BHEL: BAP: RANIPET
OUTSOURCING DEPARTMENT

ANNUAL RATE CONTRACT OF GALVANIZING – 2021-22
ENQUIRY REF: 651001E dt:21.10.2021

An ISO Company

BHARAT HEAVY ELECTRICALS LIMITED

(A Government of India Undertaking)

பாரதமிகுமின் நிறுவனம்

BOILER AUXILIARIES PLANT, Indira Gandhi Industrial Complex,

RANIPET– 632 406 (Tamil Nadu)

Ph: 04172-284030, 284158, 241170

Email:

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SECTION – I

NOTICE INVITING TENDER (NIT)

E Tenders are hereby invited from experienced vendors for Galvanizing of Hand rail tubes, Hand rail bends, (from tube dia 27.3 to dia 76.1mm) and other components like flats and ladder, structure of gallaries and platforms, Plate/sheet formed structures etc,as per the drawings, quality work instructions from BHEL/BHEL vendors supplied materials. Galvanizing to be done to 600 gsm/610 gsm/ 750 gsm/900 gsm depending up on the QP/CQR/ project requirement. Basic cleaning, degreasing, caustic cleaning, pickling, rinsing, fluxing etc prior to galvanizing and post galvanizing processes as per standard are to be done by Galvanizing vendor. Unloading of jobs and loading of galvanized jobs are in galvanizing vendors scope. Materials for Galvanizing will be delivered to your works by BHEL/BHEL vendors and collect back the same after galvanizing. Hence, transport charges are NOT APPLICABLE/PAYABLE for Galvanizing vendors. Inspection will be done by BHEL/BHEL approved agency at all stages of galvanizing and prior to dispatch. (Standard Ref for galvanizing: IS 2629 –latest version).

Reverse Auction will be conducted for finalizing the rates among the technically qualified bidders

Enquiry No. & Date	**651001E Dated 21-10-2021**
DUE DATE & TIME For Submission Of Offer	**11-Nov -2021 12.00 Hrs**
Date & Time Tender Opening	**11-Nov -2021 by 16.00 Hrs**
Place Of Tender Opening	E procurement portal

Kindly refer to SECTION-V for detailed scope. This is only a request for an offer and not a Contract.

This tender specifies a set of prequalification criteria defining the eligibility for the vendors to quote against this tender. (Ref. **SECTION-III**). The Bidders are advised to go through all the enclosed tender documents terms & conditions detailed under **SECTIONs I to XI**, **ANNEXURES A to R**, carefully before submitting their Offer.

All the **ANNEXURES B to R** should be filled, wherever applicable by the bidders without fail for evaluation of their offer and **all necessary copies of the supporting documents** as required.

An electronic bid shall be submitted in two parts namely (1) EMD or Valid MSME certificate & Techno Commercial Bid and (2) Price Bid.

Kindly refer to the **SECTION -IV** (Instruction to Bidders) for detailed procedure for submission of offers and details of exemption from submission of EMD for vendors registered with MSME

E Tenders are hereby invited from experienced fabricators for the above the scope.

For any clarification required in this regard, the Bidders may contact:
Manager(Contracts)
Outsourcing/BHEL/BAP/Ranipet

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Kindly refer to Section-I for the date of Bid opening

SECTION – II
SALIENT FEATURES OF THE TENDER

The salient features of the galvanizing Annual Rate Contact (ARC) Tender is detailed below,

1. This is an open tender enquiry inviting quotations for entering into Rate Contract, during 2021-22 for Galvanizing of Hand rail tubes, Hand rail bends, (tube dia 27.3 to dia 76.1mm) and other components like flats and ladder, structure of gallaries and platforms, Plate/sheet formed structures etc,as per the drawings, quality work instructions from BHEL/BHEL vendors supplied materials. Galvanizing to be done to 600 gsm/610 gsm/ 750 gsm/900 gsm depending up on the QP/CQR/ project requirement. Basic cleaning, degreasing, caustic cleaning, pickling, rinsing, fluxing etc prior to galvanizing and post galvanizing processes as per standard are to be done by Galvanizing vendor. Unloading of jobs and loading of galvanized jobs are in galvanizing vendors scope. Materials for Galvanizing will be delivered to your works by BHEL/BHEL vendors and collect back the same after galvanizing. Hence, transport charges are NOT APPLICABLE/PAYABLE for Galvanizing vendors. Inspection will be done by BHEL/BHEL approved agency at all stages of galvanizing and prior to dispatch. (Standard Ref for galvanizing: IS 2629 –latest version).
   a. Recommended practice of Hot Dip Galvanizing for Iron & Steel as per IS:2629(latest version) and Continuous galvanizing process consists of cleaning of base steel surface by first oxidizing and subsequently reducing the surface oxides under controlled atmosphere or by any other inline cleaning method. Please specify your process for continuous feeding of molten zinc bath.
   b. Passivizing treatment by suitable agent like chromic acid needs to be followed.
   c. After galvanizing, when the sheet emerges from the zinc bath, the excess molten zinc on them is wiped off by air or gas jets. There is no fluxing in this process.
   d. Zinc purity certificate for all cycle needs to be generated and shown to our inspection on demand.
   e. Type Test / Acceptance Test such as Visual Inspection, Adhesion of Coating, Uniformity of coating and Mass of Zinc coating will be made for all products.
   f. IS: 2633 - 1986 Methods of testing uniformity of coating on zinc coated articles will be referred.
   g. Mass of Zinc Coating - Minimum average mass of zinc coating for fabricated items shall be ensured as per requirement.
   h. The damaged surface after cleaning shall be painted with two or more coats of zinc rich primer followed with finish coat of zinc rich paint as per painting schedule recommended by manufacturers. However the total DFT shall be mini. 87microns. as per BHEL drawings and Quality requirement with materials issued by BHEL.
2. Only those vendors meeting the **prequalification criteria** are eligible to participate in the tender. (Ref. Section-III)
3. Quotations received from bidders not meeting the pre qualification criteria will be rejected.
4. Rate Contract is valid for a period of 12 months from the date of contract finalization date.(Clause 1.1 of Section V)
5. The rate contract tender is for GALVANIZING of hand rail tubes, bends, etc., for a tentative quantity of 1500 M.T(ref. Scope of NIT).(Clause 1.8 of Section V).

6. **Price Variation clause** is applicable based on change in rate of HG-Zinc applicable for Hyderabad as published by Hidustan Zinc Limited in their website: www.hzlconnect.com.(Ref.Section VII)
7. Firms submitting the offer, please take into account all the cost elements (ref. Cl. 2.1.1. to 2.1.6 of Section-V)of Galvanizing, tender terms and conditions etc. Kindly refer scope of work under Terms & Conditions of the contract.The Drawings/Sketches indicated are representative only.
8. There are three category of galvanizing requirement based on coating of weight in grams per sq.(Section-IV). The eligibility criteria of vendors (Ref. Section-III) and Evaluation Criteria for Galvanizing (Doc.ref: GAL1) is as per(Ref. Annexure-B).
9. The rate to be quoted is based on "Ex-Works" ,inclusive of raw-materials and chemicals required for galvanizing,unloading of items given for galvanizing and loading of galvanized items on contractor/BHEL vehicle, handling charges,cleaning, testing, painting.No extra charges or compensation in any form shall be allowed for multiple activities. (Clause 2.1.1 to 2.1.6of Section V)
10. Conditional offers if any submitted by the firms will not be acceptable.
11. No revision of quoted prices will be entertained after the tender is opened. (Clause 2.2 of Section V)
12. The land in which the galvanizing to be carried out, should be either in the name of the firm or in the name of the proprietor / partners. Proof of land document to be submitted. (Clause K of Section III).
13. If galvanizing work is to be carried out in leased land, registered lease agreement valid for minimum 3 years to be submitted.
14. Availability of BG for the free issue material is a mandatory for release of Job Work Order. For details on BG refer(Clause 12.7 of Section-Vfor BG Norms –ref.Section X .For the BG-Format.
15. Subletting/Part processing of BHEL jobs shall be allowed (to ensure PGMA completion) where necessary, with BHEL's prior approval (clause.14 of Section-V)
16. In case of number of qualified vendors found more than 2 and less than 10, only H1 vendor will be eliminated. However, in case of number of qualified vendors found less than or equal to 2 (Two), no elimination will be done.
17. **GST:-**

    "For firms located within Tamilnadu:

    GST as applicable from time to time, shall be paid extra over the quoted rates as per GST rules and the amount is Cenvatable. GST amount will be reimbursed on submission of proof of remittance challan, declaration if any and uploading of details in GSTN network with in the statutory time period.

    For firms located other than Tamilnadu:

    IGST as applicable from time to time, shall be paid extra over the quoted rates as per GST rules and the amount is Cenvatable. IGST amount will be reimbursed on submission of proof of remittance challan, declaration if any and uploading of details in GSTN network with in the statutory time period.

17.1 In case any changes in GST guidelines as per Gov. Notification , the same shall be applicable from time to time.

18. New vendor (not registered with BHEL /BAP/Ranipet- Outsourcing so far are advised to meet BHEL-OS Officials to understand and get better clarity regarding various terms & conditions of the tender.

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SECTION-III (PRE QUALIFICATION CRITERIA)

a. **New Firms** should have experience of doing galvanizing of items as specified in the evaluation criteria Annexure-B. The self-attested documentary proof for the galvanizing as per specification made to any reputed industry, having experience shall be enclosed with the tender.

b. **New firms** having their works located with in **350 Kilo Meters**, only are eligible to participate in this tender (radial distance from BHEL, Ranipet to registered address of the works where Galvanizing is done).

c. **Existing Firms, who** already registered with Outsourcing (OS) BHEL/BAP/Ranipet shall be directly qualified for the Galvanizing the respective categories already executed by them.

d. Vacant

e. The list of RS- Group is indicated in Technical Bid and in Price Bid vide SECTION –VIII and Price bid format.

f. There are 3 (Three categories of rates covered in this tender based on coating thickness.(600/610 gsm, 750 gsm, 900 gsm) and firms are requested to quote for all the three categories. Evaluation criteria detailed in Annexure-B covers all the three RS categories.
Note: The Evaluation criteria is projected in Annexure-B
Firms should meet the requirements
   i. The facilities indicated as "Mandatory" in ANNEXURE B should be available and in working condition as on date at the time of submission of offer and to be made available for the whole contract period.
   ii. new vendors shall meet the evaluation criteria.

g. The offers are to be submitted for all the three categories. If rate for one or more of the category is not quoted, then the rate quoted for others will not be considered.

h. New vendors are eligible to quote for rate schedules(meeting the eligibility criteria as detailed in Annexure-B), subject to meeting eligibility criteria (w.r.t. the Facilities, man-power, Financial stability, experience in completing similar/same job earlier) supported with documents. Facilities indicated as Mandatory in Annexure B should be available and in working condition as on date at the time of submission of offer and to be made available during the contract period.

i. All new firms submitting the offer shall be subjected to assessment and submission of vendor registration forms (Annexure-E) along with supporting documents & spot evaluation (if applicable) for considering their price bid . Price bids of firms failing to meet the technical qualification shall not be considered for further processing in the tender.

j. All new Firms should meet the required land area (0.5 Acre) as per the checklist.

k. As far as new vendors concerned, the Land shall be owned either by the partners/ proprietor or registered in the name of the firm. In case of Leased land, the lease agreement shall be registered in the name of either by the partners/ proprietor or registered in the name of the firm and valid for a minimum period of 3 years from the date of offer submission. Self attested Copy of Lease agreement / own land document with EC for 20 years to be enclosed along with the tender. As far as existing vendors, whose lands were on lease shall ensure the availability of Land for a minimum period of 3 years from the date of offer submission.

l. All the supporting documents should be duly self-attested.

m. Vendors who are not eligible to participate in this tender:

   a. Vendors "declared/notified" as "Banned" & "defaulters/poor-performers" on "quality/delivery grounds" are not eligible to quote. Offers if any received such vendors shall be rejected.

n. 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/ who have not met the qualification criteria as in Annexure-B.

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., 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.

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SECTION – IV
Instructions to Bidders

1.0 Bid Submission: **An Electronic Bids shall be submitted in two parts namely** (i) A cover containing Earnest Money Deposit (EMD) fee Cover OR Micro Small Medium Enterprises (MSME) valid certificate & Techno Commercial Bid Cover and (ii) Price bid cover.

1.1 The FIRST Cover shall contain The EMD fee OR the MSME valid certificate & Techno commercial bid . This shall contain

1.1.1 Earnest Money Deposit (EMD) Rs. 2.00 lakh in the form of Demand Draft, as called for for Non MSE supplier (OR)

MSE documents to avail exemption from submission of EMD: –

i) UDYAM REGISTRATION CERTIFICATE (URC)

ii) UAM along with CA certificate

III) Attested copy of EM Part II along with CA certificate

In case UAM/EM Pat II is submitted by sub-contractor then CA certificate is required as per **Annexure –M.** CA certificate must be for the year up to March 2021 or later.

1.1.2 EMD or valid MSME certificate, which is mandatory for participating in Tender. Non MSE Vendors have to submit EMD for Rs. 2.00 Lakh in the form of Demand Draft favouring "Bharat Heavy Electricals Ltd., Ranipet – 632 406" payable at Ranipet (Original copy should reach BAP RANIPET before tender opening). **EMD is applicable for Medium category vendor also.**

BHEL has now made arrangements for payment of EMD thru' Online. The steps to make online payment is detailed as below:

1) Visit https://www.onlinesbi.sbi/sbicollect/icollecthome.htm
2) Click 'Proceed' button
3) Select '**Tamilnadu'** in the drop down menu under 'State of Corporate/Institution *"
4) Select '**PSU-PUBLIC SECTOR UNDERTAKING**' in the next drop down menu under " Type of Corporate/Institution"
5) Click 'Go' button
6) Select '**BHEL BAP RANIPET** in the drop down menu under "PSU-PUBLIC SECTOR UNDERTAKING'
7) Click 'Submit' Button
8) Select '**EMD** ' in the drop down menu under ´ Select Payment Category'
9) Now Fill in the required details and ensure correctness of data filled. Ensure that you are entering correct enquiry/tender number and other details correctly.
10) **Make payment for EMD as required in tender after entering the details and enclose copy of receipt along with tender documents.**

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1.2 The Techno-Commercial-BID as detailed below duly filled along with the supporting documents.

1.2.1 The Techno Commercial-Bid shall Contain the duly-filled-in Documents including

1.2.1.1 Check list for Cover I (**Annexure –A**)

1.2.1.2 The Mandatory documents such as Annexure-B to R (as applicable) and

1.2.1.3 Section VIII(technical Bid format duly filled)

1.2.1.4 **Own land -** Document copy / **Lease Land –** Self attested Copy of Registered Lease Agreement for 3 years *period*

1.2.1.5 ***Documents to be enclosed for Partnership Firm – Self attested Copies***

i) Latest Form- A, issued after 01.04.2020.

ii) Partnership Deed Copy (AT WILL).

1.2.1.6 ***Documents to be enclosed for Limited Firm (Private Firm) – Self attested Copies***

i) Latest resolution by Board of Directors.

ii) Memorandum of Article of Association.

iii) Company's Affidavit for existence

iv) Latest Annual Report.

v) Directors Share details

1.2.2 The supporting Documents and/or Certificates as called for in Sl.No. 1.2.1 of Techno-Commercial bid also required to be self-attested and submitted along with the Technical-Bid.

1.2.3 The Technical BID shall not contain the rates quoted by you to this tender.

1.2.4 Incomplete offers and offers from bidders not complying with the prequalification criteria as per SECTION III & ANNEXURE-B shall be rejected.

1.3 The second cover shall contain the Price Bid format provided in the tender document. Any Rates indicated other than in Price Bid Cover II shall not be considered.

1.4 NO email offer will be entertained. Offer to be submitted only in E procurement portal

2.0 Persons Authorized for Signing the Offer/Quotation:

The Tender documents shall be signed by the Authorized Signatory Only.

i) Proprietary Firm: In case of Single Ownership / Proprietorship establishment, the Tender shall be signed by the Owner / Proprietor Only.

ii) Partnership Firm: In case the Bidder is a Partnership Firm under Partnership Act, the Tender shall be signed by all the Partners of the firm or by the Managing Partner who have Signature and Seal of the Firm authorized to do so **OR** by a person holding the Power of Attorney on behalf of the Partnership Firm. Power of Attorney attested by a **Public Notary** shall accompany the Techno-Commercial-Bid. Power of Attorney shall be submitted as per format given as **Annexure R** only.

iii) Private Firm: Authorized signatory shall be the person holding "Power of Attorney" on behalf of the firm/company/Bidder-concerned and authorized/empowered by MD or Board of Directors or owner of the firm, to act on behalf of the firm for quoting this Tender and all proceedings connected with, till finalization and execution of the Contract. Power of Attorney attested by a **Public Notary** shall accompany the Techno-Commercial-Bid.

iv) This tender is being floated through E Procurement Portal. Submission of requisite documents for tender are being submitted by the Authorized Signatory of the Firm.

v) For participating in the e-tender, Digital Signature Certificate Class III is mandatory for the subcontractor to quote.

vi) Subcontractors should quote the rate and fill other required details only in the respective fields provided.

vii) The offer should be submitted on or before the due date & time mentioned in the Procurement portal. Further tender due date extension, if any, will be communicated through E-procurement portal only. Hard copy bid or bids through E-mail / fax shall not be accepted.

viii) Subcontractor should take utmost care for the use of their Digital Key registered while participating in a Tender

3.0 Tender Due Date:

3.1 The completed offers shall reach OS/Contracts/BHEL as indicated in Section-I.

3.2 Late offers received after the specified time will be rejected.

3.3 It is in their own interest of the bidders to ensure that the Tenders are submitted before the specified date and time.

3.4 Tenders not submitted in the prescribed forms or incomplete tenders are liable to be rejected.

4.0 Vacant

5.0 Opening of Offers

a) Tenders (Offers) shall be received upto 12.00 Hours on the said due date.The times indicated are Indian Standard Time (IST).

b) b) It is bidder's responsibility to ensure that the Tenders are submitted before the specified date and time.

c) Price Bid opening will be finalized through Reverse Auction method (English method). All tenderers would have to specifically give their acceptance for this in their bid/s. The date / time of Price Bid opening will be communicated to the technically qualified Bidders separately.

6.0 **EMD :** After opening the Tender, if the Tenderer withdraws his Tender within the validity period, the EMD will be forfeited.

6.1 After becoming L1 if the firm does not sign the contract or not submitting the required base BG within the specified period, the EMD will be forfeited.

6.2 Otherwise, the EMD submitted by the vendors will be returned within a month from the date of commencement of ARC-period, including the following.

6.2.1 The EMD of vendors whose Techno -Commercial Bid is "Rejected" and their price bid is not opened.

6.2.2 The EMD of vendor who are not ranked L1, whether they agree for the counter offered rates or not.

7.0 **No Interest:** No interest shall be payable by BHEL on Earnest Money Deposit (EMD) or Security

Deposit(SD), if applicable, or any money due to the sub-contractor by BHEL.

8.0 Validity Of Offers :

The offers submitted shall be valid for a minimum period of 1 Year from the date of finalization of Contract. However the validity date of the offer is 180 days from the date of tender opening for ordering. No revision of bids is allowed, after submission till finalization of the Rate Contract.
The PVC clause will be applicable based on the change in rate of HG-Zinc applicable for Hyderabad as published by M/s Hidustan Zinc limited. The PVC terms and working are as per Section – VII.

9.0 Evaluation of New Firm :

9.1 Filled-in Registration form (as in Annexure-E) is mandatory for all new firms, **WHO HAVE NOT BEEN REGISTERED AS VENDOR WITH BHEL, BAP, RANIPET SO FAR.**

9.2 The Techno commercial bids and Registration forms submitted by the firm will be scrutinized and if the firm is meeting the pre-qualification & mandatory requirements, then the firm will be visited by BHEL team for spot assessment of their works.

9.3 Based on the feedback of the BHEL assessors, the vendor will be accepted / rejected and the same will be communicated to the firm.

9.4 Subsequently vendor code will be generated and intimated to the vendor by BHEL.

9.5 Only those firms approved as above will be considered for price bid evaluation and for Rate Contract.

10.0 Evaluation of Existing firms:

The firms who continue to be in OS Rate Contract shall be considered as existing firms.

10.1 Firms not considered in/those who have withdrawn or cancelled the ARC/not signed/discontinued in ARC shall be treated as new firms.

10.2 For other cases, Fresh evaluation will be carried out based on the Annexure-B to be submitted by the vendor for rates quoted for the new rate schedules.

11.0 Evaluation of Techno Commercial Bid :

11.1 The eligibility of the firms will be verified based on the pre-qualification criteria (SECTION III) of the tender and compliance / confirmation to the tender requirements for each Rate Schedules quoted. Only those firms complying with the pre-qualification criteria shall be considered for participation in the tender.

11.2 Once the vendor is found to be technically suitable meeting all the technical and commercial requirements of BHEL, price bid of those qualified vendors only will be considered for further processing.

11.3 Offers of vendors not technically qualified will be rejected and the same will be communicated to those vendors with reasons.

12.0 Evaluation of Price Bid :

12.1 The rates quoted shall be evaluated on the basis of "total cost to BHEL". Though the rates offered by galvanizing vendors are on "Ex-works" basis, while working for "total cost to BHEL", BHEL will also add the transport cost incurred to BHEL as per the below details.

a) Rs.400/- per MT will be added for the Vendors located with in 60Kms from BHEL,Ranipet
b) Rs.900/-per MT will be added for the Vendors located above 60 Kms and upto 160 Kms
c) Rs.2200/-per MT will be added for the Vendors located above160Kms and upto 350 Kms

The above rates are tentative and exact rates will be intimated at the time of price bid opening.

12.2 If the rates of Two vendors are equal resulting in same ranking (whether L1/L2/…), among the equal ranked vendors, the sub-ranking will be done to differentiate (a.) to decide the L1-vendor eligible for negotiation and (b) for elimination of higher ranked vendor as below. The sub-ranking will be done in-the-order by providing lower ranking for vendors (1) nearer to BHEL by location (2) Earlier date of commencement of activity as in MSME certificate),(3) Less count of Pending IPs to be settled for MAS, for morethan 30 days (as on Tender-Technical-Bid-opening date), (4)Become Sole-L1 for more number rate Schedules (5) Draw of lots as a final measure (in presence of such vendors, who may like to be present).

12.3 If the L1 rate against any RS description is found not acceptable to BHEL, then the L1 firm/s may be called for negotiation before finalizing the rate.

12.4 BHEL has the right to refloat or short-close the Tender if L1 price is not the lowest acceptable price, or for other reasons.

12.5 In case of number of qualified vendors found more than 2 and less than 10, only H1 vendor will be eliminated. However, in case of number of qualified vendors found less than or equal to 2 (Two), no elimination will be done.

13.0 Counter offer and load distribution

13.1 Counter offering will not be extended to H1 vendor in case of qualified responses found more than 2 and less than 10. However number of qualified response found less than or equal to 2, no elimination will be done.

13.2 Tentative quantity likely to be ordered against each RS group and the methodology for arriving total cost to BHEL is indicated (SECTION VI) .

13.3 Tender quantity may increase / decrease during the rate contract period. BHEL does not guarantee any minimum load for any vendor.

13.4 Once the L1 rates for the rate groups are finalized by BHEL, then the L1 rate shall be counter offered to the other technically qualified vendors for their acceptance. Acceptance of counter offer for all rate groups offered by BHEL is mandatory and part acceptance will not be considered.

13.5 Based on the acceptance of vendors for the rate groups, rate contract will be entered with the vendor for the accepted rate groups in full.

13.6 Lowest (L1) vendor will be given TWO (2) splits of load, when all other vendors(other than L1) were given One(1) split , during every bulk loading cycle, subject to meeting all the basic requirements such as Capacity availability, BG, Delivery Performance, Quality Performance, Legal

compliances, validity of lease documents, Validity of constitution etc., required as per contract.

13.7 If the counter offer given by BHEL to other than L1 Vendors is not accepted by them, then BHEL will place orders In case the L1 vendor does not execute the orders, BHEL may get the job done through other vendors at the Risk and cost of L1 vendor and the extra expenditure involved if any shall be recovered from the L1 vendor from any amount due to them.

13.8 If the counter offer is accepted by only few vendors, then BHEL will place orders only to those vendors, In case those vendors do not execute the orders, BHEL may get the job done through other sources at the Risk and cost of those vendors and the extra expenditure involved shall be recovered from these vendors from any amount due to them. BHEL may also suspend business dealings with such vendors as per BHEL policy guidelines.

14.0 General Conditions :

14.1 The offer has to be submitted as per price bid format for RS description.

14.2 It will be the Firms responsibility to ensure that the tender documents, Rate Schedules, drawings, Quality documents and related technical & commercial conditions are studied and understood fully before submitting the offer.

14.3 The Firms are advised to study and understand the scope of work and the entire process of Contract execution involved before quoting. Any technical clarifications required can be sought in person or by e-mail one week before the due date of Tender opening.

14.4 BHEL will conclude that the offer has been submitted by the firm fully understanding all the requirements both explicit and implied and other conditions and accepting the same. After tender opening, the bidders are not allowed to change / alter any of the conditions either partly or fully. Offers of any such firms doing so, will be rejected.

14.5 No deviation or change from the Tender conditions will be allowed and BHEL reserves the right to reject such offers.

14.6 Conditional offers, if any, will be rejected.

14.7 While quoting their rates, the Bidders are advised to take into account the likely expenditure, escalations, statutory requirements & levies, labour laws, safety requirements, taxes ,etc during the operation of Rate Contract for one year from the date of award of Contract. For Sub-contractors located outside Tamilnadu, Taxes and Duties arising if any, due to interstate movement of material (and Road Permit if any, will have to be arranged by sub-contractor) is to be borne by Sub-contractor.

14.8 All entries in Tender documents shall be clearly written in one ink or typed. All the corrections/cancellations/ insertions, if any, shall be duly attested by the Bidders concerned.

14.9 Rates should be quoted as per the Price Bid. Rates quoted in any other form will not be accepted and will be rejected.

14.10 The rates shall be quoted only in the list attached, both in words and figures. Wherever there is a difference between the words and figures, the following guidelines will be followed.

14.10.1 If there is a discrepancy between word and figures, the amount in words shall

prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail.

14.10.2 If there is such discrepancy in an offer, the same will be conveyed to the bidder with target date up to which the bidder has to send his acceptance on the above lines and if the bidder does not agree to the decision of BHEL, the bid is liable to be ignored.

14.11 Should a Bidder find discrepancies or omissions in the Tender documents or should there any doubt as to their meaning, the bidder should at once approach the authority inviting the Tender, for clarification well before the due date, so as to submit his Tender in time.

14.12 Conditional and late Tenders, Tenders which are incomplete or otherwise considered defective with respect to Tender conditions and Tenders not in accordance with the Tender conditions herein contained and the Tenders not in original shall be rejected, outrightly, at any point of time during the Tender processing.

14.13 During the course of finalization, if the prices offered by L1 Bidders are found to be unrealistic, unworkable with respect to BHEL's estimate or prevailing market rates, BHEL will ask for justification also demand the break up cost element for such rates from the vendors with appropriate documentary evidence and if not submitted it will be construed that the vendor has offered the rates with an intention to sabotage BHEL Tender process/ tamper Tendering procedure, affecting the RC process. In such cases, BHEL will take appropriate action in line with BHEL procedures. Hence the bidders are advised to exercise abundant care in submitting a correct genuine offer.

14.14 If a Bidder is found to have given false information / documents as a part of their offer, such offers shall be rejected / the contract shall be terminated and the firm shall be banned from getting business from all BHEL units.

14.15 Should a Bidder's or a Contractor's or in the case of a firm or company of Contractors/any of its shareholder's or shareholder's relative is employed in BHEL, the authority inviting the Tenders shall be informed in writing of this fact at the time of submission of the Tender. If such a fact comes to light subsequently, the Contract may be cancelled and the firm may be banned.

14.16 The entire terms and Conditions contained in this tender shall be deemed to form an integral part of the Contract to be entered.

14.17 Incase BHEL finds that vendors join together, form cartel, or influence others / new vendors to submit offers in their favor, then BHEL will take severe action against such vendors including permanent blacklisting / banning of such vendors for BHEL's Business.

14.18 Bidders will be disqualified from BHEL vendors list and business with them will be suspended by BHEL, if it is found that they indulge / carry out activities / business which are in direct competition or detrimental to BHEL business and accordingly such firms will be banned.

14.19 Suspension of business dealing as Hold / De-List / Ban will be invoked based on the guidelines.

14.20 The contract to be finalized against tender to be signed in Rs.100/- stamp paper. Hence after getting a confirmation on signing of contract, you shall get a stamp-paper for a value of Rs. 100/- and submit.

15.0 **Reverse auction (RA)**

15.1 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.

15.2 The philosophy followed for reverse auction shall be English Reverse (No ties).

15.3 For the proposed reverse auction, technically and commercially acceptable bidders only shall be eligible to participate.

15.4 BHEL will engage the services of a service provider who will provide all necessary training and assistance before commencement of on line bidding on internet.

15.5 Before reverse auction, BHEL will inform the bidders the details of Service Provider to enable them to contact & get trained.

15.6 Business rules like event date, time, bid decrement, extension etc. also will be communicated through service provider for compliance.

15.7 Bidders have to fax/E mail the Compliance form before start of Reverse auction. Without this, the bidder will not be eligible to participate in the event.

15.8 Reverse auction will be conducted on scheduled date & time.

15.9 The lowest bidder has to fax/e-mail the duly signed and filled-in prescribed format for price breakup including that of line items, to the Service provider within two working days of Auction without fail.

15.10 Bidders are required to read the "Terms and Conditions" section of the auctions site of Service provider, using the Login IDs and passwords given to them by the service provider before reverse auction event. Bidders should acquaint themselves of the „Business Rules of Reverse Auction", which will be communicated before the Reverse Auction.

15.11 If the Bidder or any of his representatives are found to be involved in Price manipulation/ cartel formation of any kind, directly or indirectly by communicating with other bidders, action as per extant BHEL guidelines, shall be initiated by BHEL and the results of the RA scrapped/ aborted.

15.12 The Bidder shall not divulge either his Bids or any other exclusive details of BHEL to any other party.

15.13 The calculation sheet e.g. excel sheet (which will help to arrive at 'Total Cost to BHEL') will be communicated to respective bidders of RA by BHEL. In line with the NIT terms, BHEL will provide the calculation sheet (e.g., EXCEL sheet) which will help to arrive at "Total Cost to BHEL" like Packing & forwarding charges, Taxes and Duties, Freight charges, Insurance, Goods & Services Tax (GST) and loading factors (for non-compliance to BHEL standard Commercial terms & conditions) for each of the bidder to enable them to fill-in the price and keep it ready for keying in during the Auction.]

15.14 This calculation sheet will be finalized based on the evaluation criteria specified in the NIT.

15.15 Start price for RA shall be lowest of sealed envelope price bid.

15.16 Wherever more than one lowest sealed envelope price bids are identical and lower than the estimate, the start price, would be that price arrived by reducing the lowest sealed envelope price bid by maximum of one decrement.

15.17 The start price & bid decrement will be decided by RA committee of BHEL and the same would be communicated to the service provider, to start the bidding process.

15.18 Only those bidders who have submitted the 'Process compliance form' duly signed and within the scheduled time would be eligible to participate in RA process.

15.19 Reverse Auction will be conducted if two or more bidders are techno commercially qualified. In case of two or three qualified bidders, there shall be no elimination of H1 bidder (whose quote is highest in sealed envelope price bid). In case of four qualified bidders, the H1 bidder shall be

eliminated whereas in case of five qualified bidders, H1 & H2 bidders shall be eliminated. However, in case of six or more qualified bidders are available, RA would be conducted amongst first 50% of the bidders arranged in the order of prices from lowest to highest. Number of bidders eligible for participating in RA would be rounded off to next higher integer value if number of qualified bidders is odd (e.g. if 7 bids are qualified, then RA will be conducted amongst lowest four bidders). However, there will be no elimination of qualified bidders who are MSE or qualifying under PPP-MII, Order 2017, irrespective of the number of bidders qualifying techno-commercially.

15.20 In case of multiple H1 bidders, all H1 bidders (excluding MSEs and bidders qualifying under PPP-MII, Order 2017) shall be removed provided minimum two bidders remain in fray, else no H1 removal.

15.21 The lowest bidder in sealed envelope price bid shall be shown as current L1 automatically by the system. System shall have the provision to indicate this bid as current L1 for further bidding. This price can be displaced by an even lower bid of a competing bidder.

15.22 If the start price is lower than the lowest sealed envelope price bid (in line with clause 8.0), on acceptance of such start price by any bidder this bid would be indicated as current L1 for further bidding. However, if no bidder accepts the start price, RA shall be treated as cancelled for the respective line item(s) and the tender shall be processed accordingly.

15.23 In case of no further bidding, RA will be deemed to have been successful with current L1 bidder.

15.24 During RA, all bidders will see their rank and current L1 price on the screen. Once the RA is done, the ranking status would be based on the last quoted price of the bidder(s) irrespective of the quote received in RA or sealed envelope price bid.

15.25 No bidder shall be allowed to lower its bid below the current L1 by more than 5 decrements at one go.

15.26 Wherever the evaluation is done on total cost basis, after RA, prices of individual line items shall be reduced on pro-rata basis.

15.27 In case of splitting requirement, H1 bidder(s) who were removed from participation in RA may also be considered for counter offer if the pre-stated (NIT) number of suppliers do not accept the counter offer. However, the principle of splitting to N-1 bidder shall be maintained in line with extant Purchase Policy / Work Policy

15.28 Reasonability of rates received through RA to be ascertained as per extant Policy provisions.

15.29 In case of enquiry through e-Procurement, the sealed electronic price bid (e-bid) would be treated as sealed envelope price bid.

Note: In order to bring more transparency and to address any queries of Bidders on Reverse Auction, an abridged version of BHEL's "Common Guidelines for conducting Reverse Auction (RA)" has been hosted in BHEL's web site www.bhel.com under the links "Supplier Registration Page" and "Tender Notification". All Bidders are requested to visit the link and familiarize themselves with BHEL's RA procedures and guidelines before submission of their bid/s. Submission of Bid shall mean that the Bidder has read and understood BHEL's RA procedures and the bid is in agreement with the same

SECTION-IV-A INSTRUCTIONS TO TENDERERS

1.0 All the prices shall be given in the Price-Bid-Format, both in Words and Numerals,. In case of any difference between the two, the amount as given in Words shall prevail.

1.1 The Price-Bid Format to be used.
1.2 The Rate to be Quoted may please be filled in Numerals in the separate column provided.
1.3 Submission of Price-BID in Excel form is Mandatory.
1.4 Tenders shall be signed by a legally authorized principal officer (s) of the tenderer.

2.0 The tenderer shall acquaint himself with the conditions/limitations and official regulations under which or conforming to which the jobs are to be performed and shall examine carefully at the information as may be furnished to them in writing from time to time.

3.0 The tenderer shall acquaint himself with applicable Acts.

4.0 No deviation or change from the tender conditions will be entertained and BHEL has the right to reject such tenders with deviations.

5.0 BHEL reserves the right to restrict the number of parties for award of contract for any or all the schedules and restrict the number of parties to be called for negotiation (if necessary) based on their competitive bidding, past performance etc. ensuring at the same time no cornering of the orders.

6.0 Tenderer are requested to indicate their reasonable offers and it may please be noted that offers with unreasonable/ abnormal rates are liable for rejection at the discretion of BHEL without assigning any reason thereof and without even an opportunity being afforded for negotiation etc.

7.0 Insertions, postscriptions, additions and alterations in the tender shall not be recognized unless received prior to the closing date, of the tender and in time and confirmed by the tenderer' signature.

8.0 Tenderer shall bear all cost incidentals to preparation, submission and negotiations of the tender.

9.0 Tenders containing erasures and alterations in the tender documents are liable to be rejected. Any correction made by the tenderers/his/their representative must be authenticated by the tenderer who has signed the original tender. All pages of the tender documents shall be signed by the authorized signatory with seal.

10.0 In case of any discrepancy between the description of the schedule or quantities specifications, drawings and for other tender documents, the decision of BHEL in writing is final, binding and conclusive for the purpose of this contract.

11.0 Whether the tender is accepted or not, tenderer shall not be entitled to claim any costs, charges, expenses incidental or incurred by him through or in connection with the submission of the Tender even if BHEL withdraws the Tender before or after the receipt of the tenders.

12.0 As a policy BHEL is not registering any power of attorney issued by Contractors/Contractors in favour of their bank for the collection of Invoice amounts on behalf of Contractors/Contractors and merely because BHEL had acted upon any such request by the party or their bankers does

not constitute any legal right or binding on BHEL for any acts of omissions and commissions or failure to act upon it or for any payment made directly to the party. If any banker includes BHEL also as a party to any such dispute between the banker and the party, all legal and incidental expenses thereof will be recovered from the concerned parties only.

13.0 Tenderer contacted in this tender does not automatically qualify for consideration just because they are found to be the lowest in Tender. BHEL reserves the right to reject any offers without assigning any reasons. BHEL also reserves the right to negotiate or counter offer the rates to any of the parties at their discretion.

14.0 Conditional tenders are liable to be rejected.

15.0 Should the tenderer or the contractor have a relation or relations in the case of a firm or company of contractors, one or more of its shareholders or relations or relations of the share holders employed In BHEL or any ex employee who has retired/resigned within a period of two years as on date of quotations or at any subsequent date after the award of the contract, the authority inviting the Tender shall be informed of the fact at the time of submission of the tender and there after as applicable and obtain the clearance of BHEL for such engagement failing which, BHEL may in its own discretion reject the tender or rescind the contract.

16.0 After finalization of tender, if the Contractor is awarded the Contract, Proprietor, Partners and Directors (as applicable) should physically present themselves and sign the contract in the presence of Head of OS Department with in the dates specified.

SECTION-IV-B Instruction to Bidders (GENERAL CONDITIONS)

1.0 DEFINITIONS
Throughout these conditions and in the specifications the terms :

(a) "The Contractee" means the Bharat Heavy Electricals Limited, acting through the Addl.General Manager, Outsourcing ,Boiler Auxiliaries Plant, Ranipet – 632 406 unless the context otherwise provides.

(b) "The Contractor" means the person, firm or company with whom the order for machining / fabrication is placed and shall be deemed to include the Contractor's successor (approved by the Contractee), representatives, heirs, executors and administrators, as the case may be, unless excluded by the terms of the Contract.

(c) "Drawings" means the drawings exhibited or provided for the guidance of the Contractor.

2.0 EXECUTION :
The whole contract is to be executed in the most approved substantial and workman like manner to the entire satisfaction of the contractee, or the inspecting officer, who shall have power to reject any of the fabrication of which he may disapprove; and his decision thereon and on any question as to the true intent and meaning of the specifications of drawings or of the work necessary for the proper completion of the contract, shall be final and conclusive. The contractee may require alternations if any to be made during the progress of machining /fabrication, and should these alterations be such that either partly to the contract considers an alteration in the changes justified such alteration shall not be carried out until amended cost of machining /fabrication charges have been submitted by contractor and accepted to fabricate without obtaining the consent of the contractee in writing to an amended cost of machining /fabrication charges, the contractor shall be deemed to have agreed to execute fabrication at such charges as may be considered reasonable by the contractee.

3.0 FORCE MAJEURE :
If at any time during the continuance of this contact the performance in whole or part by either party or any obligation under this contract shall be prevented or delayed by reasons of war, hostilities acts of public enemy, civil commotions, sabotage, fires, floods, explosions, epidemic, quarantine restrictions or acts of God (herein referred to as events), then provided the notice of the happening of any such events is given by either party to other party within 21 (twenty one) days from the date of occurrence thereof, either to terminate this contract, nor shall either partly have any claim for damages against the other in respect of such non-performance and delivery under the contract shall be resumed as soon as practicable after such event has come to an end or ceased to exist and the decision of the contractee as to whether the deliveries have been so resumed or not shall be final and conclusive. If the performance in whole or part of any obligation under this contract is prevented or delayed by reason of any such event, claims for extension of time shall be granted for periods considered reasonable by the contractee subject to prompt notification by the contractor to the contractee of the particulars of the event and supply to the contractee if required of any supporting evidence. Any waiver of time in respect of partial installment shall be deemed to be waiver of time in respect of remaining deliveries.

4.0 If as a result of difficulty in procurement of raw materials or due to force majeure reasons or any other reasons what-so-ever the contractor is unable to keep the delivery schedule of the contractee, extension of time may be granted by the contractee at their discretion as my be necessary to the extent considered necessary should there be delay in supply beyond the extended date of delivery, it shall be open to the contractee to terminate the contract in part or full and make other arrangements for executing fabrication else where at the cost and risk of the contractor.

5.0 **Integrity Pact**

IP is a tool to ensure that activities and transactions between the company and its Bidders/ Contractors ate handled in a fair, transparent and corruption free manner. A panel of Independent External monitor (IEMs) have been appointed to oversee implementation of IP in BHEL.

The IP as enclosed with the tender is to be submitted (duly signed by authorized signatory who signs in the offer) along with techno-commercial bid. Only those bidders who have entered into such an IP with BHEL would be competed to participate in the bidding. In other words, entering into pact would be a preliminary qualification.

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

Please refer section-8 of the IP for Role and Responsibilities of IEMs. In case of any complaint arising out of the tendering process, the matter may be referred to the IEM mentioned in the tender.

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".

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

Name: B.Sivasubramanian Manager & S.Srinivasan, Exe.Addl.Engr II

Deptt: Outsourcing

Address: BHEL, Ranipet

Phone: (Landline/ Mobile) 04172-284030/284158/ 9442586376 & 9442308554

e-mail: *bsmanian@bhel.in* & ssvasan@bhel.in

Integrity Pact are applicable for all the BHEL enquiries whose estimated value is equal to or more than Rupees 02 Crores.

6.0 **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.

As per BHEL's Fraud prevention Policy, Nodal officers were nominated by BHEL Management. The details of such Nodal officers are furnished below:

Name shri/smt	Designation	Email ID	Phone No
Manimala K P	GM-OS & WCM	manimala@bhel.in	04172-28 4050
Ashok K	GM-,SOM , PMS & DTG	apa @bhel.in	04172-28 4607
Ravikumar P	GM- OPERATIONS	pravi @bhel.in	04172-28 4574
Saravanan G A	GM- Marketing & NGA	saravananga @bhel.in	04172-28 4446
Sundar VV	GM-Engineering	sundarvv@bhel.in	04172- 28 4615
Suresh Kumar P	AGM – Coml ,RM & Shipping	psureshkumar@bhel.in	04172-28 4300
Umapathi N K	Vigilance	umapathi@bhel.in	04172 -28 4463
Balasubramanian K	Internal audit	kbala@bhel.in	04172 -28 4304
Vijayalakshmi K G	GM/Finanace	kgviji@bhel.in	04172 -28 4518

Any bidder / contractor who come across any fraudulent behaviour of BHEL's employees may communicate the same to any / all of these Nodal officers.

7.0 RISK PURCHASE

Alternatively, the BHEL at his option will be entitled the contract and to manufacture 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 dispatch 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 BHEL may sustain by reason of such risk purchases in addition to penalty at the rate mentioned in LD clause.

In case those vendors do not execute the orders, BHEL may get the job done through other sources at the Risk and cost of those vendors and the extra expenditure involved shall be recovered from these vendors from any amount due to them.

8.0 SUSPENSION OF BUSINESS DEALINGS WITH VENDORS

The offers of the bidders who are under suspension as also the offers of the bidders, who engage the services of the banned firms, shall be rejected. The list of banned firms is available on BHEL web site www.bhel.com.
Integrity commitment, performance of the contract and punitive action thereof:

1.1. Commitment by BHEL:

BHEL commits to take all measures necessary to prevent corruption in connection with the tender process and execution of the contract. BHEL will during the tender process treat all Bidder(s) in a transparent and fair manner, and with equity.

1.2. Commitment by Bidder/ Supplier/ Contractor:

1.2.1. The bidder/ supplier/ contractor commit to take all measures to prevent corruption and will not directly or indirectly influence any decision or benefit which he is not legally entitled to nor will act or omit in any manner which tantamount to an offence punishable under provision of the Indian Penal Code, 1860 or any other law in force in India.

1.2.2. The bidder/ supplier/ contractor will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract and shall adhere to relevant guidelines issued from time to time by Govt. of India/ BHEL.

1.2.3. The bidder/ supplier/ contractor will perform/ execute the contract as per the contract terms & conditions and will not default without any reasonable cause, which causes loss of business/ money/ reputation to BHEL.

If any bidder/ supplier/ contractor during pre-tendering/ tendering/ post tendering/ award execution/ post-execution stage indulges in mal-practices, cheating, bribery, fraud or and other misconduct or formation of cartel so as to influence the bidding process or influence the price or acts or omits in any manner which tantamount to an offence punishable under any provision of the Indian Penal Code, 1860 or any other law in force in India, then, action may be taken against such bidder/ supplier/ contractor as per extant guidelines of the company available on www. bhel.com and/or under applicable legal provisions".

9.0 INTERPRETATION :

Any dispute or difference of opinion in respect of the interpretation, effect or application of this particular condition of the contract or of the amount recoverable here under from the contractor shall be decided by the contractee and the decision shall be final and conclusive.

10.0 BOOK EXAMINATION CLAUSE :

(a) The contractor shall, whenever required, produce or cause to be produced for examination by any officer of the contractee authorized in that behalf any cost or other account book or account voucher, receipt letter, memorandum, paper or writing or any copy of extract from any such document and also furnish information and returns verified in such a manner as may be required in any way relating to the execution of this contract or relevant for verifying, ascertaining, the cost of execution of this contract (the decision of such officer of the contractee on this question or relevancy of any document, information or return being final and binding on the parties). The obligation imposed by this clause is without prejudice to the obligation of the contract/Job-Work-Order or under any statute rules or orders binding the contractor.

(b) The contractor shall, if the authorized officer of the contractee so requires (whether before or after the prices have been finally fixed), afford facilities to the officer of the contractee concerned to visit the contractor's works for the purpose of examining the process of manufacture and estimate of ascertaining the cost of production of the articles. If any portion of the work be carried out by a sub-contractor or any subsidiary or an allied firm or company, the authorized officer of the contractee shall have power to secure the books of such sub-contractor or any subsidiary or an allied firm or company shall be open to this inspection.

11.0 SET-OFF CLAUSES :

Payment shall be subject to the deduction of any amount, for which the contrctor is liable under this contract, or any contract in respect of which Bharat Heavy Electricals Limited, Ranipet 632 406, Tamilnadu is the Contractor.

12.0 LAWS GOVERNING THE CONTRACT :

(a) The contract shall be governed by the laws of Government of India in force.

(b) Irrespective of the place of execution of the contract, place of delivery, place of payment under the contract, the contract shall be deemed to have been made at Ranipet.

13.0 THE GLOBAL COMPACT:

Global compact is a signature initiative of United Nations Security General and four United Nation Agencies:

- Office of the High Commissioner for Human rights
- International Labour Organization
- United Nations Environment Programme
- United Nations Development programme

This is a board based initiative and engages:

- Individual Companies
- Business Associations
- International Labour

- Human Rights, Environment and development Organizations
- Academic & Public Policy Instructions and United Nations

The Contractee (BHEL) is a member of this Global Compact. As a participating Company, We have the obligation to

** Support and respect Human rights with in our spheres of influence.
** Make sure we are not complicit in Human right abuses.
** Make sure we are not employing forced or compulsory labour.
** Refrain from employing child labour
** Eliminate discrimination in our hiring and firing policies
** Support a precautionary approach to Health, Safety of employees and society and environmental challenges.
** Undertake initiatives to promote greater environmental responsibility
** Encourage development and diffusion of environmentally friendly technologies.

CONTRACTOR shall also ensure to fall in line with the above principles.

BAP/RANIPET got accreditation Occupational Health and Safety Management System (ISO 45001) and Environmental Management System (ISO 14001). As per this, OS Contractors are requested to meet the requirements of EHS (Environmental Health & Safety) guidelines (mentioned below), while engaging and using Vehicles for incoming/outgoing transportation.

- To have valid Driving license and RC book for the Transports
- To load the vehicle/bullock cart within the Safe Working Load (S.W.L.) The S.W.L. is to be displayed/painted on the vehicle/bullock cart.
- To load the material in such a way that it should not project outside the dimensions of the Vehicle/bullock cart.
- To stack the material in a manner that the material should not slide/fall during transportation.
- During manual lifting with an Adult, the weight should not exceed 50 kg.
- To attempt to adopt ISO 45001/ISO 14001 requirements in their manufacturing process at Contractor's work place.
- To comply with applicable provisions of the Central Motor Vehicles Rules 1989 (Rule:136 and if any). List of important Phone Nos: (given by OS) should be available with the driver while transporting BHEL materials.
- To train drivers to handle emergency situation during transportation.
- To follow the Various Acts/Rules and Regulations (particularly Factories Act 1948 and Tamil Nadu Factory Rules 1950) applicable to them.
- To maintain valid PUC (Pollution Under Control) certificates and produce while vehicle is in this company premises.

** OS Contractors are requested to meet the requirements of ISO 45001/ISO 14001 as given below:

** To adopt ISO 45001/ISO 14001 requirements in their manufacturing process at Contractor's work place.
** To comply with applicable provisions of the Central Motor Vehicles Rules 1989 (Rule: 136 and if any).
** To follow the applicable Acts/Rules and Regulations (like Factories Act 1948 and Tamil Nadu Factory Rules – 1950) applicable to them.
** In addition to this,they should follow the day to day communication of OS on this regard

Bharat Heavy Electricals Limited /Boiler Auxiliaries Plant, Ranipet- 632 406

பாரதமிகுமின் நிறுவனம்

OUTSOURCING DEPARTMENT

SECTION-V (Terms and Conditions)

Enquiry No. : **651001E dt 21/10/2021**

Kindly refer to Section-I for the date of Bid opening

Enquiry for entering into Rate Contract during 2021-22 for GALVANIZING of Handrail tubes, bends and other components like flats and ladder, structure of gallaries and platforms, Plate/sheet formed structures etc., as per BHEL Engineering drawings, quality documents and technical specifications, with materials / components supplied by B.H.E.L., as free issue.

Scope of Work:

Galvanizing of Hand rail tubes, Hand rail bends, (from tube dia 27.3 to dia 76.1) and other components like flats and ladder, structure of gallaries and platforms, Plate/sheet formed structures etc,as per the drawings, quality work instructions from BHEL/BHEL vendors suppliedmaterials. Galvanizing to be done to 600 gsm/610 gsm/ 750 gsm/900 gsm depending up on the QP/CQR/ project requirement. Basic cleaning, degreasing, caustic cleaning, pickling, rinsing, fluxing etc prior to galvanizing and post galvanizing processes as per standard are to be done by Galvanizing vendor. Unloading of jobs and loading of galvanized jobs are in galvanizing vendors scope. Materials for Galvanizing will be delivered to your works by BHEL/BHEL vendors and collect back the same after galvanizing. Hence, transport charges are NOT APPLICABLE/PAYABLE for Galvanizing vendors. Inspection will be done by BHEL/BHEL approved agency at all stages of galvanizing and prior to dispatch. (Standard Ref for galvanizing :IS 2629 –Latest version).

a. Recommended practice of Hot Dip Galvanizing for Iron & Steel as per IS:2629 and Continuous galvanizing process consists of cleaning of base steel surface by first oxidizing and subsequently reducing the surface oxides under controlled atmosphere or by any other inline cleaning method. Please ensure your process for continuous feeding of molten zinc bath.
b. Passivizing treatment by suitable agent like chromic acid needs to be followed.
c. After galvanizing, when the sheet emerges from the zinc bath, the excess molten zinc on them is wiped off by air or gas jets. There is no fluxing in this process.
d. Zinc purity certificate for all cycle needs to be generated and shown to our inspection on demand.
e. Type Test / Acceptance Test such as Visual Inspection, Adhesion of Coating, Uniformity of coating and Mass of Zinc coating will be made for all products.
f. IS: 2633 - 1986 Methods of testing uniformity of coating on zinc coated articles will be refered.
g. Mass of Zinc Coating - Minimum average mass of zinc coating for fabricated items shall be ensured as per requirement.
h. The damaged surface after cleaning shall be painted with two or more coats of zinc rich primer followed with finish coat of zinc rich paint as per painting schedule recommended by manufacturers. However the total DFT shall be mini. 87microns.

1. **Eligibility to quote the rate groups**: The vendors complying with the Evaluation Sheet (as in Annexure-B) requirements alone are eligible to quote. Rates quoted by ineligible vendors if any shall be rejected. Please ref. **Section-III** and **Annexure-B** for the eligibility.

1.1. Contract period for this Enquiry will be **12 months** form the date of award (finalization) of contract.

1.2. The Enquiry is for Galvanizing of subjected items to a total quantum of **1500 MT Appx.** (contract for doing Galvanizing of subjected items) in accordance with drawings/QWIs to be supplied by BHEL/RANIPET, on the items/materials/components supplied as free issue by BHEL/RANIPET or its vendors. The rates are on "Ex-works" basis. The other details of the conditions of the Enquiry are given below.

1.3. For study and quoting of rates for various Rate Schedules, the sketches along with other documents listed in Annexures are made available for downloading. For your study and reference the sample copies of actual drawings are kept at our office during working hours on all working days (up to 1 week prior to the due date for submission of tender) .

1.4. You are requested to have perusal of these drawings, before submitting your offer.

1.5. Based on the Rate contract, to be finalized, the Sub-Contractors shall accept and undertake all jobs awarded to them and execute them to the satisfaction of BHEL. Failure to comply with this requirement will be viewed seriously.

1.6. BHEL will conclude that the offer has been submitted by the Sub-contractor fully understanding all the requirements both explicit and implied and other conditions and accepting the same. After tender opening, Sub-contractors do not have any right to change / alter any of the conditions either partly or fully. Offers of any such Sub-Contractors doing so, will be rejected.

1.7. Vendors are requested to refer to **SECTION-I** of this tender for (a) the applicability of EMD, (b) waiver available for EMD for MSME vendors and (c) procedure involved in submitting the offer in two parts.

1.8. The rates are invited under following categories from eligible vendors:

Sl	Description: GALVANIZING confirming to IS 2629(latest version) of	Coating thickness in Grams per Square meter	Tentative Quantity for ARC 2021-22 In Metric Tons	Remarks
1	Galvanizing of Hand rail tubes, Posts, bends (tube dia from 27.3 to dia 76.1) and other components like angles, channels, flats, platform, supports and ladder etc., Galvanizing to be done to 600/610 gsm depending upon the QP/CQR/Project requirement. Various Drawings	600 or 610	1200	Rates to be quoted in Rs. Per Metric ton
2	Galvanizing of Hand rail tubes, Posts, bends (tube dia from 27.3 to dia 76.1) and other components like angles, channels, flats, platform, supports and ladder etc., Galvanizing to be done to 750 gsm depending upon the QP/CQR/Project requirement. Various Drawings	750	150	Rates to be quoted in Rs. Per Metric ton
3	Galvanizing of Hand rail tubes, Posts, bends (tube dia from 27.3 to dia 76.1) and other components like angles, channels, flats, platform, supports and ladder etc., Galvanizing to be done to 900 gsm depending upon the QP/CQR/Project requirement. Various Drawings	900	150	Rates to be quoted in Rs. Per Metric ton

1.9. Vendors are requested to quote the rates for all the three categories in Rs. per MT meeting the terms and conditions of this tender in full.

2. RATES :

2.1. The price offer has to be submitted only in price bid format **,** duly e-signed by the authorized person of your Firm . No deviation or change from the Tender conditions will be entertained and BHEL reserves the right to reject such offers. Please quote your FIRM rates per MT. The rate shall include all consumables/activities as specified in clause 2.1.1 to 2.1.6 and the operations called for as well as the conditions indicated in the tender.

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

2.1.2. The rate shall include all consumables for galvanizing as stipulated in the drawings/QWIs/Specifications/procedures and any indirect materials required for galvanizing.

2.1.3. The rate shall be inclusive of all the preparatory activities required for galvanizing as per standards and the post galvanizing activities.

2.1.4. All painting charges including cost of the paint required in the process is fully in the scope of vendor. No extra charges payable by BHEL for such paintings.

2.1.5. Offering the jobs for inspection to BHEL /Customer or its authorized inspection agency is in Sub-Contractors scope and the quoted rate shall include the same.

2.1.6. All the charges incurred for the testing (as applicable and called for by the inspection) of the items and the work to be done after testing is in vendors scope and the quoted rate shall include the same. The description of items (hand rail tubes, bends, etc) given for the tender is only indicative. Any items of similar nature with different name/description shall be loaded against the same rate based on the work content. For payment purpose, only Rate given shall be considered.

2.1.7. Protecting the material issued by BHEL under safe custody until completing the delivery as required. (to be read with cl. 3.4.10)

2.2 The rates shall be quoted by considering the "**Price variation clause** (PVC) as per section-VII". The rates are operative, with application of PVC for placement of orders for **ONE YEAR** on Rate Contract basis to be entered into between BHEL and the Sub-contractor. Please quote rates for galvanizing based on HZL rate of Rs. **3, 11,900** per MT for Zinc as on dt. 18.10.2021-(Hyderabad stock point of HG grade)

2.2.1. The total available load from time to time will be distributed to those Sub-contractors with preference to L1, L2 and L3, with whom Contract is entered into and to that Contract, the addenda shall be placed in a phased manner subject to the availability of potential for BHEL and also depending upon your performance such as completion according to our plans/requirements, meeting quality requirements, prompt issue of documents, submission of other reports as called for, then and there. BHEL does not guarantee ordering of any minimum quantity on any Sub-contractor.

2.2.2. However, if the Sub-contractors are performing well in terms of sequential dispatches and required tonnage interalia meeting the requirements laid down above, the same will be considered during loading. Please ref. **Cl. 14 of Section-IV** for counter offer load distribution (The Scope of fabrication will be indicated in Annexure II & Customer

approved quality plan in issued along with Addenda to be released after finalization of contract).

2.2.3. The L1, L2 and L3 Vendors will be loaded for more quantum, subject to other performance criteria specified above.

2.2.4. Job Work orders will be issued after entering into Rate contract with the Sub-Contractors. Discrepancy in the JWOs if any, has to be settled immediately then and there within 10 days from the date of Job Work Order.

2.2.5 ARC Contract will be entered only with the vendors who respond to this ARC-Enquiry. New vendors who have not responded to this ARC-Tender-but registered/approved later, if any will be permitted in the next year ARC (provided they respond to the next-year ARC).

2.2.6 In case of new vendors, The Inspection report on **First-of-trial** of First-addendum-JWO shall be submitted. Further loading of jobs will only be considered after the successful completion of the First-addendum-PO.

2.3 ELIGIBILITY TO QUOTE: Please refer **SECTION-III** for the pre-Qualification criteria

3. RAW MATERIAL ISSUES AND ACCOUNTAL:

3.1.1 The items/material required for galvanizing will be delivered to your works by BHEL/BHEL vendors and collect back after Galvanizing. Galvanizing to be done to 600/610 grams/sq.mtr, 750 grams/sq.mtr, 900 grams/sq.mtr, depending upon the requirement. Transport charges are NOT in your scope and hence not Payable. Weights of GMS (Annexure II of addenda to be released after finalization of contract) will be the basis for accounting of materials issued and for billing of galvanizing charges.

3.1.2 The galvanizing shall be done AT THE EARLIEST WITHOUT ANY DELAY. If BG limit becomes a constraint, in case of more quantity of items for galvanizing, vendor shall arrange for additional BG within 2 weeks time as per the need.

3.1.2 Wherever Sub-contractor comes across receipt of excess material due to any error in GMS/Drgs/JWO/addenda that is to be brought to the notice of AGM/OS immediately.

3.1.3 Excess material arising out of wrong issue shall be returned back.

3.1.4 Returning of excess-material to BHEL is mandatory. Incase where those materials are not returned, cost shall be recovered along with all applicable statutory levies such as GST, Taxes etc along with our departmental charges/Administrative charges. Currently the departmental/administrative charges are 25% for indigenous materials and 50% for imported materials on the value. In addition, Statutory taxes, duties & levies as applicable will also be recovered and no claim for refund will be admitted by BHEL/RANIPET. The rate of departmental and administrative charges, as applicable from time to time, irrespective of the date of failure, will be applicable. Besides penal interest will be levied on the material value, for the period starting from date of issue of material.

3.1.5 For the purpose of material accounting after completion of a particular WO, BHEL/OS department will issue a preliminary material accounting statement thro' E-mail, the next day of completion.

- The Sub-contractor shall respond within 7 days of receipt of Preliminary MAS, Either by Accepting the Pre-MAS OR submit their own Sub-contractor/Firm-MAS (In the case if the Pre-MAS is not in line with the requirement).
- Any discrepancy as indicated in Pre-MAS will have to be reconciled with the Material Accounting section with necessary proof of documents within a week from the date of issue of Pre-MAS. If reconciliation is not done within a week, it will be treated that Pre-MAS is correct in all respects
- If the Pre-MAS is accepted by the Sub-contractor, BHEL will prepare, within 7 days, the Final-MAS.
- For Deleted /Diverted Job Work orders, Final material accounting should be settled within 14 days time, after deletion/diversion. Otherwise, BHEL will prepare suo-motto Final-MAS on completion 14 days of IOM date. For exceptional cases with reasons attributable to BHEL, a further relaxation of 1 week will be given on the certification of respective field officers.
- The response if any received from the Sub-contractor will be studied and considered and Final MAS will be prepared. In case if no response is received, the provisional MAS will be treated as 'Final' MAS and accordingly, Final material accounting statement (FMAS) will be issued. BHEL will prepare the FINAL MAS within 30 days of DC control.

3.1.6 Recovery towards non return of balance material as per FMAS will be done as per Contract norms along with statutory taxes, duties & Levies as applicable from any one of the running bills. Hence, any correction after the issue of Final-MAS will not be entertained. After the issue of Final-MAS, the WO will be treated as closed in all respects thereby any requests towards refund of recovery if any will not be entertained.

3.1.7 Please note that the Sub-contractor is responsible for prompt material accounting and settlement of outstanding dues towards non-return of balance material. Delay in settling the material accounting / outstanding dues will entail BHEL the right to terminate the Contract forthwith or to impose temporary suspension on further loading at the discretion of BHEL /RANIPET. Also, in case of non return of material or non submission of material accountal statement, BHEL reserves the right to en-cash the Bank Guarantee / Fixed Deposit Receipt submitted by the Sub-contractor and initiate legal action against the Sub-contractor.

3.1.8 Where an entity (whether a proprietorship, partnership, company, Hindus Undivided Family or otherwise) commits a default or breaches the Contract and the proprietor/ partner/ director/ member of such entity is also a proprietor/ partner/ director/ member of another entity that is registered with BHEL (in Ranipet or any other unit of BHEL), BHEL shall have the right to recover losses due to the default or breach, whether direct, indirect or consequential, either from the defaulting/ breaching entity or the other said entity or both. Such right shall also include the right to encash any security (in any form such as but not limited to bank guarantee, demand draft, FD, etc.)_ furnished by either or both entities. Without limiting the applicability of the foregoing, it shall not be a defence to the other said entity for enforcement of such a right that:

(a) both entities are legally distinct/ separate entities, or

(b) the management of the entity/ partners/ directors/ members of such other entity were not aware that the proprietor/ partner/ director/ member of the defaulting/ breaching entity was also a proprietor/ partner/ director/ member of the other said entity.

3.1.9 The material issued to the Sub-contractor as free issue shall remain the property of BHEL/RANIPET. The Sub-contractor shall use the above material only for the execution of BHEL's Contract / addenda and for no other purpose whatsoever. The Sub-contractor shall be responsible for the full value thereof to be assessed by BHEL/ RANIPET whose decision shall be binding on the Sub-contractor. The Sub-contractor shall be liable for the loss or damage to such property from whatever cause, including but not limited to theft, fire, destruction or damage of property due to reasons beyond the control of the Sub-contractor, while such property is in the possession or under the control of the Sub-contractor, their employees, workmen or agents or any other person connected with the Sub-contractor. The Sub-contractor should execute an agreement in **Rs. 100/-** non- judicial stamp paper and maintain the secrecy of the design, know how of BHEL products.

3.1.10 All the materials of BHEL RANIPET shall under no circumstance be hypothecated/ leased/ encumbered to any Bank or any Lending Institution or to any party whomsoever. It should not also be shown as the Sub-contractor's assets in any of the statements of the Sub-contractor to any party. The Sub-contractor shall, whenever required, produce the materials supplied as free issue by BHEL/RANIPET or BHEL Vendors, to BHEL officials visiting the Sub-contractor's unit for verification purposes. If the Sub-contractor fails to produce or properly account the material so issued, BHEL/RANIPET will have the right to take further action as deemed fit including recovery of the value of materials along with the respective administrative charges and statutory levies from the running bills of the Sub-contractor (with BHEL/Ranipet and with other Units of BHEL) and also any or all of the actions such as, Suspension of business dealing temporary suspension of loading, termination of Contract, holding the payment due etc., Similarly for the claim made by any units of BHEL (on account of such vendor) to the BHEL-Ranipet, the Bank Guarantee submitted to BHEL/Ranipet will be encashed.

3.1.11 As and when required/applicable, BHEL /RANIPET will transfer (or advice for returning u/RSV) the material available for which JWO/Issue Position(IP) is not closed, from one Sub-contractor to the other Sub-contractor/other IP of the same Sub-contractor. For this, necessary credit will be given during material accounting. The material transfer emanating from Outsourcing Department, BHEL, RANIPET, is to be honored by the Sub-contractor **immediately** or otherwise recovery will be made at the prime material cost. Any difficulty for effecting such transfer shall be brought to the knowledge of OS/BHEL/RANIPET immediately.

3.1.12 The Sub-contractor is responsible for submission of CLEAR material accounting statement (MAS) ie. ensure that all transactions are completed (including IAWTV/RSV etc) with in 7days from the date of completion of work order & failing, without prejudice to other rights under Sub-contractor, law or otherwise, which MAS will be closed suomotto and recovery for the material will be effected after adjusting of balance payment due to the Sub-contractor from any of the running bills. Delay in settling the

material accounting will entail BHEL the right to terminate the contract forthwith or to impose a temporary suspension on further loading at the discretion of BHEL/RANIPET.

3.1.13 Materials will be delivered / collected by BHEL/BHEL vendor either in Lorries / trailers / trucks and can be overseen by Sub-contractor's representative. Shortage or variation in quantity, size and weight shall not be accepted. Materials will be issued BY BHEL/RANIPET only after the receipt of necessary Bank Guarantee as per **C.L.12.0**.

3.1.14 The Sub-contractor shall be bound by the accounts, statements acknowledgement of materials, receipts etc., wherever signed by their representatives.

4. PAINTING:

4.1 All painting works if any shall be part of vendor's responsibility, including cost of paints.

4.2 Application The damaged surface after cleaning shall be painted with two or more coats of zinc rich primer followed with finish coat of zinc rich paint as per painting schedule recommended by manufacturers. However the total dry film thickness (DFT) shall be minimum 87microns.

5. TRANSPORT CHARGES: As the rate are invited with Delivery–terms as Ex-works basis, the freight charges are NOT PAYABLE.

6. TECHNICAL REQUIREMENTS :

6.1. The galvanizing shall strictly conform to the specifications/standards indicated in the drawings/QWI. Care must be taken to adhere strictly to the NOTES given in the drawings. It should be ensured that deviations, if any, are recorded properly in the D.R. books and the same shall be made available to BHEL officials or to their authorized agencies.

6.2. Any other work carried out outside the requirements of drawings /QWIs shall have the prior approval of the competent authority of Outsourcing Department, BHEL/RANIPET.

6.3. Adequate facilities like equipments required for cleaning, Heating, handling facilities and measuring / testing instruments as called for must be available duly calibrated and kept with the Sub-contractor for the purpose of Galvanizing. All the above basic facilities/equipments must be under working condition and the same be made available for verification by the BHEL officials or their authorized agents whenever they are called for.

The instrument/gauges are to be calibrated periodically as follows:

Sl.No.	Type	Periodicity
01	Measuring instruments / gauges	One year
02	Limit Guages (Eg.Plug/ring)	One year
03	Temperature , Pressure gauges	6 months
04	Measuring Steel tape	Once

6.4. Calibration status shall be displayed at the sub-contractors works in a conspicuous location. Calibration can be performed either at BHEL or at any Govt. approved labs traceable to national standards.

6.5. Normal safe loading of galvanized items on the BHEL/BHEL vendor vehicles shall be made by the Sub-contractor to avoid damages on the galvanized surface. The rate is inclusive of this safe handling.

7. Vacant
8. Vacant

9.0 **INSPECTION :**

9.1 Inspection of Galvanizing process and the Galvanized jobs shall be carried-out by our Quality control department and/or by the customers and/or by an agency or persons authorized by BHEL/RANIPET at the Sub-contractor's works. The concerned Engineer/supervisor/Authorized Official of the Sub-contractor authorized by the Sub-contractor to carry out all Inspection activities and their authority/activities shall be on par with any other Inspection agency approved by BHEL (like TUV/IRS/INTERTEK etc.,). All facilities and equipments, calibrated instruments and standard gauges required for inspection shall be provided by the Sub-contractor free of cost.

9.2 Our representatives/authorized agents will have free access to the Sub-contractor's works at any time during the execution of orders as well as for verification of requisite documents/materials.

9.3 The Galvanized items/components are deemed to have been accepted as ready for delivery only after IR is raised by the Inspecting Agency.

9.4 Statutory inspection requirements such as standard procedures/testing methodologies if any are to be met by the Sub-contractor.

9.5 The quality of the pint being used will be checked by BHEL Ranipet at regular intervals. Samples will be collected from vendor works and will be tested at BHEL to ensure quality as per relevant standards. In case of discrepancy in meeting our specification, the job may be rejected/vendor may be put under suspension of business.

9.6 In case of any internal dispute of the Sub-contractor, such as but not limited to disputes between partners of the Sub-contractor, dispute between Sub-contractor and its employees, the same shall be intimated to BHEL within one (1) month from the date of dispute. Notwithstanding anything to the contrary, BHEL shall not be made a party any suit or legal proceeding in respect of such internal dispute. In case BHEL is made a party to the same, the Sub-contractor and other party(ies) to the dispute, if signatories to this Agreement, shall indemnity BHEL for (a) all direct and indirect costs expended towards such legal proceedings immediately on the issue of a claim notice to that effect from BHEL and (b) any liability that may be imposed in such legal proceedings against BHEL.

10.0 PAYMENTS:

10.1 The weight of the items/components is only based on the "DU" (Dispatchable Unit) weight as per Annexure-II of Job Work order given in and Invoice shall be raised for the DU weight only to be released after finalization of contract (scope of work).

10.2 100% payment shall be made against invoices supported by (a) inspection report (IR) in duplicate, issued by the BHEL inspector or any other BHEL authorized agency, (b) Inter AD works transfer Voucher (IADWTV) duty signed by your authorized person and the vendor taken delivery of galvanized items along with Delivery Challans (DC) OR

acknowledged by BHEL/Stores in case of delivery taken by BHEL and (c) Material Accounting Statement(MAS).

10.3 Payment will normally be made in about 45 days after receipt of valid invoices raised in accordance with CL. 10.2 & supported by full set of necessary documents at Finance.

10.4 The payment shall be subject to the deduction of any amount for which the fabricator is liable or indirectly under this contract or any other contract of the fabricator or any other fabricator‟s contract where the proprietor / any of the partners / directors of the present fabricator is / are proprietor/director/s/partner/s, in respect of which BHEL / Ranipet is a contractee.

10.5 **No Interest:** No interest shall be payable by BHEL on Earnest Money Deposit (EMD) or Security Deposit(SD), if applicable, or any money due to the sub-contractor by BHEL.

11.0 PROGRESS REPORT :

11.1 The Sub-contractor shall from time to time tender such reports and also discuss with our officials concerning the progress of the work and commitment as may be required by BHEL RANIPET. The submission, receipt, and acceptance of such reports shall not prejudice the rights of BHEL RANIPET, under the Contract shall operate as an estoppel against BHEL RANIPET merely by reason of the fact that they have not taken notice of/or objected to any information contained in such reports. Action as deemed fit will be taken if the progress of the work is not satisfactory.

11.2 The Sub-contractor shall furnish a monthly inventory report at the end of every month regarding the availability of free issue materials at their end as required by Outsourcing Department, BHEL RANIPET. If the Sub-contractor fails to produce properly account the materials so issued, BHEL, Ranipet have the right to take further action as deemed fit including recovery of the value of the materials along with the respective adminstarive charges and statutory levies from the running bills of the Sub-contractor/suspension of load/termination of contract/de-listing

11.3 Any act of Sub-contractor resulting in dishonest misappropriation or conversion of the materials so issued for his own use shall constitute the offence of Criminal Breach of Trust under Indian Penal Code and /or such other offences under any other provisions of law and the Contractee shall have every right to proceed against the Sub-contractor under Criminal Law in order to ensure proper punishment to such perpetrator/s for the said offence/s. In such cases, BHEL shall take all necessary steps to recover the material available with those firms.

12.0 **BANK GUARANTEE :**

12.1 Vendor shall provide Bank Guarantee as stipulated as in clause 12.7.

12.2 Bank Guarantee to the specified value for the safe custody of the materials issued by BHEL, Ranipet as free issue and for the satisfactory performance of the Contracts is to be executed from any one of the banks in the List of Consortium of Banks or Nationalized banks on behalf of the Sub-contractor. Bank Guarantee furnished from any other Nationalized or schedule banks other than listed banks can be accepted only with the prior approval of BHEL (OS Department**).** Also, the above bank guarantee shall be executed on a non-judicial stamp paper of value Rs.100/-or as applicable and shall be kept valid throughout the contract period PLUS 3 Months as the claim period and shall be submitted directly by bankers to BHEL as per our standard bank guarantee format attached in SECTION -X.

12.3 The bank guarantee should cover the recoveries to be made by BHEL towards material / faulty workmanship etc and also for which proper material accounting is not made within the stipulated time and shall cover all Contracts past, present and future placed by the BHEL/RANIPET. If the recovery amount is more than the pending bills, the difference amount to be settled immediately submitting Demand Draft in favour of BHEL/ Ranipet. In place of Bank guarantee, Fixed Deposit Receipt (FDR) drawn in favour of BHEL/Ranipet can also be furnished.

12.4 Necessary Bank Guarantee (BG) / Fixed Deposit Receipt (FDR) should be furnished and must be renewed in time.

12.5 The release of Contract by BHEL shall be on the strength of the BG/FDR for the safe custody of raw materials issued by BHEL, Ranipet as free issue. BHEL reserves the right to increase the value of the BG/FD depending upon the material availability with the fabricators from time to time.

List of Bankers from whom Bank Guarantee is to be obtained.

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

12.6 GUARANTEE for the finished goods: The fabricator shall warrant that the galvanizing done comply fully with the standards, drawings and other technical conditions. If the same is found defective owing to faulty workmanship/ incomplete work within a period of eighteen months from the date of delivery, the fabricator shall make good of it/replace the same free of cost. Alternatively, the rework / replacement charges will be recovered. The base BG shall be returned by BHEL after 90 days from the date of final bill submission or RC validity period whichever is later.

12.7 BANK GUARANTEE NORMS :

1. **Minimum base BG value of Rs.3 Lakhs** should be provided by the vendors at the time of signing the contract. This BG should be kept valid for **90 days after Rate Contract validity or 90 days after last bill submission date whichever is later**.
2. Prior to placement of Job Work Order, if available BG is short of the required BG value, the same will be intimated to the vendor.

3. The vendor shall arrange for the required BG within 15 days from the date of receiving such intimation from BHEL.

4. If the vendor does not submit the required BG within 15 days, then the Job Work order / loading quantity may be reduced / diverted to other firms.

5. After completion of Job Work order, the vendors can request for return of BG and the same shall be considered by BHEL.

13.0 LIQUIDATED DAMAGES :

13.1 Delayed execution beyond the delivery date stipulated in the addendum, will attract liquidated damages at the rate of half a percent (0.5%) of the value (Galvanizing cost) of the items delayed for each week or part thereof subject to a maximum of 10% value of the particular work order in the addendum to the contract without prejudice to any other relief or compensation to the BHEL/RANIPET under any other conditions of the contract.

13.2 Reasons like power cut, Labour Issue, Machine Break-down etc., which are controllable by the vendors shall not be accepted as reasons for delay for delivery extension purposes.

13.3 Where delivery extension is sought with waiver of penalty, the same should be applied with justification before **delivery to BHEL Stores/Shipping.**

13.4 **ACTION AND COMPENSATION IN CASE OF BAD WORKMANSHIP** :If any work has been executed with unsound, imperfect or bad workmanship or with materials of inferior quality, the Sub-contractor shall on demand in writing from BHEL specifying the work, material/articles complained of, notwithstanding that the same may have been passed, certified and paid for, forthwith, rectify the work so specified in whole or in part as the case may require, at their own cost and in the event of his failure to do so within reasonable period, BHEL will rectify or remove and re execute the work at the risk and expense of the Sub-contractor.

13.5 BHEL shall have general supervision and direction over the work. BHEL has the authority to stop the work, whenever such stoppage may be necessary to ensure the proper execution of the contract. BHEL shall also have the authority to reject all the works which do not conform to the specification, to direct the application of forces to any portion of the work as, in their judgment is required, and order the force increase or decrease and to decide on the issues which arise in the execution of the work.

13.6 BHEL reserves the right to suspend the work or part thereof put a hold on further loading to the Sub-contractor at any time for any reason at its discretion and no claim whatsoever on this account will be entertained.

14.0 **SUBLETTING :** The Sub-contractor shall not sublet or assign this contract or any part thereof without the written permission of BHEL/RANIPET .

14.1 Subletting or assigning this contract or any part thereof without such permission, the BHEL/RANIPET shall be entitled to cancel the contract and to execute the work elsewhere at the risk and cost of the Sub-contractor and the Sub-contractor shall liable for any loss or damage which BHEL/RANIPET may sustain in consequence of

or arising out of such fabrication elsewhere and also cancellation of registration/temporary suspension of further loading.

15.0 GST:-

For firms located within Tamilnadu:

GST as applicable from time to time, shall be paid extra over the quoted rates as per GST rules and the amount is Cenvatable. GST amount will be reimbursed on submission of proof of remittance challan, declaration if any and uploading of details in GSTN network with in the statutory time period.

For firms located other than Tamilnadu:

IGST as applicable from time to time, shall be paid extra over the quoted rates as per GST rules and the amount is Cenvatable. IGST amount will be reimbursed on submission of proof of remittance challan, declaration if any and uploading of details in GSTN network with in the statutory time period.

15.1 Income Tax deduction and surcharge on IT at source at such percentage as prescribed in the Income Tax Act from time to time will be made on the value of the invoices in the absence of Income Tax Exemption Certificate from the concerned Income Tax Officer received and submitted by the Sub-contractor. Sub-contractor has to submit photocopy of PAN Card along with original for verification.

15.2 BHEL/RANIPET will not be responsible for payment of any taxes and duties wrongly paid on account of ignorance of law or otherwise and also duty paid at a later date based on litigation.

16.0 GENERAL :

BHEL reserves the right to recover the dues if any, from the Sub-contractor from any one of the running bills of this contract or any other contract with the Sub-contractor or from any other division of BHEL.

(a) It is preferred that the Proprietor/Managing Partner/Director as applicable to the company should be easily accessible to BHEL official for day to day interaction Any change in the constitution of the Sub-contractor's unit or in shifting of works to a new location, the same shall be made only after getting specific approval from Outsourcing , BHEL RANIPET. Any deviation found later will be dealt with as deemed fit including cancellation of registration. Also change of Banker requires the prior approval of BHEL/RANIPET.

(b) Partnership firms should have the latest Form A (Rule 5) Declaration filed with the Registrar of Firms and private Limited firms should have the current MOA and the copy of the same should be produced at the time of signing the Contract.

(c) The Sub-contractor is liable for all statutory obligations, including but not limited to taxes and duties, ESI, PF, ED/ST, Labour Acts, Factories Acts, Workmen Compensation Act, etc., for their workers. BHEL/RANIPET will have no liability in respect thereof. Notwithstanding the above, if any demand notice is served by the concerned Statutory authorities for recovery of any of their dues on BHEL, BHEL shall have the right to pay the same without notice to the Sub-contractor and recover the same plus administrative

charges of 15% of such amount from the Sub-contractor either from the pending/future bills of the Sub-contractor or otherwise. Such act of repeated default is liable for suspension/stoppage of further business till such time the default/violations get vacated. Notwithstanding anything to the contrary, BHEL shall not be liable for any penalty or interest imposed by any statutory authority due to the action of the Sub-contractor or his employees, workers, agents, etc.,

(d) The Sub-contractor has to devise suitable scheme whereby the employment of child labour should be regulated in line with the child Labour Act (prohibition & Employment Act 1986).

(e) All the safety precautions and use of safety equipments are to be followed while carrying out the work. The Sub-contractor must have proper tools and handling equipments. There should always be a responsible person available at the Sub-contractor's works to oversee the operation and compliance of safety regulations. If any non-compliance with respect to proper safety conditions/requirements, BHEL may withhold visit/inspection, instruct stoppage of work till such time the desired safety requirements/conditions are met with.

(f) All the documents (Inclusive of Drawings, GMS and Standards) of BHEL made available to the Sub-contractor should be kept in a strict confidence and under no circumstance be made available to others or allow others to make use of them for any other commercial purpose whatsoever. This secrecy clause is binding on the employees of the Sub-contractors also. Any contravention will be subjected to legal action besides suspending business with BHEL. Such documents should be returned to the BHEL/RANIPET destroyed with the prior approval of Outsourcing, BHEL/RANIPET.

(g) Un-authorized act of engagement of any individual who is a full time employee of BHEL for part time/full time work by the Sub-contractor will be viewed very seriously and such act is liable for suspension/total stoppage of further business dealings with the Sub-contractor by BHEL/RANIPET.

(h) Should a Sub-contractor has a relation or relations in the case of a firm or a company of the Sub-contractor, one or more of its shareholders or relation or relations of the shareholders employed in BHEL or any ex employee who has retired/resigned within a period of two years as on date of the Contract or at any subsequent date after award of this contract, BHEL shall be informed of the fact at the time of signing the contract and thereafter as applicable and obtain the permission of BHEL for such engagement, failing which BHEL may in its own discretion rescind the contract.

(i) The Sub-contractor shall not attempt any unethical acts and if they are found indulging in such acts, they are liable to be blacklisted apart from other actions. Sub-contractors indulging in any business practices detrimental to BHEL either directly or indirectly, will be dealt with severely by the due process of law.

(j) Payment for all the invoices shall be effected by a crossed A/C payee cheque /EFT/RTGS in favour of the Banker which should be indicated in all invoices of the Sub-contractor.

(k) In order to ensure safe custody of our materials, leasee of those firms under lease shall ensure that their lease period is valid for min .of 3 years (from date of signing the contract)

(l) In addition to the above, our standard General Conditions enclosed shall also apply.

17.0 BHEL reserves the right to :

(a) Negotiate with the Sub contractor who has submitted the Lowest offer for "Payment Rate Schedules"

(b) Distribute the requirements on more than one subcontractor at the Lowest acceptable rate.

18.0 Sub-contractors are requested to indicate their one email-Id as "Primary e-Mail-ID", which will only be used for all correspondences (like for MAS and Payment etc..)

19.0 **Arbitration and Jurisdiction:**

(a) Any dispute between BHEL and the Sub-contractor arising out of or in connection with this Contract, other than those for which BHEL decision is final, shall be referred to arbitration by a sole arbitrator.

(b) The parties hereto agree that the Sole Arbitrator shall the Unit Head of BHEL, BAP, Ranipet or his nominee. The venue of Arbitration shall be Ranipet, Tamil Nadu. The arbitrator may hold meetings for convenience at such places as per his discretion.

(c) The award of the Arbitrator shall be final, conclusive and binding on both parties to the Contract.

(d) Subject to the above, the courts at Ranipet alone have the jurisdiction to decide any dispute arising out of or in respect of the Contract.

BHEL/RANIPET is not responsible for any type of delay in receipt of tender.

The Section I to XI and Annexure A to R (as applicable) are part of this tender.

BHEL/RANIPET reserves the right to reject any or all the tenders either in full or part thereof at their discretion without assigning any reason thereof.

Kindly acknowledge the receipt.
Thanking you,

Yours truly,

For and on behalf of
BHARAT HEAVY ELECTRICALS LIMITED,

MANAGER/OS

SECTION VI

METHODOLOGY FOR ARRIVING THE RANKING OF RATES

Note:

1. The evaluation criteria is common for all the three rate descriptions given below. You are requeted to quote for all the three description compulsorily.
2. The rates quoted shall be evaluated on the basis of "total cost to BHEL". Though the rates offered by galvanizing vendors are on "Ex-works" basis, while working for "total cost to BHEL", BHEL will also add the transport cost incurred to BHEL as per the below details.

a) Rs.400/- per MT will be added for the Vendors located with in 60Kms from BHEL,Ranipet

b) Rs.900/-per MT will be added for the Vendors located above 60 Kms and upto 160 Kms

c) Rs.2200/-per MT will be added for the Vendors located above160Kms and upto 350 Kms.

(The above rates are only tentative and exact rate will be intimated at the time of price bid opening)

3. Only the L1 ranked vendors will be called for Negotiation.
4. The location of vendor is the radial distance from BHEL/Ranipet to Vendor works where the Galvanizing is done.

sl	**Description:** Galvanising conforming to IS 2629 (latest version)	Coating thickness in Grams Per Sq. Mtr (gsm)	Qty Unit	Rate in Rs. / MT	Distance of vendor from BHEL /Ranipet in KM	TPT cost to BHEL	Arrived rate in Rs./MT
1	Galvanizing of Hand rail tubes, Posts, bends (tube dia from 27.3 to dia 76.1) and other components like angles, channels, flats, platform, supports and ladder etc., Galvanizing to be done to 600/610 gsm depending upon the QP/CQR/Project requirement. Various Drawings	**600 or 610**	**1200 MT**	**A**		**B**	**A+B**
2	Galvanizing of Hand rail tubes, Posts, bends (tube dia from 27.3 to dia 76.1) and other components like angles, channels, flats, platform, supports and ladder etc., Galvanizing to be done to 750 gsm depending upon the QP/CQR/Project requirement. Various Drawings	**750**	**150 MT**	**A**		**B**	**A+B**
3	Galvanizing of Hand rail tubes, Posts, bends (tube dia from 27.3 to dia 76.1) and other components like angles, channels, flats, platform, supports and ladder etc., Galvanizing to be done to 900 gsm depending upon the QP/CQR/Project requirement. Various Drawings	**900**	**150 MT**	**A**		**B**	**A+B**

SECTION-VII - METHODOLOGY for PVC WORKING

1. The Rate Descriptions for GALVANIZING ARC 2021-22 are listed hereunder.

Sl	Description: GALVANIZING confirming to IS 2629(latest version) of	Coating thickness in Grams per Square meter	Quantity for ARC 2021-22 In Metric Tons	Remarks
1	Galvanizing of Hand rail tubes, Posts, bends (tube dia from 27.3 to dia 76.1) and other components like angles, channels, flats, platform, supports and ladder etc., Galvanizing to be done to 600/610 gsm depending upon the QP/CQR/Project requirement. Various Drawings	600 or 610	1200	
2	Galvanizing of Hand rail tubes, Posts, bends (tube dia from 27.3 to dia 76.1) and other components like angles, channels, flats, platform, supports and ladder etc., Galvanizing to be done to 750 gsm depending upon the QP/CQR/Project requirement. Various Drawings	750	150	
3	Galvanizing of Hand rail tubes, Posts, bends (tube dia from 27.3 to dia 76.1) and other components like angles, channels, flats, platform, supports and ladder etc., Galvanizing to be done to 900 gsm depending upon the QP/CQR/Project requirement. Various Drawings	900	150	

2. Price Variation clause is applicable for the above rates as per the following working:

2.1 PVC for the above galvanizing charges are based on change in rate of HG-Zinc applicable for Hyderabad as published by Hidustan Zinc Limited in their website: www.hzlconnect.com.

2.2 Increase/decrease of 9% on difference in the cost of zinc over the base period for 600/610/750 gram/sqm and 10% for 900gram/sqm. Accordingly the following formula is to be adopted.

2.2.1 $R1 = R_0 + (0.09(Z1-Z_0))$ for 600/610/750 grams/sqm

2.2.2 $R1 = R_0 + (0.1(Z1-Z_0))$ for 900 grams/sqm

Where,

R1 = Revised rate for galvanizing

R_0 = Original rate for galvanizing

Z1 = Ruling price of Zinc per MT 15 days prior to IR date of the Job

Z_0 = Ruling price of Zinc per MT as on 18.10.2021 (Rs.**3, 11,900**/- per MT)

2.3 The increased price on galvanizing charges will be based only on increase in zinc price. All other cost elements will not be considered.

2.4 Any downward trend in zinc price will have a corresponding downward revision in Galvanizing charges.

2.5 The base date for HG-Zinc prices is on 18.10.2021, and the ruling price of Zinc (Z_0 of above formula) at HZL, Hyderabad is Rs.3,11,900 per MT of Grade 'HG'.

2.6 The lead time for procurement of Zinc, the process of galvanizing of jobs, and inspection is proposed to be considered as 15 days. The date of inspection of the galvanized job (IR date)will be considered as the date of completion of the job.

2.7 For the purpose of Zinc price variation, the zinc price circular dated 1st of the month from Hindustan Zinc limited for Hyderabad will be considered for Galvanizing jobs completed during 16th to 30th of that month and Zinc price circular dated 16th of a month will be considered for Galvanizing jobs completed during 1st to 15th of the next month/subsequent month. In case of the rate are not published on 1st and 16th of any month, the rate available immediately prior to the said dates will be considered.

2.8 While submitting their Galvanizing bill, the vendor shall furnish the relevant price circular from M/s Hindustan Zinc Limited as documentary evidence for Zinc price variation.

2.9 The proposed ARC will be for a period of one year.

Section - VIII (Techno commercial Bid format)

BHEL Enq.No	651001E	Offer Ref :			
Enq.Dated	21-Oct-21	Offer Date:			
Due Date	11-Nov-21				
A1	Name & address (Head office)				
A2	Factory's address				
A3	Contact person's Names, Designation, Phone No(office & Resi'), Cell No, Email ID				
A4	Valididty of offer	Six month	Accepted		
A5	**Description: Galvanising conforming to IS 2629 (latest version)**	**Coating thickness in Grams Per Sq. Mtr (gsm)**	**Qty Unit**	**Spareable capacity in MT per Month**	**Quoted / Not quoted**
1	Galvanizing of Hand rail tubes, Posts, bends (tube dia from 27.3 to dia 76.1) and other components like angles, channels, flats, platform, supports and ladder etc., Galvanizing to be done to 600/610 gsm depending upon the QP/CQR/Project requirement. Various Drawings	600 or 610	1200 MT		**Yes / No**
2	Galvanizing of Hand rail tubes, Posts, bends (tube dia from 27.3 to dia 76.1) and other components like angles, channels, flats, platform, supports and ladder etc., Galvanizing to be done to 750 gsm depending upon the QP/CQR/Project requirement. Various Drawings	750	150 MT		**Yes / No**
3	Galvanizing of Hand rail tubes, Posts, bends (tube dia from 27.3 to dia 76.1) and other components like angles, channels, flats, platform, supports and ladder etc., Galvanizing to be done to 900 gsm depending upon the QP/CQR/Project requirement. Various Drawings	900	150 MT		**Yes / No**
A6	Previous job work order reference :	a) for Year 2020		b) for Year 2021	
A7	Scope of Transport is NOT INCLUDED IN THE SCOPE OF THE Galvanising contractor. Hence the Transport Charges are NOT-TO-BE-INCLUDED in quoted rates				
A8	Price Variation Clause applicable as per the Rate in Rs/MT is quoted based on Hindustan zinc (HG Zinc) price dt 18.10.2021 for Hyderabad using price variation clause as per Annexure VII			**Accepted / Not accepted**	
A9	Delivery Terms	EX-WORKS			
A10	Ref No. of BG, It's value and validity				
A11	Payment term:	100% after IR, IAWTV, DC, MAS within 45 days			
A12	Delivery Period	within One Month			
B1	Is GST applicable			YES/NO	%
B2	GST NO				
B3	Is levying of BHEL's Std-LD on delayed dely (@ 0.5% per week, Max 10%) as detailed in Cl.13 of Section V is acceptable				YES
B4	The Terms and Conditions of the a/m Enquiry (including Annexures) is read, understood and is acceptable				YES

(Stamped) Signature with date of authorised signatory

Name & Designation of Authorised Signotory

Bank Guarantee No……..Date……..…. Banker Name…… Page: 01

Bank Guarantee Value Rs……..Lakh(s)

FIRM CODE……

Please affix Rs.80/-Non Judicial Stamp here

1. THIS DEED OF GUARANTEE made this…… day of……20……. by……（hereinafter called the Bank)in favour of M/s.BHARAT HEAVY ELECTRICALS LIMITED,BOILER AUXILIARIES PLANT, RANIPET-632406 having its Registered Head office at BHEL HOUSE, SIRI FORT, NEWDELHI, Pin-110049.

2. WHEREAS M/s.BHARAT HEAVY ELECTRICALS LIMITED, hereinafter called the "COMPANY" have placed Purchase Orders / Work Orders which are pending as on date and also future Purchase Orders / Work Orders to be placed by the company up to the expiry of this Guarantee（hereinafter called the "CONTRACT") for machining fabrication supply of pressure and non pressure parts with…… ……..……..... ..... （hereinafter called the CONTRACTOR / SUPPLIER) and the said machining / fabrication / supply of pressure and non- pressure parts shall be made from the supply of raw materials and components by the company to the Contractor / Supplier in pursuance of the Contract(s) already placed but pending execution as on date and the Contract(s) to be placed from time to time by the company on the contractor/supplier.

3. AND WHEREAS one of the conditions for placing such Contract(s) is that contractor / supplier shall provide the company with a Bank Guarantee to the extent of Rs……..……(Rupees.…… ……..) as a security for the raw materials and components supplied and to be supplied in pursuance of the contract(s)already placed and pending as on date / and the contract(s) to be placed from time to time up to the expiry of this Guarantee and also for the satisfactory performance and completion of work/supply and the terms and conditions of the said contract.

4. AND WHEREAS the contractor/supplier have approached the Bank and at their request and in consideration of arrangements arrived at between the said contractor/supplier and the said Bank.We,the Bank have agreed to give such guarantee as hereinafter mentioned in favour of the aforesaid company.

……2

Sign & Seal of issuing Bank

Bank Guarantee Value Rs……..Lakh(s)

5. NOW, THEREFORE, these present witness that we,the Bank by the hand of Branch Manager its lawfully and duly constituted attorney, do hereby undertake irrevocably and unconditionally to pay without demur to the aforesaid company a sum of Rs…… (Rupees……) on demand being made by the said company and to keep the said company indemnified to the extent of Rs…….(Rupees……...) by virtue of this guarantee against any loss/damage caused to/suffered by the said company, by reason of any breach by the aforesaid contractor/supplier of any of the terms and conditions, stipulations or undertakings or any one of them contained in the said contract(s)and the tender documents if any attached there to and for the payment of any money payable by the said Contractor/Supplier to the said company under the terms and conditions of the said contract(s) (the decision regarding the breach, loss, damage or payment due being solely in the discretion of said company).We further undertake to pay the aforesaid amount in lump sum on demand without demur or such part thereof as the company may demand from time to time, irrespective of the fact whether the said Contractor/Supplier admits or denies such claim or questions its correctness in any court, Tribunal Arbitrations proceedings or before any authority. The liability or obligation of Bank under this guarantee would not wait till the disputes have been decided by any Court or Tribunal or in the Arbitration proceedings or by any other authority. It shall not be necessary for the said company to proceed against the Contractor/Supplier before proceeding against the Bank and its Guarantee herein contained shall be enforceable not withstanding any security, which the said company may have obtained or obtain from the Contractor/Supplier. Further any payment made by the Bank to the company under this guarantee shall be deemed to have been duly and lawfully made.

6. The liability under this guarantee is a continuing one covering all contracts, already placed and pending as on date to be placed up to the expiry of this Guarantee and should any loss or damage occur on account of the breach of the terms and conditions of the said Contract(s) by the Contractor/Supplier or should any surplus raw materials and components become due to the Company under Contract(s)and remain undelivered to company, the Bank shall indemnify the Company for loss/damage for the value of raw materials and components to an extent of Rs……(Rupees…… ……..) and this is without prejudice to any other remedies which may be otherwise available to the company against the Contractor/Supplier by way of deduction from any sum due or any sum which at any time hereafter become due from the Contractor/Supplier under this or any other contracts.

.....3

Sign & Seal of issuing Bank

Bank Guarantee Value Rs……..Lakh(s)

7. THE AFORESAID Guarantee will remain in force and the Bank shall be liable under the same irrespective of any concession or time being granted by the said company to the Contractor/ Supplier in or for fulfilling the said contract (s) between Contractor/Supplier and the Company and the guarantee will remain in full force irrespective of any change of terms, conditions or stipulations or any variations in the terms of the said Contractor(s) and irrespective of whether notice of such change and/or variation is given to us or not and claim to receive such notice of any change and/or variation is given to us or not and claim to receive such notice of any change and *I* or variation of the terms and /or conditions of the said Contract(s) is hereby specially waived by us. Further, we shall not be released from this guarantee by any forbearance or the exercise or non-exercise of any of the power or rights under the said contract(s) by the said company against the Contractor/Supplier irrespective of whether, notice of such forbearance enforcement or non-enforcement of any powers or rights, modifications or changes made in the said contract(s) or concession shown to Contractor/Supplier by the Company is given to us or not.

8. THE GUARANTEE herein contained shall not be determined or affected by the liquidation or winding up or in solvency of or change in the constitution of the Contractor/Supplier and shall in all respects and for all purposes be binding and operative until all payments of all money due or that may hereafter become due to the said company are settled irrespective of any liability or obligation of the Contractor/Supplier under the said Contract(s).

9. A REFERENCE to this Bank Guarantee in the contract(s) placed already and pending as on date and to be placed up to the expiry of this Guarantee shall be sufficient to bind the Bank in respect of their liability under this Bank Guarantee and this Bank Guarantee shall be read as an integral part of the contract(s) already placed but pending as on date and to be placed up to the expiry of this Guarantee.

10. 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(s) and that it shall continue to be enforceable till all the dues of the company under or by virtue of the said contract(s) have been fully paid and its claims satisfied that the terms and conditions of the contract (s) have been fully and properly carried out by the said Contractor/Supplier and accordingly discharge the Guarantee, subject, however to the condition that the company shall have no rights under this guarantee unless a claim or demand in writing in respect of this guarantee has been preferred by the company with the Bank on or before……../……../……(including a claim period of……Months/Year).For the purpose of this clause any letter making the demand on the Bank by M/s. BHEL despatched by R .P.A. D . or by telegram or by FAX or by any electronic media addressed to the above mentioned address of the Bank shall

…..4

Sign & Seal of issuing Bank

Bank Guarantee Value Rs……..Lakh(s)

be deemed to be the claim/demand in writing referred to above irrespective of the fact as to whether or when the said letter reached the Bank, as also any letter containing the said demand or claim is lodged with the Bank personally.

11. Any CLAIM OR DISPUTE arising under the terms of this document shall only be enforced or settled in the Courts at Ranipet, Vellore District only.

12. THE BANK undertake not to revoke this Guarantee during the currency except with the previous consent of the Company in writing.

13. THE BANK declares that it has powers to issue this Guarantee and the undersigned has full powers to do so on its behalf under the power granted to him by the proper authorities of the Bank.

14. Notwithstanding anything contained herein before, our liability under this guarantee shall be limited to a sum of Rs ..... and stand completely extinguished and discharged if no demand or claim is made upon us in writing on or before ...../...../……. (including a claim period of ……. Months/Year)

DATE THIS ..... DAY OF 20

Seal of the Bank Signature of the Bank Manager

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Section XI

QWI & SAMPLE DRAWING

PROCEDURE FOR SURFACE PREPARATION AND PAINTING

PREPARED BY

DEPARTMENT	NAME & DESIGNATION S/Shri	SIGNATURE
QA	Rajamanickam. M Sr.Engr/ QA	

REVIEWED BY

DEPARTMENT	NAME & DESIGNATION S/Shri	SIGNATURE
ENGINEERING	S.S. Mani AGM/ Engg	
QUALITY ASSURANCE	R. Aruchachalam DGM/ QA& QC-OLI	24/11/18

APPROVED AND ISSUED BY

DEPARTMENT	NAME & DESIGNATION S/Shri	SIGNATURE
QUALITY	B. Srinivasa Rao AGM/ Quality	9/12/18

Record of Revision

Rev. No	Effective Date	Details of Revision
00	10.10.2002	RP0674199 Rev 05 requirements and PRQA rev 12 requirements were fully reviewed and this document is released as Rev 00 taking care of painting requirements of BAP projects. For project specific painting schemes respective CIS or contract specific painting schemes to be referred
01	22.05.2007	Painting requirement are fully reviewed. Red oxide Zinc chromate for primer application (IS 2074) is corrected as Red oxide Zinc phosphate primer (IS 12744) and also number of coats & DFT corrected
02	24.01.2018	Painting requirement are fully reviewed and totally revamped. Specific painting scheme for different environments are envisaged and other details added for overall painting document.

1.0 SCOPE

1.1 This procedure specifies the requirements for surface preparation, application of primer, intermediate and finish paints, personnel qualification, testing, inspection of manufactured and sub contracted components of APH, Fans, ESP, Gates and Dampers and Chimney. (For desalination, please refer PRQA:526/ Latest respectively)

1.2 As these standard painting schemes have evolved well over the years, and the performance of these paint systems have been satisfactory in many sites, these schemes will be offered to the customers during the tender stage. The use of standard painting scheme has several advantages including the avoidance of certain time consuming surface preparations and also the use of the proven techno-economic options for painting of the products.

1.3 In case of special contract requirements, wherein the customer is specific about having a painting scheme different from the above, then those special contractual requirements will be addressed through a Contract Specific Document with customer approval, when required. The linkage will be provided in the CQR issued by QA.

1.4 Good preservation/ transportation enhances the life of painted products. Suitable lasing method (use of rubber, nylon, rope/bel) shall be used while transporting and avoid metal slings to tie up the product with the load carrier.

2.0 GENERAL

2.1 This procedure specifies the painting requirements to

a) Provide adequate surface protection of components under prescribed storage conditions at Shop/ Site.
b) Temporary protection for components coming under the flue gas path till they are erected and
c) Protection for a reasonable time till completion of erection for components continuously exposed to atmospheric environment.

2.2 The scheme is based on the site practice of need based touch-up/ re-preservation program based on the duration of storage and the condition.

2.3 No painting shall be applied on the stainless steel, galvanized and any plated surfaces. For estimation of requirements of painting, the approximate area of coverage on non-absorbing surface is as given below,

SL NO	Generic nature of paint	Theoretical covering area (Sq.m/ litre)	DFT/ Coat (Min)	Shade
01	Red oxide zinc phosphate primer to IS 12744	10	30	Red oxide
02	Synthetic enamel paint to IS 2932	10	20	Smoke grey
03	Heat resistant aluminum paint to IS 13183	10	20	Aluminum

2.4 For bought-out items, the painting scheme shall be specified in Engineering Drawing/ purchase Specification. Wherever it is not specified, the following is the minimum requirement,

a) Primer: Two coats of red oxide Zinc phosphate primer to IS 12744- DFT 30 microns
b) Finish: Two coats of synthetic enamel to IS 2932 smoke grey shade no:692 of IS: 5. DFT 20 microns per coat

Manufactured items for bough-out items shall be as per the painting scheme of the applicable PGMA in this document.

2.5 All currently active PGMA's are covered. Requirements for Missing/ new PGMA's can be obtained from Engineering and Quality Assurance department.

3.0 PAINTING SCHEME & REFERENCE ANNEXURES

3.1 The surface preparation, primer coat, intermediate coat and finish coat requirements for various painting schemes are given as part of this document.

3.2 Section I deals with the surface preparation schedule and section II deals with painting and coating.

3.3 Standard painting scheme for normal environment/ coastal (or) refinery (or) chemical environment/ export projects can be referred in Part- I/ II / III in Section II available with this document.

3.4 Annexure I shall be referred for notes on painting scheme furnished in this document. Necessary instructions given for protective coating of various components.

3.5 Inspection and testing plan on surface preparation and painting is given under Annexure II. Description given for various grade of surface cleanliness and inspection techniques.

3.6 Procedure for painter qualification given under Annexure III.

3.7 The paints envisaged as per this document are indicated in this document under the Annexure IV- Painting scheme details for procurement and application purposes.

3.8 Good painting practices, which will be of assistance to task performer, have been detailed in Annexure VI.

SECTION - I

4.0 SURFACE PREPARATION REQUIREMENTS FOR PAINTING AND COATING

4.1 The effectiveness and duration of the protection provided by organic, Inorganic and metallic coatings for corrosion protection depends among other things decisively on proper surface preparation. This section deals with the methods of surface preparation, their effectiveness and fields of application.

4.2 This section is largely based on ISO 8501-1; 1988 that in turn is based on the Swedish standard SS 05 59 00.

4.3 SURFACE PREPARATION METHODS

4.3.1 Surface preparation depends on the initial condition of uncoated surfaces. The details of rust level, rust removal methods and characteristics surfaces are given in Table 1.0.

4.4 DEFINITIONS AND METHODS OF CLEANING

4.5 CLEANLINES OF SURFACES

4.5.1 Cleaning requirement and levels of cleanliness, contaminants such as dirt, oil that will interfere with the adhesion or effectiveness of the proposed coating must be removed. Coats of materials related to the metal (scale, rust) and coats of different materials (e.g existing coating) should be removed until the agreed level of cleanliness is attained.

4.5.2 Contaminants/ coats, both of related material and of materials different from the metal may be removed in one operation if the nature, level and thickness permits this. The required level of cleanliness depends on

- The corrosion protection system selected
- The type of corrosion exposure expected
- The initial condition of the surface being prepared
- The possible rust removal method
- Economic considerations

4.5.3 Generally, the standard levels of cleanliness as in table 1.0 should be used as basis. This does not cover the removal of weld spatter, weld or flame cutting slag or chips, repair grinding of rolling defects (laminations) deburring and similar operations.

4.6 MECHANICAL METHODS OF REMOVING DUST

4.6.1 Manual rust removal:

4.6.1.1 This applies to standard levels of cleanliness St 2, St 3 as per table 1.0 manual cleaning uses wire brush, stripping knife, Swedish scraper, rust removing hammer etc., the method must not damage the metal being derusted. Subsequent cleaning by sweeping or brushing off or by blowing off with dry air.

4.6.2 Mechanical rust removal:

4.6.2.1 This applies to standard levels of cleanliness St2, St3 as per table 1.0 cleaning can be done by mechanically driven rust removing tools viz. rotating wire brush, impact piston devices or rotary descalers, sanding discs etc. The surface areas where the power driven tool cannot enter, manual cleaning should be done. The method must not damage the metal being derusted. Subsequent cleaning by sweeping or brushing off or blowing off with dry air.

4.6.3 Blast cleaning

4.6.3.1 This applies to standard levels of cleanliness Sa 1, Sa 2½, Sa 3 as per table 1.0. Chemically contaminated surfaces must be pre-washed. Surfaces having coarse rust must be pre-cleaned with impact tools prior to blast cleaning.

4.6.3.2 Compressed air blasting is generally recommended for our operations. It is freely directed air blasting in blasting cubicles, Rooms or sheds with re-circulation of blasting abrasives.

4.6.4 Removal of contaminants/ coat of material different from the metal

4.6.4.1 Surface of metal contaminated with cutting fluid (machine coolant) oil or grease shall be wiped with mineral turpentine/ tri-chloroethylene prior to applying any methods of mechanical surface preparation.

4.6.4.2 If any old paint film or rust preventive films are present they may be removed with paint removing jelly.

4.6.4.3 As far as possible the cleaning method should be so chosen that all the scale is removed from the metallic surface to be coated. For heavily scaled metallic surfaces either blasting or picking may be adopted over and above the requirements called for in the table 1.0

4.6.5 Notes to Table 1.0

4.6.5.1 Initial condition of uncoated surfaces (rust grade as per SS 05 59 00)

a) Steel surface largely covered with adhering mill scale but little, if any rust.

b) Steel surface, which begun to rust and from which the mill scale has begun to flake.

c) Steel surface on which the mill scale has rusted away or from which it can be scrapped, but with slight pitting visible under normal vision.

d) Steel surface on which the mill scale has rusted away and on which general pitting is visible under normal vision.

4.6.5.2 Standard levels of cleanliness equivalent to steel structures painting council of US (SSPC) also given in brackets in table 1.0.

Table 1.0

Standard levels of cleanliness	Rust removal method	Initial conditions of steel surfaces (Uncoated ref. 4.5)	Essential characteristics of the prepared steel surface
St 2 (SSPC- SP 2)	Thorough hand and power tool cleaning	B, C, D	When viewed without magnification, the surface shall be free from visible oil, grease and dirt and from poorly adhering mill scale, rust coatings and foreign matter.
St 3 (SSPC SP 3)	Very thorough hand and power tool cleaning	B, C, D	As for St 2, but the surface shall be treated much more thoroughly to give a metallic sheen arising from the metallic substrate.
Sa 1 (SSPC SP 7)	Light blast cleaning	B, C, D	When viewed without magnification, the surface shall be free from visible oil, grease and dirt and from poorly adhering mill scale, rust coatings and foreign matter.
Sa 2 (SSPC SP 6)	Thorough blast cleaning	B, C, D	When viewed without magnification, the surface shall be free from visible oil, grease and dirt and from most of the mill scale, rust, paint coatings and foreign matter. Any residual contamination shall be firmly adhering.

Standard levels of cleanliness	Rust removal method	Initial conditions of steel surfaces (Uncoated ref. 4.5)	Essential characteristics of the prepared steel surface
Sa 2½ (SSPC SP 10)	Very thorough blast cleaning	B, C, D	When viewed without magnification, the surface shall be free from visible oil, grease and dirt and from the mill scale, rust, paint coatings and foreign matter. Any remaining traces of contaminations shall show only as slight stains in the form of spots or stripes.
Sa 3 (SSPC SP 5)	Blast cleaning to visually clean steel	A, B, C, D	When viewed without magnification, the surface shall be free from visible oil, grease and dirt and from the mill scale, rust, paint coatings and foreign matter. It shall have a uniform metallic colour.

SECTION –II

PART- I

STANDARD PAINTING SCHEME FOR NORMAL ENVIRONMENT

Sl no	PGMA/Description	Surface preparation & surface profile	Primer coat		Intermediate coat		Finish coat			Total DFT µ (min)
			Paint	No of coats/ DFT	Paint	No of coats	Paint	No of coats	Shade	
A	REGENERATIVE AIR PRE- HEATERS									
01	Heating element baskets (without elements) 52010, 024, 025	Power tool cleaning to ST- 3 (SSPC SP3)	Red oxide zinc phosphate primer (Alkyd base) to IS 12744	02/ DFT=30µ/ coat	--	--	--	--	--	60
02	Heating element baskets (with elements) 52010, 024, 025	--	Temporary rust preventive oil non dry type (*) (Dipping)	--	--	--	--	--	--	--
03	Rotor post assembly machined items of (52011), Pin rack assembly (52012), Seals (52013, 52054, 52055), sector plates (52041, 52042) and machined components of APH	--	Temporary rust preventive oil dry type (**)	40	--	--	--	--	--	40
04	**Components in flue gas path and insulated** Rotor post assy (52011), T bars (52013), Rotor housing assy (52030), Hot and cold connecting plate assy (52041,52042)	Commercial blast cleaning (Sa 2) (SSPC SP6)	Red oxide zinc phosphate primer (Alkyd base) to IS 12744	02/ DFT=30µ/ coat	--	--	--	--	--	60

(*) Specification as per PRQA 522/ Rev 00

(**) Specification as per PRQA 523/ Rev 00; For CE coil- TEP/AQCS/RP (Latest)

Part- I contd….

Sl no	PGMA/Description	Surface preparation & surface profile	Primer coat		Intermediate coat		Finish coat			Total DFT µ (min)
			Paint	No of coats/ DFT	Paint	No of coats	Paint	No of coats	Shade	
05	**Components exposed to atmosphere** Rotor drive assy (52100), Access door (52220), Air seal piping (52211), observation port other than glass part (52220), Rotor stoppage alarm other than aluminium (52220), Loose items of air receiver (52220), Guide bearing assy (52261), Support bearing assy (52262), Oil piping GB, SB (52271, 52272), Oil circulation unit (52274), Deluge and wash pipe assy (52301, 52302), Cleaning device assy (52339, 52340), Thermocouple pipe assy other than SS	Commercial blast cleaning (Sa 2) (SSPC SP6)	Red oxide zinc phosphate primer (Alkyd base) to IS 12744	01/ DFT=30µ/ coat	--	--	Synthetic Enamel paint to IS 2932	02/ DFT= 20 µ/ coat; Total 40µ	Smoke grey Shade 692 of IS 5	70
B	**TUBULAR AIR PRE-HEATER**									
01	Side walls (external surfaces and internal surfaces)	Commercial blast cleaning (Sa 2) (SSPC SP6)	Red oxide zinc phosphate primer (Alkyd base) to IS 12744	02/ DFT=30µ/ coat	--	--	--	--	--	60

Part- I contd….

Sl no	PGMA/Description	Surface preparation & surface profile	Primer coat		Intermediate coat		Finish coat			Total DFT µ (min)
			Paint	No of coats/ DFT	Paint	No of coats	Paint	No of coats	Shade	
02	Machined surfaces, tubes of TAPH, tube plates and intermediate plates	--	Temporary rust preventive oil dry type (**)	40	--	--	--	--	--	40
C	**FANS**									
01	Foundation materials 550XX, 560XX (Threaded portion)	Power tool cleaning to St-3 (SSPC SP3)	Temporary rust preventive oil	40	--	--	--	--	--	--
			Other areas except threaded portion- Red oxide Zinc phosphate primer to IS 12744, DFT- 30 µ							
02	**Components exposed to atmosphere**									
02.a	Bearing pedestals, Base frame, servomotor assy, shaft with bearing assy, OGV, IGV (55-1XX, 55-2XX, 55-3XX, 55-5XX, 55-6XX, 56-4XX) Bearing pedestals, Base frame, shaft with bearing assy, RVC, IGV, Support for seal, shaft protecting tube, Spiral casing (if no insulation is applicable), Damper (56-1XX, 56-2XX, 56-3XX, 56-4XX) Coupling guard (56-8XX, 55-8XX), Tools (56-000, 55-000)	Commercial blast cleaning (Sa 2) (SSPC SP6)	Red oxide zinc phosphate primer (Alkyd base) to IS 12744	01/ DFT=30µ/ coat	--	--	Synthetic Enamel paint to IS 2932	02/ DFT= 20 µ/ coat; Total 40µ	Smoke grey Shade 692 of IS 5	70
			General notes for Sl no: 02.a & 02.b for C. Fans 1) As a assy, no blasting to be done for servomotor assy& shaft with bearing assy. 2) Before assy, all external un-machined surfaces of bearing housing/ cylinder to be painted. 3) AP impeller painting to be done before assembly except oil chamber area & mating component contact area. 4) After SR/ Before machining, blasting and primer painting to be done.							
02.b	AP fan components like Servomotor assy, Shaft with bearing assy	Power tool cleaning to St-3 (SSPC SP3)	Epoxy based zinc phosphate primer to IS 13238	02/ DFT=30µ/ coat	--	--	--	--	--	60

Part- I contd….

Sl no	PGMA/Description	Surface preparation & surface profile	Primer coat		Intermediate coat		Finish coat			Total DFT µ (min)
			Paint	No of coats/ DFT	Paint	No of coats	Paint	No of coats	Shade	
03	**Components in Air/ Gas and under insulation**									
03.a	Suction chamber, diffuser, housing, OGV, Spiral casing, damper, IGV, RVC, impeller, shaft (56-1XX,56-2XX, 56-3XX, 56-4XX) Silencer (55-9XX, 56-9XX)	Commercial blast cleaning (Sa 2) (SSPC SP6)	Red oxide zinc phosphate primer (Alkyd base) to IS 12744	02/ DFT=30µ/ coat	--	--	--	--	--	60
03.b	AP fan impeller (55-2XX, 55-3XX)	Power tool cleaning to St-3 (SSPC SP3)	Epoxy based zinc phosphate primer to IS 13238	02/ DFT=30µ/ coat	--	--	--	--	--	60
04	Journal area of shaft (55-1XX, 56-1XX, 55-2XX, 56-2XX, 55-3XX, 56-3XX, 56-4XX)- Refer PRQA 341/ Latest									
05	All machined surfaces shall be applied with rust preventive.									
D	**ELECTROSTATIC PRECIPITATOR**									
01	GD drive arrangement (7X X10), Drive arrangement for emitting system (7X X17), Inspection doors (7X X23), Drive arrangement for CE rapping (7XX26), Outer roof (7X X42), ESP Penthouse other items (7XX55), ESP test equipment (7XX61), Water washing system (7X X66), Tools & Tackles (7X 996), Lifting beam (7X X20)	Commercial blast cleaning (Sa 2) (SSPC SP6)	Red oxide zinc phosphate primer (Alkyd base) to IS 12744	01/ DFT=30µ/ coat	--	--	Synthetic Enamel paint to IS 2932	02/ DFT= 20 µ/ coat; Total 40µ	Smoke grey Shade 692 of IS 5	70

Part- I contd….

Sl no	PGMA/Description	Surface preparation & surface profile	Primer coat		Intermediate coat		Finish coat			Total DFT µ (min)
			Paint	No of coats/ DFT	Paint	No of coats	Paint	No of coats	Shade	
02	ESP Penthouse columns & Trusses (7X-X55), ESP columns (7X X81), Hopper approach platform (7X X65)	Blast cleaning to near white metal Sa 2½ (SSPC SP10) Surface profile of 35-50µm	Epoxy based Zinc phosphate primer to IS 13238 (Latest)	01/ DFT= 30µm	Epoxy based MIO pigmented intermediate coat	01/ DFT= 75µm	Epoxy based polyamide cured finish paint to IS 14209 (Latest) + Aliphatic acrylic polyurethane paint to IS 13213 (Latest)	01/ DFT= 30µm 01/ DFT= 30µm	Smoke grey Shade 692 of IS 5	165
		Columns below 0.0 level- Chlorinated rubber based zinc phosphate primer to 50µm (min) to be applied.								
03	Stringer and guard plates (8X 610), Hand rails, post, step treads, Floor grills (8X 611,612,613)	Hot dip galvanizing to a coating weight of 610gm per sq. m (minimum) and to a coating thickness of 85 microns (minimum)								

Sl no	PGMA/Description	Surface preparation & surface profile	Primer coat		Intermediate coat		Finish coat			Total DFT µ (min)
			Paint	No of coats/ DFT	Paint	No of coats	Paint	No of coats	Shade	
04	Insulator housing assy (7X X06), Gas distribution assy (7X X08), GD rapping mechanism (7X X09), Gas screening (7X X11), Emitting system suspension (7X X13), Emitting Electrode rapping (7X X16), Suspension arrangement for CE (7X X19), Frame of Emitting system Top, middle& bottom (7X	Commercial blast cleaning (Sa 2) (SSPC SP6)	Red oxide zinc phosphate primer (Alkyd base) to IS 12744	02/ DFT= 30µ/ coat	--	--	--	--	--	60

	X21, X22, X32), shock bars(7X X24), CE rapping mechanism (7X X25), contd… Contd… Ridges (7X X43), Hopper upper, lower &middle part (7X X44, X45), Insulator support panel (7X X46), Roof panel assy (7X X47) Casing structure (7X X28, X48), Casing shell (7X X49, ESP funnel (7X X50), Splitter & Guide vane (7X X57)									

Sl no	PGMA/Description	Surface preparation & surface profile	Primer coat		Intermediate coat		Finish coat			Total DFT µ (min)
			Paint	No of coats/ DFT	Paint	No of coats	Paint	No of coats	Shade	
05	EE (7X X15) (EE hook), EE suspension hook (7X X13), CE (7X X20), CE suspension hook (7X X19), Foundation material for ESP structures & ducts (7X X80)	--	Temporary rust preventive oil dry type (**)	40	--	--	--	--	--	40
E	**GATES AND DAMPERS**									
01	Gates and Damper Temperature ≤ 95°C (57-0XX, 57-1XX)	Commercial blast cleaning (Sa 2) (SSPC SP6)	Red oxide zinc phosphate primer (Alkyd base) to IS 12744	01/ DFT= 30µ/ coat	--	--	Synthetic Enamel paint to IS 2932	02/ DFT= 20 µ/ coat; Total 40µ	Smoke grey Shade 692 of IS 5	70
02	Gates and Damper Temperature ≥ 95°C (57-2XX, 57-3XX, 57-4XX, 57-6XX)	Commercial blast cleaning (Sa 2) (SSPC SP6)	Red oxide zinc phosphate primer (Alkyd base) to IS 12744	02/ DFT= 30µ/ coat	--	--	--	--	--	60

03	Gates blades, Machined components of G&D	--	Temporary rust preventive oil dry type (**)	40	--	--	--	--	--	40

Sl no	PGMA/Description	Surface preparation & surface profile	Primer coat		Intermediate coat		Finish coat			Total DFT µ (min)
			Paint	No of coats/ DFT	Paint	No of coats	Paint	No of coats	Shade	
F	**CHIMNEY**									
01	Foundation bolt (87010)	Power tool cleaning to St-3 (SSPC SP3)	Temporary rust preventive oil dry type (**)	40	--	--	--	--	--	40
02	Shells- Inside and Uninsulated side, base plate (87 100)	Blast cleaning to near white metal Sa 2½ (SSPC SP10) Surface profile of 35-50µm	Heat resistant aluminium paint as per IS 13183 (Gr I- Upto 600°C, Gr II- 200°C to 400°c Gr. III- Upto 200°C)	02/ DFT= 20µ/ coat	--	--	--	--	--	40
03	Ducts uninsulated, Strakes, (87150), Painter trolley (87200)	Power tool cleaning to St-3 (SSPC SP3)	Heat resistant aluminium paint as per IS 13183 (Gr I- Upto 600°C, Gr II- 200°C to 400°c Gr. III- Upto 200°C)	02/ DFT= 20µ/ Coat	--	--	--	--	--	40
04	Shells- Outside insulated (87100), Ducts- Insulated (87150)	Blast cleaning to near white metal Sa 2½ (SSPC SP10) Surface profile of 35-50µm	Red oxide zinc phosphate primer (Alkyd base) to IS 12744	02/ DFT= 30µ/ coat	--	--	--	--	--	60
05	Ladders, Hand rails, Floor grills. Platforms (87300)	Commercial blast cleaning (Sa 2) (SSPC SP6)	Red oxide zinc phosphate primer (Alkyd base) to IS 12744	01/ DFT= 30µ/ coat	--	--	Synthetic Enamel paint to IS 2932	02/ DFT= 20 µ/ coat; Total 40µ	Smoke grey Shade 692 of IS 5	70

SECTION –II

PART- II

STANDARD PAINTING SCHEME FOR COASTEL/ REFINERY ENVIRONMENT

Sl no	PGMA/Description	Surface preparation & surface profile	Primer coat		Intermediate coat		Finish coat			Total DFT µ (min)
			Paint	No of coats/ DFT	Paint	No of coats	Paint	No of coats	Shade	
A	REGENERATIVE AIR PRE- HEATERS									
01	Heating element baskets (without elements) 52010, 024, 025	Power tool cleaning to ST- 3 (SSPC SP3)	Red oxide zinc phosphate primer (Alkyd base) to IS 12744	02/ DFT=30µ/ coat	--	--	--	--	--	60
02	Heating element baskets (with elements) 52010, 024, 025	--	Temporary rust preventive oil non dry type (*) (Dipping)	--	--	--	--	--	--	--
03	Rotor post assembly machined items of (52011), Pin rack assembly (52012), Seals (52013, 52054, 52055), sector plates (52041, 52042) and machined components of APH	--	Temporary rust preventive oil dry type (**)	40	--	--	--	--	--	40
04	**Components in flue gas path and insulated** Rotor post assy (52011), T bars (52013), Rotor housing assy (52030), Hot and cold connecting plate assy (52041,52042)	Commercial blast cleaning (Sa 2) (SSPC SP6)	Red oxide zinc phosphate primer (Alkyd base) to IS 12744	02/ DFT=30µ/ coat	--	--	--	--	--	60

(*) Specification as per PRQA 522/ Rev 00

(**) Specification as per PRQA 523/ Rev 00; For CE coil- TEP/AQCS/RP (Latest)

Sl no	PGMA/Description	Surface preparation & surface profile	Primer coat		Intermediate coat		Finish coat			Total DFT µ (min)
			Paint	No of coats/ DFT	Paint	No of coats	Paint	No of coats	Shade	
05	**Components exposed to atmosphere** Rotor drive assy (52100), Access door (52220), Air seal piping (52211), observation port other than glass part (52220), Rotor stoppage alarm other than aluminium (52220), Loose items of air receiver (52220), Guide bearing assy (52261), Support bearing assy (52262), Oil piping GB, SB (52271, 52272), Oil circulation unit (52274), Deluge and wash pipe assy (52301, 52302), Cleaning device assy (52339, 52340), Thermocouple pipe assy other than SS	Blast cleaning to near white metal Sa 2½ (SSPC SP10) Surface profile of 35-50µm	Inorganic Ethyl zinc silicate primer to IS 14946 (Latest)	01/ DFT= 75µm/ coat	Epoxy based MIO/TiO_2 pigmented intermediate coat	01/ DFT= 75µm/ coat	Epoxy based polyamide cured finish paint to IS 14209 (Latest)	01/ DFT= 75µm/ coat	Smoke grey Shade 692 of IS 5	225
B	**TUBULAR AIR PRE-HEATER**									
01	Side walls (external surfaces and internal surfaces)	Commercial blast cleaning (Sa 2) (SSPC SP6)	Red oxide zinc phosphate primer (Alkyd base) to IS 12744	02/ DFT=30µ/ coat	--	--	--	--	--	60

Part- II contd….

Sl no	PGMA/Description	Surface preparation & surface profile	Primer coat		Intermediate coat		Finish coat			Total DFT µ (min)
			Paint	No of coats/ DFT	Paint	No of coats	Paint	No of coats	Shade	
02	Machined surfaces, tubes of TAPH, tube plates and intermediate plates	--	Temporary rust preventive oil dry type (**)	40	--	--	--	--	--	40
C	**FANS**									
01	Foundation materials 550XX, 560XX (Threaded portion)	Power tool cleaning to St-3 (SSPC SP3)	Temporary rust preventive oil	40	--	--	--	--	--	--
			Other areas except threaded portion- Red oxide Zinc phosphate primer to IS 12744, DFT- 30 µ							
02	**Components exposed to atmosphere**									
02.a	Bearing pedestals, Base frame, servomotor assy, shaft with bearing assy, OGV, IGV (55-1XX, 55-2XX, 55-3XX, 55-5XX, 55-6XX, 56-4XX) Bearing pedestals, Base frame, shaft with bearing assy, RVC, IGV, Support for seal, shaft protecting tube, Spiral casing (if no insulation is applicable), Damper (56-1XX, 56-2XX, 56-3XX, 56-4XX) Coupling guard (56-8XX, 55-8XX), Tools (56-000, 55-000)	Commercial blast cleaning (Sa 2) (SSPC SP6)	Red oxide zinc phosphate primer (Alkyd base) to IS 12744	01/ DFT=30µ/ coat	--	--	Synthetic Enamel paint to IS 2932	02/ DFT= 20 µ/ coat; Total 40µ	Smoke grey Shade 692 of IS 5	70
			General notes for Sl no: 02.a & 02.b for C. Fans 1) As a assy, no blasting to be done for servomotor assy& shaft with bearing assy. 2) Before assy, all external un-machined surfaces of bearing housing/ cylinder to be painted. 3) AP impeller painting to be done before assembly except oil chamber area & mating component contact area. 4) After SR/ Before machining, blasting and primer painting to be done.							
02.b	AP fan components like Servomotor assy, Shaft with bearing assy	Power tool cleaning to St-3 (SSPC SP3)	Epoxy based zinc phosphate primer to IS 13238	02/ DFT=30µ/ coat	--	--	--	--	--	60

Part- II contd….

Sl no	PGMA/Description	Surface preparation & surface profile	Primer coat		Intermediate coat		Finish coat			Total DFT µ (min)
			Paint	No of coats/ DFT	Paint	No of coats	Paint	No of coats	Shade	
03	**Components in Air/ Gas and under insulation**									
03.a	Suction chamber, diffuser, housing, OGV, Spiral casing, damper, IGV, RVC, impeller, shaft (56-1XX,56-2XX, 56-3XX, 56-4XX)	Commercial blast cleaning (Sa 2) (SSPC SP6)	Red oxide zinc phosphate primer (Alkyd base) to IS 12744	02/ DFT= 30µ/ coat	--	--	--	--	--	60
03.b	Silencer (55-9XX, 56-9XX)	Blast cleaning to near white metal Sa 2½ (SSPC SP10) Surface profile of 35-50µm	Inorganic Ethyl zinc silicate primer to IS 14946 (Latest)	01/ DFT= 75µm/ coat	Epoxy based MIO/TiO_2 pigmented intermediate coat	01/ DFT = 75µ m/ coat	Epoxy based polyamide cured finish paint to IS 14209 (Latest)	01/ DFT= 75µm / coat	Smoke grey Shade 692 of IS 5	225
03.c	AP fan impeller (55-2XX, 55-3XX)	Power tool cleaning to St-3 (SSPC SP3)	Epoxy based zinc phosphate primer to IS 13238	02/ DFT= 30µ/ coat	--	--	--	--	--	60
04	Journal area of shaft (55-1XX, 56-1XX, 55-2XX, 56-2XX, 55-3XX, 56-3XX, 56-4XX)- Refer PRQA 341/ Latest									
05	All machined surfaces shall be applied with rust preventive.									
D	**ELECTROSTATIC PRECIPITATOR**									
01	ESP Penthouse other items (7XX55), Water washing system (7X X66), Tools & Tackles (7X 996), Lifting beam (7X X20) Ridges (7X X43), Hopper upper, lower &middle part (7X X44, X45)	Commercial blast cleaning (Sa 2) (SSPC SP6)	Red oxide zinc phosphate primer (Alkyd base) to IS 12744	01/ DFT= 30µ/ coat	--	--	Synthetic Enamel paint to IS 2932	02/ DFT= 20 µ/ coat; Total 40µ	Smoke grey Shade 692 of IS 5	70

	Insulator support panel (7X X46), Roof panel assy (7X X47) contd… Contd… Casing structure (7X X28, X48), Casing shell (7X X49, ESP funnel (7X X50), Splitter & Guide vane (7X X57)									

Sl no	PGMA/Description	Surface preparation & surface profile	Primer coat		Intermediate coat		Finish coat			Total DFT µ (min)
			Paint	No of coats/ DFT	Paint	No of coats	Paint	No of coats	Shade	
02	GD drive arrangement (7X X10), Drive arrangement for emitting system (7X X17), Inspection doors (7X X23), Drive arrangement for CE rapping (7XX26), Outer roof (7X X42)ESP Penthouse columns & Trusses (7X-X55), ESP columns (7X X81), ESP test equipment (7XX61), Hopper approach platform (7X X65),	Blast cleaning to near white metal Sa 2½ (SSPC SP10) Surface profile of 35-50µm	Inorganic Ethyl zinc silicate primer to IS 14946 (Latest)	01/ DFT= 30µm/ coat	Epoxy based MIO/TiO_2 pigmented intermediate coat	01/ DFT= 75µm/ coat	Epoxy based polyamide cured finish paint to IS 14209 (Latest) + Aliphatic acrylic polyurethane paint to IS 13213 (Latest)	01/ DFT= 30µm/ coat 01/ DFT= 30µm/ coat	Smoke grey Shade 692 of IS 5	165
		ESP columns- Below 0.0 level- Two coats of primer as mentioned above shall be applied since this item will be embedded inside the concrete pedestal.								
03	Stringer and guard plates (8X 610), Hand rails, post, step treads, Floor grills (8X 611,612,613),	Hot dip galvanizing to a coating weight of 610gm per sq. m (minimum) and to a coating thickness of 85 microns (minimum)								

Part- II contd….

Sl no	PGMA/Description	Surface preparation & surface profile	Primer coat		Intermediate coat		Finish coat			Total DFT µ (min)
			Paint	No of coats/ DFT	Paint	No of coats	Paint	No of coats	Shade	
04	Insulator housing assy (7X X06), Gas distribution assy (7X X08), GD rapping mechanism (7X X09), Gas screening (7X X11), Emitting system suspension (7X X13), Emitting Electrode rapping (7X X16), Suspension arrangement for CE (7X X19), Frame of Emitting system Top, middle& bottom (7X X21, X22, X32), shock bars(7X X24), CE rapping mechanism (7X X25)	Commercial blast cleaning (Sa 2) (SSPC SP6)	Red oxide zinc phosphate primer (Alkyd base) to IS 12744	02/ DFT= 30µ/ coat	--	--	--	--	--	60

Sl no	PGMA/Description	Surface preparation & surface profile	Primer coat		Intermediate coat		Finish coat			Total DFT µ (min)
			Paint	No of coats/ DFT	Paint	No of coats	Paint	No of coats	Shade	
05	EE (7X X15) (EE hook), EE suspension hook (7X X13), CE (7X X20), CE suspension hook (7X X19), Foundation material for ESP structures & ducts (7X X80)	--	Temporary rust preventive oil dry type (**)	40	--	--	--	--	--	40
E	**GATES AND DAMPERS**									
01	Gates and Damper Temperature ≤ 95°C	Blast cleaning to	Inorganic Ethyl zinc	01/	--	--	Epoxy based	01/	Smoke grey	160

	(57-0XX, 57-1XX)	near white metal Sa 2½ (SSPC SP10) Surface profile of 35-50µm	silicate primer to IS 14946 (Latest)	DFT= 80µm/ coat			polyamide cured finish paint to IS 14209 (Latest)	DFT= 80µm/ coat	Shade 692 of IS 5	

Sl no	PGMA/Description	Surface preparation & surface profile	Primer coat		Intermediate coat		Finish coat			Total DFT µ (min)
			Paint	No of coats/ DFT	Paint	No of coats	Paint	No of coats	Shade	
02	Gates and Damper Temperature > 95°C (57-2XX, 57-3XX, 57-4XX, 57-6XX)	Blast cleaning to near white metal Sa 2½ (SSPC SP10) Surface profile of 35-50µm	Inorganic Ethyl zinc silicate primer to IS 14946 (Latest)	01/ DFT= 80µm/ coat	--	--	Heat resistant aluminium paint as per IS 13183 (Gr I- Upto 600°C	02/ DFT= 20µ/ coat	Alumi nium	120
03	Gates blades, Machined components of G&D	--	Temporary rust preventive oil dry type (**)	40	--	--	--	--	--	40
F	**CHIMNEY**									
01	Foundation bolt (87010)	Power tool cleaning to St-3 (SSPC SP3)	Temporary rust preventive oil dry type (**)	40	--	--	--	--	--	40
02	Shells- Inside and Uninsulated side, base plate (87 100)	Blast cleaning to near white metal Sa 2½ (SSPC SP10) Surface profile of 35-50µm	Heat resistant aluminium paint as per IS 13183 (Gr I- Upto 600°C, Gr II- 200°C to 400°c Gr. III- Upto 200°C)	02/ DFT= 20µ/ coat	--	--	--	--	--	40
03	Ducts uninsulated, Strakes, (87150), Painter trolley (87200)	Blast cleaning to near white metal Sa 2½	Heat resistant aluminium paint as per IS 13183	02/ DFT= 20µ/ Coat	--	--	--	--	--	40

		(SSPC SP10) Surface profile of 35-50µm	(Gr I- Upto 600°C, Gr II- 200°C to 400°c Gr. III- Upto 200°C)							
Sl no	**PGMA/Description**	**Surface preparation & surface profile**	**Primer coat**		**Intermediate coat**		**Finish coat**			**Total DFT µ (min)**
			Paint	**No of coats/ DFT**	**Paint**	**No of coats**	**Paint**	**No of coats**	**Shade**	
04	Shells- Outside insulated (87100), Ducts- Insulated (87150)	Blast cleaning to near white metal Sa 2½ (SSPC SP10) Surface profile of 35-50µm	Red oxide zinc phosphate primer (Alkyd base) to IS 12744	02/ DFT= 30µ/ coat	--	--	--	--	--	60
05	Ladders, Hand rails, Floor grills. Platforms (87300)	Hot dip galvanizing to a coating weight of 610gm per sq. m (minimum) and to a coating thickness of 85 microns (minimum)								

SECTION –II

PART- III

STANDARD PAINTING SCHEME FOR EXPORT CONTRACTS

Sl no	PGMA/Description	Surface preparation & surface profile	Primer coat		Intermediate coat		Finish coat			Total DFT µ (min)
			Paint	No of coats/ DFT	Paint	No of coats	Paint	No of coats	Shade	
A	**REGENERATIVE AIR PRE- HEATERS**									
01	Heating element baskets (without elements) 52010, 024, 025	Power tool cleaning to ST- 3 (SSPC SP3)	Red oxide zinc phosphate primer (Alkyd base) to IS 12744	02/ DFT=30µ/ coat	--	--	--	--	--	60
02	Heating element baskets (with elements) 52010, 024, 025	--	Temporary rust preventive oil non dry type (*) (Dipping)	--	--	--	--	--	--	--
03	Rotor post assembly machined items of (52011), Pin rack assembly (52012), Seals (52013, 52054, 52055), sector plates (52041, 52042) and machined components of APH	--	Temporary rust preventive oil dry type (**)	40	--	--	--	--	--	40
04	**Components in flue gas path and insulated** Rotor post assy (52011), T bars (52013), Rotor housing assy (52030), Hot and cold connecting plate assy (52041,52042)	Commercial blast cleaning (Sa 2) (SSPC SP6)	Red oxide zinc phosphate primer (Alkyd base) to IS 12744	02/ DFT=30µ/ coat	--	--	--	--	--	60

(*) Specification as per PRQA 522/ Rev 00 (**) Specification as per PRQA 524/ Rev 00 (Sea worthy rust preventive oil); CE coil- TEP/AQCS/RP (Latest)

Sl no	PGMA/Description	Surface preparation & surface profile	Primer coat		Intermediate coat		Finish coat			Total DFT µ (min)
			Paint	No of coats/ DFT	Paint	No of coats	Paint	No of coats	Shade	
05	**Components exposed to atmosphere** Rotor drive assy (52100), Access door (52220), Air seal piping (52211), observation port other than glass part (52220), Rotor stoppage alarm other than aluminium (52220), Loose items of air receiver (52220), Guide bearing assy (52261), Support bearing assy (52262), Oil piping GB, SB (52271, 52272), Oil circulation unit (52274), Deluge and wash pipe assy (52301, 52302), Cleaning device assy (52339, 52340), Thermocouple pipe assy other than SS	Blast cleaning to near white metal Sa 2½ (SSPC SP10) Surface profile of 35-50µm	Inorganic Ethyl zinc silicate primer to IS 14946 (Latest)	01/ DFT= 75µm/ coat	Epoxy based MIO/TiO_2 pigmented intermediate coat	01/ DFT= 75µm/ coat	Epoxy based polyamide cured finish paint to IS 14209 (Latest)	01/ DFT= 75µm/ coat	Smoke grey Shade 692 of IS 5	225
B	**TUBULAR AIR PRE-HEATER**									
01	Side walls (external surfaces and internal surfaces)	Commercial blast cleaning (Sa 2) (SSPC SP6)	Red oxide zinc phosphate primer (Alkyd base) to IS 12744	02/ DFT=30µ/ coat	--	--	--	--	--	60

Part- III contd….

Sl no	PGMA/Description	Surface preparation & surface profile	Primer coat		Intermediate coat		Finish coat			Total DFT µ (min)
			Paint	No of coats/ DFT	Paint	No of coats	Paint	No of coats	Shade	
02	Machined surfaces, tubes of TAPH, tube plates and intermediate plates	--	Temporary rust preventive oil dry type (**)	40	--	--	--	--	--	40
C	**FANS**									
01	Foundation materials 550XX, 560XX (Threaded portion)	Power tool cleaning to St-3 (SSPC SP3)	Temporary rust preventive oil	40	--	--	--	--	--	--
			Other areas except threaded portion- Red oxide Zinc phosphate primer to IS 12744, DFT- 30 µ							
02	**Components exposed to atmosphere**									
02.a	Bearing pedestals, Base frame, servomotor assy, shaft with bearing assy, OGV, IGV (55-1XX, 55-2XX, 55-3XX, 55-5XX, 55-6XX, 56-4XX) Bearing pedestals, Base frame, shaft with bearing assy, RVC, IGV, Support for seal, shaft protecting tube, Spiral casing (if no insulation is applicable), Damper (56-1XX, 56-2XX, 56-3XX, 56-4XX) Coupling guard (56-8XX, 55-8XX), Tools (56-000, 55-000)	Blast cleaning to near white metal Sa 2½ (SSPC SP10) Surface profile of 35-50µm	Inorganic Ethyl zinc silicate primer to IS 14946 (Latest)	01/ DFT=80µ/ coat	--	--	Epoxy based polyamide cured finish paint to IS 14209 (Latest)	01/ DFT= 80µm/ coat	Smoke grey Shade 692 of IS 5	160
			General notes for Sl no: 02.a & 02.b for C. Fans 5) As a assy, no blasting to be done for servomotor assy& shaft with bearing assy. 6) Before assy, all external un-machined surfaces of bearing housing/ cylinder to be painted. 7) AP impeller painting to be done before assembly except oil chamber area & mating component contact area. 8) After SR/ Before machining, blasting and primer painting to be done.							
02.b	AP fan components like Servomotor assy, Shaft with bearing assy	Power tool cleaning to St-3 (SSPC SP3)	Epoxy based zinc phosphate primer to IS 13238	02/ DFT=30µ/ coat	--	--	--	--	--	60

Part- III contd….

Sl no	PGMA/Description	Surface preparation & surface profile	Primer coat		Intermediate coat		Finish coat			Total DFT µ (min)
			Paint	No of coats/ DFT	Paint	No of coats	Paint	No of coats	Shade	
03	**Components in Air/ Gas and under insulation**									
03.a	Suction chamber, diffuser, housing, OGV, Spiral casing, damper, IGV, RVC, impeller, shaft (56-1XX,56-2XX, 56-3XX, 56-4XX)	Commercial blast cleaning (Sa 2) (SSPC SP6)	Red oxide zinc phosphate primer (Alkyd base) to IS 12744	02/ DFT= 30µ/ coat	--	--	--	--	--	60
03.b	Silencer (55-9XX, 56-9XX)	Blast cleaning to near white metal Sa 2½ (SSPC SP10) Surface profile of 35-50µm	Inorganic Ethyl zinc silicate primer to IS 14946 (Latest)	01/ DFT= 75µm/ coat	Epoxy based MIO/TiO_2 pigmented intermediate coat	01/ DFT = 75µ m/ coat	Epoxy based polyamide cured finish paint to IS 14209 (Latest)	01/ DFT= 75µm / coat	Smoke grey Shade 692 of IS 5	225
03.c	AP fan impeller (55-2XX, 55-3XX)	Power tool cleaning to St-3 (SSPC SP3)	Epoxy based zinc phosphate primer to IS 13238	02/ DFT= 30µ/ coat	--	--	--	--	--	60
04	Journal area of shaft (55-1XX, 56-1XX, 55-2XX, 56-2XX, 55-3XX, 56-3XX, 56-4XX)- Refer PRQA 341/ Latest									
05	All machined surfaces shall be applied with rust preventive.									
D	**ELECTROSTATIC PRECIPITATOR**									
01	ESP Penthouse other items (7XX55), Water washing system (7X X66), Tools & Tackles (7X 996), Lifting beam (7X X20) Ridges (7X X43), Hopper upper, lower &middle part (7X X44, X45) Insulator support panel (7X X46),	Blast cleaning to near white metal Sa 2½ (SSPC SP10) Surface profile of 35-50µm	Red oxide zinc phosphate primer (Alkyd base) to IS 12744	02/ DFT= 30µ/ coat	--	--	Synthetic Enamel paint to IS 2932	02/ DFT= 20 µ/ coat; Total 40µ	Smoke grey Shade 692 of IS 5	100

	Roof panel assy (7X X47) contd… Contd… Casing structure (7X X28, X48), Casing shell (7X X49, ESP funnel (7X X50), Splitter & Guide vane (7X X57)									

Sl no	PGMA/Description	Surface preparation & surface profile	Primer coat		Intermediate coat		Finish coat			Total DFT µ (min)
			Paint	No of coats/ DFT	Paint	No of coats	Paint	No of coats	Shade	
02	GD drive arrangement (7X X10), Drive arrangement for emitting system (7X X17), Inspection doors (7X X23), Drive arrangement for CE rapping (7XX26), Outer roof (7X X42)ESP Penthouse columns & Trusses (7X-X55), ESP columns (7X X81), ESP test equipment (7XX61), Hopper approach platform (7X X65),	Blast cleaning to near white metal Sa 2½ (SSPC SP10) Surface profile of 35-50µm	Inorganic Ethyl zinc silicate primer to IS 14946 (Latest)	01/ DFT= 75µm/ coat	Epoxy based MIO/TiO_2 pigmented intermediate coat	01/ DFT= 75µm/ coat	Epoxy based polyamide cured finish paint to IS 14209 (Latest) + Aliphatic acrylic polyurethane paint to IS 13213 (Latest)	02/ DFT= 35µm/ coat 01/ DFT= 30µm/ coat	Smoke grey Shade 692 of IS 5	250
		ESP columns- Below 0.0 level- Two coats of primer as mentioned above shall be applied since this item will be embedded inside the concrete pedestal.								
03	Stringer and guard plates (8X 610), Hand rails, post, step treads, Floor grills (8X 611,612,613),	Hot dip galvanizing to a coating weight of 610gm per sq. m (minimum) and to a coating thickness of 85 microns (minimum)								

Part- III contd….

Sl no	PGMA/Description	Surface preparation & surface profile	Primer coat		Intermediate coat		Finish coat			Total DFT µ (min)
			Paint	No of coats/ DFT	Paint	No of coats	Paint	No of coats	Shade	
04	Insulator housing assy (7X X06), Gas distribution assy (7X X08), GD rapping mechanism (7X X09), Gas screening (7X X11), Emitting system suspension (7X X13), Emitting Electrode rapping (7X X16), Suspension arrangement for CE (7X X19), Frame of Emitting system Top, middle& bottom (7X X21, X22, X32), shock bars(7X X24), CE rapping mechanism (7X X25)	Blast cleaning to near white metal Sa 2½ (SSPC SP10) Surface profile of 35-50µm	Red oxide zinc phosphate primer (Alkyd base) to IS 12744	02/ DFT= 30µ/ coat	--	--	--	--	--	60

Sl no	PGMA/Description	Surface preparation & surface profile	Primer coat		Intermediate coat		Finish coat			Total DFT µ (min)
			Paint	No of coats/ DFT	Paint	No of coats	Paint	No of coats	Shade	
05	EE (7X X15) (EE hook), EE suspension hook (7X X13), CE (7X X20), CE suspension hook (7X X19), Foundation material for ESP structures & ducts (7X X80)	--	Temporary rust preventive oil dry type (**)	40	--	--	--	--	--	40
E	**GATES AND DAMPERS**									
01	Gates and Damper Temperature ≤ 95°C (57-0XX, 57-1XX)	Blast cleaning to near white metal Sa 2½	Inorganic Ethyl zinc silicate	01/ DFT= 80µm/ coat	--	--	Epoxy based polyamide cured	01/ DFT= 80µm/ coat	Smoke grey	160

		(SSPC SP10) Surface profile of 35-50µm	primer to IS 14946 (Latest)				finish paint to IS 14209 (Latest)		Shade 692 of IS 5	

Sl no	PGMA/Description	Surface preparation & surface profile	Primer coat		Intermediate coat		Finish coat			Total DFT µ (min)
			Paint	No of coats/ DFT	Paint	No of coats	Paint	No of coats	Shade	
02	Gates and Damper Temperature > 95°C (57-2XX, 57-3XX, 57-4XX, 57-6XX)	Blast cleaning to near white metal Sa 2½ (SSPC SP10) Surface profile of 35-50µm	Inorganic Ethyl zinc silicate primer to IS 14946 (Latest)	01/ DFT= 80µm/ coat	--	--	Heat resistant aluminium paint as per IS 13183 (Gr I- Upto 600°C	02/ DFT= 20µ/ coat	Alumi nium	120
03	Gates blades, Machined components of G&D	--	Temporary rust preventive oil dry type (**)	40	--	--	--	--	--	40

Sl no	PGMA/Description	Surface preparation & surface profile	Primer coat		Intermediate coat		Finish coat			Total DFT µ (min)
			Paint	No of coats/ DFT	Paint	No of coats	Paint	No of coats	Shade	
F	CHIMNEY									
01	Foundation bolt (87010)	Power tool cleaning to St-3 (SSPC SP3)	Temporary rust preventive oil dry type (**)	40	--	--	--	--	--	40
02	Shells- Inside and Uninsulated side, base plate (87 100)	Blast cleaning to near white metal Sa 2½ (SSPC SP10) Surface profile of 35-50µm	Inorganic Ethyl zinc silicate primer to IS 14946 (Latest)	01/ DFT= 80µm/ coat	--	--	Heat resistant aluminium paint as per IS 13183 (Gr I- Upto 600°C, Gr II- 200°C to 400°c Gr. III- Upto 200°C)	02/ DFT= 20µ/ coat	Alumi nium	120
03	Ducts uninsulated, Strakes, (87150), Painter trolley (87200)	Blast cleaning to near white metal Sa 2½ (SSPC SP10) Surface profile of 35-50µm	Inorganic Ethyl zinc silicate primer to IS 14946 (Latest)	01/ DFT= 80µm/ coat	--	--	Heat resistant aluminium paint as per IS 13183 (Gr I- Upto 600°C, Gr II- 200°C to 400°c Gr. III- Upto 200°C)	02/ DFT= 20µ/ coat	Alumi nium	120

Part- III contd….

Sl no	PGMA/Description	Surface preparation & surface profile	Primer coat		Intermediate coat		Finish coat			Total DFT µ (min)
			Paint	No of coats/ DFT	Paint	No of coats	Paint	No of coats	Shade	
04	Shells- Outside insulated (87100), Ducts- Insulated (87150)	Blast cleaning to near white metal Sa 2½ (SSPC SP10) Surface profile of 35-50µm	Inorganic Ethyl zinc silicate primer to IS 14946 (Latest)	01/ DFT= 80µm/ coat	--	--	Heat resistant aluminium paint as per IS 13183 (Gr I- Upto 600°C, Gr II- 200°C to 400°c Gr. III- Upto 200°C)	02/ DFT= 20µ/ coat	Aluminium	120
05	Ladders, Hand rails, Floor grills. Platforms (87300)	Hot dip galvanizing to a coating weight of 610gm per sq. m (minimum) and to a coating thickness of 85 microns (minimum)								

ANNEXURE I

NOTES FOR PAINTING SCHEME PART I, II& III

1. This painting scheme covers a comprehensive list of PGMAs being used in 125 to 800MW in an effort to standardize the painting scheme. Therefore, entire list of PGMAs will not be applicable for any specific project and only those PGMAs applicable for the project may be used, while choosing the painting scheme applicable.
2. Rust preventive coating should be given on HSFG bolt and nut threads and inside surfaces of fabricated structure shall be painted with red oxide primer paint during fitup stage.
3. All threaded & machined surfaces are to be applied with a coating of Temporary Rust preventive oil.
4. All surfaces of foundation materials, insulation pins, Anchor channels, Sleeves Splice/ cover plate/ gusset plate and metal contact area usually bolted at site to enhance the load transfer by friction grip shall be coated with temporary rust preventive fluid and during execution of civil works; the dried film coating shall be removed using organic solvents.
5. PGMAs under sub vendor items are not indicated. Please refer respective Engineering document for all sub-vendor items. Whenever it is not specified, it shall be as per the painting scheme of the applicable PGMA.
6. No painting is required for Aluminium, Stainless steel components and galvanized items. Abrasive blast cleaning to SSPC – SP 6 (Sa 2) grade shall be done on any damaged painting area. This repair is not applicable to inorganic ethyl zinc silicate pained component.
7. The Temporary rust preventive coating that has already been applied on any component, tubes, pipes etc shall be visually inspected for good adherence. If the coating is intact, direct coating of alkyd based red oxide paints over the coating is permitted. In case the coating is peeled off over a large area, then the coating is to be removed by suitable solvents/ heating to 350- 400 deg C for an hour before primer paint application- but in this case, it should be ensured that the minimum surface cleanliness required for primer paint application shall be SSPC – SP2 (equivalent- Hand tool cleaning)
8. All currently active PGMAs are covered. Requirements for Missing / new PGMAs will be included under the relevant section following the appropriate paint logic.
9. Ground shade/ color finish paints & identification tag/ band for equipments, supporting structures and other components shall be followed as per tender.
10. In components, wherever plate/ sheets of thickness less than or equal to 4mm, tubes/ rods are used, power/ hand tool cleaning to SSPC- SP3/ SSPC-SP 2 shall be followed and the painting shall be done as per SL no: D/01 of PRQA:590- Section II A/B/C. For all commissioning components- erection materials two coats of Red oxide Zinc phosphate primer shall be applied to meet the temporary protection till erection, after power tool cleaning.
11. Touch-up painting of damaged areas shall be carried out as per clause applicable painting scheme.
12. Structural members having welded connections at site, relevant area can be painted with primer paint instead of weldable primer.
13. This painting scheme is the final document and it overwrites any other document indicating painting/ coating schemes. The component not covered in approved painting scheme, this is the document to decide the type of paint application.
14. All components covered under different PGMAs are to be painted. In case any component is left out, the same shall be deemed to be included under relevant section.

ANNEXURE II

INSPECTION & TESTING PLAN FOR SURFACE PREPARATION, PAINTING

SL NO	COMPONENT/ OPERATION	CHARACTERISTICS	CL	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOC/ ACCEPTANCE NORM	TYPE OF RECORD	AGENCY			REMARKS
								M	C		
1.0	Surface preparation for plates/ rolled sections/ components										
1.1	Raw material	Rust, pitting	B	Visual	100%	Note 1	R	P	V	-	
1.2	Blasting media	Type of quality of abrasives	B	Random sample test	Abrasive quality for each lo	Note 1a	R	P	V	-	
1.2.1	Blasting/ Power tool cleaning	Surface roughness/ cleanliness	A	Visual, Measure-ment	100% 10 spots/ sq.m	Surface profile as per approved painting scheme, Note 2	R	P	W	-	
		Profile defects	B	Visual	100%	Note 3	R	P	W		
1.2.2	Substrate dust contamination (for blasting)	Adhesive Tape test	B	Measure-ment	Two spots/ component	Note 4	R	P	W	-	Randomly selected 10X magnifier, Transparent adhesive tape 25mm width
1.2.3	Substrate chemical contamination (for blasting)	Surface contamination test	B	Measure-ment	One test/ abrasive lot used	SSPC SP 12 Chloride <15µg/cm² (PPM) Sulphate <20 PPM	R	P	W	-	Any suitable method to identify salt contamination
1.2.4	Substrate-coating conditions	Flash rusting steel temp environmental condition	A	Visual Measure-ment	100% One spot/ Lot	Note 5	R	P	V	-	
2.0	In process Painting										
2.1	Paint	Physical& Chemical	A	Review of documents	100%	Invoice/ data sheet	TC	P	V	-	Physical verification of shade, batch no, date of manufacture, supplier approval status
2.2	Mixing (Two pack system)	Mixing ratio& Durations	B	Documents	100%	Painting data sheet Note 6	R	P	V	-	Electrical/ pneumatic agitator

SL NO	COMPONENT/ OPERATION	CHARACTERISTICS	CL	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOC/ ACCEPTANCE NORM	TYPE OF RECORD	AGENCY			REMARKS
								M	C		
2.2.1	Filtering	Free from foreign particle	B	Documents	100%	Use sieves 80-100 microns	R	P	V	-	Nylon mesh or muslin cloth
2.2.2	Paint testing	Physical & chemical properties	C	Lab test	Random	Suppler TC/ Data sheet/ IS specificaions	R	P	W		Sample collected at each vendor at regular intervals as advised by BHEL shall be sent to BHEL/ NABL accredited lab
2.2.3	Painting	Personnel qualification Inspection personnel	C C	Review of documents	100%	In line with this PRQA- Annexure III Certification by reputed institution or by an Expert. (NACE/SSPC/ Level II)	R R	V V	V V		
2.3	Airless/ Air spray	Spray process pot life	B	Documents	100%	Supplier manual Tip selections, Note 7	R R	V P	V V		
2.4	Coating thickness & coating intervals	Wet film, Dry film thickness	B	Measurement	100%	SSPC- PA 2 Note 8	R	P	V		
		Intervals	B	Documents	100%	Painting data sheet/specification	R	P	V		Min: 24 hrs or as per paint specification / data sheet
3.0	Final Testing										
3.1	Peel off test Cross cu/ X-cut	Adhesive strength between substrate & primer and subsequent over coats	A	Test on each coat: Primer, Intermediate& final coat	3 spots	ASTM D3559-7 Note 9	R	P	W		4x magnifier lens, 25mm width pressure sensitive tape (P99), cutting edges with template

SL NO	COMPONENT/ OPERATION	CHARACTERISTICS	CL	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOC/ ACCEPTANCE NORM	TYPE OF RECORD	AGENCY			REMARKS
								M	C		
3.2	Final Inspection	Dry film thickness	A	Document	15 spots/ sq.m	Approved painting scheme, SSPC PA 2	R	P	W		
		Finish, shade and paint defect	A	Visual	100%	Note 8	R	P	W		Use of shade card

NOTE- 1: Rust Grade

As per ISO 8501-1, rust and painting are graded into four categories as A, B, C & D. Rust and pitting shall be removed by competent process prior to application of primer. Pitted area shall be cleaned by blasting/ power tool cleaning/ grinding provided thickness shall be met to the design requirement. Plates/ components identified under heavy pitted category C or D, acceptance/rejection reserved to QC/ BHEL.

NOTE- 1a: Blasting media

Blasting media shall be copper slag, iron slag, steel shots/ grits & aluminum oxide. The abrasive used for blasting process shall be within chemical contaminations chloride<15ppm and sulphate <20ppm. Mixing ratio of shots/ grits (generally 3:1) shall meet the surface roughness 35-50 microns after blasting. Blasting media shall be suitably sieved to get the required particle size 0.5 to 1.0mm. (Steel shots ASTM G40/G80)

NOTE- 2: Blast cleaning

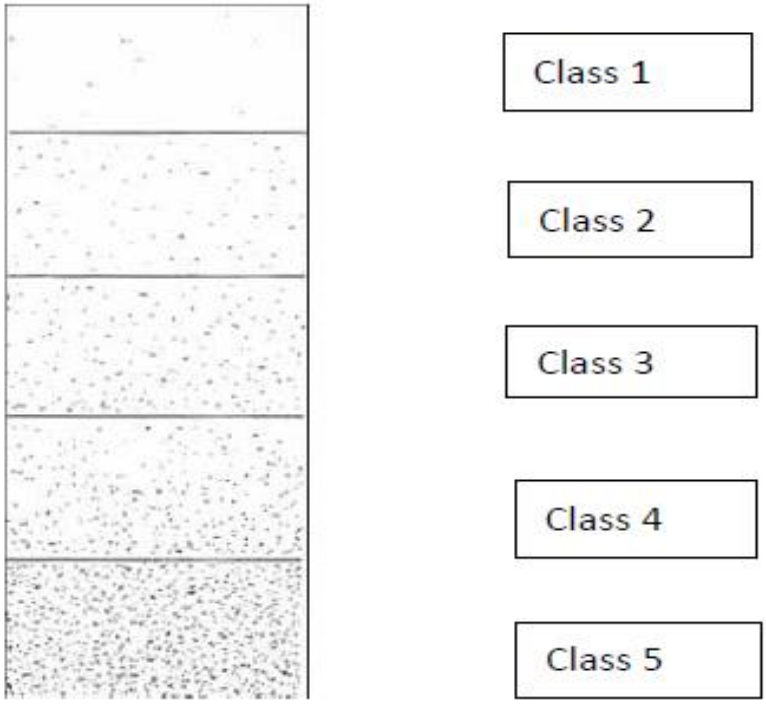
a) Air quality must be checked before start of blasting process by blotter test
b) Surface finish: The blasted surface shall meet the SSPC- SP10 (SA 2.5) finish near white metal. Surface roughness shall be checked in 10 spots/Sq.m. Digital/ Analog instrument duly calibrated shall be used to measure the surface roughness. Power tool cleaned surface shall be met to SSPC- SP3. Blasting/ power tool cleaned surface shall be met as per ISO 8501-1 requirement.
c) Surface roughness: Average value shall be 35-50 microns for blast cleaned surface.
d) Blasting: Shall not be done during rainy/ mist seasons where relative humidity is more than 80%.
e) Optimum blasting pressure and nozzle size (straight bore or venturi type) to get required surface roughness (90-100psi for mineral abrasives and 120-125 psi for metallic abrasives, standing distance 12-18 inches and standing angle 80-90 deg. for full blasting, sweep blast 45-60 deg. with respect to the substrate).

NOTE- 3: Profile defects

a) Surface shall be visually checked and free from defects such as rust, dust, grease, oil, sharp corner/edges, rolling imperfection/ overlap, vein, undulations, mill scales, improper weld beads/ shapes/ undercuts, weld slag, spatters etc.
b) Sharp corner/edges shall be ground off to radius 1.5 to 2mm and blunted. Other profile defects if any shall be ground/chipped out/ repaired by suitable means

NOTE- 4: Dust

A transparent adhesive tape test shall be conducted on substrate to ensure cleanliness of the substrate and same shall meet the class 1 requirement.



NOTE- 5: Coating conditions

a) Abrasive media used for blasting shall be free from moisture and other contaminations.
b) Flash rusting if any shall be removed by sweep blasting

c) Primer paint shall be applied immediately or within 4 hours in case of blast cleaning and within 8 hours in case of power tool cleaning.
d) Painting shall not be done during rainy/ mist seasons when relative humidity is >80%.
e) Painting shall be commenced, when the metal surface temperature is >3°C above the dew point temperature
f) Painting shall not be done, when the steel surface temperature is >45°C.
g) A suitable instrument duly calibrated is required to check the dew point temperature and steel surface temperature.

NOTE- 6: Mixing

a) Paint mixing ratio for two packs painting system shall be done as per the painting data sheet provided by the manufacturer. Individual component shall be mixed thoroughly and then mix the component as per data sheet ratio (by volume or by weight). Blend by boxing is prohibited for inorganic zinc rich primer (ie react with moisture). Off ratio (partial ratio) blends won't cure properly.
b) Mixing of thinner is not required for airless spray, however mixing of thinner<5% is permitted. If required add thinner after mixing of paints and mix it with homogenously.
c) Paint mixing shall be done at least for not less than 20 minutes or as per paint data sheet with electrical/ pneumatic operated tool to achieve mixing chemically matured.
d) Mixed paint particles shall be filtered with sieves of 80-100 microns to avoid clogging of nozzle tip. Once components are blended, pot life begins and use the mixed paint immediately as specified pot life period indicated in the data sheet.
e) Zinc rich primers dispersed slowly in to binder and agitate slowly while mixing process.
f) Primer, Intermediate and final coat shall be the same supplier, if any change, compatibility certificate shall be obtained from the paint supplier.

NOTE- 7: Spray process

a) Painting shall be done at controlled environment only and free from dust& paint soot.
b) When volume of solids of paint s more than 50%, airless spray shall be selected for painting application.
c) Select proper nozzle tip size and pressure to achieve uniform DFT and less wastage.
d) Painting shall be done within pot life period specified in the paint product data sheet, to avoid premature paint failure.
e) Avoid arcing, tilting and maintain constant distance (12-18 inch), tip selection, tip pressure according to paint, triggering at appropriate locations and banding while painting.
f) While painting of inorganic zinc silicate, RH shall be above 65%, if painted below RH 65% water curing is required.
g) Top coat over and above epoxy intermediate coat shall be done within a month and proper roughness shall be created before top coat.

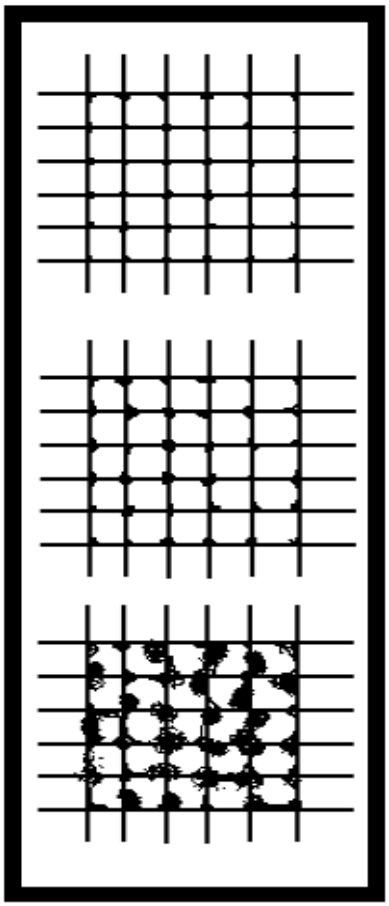
NOTE- 8: Coating Thickness

a) Wet film thickness (WFT) shall be measured immediately after paint applications using Comb gauge/ eccentric wheel.
b) WFT can be calculated as: WFT= (100XDFT)/ VS where, DFT is the dry film thickness and VS= % of volume solid of supplied paint from data sheet.
c) Dry film thickness shall be measured after hard dry condition of each coat.
d) Dry spray/ Dust particles embedded after previous coat shall be cleaned/ removed with fine emery paper prior to application of subsequent coat. Coating thickness shall not be less than the requirement as specified in the painting scheme at any case tolerance on total DFT as specified in the applicable painting scheme shall be within -0/+20 microns or +10% of total DFT, whichever is higher.
e) Coating thickness shall not be less than the requirement as specified in the painting scheme at any case tolerance on total DFT as specified in the applicable painting scheme shall be within -0/+20 microns as specified in the applicable painting scheme.
f) Painted surface shall be free from paint defects namely crack, sagging, dry spray, orange peel etc.
g) Finish and shade as per paint data sheet. A painted panel shall be made available with at works to check/ compare the painted surface.

NOTE- 9: Peel off Test

a) Paint peel off test shall be done after 48 hours of painting operation, on single/ multi coated painted surface of the component for each coat.
b) When total DFT is less than 125 microns- Cross cut method shall be followed.
c) DFT up to 50 microns 1mm spacing with 6 cuts minimum to the length of 20mm.
d) DFT more than 50 microns and less than 125 microns 2mm spacing with 6 cuts minimum to the length of 20mm.
e) When total DFT is more than 125 microns- X cut method shall be followed. The smaller angle of cut shall be between 30 to 45 degrees cut to length of 40mm.
f) For all tests, ensure that coating film has been penetrated and minimum three locations shall be tested.
g) The adhesion test shall be conducted where the substrate temperature is below 35°C for alkyd base paints.

Acceptable norm for Cross cut method:



< 5% Peel- Acceptable-(5A)

5-10% % Peel – Acceptable (4A)

>10% Peel - Not Acceptable (3A)

Acceptable norm for X cut method:

5A- No peeling- Acceptable

4A- Trace peeling along incisions or at their intersection- Acceptable

3A- Jagged removal along incision up to 1.6mm on either side- Not acceptable

PAINTING INSPECTION FORMATS

VENDOR CODE	I ST VENDOR : FABRICATION/ 2 ND VENDOR BLASTING							
	SURFACE PREPARATION (POWER TOOL/BLASTING REPORT							
PAINTING SCHEME			REPORT NO& date					
PROJECT			PO.NO.					
WO.NO.								
PRODUCT DESCRIPTION								
SURFACE PREPARATION (REF STANDARD ISO 8501)								
Sieve size used and size of abrasive								
BLASTING MEDIUM USED			RAW MATERIAL RUST GRADE A B C D					
DU .NO	QTY	TEMPERATURE			RH	DATE	START TIME	END TIME REMARKS
		DRY BULB	WET BULB	DEW POINT				
MOISTURE CONTENT TEST FOR IF COMPRESSED AIR USED (BLOTTING PAPER CHECK)							OK / NOT OK	
SURFACE PROFILE GAUGE READING(IN MICRONS) DATE & TIME SURFACE FINESH TO SA 2.5 (SSPC SP 10)/ SURFACE CLEANLINESS FOR POWER TOOL CLEANING								
SURFACE SALT CONTAMINATION TEST(IF ANY) FOR BLASTED SURFACE					REPORT		OK / NOT OK	
DUST FREE CHECK TEST FOR BLASTED SURFACE	TAPE REPORT							
DUST FREE CHECK RESULT LEVEL FOR BLASTED SURFACE	1 2 3 4 5							
Visual inspection(pitting, weld spatter/slag, rolling defects ,etc.,								
FIRM QC	TPI /BHEL QC							

VENDOR CODE	1'ST VENDOR;FABRICATION, 2'ND VENDOR: PAINTING									
	PAINT REPORT									
PAINTING SCHEME			REPORT NO & date							
PROJECT			PO.NO.							
WO.NO.										
PRODUCT										

PRIMER COAT PAINT

PAINT SPECIFICATION/STD IS No:..... /SHADE	
PAINT MANUFACTURER	
SUPPLIER/TRADER NAME	
MANUFACTURING DATE / BATCH NO. / TC No	
MIXING RATIO / TWO PART SYSTEM IF ANY	
NUMBER OF COAT	
DURATION OF MIXING (use of stirrer) DATE / TIME :	

DU NO	QTY	TEMPERATURE				RH	DATE	START TIME	END TIME	REMARKS
		DRY BULB	WET BULB	METAL SURFACE	DEW POINT					

WET FLIM THICKNESS (in microns)			
SPRAY GUN USED			
HARD DRY TIME (REQURIED)			
DFT REQUIRED			
DFT ACTUAL MEASURED (SSPC PA 2)			
Visual inspection(pitting,weld spatter/slag,rolling defects ,etc.,) / paint defect			
PEAL OFF TEST(AST M- D3359)	CROSS CUT TEST DFT UP TO 50 MICRONS PITCH 1mm , cut Length 20mm	REPORT	OK / NOT OK
	CROSS CUT TEST DFT BETWEEN 50 TO 125 MICRONS PITCH 2mm, cut length 20 mm	REPORT	OK / NOT OK
	X CUT TEST ABOVE 125 MIC(included angle 30 to45 deg, cut length 40mm)	REPORT	OK / NOT OK

FIRM QC	TPI /BHEL QC

VENDOR CODE	1ST VENDOR;FABRICATION 2ND VENDOR: PAINTING
	PAINT REPORT

PAINTING SCHEME	-	REPORT NO& Date	
PROJECT		PO.NO.	
WO.NO.			
PRODUCT			

INTERMEDIATE/FINAL COAT

PAINT SPECIFICATION/ SHADE	
PAINT MANUFACTURER	
SUPPLIER/TRADER NAME	
MANUFACTURING DATE / BATCH NO. / TC No./DC	
MIXING RATIO / TWO PART SYSTEM IF ANY	
NUMBER OF COAT	
DURATION OF MIXING (use of stirrer) DATE / TIME :	

DU NO	QTY	TEMPERATURE				RH	DATE	START TIME	END TIME	REMARKS
		DRY BULB	WET BULB	METAL SURFACE	DEW POINT					

WET FLIM THICKNESS (in microns)	
SPRAY GUN/NOZZLE NO USED	
HARD DRY TIME (REQURIED)	
DFT REQUIRED	
DFT ACTUAL MEASURED (Not less than specified in painting scheme)	
Visual /paint defect (if any)	

Peel of test (ASTM-D3359)	CROSS CUT TEST DFT BETWEEN 50 TO 125 MICRONS PITCH 2mm, cut length 20 mm	REPORT	OK / NOT OK
	X CUT TESTABOVE 125 MIC(cut included angle 30 to45 deg, cut length 40mm)	REPORT	OK / NOT OK

FIRM QC	TPI/BHEL QC

ANNEXURE III

PROCEDURE FOR QUALIFICATION OF PAINTERS

1.0 SCOPE

This standard describes, in general, the procedure and criteria to be followed for qualifying an operator/ painter for carrying painting work at BHEL Shop or at vendor works.

2.0 OBJECTIVE:

To evolve criteria and procedure for qualification of operators/ painters.

3.0 PROCEDURE:

Following procedure shall be adopted for certification of operator/ painter qualification for carrying out painting process.

3.1 Vendor shall initiate the format 'Record of personnel deployed for painting work' as shown in Annexure III A. This annexure is subsequently forwarded to concerned department of the unit.

3.2 Concern department is to forward to the reputed agency/expert having NACE/ SSPC (Level II) shall assess and certify the suitability of an operator / painter to conduct a painting process. In case, a new operator/ painter is inducted shall have experience in the painting field minimum 2 years and qualification not less than VII std, then he shall be assessed by reputed agency/expert. In case, an operator/painter does not carry out painting work for more than two years, then he shall be re-qualified and issued a certificate in line with the annexure.

3.3 An operator/ painter engaged in carrying special process like painting shall be re-qualified once in 3 years.

3.4 Following criteria have been identified and evaluated for each operator/ painter. Each criterion has been allocated 10 marks.

3.4.1 Mainly, there are three types of painting processes which are being followed for carrying out painting, these are

- Brush application
- Air spray painting
- Airless spray painting/ Air assisted airless spray

The operator is expected to know the basics of the above painting processes, technical details of process equipment and their salient features, awareness about Do's and Don'ts in painting work.

3.4.2 Understanding of the documents/ specification

The operator/ painter should have the knowledge about surface cleaning and acceptance norms, paint systems, mixing ratio and pot life of two pack systems, drying and curing behavior, use of proper thinner, control of viscosity and its importance, over-coating interval, precautions to be observed during their use etc.

3.4.3 Awareness about handling of materials/ jobs

The operator/ painter is expected to have knowledge about handling of paint components like base, hardener and thinner, handling and upkeep of painting equipment, cleaning of brush, gun and other parts of equipment. He is also expected to know how to handle cleaned and painted jobs.

3.4.4 Performance evaluation based on job/samples

The operator / painter shall be asked to prepare the test panel/job which shall be evaluated for following parameters:

- Uniformity of coating + 10% DFT required.
- Visual defects like brush marks, wrinkles, pinholes etc.
- Surface finish, gloss
- Presence of dry spots, overflow marks

The operator/ painter shall first clean the test panels thoroughly followed by a coat of primer/ finishing paint etc, using requisite painting process , i.e., brush/ air spray/ airless spray etc. After evaluation of test panels and based on result, the marks shall be allotted. After evaluation of test panels and based on result, the marks shall be allotted.

3.4.5 Knowledge about safety and hygiene

Each operator/ painter is expected to know about the safety of self and surroundings, use of safety appliances, effect of solvent vapors on health etc. He is supposed to know personal hygiene as well as upkeep of painting equipment and painting area.

3.4.6 Classroom training

A class room training by the supplier/ expert (manufacturer like Nerolac, Berger etc) of the paint which we are procuring, must be arranged for the painters to have knowledge about the paints, enamels, coatings etc and their applications. The class room training must be arranged in local languages for understanding of the painters.

4.0 CERTIFICATION FOR QUALIFICATION

Each operator/ painter is evaluated for above criteria and marks are being allotted for each criterion. The operator/ painter must obtain a minimum marks 5 for each criteria and

qualifying marks shall be 25 out of 50. The painter should pass in field/ practical test, even performed well in the written examination. The certification shall be specified in the area of type of application process as a painter is qualified. (example: airless/ spray/ pressure pot/ air spray) etc.

5.0 ISSUE OF CERTIFICATE

The operator/painter who qualifies the test shall be issued a certificate in standard format shown below, which shall be kept in the concerned and certifying department/ vendor works for record. The format can be modified to suit the requirement at vendor works with prior approval from QA. This certificate shall be signed by initiating section in charge and certifying department/ reputed agency/expert

6.0 VALIDITY

The validity of the certificate is for 3 years from the date of issue. The operator/ painter is required to appear for re-test to extend the validity.

Annexure III- A

RECORD OF TRAINING & QUALIFICATION FOR PERSONNEL TO BE DEPLOYED FOR PAINTING PROCESS

Photo

VENDOR NAME AND ADRESS

1. Name :
2. Father's name :
3. Date of birth/ Age :
4. Basic Qualification :
5. Experience in the painting field :

Name of Expert trainer :
Designation :

Date of start of training	Training subject	Faculty	Duration (Hrs.)	Certificate issued Yes/no	Remarks
	1.Painting process and Equipment		2		Issued on
	2.Painting Document/ Data sheet/Batch TC		1		
	3.Knowlege of paint component and mixing		1		Validity up to:
	4.Painting performance Evaluation on sample		2		
	5. Safety and hygiene		1		

Marks obtained: (each section carry 10 marks)

1) Knowledge of painting process and equipment : ----------
2) Understanding of documents / specification : ----------
3) Handling of components : ----------
4) Performance evaluation based on jobs/samples : ----------
5) Knowledge of safety and hygiene : ----------

Qualifying marks are 25/50

Qualified for : Airless spray & air spray
Painting System : Alkyd/ Epoxy/zinc silicate and heat Resistant based paints

Signature of Initiating Official

Signature of Certifying expert

ANNEXURE IV

Painting Scheme- Details for procurement and application process

Sl no	Generic nature of paint	Theoretical covering capacity Sq. m per litre	No of pack	Volume solids % (min)	DFT in microns (min) per coat	Shade	Shade no to IS 5	Mode of appln	Over coating Interval hrs
01	Heat resistant Aluminium paint to IS 13183 Gr. I	10	1	--	--	Aluminium	--	Brush/ Spray	24
02	Heat resistant Aluminium paint to IS 13183 Gr. II	10	1	--	--	Aluminium	--	Brush/ Spray	24
03	Red oxide zinc phosphate primer to IS 12744	10	1	--	--	Red oxide	--	Brush/ Spray	12
04	Epoxy Zinc rich primer to IS 14589 Gr.II	8	2	35	40	Grey	--	Spray	24
05	HB Chlorinated rubber based zinc phosphate primer	10	1	40	50	Grey	--	Brush/ Spray	12
06	Epoxy based zinc phosphate primer to IS 13238	10	2	40	35	Grey	--	Spray	24
07	Inorganic Ethyl Zinc silicate to IS 14946	8	2	60	65	Grey	--	Spray	24
08	Polyamide cured Epoxy based MIO/ TiO_2 pigmented intermediate coat	8	2	50	75	Grey/ Brown	--	Spray	16
09	Long oil alkyd synthetic enamel finish paint to IS 2932	10	1	--	--	Reqd. shade	Corrpdg. Shade no	Brush/ Spray	12
10	Epoxy based polyamide cured finish paint to IS 14209	10	2	40	35	Smoke grey/ Grey white	692 RAL 9002	Spray	24
11	Aliphatic acrylic polyurethane paint to IS 13213	10	2	40	30	--	--	Spray	24

Sl no	Generic nature of paint	Theoretical covering capacity Sq. m per litre	No of pack	Volume solids % (min)	DFT in microns (min) per coat	Shade	Shade no to IS 5	Mode of appln	Over coating Interval hrs
12	Temporary rust preventive fluid (Non- drying type) to PRQA 522 (Latest)- For APH Elements	10	1	--	--	Black	--	Dip	--
13	Temporary rust preventive fluid (Drying type) to TEP:AQCS:RP (Latest)- For CE coils	10	1	--	--	Black	--	Dip	--
14	Temporary rust preventive fluid (Drying type) to PRQA:523 (Latest) for other components	10	1	--	--	Amber	--	Brush/ Spray	12
15	Sea worthy rust preventive fluid to PRQA:524 (Latest) for other components	10	1	--	--	Amber	--	Brush/ Spray	12

ANNEXURE V

GOOD PAINTING PRACTICES (DO's and DON'Ts IN PAINTING):

1.0 Do's:

a) Remember, painting is an important value adding activity. Give it all your care.
b) Store paints in covered places. Avoid direct exposure to sunlight on paints.
c) Ensure the validity of the shelf life of the paint before use.
d) Roll the paint drum several times to ensure thorough mixing of the paint before use.
e) Use proper tools to open lid of the drum.
f) Mix the paints thoroughly to ensure homogeneity.
g) Apply strip coat on edges, corners and weld beads.
h) Follow instructions on the paint can or literature whenever a new scheme/ source of paint is used.
i) Draw only the required quantity of the paint for the job and immediately recap the can.
j) Ensure proper ratio of mixing in case of two pack system, as per norms.
k) Use only the specified thinner prescribed by the supplier or standard.
l) Ensure good quality of compressed air (free from moisture and oil) prior to spray painting.
m) Use only clean/ new brushes of definite size for painting.
n) Clean the bristles well in the thinner before they are used for the painting.
o) Painting shall be done in a well-ventilated area/ identified area
p) Ensure proper surface preparation as per the painting scheme.
q) Ensure that the blasted surface be painted within 4 hours after blasting.
r) Ensure that the surface to be painted is free from oil, grease, stay arcs, dents etc.
s) Adhere to the number of coats shade, dry film thickness and inter-coat curing time interval as specified. Clarify with lab, if needed.
t) Use lint free cloth/ clean wiping rags for cleaning the surfaces prior to the painting.
u) Maintain the right distance between the surface and spray gun (6 inches to 8 inches)
v) Ensure that the mixed paints will be used before the expiry of its pot life in case of two-pack systems.
w) Ensure that the items to be painted are inspected and cleared by the inspection personnel concerned.
x) Preserve the balance thinned paints in a separate closed container for future use, if they don't have any restricted pot life.
y) Clean the brush before and immediately after painting. Keep them clean during interruptions too.

2.0 Don'ts:

a) Do not use the paint, which has crossed its expiry date.
b) Do not draw more paint than necessary from the stores.
c) Do not make holes in the drum to draw the paint.
d) Do not keep the paint drum open for a long time.
e) Do not interchange the thinners for the same generic paint between suppliers.
f) Do not use kerosene as thinner.
g) Do not smoke while painting.
h) DO not leave the brush without cleaning after painting.
i) Do not paint close to a welding area.
j) Do not paint when there is rain or sandstorm or when the relative humidity is about 90%.
k) Do not paint when the metal is chill (temp< (dew point+3°C) or very hot (>48°c)
l) Do not paint when the surface is not cleaned/ prepared for painting requirements.
m) Do not paint the finish coat if the primer coat is not satisfactory.
n) Do not leave the balance paint open after painting.
o) Do not use VCI pellets for stainless steel components and its composite assemblies.

3.0 CLEANING OF PAINTED & RUST PREVENTIVE COATED SURFACES

Wherever required, paints and rust preventive protection can be removed either by using the following commercial solvents or by flame cleaning/ blasting

For rust preventive	Acetone, Methyl Ethyl ketone or Tri-chloro Ethylene
For all paints	Alkaline paint strippers or Solvent based paint strippers

4.0 SURFACE PREPARATION

- Surfaces of components shall be thoroughly cleaned before the application of primer paint and shall be free from grease, oil, rust, weld slag, spatters etc.
- Abrasive blast cleaning to SSPC SP6 (Sa 2) grade shall be done to prepare the surfaces of hot worked pipes prior to application of primer.
- A comparative chart indicating the surface preparation standard equivalents is given below for ready reference.

DESCRIPTION	SSPC SCHEME	SWEDISH STANDARD SIS - 05 - 5900
Solvent cleaning	SSPC- SP 1	-
Hand tool cleaning	SSPC- SP 2	St2
Power tool cleaning	SSPC- SP 3	St3
Flame cleaning	SSPC- SP 4	F1
Blast cleaning to White metal	SSPC- SP 5	Sa3
Commercial blast cleaning	SSPC- SP 6	Sa2
Brush off blast cleaning	SSPC- SP 7	Sa1
Pickling	SSPC- SP 8	-
Blast cleaning to near white metal	SSPC- SP 10	Sa 2½

5.0 APPLICATION OF PAINT

a) Primer paint shall be applied immediately or within 4 hours in the case of shot blast cleaning and within 8 hours for mechanical cleaning.
b) Wherever tubes/ pipes are not either shot blasted or heat treated during manufacture, the rust preventive coating provided by the tube/ pipe mill shall be treated as base for primer coating for subsequent painting of alkyd base paints like one coat of red oxide zinc phosphate (when called for). When special paint is specified in the painting scheme, the existing rust preventive fluid is to be removed by blast cleaning. However, rusted areas are to be cleaned free of oil, grease, rust etc. thoroughly using emery paper/wire brush and making rust preventive coated surfaces coarse.
c) Ready mixed paints shall be used as supplied by the supplier without any addition of thinner unless otherwise specified. Two pack systems are to be used as per supplier's instructions.
d) Wherever second coat of finish coat is to be applied in succession, 24 hours minimum drying time shall be provided between each coat for single pack paints. For two-pack system refer paint supplier's catalogue.
e) No painting is required in case of Stainless Steel, Aluminium and Galvanized components, unless otherwise specified in contracts.
f) For all machined components, rust preventive fluids shall be applied.
g) All weld edge preparations for site welding shall be applied with one coat of weldable primer. For small components having weld ends on both sides, full surface can be painted with weldable primer.
h) Part processed items meant for shop assembly shall be painted at sub-contractors works with primer/ special paints (when called for in the painting scheme) based on the scope

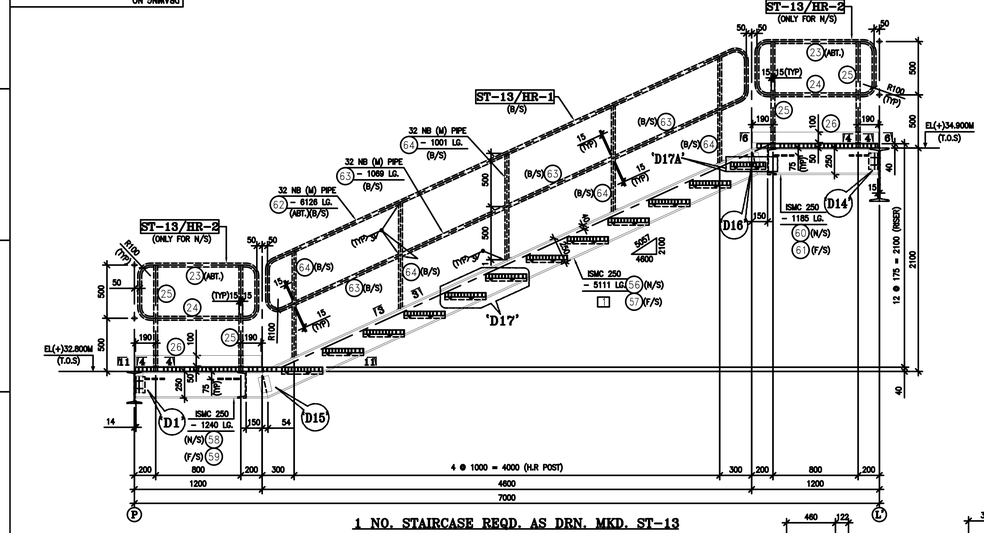
of the indent/ purchase order. Further paint touchup/ Coating shall be given appropriately during assembly.

i) For items meant for Spares and subcontracting where no further processing is involved, the painting scheme selected shall be the same as that of similar product configuration / description and not with respect to PGMA. All running meter items for spares one coat of red oxide primer and two coats of Synthetic enamel paint to IS 2932 (Latest) shall be supplied.

j) Assemblies consisting of machined components and special equipments shall not be shot blasted wherever it may affect the system. In such cases power tool cleaning may be adopted for the localized areas only.

DRAWING NO. 0-CC-309-01177

All dimensions are in millimetres



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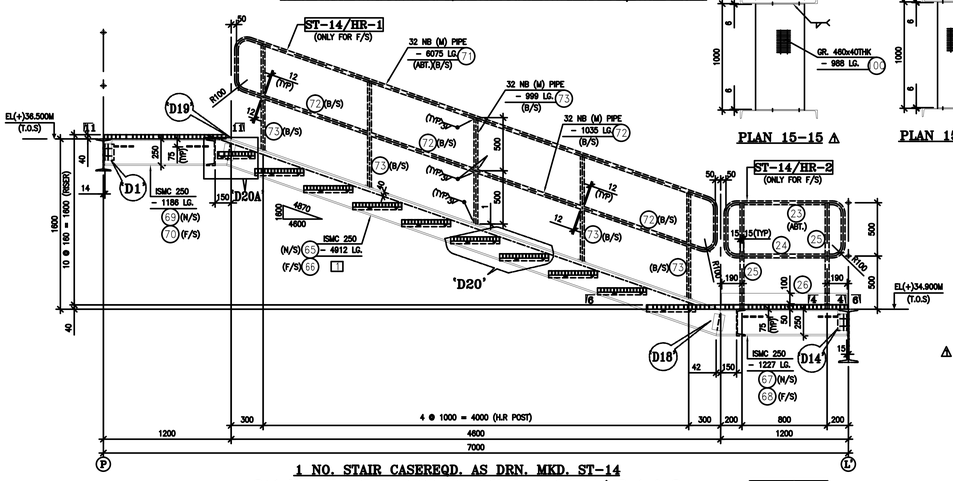
2+2 Nos. HANDRAIL REQD. AS DRN. MKD. ST-13/HR-1 & 2



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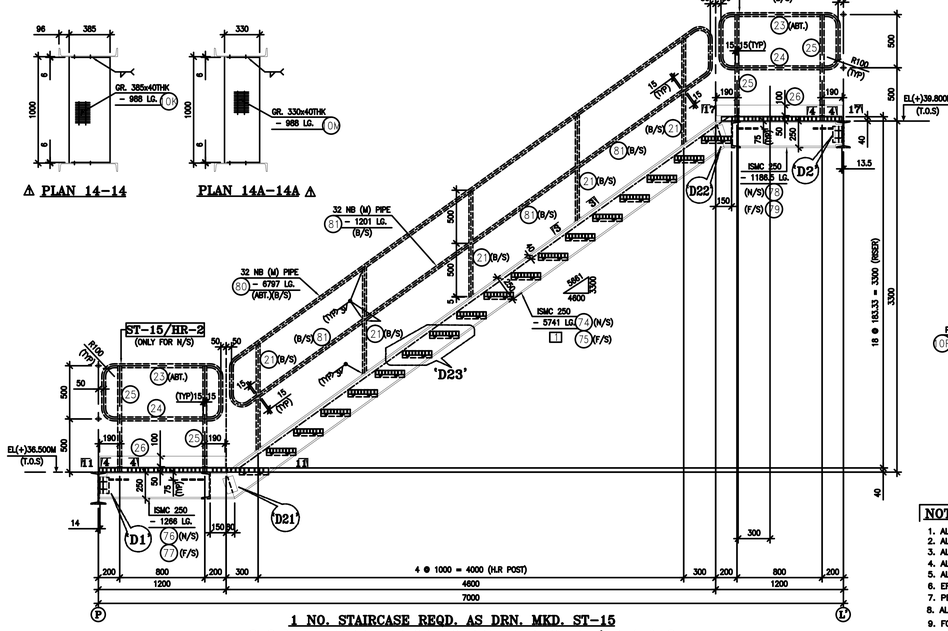

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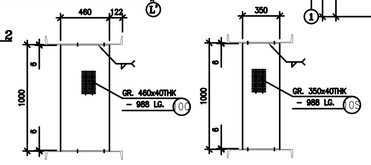
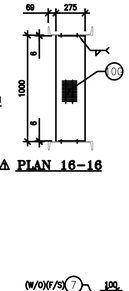


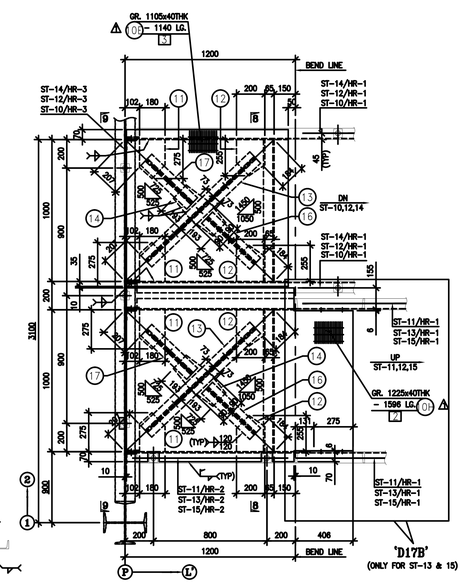
PLAN 15-15 ⚠

PLAN 15A-15A ⚠

⚠ PLAN 14-14 PLAN 14A-14A ⚠



⚠ PLAN 16-16



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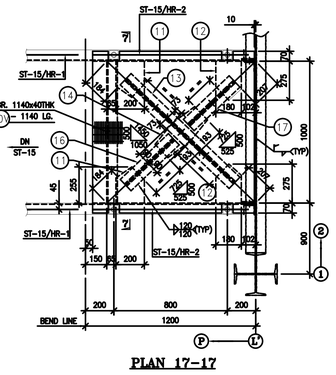
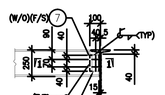


PLAN 17-17



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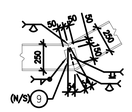

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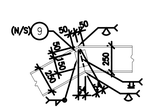

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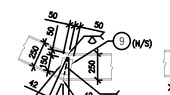

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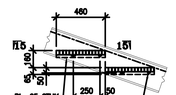

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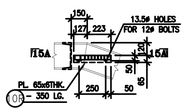

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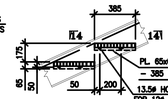

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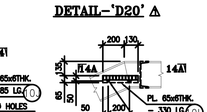

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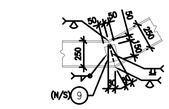

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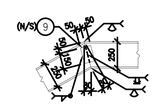

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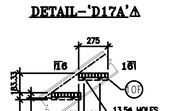

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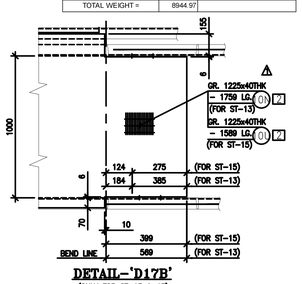


DETAIL-'D17B'
(ONLY FOR ST-13 & 15)

NOTES:-

1. ALL DIMENSIONS ARE IN MM. & LEVELS ARE IN M.
2. ALL ERECTION HOLES ARE 17.5ø FOR M-16 BOLTS U.N.O.
3. ALL PERMANENT HOLES ARE 17.5ø FOR M-16 BOLTS U.N.O.
4. ALL MEMBERS AND GUSSETS PLATES TO BE CUT AFTER FULL SCALE SHOP LAYOUT BEFORE FABRICATION
5. ALL SHOP WELD ARE 6mm. THICK AND SITE WELD ARE 8mm. THICK. U.N.O.
6. ERECTION HOLES SHOWN THUS ——|——
7. PERMANENT HOLES SHOWN THUS ——+——
8. ALL ERECTION BOLTS SHALL BE RETAINED IN POSITION
9. FOR MARKING REF. DRG. NO. ASTHA-BHEL-TP-39-FB-001 REV-0
10. THIS DRG. SHALL BE READ IN CONJUNCTION WITH DRG. NO. ASTHA-BHEL-TP-39-FB-005 REV-0

THIS DRAWING SHOULD BE READ ALONG WITH
0-CC-309-01175 TO 0-CC-309-01176
0-CC-309-01178 TO 0-CC-309-01180

CONT. PART - 1 BILL OF MATERIALS

ERECTION MKD.		ITEM NO.	SECTION	LENGTH IN mm.	NOS. REQD.	UNIT WT. (Kgs.)	TOTAL WT. (Kgs.)	QTY. REQD.	EREC. MKD. WT. (Kgs.)	REMARKS
ST-12/HR - 1		54	32 NB (M) PIPE	6593	1	3.15	20.77			
		55	32 NB (M) PIPE	1152	4	3.15	14.52			
		39	32 NB (M) PIPE	1004	5	3.15	15.81			
		22	PL.60x8	80	5	62.80	1.51			
							52.60	2	105.21	
ST-12/HR - 2			MATE. SAME AS ST-9/HR - 2				21.70			
							21.70	1	21.70	
ST-12/HR - 3			MATE. SAME AS ST-9/HR - 3				36.69			
							36.69	1	36.69	
ST - 13			MATE. SAME AS ST-9 PART MKD. 1 EXCL. ITEM NO - 1 TO 6,10 & 10A				151.74			
		56	ISMC 250	5111	1	30.60	156.40			
		57	ISMC 250	5111	1	30.60	156.40			
		58	ISMC 250	1240	1	30.60	37.94			
		59	ISMC 250	1240	1	30.60	37.94			
	B	60	ISMC 250	1185	1	30.60	36.26			
		61	ISMC 250	1185	1	30.60	36.26			
		10J	PL.65x6	385	20	47.10	23.57			
		10K	PL.385x40 THK.	988	10	58.50	222.52			
	⚠	10L	PL.65x6	385	2	47.10	2.36			
		10M	PL.385x40 THK.	988	1	58.50	22.25			
							883.65	1	883.65	
		10N	PL.1225x40 THK.	1759	1	58.50	126.05			
	⚠	10	PL.65x6	290	2	47.10	1.78			
		10C	PL.1140x40 THK.	1225	1	58.50	81.70			
							81.70	1	81.70	
ST-13/HR - 1		62	32 NB (M) PIPE	6126	1	3.15	19.30			
		63	32 NB (M) PIPE	1069	4	3.15	13.47			
		64	32 NB (M) PIPE	1001	5	3.15	15.77			
		22	PL.60x8	80	5	62.80	1.51			
							50.04	2	100.08	
ST-13/HR - 2			MATE. SAME AS ST-9/HR - 2				21.70			
							21.70	2	43.41	
ST-13/HR - 3			MATE. SAME AS ST-9/HR - 3				36.69			
							36.69	1	36.69	
ST - 14			MATE. SAME AS ST-9 PART MKD. 1 EXCL. ITEM NO - 1 TO 6,10 & 10A				151.74			
		65	ISMC 250	4912	1	30.60	150.31			
		66	ISMC 250	4912	1	30.60	150.31			
		67	ISMC 250	1227	1	30.60	37.55			
		68	ISMC 250	1227	1	30.60	37.55			
	B	69	ISMC 250	1186	1	30.60	36.29			
		70	ISMC 250	1186	1	30.60	36.29			
		10P	PL.65x6	460	16	47.10	22.53			
		10Q	PL.460x40 THK.	988	8	58.50	212.70			
	⚠	10R	PL.65x6	350	2	47.10	2.14			
		10S	PL.350x40 THK.	988	1	58.50	20.23			
							857.63	1	857.63	
		10T	PL.1225x40 THK.	1759	1	58.50	126.05			
	⚠	10P	PL.65x6	460	2	47.10	2.82			
							128.87	1	128.87	
		10E	PL.1105x40 THK.	1140	1	58.50	73.69			
							73.69	1	73.69	
ST-14/HR - 1		71	32 NB (M) PIPE	6075	1	3.15	19.14			
		72	32 NB (M) PIPE	1035	4	3.15	13.04			
		73	32 NB (M) PIPE	999	5	3.15	15.73			
		22	PL.60x8	80	5	62.80	1.51			
							49.42	2	98.84	
ST-14/HR - 2			MATE. SAME AS ST-9/HR - 2				21.70			
							21.70	1	21.70	
ST-14/HR - 3			MATE. SAME AS ST-9/HR - 3				36.69			
							36.69	1	36.69	
ST - 15			MATE. SAME AS ST-9 PART MKD. EXCL. ITEM NO - 1 TO 6,10 & 10A				151.74			
		74	ISMC 250	5741	1	30.60	175.67			
		75	ISMC 250	5741	1	30.60	175.67			
		76	ISMC 250	1266	1	30.60	38.74			
		77	ISMC 250	1266	1	30.60	38.74			
	B	78	ISMC 250	1186.5	1	30.60	36.31			
		79	ISMC 250	1186.5	1	30.60	36.31			
		10F	PL.65x6	275	34	47.10	28.63			
	⚠	10G	PL.275x40 THK.	988	17	58.50	270.21			
							952.02	1	952.02	
		10U	PL.1225x40 THK.	1589	1	58.50	113.87			
	⚠	10F	PL.65x6	275	2	47.10	1.68			
							115.56	1	115.56	
		10V	PL.1140x40 THK.	1140	1	58.50	76.03			
							76.03	1	76.03	
ST-15/HR - 1		80	32 NB (M) PIPE	6797	1	3.15	21.41			
		81	32 NB (M) PIPE	1201	4	3.15	15.13			
		21	32 NB (M) PIPE	1005	5	3.15	15.83			
		22	PL.60x8	80	5	62.80	1.51			
							53.88	2	107.76	
ST-15/HR - 2			MATE. SAME AS ST-9/HR - 2				21.70			
							21.70	3	65.11	

GRAND TOTAL WEIGHT = 8,944.97 Kgs = 8.945 T ⚠

ABSTRACT ⚠

SL. NO.	SECTION	TOTAL WT. (Kgs.)	MATERIALS SPECIFICATION
1	ISMC 250	3790.76	
2	L 75x75x8	37.02	IS : 2062-2006 (GR E250-A)
3	L 50x50x6	248.47	
4	32 NB (M) PIPE	1050.50	IS : 1161 (YST-240)
5	FL. 100x6	128.87	
6	GR. 40 THK.	3105.44	
7	PL. 10 THK.	347.65	IS : 2062-2006 (GR E250-A)
8	PL. 8 THK.	30.60	
9	PL. 6 THK.	199.67	
TOTAL WEIGHT =		8944.97	

BILL OF MATERIALS

ERECTION MKD.	PART MKD.	ITEM NO.	SECTION	LENGTH IN mm.	NOS. REQD.	UNIT WT. (Kgs.)	TOTAL WT. (Kgs.)	QTY. REQD.	EREC. MKD. WT. (Kgs.)	REMARKS
ST - 9		1	ISMC 250	5638	1	30.60	172.52			
		2	ISMC 250	5638	1	30.60	172.52			
		3	ISMC 250	1263	1	30.60	38.65			
		4	ISMC 250	1263	1	30.60	38.65			
		5	ISMC 250	1186.5	1	30.60	36.31			
		6	ISMC 250	1186.5	1	30.60	36.31			
		7	L 75x75x8	150	4	8.90	5.34			
		8	PL 95x10	150	4	78.50	4.47			
		9	PL 100x10	150	4	78.50	4.71			
		10	PL 65x6	290	30	47.10	26.64			
	⚠	10A	PL 290x40 THK	988	15	58.50	251.42			
		11	PL 180x10	275	4	78.50	15.54			
		12	PL 200x10	255	4	78.50	16.01			
		13	L 50x50x6	1059	4	4.50	19.06			
		14	PL 180x10	255	2	78.50	7.21			
		15	PL 40x10	70	8	78.50	1.76			
		16	L 50x50x6	468	4	4.50	8.42			
		17	L 50x50x6	445	4	4.50	8.01			
		18	ISMC 250	1000	2	30.60	61.20			
							924.75	1	924.75	
	⚠	10B	PL 1225x40 THK	1610	1	58.50	115.38			
	⚠	10	PL 65x6	290	2	47.10	1.78			
							117.15	1	117.15	
	⚠	10C	PL 1140x40 THK	1225	1	58.50	81.70			
							81.70	1	81.70	
ST-9/HR - 1		19	32 NB (M) PIPE	6706	1	3.15	21.12			
		20	32 NB (M) PIPE	1179	4	3.15	14.86			
		21	32 NB (M) PIPE	1005	5	3.15	15.83			
		22	PL 60x8	80	5	62.80	1.51			
							53.32	2	106.63	
ST-9/HR - 2		23	32 NB (M) PIPE	2228	1	3.15	7.02			
		24	32 NB (M) PIPE	770	1	3.15	2.43			
		25	32 NB (M) PIPE	992	2	3.15	6.25			
		26	FL. 100x6	1180	1	4.71	5.56			
		27	PL 60x8	60	2	62.80	0.45			
							21.70	2	43.41	
ST-9/HR - 3		28	32 NB (M) PIPE	3428	1	3.15	10.80			
		25	32 NB (M) PIPE	992	3	3.15	9.37			
		27	PL 60x8	60	3	62.80	0.68			
		29	32 NB (M) PIPE	870	2	3.15	5.48			
		30	FL. 100x6	2200	1	4.71	10.36			
							36.69	1	36.69	
ST - 10			MATE. SAME AS ST-9 EXCL. PART MKD. 1 ITEM NO - 1 TO 6,10 & 10A				151.74			
		31	ISMC 250	5497	1	30.60	168.21			
		32	ISMC 250	5497	1	30.60	168.21			
		33	ISMC 250	1186.5	1	30.60	36.31			
		34	ISMC 250	1186.5	1	30.60	36.31			
		35	ISMC 250	1186	1	30.60	36.29			
		36	ISMC 250	1186	1	30.60	36.29			
	⚠	10	PL 65x6	290	30	47.10	26.64			
	⚠	10A	PL 290x40 THK	988	15	58.50	251.42			
							911.41	1	911.41	
	⚠	10D	PL 1105x40 THK	1610	1	58.50	104.07			
	⚠	10	PL 65x6	290	2	47.10	1.78			
							105.85	1	105.85	
	⚠	10E	PL 1105x40 THK	1140	1	58.50	73.69			
							73.69	1	73.69	
ST-10/HR - 1		37	32 NB (M) PIPE	6581	1	3.15	20.73			
		38	32 NB (M) PIPE	1149	4	3.15	14.48			
		39	32 NB (M) PIPE	1005	5	3.15	15.83			
		22	PL 60x8	80	5	62.80	1.51			
							52.54	2	105.09	
ST-10/HR - 2			MATE. SAME AS ST-9/HR - 2				21.70			
							21.70	1	21.70	
ST-10/HR - 3			MATE. SAME AS ST-9/HR - 3				36.69			
							36.69	1	36.69	
ST - 11			MATE. SAME AS ST-9 PART MKD. 1 EXCL. ITEM NO - 1 TO 8,10 & 10A				141.93			
		40	ISMC 250	5623	1	30.60	172.06			
		41	ISMC 250	5623	1	30.60	172.06			
		42	ISMC 250	1262	1	30.60	38.62			
		43	ISMC 250	1262	1	30.60	38.62			
		44	ISMC 250	1187	1	30.60	36.32			
		45	ISMC 250	1187	1	30.60	36.32			
		10F	PL 65x6	275	32	47.10	26.94			
	⚠	10G	PL 275x40 THK	988	16	58.50	254.31			
		7	L 75x75x8	150	2	8.90	2.67			
		8	PL 95x10	150	2	78.50	2.24			
		7A	L 75x75x8	140	2	8.90	2.49			
		8A	PL 95x10	140	2	78.50	2.09			
	⚠						926.67	1	926.67	
		10H	PL 1225x40 THK	1596	1	58.50	114.37			
	⚠	10F	PL 65x6	275	2	47.10	1.68			
							116.06	1	116.06	
	⚠	10C	PL 1140x40 THK.	1225	1	58.50	81.70			
							81.70	1	81.70	
ST-11/HR - 1		46	32 NB (M) PIPE	6580	1	3.15	20.73			
		47	32 NB (M) PIPE	1176	4	3.15	14.82			
		21	32 NB (M) PIPE	1005	5	3.15	15.83			
		22	PL 60x8	80	5	62.80	1.51			
							52.88	2	105.76	
ST-11/HR - 2			MATE. SAME AS ST-9/HR - 2				21.70			
							21.70	2	43.41	
ST-11/HR - 3			MATE. SAME AS ST-9/HR - 3				36.69			
							36.69	1	36.69	
ST - 12			MATE. SAME AS ST-9 PART MKD. 1 EXCL. ITEM NO - 1 TO 8 ,10 & 10A				141.93			
		48	ISMC 250	5510	1	30.60	168.61			
		49	ISMC 250	5510	1	30.60	168.61			
		50	ISMC 250	1259	1	30.60	38.53			
		51	ISMC 250	1259	1	30.60	38.53			
		52	ISMC 250	1186	1	30.60	36.29			
		53	ISMC 250	1186	1	30.60	36.29			
	⚠	10F	PL 65x6	275	32	47.10	26.94			
		10G	PL 275x40 THK	988	16	58.50	254.31			
		7	L 75x75x8	150	2	8.90	2.67			
		8	PL 95x10	150	2	78.50	2.24			
		7A	L 75x75x8	140	2	8.90	2.49			
		8A	PL 95x10	140	2	78.50	2.09			
	⚠						919.51	1	919.51	
	⚠	10D	PL 1105x40 THK	1610	1	58.50	104.07			
	⚠	10	PL 65x6	290	2	47.10	1.78			
							105.85	1	105.85	
	⚠	10E	PL 1105x40 THK	1140	1	58.50	73.69			
							73.69	1	73.69	

REV	DATE	ALTERED/CHECKED
01	26/07/18	ALTERED R.A.M
ZONE		GRATING SUPPORT MODIFIED

CAUTION: The information in this drawing is the property of BHARAT HEAVY ELECTRICALS LTD. It is not to be used directly or indirectly to the detriment of the company.

TYPE OF PRODUCT
OR NAME OF
CUSTOMER/PROJECT

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

	NAME	SIGN	DATE	HOLOGRAM
DRN	R.A.M.		07/07/18	-
2nd	B.V.REDDY		07/07/18	-
APPD	C.GANESH		07/07/18	-

DEPT	GRADE OF UNTOL.DIM	SCALE	WEIGHT (Kg).	REF. TO ASSY/OLD DRG.	mm m.	no. of SHTS
AGCS		1:20	-	-	-	-
CODE 882	PR.AQ.500					

TITLE
TRANSFER POINT-3B
DETAIL OF STAIR CASE MKD. ST-13 TO ST-15 WITH B.O.M.

CARD CODE U 01

DRAWING NO. 0-CC-309-01177

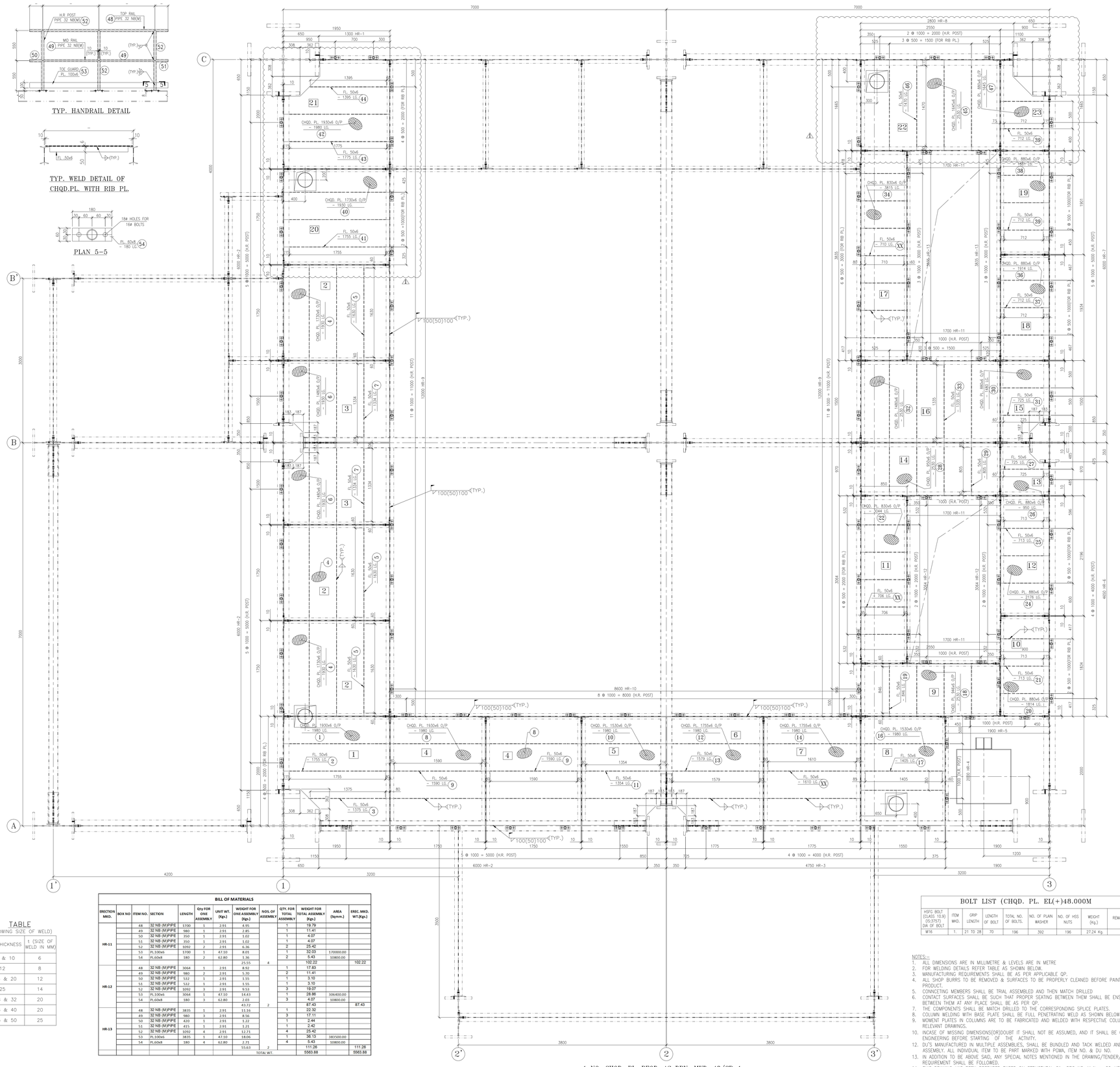
REV 01

Size A0

TYP. HANDRAIL DETAIL

TYP. WELD DETAIL OF CHQD.PL. WITH RIB PL.

PLAN 5-5



BILL OF MATERIALS

ERECTION MKD.	BOX NO	ITEM NO.	SECTION	LENGTH	QTY FOR ONE ASSEMBLY	UNIT WT. (Kgs.)	WEIGHT FOR ONE ASSEMBLY (Kgs.)	NOS. OF ASSEMBLY	QTY. FOR TOTAL ASSEMBLY	WEIGHT FOR TOTAL ASSEMBLY (Kgs.)	AREA (Sqmm.)	EREC. MKD. WT.(Kgs.)
CHQD. PL. 48/CP-1	1	1	PL.1930x6 O/P	1980	1	53.20	183.60		1	183.60	3451219.13	
		2	FL. 50x6	1755	2	2.36	8.27		3	8.27		
		3	FL. 50x6	1375	1	2.36	3.24		3	3.24		
							195.11	1		195.11		195.11
	2	4	PL.1730x6 O/P	1930	1	53.20	177.63		1	532.89	3338900.00	
		5	FL. 50x6	1630	3	2.36	11.52		3	34.55		
							189.15	3		567.44		567.44
	3	6	PL.1480x6 O/P	1930	1	53.20	145.99		1	291.99	2744231.38	
		7	FL. 50x6	1334	3	2.36	9.42		3	18.85		
							155.42	2		310.84		310.84
	4	8	PL.1930x6 O/P	1980	1	53.20	203.30		1	406.60	3821400.00	
		9	FL. 50x6	1590	3	2.36	11.23		3	22.47		
							214.53	2		429.06		429.06
	5	10	PL.1530x6 O/P	1980	1	53.20	155.20		1	155.20	2917231.38	
		11	FL. 50x6	1354	3	2.36	9.57		3	9.57		
							164.76	1		164.76		164.76
	6	12	PL.1755x6 O/P	1980	1	53.20	178.90		1	178.90	3362731.38	
		13	FL. 50x6	1579	3	2.36	11.16		3	11.16		
							190.05	1		190.05		190.05
	7	14	PL.1755x6 O/P	1980	1	53.20	184.86		1	184.86	3474900.00	
		15	FL. 50x6	1610	3	2.36	11.37		3	11.37		
							196.24	1		196.24		196.24
	8	16	PL.1530x6 O/P	1980	1	53.20	161.16		1	161.16	3029400.00	
		17	FL. 50x6	1405	3	2.36	9.93		3	9.93		
							171.09	1		171.09		171.09
	9	18	PL.946x6 O/P	2530	1	53.20	127.33		1	127.33	2393380.00	
		19	FL. 50x6	846	3	2.36	5.98		3	5.98		
							133.30	1		133.30		133.30
	10	20	PL.880x6 O/P	1814	1	53.20	84.92		1	84.92	1596320.00	
		21	FL. 50x6	713	3	2.36	5.04		3	5.04		
							89.96	1		89.96		89.96
	11	22	PL.830x6 O/P	3044	1	53.20	134.41		1	134.41	2526520.00	
		23	FL. 50x6	706	3	2.36	4.99		3	4.99		
							139.40	1		139.40		139.40
	12	24	PL.880x6 O/P	2176	1	53.20	101.87		1	101.87	1914880.00	
		25	FL. 50x6	713	3	2.36	5.04		3	5.04		
							106.91	1		106.91		106.91
	13	26	PL.880x6 O/P	950	1	53.20	38.51		1	38.51	723831.38	
		27	FL. 50x6	725	3	2.36	5.12		3	5.12		
							43.63	1		43.63		43.63
	14	28	PL.950x6 O/P	2530	1	53.20	127.87		1	127.87	2403500.00	
		29	FL. 50x6	805	3	2.36	5.69		3	5.69		
							133.55	1		133.55		133.55
	15	30	PL.880x6 O/P	1480	1	53.20	63.32		1	63.32	1190231.38	
		31	FL. 50x6	725	3	2.36	5.12		3	5.12		
							68.44	1		68.44		68.44
	16	32	PL.1480x6 O/P	2530	1	53.20	199.20		1	199.20	3744400.00	
		33	FL. 50x6	1335	3	2.36	9.43		3	9.43		
							208.63	1		208.63		208.63
	17	34	PL.830x6 O/P	3815	1	53.20	168.46		1	168.46	3166450.00	
		35	FL. 50x6	710	7	2.36	11.70		3	11.70		
							180.16	1		180.16		180.16
	18	36	PL.880x6 O/P	1914	1	53.20	89.61		1	89.61	1684320.00	
		37	FL. 50x6	712	3	2.36	5.03		3	5.03		
							94.64	1		94.64		94.64
	19	38	PL.880x6 O/P	1881	1	53.20	88.06		1	88.06	1655280.00	
		39	FL. 50x6	712	3	2.36	5.03		3	5.03		
							93.09	1		93.09		93.09
	20	40	PL.1730x6 O/P	1930	1	53.20	169.12		1	169.12	3338900.00	
		41	FL. 50x6	1755	3	2.36	12.40		3	12.40		
							181.52	1		181.52		181.52
	21	42	PL.1930x6 O/P	1980	1	53.20	183.60		1	183.60	3451219.13	
		43	FL. 50x6	1775	2	2.36	8.36		2	8.36		
		44	FL. 50x6	1395	1	2.36	3.29		1	3.29		
							195.25	1		195.25		195.25
	22	45	PL.1645x6 O/P	2530	1	53.20	212.90		1	212.90	4161850.00	
		46	FL. 50x6	1470	4	2.36	13.85		4	13.85		
							226.75	1		226.75		226.75
	23	47	PL.880x6 O/P	1645	1	53.20	57.32		1	57.32	1077419.13	
		39	FL. 50x6	712	2	2.36	3.35		2	3.35		
							60.67	1		60.67		60.67
HR-1		48	32 NB (M)PIPE	1275	1	2.91	3.71		1	3.71		
		49	32 NB (M)PIPE	680	1	2.91	1.98		1	1.98		
		50	32 NB (M)PIPE	275	1	2.91	0.80		1	0.80		
		51	32 NB (M)PIPE	300	1	2.91	0.87		1	0.87		
		52	32 NB (M)PIPE	1092	2	2.91	6.36		2	6.36		
		53	PL.100x6	1275	1	47.10	6.01		1	6.01	127500.00	
		54	PL.60x8	180	2	62.80	1.36		2	1.36	10800.00	
							21.08	1		21.08		21.08
HR-2		48	32 NB (M)PIPE	5950	1	2.91	17.31		1	51.94		
		49	32 NB (M)PIPE	980	5	2.91	14.26		5	42.78		
		50	32 NB (M)PIPE	475	1	2.91	1.38		1	4.15		
		51	32 NB (M)PIPE	475	1	2.91	1.38		1	4.15		
		52	32 NB (M)PIPE	1092	6	2.91	19.07		6	57.20		
		53	PL.100x6	5950	1	47.10	28.02		1	84.07	595000.00	
		54	PL.60x8	180	6	62.80	4.07		6	12.21	10800.00	
							85.50	3		256.49		256.49
HR-3		48	32 NB (M)PIPE	4725	1	2.91	13.75		1	13.75		
		49	32 NB (M)PIPE	980	4	2.91	11.41		4	11.41		
		50	32 NB (M)PIPE	350	1	2.91	1.02		1	1.02		
		51	32 NB (M)PIPE	375	1	2.91	1.09		1	1.09		
		52	32 NB (M)PIPE	1092	5	2.91	15.89		5	15.89		
		53	PL.100x6	4725	1	47.10	22.25		1	22.25	472500.00	
		54	PL.60x8	180	5	62.80	3.39		5	3.39	10800.00	
							68.80	1		68.80		68.80
HR-4		48	32 NB (M)PIPE	2000	1	2.91	5.82		1	5.82		
		49	32 NB (M)PIPE	980	1	2.91	2.85		1	2.85		
		50	32 NB (M)PIPE	500	1	2.91	1.46		1	1.46		
		51	32 NB (M)PIPE	500	1	2.91	1.46		1	1.46		
		52	32 NB (M)PIPE	1092	2	2.91	6.36		2	6.36		
		53	PL.100x6	2000	1	47.10	9.42		1	9.42	200000.00	
		54	PL.60x8	180	2	62.80	1.36		2	1.36	10800.00	
							28.71	1		28.71		28.71
HR-5		48	32 NB (M)PIPE	1900	1	2.91	5.53		1	5.53		
		49	32 NB (M)PIPE	980	1	2.91	2.85		1	2.85		
		50	32 NB (M)PIPE	450	1	2.91	1.31		1	1.31		
		51	32 NB (M)PIPE	450	1	2.91	1.31		1	1.31		
		52	32 NB (M)PIPE	1092	2	2.91	6.36		2	6.36		
		53	PL.100x6	1900	1	47.10	8.95		1	8.95	190000.00	
		54	PL.60x8	180	2	62.80	1.36		2	1.36	10800.00	
							27.66	1		27.66		27.66
HR-6		48	32 NB (M)PIPE	4625	1	2.91	13.46		1	13.46		
		49	32 NB (M)PIPE	980	4	2.91	11.41		4	11.41		
		50	32 NB (M)PIPE	325	1	2.91	0.95		1	0.95		
		51	32 NB (M)PIPE	300	1	2.91	0.87		1	0.87		
		52	32 NB (M)PIPE	1092	5	2.91	15.89		5	15.89		
		53	PL.100x6	4625	1	47.10	21.78		1	21.78	462500.00	
		54	PL.60x8	180	5	62.80	3.39		5	3.39	10800.00	
							67.75	1		67.75		67.75
HR-7		48	32 NB (M)PIPE	5950	1	2.91	17.31		1	17.31		
		49	32 NB (M)PIPE	980	5	2.91	14.26		5	14.26		
		50	32 NB (M)PIPE	475	1	2.91	1.38		1	1.38		
		51	32 NB (M)PIPE	475	1	2.91	1.38		1	1.38		
		52	32 NB (M)PIPE	1092	6	2.91	19.07		6	19.07		
		53	PL.100x6	5950	1	47.10	28.02		1	28.02	595000.00	
		54	PL.60x8	180	6	62.80	4.07		6	4.07	10800.00	
							85.50	1		85.50		85.50
HR-8		48	32 NB (M)PIPE	2775	1	2.91	8.08		1	8.08		
		49	32 NB (M)PIPE	980	2	2.91	5.70		2	5.70		
		50	32 NB (M)PIPE	350	1	2.91	1.02		1	1.02		
		51	32 NB (M)PIPE	425	1	2.91	1.24		1	1.24		
		52	32 NB (M)PIPE	1092	3	2.91	9.53		3	9.53		
		53	PL.100x6	2775	1	47.10	13.07		1	13.07	277500.00	
		54	PL.60x8	180	3	62.80	2.03		3	2.03	10800.00	
							40.67	1		40.67		40.67
HR-9		48	32 NB (M)PIPE	12000	1	2.91	34.92		1	69.84		
		49	32 NB (M)PIPE	980	11	2.91	31.37		11	62.74		
		50	32 NB (M)PIPE	500	1	2.91	1.46		1	2.91		
		51	32 NB (M)PIPE	500	1	2.91	1.46		1	2.91		
		52	32 NB (M)PIPE	1092	12	2.91	38.13		12	76.27		
		53	PL.100x6	12000	1	47.10	56.52		1	113.04	1200000.00	
		54	PL.60x8	180	12	62.80	8.14		12	16.28	10800.00	
							171.99	2		343.98		343.98
HR-10		48	32 NB (M)PIPE	8600	1	2.91	25.03		1	25.03		
		49	32 NB (M)PIPE	980	8	2.91	22.81		8	22.81		
		50	32 NB (M)PIPE	300	1	2.91	0.87		1	0.87		
		51	32 NB (M)PIPE	300	1	2.91	0.87		1	0.87		
		52	32 NB (M)PIPE	1092	9	2.91	28.60		9	28.60		
		53	PL.100x6	8600	1	47.10	40.51		1	40.51	860000.00	
		54	PL.60x8	180	9	62.80	6.10		9	6.10	10800.00	
							124.80	1		124.80		124.80

BILL OF MATERIALS

ERECTION MKD.	BOX NO	ITEM NO.	SECTION	LENGTH	Qty FOR ONE ASSEMBLY	UNIT WT. (Kgs.)	WEIGHT FOR ONE ASSEMBLY (Kgs.)	NOS. OF ASSEMBLY	QTY. FOR TOTAL ASSEMBLY	WEIGHT FOR TOTAL ASSEMBLY (Kgs.)	AREA (Sqmm.)	EREC.MKD. WT.(Kgs.)
HR-11		48	32 NB (M)PIPE	1700	1	2.91	4.95		1	19.79		
		49	32 NB (M)PIPE	980	1	2.91	2.85		1	11.41		
		50	32 NB (M)PIPE	350	1	2.91	1.02		1	4.07		
		51	32 NB (M)PIPE	350	1	2.91	1.02		1	4.07		
		52	32 NB (M)PIPE	1092	2	2.91	6.36		2	25.42		
		53	PL.100x6	1700	1	47.10	8.01		1	32.03	170000.00	
		54	PL.60x8	180	2	62.80	1.36		2	5.43	10800.00	
							25.55	4		102.22		102.22
HR-12		48	32 NB (M)PIPE	3064	1	2.91	8.92		1	17.83		
		49	32 NB (M)PIPE	980	2	2.91	5.70		2	11.41		
		50	32 NB (M)PIPE	532	1	2.91	1.55		1	3.10		
		51	32 NB (M)PIPE	532	1	2.91	1.55		1	3.10		
		52	32 NB (M)PIPE	1092	3	2.91	9.53		3	19.07		
		53	PL.100x6	3064	1	47.10	14.43		1	28.86	306400.00	
		54	PL.60x8	180	3	62.80	2.03		3	4.07	10800.00	
							43.72	2		87.43		87.43
HR-13		48	32 NB (M)PIPE	3835	1	2.91	11.16		1	22.32		
		49	32 NB (M)PIPE	980	3	2.91	8.56		3	17.11		
		50	32 NB (M)PIPE	420	1	2.91	1.22		1	2.44		
		51	32 NB (M)PIPE	415	1	2.91	1.21		1	2.42		
		52	32 NB (M)PIPE	1092	4	2.91	12.71		4	25.42		
		53	PL.100x6	3835	1	47.10	18.06		1	36.13	383500.00	
		54	PL.60x8	180	4	62.80	2.71		4	5.43	10800.00	
							55.63	2		111.26		111.26
						TOTAL WT.				5563.88		5563.88

TABLE
(SHOWING SIZE OF WELD)

PL. THICKNESS	t (SIZE OF WELD IN MM)
8 & 10	6
12	8
16 & 20	12
25	14
28 & 32	20
36 & 40	20
45 & 50	25

1 NO. CHQD. PL. REQD. AS DRN. MKD. 48/CP-1
(AT FLOOR PLAN +48.000 m)

BOLT LIST (CHQD. PL. EL(+)48.000M

HSFG BOLT (CLASS 10.9) (IS:3757) DIA OF BOLT	ITEM MKD.	GRIP LENGTH	LENGTH OF BOLT	TOTAL NO. OF BOLTS.	NO. OF PLAIN WASHER	NO. OF HSS NUTS	WEIGHT (Kg.)	REMARKS
M16	1.	21 TO 28	70	196	392	196	27.24 Kg.	

NOTES:-
1. ALL DIMENSIONS ARE IN MILLIMETRE & LEVELS ARE IN METRE
2. FOR WELDING DETAILS REFER TABLE AS SHOWN BELOW.
3. MANUFACTURING REQUIREMENTS SHALL BE AS PER APPLICABLE QP.
4. ALL SHOP BURRS TO BE REMOVED & SURFACES TO BE PROPERLY CLEANED BEFORE PAINTING OF FINISHED PRODUCT.
5. CONNECTING MEMBERS SHALL BE TRIAL ASSEMBLED AND THEN MATCH DRILLED
6. CONTACT SURFACES SHALL BE SUCH THAT PROPER SEATING BETWEEN THEM SHALL BE ENSURED. THE GAP BETWEEN THEM AT ANY PLACE SHALL BE AS PER QP.
7. THE COMPONENTS SHALL BE MATCH DRILLED TO THE CORRESPONDING SPLICE PLATES.
8. COLUMN WELDING WITH BASE PLATE SHALL BE FULL PENETRATING WELD AS SHOWN BELOW.
9. MOMENT PLATES IN COLUMNS ARE TO BE FABRICATED AND WELDED WITH RESPECTIVE COLUMNS AS PER RELEVANT DRAWINGS.
10. INCASE OF MISSING DIMENSIONS(OR)DOUBT IT SHALL NOT BE ASSUMED, AND IT SHALL BE CLARIFIED WITH ENGINEERING BEFORE STARTING OF THE ACTIVITY.
11. DU'S MANUFACTURED IN MULTIPLE ASSEMBLIES, SHALL BE BUNDLED AND TACK WELDED AND SENT AS SINGLE ASSEMBLY. ALL INDIVIDUAL ITEM TO BE PART MARKED WITH PCMA, ITEM NO. & DU NO.
12. IN ADDITION TO BE ABOVE SAID, ANY SPECIAL NOTES MENTIONED IN THE DRAWING/TENDER/CONTRACT REQUIREMENT SHALL BE FOLLOWED.
13. THIS DRAWING HAS BEEN PREPARED BASED ON STRUCTURAL GA DRG NO: Maitree-00-UEF-LC-177105-ISG,
14. FOR STANDARD FABRICATION NOTES REFER **4-00-000-32487.**
15. GRATING/FLOOR GRILL/STEP TREAD IS IN SITE SCOPE.
16. HANDRAILS SHALL BE TRIMMED AT ENTRY LOCATIONS HOLLOW FACES SHALL CLOSED WITH FACE PLATE AT SITE.

	DATE	ALTERED	CHECKED	APPROVED	NOTE
2					
1					

PROJECT
2x660MW MAITREE SUPER THERMAL POWER PROJECT, RAMPAL, BANGLADESH
(EPC MAIN PLANT PACKAGE)

OWNER CONSULTANT:
FICHTNER
M/s FICHTNER GmbH & Co KG,
Stuttgart,GERMANY

OWNER:
BANGLADESH-INDIA FRIENDSHIP POWER COMPANY (PVT.) LIMITED, BANGLADESH

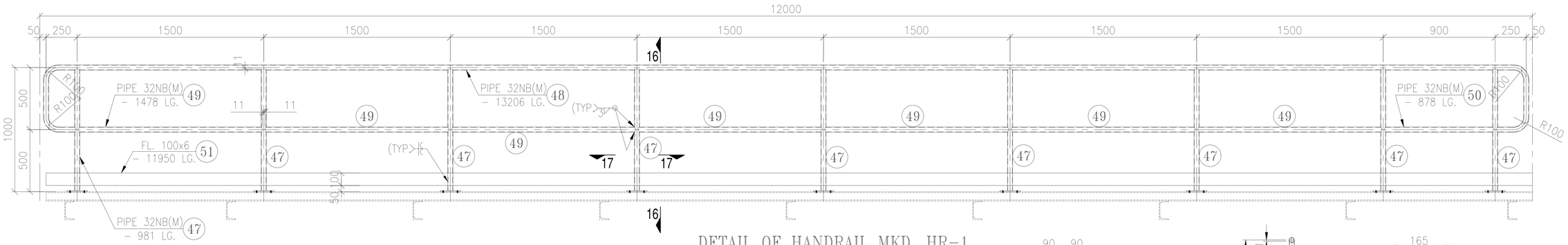
BHARAT HEAVY ELECTRICALS LTD
BOILER AUXILIARIES PLANT
RANIPET

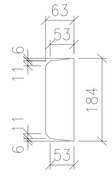
	DATE	NAME
DRAWN BY	07.11.2019	EOL/STRM.
DESIGN BY	25.10.2018	SUSHANTH
CHECKED BY	08.11.2019	J.MV/K.VENKAT
APPROVED BY	08.11.2019	MKNAHAK
SUPERSEDES:		
SUPERSEDED BY:		
SYSTEM:		

SCALE: SHEET 1 OF 1

TITLE
TRANSFER POINT-13
DETAIL OF CHQD. PL. MKD. 48/CP-1 WITH SECTION & B.O.M

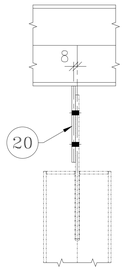
SIZE: A0	PROJECT NO.: 421	FILE: Maitree-00-UEF13-SME-FAB-160/R1
ANNEX:	DRAWING NO.:0-CC-538-02350	REV 00



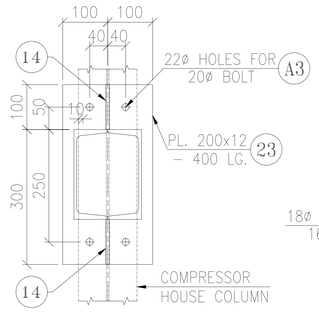


DETAIL OF ITEM NO. 24
(SCALE-1:10)

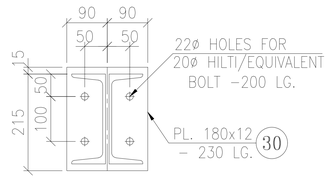
DETAIL OF HANDRAIL MKD. HR-1
(4 NOS. REQD. AS DRN.)
(SCALE 1:25)



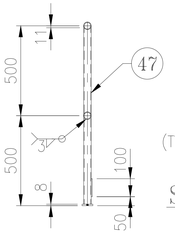
SECTION 9-9
(SCALE-1:10)



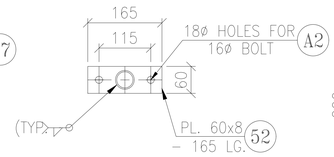
SECTION 10-10
(SCALE-1:10)



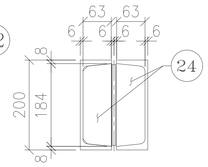
SECTION 13-13
(SCALE-1:10)



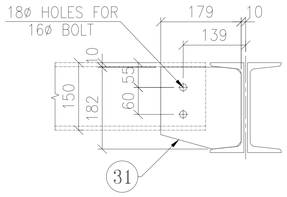
SECTION 16-16
(SCALE 1:10)



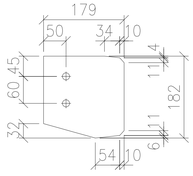
SECTION 17-17
(SCALE 1:10)



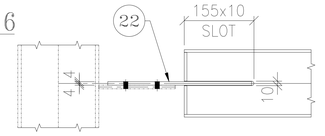
SECTION 12-12
(SCALE-1:10)



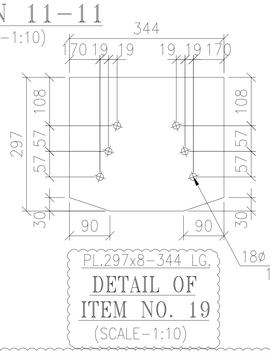
SECTION 14-14
(SCALE-1:10)



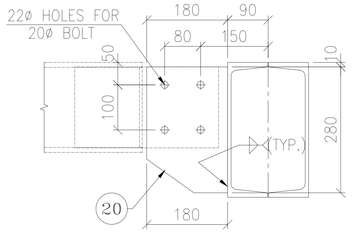
PL.179x8-182 LG.
DETAIL OF ITEM NO. 31
(SCALE-1:10)



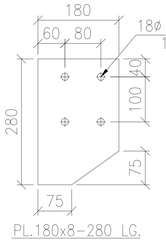
SECTION 11-11
(SCALE-1:10)



PL.297x8-344 LG.
DETAIL OF ITEM NO. 19
(SCALE-1:10)



SECTION 8-8
(SCALE-1:10)



PL.180x8-280 LG.
DETAIL OF ITEM NO. 20
(SCALE-1:10)

BILL OF MATERIAL:

EREC. MARK	ITEM MARK	SECTION	LENGTH (MM)	NOS.	UNIT WT. (KG)	TOTAL WT. (KG)	NOS. OF EREC. MKS.	GROSS WT. (KG)
SP/C-1	1	PL.400X25TH.	550	1	196.25	43.18		
	2	PL.60X12TH.	60	4	94.20	1.36		
	3	PL.150X8TH.	300	4	62.80	11.30		
	4	PL.125X8TH.	300	4	62.80	9.42		
	5	ISMC200	8792	2	22.30	392.12		
	6	PL.92X16TH.	150	2	125.60	3.47		
	7	PL.178X8TH.	506	1	62.80	5.66		
	8	PL.172X8TH.	275	1	62.80	2.97		
	9	PL.150X16TH.	200	1	125.60	3.77		
	10	ISA90X90X8	500	4	10.80	21.60		
	11	PL.180X8TH.	230	1	62.80	2.60		
						497.44	2	994.88
4.5/PRSB-1	13	ISMC300	2828	2	36.30	205.31		
	14	PL.100X8TH.	150	4	62.80	3.77		
	15	PL.274X8TH.	356	1	62.80	6.13		
	16	PL.110X8TH.	150	8	62.80	8.29		
	17	PL.400X16TH.	500	2	125.60	50.24		
						273.74	1	273.73
9/PRSB-1	18	ISMC300	2828	2	36.30	205.31		
	19	PL.297X8TH.	344	1	62.80	6.42		
	14	PL.100X8TH.	150	4	62.80	3.77		
	16	PL.110X8TH.	150	4	62.80	4.14		
	17	PL.400X16TH.	500	2	125.60	50.24		
	20	PL.180X8TH.	280	1	62.80	3.17		
						273.05	1	273.05
9/PRSB-2	21	ISMC200	2543	2	22.30	113.42		
	22	PL.180X8TH.	320	1	62.80	3.62		
	14	PL.100X8TH.	150	2	62.80	1.88		
	23	PL.200X12TH.	400	1	94.20	7.54		
	24	PL.63X6TH.	184	2	47.10	1.09		
						127.55	1	127.55
4.5/PRSBR-1 & 1X	25	ISA75X75X6	3786	2	6.80	51.49		
	26	PL.75X8TH.	95	5	62.80	2.24		
						53.73	2	107.45
4.5/PRSBR-2 & 2X	27	ISA75X75X6	4155	2	6.80	56.51		
	26	PL.75X8TH.	95	6	62.80	2.68		
						59.19	2	118.38
PSW-1 & 1X	28	ISMC200	11976	2	22.30	534.13		
	29	PL.200X8TH.	220	8	62.80	22.11		
	30	PL.180X12TH.	230	2	94.20	7.80		
	31	PL.179X8TH.	182	9	62.80	18.41		
						582.45	4	2329.79
PSW-2	32	ISMC150	1372	1	16.80	23.05		
						23.05	18	414.90
W-1	33	ISMC75	11980	2	7.14	171.07		
	34	ISA65X65X6	95	18	5.80	9.92		
	35	CH.PL.600X6TH.	1999	1	53.20	63.81		
	36	CH.PL.600X6TH.	1998	1	53.20	63.78		
	37	CH.PL.600X6TH.	1998	1	53.20	63.78		
	38	CH.PL.600X6TH.	1998	1	53.20	63.78		
	39	CH.PL.600X6TH.	1999	1	53.20	63.81		
	40	ISA50X50X6	538	5	4.50	12.11		
	41	PL.75X8TH.	150	10	62.80	7.07		
						519.11	2	1038.20
HR-1	47	TUBE32M	981	9	2.91	25.70		
	48	TUBE32M	13206	1	2.91	38.43		
	49	TUBE32M	1478	7	2.91	30.11		
	50	TUBE32M	878	1	2.91	2.56		
	51	PL.100X6TH.	11950	1	47.10	56.28		
	52	PL.60X8TH.	165	9	62.80	5.60		
						158.67	4	634.67
						TOTAL WT. (KG)		6312.60

SUMMARY:

SECTION	WT. (KG)
ISA50X50X6	24.22
ISA65X65X6	19.84
ISA75X75X6	216.00
ISA90X90X8	43.20
ISMC75	342.14
ISMC150	414.91
ISMC200	3034.18
ISMC300	410.62
PL.6TH.	226.21
PL.8TH.	313.44
PL.12TH.	41.46
PL.16TH.	114.96
PL.25TH.	86.36
CH.PL.6TH.	637.92
TUBE32M	419.08
TOTAL WT. (KG)	6344.54

NOTE
1) THIS DWG. IS TO BE READ IN CONJUNCTION WITH REFER DWG. NO. 0-CC-615-07127 – ISG DRG NO: RDA-BAN-COMH-1-F-01 (SHEET 1 OF 2)

LEGENDS:-
PL. – PLATE
THK. – THICKNESS
TYP. – TYPICAL
N.T.S –NOT TO SCALE
B.O.B.P –BOTTOM OF BASE PLATE
W.P – WORKING POINT
LG. – LENGTH
T.O.S – TOP OF STEEL

B.O.Q OF BOLT (GRADE-8.8)

HEXHEAD BOLT DIA OF BOLT	GRIP LENGTH	LENGTH OF BOLT	TOTAL NO. OF BOLTS.	NO. OF PLAIN WASHER (IS:6649)	NO. OF TAPPER WASHER (IS:5374)	NO OF HSS NUT	ITEM NO	REMARKS
16ø	24	55	24	24	–	24	A1	
16ø	16	45	224	152	72	224	A2	
20ø	22	60	4	4	–	4	A3	
16ø	20	50	24	24	–	24	A4	

NOTES:-
1. ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.
2. THIS DRAWING NOT TO BE SCALED,ONLY WRITTEN DIMENSIONS TO BE FOLLOWED.
3. ALL FILLET WELDS ARE 6mm FILLET WELDS U.N.O.
4. ALL BUTT WELDS SHALL BE PROVIDED WITH A SEALING RUN.
5. ALL GUSSET PLATES SHALL BE 8mm THK U.N.O.
6. ALL INCLINED MEMBERS AND GUSSET PLATES ARE TO BE CHECKED BY FULL SHOP LAYOUT.
8. NOT USED
9. ALL CONTACT SURFACES OF GUSSET PLATES HAVING ERECTION BOLTS. SHALL BE WELDED AFTER ERECTION AND ALIGNMENT.
10. FOR MARKING REFER DRG. NO.-RDA-BAN-COMH-1-M-01

REV.	DATE	ALTERED	CHECKED	APPROVED	NOTE

PROJECT
2x660MW MAITREE SUPER THERMAL POWER PROJECT, RAMPAL, BANGLADESH
(EPC MAIN PLANT PACKAGE)

OWNER CONSULTANT:
FICHTNER
M/s FICHTNER GmbH & Co KG,
Stuttgart,GERMANY

OWNER:
BANGLADESH-INDIA FRIENDSHIP POWER COMPANY (PVT.) LIMITED, BANGLADESH

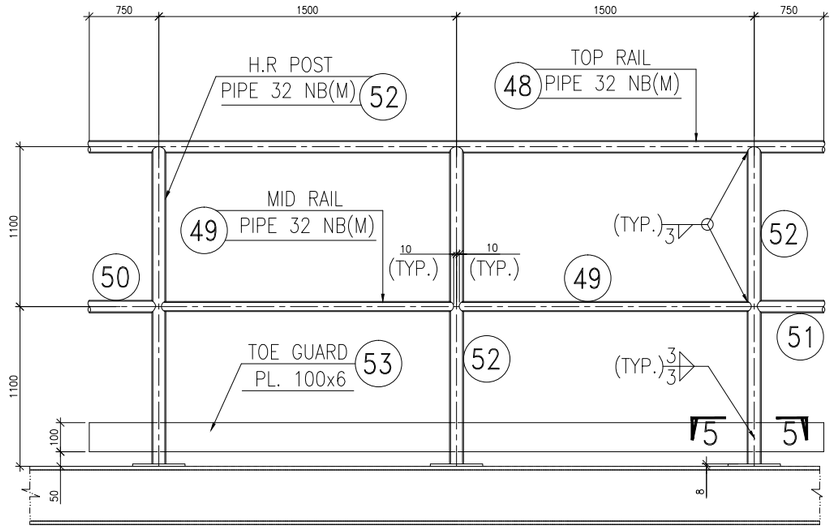
BHARAT HEAVY ELECTRICALS LTD
INDUSTRIAL SYSTEMS GROUP
BANGALORE

	DATE	NAME
DRAWN BY	06-08-2021	TAPAS
DESIGN BY	------	SHAIKH
CHECKED BY	06-08-2021	A.S
APPROVED BY	------	RKP/SCC
SUPERSEDES:		
SUPERSEDED BY:		
SYSTEM:		

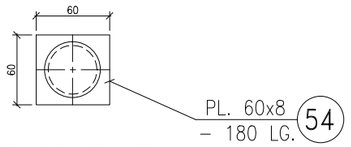
SCALE: 1:25,10
SHEET 2 OF 2

TITLE COMPRESSOR HOUSE-1
DETAIL OF DETAIL OF COLUMN & MONORAIL SUPPORTING BEAM
ISG DRG. NO: RDA-BAN-COMH-1-F-01, R1-23.08.21

SIZE: A1 | PROJECT NO.: 421 | FILE:
ANNEX: | DRAWING NO.: 1-CC-615-03073 | REV 0



TYP. HANDRAIL DETAIL



PLAN 5–5

NOTES:–

1. ALL DIMENSIONS ARE IN MILLIMETRE & LEVELS ARE IN METRE
2. FOR WELDING DETAILS REFER TABLE AS SHOWN BELOW.
3. MANUFACTURING REQUIREMENTS SHALL BE AS PER APPLICABLE QP.
4. ALL SHOP BURRS TO BE REMOVED & SURFACES TO BE PROPERLY CLEANED BEFORE PAINTING OF FINISHED PRODUCT.
5. CONNCETING MEMBERS SHALL BE TRIAL ASSEMBLED AND THEN MATCH DRILLED
6. CONTACT SURFACES SHALL BE SUCH THAT PROPER SEATING BETWEEN THEM SHALL BE ENSURED. THE GAP BETWEEN THEM AT ANY PLACE SHALL BE AS PER QP.
7. THE COMPONENTS SHALL BE MATCH DRILLED TO THE CORRESPONDING SPLICE PLATES.
8. COLUMN WELDING WITH BASE PLATE SHALL BE FULL PENETRATING WELD AS SHOWN BELOW.
9. MOMENT PLATES IN COLUMNS ARE TO BE FABRICATED AND WELDED WITH RESPECTIVE COLUMNS AS PER RELEVANT DRAWINGS.
10. INCASE OF MISSING DIMENSIONS(OR)DOUBT IT SHALL NOT BE ASSUMED, AND IT SHALL BE CLARIFIED WITH ENGINEERING BEFORE STARTING OF THE ACTIVITY.
12. DU'S MANUFACTURED IN MULTIPLE ASSEMBLIES, SHALL BE BUNDLED AND TACK WELDED AND SENT AS SINGLE ASSEMBLY. ALL INDIVIDUAL ITEM TO BE PART MARKED WITH PGMA, ITEM NO. & DU NO.
13. IN ADDITION TO BE ABOVE SAID, ANY SPECIAL NOTES MENTIONED IN THE DRAWING/TENDER/CONTRACT REQUIREMENT SHALL BE FOLLOWED.
14. THIS DRAWING HAS BEEN PREPARED BASED ON STRUCTURAL GA DRG NO: Maitree–00–UEF–LC–177097–ISG–0/R3 (SH. 1 TO 10)
15. FOR STANDARD FABRICATION NOTES REFER **4–00–000–32487.**
16. HANDRAILS SHALL BE TRIMMED AT ENTRY LOCATIONS HOLLOW FACES SHALL CLOSED WITH FACE PLATE AT SITE.
17. PACK PLATE SHALL BE PROVIDED WHERE TWIN ANGLE IS PROVIDED.

BILL OF MATERIALS

ERECTION MKD.	BOX NO	ITEM NO.	SECTION	LENGTH	Qty FOR ONE ASSEMBLY	UNIT WT. (Kgs.)	WEIGHT FOR ONE ASSEMBLY (Kgs.)
HR		48	32 NB (M)PIPE	4500	1	2.91	13.10
		49	32 NB (M)PIPE	1480	2	2.91	8.61
		50	32 NB (M)PIPE	740	1	2.91	2.15
		51	32 NB (M)PIPE	740	1	2.91	2.15
		52	32 NB (M)PIPE	1092	3	2.91	9.53
		53	PL.6X100	4500	1	21.20	21.20
		54	PL.60x8	60	3	62.80	0.68
							57.42

2					
1					
0	DATE	ALTERED	CHECKED	APPROVED	NOTE

PROJECT
2x660MW MAITREE SUPER THERMAL POWER PROJECT, RAMPAL, BANGLADESH
(EPC MAIN PLANT PACKAGE)

OWNER CONSULTANT:
FICHTNER
M/s FICHTNER GmbH
& Co KG,
Stuttgart,GERMANY

OWNER:
BANGLADESH–INDIA FRIENDSHIP POWER COMPANY (PVT.) LIMITED, BANGLADESH

BHARAT HEAVY ELECTRICALS LTD
BOILER AUXILARIES PLANT
RANIPET

SCALE:
SHEET 1 OF 1

	DATE	NAME
DRAWN BY	27.02.2021	J.MV
DESIGN BY	01.10.2019	SAI KUMAR
CHECKED BY	27.02.2021	J.MV/K.VENKAT
APPROVED BY	27.02.2021	BVR/MKN
SUPERSEDES:		
SUPERSEDED BY:		
SYSTEM:		

TITLE
HANDRAIL FOR TP–13
WITH BILL OF MATERIALS

SIZE: A1 | PROJECT NO.: 421 | FILE: AE–MAITREE–TP12–FAB–005
ANNEX: | DRAWING NO.: 3–CC–539–01606 | REV 0

SIZE-A3