Bharat Heavy Electricals Limited
Heavy Plates & Vessels Plant
Visakhapatnam – 530 012
Andhra Pradesh, INDIA

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INVITATION TO TENDER

Ref.: OS/24-25/7936,8032&8043/BS/22/022 **Date: 18.10.2024**

Sub: Fabrication of Bunker Structure against S.O. 7936, 8032 & 8043 inside the premises of BHEL- HPVP, Visakhapatnam

Dear Sir,

Sealed tenders are invited for the subject work in **two part bid** system from Vendors who are experienced in fabrication of similar jobs and fulfil the eligibility criteria specified below in clause-1. Scope of work and techno-commercial terms and conditions are as follows.

1. ELIGIBILITY CRITERIA:

1.1 Bidders must have an experience of successful completion of similar works i.e., **Fabrication of Structural items** during last 7 years ending 30.09.2024 for a minimum of one project. Bidders shall enclose Work Order, Work Completion Certificate and all other relevant documents from the customer in support of successful and satisfactory completion of the work.

1.2 Average Annual Financial Turnover of the bidder for the last 3 financial years should be a minimum of ₹ **37.50 Lakhs**. Bidders shall enclose Financial turnover certificate for previous three years issued by Chartered Accountant / Audited Profit & Loss Accounts, Balance Sheets and other necessary documents in support of the same.
In case audited financial statements are not available for latest financial year, then the applicable audited statements of preceding three financial years shall be considered.

1.3 Bidders shall also enclose the documents of Registration of Firm/ Factory License/ Certificate of Incorporation, EPF, ESI, PAN, GSTIN, Udyam Registration (if registered with MSME) etc.

1.4 The works executed in own name of the individual / firm of the tenderer will only be considered for eligibility criteria.

2. LOCATION OF WORK SPOT:

2.1) The fabrication work is to be carried out inside the premises of BHEL- HPVP, Visakhapatnam.

3. SCOPE OF WORK:

3.1 Fabrication of Bunker Structure of **620 MT approx.** which involves Marking, Cutting, Edge preparation, Pressing, machining, Drilling of holes, Assembly, Fit-up, Welding & dressing, NDT, Surface Preparation by Grit blast cleaning, Application of total no. of coats of Paints as per Painting Schedule, relevant Drawings, QAP, WPS, NDE procedures, Standards & Specifications etc.

3.2 Collection & Transportation of Free issue raw materials like Plates, rolled sections, structural items, Paints, BOCs etc., from HPVP shop / stores to fabrication yard, handing over of excess / balance materials at HPVP stores.

3.3 Rectification of Raw materials such as straightening etc., if any as per QAP / Drawings and rectification of defects, if any attributable to vendors, found after handing over to Logistics dept.

3.4 NDT is to be carried out as per approved QAP / drawings.

3.5 The fabricated items shall strictly conform to the dimensions and tolerances indicated in the drawings. It must be ensured that correct dimensions and deviations, if any, are recorded properly and is made available to BHEL officials or their authorized agencies.

3.6 Surface preparation by Grit Blast Cleaning and application of total no. of coats of Paints as per approved Painting Schedule / drawings **is to be carried out in a closed enclosure**. **Painting is to be carried out by Painters qualified by HPVP.** All tests required as per Project Specifications and BHEL Painting Procedure shall be carried out by a qualified agency for testing of painting and obtaining stage wise inspection clearance from HPVP (QC) / TPIA / customer as per approved drawing / QAP/ ITP. **Paints shall be issued as Free Issue material by BHEL-HPVP**.

3.7 All the Bed materials required for fabrication, Scaffolding materials like Pipes, Clamps, GI sheets etc. required for closed enclosure for blasting and painting of the items are to be arranged by the vendor at their cost.

3.8 Free issue materials should be collected within 3 days from the date of intimation by Outsourcing without failure. Any delay beyond 3 days shall be considered for levying of LD.

3.9 Submission of economic cutting plans for all plate materials and sections issued by BHEL and obtaining approval of competent authority is mandatory before taking up fabrication.
Wherever fabrication is done without proper approved cutting plans, any loss of materials arising due to the same will be recovered as per BHEL recovery rates.

3.10 No extra rates are applicable for the additional joints to be made in Plates / Rolled sections.

3.11 The work is to be executed as per the latest approved Drawings, Group Manufacturing Specification (GMS), Shipping List released for each PGMA, QAP, WPS, Standards & Specifications etc.

3.12 All indirect materials, consumables like electrodes, gases, grinding wheels etc. required for fabrication are in the scope of the Vendor.

3.13 Identification of all items shall be hard stamped by encircling with paint and Letter painting in a specific format with details of Project name, Customer No., Work Order No., PGMA No., DU No., Qty., Weight, match marking etc., for identification and dispatch as per the instructions of the concerned. Completed job without proper identification will not be accepted by HPVP - Stores / Logistics.

3.14 Vendors shall return the excess / balance materials including off-cuts and total scrap available with them exclusive of process allowance & invisible wastage to HPVP Stores after material reconciliation but before submission of their final bill. In case the same are not returned by the vendors, Recovery shall be made as per BHEL Rates / MSTC rates plus applicable taxes, prevailing at the time of processing of the final bills.

3.15 Hydra Cranes of sufficient capacity, Chains / Slings preferably Felt slings required for handling of all materials during Pre-fabrication, Fabrication and Post fabrication during handing over to BHEL etc., are in the scope of vendor.

3.16 Experienced Site-in-charge and Qualified Engineers & Supervisors shall be deployed for proper co-ordination of the job. **Vendor shall obtain certification of BHEL Engineer-in-charge for the same and submit along with Bills for processing**.

3.17 Vendors should deploy Experienced & Qualified QC personnel for carrying out the inspection activities in coordination with BHEL QC inspector / TPIA. **Vendor shall obtain certification of BHEL Engineer-in-charge for the same and submit along with Bills for processing.**

3.18 Vendors should deploy Qualified NDT personnel (Level III / Level II) at site for carrying out the NDT inspection activities in coordination with BHEL QC –NDT / TPIA. Vendors shall have to engage sufficient man power and resources for fabrication to meet HPVP delivery schedules.
Vendor shall obtain certification of BHEL Engineer-in-charge for the same and submit along with Bills for processing.

3.19 Vendor shall deploy sufficient no. of calibrated Welding machines, Main Ovens & Portable Ovens required for baking of electrodes, other machinery at site. All relevant documents shall also be made available for verification & approval by BHEL - HPVP (QC) / TPIA.
Vendor shall obtain certification of BHEL Engineer-in-charge for the same and submit along with Bills for processing.

3.20 Required tools & tackles like Measuring instruments like Tape, Fillet & Butt Weld Gauges, Plumb bobs with magnets etc., shall be calibrated and valid calibration certificates must be presented, whenever required.

3.21 All the Scaffolding materials like Pipes, Clamps, Jallies etc., for temporary platform works required during the complete course of the fabrication, blasting and painting are to be arranged by the Vendor.

3.22 Any modification work due to revision of the drawings during fabrication is to be carried out by the vendor without any additional cost.

3.23 Sufficient Area lighting at the work place shall be arranged by the vendor at their cost.

3.24 Loading of finished structure onto the trailers by providing necessary manpower, tools & tackles and Welding of all temporary supports required for transportation.

3.25 Vendors shall abide by all the rules and statutory regulations in force from time to time as per the Factories Act. It is their responsibility to ensure the safety of their workmen and fulfilling the ESI, PF and other relevant statutory regulations.

3.26 Area required for fabrication, site office and Stores will be provided free of charge. All other arrangements for site enabling including Jungle Clearance & Surface Levelling etc., if required, shall be done by the vendor.

3.27 Power & Construction Water shall be provided free of charge at one point but further distribution to the desired location is in vendor's scope. Vendor's scope shall include arranging & laying of cables, arranging

Distribution Boards with suitable capacity Switch Fuse units as incomer, all outgoings with necessary safe trips like MCB, ELCB etc., as per the industrial safety norms and their installation, all outgoing cables from Distribution Board, termination at the distribution board, arrangement of proper Working Area Lighting as per safety norms. In case of power failure, vendor has to make alternate arrangement at vendor's cost.

3.28 Though not mentioned specifically, any activity which is required for completion of the work is deemed to be included in the scope of work of vendors without any price implication.

4. BHEL SCOPE: BHEL – HPVP shall provide the following as free issue:

4.1 Drawings, GMS, QAP, WPS, Painting Schedule, applicable Procedures, Standards & Specifications.

4.2 Raw materials like full / off-cut Plates, Pipes & Tubes, Round Bars, Structural items etc., Paints and BOCs as per GMS.

4.3 Area required for fabrication, site office and Stores will be provided free of charge. All other arrangements for site enabling including Jungle Clearance & Surface Levelling etc., if required, shall be done by the vendor.

4.4 Power and construction Water shall be provided free of charge at one point but further distribution to the desired location is in vendor's scope. In case of power failure, the vendor has to make alternative arrangement without any extra cost to BHEL.

5. INSPECTION:

5.1 Inspection shall be carried out by M/s. BHEL–HPVP, Vizag / BHEL Authorized Inspection Agency (TPIA) / Customer as per approved QAP/ITP. Contractor shall offer for Stage wise and Final inspection as per approved QAP and obtain necessary stage wise & final clearances before proceeding for further operations along with all necessary documentation.

5.2 Fabrication Vendor shall be solely responsible for preparation and submission of all Inspection Reports & documents duly certified by Inspection Authority along with the finished equipments.

5.3 All the documentation related to inspection clearance of M/s. BHEL/TPIA/Customer, Generation of Inspection Reports, Preparation of Final Documents as per BHEL standard formats etc., are included in the scope of vendor and scanned copy as well as hard copy of the same is to be submitted to BHEL-QA.

Note: QAP enclosed with the tender document is tentative only and may be subject to revision due to incorporation of comments of the approving authority. Hence, the approved QAP issued to the vendor after ordering shall only be followed for execution and inspection of the job.

6. DELIVERY:

6.1 Finished items along with inspection documents and all other certificates are to be handed over to HPVP-Logistics **within 3 Months from the date of issue of First consignment of free issue materials or 6 weeks from the date of issue of Last consignment of materials (Excl. Gaskets, Fasteners & Paints), whichever is later.** The delivery period includes the time involved in collection of all raw materials, cutting plan approval, handing over of finished items at HPVP- Logistics.

Note: a) **Time schedule is very stringent and Vendor has to deliver the job as per Customer requirement and schedule which will be meticulously monitored by BHEL/Customer. All necessary steps to reduce the cycle time for the individual sub-activities and main activities will be mutually discussed and Vendor has to mobilize additional resources as per time to time requirement to achieve the same.**

b) In case the delivery period offered by the vendor is more than the tender delivery, Price quoted by the bidder shall be loaded for additional period @ 0.5% per week or part thereof for the purpose of evaluation of Bidder Status.

7. SITE MOBILISATION:

7.1 Successful bidders shall complete site mobilization within 7 days from the date of receipt of order (or) from the date of intimation for the same by BHEL whichever is later.

8. PRICE:

8.1 The price shall be quoted in the **Price Bid** as per the Schedule of Quantities & Rates for the detailed scope of work and the quoted price shall be inclusive of all applicable taxes & duties except GST.

8.2 The prices shall be fixed & firm without any escalation during the entire period of contract and till completion of the work.

8.3 GST shall be reimbursable to the vendor as detailed in Clause - 9 and as per Annexure – GST.

8.4 Income tax will be deducted at applicable rates from RA & Final bills.

9. GOODS & SERVICES TAX (GST):

9.1 Bidders shall make a note of the following points of GST before submission of their offer:

a) Vendors shall have to mention their GSTIN no. (15 Digits) in their Technical Bid. If any specific exemption is available, a declaration with due supporting documents need to be furnished for considering the offer.

b) Semi-finished goods are to be delivered by the Vendors in BHEL, HPVP premises within a maximum period of one year from the date of issue of the material, failing which the whole transaction will be considered as Supply & Sale and GST is required to be paid along with interest (calculated @ SBI Base Rate + 6%) along with penalty, if any, from the date of Challan on the whole value of materials. Hence vendors shall have to ensure that materials issued to them are returned within 365 days.

c) After fabrication, the vendors shall have to deliver the Semi - finished Goods by fulfilling the following formalities:

i) GST invoice should be raised by the vendors by paying GST on job work charges at applicable rates and by incorporating the HPVP GSTIN no. in the invoice for availing the reimbursement of GST from HPVP.

ii) The vendor shall also have to enter in their GST Return -1 (GSTR-1) the details of invoice raised for payment of GST so as to enable HPVP to avail input credit.

10. REVERSE AUCTION:

10.1 BHEL shall be resorting to Reverse Auction (RA) for this tender. RA shall be conducted among the techno-commercially qualified bidders. Business Rules for Reverse Auction are given at Annexure – V and Guidelines for Reverse Auction are available on our website, **www.bhel.com** → supplier registration → Guidelines for Reverse Auction 2021, before submission of their offer.

10.2 Sealed envelope / Electronic Price bids of all the techno-commercially qualified bidders shall be opened and the same shall be considered as initial bids of the bidders in RA. In case any bidder(s) do(es) not participate in online Reverse Auction, their sealed envelope price bid along with applicable loading, if any, shall be considered for ranking.

10.3 BHEL will inform bidders the details of service provider who will provide business rules, all necessary training and assistance before commencement of online bidding. The bidders participating in the Reverse Auction shall have to necessarily submit **'Process Compliance Form'** (PCF) to the designated Service Provider.

10.4 Bidders are advised to read the 'Business Rules' (Annexure – V) indicating details of RA event carefully, before reverse auction event.

11. RISK PURCHASE:

In case the contractor fails to execute the work within the scheduled time or due to any other reasons, BHEL - HPVP reserves the right to get the same completed through some other party at the risk & cost of the contractor and any additional expenditure incurred due to the same shall be charged to the contractor**.**

Non-performance of contract attracts penal provisions in line with BHEL Guidelines for Suspension of Business Dealings**.**

12. VALIDITY OF OFFER:

The offer shall be valid for a period of **3 months** from the date of Reverse Auction.

13. GENERAL:

13.1) The bidders shall study the Tender documents, Drawings, Quality Documents and all other relevant documents in detail for understanding the scope of work and the processes involved before submission of offer. Bidders shall get clarifications, if any, from concerned officials on the scope of work or any other details of the tender document, over phone between 09:00 AM and 04:00 PM on any working day or through e-mail.

13.2) **Conditional / Partial Price Bids** and any other deviations to the tender terms & conditions are not acceptable and BHEL reserves the right to reject such offers without further correspondence. Bidders shall confirm their acceptance to all the terms & conditions of the tender enquiry in the Techno-commercial Bids without any deviations.

13.3) BHEL reserves the right to modify or cancel the tender enquiry at any stage without assigning any reasons thereof.

13.4) The General Terms & Conditions, if any, contradicting with the specific terms & conditions given in the tender, then specific terms & conditions shall only be considered.

13.5) Other Terms & Conditions, whichever applicable, shall be as per Annexure – III enclosed.

14. The following documents shall form part of the tender enquiry including this Notice Inviting Tender:

PART - 1: TECHNO-COMMERCIAL BID

i) Schedule of Quantities : Annexure – I
ii) Reference Documents & Details of Structure to be fabricated : Annexure – II
iii) General Terms & Conditions : Annexure – III
iv) Acceptance to tender terms & conditions : Annexure – IV
v) Business Rules for Reverse Auction : Annexure – V
vi) GST Compliance for Indigenous Suppliers : Annexure – GST
vii) Tentative Painting Schedule, Drawings, QAP etc.

PART - 2: PRICE BID

viii) Price Bid (Schedule of Quantities & Rates)

15. TENDER SUBMISSION (Through e-Procurement system):

15.1 The tender completed in all respects shall be submitted in **Two parts** (Techno-commercial bid and Price Bid) through online e-procurement portal (https://eprocurebhel.co.in) latest by **13:00 Hrs. on 21.10.2024.**

Note: Techno-commercial bid along with all the tender documents shall be duly signed & stamped by the bidder on all pages.

15.2 Submission of offer by the bidder implies that all the tender documents were read by the bidder and the bidder is aware of the scope and specifications of the job.

15.3 **OFFERS SENT IN ANY OTHER FORM WILL BE TREATED AS INVALID AND WILL BE SUMMARILY REJECTED.**

16. TENDER OPENING:

16.1 Techno-commercial Bids will be opened on **21.10.2024 at 15:00 Hrs**. in online e-procurement portal.

16.2 After evaluation of the Techno-commercial Bids, intimation regarding date & procedure of conducting Reverse Auction shall be given by the service provider to all the eligible techno-commercially qualified bidders through an e-mail in advance at an appropriate time.

For Bharat Heavy Electricals Limited,

18/10/2024

D. N. MURTHY
Manager (OS)
Bharat Heavy Electricals Ltd
HPVP, Visakhapatnam-530 012

Annexure - I

SCHEDULE OF QUANTITIES

Ref: OS/24-25/7936,8032&8043/BS/22/022 **Date: 18.10.2024**

Sub: Fabrication of Bunker Structure against S.O. 7936, 8032 & 8043 inside the premises of BHEL-HPVP, Visakhapatnam

Sl. No.	S.O. No.	Description of Work	Unit	Qty.
1	**7936, 8032 & 8043**	**Fabrication of Bunker Structure**	MT	620
		TOTAL	**MT**	**620**

Notes :

1) **L1 status shall be evaluated based on the total quoted value.**

2) The quoted price shall be inclusive of all applicable taxes & duties except GST. Income Tax shall be deducted at applicable rates from Bills and GST shall be reimbursable to the vendor as per applicable guidelines.

3) The prices shall be fixed & firm without any escalation during the entire period of contract and till completion of work.

4) The quantity indicated above is tentative and may vary subject to the requirement at the time of ordering / execution. However, payment shall be made for the actual quantity only.

5) The bidders are advised to go through all the drawings & documents before quoting the tender.

6) The evaluation currency for this tender shall be **INR**.

Signature of the Bidder with stamp

Annexure - II

Ref: OS/24-25/7936,8032&8043/BS/22/022 **Date: 18.10.2024**

REFERENCE DOCUMENTS & DETAILS OF STRUCTURE TO BE FABRICATED

Sub:Fabrication of Bunker Structure against S.O. 7936, 8032 & 8043 inside the premises of BHEL- HPVP, Visakhapatnam

Sl. No.	S.O. No.	PGMA	Description of Item	Approx. Wt.	Unit	GA Drawing / Document ref. & Rev. No. (Tentative)
1	7936	66-230, 66-240 & 66-250	Bunker Structure	300	MT	0-66-101-U-0021, REV.1 0-66-230-U-0022, REV.0 0-66-240-U-0029, REV.0 0-66-250-U-0034, REV.0 0-66-250-U-0035, REV.0 0-66-250-U-0036, REV.0 0-66-250-U-0037, REV.0 0-66-250-U-0038, REV.0
2	8032	66-230, 66-240 & 66-250	Bunker Structure	160	MT	0-66-102-A0003, REV.0 0-66-102-A0004, REV.0 0-66-102-A0005, REV.0 1-66-230-U0022, REV.1 7936-ENPNT-DOC-002, REV.0
3	8043	66-230, 66-240 & 66-250	Bunker Structure	160	MT	
4	7936		Painting Schedule			
5	8032 & 8043		Painting Schedule			PL:C3-PS/1832, REV.02
6	7936, 8032 & 8043		Standard Quality Plan for General Structures			SQP:NP:07/04, Dtd. 23.09.2016
			Total	**620**	**MT**	

Note : The above weights are approximate and may vary as per the drawings issued at the time of order / during execution.

GENERAL TERMS & CONDITIONS

1. **TECHNICAL DELIVERY CONDITIONS:**

   The work should conform to the technical data given in our drawings, GMS, Shipping List Specifications, QAP, WPS etc.

2. **PARTY'S SCOPE:**

   The scope of the party shall be as follows: -

   a) All welding equipments, baking oven, tools, jigs and fixtures, measuring instruments duly calibrated, handling facilities, testing facilities etc.

   b) All materials other than those mentioned under “Free Issue Materials", which are required for completion of the work.

   c) All consumables such as electrodes, gases, grinding wheels etc.

   Note: Electrodes of specification mentioned in the drawings / WPS and of BHEL approved brands only shall be used and MTCs of the same shall be submitted to BHEL for verification before use.

3. **REVISION OF DRAWINGS:**

   There may be minor changes in the drawings during execution. In such a case, party should accommodate the same without any extra claim.

4. **WELDING QUALIFICATION:** Qualification of required number of Welders is party’s responsibility at their cost.

5. **X–RAY:**

   All welding shall be of X-ray quality where specified on drawings. Inspection would specify the quantum of X-ray based on drawings / code requirement. Party should strictly follow the WPS and QAP issued by BHEL during welding. Getting the welds radiographed and getting them cleared by inspection is the responsibility of the party.

6. **RECTIFICATIONS / REJECTIONS:**

   Any rectification due to defective work, if required, shall be done by the party free of charge with a suitable technology approved before hand by BHEL in writing. The cost of material, if any used for rectification work / rejection work, will be estimated by BHEL and the same shall be debited to party's account. In case any rectification / rework is to be carried out due to defective material supplied by BHEL, the replacement material and consumables will be supplied by BHEL free of Cost.

7. **SECURITY DEPOSIT:**

   a) Vendors shall have to submit a Bank Guarantee for **10%** of the order value in case of **HPVP ADM / Lovagarden site** (or) **25%** of the material cost in case of Vendor works towards Security Deposit and safe custody of free issue materials within 15 days from the date of intimation by Outsourcing dept. The BG shall be valid for the contract period with a claim period of 12 months. This Bank Guarantee shall be released to the contractor after completion of work and on acceptance of the same by BHEL / Owner.
   Bidder agrees to submit performance security required for execution of the contract within the time period mentioned above. In case of delay in submission of performance security, enhanced performance security which would include interest (SBI rate + 6%) for the delayed period, shall be submitted by the bidder. Further, if performance security is not submitted till such time the first bill becomes due, the amount of performance security due shall be recovered as per terms defined in NIT/contract, from the bills along with due interest.

   b) **MODE OF DEPOSIT:** Security Deposit may be furnished in the following forms:

      i) Local cheques of Scheduled Banks (subject to realization)/ Pay Order/ Demand Draft/ Electronic Fund Transfer in favour of BHEL.
      ii) Bank Guarantee from Scheduled Banks / Public Financial Institutions as defined in the Companies Act. The Bank Guarantee format should have the approval of BHEL.
      iii) Fixed Deposit Receipt issued by Scheduled Banks / Public Financial Institutions as defined in the Companies Act (FDR should be in the name of the Contractor, a/c BHEL).
      iv) Securities available from Indian Post offices such as National Savings Certificates, Kisan Vikas Patras etc. (held in the name of Contractor furnishing the security and duly endorsed/ hypothecated/ pledged, as applicable, in favour of BHEL).
      v) Insurance Surety Bond.

   (Note: BHEL will not be liable or responsible in any manner for the collection of interest or renewal of the documents or in any other matter connected therewith).

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8. PERFORMANCE BANK GUARANTEE:

Vendors shall have to submit Performance Bank Guarantee (claim period of 12 months) for 10% of the order value covering for the defects liability period. If PBG is not submitted, 10% of the order value shall be deducted towards PBG from the final bill and shall be refundable after performance guarantee period, if no defects are found during this period.

9. RAW MATERIALS ISSUE:

Raw materials shall be issued with appropriate processing allowance and invisible wastage over the theoretical requirement of raw materials **(Plates, Sheets, Sections and Pipes).**

10. TRANSFER / RETURN OF LEFT-OVER MATERIALS:

Party should maintain proper records for receipt & use of all free issue materials. The left-over materials & scrap as per the material accounting statement shall be returned to HPVP stores along with finished job. Material Transfer Vouchers (MTV) from one order to another or from one vendor to another and Material Return Vouchers should be submitted immediately after transfer / return. The material reconciliation statement shall be submitted by the contractor after verification and certification by BHEL along with the final bill **within 30 days from the date of completion of work**. Otherwise, recovery for the balance materials shall be made from any of their pending bills without further intimation.

11. MATERIAL RECONCILIATION:

Orders issued to the vendors have to be completed in all respects including Material Accounting within a maximum of **180 days** from the **date of issue of material** from BHEL - HPVP stores.

Maximum of 0.5 % on the requirement of materials **(Plates, Sections and Pipes)** is admitted towards **process allowance and invisible wastage**.

Scrap quantity is permissible up to a **maximum of 1% on Structurals (Beams, Channels, Angles, Rods, Pipes etc.), 2% on Sheets, 3% for Plates** on the theoretical requirement of materials.

If wastage and scrap is beyond the above limits, it should be fully justified with cutting diagrams etc. which are to be approved in advance by BHEL. **Otherwise, the cost of raw materials beyond approved limits will be recovered from the contractor as per BHEL recovery rates including applicable taxes & duties**.

Material reconciliation including return of balance materials, off-cuts is to be completed within 20 days from the date of completion of the order. The material reconciliation statement shall be submitted by the contractor after verification and certification by BHEL-HPVP along with the final bill **within 30 days from the date of completion of work**. Otherwise, recovery for the balance materials shall be made from any of their pending bills without further intimation,

Repeated occurrence of inordinate delays in returning and settling the material accounting will entail BHEL the right to terminate the contract forthwith or impose a temporary suspension on further loading at the discretion of BHEL.

12. SCRAP & OFF-CUT NORMS:

Sl. No.	Description	Scrap Size (in mm)	Off-Cut (in MM)
1.	CS/AS Sheets & Plates	Below 500 × 250	500 × 250 & above
2.	Rolled sections Rod, angles etc. (other than -tubes, pipes)	Below 1000	1000 & above
3.	Tubes & Pipes	Below 500	500 & above
4.	Universal column	Below 1000	1000 & Above
5.	SS Sheets & Plates	Below 500 × 250	500 × 250 & above
6.	SS Structural, Rods, Tubes, Pipes	Below 250	250 & above
7.	Non – ferrous: sheets & plates, rods & tubes	Below 500 × 250 (S & PL), Below 250 (Rods & Tubes)	500 × 250 & above, 250 & above
8.	Big size Scrap	(2500 & above) × (150 to 249)	-

13. INSPECTION:

Party shall contact our Quality Control Dept. for stages of inspection before commencement of job and should strictly follow the stages of inspection as per QAP.

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14. WORKMANSHIP GUARANTEE:

The vendors should give workmanship guarantee for fabricated items for a period of 18 months from the date of last delivery of the order. Any defects due to incomplete work, faulty workmanship found in the fabricated items after delivery during the defects liability period shall be rectified / replaced by the vendor free of cost. Otherwise, the expenditure incurred towards the same will be recovered from the pending bills of vendors.

15. WORK PROGRESS:

The fabricator shall furnish a weekly report on the progress of work along with the status of availability of free issue materials and requirement of further materials, if any.

Outsourcing dept. personnel will visit vendor's works from time to time to assess and review the work progress. Free access shall be provided to BHEL or its inspection agency at all reasonable times of the day / night.

In case the progress is not satisfactory or supplies are delayed abnormally beyond the contractual delivery date, BHEL-HPVP, Visakhapatnam reserves the right to cancel the order in part or full or get the balance job in as is where is condition completed elsewhere by another agency at the risk and cost of Fabricator. The value of the work carried out by the party will be assessed by BHEL and the same shall be final. No compensation will be given to the fabricator in case of cancellation of order or diversion of balance job even if the jobs have been processed partly.

16. DELIVERY:

Finished items should be handed over to BHEL-HPVP on party's delivery challans along with Job completion certificate / Final Inspection Report from inspection agency / HPVP-QC department.

17. PENALTY:

Penalty calculations will be done on DU wise (Dispatchable Unit) delivery. If delivery exceeds the stipulated delivery schedule, penalty @ 1/2 % of the value of each DU per week (or) part thereof subject to a maximum of 10% of the value of each DU will be levied. However, time taken for the following will not be considered as delay on the part of the Sub-Contractor.

1) Intermediate operations, if any, carried out by BHEL.
2) Waiting time for BHEL / Third party Inspection beyond a normal time of 3 days.

18. PAYMENT TERMS:

Payment shall be made against RA Bills within 45 days for MSE (Micro & Small Enterprise), 60 days for Medium Enterprise and 90 days for non-MSEs from the date of submission of Bill.

90% payment will be made after handing over of the finished equipments along with all inspection documents to HPVP shops / Logistics dept. / ADM site / Lova Garden site, duly inspected & cleared by Inspection authority. Balance 10% payment shall be made along with the Final Bill against completion of total order in all respects including documentation.

Vendors shall have to submit the bills in the formats specified by HPVP-Outsourcing and the bills submitted in the specified format along with necessary supporting documents are only admitted for processing. The following documents shall be submitted along with the Final Bill: -

1. No Claim Certificate from the contractor
2. No Dues Certificate from BHEL
3. Work Completion Certificate from BHEL
4. Material Reconciliation Statement submitted by the Contractor and certified by concerned authority of BHEL (if applicable)
5. Workmanship Guarantee certificate from the contractor

19. SECRECY:

All the documents of BHEL inclusive of Drawings, GMS and Standards made available to the fabricator should be kept in strict confidence and under no circumstance be made available to others or allow others to make use of them. Such documents shall be returned to BHEL on demand after completion of the job. This secrecy clause is binding on the employees of the fabricators also. Violation of the same may lead to suspension of business with the vendor and necessary legal action.

20. SUB-LETTING:

In general, sub-letting of jobs will not be permitted. But in special circumstances, this may be allowed. In such case, the party should obtain written approval from BHEL-HPVP, Visakhapatnam before sub-letting.

Contd…4

21. FACTORY RULES AND REGULATIONS:

Party shall abide by all the rules and statutory regulations in force from time to time as per factories act. It shall be party's responsibility to ensure the safety of their workmen and fulfilling the ESI, PF and other relevant statutory regulations.

22. SAFETY:

a) Contractor shall adhere to safe construction practices, guard against hazardous & unsafe working conditions and shall comply with the safety rules of BHEL and local authorities. He shall maintain First Aid facilities for all his employees and labour. Contractor's responsibility includes supply of welder kit, all safety items such as safety belts, white and colour glasses, goggles, safety helmets, safety shoes etc.

b) Contractor and his employees shall follow all fire & safety, security regulations of BHEL.

23. HOUSE KEEPING:

During execution of work, the contractor at all times keep the working place and storage area clean and free from accumulation of waste materials, rubbish etc.,

24. ACCIDENT / DAMAGE / CONDUCT ETC.:

Contractor will be held responsible for any disorderly conduct / misconduct, indiscipline, theft, smoking etc., on the part of his men. He will ensure summarily eviction of such men from his premises failing which BHEL would remove them from the factory on his responsibility. Any damage to and or loss of equipment, machinery, building etc., to BHEL or BHEL employees, visitors or other contractors resulting from his own or any of his men's negligence shall be liable to be made good by him. Contractor shall be solely responsible for any accident in which you or your men or your equipment may be involved during the execution of contract on account of any reason what so ever.

25. TERMINATION OF CONTRACT:

In the event of any failure on the part of the contractor, BHEL reserves the right to terminate the contract by giving a notice of 2 weeks for any of the following lapses and contractual violations: -

a) Failure to make labour payments in time as per the rules
b) Failure to progress the job according to the agreed schedule
c) Failure to mobilize adequate man power, tools & tackles and consumables in time
d) Failure to adhere to Quality Standards of BHEL
e) Refused to co-operate with other agencies working in the same area
f) Failure to resolve labour disputes like strikes etc., within 7 days of occurrence
g) Failure to comply with statutory regulations applicable at BHEL

BHEL shall also be free to intervene and take necessary remedial measures. All costs incurred with interest and overheads shall be recovered from contractor by such foreclosing or off-loading any part of the contract work.

26. CONFLICT OF INTEREST AMONG BIDDERS / AGENTS:

A bidder shall not have conflict of interest with other bidders. Such conflict of interest can lead to anti-competitive practices to the detriment of Procuring Entity's interests. ***The bidder found to have a conflict of interest shall be disqualified.*** A bidder may be considered to have a confiict of interest with one or more parties in this bidding process, if:

a) they have controlling partner (s) in common; **or**

b) they receive or have received any direct or indirect subsidy / financial stake from any of them; or

c) they have the same legal representative / agent for purposes of this bid; **or**

d) they have relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the bid of another Bidder; **or**

e) Bidder participates in more than one bid in this bidding process. Participation by a Bidder in more than one Bid will result in the disqualification of all bids in which the parties are involved. However, this does not limit the inclusion of the components/ sub-assembly/ Assemblies from one bidding manufacturer in more than one bid; **or**

f) In cases of agents quoting in offshore procurements, on behalf of their principal manufacturers, one agent cannot represent two manufacturers or quote on their behalf in a particular tender enquiry. One manufacturer can also authorise only one agent / dealer. There can be only one bid from the following:

1. The principal manufacturer directly or through one Indian agent on his behalf, and
2. Indian/foreign agent on behalf of only one principal,

g) A Bidder or any of its affiliates participated as a consultant in the preparation of the design or technical specifications of the contract that is the subject of the Bid, or

h) In case of a holding company having more than one independently manufacturing units, or more than one unit having common business ownership/management, only one unit should quote. Similar restrictions would apply to closely related sister companies. Bidders must proactively declare such sisters' common business/ management units in same/ similar line of business"

Contd…5

27. OVER RUN COMPENSATION (ORC) / IDLE CHARGES:

The contractor shall not be entitled to claim and the company shall not be liable to pay any amount on account of overrun compensation and idle charges, the overrun/ idling may be for whatsoever reasons.

28. DISPUTES:

Head of BHEL- HPVP Unit will be the final authority for any disputes arising out of this contract. The disputes / arbitration / settlement of contractual or legal issues shall be under the Jurisdiction of Visakhapatnam Court.

29. For this procurement, Public Procurement (Preference to Make in India), Order 2017 dated 15.06.2017 & 28.05.2018 and subsequent Orders issued by the respective Nodal Ministry shall be applicable even if issued after issue of this NIT but before finalization of Contract / PO / WO against this NIT.

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

30. The Bidder declares that they will not enter into any illegal or undisclosed agreement or understanding, whether formal or informal with other Bidder(s). This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.

In case, the Bidder is found having indulged in above activities, suitable action shall be taken by BHEL as per extant policies/ guidelines.

31. Order Acceptance:

If the order acceptance is not received within 03 days from the date of release of Sub-contract order, it shall be assumed that the same has been accepted by you thereof.

Signature of the bidder with Stamp

Annexure – IV

Ref: OS/24-25/7936,8032&8043/BS/22/022 Date: 18.10.2024

Acceptance to Tender Terms & Conditions

I / We hereby confirm that the Tender documents, Drawings, Quality documents etc. have been studied in detail and we have fully understood the scope of work.

I / We accept to all the Terms and Conditions of the Tender Enquiry without any deviations and the prices quoted are in accordance with the same.

I / We give our acceptance to participate in reverse auction for this tender.

Tender documents duly signed on all the pages by the Owner / authorized representative of the bidder are attached herewith.

Signature of the bidder with Stamp

ANNEXURE – V

Ref: OS/24-25/7936,8032&8043/BS/22/022 Date: 18.10.2024

BUSINESS RULES FOR REVERSE AUCTION (RA)

This has reference to tender no. **OS/24-25/7936,8032&8043/BS/22/022, dated 18.10.2024**. BHEL shall finalise the Rates for **Fabrication of Bunker Structure against S.O. 7936, 8032 & 8043 inside the premises of BHEL-HPVP, Visakhapatnam t**hrough Reverse Auction mode. BHEL has made arrangement with an authorized Service provider (details will be shared before reverse auction) for conducting RA. Bidders should go through the instructions given below and submit acceptance of the same.

The technical & commercial terms are as per (a) BHEL Tender Enquiry No. **OS/24-25/7936,8032&8043/ BS/22/022, dated 18.10.2024**, (b) Bidders' technical & commercial bid (in case of two-part bid) and (c) subsequent correspondences between BHEL and the bidders, if any.

1. **Procedure of Reverse Auctioning:**
   i) Price bids of all techno-commercially qualified bidders shall be opened.
   ii) **Reverse Auction**: The 'bid decrement' will be decided by BHEL.
   iii) The lowest bidder in sealed envelope price bid shall be shown as current L1 automatically by the system and no acceptance of that price is required. System shall have the provision to indicate this bid as current L1.
   iv) Bidders by offering a minimum bid decrement or the multiples thereof can displace a standing lowest bid and become "L1" and this continues as an iterative process. However, no bidder shall be allowed to lower its bid below the current L1 by more than 5 decrements at one go.
   v) After the completion of the reverse auction, the Closing Price shall be available for further processing.
   vi) Wherever the evaluation is done on total cost basis, after Reverse Auction, prices of individual line items shall be reduced on pro-rata basis.

2. **Schedule for reverse auction:** The Reverse Auction schedule will be intimated to the techno-commercially qualified bidders at a later stage.

3. **Auction extension time:** If a bidder places a bid in the last {…} minutes of closing of the Reverse Auction and if that bid gets accepted, then the auction's duration shall get extended automatically for another {…} minutes, for the entire auction (i.e. for all the items in the auction), from the time that bid comes in. Please note that the auto-extension will take place only if a bid comes in those last {…} minutes and if that bid gets accepted as the lowest bid. If the bid does not get accepted as the lowest bid, the auto-extension will not take place even if that bid might have come in the last {…} minutes. In case, there is no bid in the last {…} minutes of closing of Reverse Auction, the auction shall get closed automatically without any extension. However, bidders are advised not to wait till the last minute or last few seconds to enter their bid during the auto-extension period to avoid complications related with internet connectivity, network problems, system crash down, power failure, etc.
   The above process will continue till completion of Reverse Auction.
   Complaints/ Grievances, if any, regarding denial of service or any related issue should be given in writing thru e-mail/ fax to M/s. {Service provider} with a copy to BHEL within 15 minutes prior to initial closing time of Reverse Auction.

4. **Bid price:** The Bidder has to quote the {……} Price inclusive of Packing & Forwarding charges, all the routine & type tests as per tender scope, taxes, duties, freight and insurance as specified in tender document including loading (if indicated by BHEL due to deviations in technical/ commercial terms) for the Items specified. Details are as shown in Excel Sheet for calculation of total cost to BHEL (To be specified by Unit as per NIT conditions).

5. **Bidding currency and unit of measurement:** Bidding will be conducted in *Indian Rupees* per *Unit* of the material as per the specifications mentioned in the tender.
   In case of foreign currency bids, exchange rate (TT selling rate of State Bank of India) as on scheduled date of tender opening (Part-I bid) shall be considered for conversion in Indian Rupees. If the relevant day happens to be a Bank holiday, then the forex rate as on the previous bank (SBI) working day shall be taken.

6. **Validity of bids:** Price shall be valid for 90 days from the date of reverse auction. These shall not be subjected to any change whatsoever.

7. **Lowest bid of a bidder**: In case the bidder submits more than one bid, the lowest bid at the end of Reverse Auction will be considered as the bidder's final offer to execute the work.

8. Unique user IDs shall be used by bidders during bidding process. All bids made from the Login ID given to the bidders will be deemed to have been made by the bidders/ bidders' company.

9. **Post auction procedure**: BHEL will proceed with the Lowest Bid in the Reverse Auction for further processing.

10. Any commercial/ technical loading shall be separately intimated to respective bidders prior to RA. The excel sheet provided in this regard shall cover all these aspects. Commercial/ technical loading if any, shall be added by the respective bidder in its price during Reverse Auction.
    Modalities of loading & de-loading shall be separately intimated to the bidders. The responsibility for correctness of total cost to BHEL shall lie with the bidders.

11. Reverse auction shall be conducted by BHEL (through M/s {*Service Provider}*), on pre-specified date, while the bidders shall be quoting from their own offices/ place of their choice. Internet connectivity shall have to be ensured by bidders themselves.

    During the RA process if a bidder is not able to bid and requests for extension of time by FAX/ email/ phone then time extension of additional 15 minutes will be given by the service provider provided such requests come before 5 minutes of auction closing time. However, only one such request per bidder can be entertained.

    In order to ward-off contingent situation of connectivity failure bidders are requested to make all the necessary arrangements/ alternatives whatever required so that they are able to circumvent such situation and still be able to participate in the reverse auction successfully. Failure of power or loss of connectivity at the premises of bidders during the Reverse auction cannot be the cause for not participating in the reverse auction. On account of this, the time for the auction cannot be extended and neither BHEL nor M/s. {*Service provider*} is responsible for such eventualities.

12. Proxy bids: Proxy bidding feature is a pro-bidder feature to safe guard the bidder's interest of any internet failure or to avoid last minute rush. The proxy feature allows bidders to place an automated bid in the system directly in an auction and bid without having to enter a new amount each time a competing bidder submits a new offer. The bid amount that a bidder enters is the minimum that the bidder is willing to offer. Here the software bids on behalf of the bidder. This obviates the need for the bidder participating in the bidding process until the proxy bid amount is decrementally reached by other bidders. When proxy bid amount is reached, the bidder (who has submitted the proxy bid) has an option to start participating in the bidding process.

    The proxy amount is the minimum amount that the bidder is willing to offer. During the course of bidding, the bidder cannot delete or change the amount of a proxy bid.

    Bids are submitted in decrements (decreasing bid amounts). The application automates proxy bidding by processing proxy bids automatically, according to the decrement that the auction originator originally established when creating the auction, submitting offers to the next bid decrement each time a competing bidder bids, regardless of the fact whether the competing bids are submitted as proxy or standard bids. However, it may please be noted that if a manual bid and proxy bid are submitted at the same instant manual bid will be recognized as the L1 at that instant.

    In case of more than one proxy bid, the system shall bid till it crosses the threshold value of 'each lowest proxy bid' and thereafter allow the competition to decide the final L1 price.

    Proxy bids are fed into the system directly by the respective bidders. As such this information is privy only to the respective bidder(s).

13. Bidders are advised to get fully trained and clear all their doubts such as refreshing of Screen, quantity being auctioned, tender value being auctioned etc. from M/s. {*Service provider*}.

14. M/s. {*Service provider}*, shall arrange to demonstrate/ train the bidder or bidder's nominated person(s), without any cost to bidders. M/s. {*Service provider}*, shall also explain the bidders, all the business rules related to the Reverse Auction. Bidders are required to submit their acceptance to the terms/ conditions/ modalities before participating in the Reverse Auction in the process compliance form as enclosed. Without this, the bidder will not be eligible to participate in the event.

15. Successful bidder shall be required to submit the final prices (L1) in prescribed format (Annexure – VI) for price breakup, quoted during the Reverse Auction, duly signed and stamped as token of acceptance without any new condition (other than those already agreed to before start of auction), after the completion of auction to M/s. {*Service provider*} besides BHEL within two working days of Auction without fail.

16. Any variation between the final bid value and that in the confirmatory signed price breakup document will be considered as tampering the tender process and will invite action by BHEL as per extant guidelines for suspension of business dealings (as available on www.bhel.com).

17. Bidders' bid will be taken as an offer to execute the work/ supplies the item as per enquiry no. **OS/24-25/7936,8032&8043/BS/22/022, dated 18.10.2024.** Bids once made by the bidder, cannot be cancelled/ withdrawn and bidder shall be bound to execute the work as mentioned above at bidder's final bid price. Should bidder back out and not execute the contract as per the rates quoted, BHEL shall take action as per extant guidelines for suspension of business dealings (as available on www.bhel.com).

18. Bidders shall be able to view the following on their screen along with the necessary fields during Reverse Auction:

a. Leading (Running Lowest) Bid in the Auction (only total price of package)
b. Bid Placed by the bidder
c. Start Price
d. Decrement value
e. Rank of their own bid during bidding as well as at the close of auction.

19. BHEL's decision on award of contract shall be final and binding on all the Bidders.

20. BHEL reserves the right to extend, reschedule or cancel the Reverse Auction process at any time, before ordering, without assigning any reason, with intimation to bidders.

21. BHEL shall not have any liability to bidders for any interruption or delay in access to the site irrespective of the cause. In such cases, the decision of BHEL shall be binding on the bidders.

22. Other terms and conditions shall be as per bidder's techno-commercial offers and other correspondences, if any, till date.

23. If there is any clash between this business document and the FAQ available, if any, in the website of M/s. {*Service provider},* the terms & conditions given in this business document will supersede the information contained in the FAQs. Any changes made by BHEL/ service provider (due to unforeseen contingencies) after the first posting shall be deemed to have been accepted if the bidder continues to access the portal after that time.

24. Bidder shall not divulge either his Bids or any other exclusive details of BHEL to any other party. 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 for suspension of business dealings (as available on www.bhel.com)*, shall be initiated by BHEL.

Signature of the Bidder with Stamp

Annexure – GST

GST COMPLIANCE FOR INDIGENOUS SUPPLIERS

1. In Response to Tenders for Indigenous supplier will be entertained only if the vendor has a valid GSTIN which should be clearly mentioned in the offer. If any specific exemption is available, a declaration with due supporting documents need to be furnished for considering the offer.
2. Supplier shall mention their GSTIN in all their invoices and invoices shall be in the format as specified/prescribed under GST laws. Invoices shall necessarily contain Invoice number (in case of multiple numbering system is being followed for billing like SAP invoice no, commercial invoice no etc., then the Invoice No which is linked/uploaded in GSTN network shall be clearly indicated), item description as per PO, Quantity, Rate, Value, applicable taxes with nomenclature (like IGST, SGST, CGST & UTGST) separately, HSN/ SAC Code, etc.
3. All invoices shall bear the HSN Code for each item separately (Harmonized System of Nomenclature)/ SAC code (Services Accounting Code).
4. A declaration to the effect that all invoice particulars are/were uploaded in the GSTN network/ portal & all tax liability as per GST rules and regulations have been and will be discharged, shall be mentioned in the invoice. If not mentioned in the invoice, a separate declaration shall be submitted as per the requirement of BHEL.
5. All documents like Test Certificate, LR copy, Guarantee/Warrantee certificate, work completion certificate, any other document mentioned in PO, shall be sent along with the vehicle/consignment where ever applicable. For all consignments received within the calendar month, input credit will be availed within that month in line with monthly returns filing cycle. In case of any discrepancy in the document or non-submission of documents mentioned in the PO, then BHEL will not be able to accept or account the material, in such case availing of tax credit will be deferred to next month or so.
6. In case of discrepancy in the data uploaded by supplier in the GSTN portal or in case of any shortages or rejection in the supply, then BHEL will not be able to avail the tax credit and will notify the supplier of the same. Supplier has to rectify the data discrepancy in the GSTN portal or issue credit note (details to be uploaded in GSTN portal) for the shortages or rejections in the suppliers, within the calendar month notified by BHEL.
7. For any such delay in availing of tax credit for reasons attributable to supplier (as mentioned above), interest (calculated @ SBI Base Rate + 6%) along with penalty if any will be deducted for the delayed period i.e. from the month of receipt till the month tax credit is availed, from the running bills.
8. Under GST regime, BHEL has to discharge GST liability on LD recovered from suppliers/contractors. Hence applicable GST shall also be recoverable from suppliers/contractors on LD amount. For this Debit note will be issued by BHEL indicating the respective supply invoice number.
9. This is to inform that GST portion of invoice, shall be released only upon Vendor declaring such invoice in his GSTR-1 and receipt of goods and Tax invoice by BHEL and Confirmation of payment of GST thereon by vendor on GSTN portal. Alternatively, BG of appropriate value may be obtained from vendor which shall be valid At least one month after the confirmation of date of payment of GST by vendor on GSTN portal and receipt of Tax invoice and receipt of goods, whichever is later. Above is subject to receipt of goods/service and tax invoice thereof along with vendor declaring invoice in his return and paying GST within timeline prescribed for availing ITC by BHEL.
10. That in case vendor delays Declaring such invoice in his return and GST credit availed by BHEL is denied or reversed subsequently as per GST law, GST amount paid by BHEL towards such ITC reversal as per GST law shall be recoverable from vendor/contractor along with interest levied/ leviable on BHEL.

Note: The above will be followed strictly for processing vendor payments to ensure GST Compliance.

Signature of the Bidder with Stamp

BHARAT HEAVY ELECTRICALS LIMITED, TIRUCHIRAPPALI 620 014

QUALITY ASSURANCE DEPARTMENT

STANDARD QUALITY PLAN FOR **SQP: NP: 07/04**

General Structurals

Prepared by Jeyaram M Quality Assurance	23/09/16
REVIEWED BY	SIGNATURE
ENGINEERING *(J.Somsasundaram)*	23/09/16.
OUT SOURCING *(G.Sharavanan)*	23/9/2016
QUALITY CONTROL *(N. Ramasamy)*	23/9/16
QUALITY ASSURANCE *(J V V Aruna kumar)*	23/09/2016

Revision No.	Date	Approved by	Signature
04	23/09/16	AGM / QA&BE	23/09/16
03	01/12/07	SDGM/QA	---
02	14/04/01	DGM/QA	
01	15/07/96	SM/QA	
00	01/04/93	SM/QA	

RECORD OF REVISIONS

Rev. No.	Clause No.	Details of revision
00	--	This document consolidates all requirements of various previous SQPs.
01	--	All amendments issued has been regularised and editorial corrections made for better clarity.Latest applicable TDC numbers incorporated.
02		SIP numbers updated
	2.4.1 Note 2	Deleted. Cl.2.4.2 to 2.4.5 renumbered.
	Note 3	Deleted. Consequently, Note 4 to Note 7 renumbered as Note 3 to Note 6.
	3.2 & 3.2.1 in Note 3	Modified in line with QCP:002
	4.1.7 in Note 4	Out of straightness revised in line with AWS D1.1 (2002 edition)
	4.1.7.10(7)	Twist included
03.	Note-1	Matl. IS 2062 Re-designated & IS 8500 replaced with new designation
	NOTE-3	3.2 & 3.2.1 is Re-worded 3.2.3 Cl. Added
	Note-4	4.1.10 new sub clause no added.
	Note-5	Clause no. 5 SR Temp changed.
04.	Cl 2.1, 2.4.3,2.4.4	Latest revision of NDE procedures updated.
	Cl 2.3	RT/UT included
	Note-1	E350 material added.IS 8500 removed.
Note	2.4.5	Material substitution details given.
	3.2.1	Removed
	3.1.1,3.2.3	10% scope added.
	3.1.2.3	Newly added.
	3.2.4	Newly added.
	4.1.9	Monorail trial assembly added. Amendment A1 incorporated
	5.1,5.2&5.3	SR details added.

Tiruchirappalli	QUALITY ASSURANCE	STANDARD QUALITY PLAN GENERAL STRUCTURALS - Welded Design	QP NO. : SQP:NP: 07 REV.: 04 DATE : 23-09-2016 PAGE : Page 3 of 10

SL. NO.	COMPONENT AND OPERATION	CHARECTERISTICS	Cl.	TYPE OF CHECK	Quantum	REF.DOCUMENT/ ACCEPTANCE STD.	TYPE OF RECORD D	Agency * M	Agency * c	Agency * n	REMARKS
1.0	MATERIAL										
	Plates,Sheets & Rolled Sections	Chemical &Mechanical Properties	A	Review of documents	100%	TDC/Matl. Spec. Note 1	TC	P	W		
2.0	INPROCESS CONTROL		(Refer QCP 002 for details)								
2.1	Marking, Cutting, Edge Preparation	Shape, Size , EP, Diagonal Straightness	B	Measurement	100%	Drawings & Note 2	R	P	V		
		Gas cut edges		MPI/LPI	Note-3	BHE:NDT:PB:MT 01, latest, BHE:NDT:PB:PT 01,latest	R	P	W		
2.2	Welding	Procedure Qlfn.	A	Review of Documents	100%	BHEL Procedure SIP:NP:07 latest	WPS	P	V		
		Personnel Qlfn.		Review of Documents	100%	SIP:NP:07 latest	R	P	V		

LEGEND : CI: Class (A: Critical B: Major , C: Minor) * M : Manufacturer C :BHEL QC/TPI N : CUSTOMER QC :Quality Control ND: NDT Lab., PL: Plant lab, R : Record

SL. NO.	COMPONENT AND OPERATION	CHARECTERISTICS	Cl.	TYPE OF CHECK	Quantum	REF.DOCUMENT/ ACCEPTANCE STD.	TYPE OF RECORD	D	Agency * M	c	n	REMARKS
2.3	Weld Inspection	Weld size & finish	B	Visual/ Measurement	100%	Drawing SIP:NP:06 latest		-	P	W		
	Butt welds	Soundness		RT/UT	Note 3	BHE:NDT:SS:RT 05 latest BHE:NDT:PB:MT		R	P	V*		*Review of films
	T.Butt Joints	Soundness		RT/UT	Note 3	01,latest, BHE:NDT:PB:PT 01,latest		R	P	V*		
	Fillet welds	Soundness		LPI/MPI	Note 3			R	P	W		
2.4	DIMENSIONAL INSPECTION											
2.4.1	Ladder	Length, Step position,Ends	B	Visual & Measurement	100%	Drawing		--	P	W		
2.4.2	Buck stay beams	Corner piece,plate,pin connection,link-arrangements. Dimns.	A	Visual & Measurement	100%	Drawings NOTE-4 BHE:NDT:PB:MT		R	P	W		
		Soundness		MPI/LPI/RT	Note-3	01,latest,BHE:NDT:PB:PT		R	P	W		
					Note-3	01latest BHE:NDT:SS:RT		R	P	W		
2.4.3	Roof beams: Profile beam / rolled section	Shape,Size,profile Straightness Verticality	B	Visual & Measurement Plumb	100%	05 latest		R	P	W		
2.4.4	Built up beams/bracings & Monorails	Shape,size , length, verticality Match mark,		measurement visual	100%	Drawing Note 4, BHE:NDT:PB:MT01latest BHE:NDT:PB:PT01latest,		R	P	W		
		Straightness Soundness		MPI/LPI/RT	Note-3	,BHE:NDT:SS:RT 05,latest		R	P	W		

SL. NO.	COMPONENT AND OPERATION	CHARECTERISTICS	Cl.	TYPE OF CHECK	Quantum	REF.DOCUMENT/ ACCEPTANCE STD.	TYPE OF RECORD	Agency *			REMARKS
							D	M	c	n	
2.5	POST WELD HEAT TREATMENT(PWHT)	Temp,soaking Time,ROH/ROC		Review of HT chart	100%	Note 5		R	P	V	
3.0 3.1	Final inspection Trial assembly	Alignment, Matching, Orientation, & Inclination		Visual Measurement/ Water level	100%	SIP:NP: 09 latest Note 4 Drawing		R	P	W	
3.2	Match marking Reference line,	Identification		Visual Measurement	100%			R	P	V	
3.3	Identification	WO.No.,DU No.& S/C code		Visual	100%	Drawings &QCP 002 latest		-	P	V	
3.4	Painting and Preservation	Surface preparation, DFT		Visual Check	100% Random	SIP:PP:22 latest		R	P	W	
3.5	Packing and Protection	Stability Cover/Shimplates		Visual	100%	Drawings SIP:PP:22 latest& NOTE-6		-	P	V	

Refer SQP:NP:027 rev03 for bolted design structures

NOTE-1

MATERIAL	MATERIAL SPEC.	TDC No.
Rolled sections	IS 2062 E250A/BR, E350 A,BR,BO&C	0:301.
	ASTM A36,BSEN10025	as per specification
Plates and sheets		
	IS 2062 E250A/BR, ASTMA36,E350A,BR,BO&C	0:301, 0:318 as per specification
	DIN 17100 St 52.3	0:302
	SA387 Gr 12 & Gr 22	0:202
	SA 515 Gr 60&70	0:202

NOTE-2

2.0 MARKING

2.1 Wherever applicable the squareness shall be ensured by checking Diagonals and reference lines shall be marked and punched.

2.2 For Rolled Beams dimensional tolerances shall be as given below.

1) Depth of section
   a) Upto 1 M : ± 3 mm
   b) 1M to 2M : ± 4.5 mm
   c) Above 2 M : + 7.5 mm, - 4.5 mm
2) Flange width : ± 3 mm
3) Web shift : 2 mm
4) Length : 1 mm / M. Max.5mm

2.3 CENTER LINE MARKING

2.3.1 All I section columns/Beams shall be marked with center lines, one on flange and other on one side of web. Box section columns will be marked on the web side. L section column shall be marked on the middle of leg.

2.3.2 Flange center line shall be obtained by joining the center point of web thickness at both ends.

2.3.3 Web center line shall be obtained by joining the mid points of the section depth at both ends.

2.3.4 After marking, the center line shall be identified by legible center punching to the length of 25mm with 5 dots and of size of dia. 2mm at the interval of 2 meters. The punched portion of center line shall be bordered with white paint.

2.4 MARKING AND PREPARATION OF ATTACHMENT PLATES

2.4.1 The length/width variation shall be within ±2mm, diagonal difference within 3 mm.

2.4.2 The flatness shall be checked and shall not exceed 2mm for plate size 50mm & below and 3mm above 50mm.

2.4.3 The bolt holes and grout holes shall be marked and drilled as per drawing. Wherever specified in the drawing, match drilling shall be done with the mating part. The tolerance for finished holes are as follows:

1. Hole dia for friction grip bolts :+0.5 /-0 mm
2. Hole dia for other holes :+1 mm /- 0 mm
3. Individual pitches :±1 mm max.
4. Cumulative pitch :±2 mm max.

2.4.4 Where splicing of rolled sections are envisaged, it shall be ensured that the rolled section is straightened and meets the requirements given below:

1. Out of Straightness : 5 mm max.
2. Splicing edge : Square to surface
3. Web centre line offset : 1.5 mm max

2.4.5 Shop joint for rolled sections/plates shall be followed as per drg No:3-35-110-00686-Latest,Production notes drg. No: 4-35-110-00347/latest,3-35-110-00995/latest.

NOTE-3

3.0 TYPE AND EXTENT OF NDE unless additional NDE is specified in CQPs.

3.1 BUTT WELDS - MPI

3.1.1 100 % M P I. for thickness above 25 mm upto and Including 32 mm.
10 % MPI per DU for thickness less than 25 mm.

3.1.2.0 MPI ON FLAME CUT EDGES

3.1.2.1 100% MPI-P3,P4&P5 - Flame cut edges t>12 mm
10% MPI- P1 – Flame cut edges t>20mm and below38mm
100% MPI-P1 - For all flame cut edges t>=38mm
100%MPI- All beveled edges for t> 20mm for all materials.

3.1.2.2 100% LPI- Root groove areas after back chipping prior to welding second side for all groove plate butt weld and all spliced joint for rolled section.

3.1.2.3 Wherever Heat treatment is applicable required MPI/LPI shall be done after HT.

3.2 BUTT WELDS –RT

3.2.1 100% RT for carbon steel for t>32 mm.
For P3,P4 if t > 16 mm
For P5 if t > 12 mm

3.2.2 100% RT on flange butt joint for mono rail beams of all sizes.

3.2.3 10% RT per DU for web butt joint in all built up monorail beams.

3.2.4 Wherever RT is not feasible UT shall be carried out with the discretion of BHEL/QC.

3.3 FILLET WELDS
3.3.1 100 % MPI, if both plate thickness over 25 mm.
3.3.2 10% MPI/LPI per DU all other fillet welds.
3.3.3 100% MPI/LPI on fillet welds of splice plates for all thickness built up beams and rolled sections
3.3.4 100% MPI on all fillet welds of mono rail beam.

NOTE-4
4.0 FABRICATION TOLERANCES
4.1 The tolerances for fabrication shall be as per the relevant product drawing. However the following tolerances can be adopted, where not specified.
4.1.1 Length:
a) For members where ends are free: ± 1 mm/M subject to 5mm max
b) Members connecting between two structural members : +0 mm - 3mm
4.1.2 Web shift : 2mm
4.1.3 Out of squareness : 2mm
4.1.4 Combined warpage and tilt of flange of welded beams shall not exceed 1/100 of total width of flange or 6 mm whichever is greater.
4.1.5 The twisting of the beams or members shall not exceed 0.005h / 5M length subject to a maximum of 10 mm. (where "h" is the height of beam)
4.1.6 Out of Straightness
Length upto 15 Mtr. : 1 mm/Mtr and max. 10mm.
Length over 15 mtr. : 10mm + 1mm/M for the length in excess of 15M.
4.1.7 For Frames of General Structures the following tolerances shall apply:

Length and width	: ± 1.5 mm/M max. 6 mm
Difference between diagonals	: 2 mm/M max. 8 mm
Height	: + 1.5 mm/M max. 6 mm
Spacing of inter-mediate members	: ± 3 mm

4.1.8 For handrails the variation permitted in length is ±3mm and bow is ±2mm per meter subject to a maximum of 10mm.

4.1.9 For monorail beams the following tolerances shall apply
(clause Nos. 1 & 2 applies for all other beams also)

1.Depth of section	:±3 mm
2.Flange width	:+/- 3 mm
3.Flange width	:±2 mm,for monorail(+2,-0mm)
4.Web shift	: 2 mm
5.Length:	
Runways connected in between two structures (Span upto 12m)	: +0 mm,-2 mm
6.Mono rails	:+/-5mm.
7.Combined Warpage and tilt	: 3 mm max.
8.Sweep/Camber	: 5 mm max.

Monorail beams shall be checked for trial assembly as per Clause 7.0 of SIP :NP:02

NOTE:5
PWHT shall be performed for:

5.1 **Butt welds/Groove welds**

P1	All butt welds when t > 50mm and web stiffners at end bearing locations along with stool plate (except web to flange fillet & groove weld)	600-650°C
P3	All butt welds in tension members and all welds when t>16mm	620-650°C
P4	All butt welds in tension members and all welds when t>16mm	650-680°C
P5	All welds	680-710°C

5.2 **Fillet welds**

P1- Not required	
P3 -if throat thickness>13mm	620-650°C
P4 -if throat thickness>13mm	650-680°C
P5 -All thickness	680-710°C

Where t =plate thickness in case of butt welds and weld thickness in case of groove welds for P1 materials .In case of combination of groove and fillet welds both weld depth and throat thickness are to be considered.

The load carrying members shall be heat treated for flame cut edges prior to welding as per Table -2. Alternatively for flame cut edges, the cut edges shall be ground or machined upto 3mm to remove HAZ.

For Local PWHT, general guidelines shall be as per QCP:002(latest)and SIP:NP:11(latest) shall be followed.

Table -2

scope	Material	Thickness	Heat treatment cycle
Flame cut edges	P1	> 50 mm	600°- 650°C for 30 minutes.
	P3	> 16 mm	620°- 650°C for 30 minutes.
	P4	> 16 mm	650°- 680°C for 30 minutes.
	P5	all thickness	680°- 710°C for 30 minutes.
Shear cut edges	P1	> 50 mm	600°- 650°C for 30 minutes.
	P3	> 13 mm	620°- 650°C for 30 minutes.
	P4	> 13 mm	650°- 680°C for 30 minutes.
	P5	>10mm	680°- 710°C for 30 minutes.

For materials other than P5, this heat treatment may be clubbed with the final heat treatment of the product

5.3 The preheat for welding and gas cutting shall be followed as per table -3. Preheat and post heat temperature referred in Table-3 shall be followed unless otherwise specified in WPS

Table:3

Scope	Material	Preheat	Post heat
Welding	P1-IS2062 E250	t>38mm,150°C	-
		t>63mm,150°C	-
	P1-IS2062 E350	t>25mm,150°C	-
	P3&P4	allthickness, 150°C	-
	P5	allthickness, 150°C	250°C for 2 hours
Flame cutting	P1	t>50mm,150°C	-
	P3&P4	t>16mm, 150°C	-
	P5	t<13mm,120°C	-
		t=13to25mm, 150°C	
		t>25mm,200°C	

5.4 Refer QCP 002 for process controls and other details

NOTE-6

6.1 While stacking of beams, ensure that the flange portion of the beam is kept horizontal and parallel to the firm ground. Adequate supports shall be provided so as to avoid sagging or distortion.

6.2 Storage, preservation, shipping shall be as per the relevant packing instruction.

एन टी पी सी लिमिटेड
(भारत सरकार का उद्यम)
NTPC Limited
(A Govt. of India Enterprise)
(Formerly National Thermal Power Corporation Ltd.)
(केंद्रीय कार्यालय नोएडा)
Corporate Center NOIDA

Reference : CC-ENGG-4540-001-102-PVM-H-032 **Date :** 16/12/2023

From : Yogesh Kumar ADDL. GENERAL MANAGER	**To :** BHARAT HEAVY ELECTRICALS LTD NEW DELHI 110049 IN **Cc :** singhjp@bhel.in

Subject : EPC TTPP3 (2x660MW)

Please find enclosed following drawings/ documents for necessary action at your end.

Vendor Drg. No.	:	7936-ENPNT-DOC-002
Orgn. Drg. No.	:	4540-001-102-PVM-H-032
Revision No.	:	00
Drg. Title	:	PAINTING SCHEDULE OF AUXILIARY BOILER
App. Category	:	CATREL
Release Date	:	16/12/2023

Scan to verfiy

Comments : This is Auto Archive drg developed & released by BHEL. Review & approval of the same by NTPC Engineering is not envisaged.

Name of the Project/ Package	:	Talcher Thermal Power project Stage-III (2x660MW), EPC TTPP3 (2x660MW)
Drawing / Document Number	:	4540-001-102-PVM-H-032
Drawing / Document Title	:	PAINTING SCHEDULE OF AUXILIARY BOILER

Certification Statement by the Contractor (M/s BHEL) in line with requirement of Cl. No. 2.00.00 (a) of Sub Section G-07, Part-B, Section-VI (Technical Specification) w.r.t. Auto Archive (AA) Documents:

"We confirm that this document meets all the contract requirements including safety and statuary requirements and facilitate ease of operation and maintenance. In case any deviation is found, the Contractor shall carry out all required changes/ modifications without any cost implications to NTPC. In addition, Penalty on account of non-compliance of contract specification as deemed fit by the Employer shall be recovered"

BHARAT HEAVY ELECTRICALS LIMITED
Heavy Plates & Vessels Plant, Visakhapatnam-530012

NTPC- TALCHER TPP, STAGE-III (2X660MW)
Angul District, Orissa
Customer No: 7936, 1x90 TPH Net - Auxiliary Boiler
PAINTING SCHEDULE
NTPC Drawing No: 4540-001-102-PVM-H-032

Prepared by	K Munayya Drughtsman Gr.II		Document No: 7936-ENPNT-DOC-002
Reviewed by	V Raghavendra Pavan Manager/Engineering		Revision No. 00, Dated: 23.03.2023
Approved by	K. Tarakesh Sr. Manager/Engineering		Sheet No. 1 of 11

We confirm that this document meets all the contract requirements including safety and statuary requirements and facilitate ease of operation and maintenance. In case any deviation is found, BHEL shall carry out all required changes/ modifications without any cost implications to NTPC. In addition, Penalty on account of noncompliance of contract specification as deemed fit by the Employer shall be recovered.

RECORD OF REVISIONS

Rev. No.	Date	Details of revision	Remarks
0	15.12.2023	First Submission	

Sl. No.	PGMA/Description	Surface Preparation & Surface Profile	Primer coat		Intermediate coat		Finish coat			Total DFT µm (min)
			Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
1	Drum (Except Internals) 04-114, 210	SSPC-SP3/ Power Tool Cleaning	Heat Resistant Aluminium Paint to IS 13183 Gr.1, DFT=20µm/ coat.	1	--	--	Heat Resistant Aluminium Paint to IS 13183 Gr.1, DFT=20µm/ coat.	1	Aluminium	40
2	Drum Suspension 04-144	SSPC-SP3/ Power Tool Cleaning	Red Oxide Zinc Phosphate primer (Alkyd base) to IS 12744, DFT=25µm/ coat.	2	--	--	Synthetic Enamel (long oil alkyd) to IS2932, DFT=25µm/ coat.	2	Smoke Grey Shade No: 692 of IS5	100
3	Drum Internals, Foundation materials and DD items (threaded and machined surfaces only) 04-114, 210; 21-700; 24-351, 625, 627, 642, 700; 35-010, 700; 39-010; 42-700; 48-700; 81-318;	SSPC-SP3/ Power Tool Cleaning	Rust preventive Fluid to PR: CHEM: 09-04, DFT=25µm/ coat.	1	--	--	--	--	--	25
4	Boiler Supporting Structures, Columns, Girders, Bracings: 35-110,210,310,410,610; 36-391; 39-110, 303; Galleries, Stair-ways & inter connecting Walkways 36-210-220, 230, 390 Buckstays 08-100 Flue Gas Duct System supporting Structures 48-335	Blast cleaning to SA2 ½ (Near white metal) conforming to ISO 8501-1 with surface profile 40-60 µm	Inorganic Ethyl Zinc Silicate Primer DFT=70µm per coat (refer sheet 10, Sl.no.10 for details)	1	Polyamide cured epoxy with MIO content. Minimum 100µm DFT per coat (refer sheet 10, Sl.no.09 for details)	1	Two pack Aliphatic isocyanate cured acrylic Finish paint DFT 70µm. (refer sheet 10, Sl.no.2 for details)	1	Grey White Shade To RAL 9002	240

Sl. No.	PGMA/Description	Surface Preparation & Surface Profile	Primer coat		Intermediate coat		Finish coat			Total DFT µm (min)
			Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
5	Components >95^{0}C Insulated other than components in Sl.No. 7 & 9 Headers, Pipes & Fittings outside the gas path 10-170, 270; 12-850, 900, 993; 18-001; 21-600, 602, 603, 604, 700; 24-352, 600, 603, 620, 624, 627, 628, 635, 642, 700; 80-300, 345, 366, 417, 420, 421, 446, 450, 451, 453; 81-005, 026, 318; Hot Air: 48-200, 207, 332 & 334;	SSPC-SP3/ Power Tool Cleaning	Heat Resistant Aluminium Paint to IS 13183 Gr. I DFT= 20µm/ coat.	1	--	--	Heat Resistant Aluminium Paint to IS 13183 Gr. I DFT= 20µm/ coat.	1	Aluminium	40
6	Components >95^{0}C uninsulated other than components coming in gas path. 07-431; 09-001, 002, 003; 12-901; 24-642; 28-220; 42-200, 300; 48-915; 81-104	SSPC-SP3/ Power Tool Cleaning	Heat Resistant Aluminium Paint to IS 13183 Gr. I DFT= 20µm/ coat.	1	--	--	Heat Resistant Aluminium Paint to IS 13183 Gr. I DFT= 20µm/ coat.	1	Aluminium	40
7	Loose Tubes, SH. Coils 11-170, 997	SSPC-SP2 or SSPC-SP3/ Power Tool Cleaning	Red Oxide Zinc Phosphate Dip coat primer to PR: CHEM: 09 – 03 DFT=35µm/ coat.	1*	--	--	--	--	Red Oxide	35

*- In lieu of dip painting, 2 coats of brush painting of Red oxide Zinc Phosphate primer to a coating thickness of 60µ is also permitted in line with Sr.No.9.

Sl. No.	PGMA/Description	Surface Preparation & Surface Profile	Primer coat		Intermediate coat		Finish coat			Total DFT µm (min)
			Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
8	Miscellaneous Piping & Supports: 24-350, 351, 352, 353, 601, 604, 625, 626, 640, 641; 80-920, 921, 922, 936; 97-599; 99-100 Steam Blowing Piping: 42-002; Fuel Firing: 41-200, 500; 42-010, 011, 152; 80-650; Duct Plates, Expansion Joints: 48-082, 084, 911; Auxiliary Cooling water Piping: 80-460; Service Air Piping: 80-612; Dosing System: 81-127, 128 (Refer Note-7)	SSPC-SP3/ Power Tool Cleaning	Red Oxide Zinc Phosphate primer (Alkyd base) to IS 12744, DFT=30µm/ coat.	2	--	--	Synthetic Enamel (long oil alkyd) to IS2932, DFT=20µm/ coat.	2	Smoke Grey Shade No: 692 of IS5	100
9	Components>95^{0}C coming in the gas path, Headers, Commissioning Spares & Erection materials etc., 04-988; 05-137, 147, 231, 241; 06-609, 614, 616, 630, 640, 657; 07-200, 201, 202, 204, 211, 214, 601, 993, 997; 12-993; 19-850, 993; 20-988, 998; 30-215; 31-010, 301; 32-010; 37-010, 810; 48-993; 97-590	SSPC-SP3/ Power Tool Cleaning	Red Oxide Zinc Phosphate primer (Alkyd base) to IS 12744, DFT=30µm/ coat.	2	--	--	--	--	Red Oxide	60
10	Hand Rails and posts, ladders/rungs 36-820, 850; Floor Grills, Step Treads 36-811	SSPC-SP8/Acid Pickling	Hot dip Galvanizing to a coating weight of 610 g/m^2 (minimum) and to a coating thickness of 85 microns (minimum). Refer Notes given below **							

Notes **- The Guard plates, Hood Ladders, Stringer channels, angles and plates shall be painted as per painting scheme prescribed in Sl. No: 4.

Sl. No.	PGMA/Description	Surface Preparation & Surface Profile	Primer coat		Intermediate coat		Finish coat			Total DFT µm (min)
			Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
11	Cast carbon steel valves (conventional) Cast Alloy Steel Valves (Conventional) All API valves, QCNRV, SV & SRV, Silencers 24-665, 673, 24-998 (Refer Note-07); 80-901; 97-500;	SSPC-SP3/ Power Tool Cleaning	Heat Resistant Aluminium Paint to IS 13183 Gr. II DFT= 20µm/ coat.	2	--	--	Heat Resistant Aluminium Paint to IS 13183 Gr. II DFT= 20µm/ coat.	1	Aluminium	60
	Forged Valves	Chemical Cleaning	Phosphating to a coating weight of 1500 mg per sq.ft.	--	--	--	--	--	--	--
12	Soot Blower components 20-301, 304, 801, 621, 803	SSPC-SP3/ Power Tool Cleaning	Red Oxide Zinc Phosphate primer (Alkyd base) to IS 12744, DFT=30µm/ coat.	2	--	--	Synthetic Enamel (long oil alkyd) to IS2932, DFT=20µm/ coat.	2	Verdigris Green Shade No. 280 of IS5	100
13	For CLH & VLH*** PGs 07, 12, 19, 21, 24, 48 & 80 80-920, 80-921, 922, 936	Blast cleaning to SA2 ½ (Near white metal) with surface profile 35-50 µm	Epoxy Zinc Rich Primer with to IS 14589 Gr.II (latest) % VS=35 (min) DFT=40 microns per coat	1	--	--	Aliphatic Acrylic Poly-Urethane paint to IS 13213 (latest) %VS=40 (min) DFT=30.0 microns per coat	1	Phirozi Blue Shade No. 176 of IS5	70

***- For components other than CLH & VLH, Painting scheme shall be as given in Sl. No. 8.

Sl. No.	PGMA/Description	Surface Preparation & Surface Profile	Primer coat		Intermediate coat		Finish coat			Total DFT µm (min)
			Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
14	All Columns below '0' level (embedded in concrete) 35-110	SSPC-SP3/ Power Tool Cleaning	HB Chlorinated Rubber Based Zinc Phosphate Primer %VS=40, (min) DFT=50 microns per coat	1	--	--	--	--	Grey	50

NOTES:

1. Rust Preventive Coating should be given on HSFG Bolt and nut threads.
2. Machined surfaces and all retainers are to be applied with a coating of Temporary Rust Preventive oil.
3. All threaded and other surfaces of foundation bolts and its materials, insulation pins, Anchor channels, Sleeves, shall be coated with Temporary Rust Preventive Fluid and during execution of civil works; the dried film of coating shall be removed using organic solvents.
4. Ground shade/ Colour of Finish paints & identification tag/Band for equipments, pipings pipe service, boiler supporting structures and other boiler components shall be followed as per tender.
5. PGMAs under Sub-Vendor items are not indicated. For all bought-out and sub-vendors items including PGMAs mentioned above falling under the scope of BHEL, the same scheme as for main equipment as covered in this document shall be followed.
6. This painting Scheme is valid for only Customer No: 7936 (BHEL-HPVP Unit), Auxiliary Boiler -1X90 TPH (Net) catering to NTPC Talcher-2x660 MW Super Thermal Power Project.
7. No painting is required for Stainless Steel, non-ferrous & galvanized components.
8. Wherever inside surfaces of components under PGMA 48 – XXX & other PGMAs, need protection till erection, two coats of Red-oxide zinc phosphate primer paint to IS12744 to a DFT of 60 microns shall be applied, after power tool cleaning. This includes duct inside surfaces, truss, beams, gusset plate, guide vanes, divider plates, rectifier, divider vanes, etc coming in the gas path.
9. The Temporary Rust Preventive coating that already been applied on any components, 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 has peeled off over a large area, then the coating is to be removed by suitable solvents / heating to 350 –400 ^{0}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).
10. In components, wherever plates / sheets of thickness less than or equal to 5 mm and rods of <25mm/tubes/drain pipes are used, power tool / hand tool cleaning to SSPC – SP3 / SP2 shall be followed and the painting shall be done as described in Sl.No.8.
11. For all commissioning components-erection materials (xx-993) two coats of Red oxide Zinc Phosphate Primer shall be applied to meet the temporary protection till erection, after power tool cleaning.
12. Touch-up paintings, making good any damaged shop painting and completing any unfinished portion of the shop coat shall be carried out as per clause applicable painting scheme.
13. All components covered under different PGMA's are to be painted. In case any component is left out, the same shall be deemed to be included under the relevant section based on paint logic approved.
14. For very small components like clamps etc. which are not having feasible dimensions for blast cleaning, painting scheme of Sl.No.8 shall be followed.
15. For very small components with weldable primer at edges, the entire component shall be applied with weldable primer. Structural members having welded connections at site, relevant area can be painted with primer paint instead of Weldable primer.
16. All temporary/transport structures, are to be painted with 1 coat of Red oxide Zinc Phosphate primer (Alkyd Base) to IS 12744-DFT-30µ and 2 coats of Synthetic Enamel paint (Long Oil Alkyd) to IS 2932-DFT-2X20µ Shade Yellow –Shade No. 356 of IS 5- Total DFT 70µ. These are to be cut & removed at site after erection. (It excludes components covered under Sr. No. 4 & 9 of description table).
17. For internal protection of Pipes, tubes, headers and other pressure parts, Volatile Corrosion Inhibitor (VCI) pellets shall be put (after sponge testing/ draining/ or drying) and subsequently end capped. The dosage of VCI pellets shall be approximately 100 g/ Cu.m. For tubes typically 4 – 5 tablets per end are to be put. For C & I items, the dosage of self-indicating Silica Gel (colourless) shall be 250 g/ cu.m. (About 2 to 3 bags weighing approximately 100 grams each). VCI pellets shall not be used for stainless steel components and its composite associates.
18. All threaded components of spring assemblies and turnbuckles shall be galvanized and achromatized to 15 microns minimum thickness.
19. Soot blower components i.e Valve head assembly having high surface temperature (> 200 and <600 deg. C) shall be applied with protective coating as per PS9* (IS-13183 Gr.-II up to 400 deg.C and IS-13183 Gr.I up to 600 deg.C)
20. Corner plate, sheet channel and fixing pins of PG 32 shall be painted as per scheme PS3 to total DFT of 60 microns.

21. It is mandatory that for finish coat each layer shall have a permanent DFT and free from any paint defects like sags, wrinkles etc. Total DFT of a component correspond to respective painting scheme has to be ensured and recorded by inspection agency as per QP.
22. For chequered plates having thickness <=5mm, surface preparation can be power tool cleaning to SP3 and painting shall be in line with Sl. No. 8.
23. Handrails, step treads of PGMA under Sl. No. 4 need to be galvanized in line with scheme for handrails (i.e. Sl .No. 10).
24. Inside surfaces of fabricated structure (e.g. Box type column) shall be painted with two coats of red oxide primer paint during fit up stage.
25. All steel structures shall be provided with painting as given in the specification. Further, painting system shall also meet the requirements of corrosivity category C3 (durability high) as per ISO 12944.
26. Surfaces prepared as per the surface preparation scheme indicated herein shall be applied with primer paint within 6 hours after preparation of surfaces.

Painting Scheme - Details for procurement & application purposes

Sl. No.	Generic nature of paint	Theoretical covering capacity (Sq. m per litre)	No. of Pack	Volume Solids, % (min)	DFT in microns per coat (approx.)	Shade	Shade No. to IS5	Mode of application	Over coating interval, Hrs.
1	Epoxy Zinc rich primer to IS14589 Gr.II (latest)	8	2	35	40	Grey	––	Spray	24
2	Two-pack aliphatic Isocyanate cured acrylic finish paint (solid by volume minimum 55% with Gloss retention (SSPC Paint Spec No 36, ASTM D 4587, D 2244, D 523) of Level 2)after minimum 1000 hours exposure, Gloss loss less than 30 and colour change less than 2.0 Delta – E).	8	2	55	70	Grey White	RAL 9002	Airless Spray	24
3	Heat resistant Aluminium paint to IS 13183 Grade I/II/III (latest)	10	1	––	20	––	––	Brush/ Spray	24
4	Red oxide zinc phosphate primer paint to IS 12744 (latest)	10	1	––	30	––	––	Brush/ Spray	12
5	Red oxide Zinc Phosphate Dip coat primer paint to PR: CHEM: 09-03	10	1	––	35	––	––	Dip	12
6	Long oil alkyd synthetic enamel finish paint to IS2932 (latest)	17	1	––	20	Reqd. Shade	corrpdg. Shade no.	Brush/ Spray	12
7	Temporary Rust preventive fluid to PR: CHE: 09 – 04	10	1	––	25	––	––	––	12
8	HB Chlorinated Rubber Based Zinc Phosphate Primer-Colour Grey	8	1	40	50	Grey	––	Brush/ Spray	12
9	Two component polyamide cured epoxy with MIO pigmented intermediate coat. (containing lamellar MIO minimum 30% on pigment)	8	2	80	100	Brown/ Grey	––	Airless Spray	24
10	Two component moisture curing zinc (ethyl) silicate primer, metallic Zinc content 80% (min), Zinc dust quality shall be as per ASTM D 520 Type 2.	8	2	60	70	Grey	––	Airless Spray	24

The covering capacity of paints specified is only approximate.
The paints and Rust Preventive fluid shall be procured from BHEL's approved suppliers.

Painting of Damaged Areas

(Areas where the paint has deteriorated badly by erosion and areas where the paint film has lost its adhesion and where the steel has rusted appreciably, should be repainted as follows)

Sl. No.	Components	Surface Preparation	Primer coat		Intermediate coat		Finish coat			Total DFT µm (min)
			Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
1	Paint damaged components fall under Sl.no: 4	Power tool cleaning of minimum 6" of surrounding areas to bare metal	Epoxy zinc rich primer to IS 14589 Grade II	2 DFT 70µ (min)	As given in scheme	1	As given in scheme	3	As given in scheme	As given in scheme

BTG & AUXILIARIES

adani	**OWNER** MAHAN ENERGEN LIMITED(MEL) 2x800 MW ULTRA SUPER CRITICAL THERMAL POWER PROJECT, MAHAN (PHASE-II), SINGRAULI, M.P.
TATA	**OWNER'S ENGINEER** TATA CONSULTING ENGINEERS LIMITED
BHEL	**BTG CONTRACTOR** BHARAT HEAVY ELECTRICALS LTD. **CUSTOMER NO: U8-1832/1833, UNIT – I & II**
LOGO	**SUB-CONTRACTOR / SUB-SUPPLIER** Not Applicable

PLANT	**HIGH PRESSURE BOILER PLANT, TIRUCHIRAPPALLI**
DOCUMENT TITLE	**PAINTING SCHEDULE**
OWNER DOC. NO.	**552H-E-BTG-BOA-DM-S-V-0001**
CONTRACTOR / SUPPLIER DOC. NO.	**PL:C3-PS/1832**
PACKAGE DISCIPLINE	BTG & AUXILIARIES
PREPARED BY	**K. Srinivasan**
REVIEWED BY	**K. Raj Mohan**
APPROVED BY	**A. Santha Kumari**

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Revision Control History

Sr. No.	Revision No.	Date	Reasons for Change
1	0	24-10-23	Prepared in line with Annexure-1, ADANI's Technical Specification for painting & coating of equipment & structures and BHEL standard painting system.
2	1	27-11-23	Modified as per TCEL comments dt. 26.10.2023 on painting schedule submitted for approval
3	2	19-12-23	Modified as per TCEL comments dt. 01.12.2023 on painting schedule submitted for approval

Paint shade shall be as per colour coding specified in contract specification (Clause no. 9.3 of Annexure 1 - Painting & Coating of Equipment & Structures)

TATA CONSULTING ENGINEERS LIMITED
CONTRACTOR DOCUMENT REVIEW STATUS

- ☑ 1 — Approved, Further work can Proceed
- ☐ 1* — Approved with minor comments. No resubmission is required. To be incorporated in As-Built. Good for Manufacturing/Construction / Fabrication subject to incorporation of comments.
- ☐ 2 — Approved with comments. Work can proceed subject to incorportaion of comments
- ☐ 3 — Not Approved. Revise according to comments & resubmit
- ☐ 4 — Retained for Information
- ☐ 4* — Incorporate Comments & resubmit for Information & records

Approval conveyed herein neither relieves CONTRACTOR of his contractual obligations and his responsibilities for correctness of dimensions, materials of construction, weights, quantities, design details, assembly fits, system / performance requirements and conformity of supplies with National/ international statutory laws as may be applicable , nor does it limit the Employer's rights under the contract.

Reviewed by: DN Date: 22-12-2023

adani

Essakkiappan M — Digitally signed by Essakkiappan M Date: 2023.12.22 18:39:08 +05'30'

Reviewer

Pravin Kadbe — Digitally signed by Pravin Kadbe Date: 2023.12.22 19:38:46 +05'30'

Approver

Categories:

- ☑ Cat-I — Approved. Good for Manufacturing/Construction/Fabrication.
- ☐ Cat-I* — Approved with minor comments. No resubmission is required. To be incorporated in As-Built. Good for Manufacturing/ Construction/ Fabrication subject to incorporation of comments.
- ☐ Cat-II — Resubmission is required. Approved & Released for Manufacturing/ fabrication/ construction subjected to incorporation of comments.
- ☐ Cat-III — Not Approved. Revise & Resubmit for Approval
- ☐ Cat-IV — For Information & Records.
- ☐ Cat-IV* — Incorporate Comments & resubmit for Information & records.

Note: "Approval of this document does not absolve the Contractor/ Supplier/Fabricator from fulfilling Contractual obligations in any way"

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Sl. No.	PGMA / Description	Surface Preparation & Surface Profile	Primer coat		Intermediate coat		Finish coat			Total DFT µm (min)
			Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
1 PS1AC	**Collector & Separator Vessels (Except Internals), Supports** 04 –321,323;	SSPC-SP3/ Power Tool Cleaning	Red Oxide Zinc Phosphate Primer (Alkyd Base) to IS 12744 DFT= 30µm per coat	1	--	--	Synthetic Enamel paint (Long Oil Alkyd) to IS 2932 DFT= 20µm per coat	2	International orange Shade No: 592 of IS5	70
2 PS5	**Collector & Separator Vessels internals and** Dd items (threaded and machined surfaces only) 04-347;07-302,303,331,360,361,362,393; 08-911,912,913; 09-304; 12-306,314; 12-317,324,327,328,344,348,354,393; 17-304,306,319;19-306,307;21-602,605,700; 24-352,700,803,813,818,827,842,968; 28-700;32-700;34-721to726,730to733; 35-190, 721to727,730; 36-721to727,731to735; 39-700;41-710; 42-700,710;43-710; 45-710;47-710; 48-019,700; 65-710;67-710; **Foundation materials**: 35-010, 39-010,012	SSPC – SP3 Power Tool Cleaning	Rust Preventive Fluid to PR: CHEM: 09 – 04 DFT=25µm per coat	1	--	--	--	--	--	25
3 PS19C9	**Buck stays** 08-001,003,006,007,111,380,400, 08-501,503,901,910; **Boiler supporting structures, Columns, Girders, Bracings** 34-101 to 106,200,300,390, 34-441 to 446, 511, to 516, 35-131 to 137, 141 to 147, 151 to 157, 35-181 to 187, 211to214, 35-221,222,231,232,311,312,321, 35-322,331,332,341,342,351,352,361,362, 35-372, 381 to 387, 390, 35-441 to 447, 451 to 457, 511 to 517;	Blast cleaning to SA2 ½ (Near white metal) conforming to ISO 8501-1 with surface profile 50-75 µm	Inorganic Ethyl Zinc Silicate Primer DFT=75µm per coat (refer sheet 12 Sl.no.11 for details)	1	High Build Epoxy MIO coating cured with polyamide hardnener coat DFT = 100µm per coat (refer sheet 12 Sl.no.10 for details)	1	High Build gloss Aliphatic acrylic Polyurethane paint DFT = 50µm per coat. (refer sheet 12 Sl.no.2 for details)	1	Dark admiralty grey to Shade No. 632 of IS 5.	225

For structural steel, all coats shall be applied at shop.

S. No.	PGMA / Description	Surface Preparation & Surface Profile	Primer coat		Intermediate coat		Finish coat			Total DFT µm (min)
			Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
3 PS19C9 (Contd.)	35-521 to 527; 35-531 to 537, 995; **Galleries, Stair-ways & inter connecting Walkways** 36-111to115,151to155, 36-311to316, 36-321to326,331to338,341to347, 36-351to356,361to366, 36-391 to 395, 36-610,613,620,740; 38-210,299,310,381,410,510,610, 710; **ID system structures.** 39-101,102,141,142,150,299,300,301, 39-304,305,306; **Duct supports** 48-015,115,145,205,225,235,265,345,355,365, 48-385,435,465,485,495,665; (Refer note 23 for handrails, step treads released under PGMA of this Sl.No.3) (Refer note 25 for bunker structures)	Blast cleaning to SA2 ½ (Near white metal) conforming to ISO 8501-1 with surface profile 50-75 µm	Inorganic Ethyl Zinc Silicate Primer DFT=75µm per coat (refer sheet 12 Sl.no.11 for details)	1	High Build Epoxy MIO coating cured with polyamide hardnener coat DFT 100µm per coat (refer sheet 12 Sl.no.10 for details)	1	High Build gloss Aliphatic acrylic Polyurethane paint DFT 50µm (refer sheet 12 Sl.no.2 for details)	1	Dark admiralty grey to Shade No. 632 of IS 5.	225
4 PS3	**Components >95° C Insulated other than components in Sl.No.7 &9** Ring Headers, Down Comers, Hot air Headers outside the gas path etc. (Refer Note 8) 05-137,147,155,227,231,251,327,330,350; 07-102,110,125,223,231,232,317; 12-178, 850,852, 900; 17-776,807; 18-001,010,701; 19-701,702,903;21-600;24-811,824,828; 24-836,837;	SSPC-SP3/ Power Tool Cleaning	Red Oxide Zinc Phosphate Primer (Alkyd Base) to IS 12744 DFT= 30µm per coat	2	--	--	No paint	No paint	Red oxide	60
For structural steel, all coats shall be applied at shop.										

Sl. No.	PGMA / Description	Surface Preparation & Surface Profile	Primer coat		Intermediate Coat		Finish coat			Total DFT µm (min)
			Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
4 PS3 (Contd.)	**Hot Air:** **48-018, 022,116,202,204,207,208,** **48-212,214,222,224, 262,264,267,662,** **48-664,667;** **Flue Gas:** **48-342,344,352,354,362,364,372, 48-382,384,386,** **432,434,462,464,482,484,492, 48-494,496,498;**	**SSPC-SP3/ Power Tool Cleaning**	**Red Oxide Zinc Phosphate Primer (Alkyd Base) to IS 12744 DFT= 30µm per coat**	**2**	**--**	**--**	**No paint**	**No paint**	**Red oxide**	**60**
5 PS 9	**<u>Components >95° C uninsulated other than components coming in gas path.</u>** **Temp: >95°C & <400°C** **24-807,820,860,865,867;** **42-200,300;** **Instrument tappings, doors: 48-200,915;**	**SSPC-SP3/ Power Tool Cleaning**	**Heat Resistant Aluminium Paint to IS 13183 Gr. II DFT 20µm per coat**	**1**	**--**	**--**	**Heat Resistant Aluminium Paint to IS 13183 Gr. II DFT 20µm per coat**	**1**	**Aluminum**	**40**
6 PS 10	**Components uninsulated other than components coming in gas path.** **(Temp: >400°C & <600°C)** **09-003,004,005; 28-220;** **Components insulated (Temp: >400°C & <600°C)** **RH & SH headers** **10-135,174,176,178,191,235,274,276,278,283,** **10-284,285,291; 15-136, 178,236,278;**	**SSPC-SP3/ Power Tool Cleaning**	**Heat Resistant Aluminium Paint to IS 13183 Gr. I DFT 20 µm per coat**	**1**	**--**	**--**	**Heat Resistant Aluminium Paint to IS 13183 Gr. I DFT 20 µm per coat**	**1**	**Aluminum**	**40**
7 PS2	**<u>Loose tubes, SH, RH & Eco. coils</u>** **11-074,078,374,378,406,467,469,** **11-487,491,494,606,608,684,694,716,717,718,** **11-767,768,769,787,791,916,917,918,967,968,** **11-969,987,991;12-179,181,184,187,368,** **12-403,405,514,515,524,544,554;** **12-800,803,805,903,914,917,924,927,928,944,948,** **12-954,968; 16-079,201,202,203,278,379;** **19-092,402,804,814,824,853,884,914,924,984**;	**SSPC – SP2 or SSPC – SP3 Hand tool / Power tool cleaning**	**Red Oxide Zinc Phosphate Dip coat primer to PR: CHEM: 09 – 03 DFT=35µm per coat**	**1***	**--**	**--**	**No paint**	**No paint**	**Red Oxide**	**35**

*-In lieu of dip painting, 2 coats of brush painting of Red oxide Zinc Phosphate primer to a coating thickness of 60µ is also permitted in line with Sr.No.9.

Sl. No.	PGMA / Description	Surface Preparation & Surface Profile	Primer coat		Intermediate Coat		Finish coat			Total DFT µm (min)
			Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
8 PS1A	**Miscellaneous and casing sheets** **07-409,431,460,461,462,502,503,509,531,560;** **12-506,906,907,916; 17-919; 21-601,604,606;** **24-350,351,354, 800,801,804,805,806,808,809,** **24-810,814,815,817,821,825,826,835,840,841,855,** **24-950,955,960;30-233,234;** **36-396; 39-302;** **04-147, 547** **Fuel firing: 41-350,390,500;** **Steam blowing piping** **42-001,002,005,010,046,065,070,152,154,157;** **43-004,104, 200;** **45-200,801,802, 804,805,858;** **47-261,263, 858;** **Duct plates, expansion joints** **48-911,912;** **Coal Feeding:** **65-736; 67-204,272,277, 283,801,802,803;** **95-088,089,091,485;97-585, 592;** **$Handling equipment:** **99-099,100,300,400,502,600;** **Nitrogen blanketing system:24-966,967,969;** **Seal air ducting: 43-005, 105;** **Cold Air duct:48-012,014, 112,114, 141** **Tempering Air: 48-142,144** **(Refer note 22 for chequered plates)**	**SSPC-SP3/ Power Tool Cleaning**	**Red Oxide Zinc Phosphate Primer (Alkyd Base) to IS 12744 DFT= 30µm per coat**	**1**	**--**	**--**	**Synthetic Enamel paint (Long Oil Alkyd) to IS 2932 DFT= 20µm per coat**	**2**	**Smoke Grey Shade No: 692 of IS5**	**70**

$ - Final Shade is Golden yellow for Under hung crane, Chain Pulley Block, Ratchet Lever and Trolley with hoist. Black shade for Hook.

Sl. No.	PGMA / Description	Surface Preparation & Surface Profile	Primer coat		Intermediate coat		Finish coat			Total DFT µm (min)
			Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
9 PS3	**Components >95° C coming in the gas path, Headers, Commissioning Spares &erection Materials etc.,** 06-400,401,431,434,437,441,444, 06-447,451,452,453,455,500,501,515,731,732, 06-734,735,737,741,744,745,747,751,752,753, 06-755, 759; 07-309,315,316,318,423,993; 10-182,183,184,185; 11-416,474,484; 12-993;17-174,504,506,900,903,993; 19-753,763,783,793,802,850,851,852; 21-987,988; 24-822,823, 987,988, 989, 993; 30-103,105, 212,215,219,223,224,235; 31-010,104; 32-010,210,810; 35-993; 37-010;38-993; 39-993; 41-997; 42-858,997; 43-997;45-997;47-997;48-993; 65-200,997; 67-200,997; 96-193; 97-282,590; 99-501; 41-988; 42-988; (Refer note 20 for info about 32-210)	SSPC-SP3/ Power Tool Cleaning	Red Oxide Zinc Phosphate Primer (Alkyd Base) to IS 12744 DFT= 30µm per coat	2	--	--	No paint	No paint	Red oxide	60
10 PS1AB	**Hand rails and posts, ladders / rungs** 34-820,850; 35-821,822,823,851; 36-820,821, 851,852,853; 38-820,850;39-820,850;	SSPC-SP3/ Power Tool Cleaning	Red Oxide Zinc Phosphate Primer (Alkyd Base) to IS 12744 DFT= 30µm per coat	1	--	--	Synthetic Enamel paint (Long Oil Alkyd) to IS 2932 DFT= 20µm per coat	2	BLACK	70
11 PS6	**Floor Grills, Step treads** 34-810; 35 – 811,812;36-811,812,813,814 38 – 810, 39 – 810;	SSPC – SP8/ Acid pickling	Hot dip Galvanizing to a coating weight of 610 g/m^2 (minimum) and to a coating thickness of 85µm. Refer Notes given below **							

Notes **: Guard plates shall be painted as per painting scheme prescribed in Sl. No: 03.

PAINTING SCHEME FOR VALVES

Sl.No.	PGMA / Description	Surface Preparation & Surface Profile	Primer coat		Intermediate coat		Finish coat			Total DFT µm (min)
			Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
12 @PS 9/10	Cast carbon steel valves (Conventional) Cast alloy steel valves (Conventional) All API valves, QCNRV, SV & SRV Silencers, 21-800,825, 24-885; Safety valves & ERV 21-850; 24-880,881,883;	SSPC-SP3/ Power Tool Cleaning	Heat Resistant silicone Aluminium Paint to IS 13183 Gr.II/I DFT= 20µm per coat	1	--	--	Heat Resistant silicone Aluminium Paint to IS 13183 Gr.II/I DFT= 20µm per coat	1	Aluminum	40
	Forged valves	Chemical cleaning	Phosphating to a coating weight of 1500 mg per Sq.ft.	--	--	--	--	--	--	--
1AS2	Soot Blower components 20-051,054,201,204,511,794,962. (Refer note 19 for valve head assembly)	SSPC-SP3/ Power Tool Cleaning	Red Oxide Zinc Phosphate Primer (Alkyd Base) to IS 12744 DFT= 30µm per coat	2	--	--	Syn. Enamel paint (Long Oil Alkyd) to IS 2932 DFT= 20µm per coat	2	Verdigris Green Shade No. 280 of IS5	100
	HP / LP system	SSPC-SP3/ Power Tool Cleaning	Heat Resistant Aluminium Paint to IS 13183 Gr.I DFT= 20µm per coat	1	--	--	Heat Resistant Aluminium Paint to IS 13183 Gr.I DFT= 20µm per coat	1	Aluminum	40

@ Heat resistant silicone based aluminum paint to IS 13183 Gr.II shall be applied for temperature up to 400 deg.C, Gr. I shall be applied for temperature >400 deg.C and up to 600 deg.C.

Sl. No.	PGMA / Description	Surface Preparation & Surface Profile	Primer coat		Intermediate coat		Finish coat			Total DFT µm (min)
			Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
13 PS15	**For CLH & VLH*** PGs 07,08,12,17,19,21,24,47,48 &80 07-402 to 405,505;12-517,528; 17-904,906 19-506,507,904,905, 906,907; 24-353; 48-206,395;	Blast cleaning to SA2½ (Near white metal) with surface profile 35-40 µm	Epoxy zinc rich primer To IS 14589 Gr. II (latest) %VS=35, (min) DFT=40 microns per coat	1	--	--	Aliphatic acrylic Poly-urethane paint to IS13213 (latest) %VS=40.0 (min) DFT= 30.0 microns per coat	1	Phirozi Blue Shade No. 176 of IS5	70
14 PS8C	**Components > 95°C & <200°C, un-insulated Fuel pipes** 47-200, 267,269;	SSPC-SP3/ Power Tool Cleaning	Heat Resistant Aluminium Paint to IS 13183 Gr. III DFT 20µm per coat	1	--	--	Heat Resistant Aluminium Paint to IS 13183 Gr. III DFT 20µm per coat	1	Aluminum	40
15 PS5	All Columns below '0' level (embedded in concrete) PGs 34,35,36,38, 39	SSPC-SP3/ Power Tool Cleaning	Rust Preventive Fluid to PR: CHEM: 09 – 04 DFT=25µm per coat	1	--	--	--	--	--	25

*- For components other than CLH & VLH, Painting scheme shall be as given in Sl. No. 8.

NOTES:

1. Rust Preventive Coating should be given on HSFG Bolt and nut threads.

2. Machined surfaces and all retainers are to be applied with a coating of Temporary Rust Preventive oil.

3. All threaded and other surfaces of foundation bolts and its materials, insulation pins, Anchor channels, Sleeves, shall be coated with Temporary Rust Preventive Fluid and during execution of civil works; the dried film of coating shall be removed using organic solvents.

4. Ground shade/ Colour of Finish paints & identification tag/Band for equipments, pipings pipe service, boiler supporting structures and other boiler components shall be followed as per Anneure-1, ADANI'S Technical specification for painting & coating of equipment.

5. PGMAs under Sub-Vendor items are not indicated. For all bought-out and sub-vendors items including PGMAs mentioned above falling under the scope of BHEL the same scheme as for main equipment as covered in this document shall be followed. Vendor standard practice has to be followed for PGMA not specified in this document.

6. This painting Schemes is valid for only Customer No: U8/1832 & 1833, MAHAN USTPP - 2X800 MW.

7. No painting is required for Stainless Steel, non-ferrous & galvanized components.

08. Wherever inside surfaces of components under PGMA 48 – XXX & others, need protection till erection, two coats of Red-oxide zinc phosphate primer paint to IS12744 to a DFT of 60 microns shall be applied, after power tool cleaning.

09. The Temporary Rust Preventive coating that already been applied on any components, 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 has peeled off over a large area, then the coating is to be removed by suitable solvents / heating to 350 –400 °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).

10. In components, wherever plates / sheets of thickness less than or equal to 5 mm and rods of ≤25mm/tubes/drain pipes & bent rods are used, power tool / hand tool cleaning to SSPC – SP3 / SP2 shall be followed and the painting shall be done as described in Sl.No.8.

11. For all commissioning components-erection materials (xx-993) two coats of Red oxide Zinc Phosphate Primer shall be applied to meet the temporary protection till erection, after power tool cleaning.

12. Touch-up paintings, making good any damaged shop painting and completing any unfinished portion of the shop coat shall be carried out as per clause 5.0- repair of damaged areas, annexure-1, technical specification.

13. All components covered under different PGMA's are to be painted. In case any component is left out, the same shall be deemed to be included under the relevant section based on paint logic approved.

14. For very small components like clamps etc. which are not having feasible dimensions for blast cleaning, painting scheme of Sl.No.8 shall be followed.

15. For very small components with weldable primer at edges, the entire component shall be applied with weldable primer. Structural members having welded connections at site, relevant area can be painted with primer paint instead of Weldable primer.

16. Painting scheme for all temporary structures like 04-196 shall be PS 1AE i.e. 1 coat of Red oxide Zinc Phosphate primer (Alkyd Base) to IS 12744-DFT-30µ and 2 coats of Synthetic Enamel paint (Long Oil Alkyd) to IS 2932-DFT-2X20µ Shade Yellow –Shade No. 356 of IS 5- Total DFT 70µ. These are to be cut & removed at site after erection. (It excludes components covered under Sr. No. 3 & 9 of description table).

17. For internal protection of Pipes, tubes, headers and other pressure parts, Volatile Corrosion Inhibitor (VCI) pellets shall be put (after sponge testing/ draining/ or drying) and subsequently end capped. The dosage of VCI pellets shall be approximately 100 g/ Cu.m. For tubes typically 4 – 5 tablets per end are to be put. For C & I items the dosage of self-indicating Silica Gel (colourless) shall be 250 g/ cu.m. (About 2 to 3 bags weighing approximately 100 grams each). VCI pellets shall not be used for stainless steel components and its composite associates.

18. All threaded components of spring assemblies and turnbuckles shall be galvanized and achromatized to 15 microns minimum thickness.

19. Soot blower components i.e Valve head assembly having high surface temperature (> 200 and <600 deg. C) shall be applied with protective coating as per PS9 (up to 400 deg.C) and PS10 (up to 600 deg.C)

20. Corner plate, sheet channel and fixing pins of PGMA 32-210, SD-210 shall be painted as per scheme PS3 to total DFT of 60 microns.

21. It is mandatory that for finish coat each layer shall have a permanent DFT and free from any paint defects like sags, wrinkles etc. Total DFT of a component correspond to respective painting scheme has to be ensured and recorded by inspection agency as per QP.

22. For chequered plates, surface preparation can be power tool cleaning to St3 and painting shall be in line with PS1A.

23. Handrails of PGMA under Sl. No. 3 need to be painted in line with scheme for handrails (i.e. Sl .No. 10). Step treads of PGMA under Sl. No. 3 need to be galvanized in line with scheme of Sl .No. 11.

24. Inside surfaces of fabricated structure (e.g. Box type column) shall be painted with two coats of red oxide primer paint during fit up stage.

25. Painting of bunker structures to be in line with painting scheme of supporting structures (Sl. No. 3).

26. All steel structures shall be provided with painting as given in the specification. Further, painting system shall also meet the requirements of corrosivity category C4 as per ISO 12944.

27. 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.

28. DFT of the coating system shall be determined in accordance with SSPC-PA2 in line with the following procedure.

- **a. Ten readings shall be taken for every $10m^2$ of painted areas.**
- **b. 90% of all readings shall be within the specified dry film thickness.**

c. Where total dry film thickness accordance with the above procedure falls below the specified minimum, an additional coat of finish paint shall be applied.

Inspection and testing shall comply to 6.0 INSPECTION AND TESTING in ADANI's Technical specification for painting and coating of equipment. Following parameters to be inspected for surface preparation and painting of components.

Components	Surface preparation	Painting
Structures, CLH/VLH (Sl. No. 3,13)	**a) Roughness – by comparator or stylus instrument (ISO 8503) b) Cleanliness – Visual comparator for blast cleaning to Sa2.5 level. c) Salt test – by using salt contamination kit**	**Visual examination & dry film thickness of each coat.**
	Ambient and steel temperature, relative humidity, dew point to be recorded prior to blasting & painting	
Pressure parts, ducts, etc. (Sl. No. 1,2,4,5,6,7,8,9,10,12,14,15)	**Cleanliness of power tool cleaned surfaces.**	**Visual examination & dry film thickness of each coat.**

Painting Scheme – Details for procurement & application purposes

Sl. No.	Generic nature of paint	Theoretical Covering Capacity Sq.m per Litre.	No. of pack	Volume solids, % (min)	DFT in microns per coat (approx.)	Shade	Shade No. to IS5	Mode of appln.	Over coating interval, Hrs.
1	Epoxy Zinc rich primer to IS14589 Gr.II (latest)	8	2	35	40	Grey	--	Spray	24
2	High Build gloss Aliphatic acrylic Polyurethane paint.	12	2	62	50	Dark admiralty grey	632 of IS5	Airless Spray	24
3	Heat resistant Aluminium paint to IS 13183 Grade I/II/III (latest)	10	1	-	20	--	--	Brush / Spray	24
4	Red oxide zinc phosphate primer paint to IS 12744 (latest)	10	1	--	30	-	--	Brush / Spray	12
5	Red oxide Zinc Phosphate Dip coat primer paint to PR: CHEM: 09-03	10	1	--	35	--	---	Dip	12
6	Long oil alkyd synthetic enamel finish paint to IS2932 (latest)	17	1	--	20	Reqd. shade	Corrpdg. Shade no.	Brush / Spray	12
7	Temporary Rust preventive fluid to PR: CHE: 09 – 04	10	1	--	25	--	--	--	12
8	General purpose Aluminium paint to IS 2339 (latest)	10	2	--	20	Aluminum	--	Brush	12
9	Self- priming surface tolerant high build epoxy paint	8	2	80	100	--	--	Brush / Spray	12

10	High Build Epoxy MIO coating cured with polyamide hardener, intermediate coat as per IS 16943. (containing lamellar MIO minimum 50% in the dry film)	6	2	60	100 (min)	Brown	--	Airless Spray	24
11	Inorganic ethyl self-curing zinc silicate primer as per IS 14946, metallic Zinc content 75% (min) in the dry film by weight, Zinc dust quality shall be as per ASTM D 520 Type 2.	8	2	60	75 (min)	Grey	--	Airless Spray	24

The covering capacity of paints specified is only approximate. The paints and Rust Preventive fluid shall be procured from BHEL's approved suppliers.

Painting of Damaged Areas

(Areas where the paint has deteriorated badly by erosion and areas where the paint film has lost its adhesion and where the steel has rusted appreciably, should be repainted as follows)

Sl.No.	Components	Surface Prepa-ration	Primer coat		Intermediate coat		Finish coat			Total DFT µm
			Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
1	Paint damaged components fall under Sl.no: 3	Power tool cleaning of minimum 25mm of surrounding areas to bare metal	Epoxy based surface tolerant paint	2 Total DFT 175µ (min)	--	--	As given in scheme	1	As given in scheme	As given in scheme
2	Paint damaged components fall under Sl.no: 1,2,4,5,6,7,8,9,10,12,13,14,15	Power tool cleaning to bare metal	As given in scheme							