a bank holiday, then the forex rate as on the previous bank (SBI) working day shall be taken. This exchange rate will be followed till placement of order. Tenderers may please note that even if an impact price is taken as in (d) for purpose of price evaluation and arriving at the rank; the exchange rate will be taken as explained above.
- k) Unless otherwise specified, evaluation will be on individual line item basis only and ordering will be on respective L1 vendors.
- l) BHEL reserves the right to conduct negotiations on the “Price” and “Other Commercial Terms and Conditions” with the lowest ranked offered at any time after the bid opening but before the release of the Purchase Order and If so required by BHEL, Supplier may have to share their costing sheet with BHEL.
- m) Bidders are required to confirm in writing in their techno-commercial document that other than themselves (the bidder) none of its group companies, concerns or affiliates etc., are participating in the tender either directly or indirectly or through any other agency under the same proprietor / common partner(s)/ common Directors. If during the evaluation of the bids it is found that the bidder has submitted the offer in violation of this condition, then all the offers received from the group companies would stand rejected. If such relationship is found at a later date where the Purchase Order has been issued, then BHEL would cancel the Purchase Order and initiate suitable action/s under the contract/s including but not limited to invoking the Risk Purchase clause of the order and other applicable legal provisions / guidelines of BHEL including guidelines on suspension of business dealings. (Please see clause L sub-clause c).
- n) For this procurement, Public Procurement (Preference to Make in India), Order 2017 dated 15.06.2017, 28.05.2018, 29.05.2019, 04.06.2020 & 18.09.2020 and subsequent Orders issued by the respective Nodal Ministry shall be applicable even if issued after issue of this NIT but before finalization of contract/ PO/ WO against this NIT.

In the event of any Nodal Ministry prescribing higher or lower percentage of purchase preference and/ or local content in respect of this procurement, same shall be applicable.

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 04.06.2020 issued by DPIIT and subsequent amendments. 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 Part-II bids against this NIT.

**Preference to Make in India** including counter offering will be as per the Public Procurement (Preference to Make in India), Order 2017 available in the following links <https://dipp.gov.in/public-procurements>

[http://dipp.nic.in/sites/default/files/publicProcurement\\_MakeinIndia\\_15June2017.pdf](http://dipp.nic.in/sites/default/files/publicProcurement_MakeinIndia_15June2017.pdf)

[http://dipp.nic.in/sites/default/files/Revised-PPP-MII-Order-2017\\_28052018.pdf](http://dipp.nic.in/sites/default/files/Revised-PPP-MII-Order-2017_28052018.pdf)

[https://dipp.gov.in/sites/default/files/PPP-MII%20Order%20dt%2029th%20May%2019\\_0.pdf](https://dipp.gov.in/sites/default/files/PPP-MII%20Order%20dt%2029th%20May%2019_0.pdf)

<https://dipp.gov.in/sites/default/files/PPP%20MII%20Order%20dated%204th%20June%202020.pdf>

<https://dpiit.gov.in/sites/default/files/PPP%20MII%20Order%20dated%2016%2009%202020.pdf>

#### **D] Execution of the Order**

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

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

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

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

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

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

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



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

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

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

**k) Terms of payment: Refer commercial terms of enquiry. If not specified in commercial terms, then following will be followed.**

k.1) For Indigenous Suppliers: Unless otherwise agreed to by BHEL, the standard payment terms of BHEL shall be: For non-MSE suppliers 100% payment made directly through EFT within 90 days from the date of receipt and acceptance of materials at BHEL Stores, Ranipet or 90 days from the date of acknowledgement of receipt of materials at destination specified. If any supplier asks for payment terms other than the above specified, then suitable loading on cost will be considered. **Loading of any deviation in the payment terms**

**w.r.t tender terms will be "Base rate of State Bank of India (SBI) (as applicable on the date of bid opening: Techno-commercial bid opening in case of two part bids) + 6%, will be considered for loading for the periods of relaxation sought by bidders.**

k.2) For MSE vendors (under Micro & Small category alone) 100% payment will be made within 45 days from the date of receipt and acceptance of materials at BHEL Stores, Ranipet or 45 days from the date of acknowledgement of receipt of materials at destination specified. **Vendors to get themselves registered in Udyam registration Portal.** The existing Micro & Small vendors are to submit copy of CA certificate along with Udyog Adhar Registration Certificate.

**l) NOTE:**

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

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

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



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

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

In case after the bid opening it is seen that non 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 may counter offer the L1 prices for full package to eligible MSE vendor who are within the +15% band of L1.

Other concessions for MSEs / Reserved sectors (Also for women owned MSEs and MSEs owned by SC/STs)

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

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

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

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



### **E] Liquidated Damages Clause:**

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

### **F) Miscellaneous**

#### **i) Role of Principals and Agents:**

BHEL will deal directly with indigenous manufacturers only.

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

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

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

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

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

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

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

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



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

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

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

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

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

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

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

- a) **The Supplier shall furnish an authenticated copy of the Agency Agreement with his agent detailing the precise relationship between them and their mutual interest in the business along with techno commercial bid.**
- b) The Supplier shall furnish original authorization letter for the Indian Agent. The letter shall contain name, contact person, complete postal address including phone, fax and e-mail ID. It shall also spell out the type of services to be rendered by Indian Agent.
- c) Indian Agent & Agency commission: An Indian Agent can represent only one Foreign Manufacturer against a particular Tender. The CFR price quoted by the foreign bidder shall include the agency commission. However, the agency commission component payable to their Indian Agents shall be shown separately in the Offer, either as a lump-sum or as a percentage of the quoted price. This will be paid by BHEL in Indian Rupees, on satisfactory receipt & acceptance of the materials. For calculation of Rupee equivalent of Agency Commission, exchange rate as prevailing on the date of Purchase Order will be taken and
- d) For all discussions, technical clarification and negotiations etc. only the principal would be authorized for interaction with BHEL. The Agent shall not be a party to the discussions / negotiations and would not be normally allowed to participate.

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

- a) Unconfirmed irrevocable Letter of Credit at Sight only will be opened by BHEL. Confirmation of L/C is not preferred by BHEL. Also L.C will be opened in Lots in line with the staggered delivery.
- b) All Bank charges out side India are to the Supplier's account and within India to BHEL's account.



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

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

a) Signed Commercial invoice in quadruplicate, for a value not exceeding the draft amount, quoting the import Licence No and certifying goods evidencing shipment of the merchandise are as per Applicant's Purchase Order. The amount of invoice after deducting Indian Agent's commission, if any, should not exceed the Credit amount. (The Indian agent's commission, if any, is payable in India in Indian rupees only.)

b) Certificate of Country of Origin, from the country of manufacture, issued by the Chamber of Commerce.

c) One set of Original and two sets of Non-negotiable copies of 'signed', 'unmarked', 'clean on board' Ocean Bill of Lading, showing Shipper as "Government of India" Account M/s. Bharat Heavy Electrical Ltd, Unit: BHEL, Ranipet as consignee (The opening bank should not be notified as consignee), marked freight payable / prepaid at destination.

d) Packing list in 4 copies in English, indicating Size Wise Number of bundles / pieces shipped and weight.

e) Certified copy of the fax / e-mail sent by the beneficiary to the applicant giving the following particulars of shipment, as the insurance is to be arranged by the Applicant in India: (a) Purchase Order Number & date; (b) Bill of Lading Number & date (c) Name of vessel; (d) Port of Loading; (e) Number of bundles / pieces and weight; (f) Invoice Number, date and value (g) Purchase Order item number's despatched. The cable / fax is to be sent within 2 working days of shipment.

f) Beneficiary's certificate showing the relevant airmail / courier reference no. and date that the following clauses have been complied with:

1] Beneficiary to forward by Registered Airmail / Courier one complete set of original documents and one set of non-negotiable documents within 3 working days of obtaining shipping documents to Regional Manager (ROD), Bharat Heavy Electricals Ltd, 6th Floor, EVR Periyar Bldg. No 690 (Old 474), Anna Salai, Nandanam, Chennai-600035. India. (Phone: +91-24330931, 24330253; e-mail: pbpwar@bhel.in)

2] Beneficiary to courier at his cost 3 copies of complete set of non-negotiable documents to the Officer who released the Purchase Order.

3] Declaration by the Supplier certifying that the contents in each case are not less than those entered in the invoices / packing list and that the invoicing for the supplies effected is strictly in accordance with agreed rates as stipulated in the Purchase Order.

4] Declaration to the effect that all other documents as per purchase order has been couriered to the Purchase order releasing authority

5) The carrying steamer should be seaworthy, less than 25 years of age and approved by Lloyds / Classification Societies / General Insurance Corporation of India from time to time and

6) Copy of Dispatch Clearance / Instruction issued by BHEL.

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

a) Manufacturer's Original Internal Inspection / Test certificate in triplicate.



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

**y) Conditions for transportation:**

- a) All shipping documents shall show the Purchase Order Number & Date, Import Licence Number & Date, and Letter of Credit Number & Date. b) Transshipment is to be avoided.
- c) Loading on deck is not permitted. The transport document must not contain a provision that goods may be carried on deck.
- d) A transport document which is produced or appearing to have been produced by reprographic, automated or computerized systems or as carbon copy will be accepted as an original document provided that it is marked as original and is ink-signed.
- e) The transport document must contain all the conditions of carriage on the original document.
- f) The transport document must not indicate the place of destination as being different from the port of discharge.
- g) The transport document must not contain the indication 'intended' or similar qualification in relation to the vessel or other means of transport or port of loading or port of discharge.
- h) The transport document must be issued by the carrier or his agent and not by any freight forwarder.
- i) Transport documents bearing reference by stamp or otherwise, to costs additional to the freight charges are not acceptable.
- j) The Bills of Exchange must be dated and presentation of documents for negotiation must not be later than 15 days after the date of shipment and in any case not later than the expiry date of the Credit.
- l) Indian suppliers shall dispatch the materials on freight prepaid and on door-delivery basis (FOR Destination – Destination: BHEL Stores) and
- m) In the event there is a delay by the Supplier in negotiating / submitting the document, any demurrage / wharfage arising out of the same shall be to the account of the Supplier and shall be deducted from the final payment. Also, in such cases, the Supplier shall authorize the Steamer / Shipping agent / transporter to freely release the consignment to BHEL by providing a “Surrender Bill of Lading”. Over-seas Suppliers have to give a No-Objection Certificate to BHEL, authorizing BHEL to get the Delivery Order from the Steamer Agent without producing the Original Bill of Lading. This is required to ensure avoidance of incidence of demurrage at Chennai Sea-port that may arise in case of delayed presentation of documents by the Seller.



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

1. Decision to go for RA would be taken before floating of the tender and will be specified in the enquiry commercial terms.

In case it is decided to go for RA, following may be referred to:-

“BHEL shall be resorting to Reverse Auction (RA) (Guidelines as available on [www.bhel.com](http://www.bhel.com)) 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.”

Bidders are advised to read the RA guidelines published in BHEL portal [www.bhel.com](http://www.bhel.com).

<https://www.bhel.com/sites/default/files/Guidelines%20for%20Reverse%20Auction%20-%202021%20-%20Abridged.pdf>

### **H] Force Majeure**

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

### **I] Cancellation of Order:**

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



### **J] Contract Execution Bank Guarantee:**

To demonstrate the fidelity of the successful bidder, in executing the Contract, on receipt of the Letter of Intent / Purchase Order, the Supplier shall arrange to provide a contract execution bank guarantee (CEBG). The format of the CEBG is a part of this enquiry. The format may be downloaded and necessary stamping may be obtained from the Banker towards submission of the CEBG. The indigenous suppliers have to provide the CEBG from any one of the Nationalized Banks, listed in the annexure to these terms. Overseas suppliers can submit the CEBG from any of the reputed International / National Bankers. However the CEBG is to be confirmed by any of the Bankers listed by us. In the event of failure by the Supplier to execute the contract either fully or partially, BHEL would encash the entire CEBG. The CEBG shall be valid for the period covering the agreed delivery date of the order with a further claim period of 3 months on the last specified delivery date. In the event of the failure of delivery BHEL would proceed with encashing the CEBG without reference to the Supplier. In the event of BHEL granting extension of the delivery dates, then the CEBG validity shall also be got extended by the Supplier to the extent of the extended delivery times together with the claim period as specified elsewhere. **The CEBG shall be submitted for a value of 2% of the Purchase order within 30 days from issue of PO. CEBG will be returned after submission of 10% PBG/BG.**

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

### **Performance Bank Guarantee**

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

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

### **K] Post-order submission of documents for approval**

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

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



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

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

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

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

#### **L] Others**

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

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

#### **Suspension of Business dealings with Suppliers:**

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

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

#### **ii) Treatment of Banned / Under-performing Vendors:**

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

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

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

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

#### **d) Fraud Prevention Policy:**

The Bidder along with its associate/ collaborators/ sub-contractors/ sub-vendors/ consultants/ service providers shall strictly adhere to BHEL Fraud Prevention Policy displayed on BHEL website



<http://www.bhel.com> and shall immediately bring to the notice of BHEL Management about any fraud or suspected fraud as soon as it comes to their notice.

e) **Applicability of Integrity Pact (IP):-**

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

Sl.No	IEM	Email
1.	Shri Arun Chandra Verma, IPS (Retd.)	acverma1@gmail.com
2.	Shri Virendra Bahadur Singh, IPS (Retd.)	vbsinghips@gmail.com

- II. The IP as enclosed with the tender is to be submitted (duly signed by authorized signatory) along with techno-commercial bid (Part-I, in case of two/ three part bid). Only those bidders who have entered into such an IP with BHEL would be competent to participate in the bidding. In other words, entering into this Pact would be a preliminary qualification.
- III. Please refer Section-8 of IP for Role and Responsibilities of IEMs. In case of any complaint arising out of the tendering process, the matter may be referred to any of the above IEM(s). All correspondence with the IEMs 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 provided below:*

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

Name: Sachin Saini Dy Manager / Purchase Department Address: Admin Building, First Floor, BHEL BAP Ranipet Tamil Nadu - 432406 Phone: 04172 283132 / 9442517457 Email: <a href="mailto:sachin.saini@bhel.in">sachin.saini@bhel.in</a>	Name: BP Choudhary Sr. Manager / Purchase Department Address: Admin Building, First Floor, BHEL BAP Ranipet Tamil Nadu - 432406 Phone: 04172 284474 / 9425604768 Email: <a href="mailto:bp.choudhary@bhel.in">bp.choudhary@bhel.in</a>
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Integrity Pact are applicable for all the BHEL enquiries whose estimated value is equal to or more than Rupees 02 Crores.

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

- f) If any Supplier attempts to bribe, or pay commission, gift or any advantage or bring in undue influence either by himself or on his behalf any one including a stranger to the tender, in addition to instituting legal



proceedings as per the extant laws prevailing, will disqualify the supplier from this tender and all future tenders of BHEL. Decision of the Purchaser would be final in this matter.

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

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

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

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

#### **M. Conditions for rejection of offers:**

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

##### **This list is not exhaustive but only indicative.**

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

- 1. If the offer fails to meet the technical requirements/specifications of the tendered item/s.*
- 2. If the offer does not meet the commercial terms & conditions, such as but not limited to delivery period specified in the tender, Delivery terms, payment terms, Liquidated damages, Risk Purchase, cancellation clause etc., including the load factors specified in the tender.*
- 3. If the bidder fails to respond to clarification sought, within a reasonable period. In case of doubts / lack of clarity on the technical and commercial offer of the bidder, BHEL will seek clarifications. Bidders are required to respond completely to such BHEL's queries within 3 working days unless otherwise agreed to in writing by BHEL for period beyond 3 days. If supplier fails to respond within 3 working days or maximum 2 working days on a reminder thereon, the offer of such bidders will be automatically dis-qualified in the tender without further recourse to informing the bidder.*
- 4. If any of the conditions listed below are applicable to the bidder, the offer is liable to be rejected:*

If any

- Debt recovery / Winding up Proceedings are initiated against the Company in Courts / Debt Recovery Tribunals (DRTs),
  - Proceedings are there against the Company in National Company Law Tribunal (NCLT) with respect to Insolvency and Bankruptcy Code (IBC) or otherwise,
  - Any proceedings are there against the Company under the "Securitization and Reconstruction of Financial Assets and Enforcement of Security Interest (SARFAESI) Act,
  - Any restructuring proceedings are underway for the Company under Corporate Debt Restructuring (CDR), Strategic Debt Restructuring (SDR) or otherwise,
  - Divestment / demerger proceedings are underway for the Company under the Companies Act.
  - If action under guidelines of suspension of business dealings (Ref AA/MM/SB/01 Rev 02 dt 22.07.2016) and its latest revisions has been initiated against the company/bidder.
- 5. Failure to sign & accept the Integrity Pact (where applicable). Bidders are hereby informed that the contents of the Integrity Pact are firm and fixed and cannot be changed.*



The above list is not exhaustive but is indicative only.

**N. Special Note:**

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

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**ANNEXURE - C**  
**BHEL : BAP : RANIPET**  
**PURCHASE – WATER SYSTEM**  
**COMMERCIAL TERMS AND CONDITIONS**  
**DESIGN, MANUFACTURE, SUPPLY, ERECTION AND COMMISSIONING OF GRP PIPES & FITTINGS ALONG WITH REQUIRED ACCESSORIES AS PER TECH. SPEC. NO. ROS:9084, REV:00 FOR TANGEDCO - UDANGUDI STPP 2 X 660 MW PROJECT**  
**Enquiry No. 7720096E Dated 26-April-2022**

Sl. No.	DESCRIPTION	BHEL (PURCHASER) REQUIREMENT	VENDOR (SELLER) CONFIRMATION
<b>I</b>	<b><u>PRE-QUALIFICATION REQUIREMENT</u></b>		
1	PRE-QUALIFICATION REQUIREMENT (TECHNICAL)	Vendor should submit the Filled QR Datasheet & Necessary supporting documents proof for meeting the QR as per Pre-Qualification Requirement (PQR) for <b>DESIGN, MANUFACTURE, SUPPLY, ERECTION AND COMMISSIONING OF GRP PIPES &amp; FITTINGS</b>  <b>1) RWT11134 &amp; RWT11135 Rev 00 dt 08.03.2022 (3 pages)</b>	
2	PRE-QUALIFICATION REQUIREMENT (FINANCIAL SOUNDNESS)	Vendor should submit the Filled QR Datasheet & Necessary supporting documents proof for meeting the QR as per Pre-Qualification Requirement (PQR) for FINANCIAL SOUNDNESS  <b>1) ANNEXURE - K</b>	
3	FILLED Qualification Requirements DATA SHEET & NECESSARY SUPPORTING DOCUMENTS PROOF SUBMISSION	BHEL reserve the right to Accept/Reject the bids if any of the above details are not submitted - Please confirm	
<b>II</b>	<b><u>Technical</u></b>		
4	SCOPE OF SUPPLY	Please confirm the Scope of Supply of " <b>DESIGN, MANUFACTURE, SUPPLY OF GRP PIPES &amp; FITTINGS ALONG WITH REQUIRED ACCESSORIES AS PER TECH. SPEC. NO. ROS:9084, REV:00 FOR TANGEDCO - UDANGUDI STPP 2 X 660 MW PROJECT</b> " as per Specification No.  <b>1. ROS:9084, REV:00 (Total No. of Pages – 61)</b>  submit the same after necessary Filling, signing & returning a copy of the same.	
5	SPECIFICATION	Please confirm Clause wise / Point wise "IN TOTO" for all specifications and submit along with offer.	
6	DATA SHEETS / DRAWINGS	Filled Data Sheets and Drawings are to be submitted along with offer. (if applicable )	
7	QUALITY ASSURANCE PLAN (QAP)	Please Confirm to submit the QAP / RQP / MQP as per the Customer Sample Format for review and approval by customer within 2 Weeks from the date of Letter of Award (LOA).  Please Refer Quality Requirements and provide your acceptance on all pages with seal & Sign.	
8	SPECIFICATION DEVIATION DISPOSITION REPORT (SDDR)	Attached SDDR to be filled & submit along with offer. (Even, If NO deviation is taken, NIL report to be submitted).	
9	ERECTION, COMMISSIONING, PG TEST & HANDING OVER	Please confirm the carrying out " <b>ERECTION AND COMMISSIONING OF GRP PIPES &amp; FITTINGS ALONG WITH REQUIRED ACCESSORIES</b> " as per Specification No.  <b>1. ROS:9084, REV:00 (Total No. of Pages – 61)</b>	
10	COMMISSIONING SPARES	Please confirm that the Supply of "COMMISSIONING SPARES" as per the Technical specification & bidder's offer and WILL BE SUPPLIED ALONG WITH MAIN SUPPLY  Commissioning spares shall be packed separately with detailed packing list (items should not be packed along with main supply items)  The commissioning spares List and the individual price should be indicated.  Any other spare(s) required during commissioning but not indicated in the list, should also be supplied at BIDDER's cost & BHEL will not entertain any claim towards supply of such spares used/supplied during commissioning.	
11	MANDATORY SPARES	Not Applicable	
12	END CUSTOMER APPROVAL	Documents submitted for Pre-Qualifications will be submitted to M/s. TANGEDCO - UDANGUDI STPP 2 X 660 MW PROJECT for evaluation. Bidders will be required to submit any further documents/information/clarifications sought by M/s. TANGEDCO. ONLY END CUSTOMER APPROVED BIDDERS WILL BE QUALIFIED FOR PRICE BID OPENING.	
<b>III</b>	<b><u>Commercial Terms &amp; Conditions</u></b>		
13	PRICE	Please confirm 'Firm Price' till completion of order. Price Variation not applicable.	

**ANNEXURE - C**  
**BHEL : BAP : RANIPET**  
**PURCHASE – WATER SYSTEM**  
**COMMERCIAL TERMS AND CONDITIONS**  
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**Enquiry No. 7720096E Dated 26-April-2022**

Sl. No.	DESCRIPTION	BHEL (PURCHASER) REQUIREMENT	VENDOR (SELLER) CONFIRMATION
14	UNPRICED BID (PART-1)	Please confirm submission of 'Unpriced bid' in the price bid format attached duly signed. SCANNED COPY of FILLED & SIGNED COPY OF 'Price Bid' format attached by filling all informations by writing 'Quoted' as the case may be in the 'Rate' and 'Value' columns to be submitted through E-Procurement System.	
15	PRICED BID (PART-2)	Please confirm submission of 'Priced bid' in the price bid format (BOQ) attached duly signed. SCANNED COPY of FILLED & SIGNED COPY OF 'Price Bid' format attached by filling all informations by writing the value as the case may be in the 'Rate' and 'Value' columns in a separate attachment to be submitted through E- Procurement System.	
16	DELIVERY TERMS & PRICE BASIS	Please confirm for FOR - Destination ( <b>TANGEDCO - UDANGUDI STPP 2 X 660 MW PROJECT</b> ) basis.  Unloading the Material at site is BHEL's Scope	
17	RECEIPT OF GOODS AND STORAGE	The equipment after inspection at manufacturer's works shall be transported to BHEL site and shall be received, unloaded and stored by Vendor as detailed in the supply specification.  Bidder shall store all high value items & critical items (such as instruments, UPS, battery, etc..) under lock & key, using containers only - Please Confirm	
18	CONSIGNEE ADDRESS (SUPPLY DESTINATION) FOR ENQ. SL. NO. 001 - MAIN SUPPLY and ENQ. SL. NO. 002 - E&C	Please confirm supply to the following consignee address in the event of Order.  <b>SE/PROJECTS</b> <b>2X660 MW UDANGUDI STPP STAGE - I</b> <b>TAMILNADU GENERATION &amp; DISTRIBUTION CORPORATION,</b> <b>UDANGUDI, THOOTHUKUDI (DT)</b> <b>TAMILNADU - 628203</b> <b>GSTIN : 33AADCT4784E1ZC</b>  <b>Contact Person: will be informed later</b>  <b>(On account of M/s BHEL, BAP, Ranipet - 632 406)</b>	
19	ORIGIN OF DESPATCH OF VARIOUS CONSIGNMENT	Please indicate clearly the origin of despatch of various consignments duly indicating whether interstate or intrastate based on the consignee address above. Origin of despatch should not be subjected to change during execution of contract.	City of Dispatch: _____ State of Dispatch: _____
20	PACKING & FORWARDING	Please confirm inclusion of Packing & Forwarding Charges in the Basic quoted price.  If it is extra payable by BHEL, Please clearly indicate the applicable Packing & Forwarding charges in % value.  Packing shall be in conformity with specifications and shall be such as to ensure prevention of damages, corrosion, deterioration, shortages, pilferage and loss in transit or storage.  Packing List shall be submitted as per standard format along with advance set of documents for claiming payment which shall also indicate:- a) Packing size. b) Gross weight and net weight of each package. c) Contents of the package with quantity of each item separately.	

**ANNEXURE - C**  
**BHEL : BAP : RANIPET**  
**PURCHASE – WATER SYSTEM**  
**COMMERCIAL TERMS AND CONDITIONS**  
**DESIGN, MANUFACTURE, SUPPLY, ERECTION AND COMMISSIONING OF GRP PIPES & FITTINGS ALONG WITH REQUIRED ACCESSORIES AS PER TECH. SPEC. NO. ROS:9084, REV:00 FOR TANGEDCO - UDANGUDI STPP 2 X 660 MW PROJECT**  
**Enquiry No. 7720096E Dated 26-April-2022**

Sl. No.	DESCRIPTION	BHEL (PURCHASER) REQUIREMENT	VENDOR (SELLER) CONFIRMATION
21	FREIGHT & INSURANCE	<p>Please confirm inclusion of Freight &amp; Insurance Charges towards this in the Basic quoted price.</p> <p>A) If Freight &amp; GST is extra payable by BHEL, Please clearly indicate the applicable portions of :                      01.Freight charges in % on Basic Quoted price.                      02.If GST applicable for the freight kindly indicate the same.</p> <p>B) If Insurance is extra payable by BHEL, Please clearly indicate the applicable portions of : Insurance charges in % on Basic Quoted price.</p> <p>All dispatches shall be through road carriers approved by Purchaser/ Bank, on freight pre-paid basis.</p> <p>Road Permit/E-way bill, if required, will be arranged by Supplier.</p>	
22	GOODS AND SERVICES TAX FOR SUPPLY PORTION (CGST/SGST/UTGST/IGST) (FOR ENQ. SL. NO. 001 & 003)	<p>Seller/ Contractor is required to ensure that CGST/SGST/UTGST/IGST (whichever is applicable) is quoted as per the existing tariff on the date of the offer and all benefits as per existing laws have been considered.</p> <p>It is the responsibility of the seller/contractor to issue the Tax Invoice strictly as per the format prescribed under the relevant applicable GST law(CGST Act/SGST Act/UTGST Act/IGST Act).</p> <p>Vendor to indicate the proper GSTN Registration/ HSN code in their tax invoice.</p> <p>CGST/SGST/UTGST/IGST shall be paid at actuals against Tax Invoice but restricted to the amount and percentage in the order/contract</p>	
		Please Confirm the Applicable percentage of CGST/SGST/UTGST/IGST Payable Extra by BHEL (OR) Not?	GST ____% GSTN Certificate to be submitted
23	GOODS AND SERVICES TAX (GST) FOR SERVICE PORTION (CGST/SGST/UTGST/IGST) FOR ENQ SL. NO. 002)	<p>Seller/ Contractor is required to ensure that CGST/SGST/UTGST/IGST (whichever is applicable) is quoted as per the existing tariff on the date of the offer and all benefits as per existing laws have been considered.</p> <p>It is the responsibility of the seller/contractor to issue the Tax Invoice strictly as per the format prescribed under the relevant applicable GST law(CGST Act/SGST Act/UTGST Act/IGST Act).</p> <p>Vendor to indicate the proper GSTN Registration/ HSN code in their tax invoice.</p> <p>CGST/SGST/UTGST/IGST shall be paid at actuals against Tax Invoice but restricted to the amount and percentage in the order/contract</p>	
		Please Confirm the Applicable percentage of CGST/SGST/UTGST/IGST Payable Extra by BHEL (OR) Not?	GST ____% GSTN Certificate to be submitted
24	PAYMENT TERM FOR SUPPLY (ENQ. SL. NO. 001 - MAIN SUPPLY)	<p>1. Vendor has to submit the Invoice for 100% of Basic price with applicable % of GST, Freight with GST if any. BHEL will release 90% Payment of basic price of materials supplied, along with 100% freight, taxes and duties (as applicable) against submission of MRC (<b>Material Receipt Certificate - MRC signed by respective site MM official and ultimate customer designated official</b>) and submission of Bank Guarantee for 10% of PO value valid till guarantee period towards performance.</p> <p>BG - 10% of Order/ Contract value (excluding taxes, duties &amp; freight) before first submission of documents for payment to cover the due performance of Order/ Contract and to fulfill the guarantee conditions stipulated in the Order/ Contract.</p> <p><b>Validity of the Bank Guarantee shall be for the entire Guarantee period. Initially, it should be at least 18 months plus 3 months claim period, later extended to cover the entire guarantee period, two months before its expiry.</b></p>	

**ANNEXURE - C**  
**BHEL : BAP : RANIPET**  
**PURCHASE – WATER SYSTEM**  
**COMMERCIAL TERMS AND CONDITIONS**  
**DESIGN, MANUFACTURE, SUPPLY, ERECTION AND COMMISSIONING OF GRP PIPES & FITTINGS ALONG WITH REQUIRED ACCESSORIES AS PER TECH. SPEC. NO. ROS:9084, REV:00 FOR TANGEDCO - UDANGUDI STPP 2 X 660 MW PROJECT**  
**Enquiry No. 7720096E Dated 26-April-2022**

Sl. No.	DESCRIPTION	BHEL (PURCHASER) REQUIREMENT	VENDOR (SELLER) CONFIRMATION
		<p>10% will be released after</p> <p>i) submission of all final documents as per Technical Specifications and</p> <p>ii) successful completion of <b>ERECTION AND COMMISSIONING OF GRP PIPES &amp; FITTINGS ALONG WITH REQUIRED ACCESSORIES</b></p> <p>Please confirm above payment term and Please note that the Invoices should be submitted strictly on the above Indicated % only.</p>	
25	PAYMENT TERM FOR ERECTION, COMMISSIONING, PG TEST OF CW GAS CHLORINATION SYSTEM AT SAGARDIGHI PROJECT SITE (ENQ. SL. NO. 002 - SERVICE)	<p>1) Eighty percent (80%) payment on prorata basis for the work completed, as per approved billing schedule, shall be released by Site authorities/ Region on submission of protocols, duly signed by BHEL Site/ Owner.</p> <p>2) Ten percent (20%) of the total value shall be released by Site authorities/ Region on successful commissioning of the complete the <b>ERECTION AND COMMISSIONING OF GRP PIPES &amp; FITTINGS ALONG WITH REQUIRED ACCESSORIES.</b></p>	
26	CONFIRM THE PAYMENT TERM FOR SUPPLY. (DURATION FOR MAKING PAYMENT)	<p>Differential Payments applicable for Supply &amp; Service -</p> <p><b>Within 45 days for MSE (Micro &amp; Small Enterprise) vendor &amp;</b></p> <p><b>Within 90 days for MEDIUM &amp; Non MSE vendors</b></p> <p><b>For MSE status Registration, you have to submit the Notarized copy of MSE Udyam Certificate with Original CA certificate.</b></p>	<p>Select Any one</p> <p>Micro or Small Bidder _____ (Submit Udyog Adhaar)</p> <p>Medium / Large Bidder _____</p>
27	UN-ACCEPTABLE PAYMENT TERMS	Offers with payment Terms such as Cash against Delivery / advance payment / payment through Bank against dispatch documents will be summarily rejected	
28	CONDITION FOR ERECTION & COMMISSIONING, PG TEST CHARGES	Total ERECTION, COMMISSIONING & PG TEST charges including GST should be minimum <b>30% of the total quoted package price</b> (including all taxes and freight), failing which the break-up of prices shall be adjusted accordingly for ordering.	
29	DELIVERY PERIOD FOR THE SUPPLY (ENQ. SL. NO. 001 MAIN ITEMS & COMMISSIONING SPARES if any)	<p>Please confirm the supply completion within <b>06 Months from the date of CAT-I Approval of all Documents / Manufacturing clearance, which ever is Later.</b></p> <p>Vendor to submit all drawings/documents within 2 weeks from the date of purchase order and resubmit the drawings/documents within 1 week incorporating all the comments.</p> <p>In case there are supplier's delays in submission of drawings/documents beyond 2 weeks of order or 1 week of comments, that much days of delay would be reduced from delivery period.</p> <p>Vendor can also quote improved delivery date if any or otherwise, please clearly indicate the delivery period in weeks / months from the date of Manufacturing clearance.</p> <p><b>NOTE: Delivery period shall be reckoned till receipt of materials at site subject to issuance of MDCC from Customer / BHEL. For LD Purpose, Date of site receipt of material will only be considered.</b></p>	
30	ERECTION, COMMISSIONING & PG TEST PERIOD	<p>Please confirm the completion of ERECTION , COMMISSIONING, PG TEST Period within <b>6 MONTHS</b> from the Supply PO Delivery date / Date of Site Readiness whichever is Later. Site Readiness will be informed by BHEL.</p> <p>Vendor can also quote improved delivery date if any or otherwise, Please clearly indicate the ERECTION , COMMISSIONING, PG TEST period in weeks / months from the date of Supply PO Delivery date / Date of Site Readiness whichever is Later.</p>	
31	LIQUIDATED DAMAGES (LD) - Main Supply Portion	Purchaser reserves the right to recover from the Seller/ Contractor, as agreed liquidated damages and not by way of penalty, a sum equivalent to half (1/2) percent and applicable GST thereon, of the total contract price (main supply and E & C), excluding GST per week or part thereof, subject to a maximum of ten (10) percent of the total contract price (main supply and E&C) excluding GST, if E&C completion of the package is delayed beyond the contractual completion date or extension thereof as per the period stipulated in the Order/ Contract.	
32	LIQUIDATED DAMAGES (LD) - SERVICE Portion	LD on service portion ERECTION, COMMISSIONING & PG TEST, etc.) where delivery for services are defined separately in the NIT. LD shall be applicable @0.5 % percent and applicable GST thereon, of the total service portion contract value excluding GST per week or part thereof subject to a maximum of ten (10) percent of the total contract value of service portion excluding GST.	

**ANNEXURE - C**

**BHEL : BAP : RANIPET**

**PURCHASE – WATER SYSTEM**

**COMMERCIAL TERMS AND CONDITIONS**

**DESIGN, MANUFACTURE, SUPPLY, ERECTION AND COMMISSIONING OF GRP PIPES & FITTINGS ALONG WITH REQUIRED ACCESSORIES AS PER TECH. SPEC. NO. ROS:9084, REV:00 FOR TANGEDCO - UDANGUDI STPP 2 X 660 MW PROJECT**

Enquiry No. 7720096E Dated 26-April-2022

Sl. No.	DESCRIPTION	BHEL (PURCHASER) REQUIREMENT	VENDOR (SELLER) CONFIRMATION
33	OFFER VALIDITY	Please confirm Offer Validity for a minimum period of 180 days from the date of PART I bid opening.	
34	INSPECTION	Please confirm for 'Inspection of all the Items by BHEL Engineers / BHEL Authorized Engineer and Customer / Consultant Engineer either jointly or individually before the dispatch of the item at vendor works as per approved QAP. Inspection charges if any to be indicated in the price bid format.	
35	TEST CERTIFICATE (TC)	Please confirm that required TC will be provided at 'No Extra Cost'.	
36	GUARANTEE CERTIFICATE (GC) - Supply Portion.	Please confirm furnishing of Guarantee certificate in BHEL format for 12 months from the date of commissioning or 18 months from the date of last despatch whichever is earlier.	
37	GUARANTEE CERTIFICATE (GC) - E & C Portion	Please confirm furnishing of Guarantee certificate in BHEL format for the system for "12 MONTHS FROM THE DATE OF PG TEST OR 18 MONTHS FROM THE DATE OF COMPLETION OF ERECTION & COMMISSIONING" whichever is earlier.	
38	Contract Execution Bank Guarantee (CEBG) (% OF ORDER VALUE)	To demonstrate the fidelity of the successful bidder, in executing the Contract, on receipt of the Letter of Intent / Purchase Order, the Supplier shall arrange to provide a contract execution bank guarantee (CEBG) equivalent to 2% of the PO value.	
39	PERFORMANCE BANK GUARANTEE (PBG) TOWARDS Supply Portion (% OF ORDER VALUE)	PBG to be submitted in the format ENCLOSED. PBG for 10% of the Total PO Value. Validity of the Performance Bank Guarantee shall be for the entire Guarantee period. Initially, it should be at least 18 months from the date of first dispatch or 12 months from the date of commissioning plus 3 months claim period, later extended to cover the entire guarantee period plus three months claim period. PBG (if required) to be extended 2 months before the expiry date.	
40	BANK GUARANTEE (BG) TOWARDS E & C Portion. (10% OF ORDER VALUE)	BG to be submitted in the format ENCLOSED. BG for 10% of the Total PO Value valid for 12 months from the date of PG TEST OR 18 MONTHS FROM THE DATE OF COMPLETION OF ERECTION & COMMISSIONING of the Plant plus 3 months claim period. BG (if required) to be extended 2 months before the expiry date.	
41	ERECTION MANUAL (INSTALLATION INSTRUCTIONS)	Please confirm for providing of 'comprehensive Erection Manual covering the entire supply which include bought-outs' 6 sets in Hard copy & one CD form.	
42	O & M MANUAL	Please confirm for providing of 'comprehensive O&M Manual covering the entire System' 6 sets in Hard copy & one CD form.	
43	REVERSE AUCTION	BHEL shall be resorting to Reverse Auction (RA) (Guidelines as available on www.bhel.com) for this tender. RA shall be conducted among the techno-commercially qualified bidders. Price bids of all techno-commercially qualified bidders shall be opened and same shall be considered for 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.	
44	RISK PURCHASE CLAUSE	Alternatively, the purchaser at his option will be entitled the contract and to purchase elsewhere at the risk and cost of the seller either the whole of the goods or any part which the supplier has failed to deliver or despatch within the time stipulated as aforesaid or If the same were not available, the best and the nearest available substitute therefor. The supplier shall be liable for any loss which the purchaser may sustain by reason of such risk purchases In addition to penalty at the rate mentioned In LD Clause above.	
45	ZERO DATE (CONTRACT EFFECTIVE DATE)	Contract Effective date starts from Manufacturing Clearance subject to Documents submission clause. Please confirm for 'Date of Manufacturing Clearance'.	
46	Loading Criteria	Please note that no Commercial deviation is acceptable to BHEL. In case any deviation is taken in any of the commercial terms such as PAYMENT TERMS, LD etc., where in we have specified the days, percentages etc., then loading will be done to the extent of the short fall with respect to the upper Limit specified for evaluation.  In respect of LD offers which do not accept for LD Clause would be summarily rejected - Please Confirm.	
47	NEGOTIATION	In the event of negotiation if any, please confirm participation only by supplier's representative and not by their Agent which include indian Agent in the case of Foreign Offer.	

**ANNEXURE - C**  
**BHEL : BAP : RANIPET**  
**PURCHASE – WATER SYSTEM**  
**COMMERCIAL TERMS AND CONDITIONS**  
**DESIGN, MANUFACTURE, SUPPLY, ERECTION AND COMMISSIONING OF GRP PIPES & FITTINGS ALONG WITH REQUIRED ACCESSORIES AS PER TECH. SPEC. NO. ROS:9084, REV:00 FOR TANGEDCO - UDANGUDI STPP 2 X 660 MW PROJECT**  
**Enquiry No. 7720096E Dated 26-April-2022**

Sl. No.	DESCRIPTION	BHEL (PURCHASER) REQUIREMENT	VENDOR (SELLER) CONFIRMATION
48	OTHER DOCUMENTS FOR APPROVAL (BBU)	In the event of order vendor should confirm the submission of BBU (Billing Breakup) for the complete system supply with break up for each line item as well as quantities with value (If Applicable)	
49	LAW GOVERNING THE CONTRACT AND COURT JURISDICTION	The contract shall be governed by the Law for the time being in force in the Republic of India. The Civil Court having original Civil Jurisdiction at Ranipet / Vellore Tamil Nadu, shall alone have exclusive jurisdiction in regard to all matters in respect of the Contract.	
50	FRAUD POLICY	The bidder along with its associate/ collaborators/ sub-contractors/ sub-vendors/ consultants/ service providers shall strictly adhere to BHEL fraud prevention policy displayed on BHEL website <a href="http://www.bhel.com">http://www.bhel.com</a> and shall immediately bring to the notice of BHEL management about any fraud or suspected fraud as soon as it comes to their notice	
51	PLEASE PROVIDE THE STATUTORY DETAILS (Submit a copy of PAN, if not submitted already)	GST Regn. Number	
		HSN NO.: HARMONIZED SYSTEM OF NOMENCLATURE UNDER GST FOR THE OFFERED ITEM	
		PAN No. :	
52	CONTACT PERSON'S ON <b>TECHNICAL DETAILS</b> FOR CORRESPONDENCE	Name:	
		Designation:	
		Phone No.:	
		Mobile No.:	
		Fax No.:	
		E-mail ID:	
53	CONTACT PERSON'S ON <b>COMMERCIAL DETAILS</b> FOR CORRESPONDENCE	Name:	
		Designation:	
		Phone No.:	
		Mobile No.:	
		Fax No.:	
		E-mail ID:	
54	GeM Registration	GeM vendor ID is mandatory for all tenders above Rs 25 Lakhs	GeM Seller ID _____
55	<b>IMPORTANT NOTE.</b> BHEL/Ranipet will issue LOA (Letter of Award) for E&C and supervision Portion (Service Part) and BHEL/PSSR will issue the Purchase order and make the payment.	<b>Acceptance Required</b>	
56	<b>BHEL will not take cognizance of commercial terms mentioned by the bidder any where else.</b>  <b>Commercial terms and conditions indicated in this Annexure - A will only be applicable and binding.</b>	<b>Acceptance Required</b>	

Signature, Seal & Date of offerer on all the pages.

**BANK GUARANTEE FOR CONTRACT EXECUTION**

Bank Guarantee No:

Date:

To

Bharat Heavy Electricals Limited,  
Boiler Auxiliaries Plant,  
RANIPET -632 406,  
Tamil Nadu,  
INDIA

Dear Sirs,

In consideration of the **Bharat Heavy Electricals Limited** <sup>1</sup> (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 "BHEL House", SIRI Fort, New Delhi- 110049 through its Unit at **Boiler Auxiliaries Plant located at Ranipet-632406, Tamil Nadu, INDIA** having awarded to \_\_\_\_\_ <sup>2</sup> having its registered office at \_\_\_\_\_ herein after referred to as the 'Contractor/Supplier', which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns), a contract Ref No. / **PO No** \_\_\_\_\_ dated \_\_\_\_\_ <sup>3.</sup> Valued at Rs \_\_\_\_\_ <sup>4</sup> (Rupees (In words) \_\_\_\_\_) for \_\_\_\_\_ <sup>5</sup> (hereinafter called the 'Contract') and the Contractor having agreed to provide a Contract Execution Guarantee equivalent to 2% (Two 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 a maximum amount Rs \_\_\_\_\_ (**Rupees** \_\_\_\_\_) without any demur, immediately on a demand from the Employer. 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. \_\_\_\_\_ (Rupees \_\_\_\_\_)**.

We undertake to pay to the Employer any money so demanded notwithstanding any dispute or disputes raised by the Contractor/Supplier in any suit or proceeding pending before any Court or Tribunal relating thereto 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 contractors/supplier shall have no claim against us for making such payment.

We the \_\_\_\_\_ bank further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the Contract Execution of the said Contract and that it shall continue to be enforceable till all the dues of the Employer under or by virtue of the said Contract have been fully paid and its claims satisfied or discharged.

We \_\_\_\_\_ BANK further agree with the Employer that the Employer shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Contract or to extend time of Contract Execution by the said 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 Contractor/Supplier and to forbear or enforce any of the terms and conditions relating to the said Agreement and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Contractor/Supplier or for any forbearance, act or omission on the part of the Employer or any indulgence by the Employer to the said 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 Contractor and notwithstanding any security or other guarantee that the Employer may have in relation to the Contractor's liabilities.

This Guarantee shall remain in force up to \_\_\_\_\_ 6 with a validity period of \_\_\_ months & claim period of 3 months 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 Contractor/Supplier but shall in all respects and for all purposes be binding and operative until payment of all money payable to the Employer in terms thereof.

Unless a demand or claim under this guarantee is made on us in writing on or before the \_\_\_\_\_ 7 we shall be discharged from all liabilities under this guarantee thereafter.

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

Notwithstanding anything to the contrary contained hereinabove:

- a) The liability of the Bank under this Guarantee shall not exceed Rs \_\_\_\_\_ (Rupees \_\_\_\_\_ Only) 8
- b) This Guarantee shall be valid up to \_\_\_\_\_ 9
- c) Unless the Bank is served a written claim or demand on or before \_\_\_\_\_ 10 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)

Dtd :

Place of Issue:

FOR YOUR REFERENCE TO FILL THE DETAILS ACCORDINGLY:

1. NAME AND ADDRESS OF EMPLOYER *i.e., Bharat Heavy Electricals Limited.*
2. NAME AND ADDRESS OF VENDOR/CONTRACTOR/SUPPLIER
3. DETAILS ABOUT THE NOTICE OF AWARD/CONTRACT REFERENCE
4. BG AMOUNT IN FIGURES AND WORDS
5. PROJECT/SUPPLY DETAILS
6. VALIDITY DATE *with a validity of 3 months claim period.*
7. DATE OF EXPIRY OF CLAIM PERIOD
8. BG AMOUNT IN FIGURES AND WORDS
9. VALIDITY DATE
10. DATE OF EXPIRY OF CLAIM PERIOD



## Bankers, Auditors & Share Transfer Agent

<b>Bankers</b>	
Axis Bank	
Bank of Baroda	
Canara Bank	
Central Bank of India	
CITI Bank N.A	
Deutsche Bank AG	
Export-Import Bank of India	
HDFC Bank Limited	
IDBI Bank	
Indian Bank	
Indian Overseas Bank	
Indusind Bank	
Kotak Mahindra Bank	
Punjab National Bank	
RBL Bank Ltd.	
Standard Chartered Bank	
State Bank of India	
The Federal Bank Limited	
Union Bank of India	

### Registered Office

BHEL House, Siri Fort, New Delhi-110049 (India)

CIN: L74899DL1964GOI004281

Phone: 011-66337000, Fax: 011-66337428

[www.bhel.com](http://www.bhel.com)

[shareholderquery@bhel.in](mailto:shareholderquery@bhel.in)

**BANK GUARANTEE FOR PERFORMANCE SECURITY**

Bank Guarantee No:

Date:

To

Bharat Heavy Electricals Limited,  
Boiler Auxiliaries Plant,  
RANIPET -632 406,  
Tamil Nadu,  
INDIA

Dear Sirs,

In consideration of the **Bharat Heavy Electricals Limited** 1 (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 "BHEL House", SIRI Fort, New Delhi- 110049 through its Unit at **Boiler Auxiliaries Plant located at Ranipet-632406, Tamil Nadu, INDIA** having awarded to \_\_\_\_\_ 2 having its registered office at \_\_\_\_\_ herein after referred to as the 'Contractor/Supplier', which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns), a contract Ref No. / **PO No** \_\_\_\_\_ dated \_\_\_\_\_ 3. Valued at Rs \_\_\_\_\_ 4 (Rupees (In words) \_\_\_\_\_) for \_\_\_\_\_ 5 (hereinafter called the 'Contract') and the Contractor having agreed to provide a Contract Performance Guarantee equivalent to 10% (Ten 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 a maximum amount Rs \_\_\_\_\_ (Rupees \_\_\_\_\_) without any demur, immediately on a demand from the Employer. 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. \_\_\_\_\_ (Rupees \_\_\_\_\_)**.

We undertake to pay to the Employer any money so demanded notwithstanding any dispute or disputes raised by the Contractor/Supplier in any suit or proceeding pending before any Court or Tribunal relating thereto 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 contractors/supplier shall have no claim against us for making such payment.

We the \_\_\_\_\_ bank further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Contract and that it shall continue to be enforceable till all the dues of the Employer under or by virtue of the said Contract have been fully paid and its claims satisfied or discharged.

We \_\_\_\_\_ BANK further agree with the Employer that the Employer shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Contract or to extend time of performance by the said 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 Contractor/Supplier and to forbear or enforce any of the terms and conditions relating to the said Agreement and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Contractor/Supplier or for any forbearance, act or omission on the part of the Employer or any indulgence by the Employer to the said 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 Contractor and notwithstanding any security or other guarantee that the Employer may have in relation to the Contractor's liabilities.

This Guarantee shall remain in force up to \_\_\_\_\_ 6 with a validity period of \_\_\_ months & claim period of 3 months 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 Contractor/Supplier but shall in all respects and for all purposes be binding and operative until payment of all money payable to the Employer in terms thereof.

Unless a demand or claim under this guarantee is made on us in writing on or before the \_\_\_\_\_ 7 we shall be discharged from all liabilities under this guarantee thereafter.

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

Notwithstanding anything to the contrary contained hereinabove:

- a) The liability of the Bank under this Guarantee shall not exceed Rs \_\_\_\_\_ (Rupees \_\_\_\_\_ Only) 8
- b) This Guarantee shall be valid up to \_\_\_\_\_ 9
- c) Unless the Bank is served a written claim or demand on or before \_\_\_\_\_ 10 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)

Dtd :

Place of Issue:

FOR YOUR REFERENCE TO FILL THE DETAILS ACCORDINGLY:

1. *NAME AND ADDRESS OF EMPLOYER i.e., Bharat Heavy Electricals Limited.*
2. *NAME AND ADDRESS OF VENDOR/CONTRACTOR/SUPPLIER*
3. *DETAILS ABOUT THE NOTICE OF AWARD/CONTRACT REFERENCE*
4. *BG AMOUNT IN FIGURES AND WORDS*
5. *PROJECT/SUPPLY DETAILS*
6. *VALIDITY DATE with a validity of 3 months claim period.*
7. *DATE OF EXPIRY OF CLAIM PERIOD*
8. *BG AMOUNT IN FIGURES AND WORDS*
9. *VALIDITY DATE*
10. *DATE OF EXPIRY OF CLAIM PERIOD*

**ANNEXURE - E**  
**TECH SPECIFICATION AND COMMERCIAL TERMS DEVIATION DISPOSITION REPORT**

<p><b>Enquiry No. 7720096E Dated 26-April-2022</b></p>	<p>DESIGN, MANUFACTURE, SUPPLY, ERECTION AND COMMISSIONING OF GRP PIPES &amp; FITTINGS ALONG WITH REQUIRED ACCESSORIES AS PER TECH. SPEC. NO. ROS:9084, REV:00 FOR TANGEDCO - UDANGUDI STPP 2 X 660 MW PROJECT</p>	<p>Vendor Name</p>	
<p>01. TECHNICAL SPECIFICATION NO. ROS:9084, REV:00 (Total No. of Pages – 61)</p> <p>02. Quality evaluation requirements</p> <p>03. Commercial Terms &amp; Conditions as per Annexure C</p> <p>4. Financial PQR - Annexure K</p>			
Page	Clause	Details Of Deviation With Reason	Disposition By BHEL
<p>Signature Of Vendor</p>			<p>Reviewed By</p>
<p>“ AGREED DEVIATION “</p>			<p>APPROVED BY</p>
<p>if any to be incorporated in the PO in the event of order.</p>			

Date :

VENDOR's SIGNATURE WITH SEAL

Tender Inviting Authority: AGM/PURCHASE

Name of Work: DESIGN, MANUFACTURE, SUPPLY, ERECTION AND COMMISSIONING OF GRP PIPES & FITTINGS ALONG WITH REQUIRED ACCESSORIES AS PER TECH. SPEC. NO. ROS:9084, REV:00 FOR TANGEDCO - UDANGUDI STPP 2 X 660 MW PROJECT

ENQUIRY No: 7720096E Dated 26-April-2022

Name of the Bidder/ Bidding Firm / Company :	
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**PRICE SCHEDULE**

(This BOQ template must not be modified/replaced by the bidder and the same should be uploaded after filling the relevant columns, else the bidder is liable to be rejected for this tender. Bidders are allowed to enter the Bidder Name and Values only )

NUMBER #	TEXT #	TEXT #	NUMBER #	TEXT #	NUMBER #	NUMBER	NUMBER #	NUMBER #	TEXT #
Sl. No.	Item Description	Item Code / Make	Quantity	Units	BASIC RATE PER UNIT(Inclusive of packing & forwarding, freight and insurance) to be entered by the Bidder in INR Rs. P	GST on Basic price to be entered by the Bidder in percentage	TOTAL AMOUNT Without Taxes in Rs. P	TOTAL AMOUNT With Taxes in Rs. P	TOTAL AMOUNT In Words
1	2	3	4	5	13	14	53	54	55
0	DESIGN, MANUFACTURE, SUPPLY, ERECTION AND COMMISSIONING OF GRP PIPES & FITTINGS ALONG WITH REQUIRED ACCESSORIES AS PER TECH. SPEC. NO. ROS:9084, REV:00 FOR TANGEDCO - UDANGUDI STPP 2 X 660 MW PROJECT								
1	RWT111340001 to RWT111340103 DESIGN, MANUFACTURE AND SUPPLY OF GRP PIPES & FITTINGS ALONG WITH REQUIRED ACCESSORIES AS PER TECH. SPEC. NO. ROS:9084, REV:00 (One Set of 102 Items - as per Annexure M Supply Bill of Quantity)	item1	1	ST		18.00	0.00	0.00	INR Zero Only
2	RWT111350001 ERECTION & COMMISSIONING OF GRP PIPES & FITTINGS AS PER TECH SPEC NO. ROS:9084, REV:00.	item2	1	ST		18.00	0.00	0.00	INR Zero Only
<b>Total in Figures</b>							<b>0.00</b>	<b>0.00</b>	INR Zero Only
<b>Quoted Rate in Words</b>		<b>INR Zero Only</b>							

## ANNEXURE G

### **Online SRF Submission Procedure**

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

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

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

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

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

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

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

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

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

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

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

Annexure H  
(On company letter head)

Self-Certification under Preference to  
“MAKE IN INDIA” Policy

CERTIFICATE

In line with Government Public Procurement Order No. P-45021/2/2017-BE-II dt. 15.06.2017, as amended from time to time and as applicable on the date of submission of tender, we hereby certify that we M/s \_\_\_\_\_ (supplier name) are local supplier meeting the requirement of minimum Local content as defined in above orders for the material / package against BHEL’s Enquiry no – 7720096E dt 26.04.2022

Please select one category from below

- Class I supplier – (Local content more than 50%)
- Class II Supplier – (Local Content >20% <=50%)
- Non-Local Supplier – (Local Content less than 20%)

Details of location at which local value addition will be made is as follows:

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We also understand, false declarations will be in breach of the Code of Integrity under Rule 175(1)(i)(h) of the General Financial Rule for which for which a bidder or its successors can be debarred for up two years as per Rule 151 (iii) of the General Financial Rules along with such other actions as may be permissible under law.

Seal and Signature of Authorized Signatory

\*For tenders with value more than INR 10 Crore, above declaration to accompanied by a certificate from a CA. please refer GOI’s MII order P-45021/2/2017-BE-II dt. 15.06.2017 latest revision dt 16.09.2020.

# ANNEXURE I

## Payment Mechanism at BHEL, Ranipet

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

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

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

(1) Receipt of materials at BHEL, Ranipet Stores (evidenced by the Day-Book Number and Date generated at BHEL Stores, Ranipet) or Receipt of materials at Project Site / Destination specified in the Purchase Order (as evidenced by the acknowledgement given by the Consignee).

(2) Acceptance of the supplied materials at BHEL Stores, Ranipet. (Proof of evidence: Stores Receipt voucher - Short form "SRV", raised by BHEL Stores, Ranipet referenced by the SRV Number and Date)

(3) Receipt and Registration of the Bills / Invoices of the Supplier at BHEL, Ranipet Accounts Department. (evidenced by the ABS Number and Date)

(4) Receipt of clarifications, if any that may be required by BHEL, Ranipet Accounts or Purchase Department, from the Supplier. (As evidenced by the IOM Inward Date)

(5) Bill processing and passing.

(6) Payment release.

All these events are transparently available in the SCM web-site of BHEL, Ranipet,

{<http://bapscm.bhelrpt.co.in/purc>} which can be viewed by all registered supplier with a password.

Allowed Time frames:

A] From DB to SRV: 10 Days

B] From SRV to ABS: 15 Days

C] From ABS to Bill Pass: 07 Days (if Stage 4 above is not applicable)

OR

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

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

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

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

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

Thus for example:

Start seniority would be with the DB date.

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

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

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

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

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

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

**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 \_\_\_\_\_

\_\_\_\_\_ (hereinafter referred to as "Contract"). 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 panel of Independent External Monitor(s) (IEMs), 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. The Bidder(s)/ Contractor(s) commits himself to observe the following principles during 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 shall 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, terminate the contract, if already awarded, exclude from future business dealings and/ 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 (s) from the tender process before award / order acceptance according to Section 3, the Principal is entitled to demand and recover the damages equivalent to Earnest Money Deposit/ Bid Security.
- 4.2 If the Principal is entitled to terminate the Contract according to Section 3, or terminates the Contract in application of Section 3 above, the Bidder(s)/ Contractor (s) transgression through a violation of Section 2 above shall be construed breach of contract and the Principal shall be entitled to demand and recover from the Contractor an amount equal to 5% of the contract value or the amount equivalent to Security Deposit/ Performance Bank Guarantee, whichever is higher, as damages, in addition to and without prejudice to its right to demand and recover compensation for any other loss or damages specified elsewhere in the contract.



**Section 5 - Previous Transgression**

- 5.1 The Bidder declares that no previous transgressions occurred in the last 3 (three) 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 or action can be taken as per the separate "Guidelines on Banning of Business dealings with Suppliers/ Contractors", framed by the Principal.

**Section 6 - Equal treatment of all Bidder (s)/ Contractor (s) / Sub-contractor (s)**

- 6.1 The Principal will enter into Integrity Pacts with identical conditions as this Integrity Pact with all Bidders and Contractors.
- 6.2 In case of Sub-contracting, the Principal Contractor shall take the responsibility of the adoption of Integrity Pact by the Sub-contractor(s) and ensure that all Sub-contractors also sign the Integrity Pact.
- 6.3 The Principal will disqualify from the tender process all Bidders who do not sign this Integrity 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 panel of Independent External Monitor (s) (IEMs) for this Integrity Pact. The task of the IEMs is to review independently and objectively, whether and to what extent the parties comply with the obligations under this Integrity Pact.
- 8.2 The IEMs are 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 IEMs shall be provided access to all documents/ records pertaining to the Contract, for which a complaint or issue is raised before them as and when warranted. However, the documents/records/information having National Security implications and those documents which have been classified as Secret/Top Secret are not to be disclosed.
- 8.4 The Principal will provide to the IEMs 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 IEMs the option to participate in such meetings.



- 8.5 The advisory role of IEMs is envisaged as that of a friend, philosopher and guide. The advice of IEMs would not be legally binding and it is restricted to resolving issues raised by a 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 or during execution of Contract, the matter should be examined by the full panel of IEMs jointly, 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 the CMD, BHEL at the earliest. They may also send their report directly to the CVO, in case of suspicion of serious irregularities requiring legal/ administrative action. Only in case of very serious issue having a specific, verifiable Vigilance angle, the matter should be reported directly to the Commission. IEMs will tender their advice on the complaints within 30 days.
- 8.8 The CMD, BHEL shall decide the compensation to be paid to the IEMs and its terms and conditions.
- 8.9 IEMs 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 Principal should be looked into by the CVO of the Principal.
- 8.10 If the IEMs have 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 IEMs may also transmit this information directly to the Central Vigilance Commissioner, Government of India.
- 8.11 After award of work, the IEMs shall look into any issue relating to execution of Contract, if specifically raised before them. As an illustrative example, if a Contractor who has been awarded the Contract, during the execution of Contract, raises issue of delayed payment etc. before the IEMs, the same shall be examined by the panel of IEMs. Issues like warranty/ guarantee etc. shall be outside the purview of IEMs.
- 8.12 However, the IEMs may suggest systemic improvements to the management of the Principal, if considered necessary, to bring about transparency, equity and fairness in the system of procurement.
- 8.13 The word 'Monitor' would include both singular and plural.

### Section 9 - Pact Duration

- 9.1 This Integrity Pact shall be operative from the date this Integrity Pact 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. Any violation of the same would entail disqualification of the bidders and exclusion from future business dealings.
- 9.2 If any claim is made/ lodged during currency of this Integrity Pact, 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.







# Bharat Heavy Electricals Limited

Boiler Auxiliaries Plant  
RANIPET – 632 406, Tamil Nadu, India

Ref.: Enq. No. 7720096E

Date : 26.04.2022

## Annexure K PRE-QUALIFICATION REQUIREMENT (QR) FINANCIAL SOUNDNESS

Sl. No.	BHEL REQUIREMENT	VENDOR (SELLER) CONFIRMATION
1	The bidder has to submit financial accounts (audited, if applicable comprising of Audit report, Balance Sheet, Profit & Loss A/c Statement and Notes/Schedules pertaining to Turnover/Sales/Revenue), for last three years (or from the date of incorporation, whichever is less) as on tender due date to review the above criteria. In case the incorporation of vendor is less than 3 years, average annual financial turnover shall be calculated based on available information as below:-	
i	If the accounts are available for $\leq 1$ Financial Year, the Average Annual Turnover shall be calculated based on available information divided by 1 (One).	
ii	If the accounts are available for $>1$ but $\leq 2$ Financial Years, the Average Annual Turnover shall be calculated based on available information divided by 2 (Two).	
iii	If the accounts are available for $>2$ but $\leq 3$ Financial Years, the Average Annual Turnover shall be calculated based on available information divided by 3 (Three).	
2	Foreign bidders to submit a latest report from reputed third party business rating agency like Dun & Bradstreet, Credit reform etc. for review of above criteria.	
3	While calculating Annual Turnover / Sales, other operating income and other income shall not be considered.	
4	For evaluation of foreign bidder, exchange rate (TT selling rate of SBI) as on scheduled date of tender opening (Part-I bid in case of two part bid) shall be considered.	
5	Average annual financial turnover during the last Three Financial Years ending 31.03.2021 should not be less than Rs 2,00,00,000/- (Rs TWO Crores)	
6	Net worth of the vendor should be positive. *	
7	The current ratio should be $>1$ as per latest audited balance sheet	
8	Vendor should be profit earning company / firm (Profit / Earnings before depreciation & amortization, Interest and Tax) at least once in the last 3 years.	

**Note : For any Supplier the above said documents is Mandatory and without which submitted offer is liable for rejection.**

\*.....As per section 2 (57) of The Companies Act, 2013, net worth means the aggregate value of the paid up share capital and all reserves carried out of the profit and security premium after deducting the aggregate value of the accumulated losses, deferred expenditure and miscellaneous expenditure not written off as per the audited balance sheet, but does not includes reserves created out of revaluation of assets, write back of depreciation and amalgamation.

**Signature, Seal & Date of Bidder**

# To be submitted in company letter head

## ANNEXURE L

I/we are bidder from \_\_\_\_\_ (Address with country).  
We do not belong to any of the below category mentioned.

1. Any of entity/office/workshop of our organisation/incorporation, established in a country sharing land border with India, If yes, provide the full address of all such locations.
2. Any of subsidiary of our organisation/incorporation, established in a country sharing land border with India, If yes, provide the full address of all such locations.
3. Any of entity/office/workshop of our organisation/incorporation, controlled in a country sharing land border with India, If yes, provide the full address of all such locations.
4. Any of entity whose beneficial owner is situated in a country sharing land border with India, If yes, provide the full name, address of all such locations.
5. Any Indian Agent available, If so, Provide details of address and contacts.
6. Any employee/directors who is/are citizen of country sharing land border with India, If yes, provide the full name, employee code and address of all such locations.
7. Any of consortium/joint venture of our organisation/incorporation, established in a country sharing land border with India, If yes, provide the full address of all such locations.

### Meaning of beneficial owner

- 1) In case of a company or limited liability partnership, beneficial owner is the natural person, who, whether acting alone or together, or through one or more judicial 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 percent 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 rights or shareholder's agreement or voting agreement.
- 2) In case or a partnership firm the beneficial owner is the natural person (s) who whether acting alone or together or through one or more judicial person, has ownership of the 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 judicial person, has ownership of the entitlement to more than fifteen percent of the property or capital or [profits of such association or body of individual.

# To be submitted in company letter head

- 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 and any other natural person exercising the ultimate effective control over the trust through a chain of control of ownership.
- 6) An agent is a person employed to do any act for another, or to represent another in dealing with third person.

We have read the clause regarding restriction on procurement from a bidder of a country which shares a land border with India, we hereby declare that we do not belong to any such country and are eligible to be considered.

In case, any of information is found to be false, even after bid acceptance, immediate termination may happen and action will be taken as per law.

Format is being filled without altering any of the clause mentioned in the given format\*\*

Dated: \_\_\_\_\_

Authorised Sign and stamp\_\_\_\_\_

**Enquiry No. 7720096E Dated 26-April-2022**

**Annexure M  
Supply Bill of Quantity**

<b>Itm Sln</b>	<b>Matl Code</b>	<b>Description</b>	<b>Qty</b>	<b>Unit</b>
1	RWT111340001	GRP PIPE OF SIZE 100 NB & PN10 PRESSURE RATING	120	MR
2	RWT111340002	GRP PIPE OF SIZE 150 NB & PN10 PRESSURE RATING.	170	MR
3	RWT111340003	GRP PIPE OF SIZE 200 NB & PN10 PRESSURE RATING.	1060	MR
4	RWT111340004	GRP PIPE OF SIZE 250 NB & PN10 PRESSURE RATING	200	MR
5	RWT111340005	GRP PIPE OF SIZE 300 NB & PN10 PRESSURE RATING	765	MR
6	RWT111340006	GRP PIPE OF SIZE 350 NB & PN10 PRESSURE RATING.	580	MR
7	RWT111340007	GRP PIPE OF SIZE 400 NB & PN10 PRESSURE RATING.	210	MR
8	RWT111340008	GRP PIPE OF SIZE 450 NB & PN10 PRESSURE RATING.	115	MR
9	RWT111340009	GRP PIPE OF SIZE 500 NB & PN10 PRESSURE RATING.	55	MR
10	RWT111340010	GRP PIPE OF SIZE 600 NB & PN10 PRESSURE RATING.	140	MR
11	RWT111340011	GRP PIPE OF SIZE 700 NB & PN10 PRESSURE RATING.	305	MR
12	RWT111340012	GRP 90 DEGREE ELBOW OF SIZE 100 NB & PN10 PRESSURE RATING.	80	NO
13	RWT111340013	GRP 90 DEGREE ELBOW OF SIZE 150 NB & PN10 PRESSURE RATING.	70	NO
14	RWT111340014	GRP 90 DEGREE ELBOW OF SIZE 200 NB & PN10 PRESSURE RATING.	280	NO
15	RWT111340015	GRP 90 DEGREE ELBOW OF SIZE 250 NB & PN10 PRESSURE RATING.	70	NO
16	RWT111340016	GRP 90 DEGREE ELBOW OF SIZE 300 NB & PN10 PRESSURE RATING.	150	NO
17	RWT111340017	GRP 90 DEGREE ELBOW OF SIZE 350 NB & PN10 PRESSURE RATING.	85	NO
18	RWT111340018	GRP 90 DEGREE ELBOW OF SIZE 400 NB & PN10 PRESSURE RATING.	68	NO
19	RWT111340019	GRP 90 DEGREE ELBOW OF SIZE 450 NB & PN10 PRESSURE RATING.	10	NO
20	RWT111340020	GRP 90 DEGREE ELBOW OF SIZE 500 NB & PN10 PRESSURE RATING.	2	NO
21	RWT111340021	GRP 90 DEGREE ELBOW OF SIZE 600 NB & PN10 PRESSURE RATING.	14	NO
22	RWT111340022	GRP 90 DEGREE ELBOW OF SIZE 700 NB & PN10 PRESSURE RATING.	16	NO
23	RWT111340023	GRP 45 DEGREE ELBOW OF SIZE 100 NB & PN10 PRESSURE RATING.	2	NO
24	RWT111340024	GRP 45 DEGREE ELBOW OF SIZE 200 NB & PN10 PRESSURE RATING.	8	NO
25	RWT111340025	GRP 45 DEGREE ELBOW OF SIZE 300 NB & PN10 PRESSURE RATING.	10	NO
26	RWT111340026	GRP 45 DEGREE ELBOW OF SIZE 400 NB & PN10 PRESSURE RATING.	2	NO
27	RWT111340027	GRP 45 DEGREE ELBOW OF SIZE 600 NB & PN10 PRESSURE RATING.	2	NO
28	RWT111340028	GRP 45 DEGREE ELBOW OF SIZE 700 NB & PN10 PRESSURE RATING.	5	NO
29	RWT111340029	GRP FLANGE OF SIZE 100 NB & #150 PRESSURE RATING.	120	NO

30	RWT111340030	GRP FLANGE OF SIZE 150 NB & #150 PRESSURE RATING.	95	NO
31	RWT111340031	GRP FLANGE OF SIZE 200 NB & #150 PRESSURE RATING.	460	NO
32	RWT111340032	GRP FLANGE OF SIZE 250 NB & #150 PRESSURE RATING.	140	NO
33	RWT111340033	GRP FLANGE OF SIZE 300 NB & #150 PRESSURE RATING.	210	NO
34	RWT111340034	GRP FLANGE OF SIZE 350 NB & #150 PRESSURE RATING.	70	NO
35	RWT111340035	GRP FLANGE OF SIZE 400 NB & #150 PRESSURE RATING.	90	NO
36	RWT111340036	GRP FLANGE OF SIZE 450 NB & #150 PRESSURE RATING.	6	NO
37	RWT111340037	GRP FLANGE OF SIZE 500 NB & #150 PRESSURE RATING.	54	NO
38	RWT111340038	GRP FLANGE OF SIZE 600 NB & #150 PRESSURE RATING.	14	NO
39	RWT111340039	GRP FLANGE OF SIZE 700 NB & #150 PRESSURE RATING.	19	NO
40	RWT111340040	GRP FLANGE OF SIZE 100 NB & #600 PRESSURE RATING.	2	NO
41	RWT111340041	GRP FLANGE OF SIZE 250 NB & #600 PRESSURE RATING.	2	NO
42	RWT111340042	GRP FLANGE OF SIZE 350 NB & #600 PRESSURE RATING.	2	NO
43	RWT111340043	GRP EQUAL TEE OF SIZE 150 NB & PN10 PRESS. RATING.	10	NO
44	RWT111340044	GRP EQUAL TEE OF SIZE 200 NB & PN10 PRESS. RATING.	55	NO
45	RWT111340045	GRP EQUAL TEE OF SIZE 250 NB & PN10 PRESS. RATING.	13	NO
46	RWT111340046	GRP EQUAL TEE OF SIZE 300 NB & PN10 PRESS. RATING.	62	NO
47	RWT111340047	GRP EQUAL TEE OF SIZE 350 NB & PN10 PRESS. RATING.	4	NO
48	RWT111340048	GRP EQUAL TEE OF SIZE 400 NB & PN10 PRESS. RATING.	9	NO
49	RWT111340049	GRP EQUAL TEE OF SIZE 450 NB & PN10 PRESS. RATING.	3	NO
50	RWT111340050	GRP EQUAL TEE OF SIZE 500 NB & PN10 PRESS. RATING.	3	NO
51	RWT111340051	GRP EQUAL TEE OF SIZE 700 NB & PN10 PRESS. RATING.	2	NO
52	RWT111340052	GRP UNEQUAL TEE OF SIZE 200X100 NB, PN10 RATED.	4	NO
53	RWT111340053	GRP UNEQUAL TEE OF SIZE 250X150 NB, PN10 RATED.	8	NO
54	RWT111340054	GRP UNEQUAL TEE OF SIZE 250X200 NB, PN10 RATED.	10	NO
55	RWT111340055	GRP UNEQUAL TEE OF SIZE 300X200 NB, PN10 RATED.	5	NO
56	RWT111340056	GRP UNEQUAL TEE OF SIZE 300X250 NB, PN10 RATED.	12	NO
57	RWT111340058	GRP UNEQUAL TEE OF SIZE 350X250 NB, PN10 RATED.	3	NO
58	RWT111340059	GRP UNEQUAL TEE OF SIZE 400X350 NB, PN10 RATED.	2	NO
59	RWT111340060	GRP UNEQUAL TEE OF SIZE 700X400 NB, PN10 RATED.	3	NO
60	RWT111340061	GRP CONCENTRIC REDUCER OF SIZE 200X100 NB & PN10 PRESSURE RATING.	5	NO
61	RWT111340062	GRP CONCENTRIC REDUCER OF SIZE 250X150 NB & PN10 PRESSURE RATING.	10	NO
62	RWT111340063	GRP CONCENTRIC REDUCER OF SIZE 300X150 NB & PN10 PRESSURE RATING.	4	NO
63	RWT111340064	GRP CONCENTRIC REDUCER OF SIZE 300X200 NB & PN10 PRESSURE RATING.	16	NO
64	RWT111340065	GRP CONCENTRIC REDUCER OF SIZE 300X250 NB & PN10 PRESSURE RATING.	10	NO
65	RWT111340066	GRP CONCENTRIC REDUCER OF SIZE 350X250 NB & PN10 PRESSURE RATING.	3	NO
66	RWT111340067	GRP CONCENTRIC REDUCER OF SIZE 350X300 NB & PN10 PRESSURE RATING.	3	NO
67	RWT111340068	GRP CONCENTRIC REDUCER OF SIZE 400X250 NB & PN10 PRESSURE RATING.	1	NO
68	RWT111340069	GRP CONCENTRIC REDUCER OF SIZE 400X300 NB & PN10 PRESSURE RATING.	2	NO
69	RWT111340070	GRP CONCENTRIC REDUCER OF SIZE 400X350 NB & PN10 PRESSURE RATING.	1	NO
70	RWT111340071	GRP CONCENTRIC REDUCER OF SIZE 450X350 NB & PN10 PRESSURE RATING.	2	NO

71	RWT111340072	GRP CONCENTRIC REDUCER OF SIZE 500X350 NB & PN10 PRESSURE RATING.	2	NO
72	RWT111340073	GRP CONCENTRIC REDUCER OF SIZE 600X450 NB & PN10 PRESSURE RATING.	1	NO
73	RWT111340074	GRP CONCENTRIC REDUCER OF SIZE 700X400 NB & PN10 PRESSURE RATING.	1	NO
74	RWT111340075	GRP CONCENTRIC REDUCER OF SIZE 700X500 NB & PN10 PRESSURE RATING.	1	NO
75	RWT111340076	GRP CONCENTRIC REDUCER OF SIZE 700X600 NB & PN10 PRESSURE RATING.	1	NO
76	RWT111340077	GRP ECCENTRIC REDUCER OF SIZE 200X150 NB & PN10 PRESSURE RATING.	10	NO
77	RWT111340078	GRP ECCENTRIC REDUCER OF SIZE 250X150 NB & PN10 PRESSURE RATING.	4	NO
78	RWT111340079	GRP ECCENTRIC REDUCER OF SIZE 300X200 NB & PN10 PRESSURE RATING.	45	NO
79	RWT111340080	GRP ECCENTRIC REDUCER OF SIZE 350X200 NB & PN10 PRESSURE RATING.	5	NO
80	RWT111340081	GRP ECCENTRIC REDUCER OF SIZE 350X250 NB & PN10 PRESSURE RATING.	3	NO
81	RWT111340082	GRP ECCENTRIC REDUCER OF SIZE 450X250 NB & PN10 PRESSURE RATING.	2	NO
82	RWT111340083	GRP ECCENTRIC REDUCER OF SIZE 450X350 NB & PN10 PRESSURE RATING.	6	NO
83	RWT111340084	GRP ECCENTRIC REDUCER OF SIZE 600X450 NB & PN10 PRESSURE RATING.	3	NO
84	RWT111340085	GRP ECCENTRIC REDUCER OF SIZE 700X600 NB & PN10 PRESSURE RATING.	3	NO
85	RWT111340086	GRP BLIND FLANGE, SIZE 150 NB & PN10 PRESS. RATING	2	NO
86	RWT111340087	GRP BLIND FLANGE, SIZE 350 NB & PN10 PRESS. RATING	3	NO
87	RWT111340088	GRP BLIND FLANGE, SIZE 400 NB & PN10 PRESS. RATING	6	NO
88	RWT111340089	GRP BLIND FLANGE, SIZE 500 NB & PN10 PRESS. RATING	2	NO
89	RWT111340090	GRP BLIND FLANGE, SIZE 600 NB & PN10 PRESS. RATING	2	NO
90	RWT111340091	GRP BLIND FLANGE, SIZE 700 NB & PN10 PRESS. RATING	3	NO
91	RWT111340092	GRP STUB FLANGE OF SIZE 15 NB & PN10 PRESS. RATING	400	NO
92	RWT111340093	GRP STUB FLANGE OF SIZE 25 NB & PN10 PRESS. RATING	70	NO
93	RWT111340094	GRP STUB FLANGE OF SIZE 50 NB & PN10 PRESS. RATING	75	NO
94	RWT111340095	GRP END CAP, SIZE 250 NB & PN10 PRESS. RATING	18	NO
95	RWT111340096	GRP END CAP, SIZE 300 NB & PN10 PRESS. RATING	18	NO
96	RWT111340097	GRP PIPE OF SIZE 80 NB & PN10 PRESSURE RATING	10	MR
97	RWT111340098	GRP STUB FLANGE OF SIZE 40 NB & PN10 PRESS. RATING	10	NO
98	RWT111340099	GRP FLANGE OF SIZE 80 NB & #150 PRESSURE RATING.	20	NO
99	RWT111340100	GRP UNEQUAL TEE OF SIZE 200X150 NB, PN10 RATED.	2	NO
100	RWT111340101	GRP CONCENTRIC REDUCER OF SIZE 200X150 NB & PN10 PRESSURE RATING.	2	NO
101	RWT111340102	GRP BLIND FLANGE, SIZE 200 NB & PN10 PRESS. RATING	2	NO
102	RWT111340103	GRP BLIND FLANGE, SIZE 300 NB & PN10 PRESS. RATING	2	NO

1. Price of all 102 items to be quoted against Enq SI no 1.
2. Price breakup to be submitted after price bid opening

Bidder Sign and Seal

## 726253/2022/BAP-EDC-EMBSYS

	BHEL: BAP: RANIPET	Ref:	RWT11134 & RWT11135
	Pre-Qualification Requirement (PQR) for GRP Pipes & Fittings	Dt:	08.03.2022
		Rev :	00

The Qualification requirements for GRP Pipes & Fittings are detailed below and Bidders should meet the same. Offers of bidders who do not meet qualification requirement will not be considered for evaluation.

1. Bidder should have designed, manufactured, supplied, erected & successfully hydro-tested the GRP Pipes & Fittings at site either directly or through authorized agency at least in one process plant for power plant / industrial application.
2. The reference GRP Pipes & Fittings (Flanges, Elbows, Equal Tee, Unequal Tee etc.) shall be of size not less than DN100 and of pressure rating not less than PN 10.
3. The reference GRP Pipes & Fittings should have completed minimum one year after installation, as on the date of techno-commercial bid opening.
4. Bidder shall furnish necessary documentary evidence as a proof of meeting the qualifying criteria for the review by BHEL. Acceptance of documentary evidence rests with BHEL.

**General Conditions:**

1. Bidder shall produce the long term type test report along with the bid.
2. Bidder to submit duly filled & signed copy of the enclosed format (as per Annexure-I).
3. Bidders who defaulted, in any of the previous tenders floated by BHEL are not permitted to respond. Such offers, if found later, will not be considered for evaluation.
4. After receipt of offers, during scrutiny, if any vendor found to have been banned by BHEL, then their offer will be summarily rejected at any stage.
5. Bidder to make provision in case BHEL decides to visit the reference plant furnished by the bidder for meeting the PQR requirements.

	BHEL: BAP: RANIPET	Ref:	RWT11134 & RWT11135
	Pre-Qualification Requirement (PQR) for GRP Pipes & Fittings	Dt:	08.03.2022
		Rev :	00

### Annexure-I

### Qualification Datasheet

#### A. Customer details:

- a. Project name :  
a. Contact person :  
b. Designation :  
c. Mobile :  
d. Land line :  
e. Email id :  
f. Address :

#### B. Reference Plant Details:


Sl. No.	Parameters	Details
01	Certificate Reference & Date	
02	Details Pipes & Fittings	
a)	- Pipe ( Minimum & Maximum Size)	
b)	- Elbow ( Minimum & Maximum Size)	
c)	- TEE ( Minimum & Maximum Size)	
d)	- Flange (Minimum & Maximum Size)	
e)	- Any other Fittings	
03	Applicable Design Standards	
04	Design Pressure Rating (min.)	
05	List the resins utilized for:	
a)	Inner Protection Layer	
b)	Structural Layer	
06	Outer layer UV Protection?	Yes/ No

## 726253/2022/BAP-EDC-EMBSYS

	BHEL: BAP: RANIPET	Ref:	RWT11134 & RWT11135
	Pre-Qualification Requirement (PQR) for GRP Pipes & Fittings	Dt:	08.03.2022
		Rev :	00

Sl. No.	Parameters	Details
07	Layer content:	
a)	Interior layer surface ratio (Glass: Resin)	
b)	Structural layer ratio (Mat: Resin)	
c)	Exterior surface ratio (Mat: Resin)	
08	Testing Pressure	
09	Testing Standard	
10	End use	
11	Date of supply	
12	Date of installation/ commissioning	


Bidder's signature with stamp

	GENERAL SPECIFICATION FOR GRP PIPING SYSTEM	SPEC.NO.ROS: 9084
		REV: 00

BHARAT HEAVY ELECTRICALS LIMITED,  
RANIPET- 632 406.


**GENERAL SPECIFICATION  
FOR  
GRP PIPING SYSTEM**

00	03.03.22	<i>VG</i> 03/03/22	<i>SS</i> 03/03/22	<i>MSM</i> 03/03/22	Fresh issue
<b>Rev No.</b>	<b>Date</b>	<b>Prepared</b>	<b>Checked</b>	<b>Approved</b>	<b>Remarks</b>


	GENERAL SPECIFICATION FOR GRP PIPING SYSTEM	SPEC.NO.ROS: 9084
		REV: 00

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	<b>GENERAL SPECIFICATION FOR GRP PIPING SYSTEM</b>	SPEC.NO.ROS: 9084
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	<b>GENERAL SPECIFICATION FOR GRP PIPING SYSTEM</b>	SPEC.NO.ROS: 9084
		REV: 00

## **1. PART-1: SUPPLY**

### **1.1. Scope**


This specification is intended for the design, manufacturing & supply of Glass Fibre Reinforced Plastic (GRP) pipes and fittings, joining consumable (resins, hardeners etc.) Erection and Installation (E&C). The E&C includes collection of materials from BHEL site stores, transportation of materials from BHEL site stores to the erection spot, laying, joining by own supplied joining materials, assembly of BHEL supplied items (**Annexure-C**), and hydro testing of complete GRP piping with complete system to ensure to meet performance guarantee of system.

### **1.2. General**

- |                        |   |
|------------------------|---|
| a. Item                | : GRP piping system   |
| b. Application         | : Conveying of Sea water, corrosive fluid at low pressure in RO-DM plant. |
| c. Surroundings        | : Hot, dusty & humid atmosphere   |
| d. Installation        | : Indoor/ Outdoor   |
| e. Ambient Temperature | : 45 °C Maximum & 15 °C Minimum   |
| f. Operation           | : Continuous/ Intermittent  |

### **1.3. Fluid Details**

- |                          |                              |
|--------------------------|------------------------------|
| a. Medium Handled        | : Sea water, corrosive fluid |
| b. pH of Fluid           | : 2 to 12.                   |
| c. Operating Temperature | : 20 – 40 °C.                |

	<b>GENERAL SPECIFICATION FOR GRP PIPING SYSTEM</b>	<b>SPEC.NO.ROS: 9084</b>
		<b>REV: 00</b>

#### 1.4. Pipes & Fittings Details

- |                                |  |
|--------------------------------|--|
| a) Pipe Type                   | : ID series pipe   |
| b) Pipe Fittings               | : Elbows, Tees, Reducers, Fixed Flanges, flange stub and blind flanges |
| c) Pipe Thickness              | : Vendor to provide detailed calculation for Verification.             |
| d) Outer Surface Finish        | : Smooth and glassy finish   |
| e) Inner Surface Finish        | : Hazen-William flow coefficient, C = 150                              |
| f) Pressure Rating             | : PN10   |
| g) Tolerance on Pipe Thickness | : 0 to + 0.5 mm.   |
| h) Pipe Std. Length            | : 6m (Minimum)   |

#### 1.5. Marking:

Marking shall be done in all pipes and fittings. In pipes, marking shall be done at intervals not more than 3 meters. The marking shall show the following:

- a) Manufacturer's name
- b) Pipe size and pressure rating
- c) Batch number

#### 1.6. Applicable Standards


- AWWA C950 : Fibre glass pressure pipe
- AWWA M-45 : Fibre glass pipe design manual
- ASTM D 2996 : Pipe wall thickness standards
- ASTM D 3517 : Fibre glass pressure pipe
- ASTM D 3567 : Dimensional control
- ASTM D 5421 : GRP flange dimension standards
- BS 5480 : Hydrostatic pressure test/ pipe stiffness test

#### 1.7. Manufacture

GRP pipes shall be manufactured by filament winding of continuous fibreglass strand roving in a dual helical predetermined pattern under controlled tension. All fittings such as Bends, Tees, Elbows, Flanges, Blind Flanges etc. are to be manufactured using the same materials as that of pipe by contact moulding process. Standard GRP bends can be supplied as factory made. GRP pipes shall be supplied in a standard length of 6 metre (minimum).

The internal and external surfaces shall be clean and free from defects such as protruding fibres, voids, bubbles, pin holes, cracks, blisters, tackiness and foreign objects. Cut laminate surfaces are coated with liner resin and have a smooth finish.

The design shall be performed to meet the required pressure class & stiffness requirements.

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### 1.8. Resin

The resin used for the corrosion barrier of the pipes and fittings is of an unsaturated resin that can provide the required corrosive resistance. The resin in the structural wall of the pipes and fittings is of the unsaturated Polyester type incorporating styrene as the polymer monomer, but other resins may be used depending on the application. The vendor shall use only approved polyester resin system for which they can provide documented performance in this particular application.

### 1.9. Pipe Liner / Pipe Structure

The corrosion barrier surface of GRP Pipe shall have a resin rich chemical resistant barrier with a thickness of minimum 2.0 mm vinylester resin of ratio 90 % suitably reinforced with "C" glass fibre of 10%.

Structural layer is made by filament winding of angle 54.7° consists of E- Glass Chopped roving strand Mat of 60% by weight.

The outer surface of the GRP pipes shall be provided with UV stabilized barrier made of 70% of resin & outer surface of the GRP pipe shall be glassy finish.


### 1.10. Joints

GRP pipes for above ground applications shall be joined by butt & wrap or flanged joint. For connecting of equipment (pumps, tank etc.), valves & bellows flanges shall be used. For instrumentation, flanged stubs are to be used. Typical instrumentation branch details are indicated in the attached drawing.

### 1.11. Fittings

Fittings shall be supplied as per approved drawing. Only swept design shall be used for bends.

GRP flanges shall be contact mould in accordance with ASTM D 5421. Flange shall be flat faced and drilled as per ANSI B 16.5 # 150 & ANSI B 16.47#150. All flanges shall be ID chamfered (10 mm x 45°) to suit the butterfly valve disc operation.

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### 1.12. Documentation Requirements


The documentation during bid and post order stage shall meet the following requirements.

- All documents and drawings shall be submitted in English.
- Hard copies of all documents and drawings during bid stage to be submitted in duplicate.
- Hard copies of all documents for approval to be submitted in triplicate.
- Hard copies of all final documents, drawings, manual etc., shall be submitted in bound folder in duplicate.
- Soft copies of all final documents in MS office/ PDF shall be submitted through email.
- Soft copies of all fitting drawings in AUTOCAD/ PDF, latest version shall be submitted through email.

### 1.13. Documents / Details To Be Submitted Along With Bid

- Duly filled up data sheet **Annexure-A** in the enclosed format.
- List of applicable standards for shop test.
- Applicable Quality plan for supply of the above piping system.
- Supply schedule & supply sequence.
- Pipes & fittings Catalogues.
- Confirmation on the dimensional details for the GRP pipe and fittings as given in the enclosed drawing.
- Hydraulic test procedure & details for testing the pipes, fittings, joints etc. at site after installation.
- Any deviation to this specification shall be specifically mentioned in the enclosed deviation format **Annexure-B**.
- In case of any deviation, to this specification the Bidder shall indicate the deviation, clause by clause in the deviation format attached in **Annexure-B**. If there is no deviation “**NIL**” statement shall be furnished. In the absence of **Annexure-B**, it will be construed that the bid confirms strictly to this specification. Acceptance or rejection of the offer with or without deviations (either fully or partially) is sole discretion of the purchaser without seeking further clarification from the bidder.

**NOTE:** Bidders to note that failing to submit the above documents, the bid shall be considered as incomplete and may be liable for rejection.

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#### 1.14. Documents / Service After Order

- i) The following documents is to be submitted for BHEL's approval.
- Duly filled up data sheet in the enclosed format.
  - Resin datasheets.
  - Dimensional drawing for pipes and fittings.
  - Cross-sectional drawing for pipe structure.
  - GRP joining procedure.
  - Supply schedule & supply sequence.
  - Erection work plan.
- ii) The following are to be submitted to BHEL's review and acceptance for the GRP items:
- Material test certificate (including test certificates for resins and other consumables).
  - Dimensional report for pipes and fittings.
  - Hydraulic test certificates at shop.
  - Performance guarantee certificate.
  - GRP Pipe installation and supporting procedure

#### 1.15. Inspection & Testing

All the stage checks shall be offered to BHEL for inspection. Necessary test certificates for all pipes to be presented to BHEL for review. BHEL will witness sample hydro testing. If the sample fails in the hydro test, the entire lot is liable for rejection.


No material shall be despatched without obtaining written clearance from BHEL. During inspection, the internal inspection reports shall be submitted to BHEL for information.

The following inspection & testing requirements shall be fulfilled:

- Product sample test report from a reputed / accredited test lab shall be furnished to BHEL.
- Checks shall be made on all raw materials to ensure that they comply with the relevant ASTM Standard.
- All deliveries of resin shall be checked for consistency by viscosity and reactivity. Any resins deviating from the manufacturer's published figures shall not be used.

#### ***Long term hoop strength (type test for pressure pipes only):***

- In accordance with ASTM D2992 Procedure B with the exception that the test results shall be extrapolated to determine the stress which the pipe can withstand for a period of 60 years without failure. The lower 95% confidence limit at 60 years shall also be calculated.

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### ***Hydraulic test***

- 100% of the pipes shall be subjected to an internal hydraulic pressure test at the manufacturer's works prior to delivery. The test shall be applied to a pressure equal to 1.5 times the maximum working pressure stated for each classification of pipe. The test pressure shall be applied for a minimum period of 5 minutes without signs of leakage.
- In addition to the above the first pipe and every thirtieth thereafter of each class and diameter shall be maintained at test pressure for a minimum of 4 hours without signs of leakage.
- Each pipe and fitting shall be subjected to an internal low pressure air test at the manufacturer's works prior to delivery. The test pressure shall be an overpressure of 0.1 bar and this shall be applied for a minimum period of 5 minutes without signs of leakage or distress. Fittings which are of mitred construction shall be manufactured from pipes which have successfully passed the tests defined above.

### ***Dimensions***

- The dimensions and tolerances of all pipes shall be determined in accordance with ASTM-D 2122 Stiffness
- A minimum of one pipe for every 30 pipes manufactured shall be tested for stiffness in accordance with ASTM-D 2412 "Method of Test for External Loading Properties of Plastic Pipe by Parallel Plate Loading". A minimum of one pipe of each class and diameter of pipe shall be tested.
- Longitudinal and hoop tensile strength. The tensile strength properties of a minimum of one pipe for every 100 pipes manufactured shall be measured in accordance with ASTM-D 638. A minimum of one pipe of each class and diameter of pipe shall be tested.


### ***Cure***

- Curing, to be tested by the Barcol Hardness test determined in accordance with ASTM-D 2583 standard: 100 % of the produced pieces. Minimum acceptable hardness is 90% of the value recommended by the resin manufacturer of the particular resin used, when non-reinforced. The sample pipe shall also withstand a commercial acetone test on the internal portion of the laminate.

### ***Loss on ignition***

- A minimum of one pipe for every 30 pipes manufactured shall be tested in accordance with ASTM-D 2584 "Standard Method of Test for Ignition Loss of Cured Reinforced Resins".

### ***Joint tests***

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- A minimum of two pipes in every 100 pipes manufactured shall be jointed and tested in accordance with the requirements of section 7.2 of ASTM-D 3262.

#### ***Visual inspection***

- Each pipe and fitting shall be subjected to a complete visual inspection before shipment in accordance with ASTM-D 2563.

#### ***Vacuum test***

- Vacuum test of pipe shall be carried out for each diameter once at beginning of production. The vacuum to be applied shall be equivalent to the condition which occurs during full vacuum. The corresponding derated vacuum for this test shall be proved by the pipe manufacturer.

#### ***Failure of tests on completed pipes***


- In the event of a specimen not fulfilling the minimum requirements for strain corrosion resistance, all pipes of that class and diameter which have been manufactured shall be rejected and shall be replaced entirely.
- Any pipe or fitting which fails any of the quality control tests which are to be carried out on each and every pipe or fitting shall be rejected. In the event of any pipe failing any of the remaining tests outlined above that pipe shall be rejected and the relevant test shall be carried out on a further ten pipes of that class and diameter. If any one of these ten pipes fails than the manufacture of pipes of that class and diameter shall cease and the Owner reserves the right to reject all the pipes of that class and diameter.

#### ***Thermal insulating materials***

- Materials shall be tested for bulk density, specific heat, compressive strength, fire resistance under pressure, service temperature limit in accordance with VDI 2055 or equivalent standards.

#### ***Workshop manufacturing and pre-assembly***

- All workshop fabricated components and parts of the plant shall, to the fullest practical extent, be formed, machined, fitted, welded, stress-relieved, X-rayed, adjusted, tested, cleaned and painted. The equipment shall be pre-assembled in the workshop of the Bidder or his sub-supplier to the maximum possible extent, then dismantled only as far as required for safe and proper shipment, in order to keep erection work on site to a minimum. Equipment and parts shall be marked, labelled or otherwise identified to facilitate assembly and erection on site. Marks and labels shall be fixed in such a manner so that deformation or obliteration shall not occur during shipment, storage and erection on site.

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### 1.16. Packing & Dispatch

- a. All pipe and pipe fittings shall be suitably protected, coated, covered or boxed to prevent damage or deterioration during transit, handling and storage at site, till the time of erection. Each packing shall have necessary handling marks
- b. Each packing shall contain a packing slip indicating the details of item like item description, quantity, weight etc. Packing slip shall be submitted for BHEL approval for giving dispatch clearance by BHEL.
- c. Details of handling & Storage instruction shall also be provided in each packing.
- d. All items shall be properly packed with adequate cushioning material to prevent rough handling and inland transport.
- e. Special care shall be given to prevent damage to the fragile components.
- f. Please refer to the painting specifications, **Annexure-D**, for the pigment colour code.

## 2. PART-2: INSTALLATION AND TESTING

Bidder shall carry out the installation and testing of GRP piping as per the BHEL erection drawings and manuals/documents.


### 2.1. Scope of Work

The vendor's scope of work in installation and testing comprises of the following:

- 1) The following materials are to be collected as per applicable procedure from BHEL stores:
  - i) Vendor supplied GRP pipes, pipe fittings, resins, and other joining consumables.
  - ii) BHEL free supplied Piping components like Valves, Bellows, Static Mixers, flow meters, pipe U-clamps, Fasteners, Rubber Gasket & other piping accessories etc.
- 2) Safe custody of above drawn materials
- 3) Laying, joining of GRP pipes and fittings with own joining material (Resins-liner and structural, Surface mats, Mat Powder, Woven Roving GSM, Hardener, Accelerator, Promoter, Roving etc.)
- 4) Erection of piping components along with valves, fasteners & gaskets.
- 5) Hydro-testing & leakage rectification of piping system
- 6) Handing over of piping system after commissioning and trial operation
- 7) Reconciliation of drawn material from the store and material accounting for all the materials used.

### 2.2. Detailed Scope of Work

- a. Erection of GRP pipes & fittings shall be carried out as per BHEL erection drawing which will be provided during post order. However preliminary isometric piping drawing are enclosed along with the specification for information. Bidder are advised


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to go through the drawings to understand the scope of work. These drawings give only tentative work content and any modification shall be carried out to meet the site requirement by the vendor without any additional commercial implication to BHEL.


- b. Temporary joints of pipes segments to be made as per erection drawings and shall be offered for stage inspection to BHEL. Final joining of piping shall be done after getting approval from BHEL.
- c. Assembly of valves, bellows, static mixers and other accessories along with gaskets are to be taken care during erection of pipe segment.
- d. All the fasteners and gaskets used for assembly of pipes, valves, bellows etc. will be issued by BHEL, but proper accounting and returning of surplus items after erection is bidder's responsibility.
- e. The piping system shall be installed at site as per the erection drawing provided by BHEL. After the completion of pipe installation at site, entire piping, including instrument tapings will be cleaned and flushed with water and tested for **hydrostatic testing at 1.5 times the working pressure as per applicable standards**. All pipe joints shall be watertight. Joints that are found to leak by observation or during testing shall be repaired and retested. Protocol for hydro-test shall be obtained from the customer by the contractor.

### 2.3. Erection, Commissioning & Testing of GRP Pipes and Fittings

- a) Details furnished above cannot be considered as exhaustive. Contractor shall make all efforts to carry out piping works in total as per the specific requirements of the system and as per the good engineering practice to suit site conditions. All testing requirements as per the relevant and applicable standards are to be ensured by the Supplier.
- b) The Intent of this specification is to provide erection, commissioning services for execution of projects according to most modern and proven techniques and codes. It is not the intent to specify completely herein, all aspects of the entire system. Nevertheless, the entire system shall conform in all respects to high standards of engineering, design and workmanship and shall be capable of performing in continuous commercial operation. The contract services towards installation of the Plant shall not relieve the contractor of the responsibility of providing such services, facilities to complete the project of portion of project awarded to him. The quoted rate shall deem to be inclusive of all such contingencies.

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- c) The Contractor shall carry out the work in accordance with instructions/ drawings/ specification/ standard practices supplied / approved by BHEL from time to time.
- d) Modification / Rectification / repair / replacement of defective components if any shall be under bidder's scope within specified time during execution.
- e) Bidder to submit the erection schedule along with stage checks list. For each and every stage, the bidder shall get clearance from the BHEL Engineer / Customer.
- f) All the supplied materials will be issued from BHEL stores and it shall be the responsibility of the contractor for identification of the consignment and to take delivery from BHEL stores, transport the same to site & kept in their safe custody for erection.
- g) Necessary site co-ordination and clearance for stage checks, hydraulic test, pre-commissioning tests, leak check etc., from the customer engineer shall be carried out by the bidder.
- h) Alignment of the pipe support, fixing of rubber sheet (as per erection drawings), etc. at the pipe support location is under vendor's scope
- i) All the piping systems, fittings and accessories supplied under this package shall be designed to operate without replacement and with normal maintenance for a plant service life of about 25 years and shall withstand the operating parameter fluctuations and cyclic fluctuation which can be normally expected during this period.
- j) All pipe system shall be properly designed to take care of hydraulic shocks and pressure surges which may arise in the system during operation.
- k) Suitable slope shall be provided for all pipelines towards drain point. In addition to the system requirement, all low points in the pipe lines shall be provided with suitable draining arrangement and all high points shall be provided with air vent connections where air or gas pockets may occur. Vent for use during hydrostatic test shall be plugged after the completion of the test. Vent shall not be less than 15 mm size.
- l) Drain shall be provided at low points and at pockets in piping such that complete drainage of all system is possible. Drain shall not be less than 15 mm for line size up to 150 mm, not less than 20 mm up to 300 mm and not less than 25 mm for 350 mm to 600 mm pipes and not less than 50 mm for 600 mm and above pipes.

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- m) All pipe work shall be designed to provide sufficient flexibility and to prevent development of undesirable forces or moment at points of connection to equipment.
- n) Extensive use of templates, gauges, plumb lines shall be made for laying, cutting fitting up of various piping components for fabrication.
- o) On completion of both shop and field fabrication, all subassemblies shall be cleaned for the inside and outside by suitable mechanical means ensuring that they are free from all loose foreign materials such as scales, sand, oil grease, cutting chips etc.
- p) Smooth glassy finish to be maintained for all field joints with the parent color of the pipes and fittings.
- q) All field joints shall be kept clean for detecting leaks during testing. Test pressure shall be maintained long enough to facilitate complete inspection of system. Minimum duration of test shall be 6 hrs unless otherwise specified. Pressurizing equipment shall be isolated immediately after the test pressure is attained.

#### 2.4. Exclusions


The following are excluded from the scope of supplier and will be arranged by BHEL

- a. Storage of supplied items at BHEL store as of received condition
- b. All civil works pertaining to GRP piping system
- c. Service water at one point near RO-DM Plant
- d. Free Power supply at one point near RO-DM Plant for erection.
- e. Supply of service / instrument air at one point
- f. Rubber bellows, valves, Instruments, Rubber sheet (Fasteners and Gaskets) etc. for the piping system
- g. Supply & erection of pipe supports.

The requirement shall be specified by the bidder in their technical offer and the supply shall be limited to the specified quantities.

#### 2.5. Specification, Standards & Codes

All pipe and pipe fittings shall be installed and tested as per the specification, relevant national / international standards & statutory codes.

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## 2.6. Tools and Tackles

All the Tools & tackles required for the complete erection of components shall be arranged by the contractor at his cost. The bidder shall have & own a complete set of special tools and tackles required erection. The bidder shall also supply any special tools and tackles that may be required additionally during testing. All tools & tackles shall be reputed make acceptable to the Purchaser.

## 2.7. Flushing

- a. Completed piping systems shall be flushed by bidder with fresh water to clean the pipe of all dirt, debris, and foreign material. Bidder shall prepare a procedure for flushing of the system for approval of purchaser/consultant. Flushing shall not be commenced without approval of flushing procedure.
- b. Bidder shall perform all activities like dismantling and reinstalling of all strainers, in line instruments etc. before and after completion of flushing.
- c. Flushing shall be considered as complete only after inspection and approval by purchaser/consultant.
- d. Disposal of muck and flushing media shall be arranged by bidder as directed by purchaser/consultant, in such a manner that it does not spoil the adjacent installation. Bidder shall obtain purchaser consultant approval regarding the place and method to be adopted for disposal of debris.
- e. Record of flushing giving following details shall be submitted by bidder to purchaser/consultant for its approval and record:
  - a. Date of flushing
  - b. Identification of line: flushed line number

## 2.8. Disposal of Scraps / Unused Items


All the pipe scraps & materials are to be removed from the working area and transported to BHEL scrap area / as per the direction of customer. Un-used balance GRP pipes & materials are to be handed over at BHEL stores with acknowledgement.

## 2.9. Inspection

All the stage checks shall be offered to BHEL / Customer for inspection.


## 2.10. Hydrostatic Testing

- a. Completed piping system as approved by purchaser/consultant shall be hydrostatically tested in the presence of purchaser/consultant. The general

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requirement for hydrostatic test shall be accordance with design requirement of this specification and standard codes specified here in.

- b. Bidder shall prepare hydrostatic test procedure based on specified codes. The hydrostatic test shall commence only after approval of procedure by purchaser/consultant.
- c. Site test pressure of GRP pipes and fittings for pressure application should be 1.5 times the working pressure as per applicable standards. For non-pressured line the site test pressure shall be 1.5 bar as per BS-8010-2.5-1989. Necessary test certificate for all pipes to be presented to BHEL for review BHEL will witness one of such tests. The duration of the holding time will be 10 minutes for all the cases.
- d. All equipment and instrument used for hydrostatic test shall be approved by purchaser/consultant before start of test.
- e. Pressure gauge shall be installed on line to measure test pressure. In case of longer lines two or more pressure gauge shall be installed as directed by purchaser/consultant. One gauge shall be installed at the discharge of the pressuring pump. Pressure gauge used for hydrostatic testing shall be calibrated with dead weight tester in the presence of engineer-in-charge. Range of pressure gauge shall generally be 1.5 times the test pressure.
- f. Orifice plates and restriction orifices shall not be installed until hydrostatic test is completed.
- g. All equipment, lines instruments and relief valves shall be disconnected from piping system by means of blinds during testing. Control valves shall be replaced by spool pieces during testing, which is in the scope of vendor.
- h. High point vent and low point drain required for testing in addition to those marked in the drawings shall be provided by bidder at his own cost.
- i. Vendor shall arrange Gaskets & blind/dummy flanges required for Hydro testing of GRP Piping System.

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### 2.11. Test Records

The records in duplicate shall be prepared and submitted by bidder as below :


- a. Date of test
- b. Identification of pipe tested – line number
- c. Test pressure and duration of holding the pressure.
- d. Initial test pressure and the final test pressure after the holding time.
- e. Test result
- f. Signature of bidder
- g. Approval signature by purchaser/consultant / customer.

### 2.12. Additional Requirements

During execution at site, pipe routing is susceptible to change. The bidder shall carryout these changes at site without any commercial implications to BHEL.


### 2.13. General Requirements to The Bidder

- a. Vendor shall post experienced site engineers with skilled/adequate man power for execution of piping system. Vendor shall prepare a schedule for completion of the work before the commencement of work.
- b. Bidder shall quote for complete work specified in the document. Incomplete quotations for the part of the work will not be considered even if the quoted rates/price is lower.
- c. Bidder shall contact BHEL and obtain additional details/data if any required to submit proper quotation.
- d. The BHEL reserves the right to omit any one or more items of work at any time of the contact without assigning any reason what so ever.
- e. Adequate lighting facilities such as low volt hand lamps shall be arranged by the contractor at the site of construction etc. at his cost.
- f. All the handling facilities for the handling of pipes, fittings, resins, and other joining consumable from BHEL site stores to the erection spot, and for the erection shall be arranged by the Bidder.
- g. All the lifting tackles including wire ropes, slings, shackles and electrically operated equipment shall be got approved by BHEL Engineer before they are actually put on

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use. Test certificates should be submitted before their usage. Test certificate obtained from the statutory authority should be submitted before their usage.

- h. All equipment so used by contractor shall be of proven quality and safe in operation as approved by BHEL site Engineers from time to time.
- i. At periodic / intervals of work, complete and detailed account of the equipment so erected shall be submitted to the BHEL Engineer.
- j. All equipment shall be handled very carefully to prevent any damage and loss. No bare wire ropes, slings etc., shall be used for unloading and / or handling for equipment without the specific written permission of the engineer. The equipment from the storage yard shall be moved to the actual site of erection / location at the appropriate time as per the direction of BHEL Engineer so as to avoid damage for such equipment at site.
- k. The work covered under this scope of work is of highly sophisticated nature requiring best quality / precision workmanship engineering and construction management. He should also ensure successful and timely commercial operation of equipment installed. The contractor must have adequate quantity of precision tools, construction aids in possession. Contractor must also have adequate trained qualified and experienced supervisory staff and skilled personnel.
- l. The shelf life of the supplied joining consumables shall meet the laying schedule and erection requirements.
- m. All the necessary certificates and licenses required to carry out his scope of work are to be arranged by the contractor then and there at no extra cost.
- n. When the work is temporarily suspended he shall protect all construction materials equipment and facilities from causing damage to existing property interfering with the operations of the station when it goes into services. The contractor shall comply with all applicable provisions of the safety regulations clean – up programme and other precautionary measures which the BHEL has in effect at the site.
- o. It will be the responsibility of the contractor to ensure the safe lifting of the piping system taking due precautions to avoid any accidents and damage to other piping system and personnel.
- p. All piping shall be adequately supported and protected to prevent damage during handling and erection. Piping support will be provided by BHEL, however, vendor


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shall provide all necessary input details for pipe supports, thrust blocks etc. well in advance to BHEL. Piping & support erection shall be carried out in conjunction and jointly at site.

- q. Sometimes it may become necessary for the contractor to handle certain un-required components in order to install the required materials. The contractor has to take this contingency also into account. No extra payment is payable for such contingencies.
- r. Due to atmospheric conditions erected support materials are likely to get rusted more frequently. It is the responsibility of the contractor to preserve the erection materials drawn from stores for erection till these are commissioned and handed over to customer. The required paint, thinner all other consumables like painting brush, emery paper, cotton waste, cloth etc., have to be arranged by the contractor at his cost. The contractor should ensure that the materials are not rusted on any account till they are handed over to customer. The decision of the BHEL Engineer is final with regard to frequency of application of paint.
- s. Final Material accounting shall be provided by vendor for final payment.

#### **2.14. Site Cleanliness and Safety Requirements**

- a. Contractor shall strictly follow all safety regulations / conditions as per general conditions of contract booklet enclosed with this tender.
- b. Non – conformity of safety rules and safety appliances will be viewed seriously.
- c. Contractors shall ensure that the quality is maintained in all the works connected with this contract at all stages of the requirement of BHEL.
- d. Contractor shall ensure that all Inspection, Measuring and Testing equipment that are used, whether owned by the contractor or used on loan, are calibrated by the authorized agencies and the valid calibration certificate will be available with them for verification by BHEL. A list of such instruments possessed by contractor at site with its calibration status is to be submitted to BHEL Engineer for control.
- e. Contractors shall arrange for the inspection of the works at various stages as required by BHEL. Immediate corrective action shall be taken by the contractor for the non-conformances if any, observed and pointed out by BHEL.


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### 2.15. Other Statutory Requirements

- a. Contractor shall follow & adhere to all the statutory & safety laws, rules & regulations for labour deployed in executing erection works as amended time to time.
- b. Principle employer's security rules & regulations are to be followed by the contractor scrupulously in executing the contract works.
- c. Contractor shall also adhere to the requirements of the principle employer in respect of minimum wages, provident fund, insurance, etc. as applicable to the contract labour.
- d. Contractor should get the clearance from the principle employer (BIFPCL) & BHEL for wages etc. paid to the labour submitting the necessary proof for the same. Suitable records to be maintained by the contractor for a minimum of 3 years.
- e. The contractor shall submit a copy of labour license obtained from the licensing Officer.
- f. The contractor shall submit monthly running bills along with the copies of monthly wages (of the preceding month) as per contract labour rules, copies of monthly return of PF contribution with remittance challans and copy of renewed WC insurance policy or copies of monthly return of ESI contribution with challans (if applicable) in respect of the workmen engaged by them.
- g. It is advisable that Contractor shall visit the site to have adequate knowledge of all the above rules & regulations before bidding for the tender. No claim shall be entertained for any ignorance of the above rules & regulations during execution of work.
- h. BHEL shall have the right to with-hold suitable amounts from contractor bills for not making payments to labour engaged by them and not adhering to the statutory, safety rules & regulations till the contractor complies with them.

### 2.16. Time of Completion

- a. The time period for completion of GRP Piping System Installation & Testing shall be within 4 months from Purchase Order delivery date / site readiness date whichever is later. Site readiness will be informed by BHEL.

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- b. The entire work shall be completed by the contractor within the time schedule or within the such extended time as may be allowed under relevant clause.

### **2.17. Engagement of Labour**

- a. The contractor will be directly responsible for provision of health and sanitary arrangements more particularly described in contract labour (regulations & Abolition) Act, safety precautions etc., as may be required for safe and satisfactory execution of the contract.
- b. The contractor shall be responsible for proper accommodation including adequate medical facilities & transportation to the work spot and back for the personnel employed by him.

**Annexure-A****TECHNICAL DATASHEET**

<b>Sl. No</b>	<b>Description</b>	<b>Requirement</b>	<b>Vendor Confirmation / Specification</b>
1	Design codes	ASTM D 3517 / D 2996 / AWWA C 950 / AWWA M 45	
2	Type	ID series	
3	Medium handled	Sea water	
4	Pressure rating	PN10	
5	Vacuum pressure	760 mm Hg	
6	Stiffness class	5000	
7	Corrosion-barrier layer resin	Vinylester	
8	Corrosion-barrier layer glass	C-glass fibre	
9	Corrosion-barrier layer resin thickness	2.0 mm (minimum)	
10	Corrosion-barrier layer surface ratio (Mat: Resin)	10:90	
11	Structural layer glass	ECR glass fibre	
12	Structural layer ratio (Glass: Resin)	60:40	
13	Exterior layer resin	Isophthalic resin	
14	Exterior surface ratio (Mat: Resin)	30:70	
15	Exterior surface	UV stabilized resin	
16	Exterior layer thickness	0.5 mm (minimum)	
17	Winding method	Filament wound (Helical)	
18	Winding angle	54.7°	

Sl. No	Description	Requirement	Vendor Confirmation / Specification
19	Additives	Pigment, Dyes, Colouring Agent	
20	Initial specific stiffeners STIS	5000 N/m <sup>2</sup>	
21	Ring bending strain	1.3	
22	Inner surface finish	Hazen-William coefficient; C = 150	
23	Bend design	Swept	
24	Flange standards	ASME B16.5#150 ASME B16.47#150 Series-A	
25	Installation & joining	Above ground, Butt & wrap	
26	Hoop tensile modulus Mpa	Vendor to specify	
27	Axial tensile stress Mpa	Vendor to specify	
28	Axial tensile modulus Mpa	Vendor to specify	
29	Hoop bending modulus Mpa	Vendor to specify	
30	Coefficient of linear expansion m/m°C	Vendor to specify	
31	Barcol hardness	Vendor to specify	



**Annexure-C****Tentative List of BHEL supplied components to be assembled in the pipeline**

Sl. No	Item Description	Size (NB)	Unit	Approx. Qty	Approx. Unit Wt (kg)	Approx. Total Wt (kg)
<b>a) Valves</b>						
1.	Butterfly Valve (Manual)	50	Set	3	6	9
2.		65	Set	1	8	8
3.		80	Set	19	10	190
4.		100	Set	54	12	648
5.		150	Set	30	19	570
6.		200	Set	50	22	1100
7.		250	Set	29	32	928
8.		300	Set	22	42	924
9.		350	Set	15	51	765
10.		400	Set	19	83	1577
11.		500	Set	9	116	1044
12.		600	Set	2	177	354
13.		700	Set	1	248	248
14.	Wafer Check Valve	100	Set	5	4	20
15.		150	Set	18	5	90
16.		200	Set	11	9	99
17.		250	Set	3	16	48
18.		300	Set	8	28	224
19.	400	Set	7	62	434	
20.	Butterfly Valve (Auto)	50	Set	5	14	70
21.		65	Set	4	18	72
22.		80	Set	8	22	176
23.		100	Set	13	27	351
24.		150	Set	39	40	1560
25.		200	Set	88	73	6424
26.		250	Set	17	101	1717
27.		300	Set	56	154	8624
28.		350	Set	16	184	2944
29.		400	Set	3	233	699
30.		450	Set	2	284	568
31.	600	Set	1	519	519	
<b>Approx. Sub-Total Weight (kg)</b>						<b>33004</b>

Sl. No	Item Description	Size (NB)	Unit	Approx. Qty	Approx. Unit Wt (kg)	Approx. Total Wt (kg)
<b>b) Bellows</b>						
1.	Rubber expansion bellows	DN50	Set	2	3	6
2.		DN80	Set	5	4	20
3.		DN100	Set	10	5	50
4.		DN150	Set	5	7	35
5.		DN200	Set	8	10	80
6.		DN250	Set	8	17	136
7.		DN300	Set	8	20	160
8.		DN350	Set	8	23	184
9.		DN400	Set	9	26	234
10.		DN500	Set	7	30	210
<b>Approx. Sub-Total Weight (kg)</b>						<b>1115</b>
<b>c) Other items</b>						
1.	Fasteners	-	Lot	1	-	6135
2.	Gaskets & rubber sheets	-	Lot	1	-	889
3.	Static mixer	DN600	Set	1	150	150
4.		DN350	Set	1	70	70
5.	Flow meter	DN700	Set	2	240	480
6.		DN600	Set	1	162	162
7.		DN350	Set	1	89	89
8.		DN300	Set	2	77	154
9.		DN250	Set	4	64	256
10.		DN150	Set	1	23	23
<b>Approx. Sub-Total Weight (kg)</b>						<b>8408</b>



## VOLUME II

### SUB-SECTION 2.25

#### CLEANING, PROTECTIVE COATING AND PAINTING

##### 1.0.0 GENERAL

This specification covers the general requirements related to the cleaning protective coating and painting of equipment, components and systems that are covered under main equipment / system specifications for 2x660 MW Supercritical Thermal Power Plant. The components and/or equipment shall be mechanically and /or chemically cleaned during the following stages of the Contract.

- Cleaning in workshop
- Cleaning before painting and/or corrosion protection (application of prime coat)
- Cleaning before erection and during installation.

Cleaning of fabricated component items shall be carried out after fabrication and final heat treatment or welding at manufacturer's works or at site, as appropriate. No paint shall be applied surfaces within 75 mm of field welded connections. These surfaces shall be coated with a consumable preservative and marked.

For cleaning in workshop and before painting, mechanical cleaning by power tool and scrapping with steel wire brushes shall be adopted to clear the surfaces. However, in certain locations where power tool cleaning cannot be carried out, hand scrapping may be permitted with steel wire brushes and/or abrasive paper. Cleaning with solvents shall be resorted to only in such areas where other methods specified above have not achieved the desired results. Cleaning with solvents shall be adopted only after written approval of the Owner / Engineer.

Machined surfaces shall be protected during the cleaning operations.

In the event of the surfaces not being cleaned to the Owner's satisfaction, such parts of the cleaning procedures or agreed alternatives as are deemed necessary to overcome the deficiencies shall be carried out at the supplier's sole expense.

For reclining small areas, hand cleaning by wire brushing may be permitted.

##### 2.0.0 CODES AND STANDARDS

Painting of equipment shall be carried out as per the Codes indicated below and shall conform to the relevant IS Code for the material and workmanship.

The following codes and standards shall be followed for the surface preparation, surface protection and painting works.

IS: 5	Colors for ready mixed paints and enamels.
IS: 101	Methods of test for ready mixed paints and enamels.
IS: 104	Ready mixed paint, brushing, Zinc Chrome, priming.
IS: 158	Ready mixed paint, brushing, bituminous, black, lead free, acid, alkali, water and heat resisting.
IS: 161	Heat resistant paints
IS: 1303	Glossary of terms relating to paints.
IS: 1477	Code of practice for painting of ferrous metals in buildings (Parts I & II).
IS: 2074	Specifications for ready mixed paint, Air drying, red oxide zinc chrome priming.
IS: 2338	Code of practice for finishing of wood and wood based materials: Parts 2 schedules.



IS: 2339	Aluminum paint for general purposes, in dual container.
IS: 2395	Code of practice for painting of concrete, masonry and plaster surfaces: Part 2 schedules.
IS: 2524	Code of practice for painting of non-ferrous metals in buildings (Parts I & II).
IS: 2932	Specification for enamel, synthetic, exterior (a) undercoating, (b) Finishing
IS: 3140	Code of practice for painting asbestos cement building products.
IS: 6158	Recommended practice for design safeguarding against Embrittlement of hot dip Galvanized Iron & steel products.
IS: 6159	Recommended practice for design & fabrication of Iron & steel products prior to Galvanizing & metal spraying.
IS: 6278	Code of practice for white washing and Color - Washing.
IS: 10221	Code of practice for coating & wrapping of underground mild steel pipelines.
IS: 33	Inorganic pigments and extenders for paints –Methods of sampling & test.
IS: 13183	Aluminum paint, Heat resistant - specifications.
IS: 144	Specification for ready mixed paint brushing, petrol resisting, Air drying for Interior paints of tanks and containers, Red oxide.
IS: 9954	Pictorial surface preparation standards for painting of steel surfaces.
IS: 11883	Specification for Ready Mixed Paint, Air Drying, Red Oxide Priming for metals.
IS: 9404	Color code for identification of pipelines used in the Thermal Power Plants.
IS: 12744	Specification for Ready Mixed Paint, Air Drying, Red Oxide-Zinc Phosphate Priming.
BS: 2015	Glossary of paint selected terms.
BS: 5252	Final coat color.
BS: 7079A1/S1	Specification for rust grades and preparation grades of uncoated substrates after overall removal of previous coating.
BS: 7079A2	Preparations grades of previously coated steel substrates.
BS: 7079GrC	Surface roughness characteristics of blast cleaned steel substrates.
BS: 7079GrD	Methods for surface preparation.
BS-4232	Surface Finish of Blast cleaned steel for painting.
ASTM	American Standard for Testing Material.
ASTM A 780	Standard practice for repair of damaged galvanized coatings.
AWWA	American Water Works Association.
ASA-A-13.1-1981	Scheme for identification of piping system (American National Standard Institution).
DIN	Deutsehes Institute for Normung
S1S-055900-1967	Surface preparation standards for painting steel surfaces. (Swedish standard Institution)
SSPC-SP	Preparation Specifications (Steel structures painting council, U.S.A.).
	National Association of Corrosion Engineers, U.S.A. (NACE).



### 3.0.0 SCOPE OF WORK AND GENERAL REQUIREMENTS

This specification covers the surface preparation, method of application and material to be used for all coating of equipment, steel structures and piping. Steel material subjected to surface preparation on shop/site shall have minimum requirements in accordance with Rust Grade B (SSPC/SSPM Volume-2).

Coating materials according to SSPC, EN ISO, ASTM, BIS or DIN standards, shall be used. The paint shall comply with applicable laws, regulations, ordinances etc., of the local authority, state or the nation pertains to the work. The materials shall be matched with each other so that they are compatible. Coatings deviating this specification shall be subject to approval.

**Standards of surface preparation and painting shall give a time to first maintenance of minimum 10 years.**

The paint to be applied shall be approved by Owner.

All paints & paint material used shall be procured from approved manufacturers. Paint shall be supplied in manufacturers original containers with the description of content, specification No., colour, ref no, date of manufacture, shelf life expiry date & pot life.

The paint manufacturers shall provide coating system data sheet for each coating system to be used containing the following information

- a. Surface preparations
- b. Film thickness (min and max)
- c. Min and max recoating intervals at relevant temperatures
- d. Mixing ratio, thinner details and coating repair systems

The sample for testing the paint being used may be taken by the Owner at any time.

In general Shop fabricated equipment will be delivered to the site coated with a shop applied system or the manufacturer's standard finish in accordance with the requirements of this specification.

For equipment that has received shop prime coat, all touch-up prime coat and additional coats shall be applied in accordance with the coating schedule. It is responsibility of the vendor to ensure compatibility between shop and field applied paint systems.

Necessary precautions shall be provided to all equipment, structures to protect other surfaces from abrasive blasting, coating over spray and spatter. Damage to other surfaces or equipment shall be repaired by the vendor.

The Contractor shall submit the following for review and approval by the Owner:

- a. Manufacturer's recommended paint scheme for the project
- b. Latest published product & instructions for application data,
- c. Procedures for surface preparation and application.
- d. Pre qualification for equipments and blasting materials, product, procedure and personnel qualifications for the paint and painting systems.
- e. Painting repair procedures

Painting records shall contain:

- Equipment/components/location painted
- Date of painting
- Paint details such as specification No, colour, date of manufacture, shelf life, expiry date
- Application equipments



- Ambient conditions at the time of painting
- Surface temperature
- Drying time between coating, DFT and number of coatings
- Appropriate work plan for painting.

The supply of all necessary equipments, weather protection, and scaffolding for painting to ensure work is carried out in accordance with the specification and agreed programme.

Maintenance of the paint work until completion of the contract, this shall include repair of any damaged areas caused by third party.

Disposal of painting waste resulting from painting, shall comply with applicable laws, regulations, ordinances etc., of the local authority, state or the nation pertains to the work and coating materials.

It is a mandatory requirement that all operatives working to this procedure take full cognizance and implement necessary safety precautions.

#### 4.0.0 CLEANING AT MANUFACTURER'S WORKS

Mechanical cleaning shall preferably be carried out by abrasive blasting. The Owner is prepared to consider alternative methods such as chemical cleaning provided they achieve the necessary surface condition.

In case of chemical cleaning, the detailed procedure for chemical cleaning as well as the system for which chemical cleaning is required shall be submitted by the contractor for Owner's approval. The procedure shall comprise of pre-treatment and acid treatment to achieve cleanliness equivalent to that specified for mechanical cleaning.

##### **Surface condition:**

The Metal surfaces shall be clean and free of mil scale, rust, dirt, grease and any other deleterious matter.

Where metal surfaces are to be painted the surface profiles shall conform to the painting specification requirements.

Where this does not apply, surfaces shall have a surface texture not coarser than Grade 80 abrasive paper.

##### **Abrasives:**

Abrasives containing silica, silicates or slag residues shall not be used for water/steam side surfaces of plant except for cleaning sand castings, where hydro blasting may be employed.

For austenitic materials only, abrasives containing 98% or more of alumina,  $Al_2O_3$ , shall be used.

Removal of abrasive and debris:

After cleaning, abrasive and debris shall be thoroughly removed for components.

#### 5.0.0 PROTECTION AT MANUFACTURER'S WORKS

As soon as all items have been cleaned and within four hours of the subsequent drying, they shall be given suitable anti-corrosion protection.



All water, air and steam side surfaces shall be protected by the application of approved water soluble corrosion inhibitors, or vapor phase inhibitors that can be subsequently removed by site water washing or steam blowing.

The gas side of steam generating plant items shall be protected by the application of temporary protective that do not require to be removed before commissioning, but which are removed during initial firing.

The rate of application of volatile corrosion inhibitors shall be at least 10 grams per square meter or 35 grams per cubic metre, whichever is the greater, except for pipes up to 300 mm diameter for which the minimum application rates shall be 5 grams per square metre.

Immediately after the protective treatment has been applied all vessels and pipes shall be suitably sealed off by discs or caps or approved alternatives to prevent ingress from the surroundings. Cylindrical plugs shall not be driven into the ends of pipes. These protective covers shall not be removed until immediately before final connection is made to the associated equipment.

#### 6.0.0 WEATHER CONDITIONS

Painting shall be done only when the surface temperature is above 5°C. Surface temperature must be at least 3°C above dew point to ensure that condensation does not occur on the surface.

Reasonable protection against precipitation and seawater spray shall be exercised for the painting of outdoor parts.

Precautions shall also be taken against solar radiation to ensure that the specified dry film thickness of priming or finish coats is obtained.

Any prime coat exposed to excess humidity, rain, dust etc., before drying, shall be permitted to dry and the damaged area of primer shall be removed and the surface prepared and primed again.

Sheltered or unventilated horizontal surfaces on which dew may collect require more protection, and to achieve this additional top coat of paint shall be applied.

The temperature quoted as “normal” in the “Paint System Tables” refers to the average local climatic conditions.

#### 7.0.0 SURFACE PREPARATION

In preparing any surface to be coated, all loose paint, dirt, grease, rust, scale, weld slag or spatter or any other extraneous material shall be removed and defects repaired, so as to obtain a clean, dry, even surface to receive the priming or finishing coat (s) as called for in the painting schedules. Sharp edges should be rounded, especially when tank linings have to be applied.

All machined surfaces, including flange faces, shall be suitably covered to prevent damage during surface preparation.

All surfaces should be blast cleaned whenever possible.



### Surface preparation methods:

Bare steel surfaces should be prepared by one of the methods described below in order of preference and in accordance with Swedish Standard SIS 05 59 00 or Steel Structures Painting Council, SSPC, Vis 1, or DIN 55928, section 4.

The relative humidity level should not be more than 60% & the steel surface temperature at least 3° C above the dew point during dry blast cleaning operations.

#### a. White metal blast cleaning      Sa 3 or SSPC - SP 5

Sa 3 Blast cleaning to bare metal. Mill scale, rust and foreign matter must be removed completely. Subsequently, the surface is cleaned with vacuum cleaner, clean dry compressed air or a clean brush. It must then have a uniform metallic color and correspond in appearance to the prints designated Sa 3.

#### b. Near white metal blast cleaning      Sa 2 1/2 or SSPC - SP 10

Sa 2 1/2. very thorough blast cleaning. Mill scale, rust and foreign matter shall be removed to the extent that the only traces remaining are slight imperfections in the form of spots or stripes. Subsequently, the surface is cleaned with a vacuum cleaner, clean dry compressed air or a clean brush. It must then correspond in appearance to the prints designated Sa 2 1/2.

Mechanical cleaning should only be used when procedures (a) and (b) are not practicable.

#### c. Near white metal blast cleaning      P Sa 2 1/2 DIN 55928

Very thorough blast cleaning. Very adhesive coatings remain. From all other surface mill scale and rust are to be removed to such an extent that the only traces remaining are slight imperfections in the form of spots or stripes. Further treatments see Sub b).

The adhesivity of residual coatings in the transition zone has to be tested even after the application of the primer.

#### d. Very thorough mechanical scraping and wire brushing St 3

St 3 very thorough scraping and wire-brushing - machine brushing - grinding - etc. are to be preferred. Surface preparation as for St 2. But much more thoroughly. After the removal of dust, the surface must have a pronounced metallic sheen and correspond to the prints designated St. 3.

#### e. Thorough scraping and wire brushing St 2

St 2 Thorough scraping and wire-brushing - machine brushing - grinding - etc. The treatment shall remove loose mill scale, rust and foreign matter. Subsequently, the surface is cleaned with a vacuum cleaner, clean dry compressed air or a clean brush. It should then have a faint metallic sheen. The appearance must correspond to the prints designated St 2.

#### f. Air Blasting with Non-Metallic Abrasives Powder

Whenever the "Duplex"-process is to be applied (hot dip galvanising followed by painting), prepare the hot dip galvanised surface by water washing to remove flux residues and careful air blasting with non-metallic abrasive powder. Use an abrasive with grain size from 0.1 to 0.5 mm, at a greatly reduced air pressure, max. 2 bar (g) (28 psig).

This procedure also applies to stainless steel and aluminium surfaces to be coated.



Surface preparation methods	SIS 055900	DIN 55928 Part-4	BS 4232 only for blasting	SSPC-Vis
Blasting acc to item (a),(b),(c),	Sa 3		First quality	White metal SP 5
Blasting acc to item (b)	Sa 2 1/2		Second quality	near White SP 10
Blasting acc to item (c)	Sa 2		Third quality	Commercial blast SP 6
Hand/or power tool derusting acc to item (e)	St 2		--	Hand tool cleaning SP 2
acc to items (d) and (e)	St 3		--	Power tool cleaning SP 3
Flame jet cleaning		F1	--	Flame cleaning SP 4
Pickling		Be	--	Pickling

Steel structures to be blast cleaned have to be free of pitting and other severely corroded places in accordance with B.S. 4232 and SIS 055900.

The abrasives used for blast-cleaning shall be graded flint, grit, shot or silica sand and shall be such that they will produce an average keying profile on the blast-cleaned surface of not more than 40 microns.

An air pressure of 7 bar g at the nozzle shall be used.

After blast-cleaning, all accumulated grit, dust, etc., must be removed leaving the surface clean, dry and free of mill scale, rust grease and other foreign matter.

In the event of rusting after completion of the surface preparation, the surface must be cleaned again in the manner specified.

Oil, grease, soil, cement, salts, acids or other corrosive chemicals shall be cleaned from steel surfaces, by the use of solvents, emulsions or cleaning compounds. The final wiping shall be with clean solvent and clean rags or brushes. There shall be no detrimental residue left on the surface.

Primed areas which suffer damage must be spot blasted on site to a degree of cleanliness Sa 2 1/2 before, touching up.

Protective coating must be applied as quickly as possible after the completion of surface preparation no matter what cleaning method has been used.

No blast-cleaned surface shall be allowed to remain uncoated overnight.

Steel work protected by shop primer after arrival on site must be cleaned of salt, sand, oil etc. Before the first coat of paint is applied on site. Shop primer damaged during transport must be rectified by blast-cleaning and coating before application of the site coats.

Wood surfaces shall be sanded clean. All nail holes shall be puttied and sanded before priming.

Concrete: If a protective coating is required, concrete shall be allowed to cure before painting.



### 8.0.0 PREPARATION OF COATING MATERIALS

All containers shall remain un-opened until required for use.

Primers and paints which have livered, gelled or otherwise deteriorated shall not be used.

The oldest primer or paint of each kind shall be used first.

All ingredients in any container shall be thoroughly mixed before use, and shall be agitated frequently during application to keep the primer in suspension.

Primer or paint mixed in the original container shall not be transferred until all settled pigment is incorporated into the body of liquid.

Mixing in open containers shall be done in a well ventilated area.

Primer or paint shall be mixed in a manner ensuring the breakdown of all lumps, complete dispersion of pigment and uniform composition.

Two-component primers shall be mixed in accordance with the manufacturer's instructions. Thinners shall not be added to primers or paints unless necessary for proper application according to the manufacturer's instructions. When use of thinners is permitted, it must be added to the primer or paint during mixing.

#### 8.1.0 Primer Paint

After the surface is prepared, one coat of suitable primer shall be applied. After this first coat is dried up completely, second coat of primer shall be applied.

Primer shall be applied by brushing to ensure a continuous film without 'holidays'. The dry film thickness of each coat shall be as specified in the Annex- ANNEX 25.1.2 -Paint System of this specification.

The primer should be worked by brush application to cover the crevices, corners, sharp edges etc. in the presence of inspector.

The shades of successive coats should be slightly different in color in order to ensure application of individual coats, the thickness of each coat and complete coverage should be checked as per specification approved by Engineer before application of successive coats.

The contractor shall provide standard thickness measurement instrument with appropriate range(s) for measuring.

Elko meter for measuring the Dry film thickness of each coat, surface profile gauge for checking of surface profile in case of sand blasting. Holiday detectors and pinhole detectors for checking the painted surface discontinuities should be provided by the contractor.

The contractor shall make arrangements for paint manufacturer to provide expert technical service at site as and when required free of cost and without any obligation to the Owner, as it would be in the interest of the manufacturer to ensure that both surface preparation and application are carried out as per their recommendations.

Final inspection shall include measurement of paint dry film thickness, check of finish and workmanship.

#### 8.2.0 Rub down and Touch Up of Primer

The shop coated surfaces shall be rubbed down thoroughly with emery paper to remove all dust, rust and other foreign matters, washed, degreased, then cleaned with warm fresh water and air dried.



The portions, from where the shop coat has peeled off, shall be touched up and allowed to dry before applying a coat of primer.

The compatibility between shop coat and field primer shall be ascertained from the paint manufacturer. In case degreasing with white spirit is not effective, the surface shall be finally wiped clean with aromatic solvent like xylol or light naphtha.

### 8.3.0 Non Compatible Shop Coat Primer

- a) The compatibility of finishing coat shall be confirmed from the paint manufacturer. In the event of use of primer such as zinc rich epoxy, inorganic zinc silicate etc., the paint system shall depend on condition of shop coat. If the shop coat is in satisfactory condition showing no major defect, the shop coat shall not be removed. The touch up primer and finishing coat(s) shall be identified for application by Engineer. Shop coated (coated with primer & finishing coat) equipment shall not be repainted unless paint is damaged.
- b) Shop primed equipment and surfaces shall only be 'spot cleaned' in damaged areas by means of power tool brush cleaning or hand tool cleaning and then spot primed before applying one coat of field primer unless otherwise specified. If shop primer is not compatible with field primer then shop coated primer shall be completely removed before application of selected paint system for particular environment. For package units/equipment, shop primer shall be as per the paint system given for particular environment.
- c) In case of existing paint, compatibility between finishing coat and new selected finish coat shall be ascertained before application of finish coat. In case, the coat is selected for upgrading existing alkyd coating to high performance coating then, surface preparation shall be by manual/mechanical means to remove loose rust, peeled off/damaged paint, but sound old coating need not be removed. It shall be touched with suitable primer wherever it has peeled of before application of tie coat. The tie coat shall be applied after 7 days of curing of the primer. If, new paint system is not suitable to upgrade existing coating then complete paint shall be removed by mechanical or blast cleaning before application of new coating system.

### 8.4.0 Finish Paint

Suitable Finish paints as per the schedule shall be applied for the jobs. The color/shade shall be as approved by the Owner. After cleaning the dust on the dried up primer, first coat of finished paint shall be applied. After this first coat dries up hard, the surface is wet scrubbed cutting down to a smooth finish and ensuring that at no place the first coat is completely removed. After applying second coat, allowing the water to get evaporated completely, third finish coat of finish paint may be applied(if applicable).

### 9.0.0 STEEL STRUCTURES PAINTING

Generally, all steel structures shall receive two primer coats and two finish coats of painting. First coat of primer shall be given in shop after fabrication before dispatch to erection site after surface preparation as described below. The second coat of primer shall be applied (if required) after erection and final alignment of the erected structures. Two finish coats shall also be applied after erection.

Steel surface which is to painted shall be cleaned off dust and grease and the heavier layers of rust shall be removed by chipping to grade ST-2 as per SIS05-5900 or as per IS: 1477 (part -I) prior to actual surface preparation. Suitable primer of required DFT shall be applied as specified in the Paint system of this document- Annex-25.1.1.

Suitable finish paint of required DFT shall be applied as specified in the Paint system of this document- Annex-25.1.1. The undercoat and finish coat shall be of different tint to distinguish



the same from finish paint. All paints shall be of approved brand and shade as per the Owner's requirement.

Joints to be site welded shall have no paint applied within 100 mm of welding zone. Similarly where Friction grip fasteners are to be used no painting shall be provided. On completion of the joint the surfaces shall receive the paint as specified.

Surfaces inaccessible after assembly shall receive two coats of primer prior to assembly. Surfaces inaccessible after erection including top surfaces of floor beams supporting gratings or chequered plate shall receive one additional coat of finish paint over and above number of coats specified before erection. Portion of steel member embedded / to be encased in concrete shall not be painted.

### 10.0.0 PAINT MATERIALS

The paints shall conform to the specifications given in this Annex and class - 1 quality in the products range of any of the following manufacturers:

- a. Asian Paints (India) Ltd.
- b. Bombay Paints
- c. Berger Paints India Ltd.,
- d. Good lass Nerolac Paints Ltd.,
- e. Garware Paints
- f. Jenson & Nicholson
- g. Shalimar Paints
- h. Equivalent other country manufacturer after prior approval of Owner.

### 11.0.0 STORAGE

All paints and painting material shall be stored only in rooms to Engineer's approval. All necessary precautions shall be taken to prevent fire. The storage building shall preferably be separated from adjacent buildings. A signboard bearing the words "PAINT STORAGE - NO NAKED LIGHT - HIGHLY INFLAMMABLE - DANGER - NO SMOKING" shall be clearly displayed outside. All paints shall be stored in the safest manner so that no container rolls down and causes accidents. The shelf life of the paints shall be ensured so that the paint materials are not in storage and use after the date of expiry.

### 12.0.0 APPLICATION

#### Health and safety of work

The supplier has to check all painting work to be carried out according to the specification of the paint supplier further to all relevant prescriptions and regulations concerning the health and safety of work.

The paint supplier has to present a written specification including at least the flash point of the paints, ventilation requirements, handling precautions such as inhalation, eye and skin protection, and first aid procedure, storage requirements, spill or leak procedure, fire precaution, waste disposal.

#### Methods

Quality of the surface to be painted or coated has to be tested acc. to DIN 55928 and DIN 8202.

Temporary corrosion protections are to be completely removed prior to applying the definite one, in acc. with DIN 55928.



All prime coatings shall be applied by brush or airless spray or a combination of these methods, as approved by the coating manufacturer.

All doors, windows, stairways, handrails (if painted), bolts, flanges and equipment supports shall be finish painted by brush.

Spray guns should not be used outside in windy weather or near surfaces of a contrasting colour unless the latter is properly protected.

All cold-spray painting shall be done using standard equipment in accordance with accepted standards and methods.

Care has to be taken not to connect spraying devices for nitro and bakelite paints simultaneously to oil based paints.

Paint applied to items that are not being painted shall be removed at the supplier's expense, leaving the surface clean, unstained and undamaged.

#### **Dry film thickness (DFT)**

To the maximum extent practicable the coats shall be applied as a continuous film of uniform thickness and free of pores. Overspray, skips, runs, sags and drips should be avoided. The different coats shall not be of the same colour.

For a composite paint or coating system consisting of several coats, the total DFT must be at least equal to the sum of the minimal DFT's for the individual coats. If, the paint system does not have the required minimum DFT those areas should be marked & repainted. If the occurrence of those areas is high, the complete surface must be repainted. It is also critically important to check the DFT of primers and intermediate coats and to correct them where necessary.

For paintings based on Zinc silicate the DFT is limited as well on minimum DFT as on maximum (150µm) because of the risk of mud cracking.

#### **Consumption of paints**

Has to be evaluated according to DIN 53220. The paints shall be tested as per IS - 101.

Each coat of paint shall be allowed to harden before the next is applied. For epoxy paint the hardening time normally is 12-14 hours. Suppliers' recommendations regarding hardening time of epoxy paints must be followed.

Particular attention must be paid to full film thickness at edges.

The minimum total dry film thickness of the paint systems shall be as recommended in the **Annex 25.1.2**. The DFT is given in microns (millionths of a metre).

### **13.0.0 PROTECTIVE COATINGS AND PAINT SYSTEMS**

The colour coding for identification of pipelines should comply with IS-2379 & IS -9404.

The type and number of protective coats for any item requiring painting are to be in accordance with DIN 55928 and are to be at least of a quality as shown in the attached Annex-25.1.1- Paint System.

Alternative to the Annex-25.1.1- Paint System specified, are to be presented on the schedule Departure from Specification, as indicated elsewhere.



Generally, all parts shall receive the specified prime coat (s) at the supplier's works to ensure that no corrosion occurs during transport to the site and storage at the site.

Parts which cannot be damaged during transport shall receive the full number of coats.

Types of Substrate, Base metal:

- Ferrous (Surface Temperature during operation < 120° C, EN ISO 12944:1998)

To this group belongs carbon steel, low alloyed steel & high alloyed steel. All paint systems are inevitable for corrosion protection.

- Hot dip galvanized surfaces.

Hot dip galvanized surfaces do require painting in a wet, industrial, chemicals and/or marine environment

- SS (EN ISO 12944:1998 conditionally applicable)

In general, SS surfaces do not require painting unless in a chemical and/or marine environment. In case of chemical and/or marine environments determination of whether or not the surface requires painting depends on the chemical content of the base metal.

The following formula applies:

$$W = Cr + 3.3 \times Mo + 22.45 N_2$$

If  $W < 23$ , then the surface has to be painted.

If  $W < 28$  &  $W > 23$ , then the surface to be painted if splash contact with the media (i.e. sea) is possible. This may also occur if there is a strong wind carrying drops to the surface.

If  $W > 28$ , then the surface need not be painted.

- Aluminium

By default such surfaces/components will not be painted. Exceptions are architectural/aesthetic reasons and high corrosive conditions, which shall be evaluated separately depending on aluminum alloys.

#### 14.0.0 GALVANIZING

Galvanizing works shall conform in all respect to B.S. 729, B.S. 3083 and B.S.C.P. 2008 and to DIN 50976 whatever requires the higher quality and shall be performed by the hot dip process, unless otherwise specified.

It is essential that details of steel members and assemblies which are to be hot-dip galvanized should be designed in accordance with B.S 4479.

Vent-holes and drain-holes should be provided to avoid high internal pressures and air-locks during immersion, which may cause explosions, and to ensure that molten zinc is not retained in pockets during withdrawal.

Careful cleaning of welds is necessary before welded assemblies are dipped. The welds and the surrounding metal should be cleaned separately, preferably be blast-cleaning, because the usual preliminary pickling cannot be relied on to remove the welding slag.

All defects of the steel surface including cracks, surface laminations, laps and folds shall be removed in accordance with B.S. 4360. All drilling, cutting, welding, forming and final



fabrication of unit members and assemblies shall be completed, where feasible, before the structures are galvanized. The surface of the steelwork to be galvanized shall be free from paint, oil, grease and similar contaminants in accordance with DIN 55928, part 4 and DIN 50976. The weight of zinc coating per unit area has to be noted in the manufacturing documents in accordance with DIN 50976.

The minimum average coating weight shall be as specified in Table 1 of B.S. 729 or Table 2, DIN 50976, whatever requires higher quality.

Structural steel items shall be initially grit-blasted to B.S. 4232, second quality, (Sa 21/2) or by pickling in a bath and the minimum average coating weight on steel sections 5 mm thick and over shall be 610 g/m<sup>2</sup> (DFT = 85μ) .

On removal from the galvanizing bath, the resultant coating shall be smooth, continuous, free from gross surface imperfections such as bare spots, lumps, blisters and inclusions of flux, ash or dross.

Galvanized contact surfaces to be joined by high-tensile friction-grip bolts shall be roughened before assembly so that the required slip factor (defined in B.S. 3294, part 1 and B.S. 4604, part 1) is achieved. Care shall be taken to ensure that the roughening is confined to the area of the mating faces.

Bolts, nuts and washers, including general grade high-tensile friction grip bolts (referred to in B.S. 3139, and B.S.4395 part 1) shall be hot dip galvanized and subsequently centrifuged (according to B.S. 729). Nuts shall be tapped up to 0.4 mm oversize after galvanizing and the threads oiled to permit the nuts to be finger-turned on the bolt for the full depth of the nut. No lubricant, applied to the projecting threads of galvanized high-tensile friction-grip bolt after the bolt has been inserted through the steelwork, must be allowed to come into contact with the mating faces of the steelwork,. A local remelting of the galvanized parts to achieve the nuts to be finger turned on the bolt is possible in accordance with DIN 50976.

Protected slings must be used for offloading and erection. Galvanized work which is to be stored at the works or on site shall be stacked so as to provide adequate ventilation to all surfaces to avoid wet storage staining (white rust).

Small areas of the galvanized coating damaged in any way shall be restored in accordance with DIN 55928, part A and DIN 50976 by:

- Cleaning the area of any weld slag rust and other impurities and by thorough wire brushing to give a metallic clean surface.
- Application of suitable number of coats of zinc-rich paint containing more than 90 % w/w of zinc in dried film. The dry film thickness shall exceed at least 50 % the thickness of the desired galvanization. In case of application of a low melting point zinc alloy repair rod, the rods shall be in accordance with DIN1707, the thickness of the alloy shall be at least as of the desired galvanization.

The restored area is not to exceed 1 % of the galvanized surface.

Surface restoration of parts in contact with drinking water is not allowed and the quality of the galvanization is to be in accordance with DIN 2444.

After fixing, bolt heads, washers and nuts shall receive two coats of zinc-rich paint. Connections between galvanized surfaces and copper, copper alloy or aluminum surfaces shall be protected by suitable preferably hydrophobe tape wrappings to the owner's approval.



### 15.0.0 SPRAYED METAL COATINGS

Corrosion protection may be also achieved by spraying of suitable metals as zinc and/or aluminum on the surfaces of structures. For special cases tin, copper, lead can be used as well. Methods of surface preparation have to conform to B.S. 2569 or to DIN 8567. A proper treatment of the surface followed by an immediate spraying is to apply to ensure adhesion of the sprayed metal. The surface has to be clean, free of impurities, rust, mill scale and rough enough to have binding properties to ensure good enticulation with the sprayed layer. Suitable roughness can be achieved by blast cleaning acc. to BS 4232 or DIN 8567. Welds are to be cleaned and prepared with special care. All surfaces to be treated have to be dry and accessible.

Application of coatings, requirements for thickness, adhesion, composition of coating metals, and subsequent treatment have to conform to BS 2569, DIN 8565 and 8567.

Testing of the spray coated layers are to be carried out in accordance with DIN 8565.

The contractor has to specify the type, composition and thickness of the sprayed metal and of the sealing coating according to DIN 8565 including the corresponding warranties and tests if, sprayed metal coating will be applied.

#### Safety of work:

All precautions connected with this type of application of corrosion protection have to be in accordance with German regulation DVS 2307, page 1. 2.

Sprayed, unfused coating of metals and metallic compounds applied by combustion gas flame, plasma arc, detonation and similar processes, and the preparation of components, spraying techniques, sealing, finishing and inspection shall be according to B.S. 4761.

The hot galvanized surface has to be cleaned before the application of the coats to remove corrosion products, dirt, dust, grease.

The cleaning can be achieved by

- brush off
- washing with 1 - 1.5 % ammonia water with up to 0.1 % detergent added and followed by wet grinding to turn the foam to grey color,
- steam blasting.

### 16.0.0 WARNING NOTES / SIGNALS

This Instruction serves the identification of the coated surfaces that are received from shop in assembled condition / module wise.

The warning note shall prevent any possible damage to the coated surfaces during transportation / assembly at site.

Eg.: Welding work OR Heat treatment work on the outside of coated or lined surfaces is prohibited.

### 17.0.0 COLOUR CODE FOR PIPING

- a. The colour code scheme is intended for identification of the individual group of the pipeline. The system of colour coding consists of a ground colour and colour bands superimposed on it. The colour coding for the identification of pipelines shall comply with **Annex – 25.1.1** of this specification.



Ground Colour shall be applied throughout the entire length for un insulated pipes. For insulated pipes, on the metal cladding or on the pipes of material such as non-ferrous metals, austenitic stainless steel etc., ground colour coating of minimum 2m length or of adequate length not to be mistaken as colour band shall be applied at places requiring colour bands. Colour band(s) shall be applied at the following location.

- i. At battery limit points
  - ii. Intersection points & change of direction points in piping ways.
  - iii. Other points, such as midway of each piping way, near valves, junction joints of service appliances, walls, on either side of pipe culverts.
  - iv. For long stretch/yard piping at 50 M interval.
  - v. At start and terminating points.
- b. Flow direction shall be indicated by an arrow in the location stated above and as directed by Engineer. Colors of arrows shall be black or white and in contrast to the color on which they are superimposed. The size of the arrows shall conform to IS:2379. Product names shall be marked at pump inlet, outlet and battery limit in a suitable size as approved by Engineer. As a rule minimum width of color band shall conform to 75 mm up to 300 NB and to 100 mm over 350 NB. Whenever it is required by the Engineer to indicate that a pipeline carries a hazardous material, a hazard marking of diagonal stripes of red and golden yellow as per IS:2379 shall be painted on the ground color.
- c. All uninsulated piping systems, hangers and supports shall have two coats of suitable primer coats and with suitable finish paints as per Annex 25.1.2 Painting system. Shades shall be as per IS 5 or as indicated by Owner /Engineer. Service of the pipe/line designations shall be painted on all pipes at visible locations.

#### 18.0.0 IDENTIFICATION OF VESSELS, PIPING ETC.

Equipment number shall be stenciled in black or white on each vessel, column, equipment and machinery after painting.

Line number in black or white shall be stenciled on all the pipelines of more than one location as directed by Engineer; size of letters printed shall be 150 mm (high) for column & vessels. 50 mm (high) for pump compressor and other machinery and shall be as per IS: 9404 for piping. The storage tanks shall be marked as detailed in the respective drawing.

#### 19.0.0 INSPECTION AND TESTING

- a) All painting materials including primers and thinners brought to site for application shall be procured directly from manufacturer as per specifications and shall be accompanied by manufacturer's test certificates. Paint formulations without certificates are not acceptable. Engineer at his discretion, may call for tests for paint formulations. Contractor shall arrange to have such tests performed including batch wise test of wet paints for physical & chemical analysis. All costs thereof shall be borne by the contractor. The paints shall be tested as per IS: 101 / equivalent international standard and approved by the Owner.
- b) The painting work shall be subject to inspection by Engineer at all times. In particular, following stage wise inspection shall be performed and contractor shall offer the work for inspection and approval of every stage before proceeding with the next stage. The record of inspection shall be maintained in the registers. Stages of inspection shall be surface preparation, primer application and each coat of paint. In addition to above, record shall include type of shop primer already applied on equipment e.g. red oxide zinc chromate or zinc phosphate or Silicate primer etc.



- c) Any defect noticed during the various stages of inspection shall be rectified by the contractor to the entire satisfaction of Engineer before proceeding further. Irrespective of the inspection, repair and approval at intermediate stages of work, contractor shall be responsible for making good of any defects found during final inspection/guarantee period/defect liability period as defined in general condition of contract. Dry film thickness (DFT) shall be checked and recorded after application of each coat and extra coat of paint shall be applied to make-up the DFT specified without any extra coat to the Owner.

#### **20.0.0 GUARANTEE**

The contractor shall guarantee that the chemical and physical properties of paint materials used are in accordance with the specifications contained herein/to be provided during execution of work. The contractor shall produce test reports from the manufacturer regarding the quality of the particular batch of paint supplied. The Engineer shall have the right to test wet samples of paint at random for quality of the same. Batch test reports of the manufacturer's for each batch of paints supplied shall be made available by the contractor.



## ANNEX-25.1.1

## STANDARD FINAL COLOUR OF EQUIPMENT AND PIPING

## 1.0.0 STANDARD COLOUR CODE FOR MECHANICAL EQUIPMENT

Sl. No.	Description	Ground Colour
<b>A</b>	<b>CLOSED COOLING WATER SYSTEM</b>	
1	Closed cooling water pumps	Sea Green
2	Plate heat exchanger	Sea Green
3	Closed Cycle cooling Water (CCCW) pumps	Sea Green
4	CCCW Expansion tank	Sea Green
5	CCCW chemical dosing tank	Sea Green
<b>B</b>	<b>WATER TREATMENT PLANT</b>	
1	Raw water	
a	Raw water pump	Sea Green
b	Clarifier	Sea Green
c	- Raw / Fire water storage tank	Sea Green
d	DM plant supply pump	Sea Green
e	Filter air blower	Sea Green
f	Filter back wash pump	Sea Green
g	Lime slaking tank & agitator	Sea Green
h	Lime slurry transfer pump	Sea Green
l	Lime solution tank	Sea Green
j	Lime solution dosing pump	Sea Green
k	Alum solution tank	Sea Green
l	Alum solution metering pump	Sea Green
m	Polyelectrolyte solution tank	Sea Green
n	Polyelectrolyte solution metering pump	Sea Green
o	Sludge feed pump	Sea Green
p	Filter press	Sea Green
q	Service water tank for DM building	Sea Green
r	Service water tank for control annex	Sea Green
2	Demineralization system	
a	Activated carbon filter	Sea Green
b	Cation exchanger	Sea Green
c	Anion exchanger	Sea Green
d	Degasser tower	Sea Green
e	Air blower for degasser tower	Sea Green
f	Strong base anion exchanger	Sea Green
g	Degassed water transfer pump	Sea Green
h	Strong base anion exchanger	Sea Green
l	Mixed bed polisher	Sea Green
j	Air blower for mixed bed polisher	Sea Green
k	DM Water Storage tank	Sea Green
l	DM water transfer pump	Sea Green
m	Acid unloading cum transfer pump	Dark Admiralty Grey
n	Bulk acid storage tank	Dark Admiralty Grey
o	Acid measuring tank for SAC	Dark Admiralty Grey
p	Acid measuring tank for MB	Dark Admiralty Grey
q	Regeneration water pump	Dark Admiralty Grey
r	Caustic Lye unloading cum transfer pump	Dark Violet
s	Bulk caustic storage tank	Dark Violet
t	Caustic regeneration tank & agitator	Dark Violet



Sl. No.	Description	Ground Colour
u	Caustic solution filter	Dark Violet
v	Caustic dilution tank for SBA/WBA	Dark Violet
w	Caustic dilution tank for MB	Dark Violet
x	Caustic pump for regeneration for WBA/SBA	Dark Violet
y	Waste water recirculation cum disposal pump	Sea Green
<b>C</b>	<b>CRANE &amp; HOIST</b>	
1	Power house EOT crane	Canary Yellow
2	CW pump house EOT crane	Canary Yellow
<b>D</b>	<b>COMPRESSED AIR PLANT</b>	
1	Air compressor	Sky Blue
2	Compressed air dryer	Sky Blue
3	Air receiver	Sky Blue
<b>E</b>	<b>Chemical Dosing</b>	
1	Hydrazine preparation tank	Dark Admiralty Grey
2	Ammonia preparation tank	Dark Admiralty Grey
3	Hydrazine & ammonia dosing tank	Dark Admiralty Grey
4	Hydrazine & ammonia dosing pump	Dark Admiralty Grey
5	Phosphate preparation tank	Dark Admiralty Grey
6	Phosphate dosing tank	Dark Admiralty Grey
7	Phosphate dosing pump	Dark Admiralty Grey
8	Sampling system	Dark Admiralty Grey
<b>F</b>	<b>FIRE PROTECTION SYSTEM</b>	
1	Diesel engine driven pump	Fire Red
2	Fuel tank for diesel engine driven pump	Fire Red
3	Main hydrant pump (Electrical)	Fire Red
4	Jockey pump	Fire Red
5	Fire Water Storage tank	Fire Red
6	CO2 cylinder	Fire Red
<b>G</b>	<b>FUEL OIL SYSTEM</b>	
1	Fuel oil pumps skid	Light Brown
2	Fuel oil Storage tank	Light Brown
3	Fuel oil strainer	Light Brown
<b>H</b>	<b>ASH DISPOSAL SYSTEM</b>	
1	Ash transmitting vessel	Aluminium
<b>I</b>	<b>AIR CONDITIONING AND VENTILATION SYSTEM</b>	
1	Refrigerant compressor	Sky Blue
2	Chilled / condenser pumps	Sea Green
3	Condenser water pipe	Sea Green
4	Fans	Grey

## Notes:

1. This color code basically refers to IS:2379 for piping with necessary modifications
2. For any item left out, color coding will be decided after Owner's approval.



## 2.0.0 STANDARD COLOUR CODE FOR ELECTRICAL EQUIPMENT

	Description	Colour	Colour No.
1	Generator	Two undercoats of high quality epoxy based primer followed by two coats of epoxy painting	
2	Generator circuit breaker	-	RAL 7032
	a) Outdoor		
	b) Indoor	Glossy white	-
3	Transformers	Pebble grey	RAL 7032
4	Bus ducts	Pebble grey	RAL 7032
5	Junction boxes.	Pebble grey	RAL 7032
6	HT/LT Switchboards, Distribution boards, Control & Relay panels		
	a) Indoor	Pebble grey	RAL 7032
	b) Outdoor	Pebble grey	RAL 7032
7	UPS Panel, charger panels	Pebble grey	RAL 7032
8	DG Alternator	Onan Green	-
9	NGR	Pebble grey	RAL 7032
10	Motor	Pebble grey	RAL 7032
11	Lighting fittings	As per manufacturer's standard	As per manufacturer's standard
12	Cable trays	Galvanized	
13	Elevator	Red oxide primer paint	

1. For interior coating, manufacturer's standard can be adopted subject to Owner's approval.
2. All panels that are to be erected at CCR floor shall be painted using RAL 7032 (exterior colour). All Electrical, C&I, Fire alarm or any other panel shall have this colour.



### 3.0.0 COLOUR CODING FOR IDENTIFICATION OF PIPELINES USED IN THERMAL POWER PLANTS

Sl.No	Medium	Ground Shade		Band Shade		Remarks
		Color	Color No. as per IS:5	Color	Color No. as per IS:5	
1	Water system					
a)	Untreated or raw / service	Sea green	217	White	-	White is not included in IS - 5-2007
b)	Treated/dematerialized	Sea green	217	Light orange	557	
c)	Condensate	Sea green	217	Light brown	410	
d)	Potable water	Sea green	217	French blue	166	
e)	RO water	Sea green	217	Light orange	557	
f)	Service & clarified water	Sea green	217	French blue	166	
2	Steam system					
a)	Auxiliary steam	Aluminum	-	Signal red	537	with aluminum
3	Air system					
a)	Instrument	Sky Blue	101	White	-	White not included in IS-5 - 2007
b)	Service/Plant	Sky Blue	101	White	-	
c)	Vacuum pipes	Sky Blue	101	Black	-	
4	Gas system					
a)	Hydrogen	Canary yellow	309	Signal red	537	White is not included in
b)	Chlorine	Canary yellow	309	Dark violet	796	
c)	Carbon dioxide	Canary yellow	309	Light grey	631	
d)	Oxygen	Canary yellow	309	White	218	
5	Oils					



Sl.No	Medium	Ground Shade		Band Shade		Remarks
		Color	Color No. as per IS:5	Color	Color No. as per IS:5	
a)	LDO/HFO	Light brown	410	Brilliant green	221	
b)	Transformer oil	Light brown	410	Light orange	557	
6	Chemical feed					
a)	Acid piping (in water treatment plant)	Dark admiralty grey	632	Signal red	537	Hazard mark is given
b)	Alkali Piping (in water treatment plant)	Dark violet	796	Golden yellow	356	Hazard mark is given
7	Fire services	Fire red	536	-	-	-
8	Effluent pipes	Black	-	-	-	-

#### 4.0.0 COLOUR CODE FOR STRUCTURAL STEEL

SL. NO	ITEAM/SERVICE	COLOR	COLOR No. as per IS:5
1	Gantry girder & monorail	Brilliant green	221
2	Gantry girder & monorail stopper	Signal red	537
3	Building structural steel columns brackets, beams bracings, roof truss, purloin, side grit, louvers, stringers	Dark admiralty grey	632
4	Pipe rack structure & trestle	Dark admiralty grey	632
5	Chequered plate (Plain Face)	Black	-
6	Grating	Black	-
7	Ladder	Dark admiralty grey	632
8	Hand railing Hand rail	Signal red	537
9	Middle rail	Signal red	537
10	Toe Plate	Signal red	537
11	Vertical post	Black	-
12	Structural steel for Silo	Smoke grey	692

**Notes**

1. Covering capacity and DFT depends on method of application. Covering capacity specified above is theoretical. Allowing the losses during application, min specified DFT shall be maintained.
2. All primers and finish coats shall be cold cured and air dried unless otherwise specified.
3. All paints shall conform to relevant Indian Standard and shall be applied in accordance with manufacturer's instructions for surface preparation, intervals, curing and application. The surface preparation, quality and workmanship shall be ensured.
4. Technical data sheets for all paints shall be supplied at the time of submission of quotations.
5. In case of use of epoxy tie coat, manufacturer shall demonstrate satisfactory test for inter coat adhesion. In case of limited availability of epoxy tie coat, alternate system may be used taking into consideration the service requirement of the system.
6. Contractor will submit the final colour shade for all equipments & piping under his scope for final approval by client / consultant.

ANNEX 25.1.2 PAINTING SYSTEMS						
Cleaning, Protective Coating and Painting - Systems designed as per ISO 12944 with service life of 10 yrs.						
Surface/ Location	Temp	Surface prep	Coat	No. of coats	Generic Type	Dft/Coat
Structural Steel work, piping ( Oil + Water), tanks outside surface, transmission towers cranes, steel floors, galleries, stairways, Outdoor.	< 130 Deg	SA 2 1/2	Primer	1	Solvent based IZS - VS of 60%. Zn Dust - 1.77 kg/ltr minimum. Zn dust by weight - minimum 85%. Pot life 12 hrs / 21 Deg.- Paint to meet compositional & performance specifications for SSPC Paint 20 , Level 1	75
			Touch up	1	Two component Zinc rich Primer meeting performance and compositional specifications of SSPC Paint 20 Level2	(75)
			Mid coat	1	2 pack High build High Solid Lamellar MIO based Epoxy Mid coat.	200
			Finish	1	2 pack Acrylic Aliphatic Polyurethane top coat - with Gloss retention of at least 90% on QUVB exposure of minimum 1000 hrs.	75
					<b>Total</b>	<b>350</b>
Structural Steelwork, piping, indoor and outdoor	130 to 200 Deg	SA 2 1/2	Primer	1	Solvent based IZS - VS of 60%. Zn Dust - 1.77 kg/ltr minimum. Zn dust by weight - minimum 85%. Pot life 12 hrs / 21 Deg.- Paint to meet compositional & performance specifications for SSPC Paint 20 , Level 1.	75
			Touch up	1	Two component Zinc rich Primer meeting performance and compositional specifications of SSPC Paint 20 Level2	(75)
			Sealer	1	Single pack Heat Resistant Silicon Acrylic Finish paint.	25
			Finish	2	Single pack Heat Resistant Silicon Acrylic Finish paint.	25
					<b>Total</b>	<b>150</b>
<b>Alternative -2</b>		SA 2 1/2	Primer	1	Solvent based IZS - VS of 60%. Zn Dust - 1.77 kg/ltr minimum. Zn dust by weight - minimum 85%. Pot life 12 hrs / 21 Deg.- Paint to meet compositional & performance specifications for SSPC Paint 20 , Level 1.	75
				1	Single pack Moisture Cured, Inorganic Silicate based heat resisting finish up to 400 Deg - Grey shade./ white/ Aluminium.	50
			Finish	1		50
					<b>Total</b>	<b>175</b>
<b>Alternative-3</b>			Finish	1	Single pack Heat Resistant Silicon Acrylic Finish paint. - either Aviation White/ Aviation Orange.	80
					<b>Total</b>	<b>155</b>
Structural Steel work Piping, Un-insulated	200 to 400	SA 3	Primer	1	Solvent based IZS - VS of 60%. Zn Dust - 1.77 kg/ltr minimum. Zn dust by weight - minimum 85%. Pot life 12 hrs	75

ANNEX 25.1.2 PAINTING SYSTEMS						
Cleaning, Protective Coating and Painting - Systems designed as per ISO 12944 with service life of 10 yrs.						
Surface/ Location	Temp	Surface prep	Coat	No. of coats	Generic Type	Dft/Coat
Carbon Steel Indoor and Outdoor	Deg C.				/ 21 Deg.- Paint to meet compositional & performance specifications for SSPC Paint 20 , Level 1.	
			Touch up	1	Two component Zinc rich Primer meeting performance and compositional specifications of SSPC Paint 20 Level 2.	(75)
			Finish	2	Heat Resisting Silicon Aluminium Paint. VS to be min 28%.	20
					<b>Total</b>	<b>115</b>
Carbon steel surfaces subjected to temperature up to 400 °C. But Under Thermal Insulation.	< 400 °C	Power tool cleaning to St 2 /3		2	Red-oxide Zinc phosphate primer to IS 12744	30
						60
Components coming in the gas path (other than Coils), including water walls, SH panels, SH Headers, Hot air ducts etc.		Power tool cleaning		2	Red-oxide Zinc phosphate primer to IS 12744	30
						60
Structural Steel work, Piping (Oil + water ) , Tanks Indoor.	<130 Deg.C	SA 3	Primer	1	Solvent based IZS - VS of 60%. Zn Dust - 1.77 kg/ltr minimum. Zn dust by weight - minimum 85%. Pot life 12 hrs / 21 Deg.- Paint to meet compositional & performance specifications for SSPC Paint 20 , Level 1.	75
			Touch up	1	Two component Zinc rich Primer meeting performance and compositional specifications of SSPC Paint 20 Level2	(75)
			Mid coat	2	2 pack High build High Solid Lamellar MIO based Epoxy Mid coat.	100
			Finish	2	Two component Polyamide Cured Epoxy Coating.	25
					<b>Total</b>	<b>325</b>
Structural Steel work in the battery rooms, chlorination plant and	Ambient	SA 3	Primer	1	Solvent based IZS - VS of 60%. Zn Dust - 1.77 kg/ltr minimum. Zn dust by weight - minimum 85%. Pot life 12 hrs / 21 Deg.- Paint to meet compositional & performance	75

ANNEX 25.1.2 PAINTING SYSTEMS						
Cleaning, Protective Coating and Painting - Systems designed as per ISO 12944 with service life of 10 yrs.						
Surface/ Location	Temp	Surface prep	Coat	No. of coats	Generic Type	Dft/Coat
water treatment plant, ( extremely aggressive atmosphere )					specifications for SSPC Paint 20 , Level 1	
			Touch up		Two component Zinc rich Primer meeting performance and compositional specifications of SSPC Paint 20 Level2	(75)
			Mid coat	1	Two component, high build rust encapsulating, aluminium pigmented modified epoxy coating.	125
			Finish	1	Two component High Build high Solid Aliphatic Amine Cured Epoxy coating. - Min VS 85%	150
					<b>Total</b>	<b>350</b>
Steel Tanks inside Surface (Total) for Oil Storage	Normal	SA 2.5	Primer	1	Two component high build amine cured epoxy Primer with zinc phosphate pigment.	75
			Finish	2	Two component Self priming High Build Polyamine adduct cured epoxy coating.	125
					<b>Total</b>	<b>325</b>
<b>Alternative-1</b>			Finish	3	Two component Self priming High Build Polyamine adduct cured epoxy coating. <b>(No primer required. Self priming coating post blasting)</b>	125
					<b>Total</b>	<b>375</b>
<b>Alternative-2</b>			Finish	2	Two component High build high solid Solvent free epoxy coating - certified by CFTRI for Potable water usage. <b>(Primer same as above)</b>	150
					<b>Total</b>	<b>300</b>
Steel Tanks inside Surface (Total) for Water Storage ( Potable and Distilled Water )	Ambient	SA 3	Primer	1	Two component high build polyamide cured zinc phosphate Primer	75
			Finish	2	Two component Self priming High Build Polyamine adduct cured epoxy coating - certified by CFTRI for Potable water usage.	125
					<b>Total</b>	<b>325</b>
<b>Alternative 1</b>			Finish	2	Two component High build high solid Solvent free epoxy coating - certified by CFTRI for Potable water usage. <b>(No primer required. Self priming coating post blasting)</b>	200
					<b>Total</b>	<b>400</b>
Steelwork immersed in	< 60	SA 3	Primer	1	Two component High Build High Solid Rapid Curing Epoxy	75

ANNEX 25.1.2 PAINTING SYSTEMS							
Cleaning, Protective Coating and Painting - Systems designed as per ISO 12944 with service life of 10 yrs.							
Surface/ Location	Temp	Surface prep	Coat	No. of coats	Generic Type	Dft/Coat	
seawater such as inlet/ outlet structures, dolphins, sheet piling	Deg C				Zinc Phosphate Primer.		
			Finish	1	Two component High build High Solid Modified Epoxy coating.	500	
					<b>Total</b>	<b>575</b>	
					<b>Wherever TAR based product is not to be recommended.</b>		
			Finish	1	Two component High build High Solid Modified Epoxy coating	500	
					<b>Total</b>	<b>500</b>	
			Finish	1	Two component High build High Solid Modified Epoxy coating with Glass Flake.	500	
					<b>Total</b>	<b>500</b>	
<b>Alternative 1</b>							
Cast Iron Water pipelines - Outside surface, buried in Soil	< 60 Deg C	SA 3	Primer	1	Solvent based IZS - VS of 60%. Zn Dust - 1.77 kg/ltr minimum. Zn dust by weight - minimum 85%. Pot life 12 hrs / 21 Deg.- Paint to meet compositional & performance specifications for SSPC Paint 20 , Level 1	75	
			Finish	2	Polyamide Cured Coal Tar Epoxy, Vs min 65% black.	200	
					<b>Total</b>	<b>475</b>	
Alternate-1			Finish	1	Two component High build High Solid Modified Epoxy coating	500	
Alternate -2			Finish	1	Two component High build High Solid Modified Epoxy coating with Glass Flake	500	
Steel Pipes - Inside surfaces such as cooling water lines.	< 60 Deg C	SA 3	Primer	1	Solvent based IZS - VS of 60%. Zn Dust - 1.77 kg/ltr minimum. Zn dust by weight - minimum 85%. Pot life 12 hrs / 21 Deg.- Paint to meet compositional & performance specifications for SSPC Paint 20 , Level 1.	75	
			Finish	2	Coal Tar Epoxy, Vs min 65% black.	225	
					<b>Total</b>	<b>525</b>	
Water Pipelines - Outside Surface, Indoor	< 60 Deg C	SA 3	Primer	1	Solvent based IZS - VS of 60%. Zn Dust - 1.77 kg/ltr minimum. Zn dust by weight - minimum 85%. Pot life 12 hrs / 21 Deg.- Paint to meet compositional & performance specifications for SSPC Paint 20 , Level 1.	75	
			Touch	1	Two component Zinc rich Primer meeting performance and	(75)	

ANNEX 25.1.2 PAINTING SYSTEMS							
Cleaning, Protective Coating and Painting - Systems designed as per ISO 12944 with service life of 10 yrs.							
Surface/ Location	Temp	Surface prep	Coat	No. of coats	Generic Type	Dft/Coat	
			up		compositional specifications of SSPC Paint 20 Level2		
			Finish	2	Two component High Build high Solid Aliphatic Amine Cured Epoxy coating. - Min VS 85%	100	
					<b>Total</b>	<b>275</b>	
Oil pipelines - Outside surface, above ground	< 100 Deg C	SA 3	Primer	1	Solvent based IZS - VS of 60%. Zn Dust - 1.77 kg/ltr minimum. Zn dust by weight - minimum 85%. Pot life 12 hrs / 21 Deg.- Paint to meet compositional & performance specifications for SSPC Paint 20 , Level 1.	75	
			Touch up			Two component Zinc rich Primer meeting performance and compositional specifications of SSPC Paint 20 Level2	(75)
			Mid coat	2	Two component High Build high Solid Aliphatic Amine Cured Epoxy coating. - Min VS 85%	100	
			Finish	1	2 pack Acrylic Aliphatic Polyurethane top coat - with Gloss retention of at least 90% on QUVB exposure of minimum 1000 hrs.	75	
					<b>Total</b>	<b>350</b>	
Pumps, Motors, Turbine, Claddings, Steam Turbine Condenser, Indoor	Up to 90 Deg	SA 2.5	Primer	1	Catalysed Zn rich Primer with a VS of 60% min, complying to SSPC Paint 20 level 2.	75	
			Finish	2	Two component High Build high Solid Aliphatic Amine Cured Epoxy coating. - Min VS 85%.	100	
					<b>Total</b>	<b>275</b>	
<b>Alternative 1</b>		SA 2.5	Primer	1	Catalysed Zn rich Primer with a VS of 60% min, complying to SSPC Paint 20 level 2.	75	
			Mid coat	1	Two component High Build high Solid Aliphatic Amine Cured Epoxy coating. - Min VS 85%.	100	
			Finish	2	2 pack Acrylic Aliphatic Polyurethane top coat - with Gloss retention of at least 90% on QUVB exposure of minimum 1000 hrs.	75	
					<b>Total</b>	<b>250</b>	
Heat Exchangers - Inside Surface.	Up to 60 Deg	SA 2.5	Primer	1	Solvent based IZS - VS of 60%. Zn Dust - 1.77 kg/ltr minimum. Zn dust by weight - minimum 85%. Pot life 12 hrs / 21 Deg.- Paint to meet compositional & performance specifications for SSPC Paint 20 , Level 1.	75	
			Finish	2	Coal Tar Epoxy, Vs min 65% black.	200	

ANNEX 25.1.2 PAINTING SYSTEMS						
Cleaning, Protective Coating and Painting - Systems designed as per ISO 12944 with service life of 10 yrs.						
Surface/ Location	Temp	Surface prep	Coat	No. of coats	Generic Type	Dft/Coat
					<b>Total</b>	<b>475</b>
Heat exchanger Coils coming in the gas path . (Eco, SH, RH coils & Loose tubes etc.)		Power tool cleaning			One coat of dip-coat paint -Red-oxide Zinc phosphate primer	35
Instrument panels, Electrical cubicles and similar steel sheet – indoor <b>(Can be used on Aluminium, steel, stainless steel and galvanized substrates.)</b>	Ambient	Oil grease and contaminants must be removed	Primer	1	Two pack , high build siloxane modified epoxy primer with zinc phosphate pigment.	75
			Mid coat	1	Two component High Build Surface Tolerant Epoxy coating pigmented with Aluminium and Lamellar Micaceous iron oxide	100
			Top coat	1	Two component High Build high Solid Aliphatic Amine Cured Epoxy coating. - Min VS 85%	100
					<b>Total</b>	<b>275</b>
Instrument panels, Electrical cubicles and similar steel sheet – outdoor <b>(Can be used on Aluminium, steel, stainless steel and galvanized substrates.)</b>	Ambient	Oil grease and contaminants must be removed	Primer	1	Two pack , high build siloxane modified epoxy primer with zinc phosphate pigment.	100
			Mid coat	1	Two component High Build Surface Tolerant Epoxy coating pigmented with Aluminium and Lamellar Micaceous iron oxide.	150
			Top coat	1	2 pack Acrylic Aliphatic Polyurethane top coat - with Gloss retention of atleast 90% on QUVB exposure of minimum 1000 hrs.	75
					<b>Total</b>	<b>325</b>
Substrate, base metal: Carbon steel, HDG acc ISO 1461 Or. Equiv. Non Insulated. - Outdoor	<120 Deg	Air blasting with Nonmetallic abrasive Powder	Touch up	1	Two component Zinc rich Primer meeting performance and compositional specifications of SSPC Paint 20 Level2	(75)
			Primer	1	Two pack , high build siloxane modified epoxy primer with zinc phosphate pigment.	50
			Mid coat	1	Two component High Build Surface Tolerant Epoxy coating pigmented with Aluminium and Lamellar Micaceous iron oxide	150

ANNEX 25.1.2 PAINTING SYSTEMS								
Cleaning, Protective Coating and Painting - Systems designed as per ISO 12944 with service life of 10 yrs.								
Surface/ Location	Temp	Surface prep	Coat	No. of coats	Generic Type	Dft/Coat		
			Finish	1	2 pack Acrylic Aliphatic Polyurethane top coat - with Gloss retention of atleast 90% on QUVB exposure of minimum 1000 hrs.	75		
					<b>Total</b>	<b>275</b>		
Substrate, base metal: Carbon steel, HDG acc ISO 1461 Or. Equiv. Non Insulated.- Indoor	<120 Deg	Air blasting with Nonmetallic abrasive Powder	Touch up	1	Two component Zinc rich Primer meeting performance and compositional specifications of SSPC Paint 20 Level 2.	75		
			Primer	1	Two pack , high build siloxane modified epoxy primer with zinc phosphate pigment.	125		
			Finish	1	Two component High Build high Solid Aliphatic Amine Cured Epoxy coating. - Min VS 85%.	100		
						<b>Total</b>	<b>225</b>	
						<b>For Outdoor Application</b>		
				Touch up	1	Two component Zinc rich Primer meeting performance and compositional specifications of SSPC Paint 20 Level2	(75)	
				Primer	1	Two pack , high build siloxane modified epoxy primer with zinc phosphate pigment.	125	
				Finish	1	2 pack Acrylic Aliphatic Polyurethane top coat - with Gloss retention of at least 90% on QUVB exposure of minimum 1000 hrs.	75	
					<b>Total</b>	<b>200</b>		
					<b>For Indoor Application</b>			
Substrate, Stainless Steel - Non insulated.	< 120 Deg	Air blasting with Nonmetallic abrasive Powder	Primer	1	Two pack , high build siloxane modified epoxy primer with zinc phosphate pigment.	125		
			Finish	1	Two component High Build high Solid Aliphatic Amine Cured Epoxy coating. - Min VS 85%	100		
						<b>Total</b>	<b>225</b>	
						<b>For Outdoor Application</b>		
				Primer	1	Two pack , high build siloxane modified epoxy primer with zinc phosphate pigment.	125	
				Finish	1	2 pack Acrylic Aliphatic Polyurethane top coat - with Gloss retention of atleast 90% on QUVB exposure of minimum 1000 hrs.	75	
					<b>Total</b>	<b>200</b>		
Applicable for Water -					<b>For Indoor Application</b>			

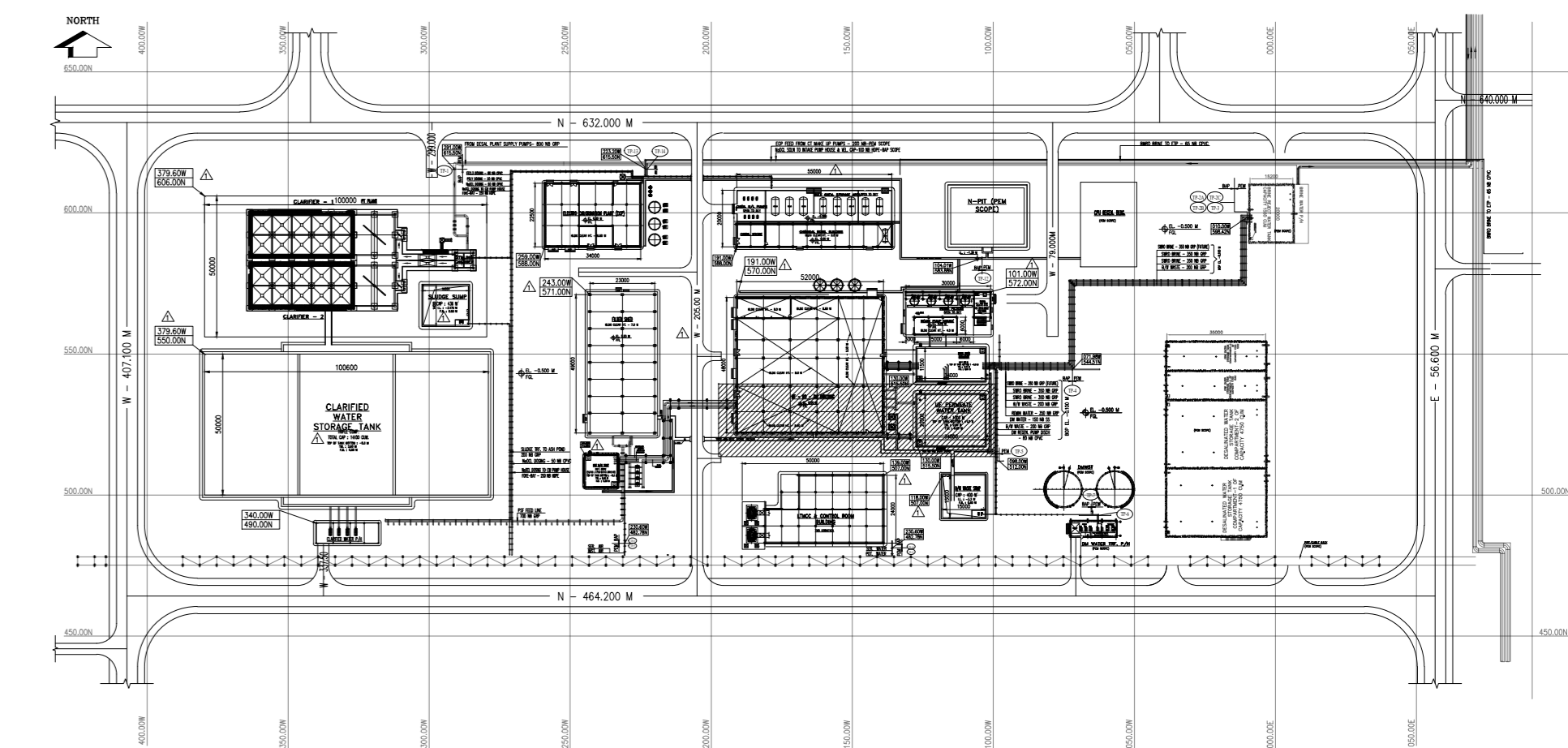
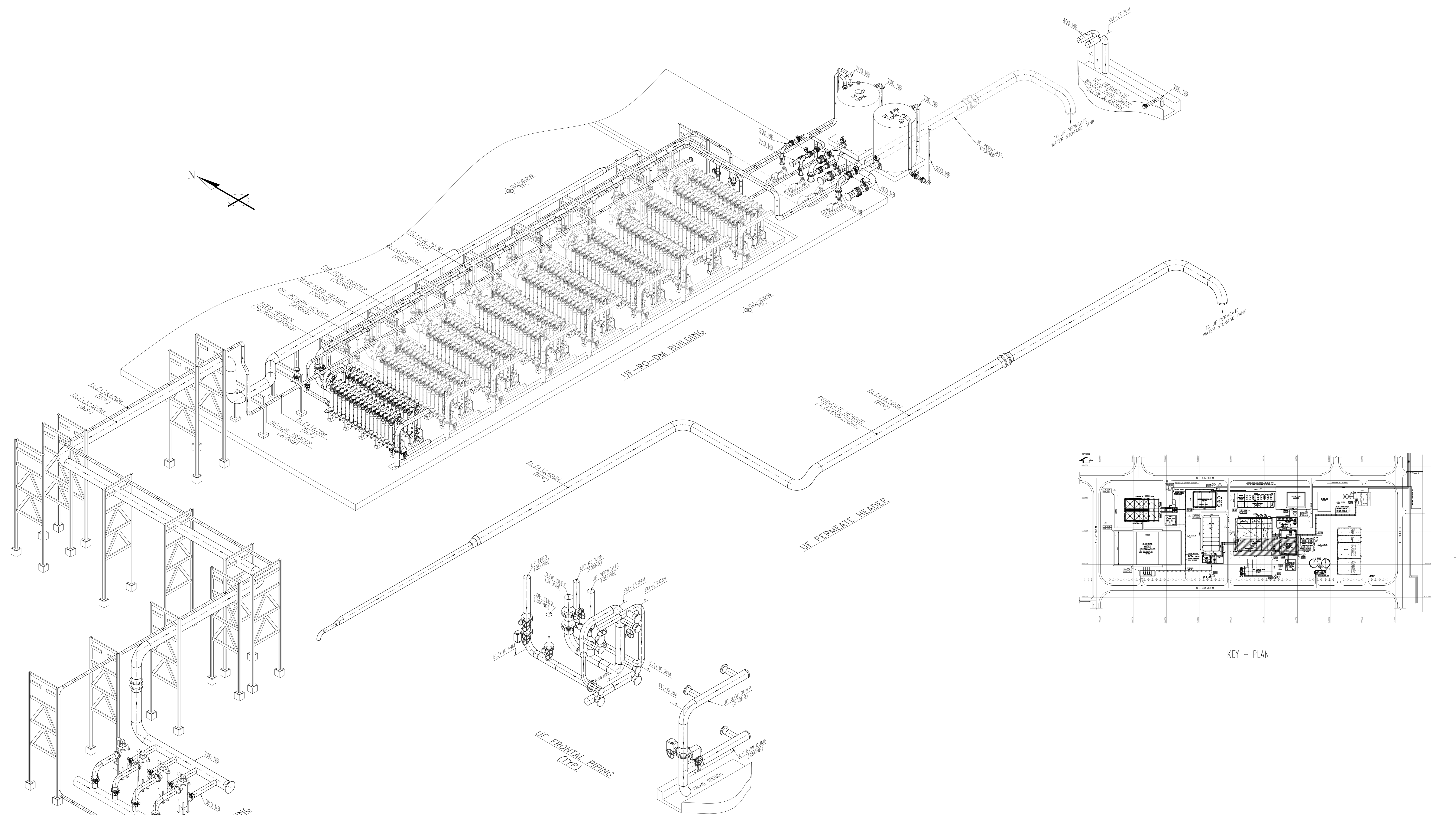
ANNEX 25.1.2 PAINTING SYSTEMS							
Cleaning, Protective Coating and Painting - Systems designed as per ISO 12944 with service life of 10 yrs.							
Surface/ Location	Temp	Surface prep	Coat	No. of coats	Generic Type	Dft/Coat	
Water Cooled heat Exchangers like Condensers, Flash box, Water - Water coolers etc.	< 120 Deg	Air blasting with Nonmetallic abrasive Powder	Primer	1	Two pack , high build siloxane modified epoxy primer with zinc phosphate pigment.	75	
			Top coat	2	Two component High Build high Solid Aliphatic Amine Cured Epoxy coating. - Min VS 85%.	100	
					<b>Total</b>	<b>275</b>	
For Outdoor installations in corrosive atmosphere - like Chemical/ Marine.			<b>For Outdoor Application</b>				
			Primer	1	Two pack , high build siloxane modified epoxy primer with zinc phosphate pigment.	125	
			Mid coat	1	Two component High Build high Solid Aliphatic Amine Cured Epoxy coating. - Min VS 85%.	100	
		Top coat	1	2 pack Acrylic Aliphatic Polyurethane top coat - with Gloss retention of at least 90% on QUVB exposure of minimum 1000 hrs.	75		
				<b>Total</b>	<b>300</b>		



### PAINTING SPECIFICATION FOR CIVIL BUILDINGS – COASTAL

S.No.	Location	Description
1	Metal and Timber Joinery	Two component high build, self priming, rust encapsulating, modified epoxy coating. Min VS 80%.
2	All Ceiling	Oil bound distemper ( Office rooms ) White Washing - all areas.
3	Internal wall surfaces	Oil Bound distemper
4	Control room/office	Acrylic Emulsion.
5	External faces of walls	Cement based Water proof paint
6	Walls of battery room and other acid/alkali spillage areas	1. Primer -1 coat of 50 microns - Two pack Polyamide Epoxy Primer with Zinc phosphate Pigment for concrete application. Min VS 48%.  2. Top coat - 1 coat of 125 microns - Two component self priming, high build polyamine adduct cured epoxy coating having excellent chemical resistance. Min VS 60%.
7	Cooling Tower External	
	a. Steel sections	i) Blasting to SA 2.5  ii) 1 x 75 microns - Inorganic Zinc Silicate as per SSPC Paint 20 Level 2.  iii) 1 x 150 microns –Two components high build epoxy intermediate pigmented with lamellar micaceous iron oxide. Min VS 65%.  iv) 1 x 75 microns - Two component high solids, Glossy, Acrylic Aliphatic Polyurethane paint, Min VS of 57%, Gloss retention of 90% after exposure to 2000 hrs under QUV B 313 lamp
	b. Concrete sections	1. 1 x 50 microns - Epoxy Polyamide Primer  2. 1x 500 microns-Two components high build high solid, engineered epoxy coating. Min VS 87%. - Typical dft - 500 microns per coat. Condensation as per IS 101 - 9000 hrs, Salt spray as per ASTM G 85 - 8000 hrs.
8	Chimney external	i) 1 x 50 microns Concrete Epoxy Polyamide primer followed by ii) 2 Coats of 50 microns of Acrylic Aliphatic Polyurethane paint





KEY - PLAN

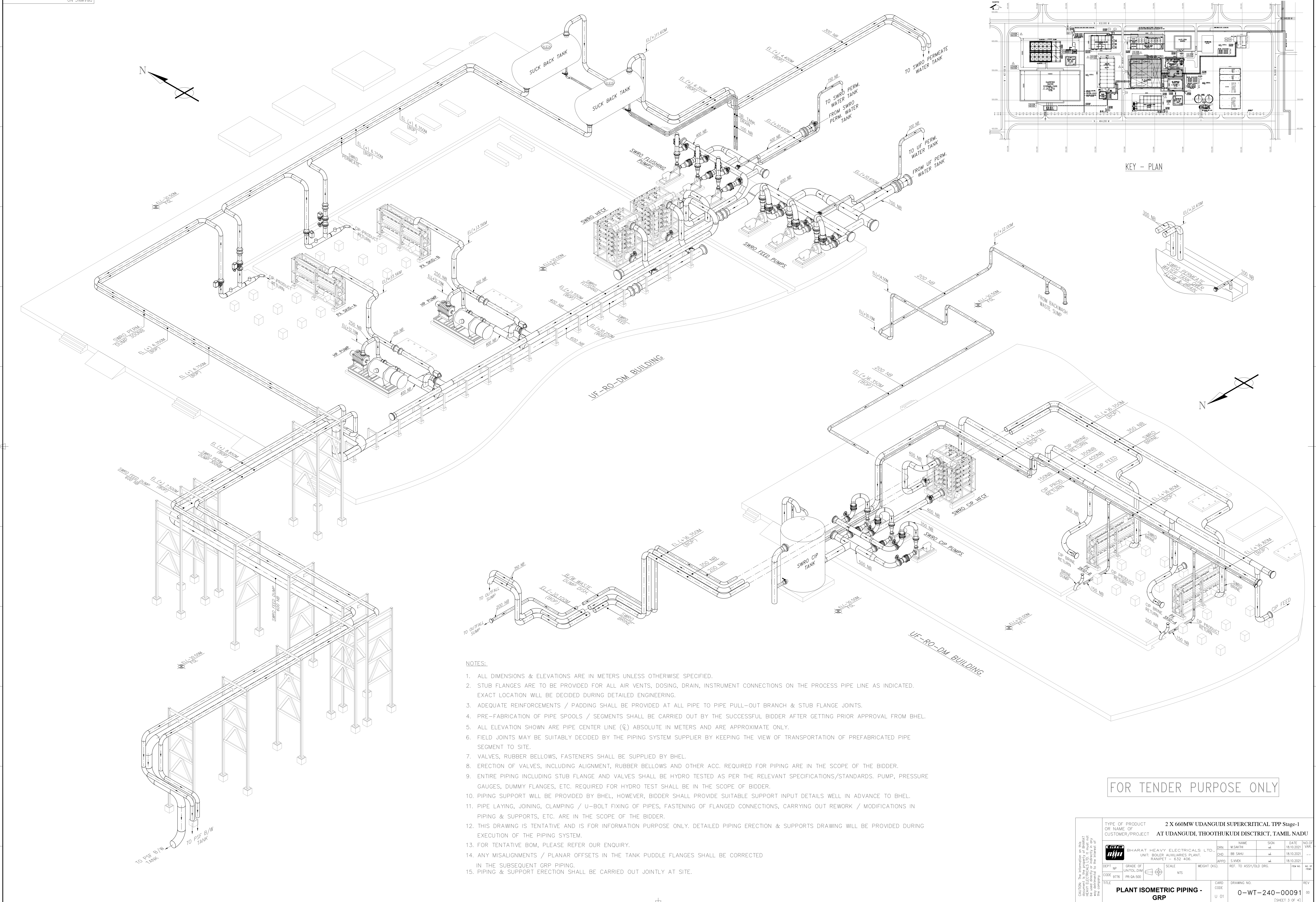
NOTES:

1. ALL DIMENSIONS & ELEVATIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
2. STUB FLANGES ARE TO BE PROVIDED FOR ALL AIR VENTS, DOSING, DRAIN, INSTRUMENT CONNECTIONS ON THE PROCESS PIPE LINE AS INDICATED. EXACT LOCATION WILL BE DECIDED DURING DETAILED ENGINEERING.
3. ADEQUATE REINFORCEMENTS / PADDING SHALL BE PROVIDED AT ALL PIPE TO PIPE PULL-OUT BRANCH & STUB FLANGE JOINTS.
4. PRE-FABRICATION OF PIPE SPOOLS / SEGMENTS SHALL BE CARRIED OUT BY THE SUCCESSFUL BIDDER AFTER GETTING PRIOR APPROVAL FROM BHEL.
5. ALL ELEVATION SHOWN ARE PIPE CENTER LINE (CL) ABSOLUTE IN METERS AND ARE APPROXIMATE ONLY.
6. FIELD JOINTS MAY BE SUITABLY DECIDED BY THE PIPING SYSTEM SUPPLIER BY KEEPING THE VIEW OF TRANSPORTATION OF PREFABRICATED PIPE SEGMENT TO SITE.
7. VALVES, RUBBER BELLOWS, FASTENERS SHALL BE SUPPLIED BY BHEL.
8. ERECTION OF VALVES, INCLUDING ALIGNMENT, RUBBER BELLOWS AND OTHER ACC. REQUIRED FOR PIPING ARE IN THE SCOPE OF THE BIDDER.
9. ENTIRE PIPING INCLUDING STUB FLANGE AND VALVES SHALL BE HYDRO TESTED AS PER THE RELEVANT SPECIFICATIONS/STANDARDS. PUMP, PRESSURE GAUGES, DUMMY FLANGES, ETC. REQUIRED FOR HYDRO TEST SHALL BE IN THE SCOPE OF BIDDER.
10. PIPING SUPPORT WILL BE PROVIDED BY BHEL, HOWEVER, BIDDER SHALL PROVIDE SUITABLE SUPPORT INPUT DETAILS WELL IN ADVANCE TO BHEL.
11. PIPE LAYING, JOINING, CLAMPING / U-BOLT FIXING OF PIPES, FASTENING OF FLANGED CONNECTIONS, CARRYING OUT REWORK / MODIFICATIONS IN PIPING & SUPPORTS, ETC. ARE IN THE SCOPE OF THE BIDDER.
12. THIS DRAWING IS TENTATIVE AND IS FOR INFORMATION PURPOSE ONLY. DETAILED PIPING ERECTION & SUPPORTS DRAWING WILL BE PROVIDED DURING EXECUTION OF THE PIPING SYSTEM.
13. FOR TENTATIVE BOM, PLEASE REFER OUR ENQUIRY.
14. ANY MISALIGNMENTS / PLANAR OFFSETS IN THE TANK PUDDLE FLANGES SHALL BE CORRECTED IN THE SUBSEQUENT GRP PIPING.
15. PIPING & SUPPORT ERECTION SHALL BE CARRIED OUT JOINTLY AT SITE.

FOR TENDER PURPOSE ONLY

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT		2 X 660MW UDANGUDI SUPERCritical TPP Stage-1 AT UDANGUDI, THOOTHUKUDI DISTRICT, TAMIL NADU			
DEPT	MP	GRADE OF UNITS/DIM	SCALE	WEIGHT (KGS)	REF. TO ASSY/OLD DRG.
9776		PR:04:500	NTS		
TITLE		CARD CODE	DRAWING NO.	REV	
PLANT ISOMETRIC PIPING - GRP		U 01	0-WT-240-00091	00	

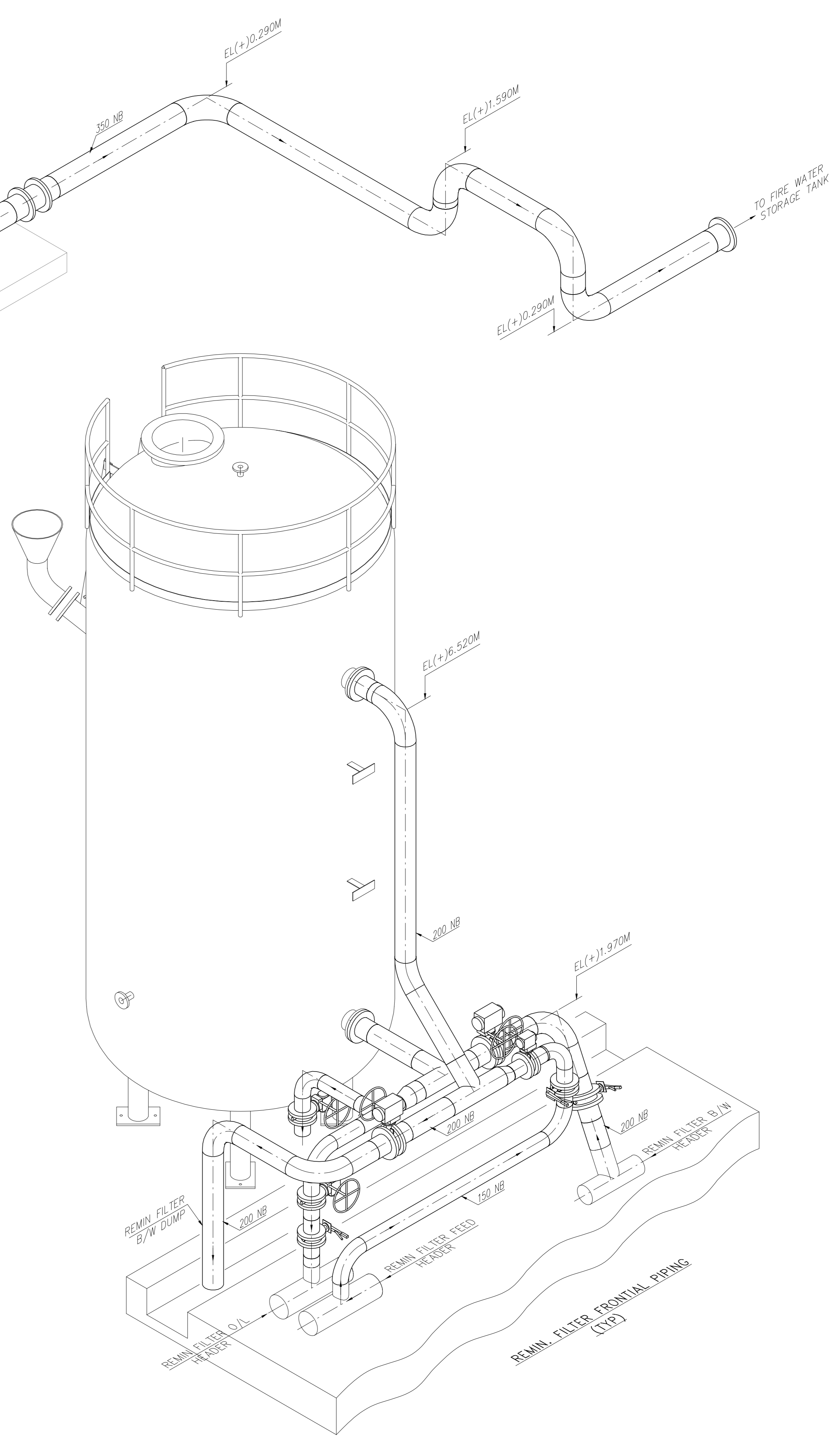
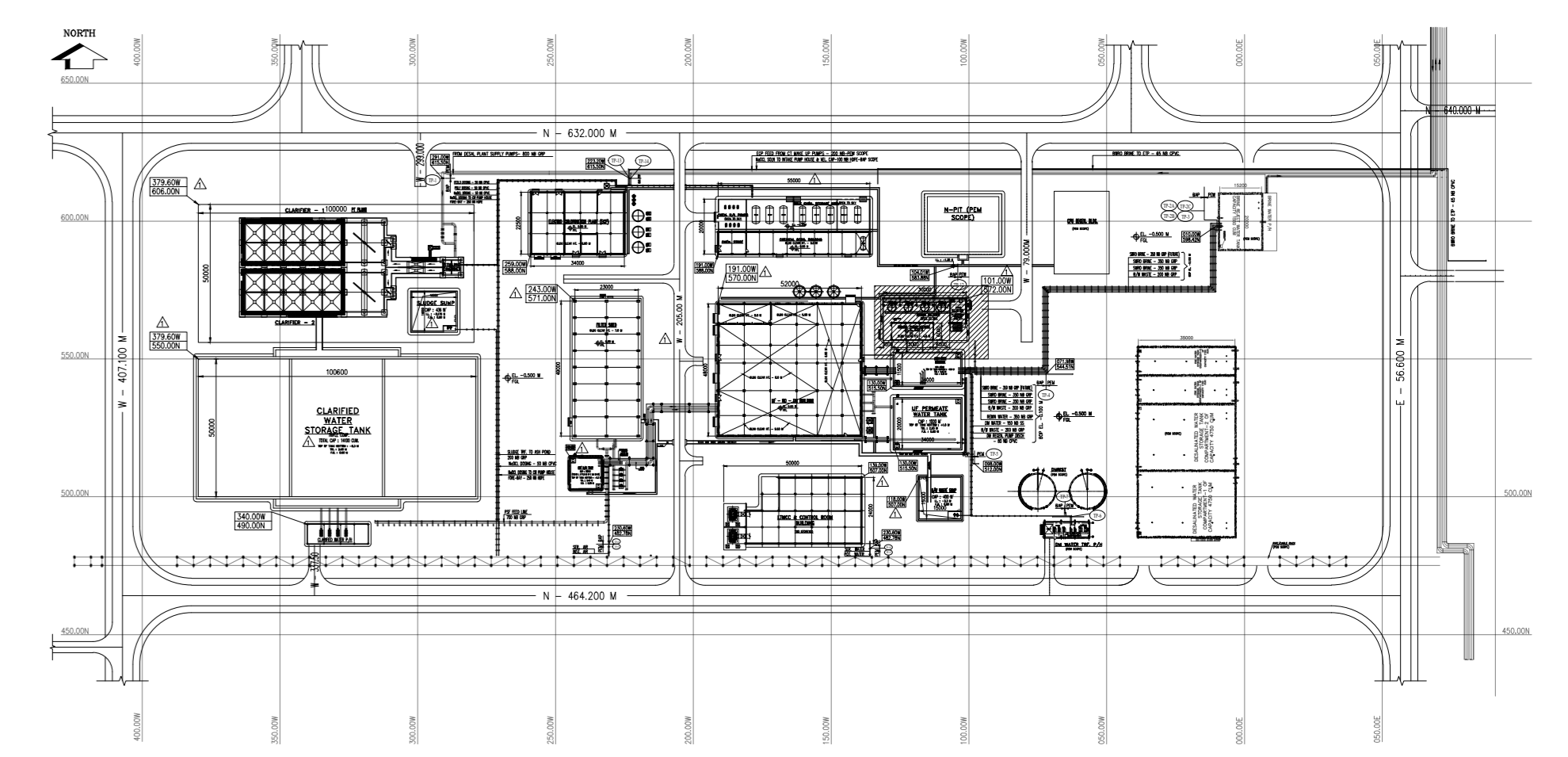
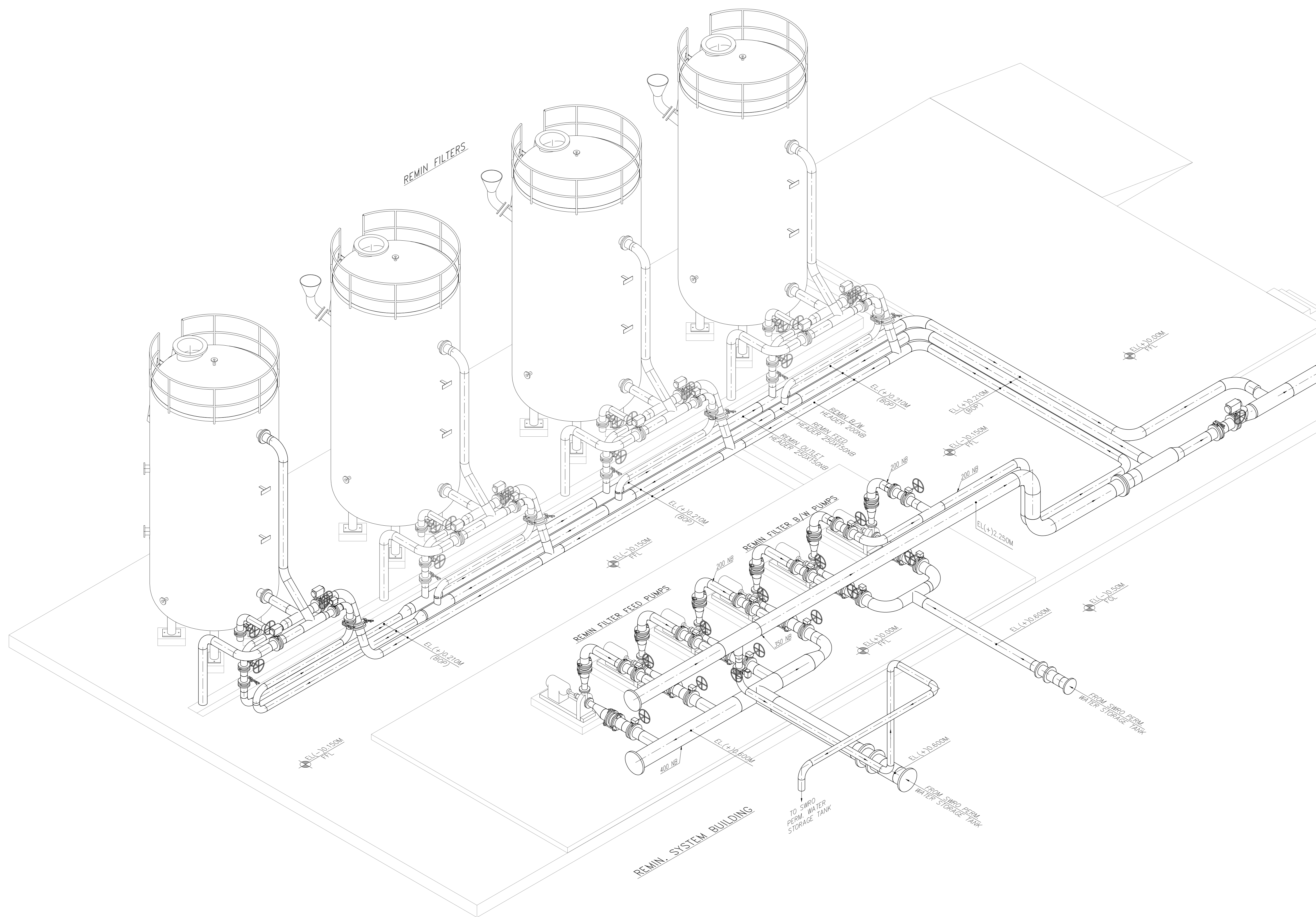
CAUTION: The information on this drawing is for information only. It is not to be used directly or indirectly in any way without the prior written consent of the company.



- NOTES:**
1. ALL DIMENSIONS & ELEVATIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
  2. STUB FLANGES ARE TO BE PROVIDED FOR ALL AIR VENTS, DOSING, DRAIN, INSTRUMENT CONNECTIONS ON THE PROCESS PIPE LINE AS INDICATED. EXACT LOCATION WILL BE DECIDED DURING DETAILED ENGINEERING.
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  15. PIPING & SUPPORT ERECTION SHALL BE CARRIED OUT JOINTLY AT SITE.

FOR TENDER PURPOSE ONLY

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT		2 X 660MW UDANGUDI SUPERCritical TPP Stage-1 AT UDANGUDI, THOOTHUKUDI DISTRICT, TAMIL NADU			
DEPT. NO.		GRADE OF UNITS/DIM. PR: 04/500		SCALE: NTS	
C/O		PR: 04/500		SCALE: NTS	
TITLE		PLANT ISOMETRIC PIPING - GRP		DRAWING NO. 0-WT-240-00091	
CAUTION: The information on this drawing is for information only and shall not be used directly or indirectly in any way without the approval of the company.		BHARAT HEAVY ELECTRICALS LTD. UNIT: BOILER AUXILIARIES PLANT. PROJECT: 632-1008		NAME: M. SAKTHI, SIGN: [Signature], DATE: 18.10.2021, NO. OF SHEETS: 4, REV. NO. OF THIS DRG: 00	



- NOTES:**
1. ALL DIMENSIONS & ELEVATIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
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FOR TENDER PURPOSE ONLY

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT		2 X 660MW UDANGUDI SUPERCRITICAL TPP Stage-I AT UDANGUDI, THOOTHUKUDI DISTRICT, TAMIL NADU			
DEPT. NO.		GRADE OF UNITS/DIM. CODE		SCALE	WEIGHT (KGS)
9776		PR-04/500		NTS	
TITLE		CARD CODE		DRAWING NO.	REV.
PLANT ISOMETRIC PIPING - GRP		U 01		0-WT-240-00091	00
CAUTION: The information on this drawing is the property of Bharat Heavy Electricals Ltd. and shall not be used in any way without the written consent of the company.		Bharat Heavy Electricals Ltd. BOILER AUXILIARIES PLANT. PANIPET - 632 408.		NAME: M. SAKTHI, S. NIKHIL	DATE: 22/10/2023, 22/10/2023
[SHEET 4 OF 4]		Size A0			

**Bharat Heavy Electricals Limited**  
**Ranipet -632406, India.**  
**Quality Assurance(Mech)**

**WS: UDAN: GRP PIPES & FITTINGS: 399**

**Dt. 12-03-2022**


Project: UDANGUDI (2X660 MW)

Item Name	Indent No	Indent dt	PGMA	Technical Specification/Drawing/ Reference Documents.
GRP PIPES & FITTINGS along with Acc.	RWT11134	08.03.2022	WT240	ROS: 9084 along with Annexure 'A', 'C' and 'D'.

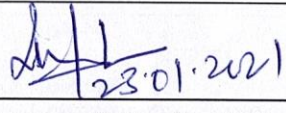
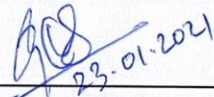
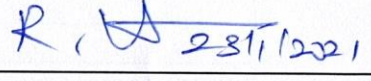
1. All the items shall be inspected at Manufacturer works as per BHEL QP /Approved datasheet and Technical Specification.
2. Bidders to confirm acceptance on our QP (GRPS: 740/00, DT: 23.01.2021.) Any deviation on this QP shall be discussed with relevant Standard/ Plant Procedure and settled by Bidder before placement of PO.
3. Only Customer approved bidders will be considered for ordering.
4. Physical Inspection shall be done by BHEL/BHEL AIA at Manufacturer works.
5. Packing of items shall be as per BHEL Engg Approved Packing Drawing/Packing Specifications.
6. BHEL Authorized representatives shall have the right to witness the necessary inspection and testing of goods mentioned in the PO. The supplier shall inform BHEL in advance about the readiness of the goods for inspection and testing. Inspection / Inspection wavier / approval by BHEL does not absolve Supplier's responsibility for conformity of the specification as per the terms of PO. Material Test Certificates shall be submitted to BHEL.
7. Annexure 'Q' shall be part of offer and shall be filled by Supplier with their sign and duly sealed.
8. Following Inspection Notes applicable during inspection:
  - a. Latest version of standards & Specification shall be applied.
  - b. Materials shall be procured in compliance to Functional Technical specification.
  - c. Gauges and measuring instruments with valid calibration only shall be used.
  - d. Inspection / Inspection wavier / approval by BHEL does not absolve Supplier's responsibility for conformity of the specification as per the terms of PO.
  - e. BHEL /BHEL Authorized representatives shall have the right to witness the necessary Inspection and testing of goods mentioned in the PO.
  - f. In case of Vendor Drawing & Datasheet, it needs approval by BHEL Engineering.
  - g. This QP shall be read along with relevant PO, BHEL Specification / Approved Drawing/Datasheet.

Vendor Seal & Sign

733651/2022/BAP-QA\_MECH

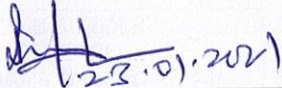
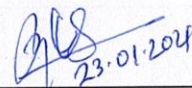
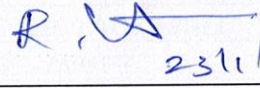
 Ranipet		MANUFACTURER'S NAME & ADDRESS:  BHEL/ CUSTOMER / BHEL APPROVED SOURCE		<b>STANDARD QUALITY PLAN</b>									
				ITEMS : PRE FABRICATED GRP PIPE SEGMENTS as per SPEC.NO,ROS: 9084	QP. No.: GRPS:740 Rev No. :00 Date: 23.01.2021 Page 1 of 3	PROJECT : UDANGUDI (2X660 MW) STPP STAGE - I PACKAGE : WATER SYSTEM MAIN CONTRACTOR: BHEL							
SL NO	COMPONENT & OPERATION	CHARACTERISTICS	CLASS OF CHECK	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD	Agency			REMARKS
1	2	3	4	5	M	B/C	7	8	9	D	10		11

<b>1.0 RAW MATERIALS</b>													
1.1	Resin	Color Relative density Viscosity Acid value Volatile content Peak exotherm	Major	TC Review	100%	100%	Technical Specification / Approved data sheet	TC	√	P	V	-	
1.2	Fiberglass Reinforcements	Chemical & Mechanical test	Major	TC Review	100%	100%	Technical Specification / Approved data sheet/ Approved Drawing	TC	√	P	V	-	
<b>2.0 IN-PROCESS INSPECTION ( Coupon Testing )</b>													
2.1	Glass Content	Chem. Properties	Major	Laboratory Testing	3 samples	Technical Specification / Approved data sheet / Manufacturer Procedure & Relevant Standard	Lab. Test Report	√	P	V	-		
2.2	Tensile Strength	Tensile Test	Major					√	P	V	-		
2.3	Barcol Hardness	Check of Barcol Hardness	Major					√	P	V	-		
<b>3.0 FINAL INSPECTION ( Final Product)</b>													


<b>LEGENDS:</b> M – Manufacturer / Subcontractor, B - BHEL /BHEL Authorized Inspection Agency, C - Customer, P - perform, V - Verification of reports W - Witness, TC - Test certificate, IR – Inspection report. "D" – Record, identified with tick (√) shall be essentially included by Supplier in QA documentation. COC-Certificate of Conformance.	Prepared by	Reviewed by	Approved by
	 23.01.2021	 23.01.2021	 23/1/2021
	Rakesh Kumar Madhu (Dy Mgr / QA)	K Renjith Manager (QA)	R Arunachalam (DGM/QA & OLI)

SL NO		COMPONENT & OPERATION	CHARACTERISTICS	CLASS OF CHECK	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD	Agency			REMARKS
1		2	3	4	5	M	B/C	7	8	9	D	10	11	
		MANUFACTURER'S NAME & ADDRESS: Ranipet			BHEL/ CUSTOMER / BHEL APPROVED SOURCE			STANDARD QUALITY PLAN		PROJECT : UDANGUDI (2X660 MW) STPP STAGE - I				
					ITEMS : PRE FABRICATED GRP PIPE SEGMENTS as per SPEC.NO,ROS: 9084			QP. No.: GRPS:740 Rev No. :00 Date: 23.01.2021 Page 2 of 3		PACKAGE : WATER SYSTEM MAIN CONTRACTOR: BHEL				

3.1	Hydrostatic Test	Pressure test	Major	Visual & Measurement	100%	One no of each size/ Type	AWWA-C 950 Table-7	No leakage, No Pressure Drop	Test Report	√	P	W	-	One Pipe of each size/ Type shall be randomly selected from the offered lot for BHEL / BHEL AIA witness.
3.2	Destructive Testing	Axial Tensile strength test	Major	Visual & Measurement	One Per Size/Type		AWWA-C 950	AWWA-C 950 Table- 11- B	Test Report	√	P	W	-	
		Hoop Tensile strength test						AWWA-C 950 Table- 10- B						
		Stiffness test						AWWA-C 950 Table- 6						
3.3	Workmanship	Visual Check	Major	Visual	100%	100%	Approved Drawing / Datasheet/Spec.	Free from Defects	Report	√	P	W	-	
3.4	Dimensions	Measurement	Major	Measurement	100%	100%	As per Approved Drawing		Report	√	P	W	-	
3.5	Barcol Hardness	Barcol Hardness Check	Major	Measurement	100%	100%	As per Approved Spec. & Relevant Std. Minimum 32		Report	√	P	W	-	
3.6	Marking, Packing & Preservations	Visual Check	Major	Measurement	100%	100%	Technical Specification / Approved data sheet /		COC	√	P	W	-	
<b>4.0 Complete Quality Record</b>														

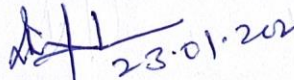

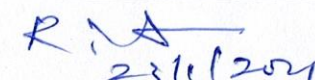
LEGENDS:	Prepared by	Reviewed by	Approved by
M – Manufacturer / Subcontractor, B - BHEL /BHEL Authorized Inspection Agency, C - Customer, P - perform, V - Verification of reports W - Witness, TC - Test certificate, IR – Inspection report. "D" – Record, identified with tick (√) shall be essentially included by Supplier in QA documentation. COC-Certificate of Conformance.	 23.01.2021	 23.01.2021	 23/1/2021
	Rakesh Kumar Madhu (Dy Mgr / QA)	K Renjith Manager (QA)	R Arunachalam (DGM/QA & OLI)

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 Ranipet		MANUFACTURER'S NAME & ADDRESS:  BHEL/ CUSTOMER / BHEL APPROVED SOURCE		<b>STANDARD QUALITY PLAN</b>										
				<b>ITEMS :</b> PRE FABRICATED GRP PIPE SEGMENTS as per SPEC.NO,ROS 9084	<b>QP. No.:</b> GRPS:740 <b>Rev No. :</b> 00 <b>Date:</b> 23.01.2021 <b>Page</b> 3 of 3	PROJECT : UDANGUDI (2X660 MW) STPP STAGE - I PACKAGE : WATER SYSTEM MAIN CONTRACTOR: BHEL								
SL NO	COMPONENT & OPERATION	CHARACTERISTICS	CLASS OF CHECK	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD		Agency			REMARKS
1	2	3	4	5	M	B/C	7	8	9	D	10			11
4.1	Review of all Quality documents	Verification & Review	Major	Verification	100%	100%	As per Approved Drawing / Spec. / P.O.	COC	√	P	V	-		
Note: 1. All Destructive test shall be as per International Standards 2. All the inspection/ test reports shall be submitted to Inspection agency for review and record purpose. 3. Latest revision of Drawings, specification and standard shall be used. 4. Materials shall be procured in compliance to Functional Technical Specification. 5. Gauges and measuring instruments with valid calibration only shall be used. 6. Inspection / Inspection waiver / approval by BHEL does not absolve Supplier's responsibility for conformity of the specification as per the terms of PO. 7. BHEL /BHEL Authorized representatives shall have the right to witness the necessary inspection and testing of goods mentioned in the PO. 8. In case of Vendor Drawing, it needs approval by BHEL Engineering. 9. This QP Shall be read along with relevant PO, BHEL Specification/Drawing.														

## Record of revision

Rev no.	Date.	Description.
00	23.01.2021	Original Issue – First submission

<b>LEGENDS:</b> M – Manufacturer / Subcontractor, B - BHEL /BHEL Authorized Inspection Agency, C - Customer, P - perform, V - Verification of reports W - Witness, TC - Test certificate, IR – Inspection report. "D" – Record, identified with tick (√) shall be essentially included by Supplier in QA documentation. COC-Certificate of Conformance.	Prepared by	Reviewed by	Approved by
	 23.01.2021	 23.01.2021	 23.01.2021
	Rakesh Kumar Madhu (Dy Mgr / QA)	K Renjith Manager (QA)	R Arunachalam (DGM/QA & OLI)

## Annexure Q

		Indent No:	Enquiry no:	
Sl.No	BHEL / Customer Requirements	## Specific confirmations by the manufacturer (Acceptable/Not acceptable)		
	<b>Quality Plan Requirement: (If SQP is not given &amp; Vendor QP applicable)</b>			
	(i) MQP (Manufacturing Quality Plan) shall be submitted in attached format for BHEL/Customer review & approval. Our SQP/Typical MQP/ MQP Format is attached for guidance & use.			
	(ii) MQP shall invariably cover w.r.t Inward inspection including on Raw material Procurement, In process and Final inspection in elaborated way/details.			
	(iii) Bidder shall also to give specific confirmation that on need basis, their competent officials shall visit to BHEL / customer for finalization of Quality plan including test procedure/methodology during preaward / post award approval / detailed engineering in the event of an order.			
	(iv) No deviation on BHEL/Customer approved MQP/ SQP (In case BHEL SQP is provided) is acceptable.			
1	(v) Bidder shall agree to submit all cross referred documents other than codes/standards to BHEL/Customer/Consultant.			
	<b>Important Notes shall be included in MQP :</b> (a) Latest revision of Standard s & Specification shall apply. Only International Standards are applicable. (b) Materials shall be procured in compliance to Functional Technical Specification. (c) Inspection shall be in compliance with Approved Quality Control Procedure for the Product. (d) NDT shall be carried out by Qualified Personnel with compliance to Approved NDT Procedures and Acceptance Norms, as per ASME standard. (e) Gauges and measuring Instruments, with valid calibration only shall be used. (f) Cleaning and Painting of products shall be carried out as per Approved Painting Schedule. (g) Finished Products shall be packed to comply with Approved Packing Schedule. (h) Welding shall be carried out by Qualified Personnel with compliance to Approved NDT Procedures and Acceptance Norms, as per ASME standard.			
2	<b>Domestic / Inland Inspection</b> will be carried out by BHEL/BHEL appointed Third Party Inspection Agency (TPIA) / Customer/Customer Appointed Inspection Agency/Consultant. This is applicable for all Stage inspection and Final Inspection identified as "W" - Witness or "CHP" - Customer Hold Point as per customer approved Quality Plan/ Technical specification / Approved Drawing/ Approved Data sheet / Scheme / PID / PFD / SLD (Process Instrumentation Diagram / Process Flow Diagram / Single Line Diagram) etc. (as applicable).			
3	<b>Inspection Agency for Foreign Bidders and also for Indian Bidder but importing from Foreign Sources:</b> (1) Any one of the following Third Party Inspection Agency (TPIA) shall be appointed by the bidder and same shall be furnished by the bidder in techno commercial bid itself. (2) The details of TPIA with contact details like Name of the official, Phone no, Email id shall also to be submitted during pre/post award. However cost for such inspection agency shall be borne by the bidder only. Inspection charges for such inspection agency shall be indicated separately so that if BHEL/Customer is undertaking the inspection by on their own , then these charges are non claimable by the bidder. For NTPC Project ensure TPI Approved by NTPC. Refer our QC Procurement email in this regard. <b>List of TPIA</b> 1.M/s Bureau Veritas 2.M/s TUV-Nord 3.M/s TUV-SUD 4.M/s TUV Rheinland 5.M/s Lloyds Register 6.M/s SGS 7.M/s Germanischer Lloyds 8.M/s QUEST 9.M/s Certification Engineers International 10.M/s Intertek 11.M/s IR Class Systems and Solutions 12.M/s DNV 13. M/s Fichtner 14. M/s ABS Inspection Services			

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Sl.No	BHEL / Customer Requirements	## Specific confirmations by the manufacturer (Acceptable/Not acceptable)
4	<b>Stage Inspection during manufacturing Process</b> : Stage Inspection during manufacturing shall be carried out as per approved quality plan and all necessary documents shall be provided for review, verification and clearance for further processing. This inspection call shall be given well in advance (at least 2 weeks before) to TPI/Bidder's own inspection agency to avoid delay in the manufacturing processes.	
5	<b>Inspection before despatch for domestic supplier</b> : Inspection before despatch at supplier's works shall be carried out by BHEL appointed Inspection agency (as in Sl no. 2). Inspection shall be done as per approved Quality plan/ Technical specification/ Approved Drawing/ Approved Data sheet .	
6	<b>Inspection at Foreign Source/Supplier:</b> (a) As in sl no: 3. shall be ensured without fail (b) No material / items shall be despatched without getting the written communication from BHEL / Customer inspection carried out by Bidder appointed Third Party Inspection Agency (As per Sl no.3) / Customer/Customer Appointed Inspection Agency/Consultant. This is applicable for all Stage inspection and Final Inspection identified as "W" - Witness or "CHP" - Customer Hold Point as per customer approved Quality Plan/ Technical specification / Approved Drawing/ Approved Data sheet / Scheme / PID / PFD / SLD (Process Instrumentation Diagram / Process Flow Diagram / Single Line Diagram) etc. (As applicable). Inspection before despatch for Foreign supplier : Inspection before despatch at supplier's works shall be carried out by bidder appointed inspection agencies having international presence at vendors and or vendor's sub vendor works. Inspection shall be done as per approved Quality plan/ Technical specification/ Approved Drawing/ Approved Data sheet by TPIA mentioned in Sl no: 03 at supplier's cost.	
7	<b>Painting</b> shall be done strictly as per BHEL/Customer approved painting schedule / scheme only. Paint Thickness / Paint shade shall be ensured as per BHEL / Customer approved painting schedule / specification / data sheet etc. No deviation is acceptable unless otherwise accepted by BHEL/Customer in writing. Any conflict if any among BHEL / Customer approved painting schedule / Spec / data sheet etc. shall be brought to the notice of BHEL well in advance before proceeding including the BOI being procured for assy / skid like motors etc.	
8	Specific conformation for document package in the event of an order (2 Hard copies & soft copy in PDF file) is to be given containing the following with proper linkages (i) Index Sheet (ii) MQP/RQP/Endorsement Sheet (As applicable) (iii) TCs identified by BHEL/ Customer for record for "CHP" / "W" and Verification portion ("V") as given in approved QP. (iv) Final inspection report + TC including Chemical + Mechanical + HT + NDT etc. (v) Third party Inspection report + TC (vi) Customer CHP/ MDCC (vii) Type test / Performance Test reports conducted (viii) Type test / Performance Test approval/ clearance obtained from BHEL/Customer (ix) BOM with As Build Drgs with actual make / rating used with BHEL/customer approved drawings.	
9	<b>Packing / Seaworthy Packing</b> shall be as per BHEL Packing schedule / approved drg / sketch. This shall be ensured to take care transit / handling / transshipment in Road / Sea / Air. Photographs are to be submitted for BHEL review before despatching the material as per contract conditions.	
10	<b>Outsourcing of test facilities:</b> Bidder shall ensure all the testing facilities in house. However If any of the test facilities are not available with successful bidder, then bidder shall ensure the same at NABL accredited third party lab / Govt / Govt Lab for major testing such as NDT, Electrical & Mechanical testing.	
11	<b>Important Note:</b> No deviation on the above requirement 01 to 10 is acceptable with respect to Quality Requirement and those offers not meeting these specific customer requirement is liable for rejection and hence the bidder shall submit all the required documentary evidences in the offer itself.	
12	## Necessarily to be filled up by the bidder at the time of offer itself otherwise the offer may not be considered w.r.t Quality Requirement being customer specific requirement.	

VENDOR SIGN AND STAMP:

Vendor Name &amp; Address:



Ref :INSP:CHK:001/ REV 00  
DT:10/08/2020

## Inspection document Check List

Inspection documents to be submitted after inspection of the items for getting dispatch clearance. Vendor shall provide documents to the BHEL/BHEL TPIA inspector during inspection and TPIA shall sign all the documents.

The document dossier shall contain following.

SL no.	Documents
1	Unpriced PO COPY.
2	Latest approved specification, datasheet, drawing, P&ID, test procedures, approved painting schedule, Packing etc.
3	Approved QAP.
4	CQIR Report (Disposal code should be Accepted all the offered QTY)
5	<p>As per approved QAP all the inspection documents to be submitted.</p> <p><b>Indexing of the reports as per QAP and each page wise numbered and correlated to QAP.</b> <b>If more than one test in each page, against each test the clause number of QAP to be mentioned.</b></p> <p>Inspection clause shall be mentioned against each test.</p> <p>1. Raw Material Test Certificates (NABL approved Lab TC/Manufacturer TC like Mechanical properties, Chemical Properties, UT etc. as per approved QAP.</p>

*K. Kovarthan*

கி. கோவர்தான்  
கி. கோவர்தான் / K. KOVARTHANAN  
பரிசுடர் இঞ্জினியர் / Sr. Engineer  
கuality கிளர் / Quality Department  
BHEL R&P RANIPET-3

	<p>2. In process Inspection Reports like Hydro test, Dimension Report, MPI,UT ,Balancing etc. as per approved QAP.</p> <p>3. Final Inspection Reports like Shop Assembly with testing reports, Hydro test/Leak / Pressure test reports, Type test Reports, WPS/PQR/WPQ Reports, PT/RT/UT/MT Reports etc. as per approved QAP.</p> <p>4. Final Inspection like packing and surface preparation &amp; Painting/Metal finishing reports. (Sea worthy packing / Special Packing requirement).</p>
6	Relevant pages of standard shall be attached with report.
7	Calibration reports of the instruments used to be signed by TPI after verification.
8	Above said documents are should be in single .pdf file with not more than 10MB (if more than 10MB can be split into multiple files)
9	Hard copy of the same to be submitted along with material dispatch.

*Kovarthanan*

**K KOVARTHANAN**

கா. கோவர்த்தனன்  
 क. कोवर्धनन / K. KOVARTHANAN  
 वरिष्ठ इंजीनियर / Sr. Engineer  
 गुणवत्ता विभाग / Quality Department  
 बीएचईएल राणीपेट, राणीपेट, BHEL, BAP, RANIPET

**DM/QC PROC**

**BHEL RANIPET**