

Pre-Qualification requirement for Pneumatically operated gate

1. The vendor shall be an established Pneumatically operated Round port knife edge gate manufacturer having adequate Engineering, Manufacturing and testing facilities.
2. The pneumatic operated gate model (26" size) offered shall be from the existing regular manufacturing range of the supplier. Vendor shall provide the manufacturing catalogue or general reference list for the offered power operated gate along with offer.
3. The supplier shall have experience of having supplied pneumatic operated gate for erosive medium of coal-air application or for the application of similar severity of erosion. Supplier shall submit documents in proof of the same.



An ISO 9001
Company

Bharat Heavy Electricals Limited
(High Pressure Boiler Plant)
Tiruchirappalli-620 014, Tamil Nadu, India
Dept: MATERIALS MANAGEMENT/BOI

Annexure – B- Terms and Conditions

ACCEPTANCE OF TECHNO - COMMERCIAL TERMS & CONDITIONS BY THE BIDDERS

Description of the Equipment:		Pneumatic Operated gate valve
Enquiry No:		Enq No. 1801900458/14 dt.18.05.2019
Sl. No.	Terms and conditions	Vendor's confirmation
1 (a)	The supply shall be as per BHEL specification: TCC 1041 / REV. 03 & Drg. 2-47-003-01439/Rev.02.and Annexure- A attached with the enquiry, without deviation.	
1 (b)	Inspection by BHEL or BHEL Approved Third Party Inspection Agencies/Any IBR approved TPI agency & Customer at vendor works before dispatch is applicable. Shipment shall be made only after obtaining despatch clearance from BHEL/MDCC from Customer.	
1 (C)	Confirmation & submission of all PQR documents as per annexure A (Technical pre-qualification requirements) Note: Vendors not meeting the PQR will not be considered for this tender.	
1 (d)	Offer will be considered on total package basis for evaluation & ordering, as indicated in the tender. Evaluation will be on total cost to BHEL & after all loadings as applicable.	
1 (e)	Pl note that your offer consideration is subject to Techno- Commercial Suitability.	
2	<u>Firm Price:</u> The quoted / finalised rates shall be Firm till execution of the supplies. Offer with Price Variation Clause (PVC) will not be considered.	
3	The tender will be operated in two part bid system. One-part consisting of Technical bid with Commercial terms & conditions and other part is Price Bid. Based on the above and other conditions, as well as technical capability, vendors will be short-listed. The Techno-commercial bid will be opened on the due date and based on the suitability of techno-commercial bid, the price Bid of the techno-commercial suitable qualified vendors will be considered and opened on a suitable date with due intimation to vendors.	
4	<u>Delivery term For indigenous Suppliers:</u> The quote shall be on FOR Udangudi Project Site Basis (in Tamil Nadu state). Packing & forwarding and Freight to yours account. Transit Insurance is on BHEL scope <u>Ex-Works Contracts will not be entertained.</u> <u>Delivery term For Import Suppliers</u> Bidders should submit their offer on CFR Chennai Seaport basis with freight break up details. Pls. indicate the freight breakup details. FOB rate will be arrived by subtracting the corresponding freight break up	

	from the CFR rate. BHEL reserves the right to order on FOB or CFR basis.	
5 (a)	<u>Payment terms for Indigenous Suppliers:</u> “100% direct EFT payment after 60 days from the date of dispatch against site acknowledgement & against submission of 10% PBG, valid for the Guarantee period”. <u>Payment terms for Import Suppliers:</u> “100% payment on CAD basis after 60 days from the date of receipt of documents, specified in PO. Respective bank charges to respective account & against submission of 10% PBG, valid for the Guarantee period, Respective bank charges to respective account”. Note: PBG format is attached with the Enquiry. No deviation is permitted & the deviated offers are liable for rejection. PBG shall be submitted for 10% of the PO value and the validity of the PBG shall have a validity period till the Guarantee period & the claim period shall have three months extra.	
5 (b)	<u>Loading Criteria for arriving the L1 rate:</u> <u>For Indigenous Suppliers</u> <u>Loading Criteria :</u> Payment Terms: No deviation is permitted. Any deviation in the above payment term, any other conditions in payment term or any other payment term may not be accepted and the offers of such vendors are liable for rejection. <u>For Import Suppliers</u> In the case of LC payment, only usance LC with 60 days credit will be opened one month prior to material readiness, further loading will be considered @ 1.5% on the offered value. Hence supplier shall intimate the material readiness accordingly for opening LC. LC validity period will be 90 days and for any extension, applicable charges will be to supplier's account. PBG shall be submitted for 10% of the PO value and the validity of the PBG shall have a validity period till the Guarantee period & the claim period shall have three months extra. Any deviation in the above payment term, any other conditions in payment term or any other payment term will not be accepted and the offers of such vendors will not be considered	

6 (a)	<u>Liquidated damages:</u> Delivery of the goods specified in the purchase order should be made within the time prescribed. Failure to dispatch the materials in the time as per the delivery quoted in our Purchase Order would make the supplier liable to an un-conditional LD at the rate of 0.5% of the order value per week of the delay or part thereof subject to a maximum of 10% of the total order value. In case of PO placements, required documents have to be submitted for approval within 15 days from the date of PO & reply for any further clarification has to be within 7 days. Any delay beyond the above specified period will be considered during LD calculation	
6 (b)	<u>Loading Criteria for arriving the L1 rate:</u> Any deviation on BHEL LD clause, loading (on Offered Value) will be applied to the extent to which it is not agreed by the bidder.	
7 (a)	<u>Guarantee / Warranty Period:</u> All materials shall be defect free and shall be replaceable free of cost during Guarantee Period. Guarantee clause shall be 18 months from the date of supply or 12 months from the date of commissioning, whichever is earlier.	
7 (b)	<u>Loading Criteria:</u> <u>Guarantee / Warranty Period:</u> No Deviation is permitted. If still vendor offered any deviation on the Guarantee / warranty period, it may lead to rejection of offer.	
8	<u>Risk purchase:</u> If the supplier fails to deliver the goods within the delivery specified in the Purchase Order, BHEL will be entitled to terminate the contract and to Purchase elsewhere at the risk and cost of the seller either the whole of the goods or any part which the supplier has failed to deliver or despatch within the delivery period mentioned in the Purchase Order. Also, action will be taken as per our guidelines for suspension of Business dealing procedure.	
9	<u>Delivery Period:</u> Vendors shall offer their best possible shortest delivery period	
10	<u>For Indigenous Vendor-</u> LR date will be considered for LD calculation. <u>For Import Suppliers-</u> OBL date will be considered for LD calculation.	
11	<u>For Import Suppliers</u> Foreign Exchange rate prevailing on Techno – Commercial bid opening rate will be taken for calculation. If the date of opening happens to be a bank holiday, then the forex rate as on previous bank (SBI) working day shall be taken.	
11	<u>Validity:</u> 120 days minimum from techno commercial bid opening (Part-1). Any Deviation with respect to validity your offer will not be considered. Ensure your quoted rates will have 120 days' minimum validity from techno commercial bid opening. The delay in technical clarification beyond four days will be subsequently added to the validity period, Revised Price Bids will not be encouraged.	

12	MSE Applicability as per Annexure C. The vendors shall furnish valid MSE certificates for availing the benefits of MSE with deemed validity in the offer itself.	
13	<u>Make in India:</u> 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. Default margin of purchase preference shall be 20% to local suppliers with default minimum local content of 50%. For more details, pls. refer the 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.	
14	<u>Inspection and testing requirements:</u> Inspection and testing requirements are to be carried out as per the specification and BHEL/Customer approved Drawing, Technical spec & QP and all test certificates are to be submitted in complete set. Inspection notice period: For TPI inspector visit to vendor works, a minimum of 3 working days' notice period is required well in advance from the proposed date of inspection	
15	<u>Repair & replacements:</u> Within the guarantee period vendor has to replace / rectify the defective/ damaged items on free of cost within a reasonable time of reporting from our end.	
16 a	<u>Important Information for Indigenous Suppliers:</u>	
	Kindly indicate the GST No of your Firm	
	Kindly Indicate the HSN Code for the Enquiry item.	
	Please indicate the applicable GST % (IGST, SGST, CGST)	
	Kindly Note the BHEL Trichy Unit GST NO : 33AAACB4146P2ZL	
	Response to Tenders for Indigenous supplier will be entertained only if the vendor has a valid GST registration number which should clearly have mentioned in the offer. If any specific exemption is available, a declaration with due supporting documents need to be furnished for considering the offer.	
16 b	<u>In Case of Order Placement:</u> Supplier shall mention their GSTN registration number 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, Qty, Rate, Value, applicable taxes with nomenclature (like IGST, SGST, CGST & UTGST) separately, HSN/ SAC Code, etc.	
	All invoices shall bear the HSN Code for each item separately (Harmonized System of Nomenclature)/ SAC code (Services Accounting Code).	
	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.	
	All dispatch and quality documents like Mill Test Certificate, LR copy, Guarantee/Warranty certificate, work completion certificate, any other document mentioned in PO, shall be sent along with the vehicle/consignment. 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	
	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	
	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.	
	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. Debit note will be available on our B2B portal.	
	<u>Important Information for Import Suppliers:</u> <u>FOR CFR INCO TERMS – CONTAINERIZED CARGO</u> For CFR terms, moved through CONTAINERS (Suppliers should clearly specify this in their offer) it would be presumed by BHEL that the freight charges quoted is on LILLO (LINER IN LINER OUT) basis including extra charges, if any, like Container Imbalance Charges, Trade Imbalance charges or any other charges payable to the Liner. No other charges other than the quoted Freight rate will be paid by BHEL excepting applicable Terminal Handling Charges, Container cleaning Charges, DO charges to Shipping Liner at Discharge Port. 14 FREE DAYS FOR Container detention shall be provided. If any deviation is taken by Tenderer, a loading of 22% on the freight rate per MT shall be considered by BHEL for arriving at the Total Landed Cost.	

- In case of shipment through Containers on CFR basis, the BL should bear the endorsement that “14 free days for Container Detention is applicable”.

BREAKBULK CARGO

- For CFR terms, moved through BREAK BULK BASIS (Suppliers should clearly specify this in their offer) it would be presumed by BHEL that the freight charges quoted is on LILO (LINER IN LINER OUT) basis. The materials will be Custom cleared from Port itself.
- The Indian Customs imposed, a penalty on late filing of Bill of Entries (Air/Sea Shipments) by the importer. The maximum free time allowed is 24 hrs from the time of arrival of cargo at final port of discharge. Rs.5000/- per day (for Initial 03 days) & Rs.10000/- per day (thereafter)
- The vendor should furnish the Non-Negotiable Documents (Air Way Bill/Bill of Lading, Commercial Invoice, Packing List, and Certificate of Origin) either by email or post/courier to BHEL well before the landing of cargo at final port of discharge.
- Vendor will be held responsible for the penalty arises against the late filing of Bill Of entry due to:
 - Non availability of Non-Negotiable Documents (NNDs) before the cargo arrival
 - Discrepancy in documents
 - Short landing of Consignments (For shipments on CFR/CPT/CIF/CIP – Chennai Port)
- All the shipments for the contracts (POs) finalized on CFR - Chennai Port basis
 - (i) Delivery Orders involving multiple agencies like liners/freight forwarders are not allowed. There must be a single agency office at the final discharge Port (Chennai) for issuing the Delivery Order to BHEL.
 - (ii) The detention/demurrage charges arise due to the delay in collection of Delivery Orders from multiple agencies of liner/freight forwarder also whose offices are not at available Chennai, the same amount will be deducted from Vendor's bills only.
 - (iii) Apart from the normal charges like Terminal Handling Charges, Container cleaning Charges, Delivery Order Charges at final port of discharge no other charges will be borne by BHEL.
 - (iv) The liner/freight forwarders should be properly communicated by the Vendor for not to claim such charges for issuing Delivery Order. If the liner/freight forwarder claims such charges in their invoices, the same amount will be deducted from the Vendor bills without any prior intimation in order to avoid the delay in Customs clearance. The likely additional/hidden costs or charges are:
 - a. CIC - Container Imbalance Charges/Surcharges
 - b. EIC - Equipment Imbalance Charge/Surcharges
 - c. CAF - Container/Currency Adjustment Factor
 - d. BAF - Bunker adjustment Factor
 - e. RDS - Rupee Depreciation Surcharge

	f. CDS - Currency Depreciation Surcharge <u>Transport Conditions for Import:</u> The Original Documents (Bill of Lading, Invoice, Packing List, Certificate of Origin & Test Certificate) shall reach BHEL well in advance before the vessel arrival. The soft copies of the above shall be forwarded to BHEL immediately after shipment. • In the event of delayed submission of documents by the supplier, an amount up to 5% of the invoice value will be retained towards demurrage & other charges and the difference if any between actual charges and recovery will be settled separately through supplementary invoice. • In such cases, the Supplier shall authorize the Steamer / Shipping agent / transporter to freely release the consignment to BHEL by providing a "Surrender Bill of Lading". • Otherwise, No-objection Certificate shall be issued to the Liner, authorizing BHEL to get the Delivery Order without producing the Original Bill of Lading. • This is required to ensure avoidance of demurrage at Chennai Sea-port that may arise in case of delayed presentation of documents by the Seller. • <u>Following details to be endorsed in OBL</u> a. Import & Export Code (IEC) of importer : 0588138690 b. GST Identification No (GSTIN) of importer : 33AAACB4146P2ZL c. Official email id of importer: santoshj@bhel.in ; asvasalu@bhel.in	
	<u>Discrepancy in payment documents submission:</u> 1. A vendor / bill who or which has been blocked for reasons like MSME certification / GST compliance / BG etc. – upon getting the discrepancy resolved, if the discrepancy resolved date falls as due date for payment or beyond the due date for payment, then accordingly the due date for payment will stand extended by a week from the date of passing the bill. 2. When vendor himself submits the complete bill along with requisite documents as called for in the PO after due date for payment, then the due date for payment will stand extended by a week from the date of passing the bill.	
	BHEL may negotiate the L1 rate, if not meeting our budget/estimated cost. BHEL may re-float the tender opened, if L1 price is not the acceptable price to BHEL. Any deviation in specified commercial terms-Annexure B, will lead to rejection of offer. Any other Techno –Commercial Terms indicated by the vendor in their offer elsewhere will be ignored. BHEL will proceed with tender evaluation as per Annexure B only.	

Vendor's Seal and Signature

Annexure C

Clause: Special Provisions for Micro and small Enterprises (MSE):

1. In case MSE vendor participating in the tender quotes within the price band of L1+15%, they will be allowed to supply the complete package requirement subject to acceptance of L1 price by MSE vendor.
2. In case of more than one such MSE, the counter offering will be to the lowest quoted MSE vendor subject to fulfilment of Point No.1
3. MSE suppliers can avail the intended benefits only if they submit along with the offer, attested copies of either EM II certificate having deemed validity (Five years from the date of issue of acknowledgement in EM II) or valid NSIC certificate or EM II certificate along with CA certificate (Format enclosed) applicable for the year, certifying quantum of investment in plant and machinery within the permissible limit as per the act for relevant status (Micro or small) where the deemed validity of EM II is over. Date to be reckoned for determining the deemed validity will be the last date of technical bid submission. Non submission of such documents will lead to consideration of their bids at par with other bidders and MSE status of such suppliers shall be shifted to Non MSE supplier till the supplier submits these documents.
4. Declaration of UAM number by MSE bidders is mandatory. Failing which, such bidders will not be able to enjoy the benefits as per Public Procurement Policy for MSEs Order, 2012.
5. Payment for MSE Indigenous vendors will be as per MSMED Act 2006

Certificate by Chartered Accountant on letter head

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

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

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

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

Date:

(Signature)

Name -

Membership number -

Seal of Chartered Accountant



BHARAT HEAVY ELECTRICALS LIMITED
TIRUCHIRAPALLI-620014

FUEL SYSTEMS/PRODUCT ENGINEERING (FOSSIL BOILERS)

TITLE SHEET



**SPECIFICATION FOR
POWER OPERATED SHUT OFF GATE
- KNIFE EDGE GATE VALVE WITH
PNEUMATIC ACTUATOR**

SPECIFICATION NUMBER: TCC 1041 / REVISION NO.03

REVISION STATUS

03	08-07-15	NFPA clause updated and Gasket material options revised (CL.5.6).	M.V	GSK & MTP
02	16-06-14	GASKET MATERIAL SELECTION (CL.5.6)ADDED	MCHSG	GSK & MTP
01	16-09-08	SPECIFICATION UPDATED	CSS	MTP
Rev.No.	Date	Description	Altered	Checked & Approved

	NAME	SIGNATURE	DATE
PREPARED	G.SARAVANAKUMAR	-Sd-	21.03.2007
CHECKED	M.THANDAPANI	-Sd-	21.03.2007
APPROEVED	S.V.SIVARAMULU	-Sd-	21.03.2007

	SPECIFICATION FOR POWER OPERATED SHUT-OFF GATE /KNIFE EDGE GATE VALVE WITH PNEUMATIC ACTUATOR	SPECN.NO. TCC-1041 REV-03	PAGE 02/09
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1.0 SCOPE

The scope covers the design, supply, manufacture, testing, certification, marking and identification and packing for shipment of Round port Knife Edge Gate Valve assembly with Pneumatic Actuator for the specified duty conditions in Annexure.

The accessories those are to be supplied with gate, are tabulated in this document. This list is to be considered as non-exhaustive. The supplier is requested to state the items that has to be supplied to meet the intent of the requirements, which will be used during the evaluation of all potential suppliers.

The use of Supplier references, catalogue numbers shall not be deemed to supersede the performance requirements of the purchase order.

2.0 EXTENT OF SUPPLY

The following extent of supply given is not necessarily exhaustive and shall not relieve the contractor of his responsibility to provide plant, equipment and services necessary to satisfy the performance criteria and guarantees specified, safely and efficiently.

Provide 6 numbers of Operation and Maintenance (O&M) instructions.

2.1 EXCLUSIONS

None.

3.0 TERMINAL POINTS

The terminal points for the extent of supply of the valves shall be,

- Fuel inlet elbow flange at valve inlet
- Coal nozzle flange at valve outlet
- All terminals connected to JUNCTION BOX (JB) & JB shall be on supplier's scope
- Single instrument air connection to air filter regulator (interconnecting pipes by Supplier)

	SPECIFICATION FOR POWER OPERATED SHUT-OFF GATE /KNIFE EDGE GATE VALVE WITH PNEUMATIC ACTUATOR	SPECN.NO. TCC-1041 REV-03	PAGE 03/09
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4.0 TECHNICAL REQUIREMENTS

This knife edge gate valve is mounted between the fuel inlet elbow of coal – air piping and coal burner nozzle. One valve per coal pipe is envisaged. Pulverized coal – air mixture at a temperature of 90°C to 120°C flows through these gates at a velocity of 25 m/sec. The leading edge of the valve blade shall contain a 45° chamfer to eject out the accumulated dust and clean the blade guides during closing. Vendor shall include necessary provision in the valve to prevent ingress of dust and ensure friction free movement. The supplier has to ensure that the valves are suitable for operation in the specified conditions.

The supplier shall provide suitable body tapping for air to purge out the dust collected in the dead space between the body inner faces when the blade is retracted. To the body tapping supplier shall provide means for an air purge prior to valve closing. All valves shall be capable of safe, reliable operation and shall comply with the requirements of NFPA 85 / 2015 in particular to the sub-section 9.4.6.13 and 9.4.5.1.6 of less than 13.8 KPa gauge pressure for dust tight valve application.

As the coal particles are highly erosive, the valve supplier shall provide measures to combat erosion of valve internals. Vendor shall indicate the details in the offer.

Proper cable glands and tube fittings, for taking out/in cables and air tubing shall be provided. The limit switches shall be mounted on to gate valve to give signal for valve open/close condition. Overall dimensions of the gate shall be as per the attached drawing 2-47-003-01439 or 2-47-200-01750 whichever is asked for in the enquiry.

4.1 VALVE OPERATION

During service the valve is always in opened condition and will be closed only during pulveriser maintenance. The valves are remote operated by a double acting pneumatic actuator with limit switch indicating the open & closed position of the valve. Each valve shall be provided with one solenoid valve. The solenoid valve shall be energized to open and energized to close.

4.2 OPERATING ENVIRONMENT

The equipment will be required to operate in dust laden pulverized coal-air mixture, which can be expected to settle on the valve components during normal operation. The coal-air mixture is very erosive in nature and hence the interior surfaces of the valve shall be protected suitably.

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5.0 ACCESSORIES

The following accessories shall be assembled with Knife edge gate valves. The valve shall be integral part of the assembly with the power cylinder, limit switches, solenoid valve and air filter regulator and shall be supplied in fully piped up condition. Purchaser to provide only inlet air connection to the Air filter regulator.

5.1 AIR CYLINDER

The air cylinder shall be of double acting type and of heavy duty. The cylinder body shall be corrosion resistant and shall have a fine finish preferably honed that ensures minimum friction and long seal life. A self-centering cushion sleeve shall be provided at both sides of the piston. The piston rod shall be covered with leather gaiter to prevent dust and water intrusion for smooth operation.

The power cylinder shall be capable of stroking the valve to full travel on load at an air pressure of 3.0 Kg/Sq.cm (g). The material of gland seal/piston shall be suitable to withstand temperature of 120°C and a pressure of 7.0 Kg/Sq.cm (g).

5.2 SOLENOID VALVE (SV)

The heavy-duty dual coil solenoid valve shall be of ASCO make or ROTEX make with 5 ports, 2 way type and shall be as per Clause 11.3.3 of data sheet. The Solenoid valve shall be mounted at upstream side of the valve to enable easier approach at site.

5.3 AIR FILTER CUM REGULATOR (AFR)

A suitably sized air filter cum regulator of make of PLACKA / AIRMATIC / NUCON / FESTO shall be provided. The filter cum regulator shall be of metallic bowl only. The air filter cum regulator shall have the range of regulation from 6.0 kg/sq.cm (g) to 1.0 kg/sq.cm (g).

5.4 LIMIT SWITCH (LS)

Two numbers heavy duty limit switches of OMRAN or HONEYWELL make with DPDT contacts to indicate open/closed position of the valve with rating of 5A 230V AC / 0.5A 220V DC shall be provided. The enclosure shall be of IP55 class with ¾" NPT conduit for cable entry. The limit switch shall be firmly fixed on to a mounting plate.

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5.5 COPPER TUBING & FITTINGS

Necessary PVC sheathed copper tubing of sufficient wall thickness and good quality of fittings shall also form part of the assembly.

5.6 COMPRESSION GASKET SELECTION

Gasket shall be selected to withstand the higher compression load at elevated temperatures. These gaskets shall be selected for minimum design strength of 4000psi and continuous operating temperature not less than 120° C. Preferable material of gaskets is Silicone Rubber 60/70A shore a durometer or harder rated to +232°C to +260°C or Non-asbestos gasket of aramid fiber with a NBR Binder or higher grade meeting the design requirement said above. Two gaskets per gate shall be supplied.

6.0 INSPECTION AND TESTING

Supplier shall submit QP for Purchaser's review and approval. It is expected that Quality plan shall encompass the Supplier's standard inspection to satisfy all applicable design code and its testing requirements and will involve, as a minimum, the examination of material certificates, dimensional checks on parts and sub-assemblies, examination by visual or other methods for welds and material surfaces. The Purchaser's inspecting authority is to be allowed reasonable access to the Supplier's works during manufacture/ testing before delivery, in accordance with the approved Quality plan.

6.1 TESTING

1. The smooth operation of the valve shall be tested for an instrument air pressure of 3.0 kg/sq.cm.
2. Body and seat shall be tested accordingly as called for in API or MSS or any other equivalent standard.
3. Each valve shall be tested for leak as per API or MSS or any other equivalent standard for "**no visual leak**" condition.

7.0 CODES AND STANDARDS

The Supplier is required to list all the standards applicable to the equipment covered in this specification. To be provided and agreed before manufacture proceeds. Where the Supplier considers that the standards used in the design, manufacture or operation of the equipment may vary with the contents of this specification, then the matter shall be immediately brought to the written attention of Purchaser.

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8.0 DOCUMENTATION

- 8.1 Technical offer shall contain complete details as called for specification confirming the requirements point by point.
- 8.2 Completely filled in data sheet CLAUSE 11.0.
- 8.3 Supplier shall submit the dimensional drawing giving details of MOC, accessories, dimensions, pneumatic hook up diagram, actuator selection data, and valve test parameters. Drawings shall be submitted in AutoCAD format and legible hard copies.
- 8.4 Confirmation for BHEL dimensional drawing as per enquiry.
- 8.5 Supplier may separately quote for the list of spares for two years of trouble free operation.
- 8.6 Supplier to quote for commissioning spares along with the main offer.
- 8.7 Reference list.

9.0 GUARANTEE

The performance guarantee shall be given for minimum a period of 12 months from the date of commissioning or 18 months from the date of shipment whichever is earlier.

10.0 PACKING AND DESPATCH

After inspection, the assembly shall be cleaned, prepared and suitably protected for despatch in such a way as to minimize the possibility of damage and deterioration during transit and storage.

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11.0 DATA SHEET

BHEL MATERIAL CODE:L172914720001001

11.1 VALVE DATA SHEET

	BHEL SPECIFICATION	VENDOR CONFIRMATION
DESIGN PRESSURE	To comply with NFPA 85, Valve body/ flanges shall be designed for 250 class.	
NORMAL WORKING PRESSURE	300-400 mm WC	
Design temperature	120°C	
Normal working temperature	90°C	
Indoor or outdoor installation	Outdoor	
Design pressure drop	Vendor to furnish	
Maximum pipe velocity	25 m/s	
Operation/frequency of use	Normally open. Closed during mill maintenance	
Flow medium	Hot air and coal particles	
Coal particle size	75 µm and less – 75% through 200 Mesh	
Erosion	The coal particles are highly erosive and the supplier shall provide measures to combat erosion of valve internals	

11.2 Mechanical Data sheet for Power operated shut-off gate

Model No.	Supplier to furnish	
Service	Coal pipe shut-off	
Valve performance code	NFPA 85 – Dust tight Valve	
Size	Valve ID = 632 mm Ref: 2-47-003- 01439/02	
End Connection - Flanged	Flange details as per enclosed drawing	
Body Tapping (Yes/No)	Yes	
Remote Operation Details	Double acting pneumatic actuator, energized to open and energized to close	
Maximum Leakage Rate	"No Visual leak" as per API/MSS or equivalent specification	
Quality Plan	Supplier to furnish	
Painting Details	As per approved QP	

	SPECIFICATION FOR POWER OPERATED SHUT-OFF GATE /KNIFE EDGE GATE VALVE WITH PNEUMATIC ACTUATOR	SPECN.NO. TCC-1041 REV-03	PAGE 08/09
---	--	---	-----------------------

BHELMATERIAL CODE: L172914720001001

	BHEL SPECIFICATION	VENDOR CONFIRMATION
Body Ends Sealed (Yes/No)	Yes	
Joining Surfaces Protected (Yes/No)	Yes	
MATERIAL SELECTION		
Body	Carbon steel (Specify grade)	
Slide	Stainless Steel (Specify grade)	
Seals	Supplier to furnish	
Body Connector	Supplier to furnish	
Insert	Supplier to furnish	
Cover	Supplier to furnish	
Gasket	Silicone Rubber 60/70A shore a durometer or harder rated to +232°C to +260°C or Non-asbestos gasket of aramid fiber with a NBR Binder or higher grade to meet design criteria	
Fasteners	SA193 GRB7 or higher strength	

11.3 ACCESSORIES

11.3.1 POWER CYLINDER

BHEL SPECIFICATION	VENDOR CONFIRMATION
Type	
Make	
Size – Diameter x Stroke	
Selection criteria of Power cylinder	Attach calculation sheet
End Connection details (Air entry)	
Bellows provided for air cylinders - Required	
Air consumption per stroke	Nm ³ /Hr

11.3.2 LIMIT SWITCH

Type	
Make & Model	
Contact	
Rating	
Enclosure IP55 Class	
Cable entry Conduit size	

	SPECIFICATION FOR POWER OPERATED SHUT-OFF GATE /KNIFE EDGE GATE VALVE WITH PNEUMATIC ACTUATOR	SPECN.NO. TCC-1041 REV-03	PAGE 09/09
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BHEL MATERIAL CODE: L172914720001001

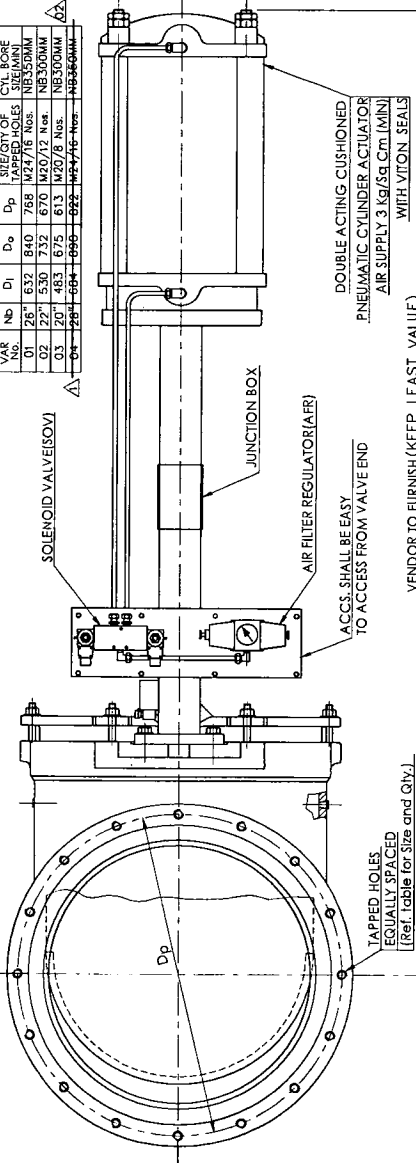
BHEL SPECIFICATION	VENDOR CONFIRMATION
11.3.3 Solenoid valve	5 Port-2way Dual coil
Type	
Make & Model	
Power supply / Coil Rating	240V AC $\pm$ 10%
11.3.4 Air Filter Cum Regulator	
Make	
Size	
End Connection size at BHEL TP	NPT (F)
11.3.5 Copper Tubing & Fitting provided	YES
11.3.6 Housing for accessories	Required
Confirm provision of box housing filter/regulator & solenoid valves	
11.4 Commissioning Spares Quoted with Offer	YES / NO
11.5 2/3 Years operational Spares Quoted with Offer	YES / NO
11.6 General Arrangement Drawing No.	

NOTE:

Vendor shall fill-up the valve data sheet, Mechanical data sheet, Data sheets for accessories and others (Clause 11), submit along with the offer duly signing the same.

65710-000-47-2
ON DRAWING

ARRANGEMENT-P



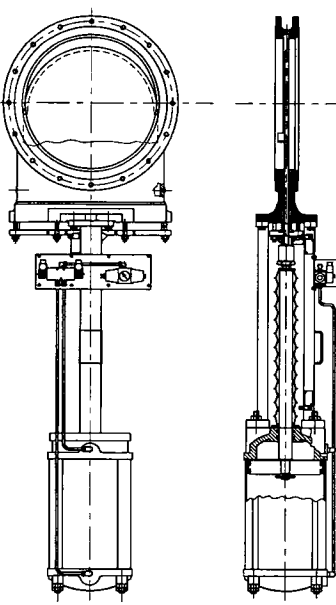
SELECTION TABLE

VAR. No.	D1	D0	Dp	SIZE/QT OF TAPPED HOLES (mm)	CYL BORE (mm)
01	26	532	840	768	1247/16 Nos.
02	22	530	732	670	1247/16 Nos.
03	20	463	675	613	1247/16 Nos.
04	26	654	1050	1022	1247/16 Nos.

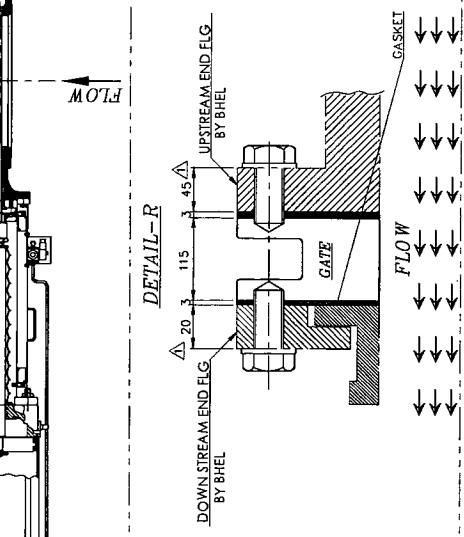
SPECIAL NOTE

- AS THE PUL COAL PARTICLES ARE OF HIGHLY ERODIVE, THE VENDOR HAS TO PROVIDE SUITABLE MEASURES TO COMBAT EROSION OF VALVE INTERNALS OF 350BHN HARDNESS MIN. Δ
- VENDOR TO INDICATE / CONFIRM IN THE OFFER.
- VENDOR TO MAKE 50% QTY AS PER "ARRANGEMENT-P"; TO MAKE 50% QTY AS PER "ARRANGEMENT-Q".

ARRANGEMENT-Q



DETAIL-R



VALVE DESIGN DATA:

- FLOW MEDIUM: HOT AIR + PUL COAL
- FLOW TEMPERATURE: 90 DEG C
- DESIGN TEMPERATURE: 120 DEG C
- FLOW MEDIUM VELOCITY: 25 M / SEC
- SERVICE: COAL PIPE SHUT-OFF
- CODE REQUIREMENT TO MEET: NFA 85

TERMINAL POINTS OF THE VALVE:

- UPSTREAM END FLANGE: 145 mm Δ
- DOWN STREAM END FLANGE: 145 mm
- ELECTRICAL TERMINAL POINT AT JUNCTION BOX. (LS & SOV TO BE INTERNALLY WIRED BY VENDOR)
- SINGLE INSTRUMENT AIR CONNECTION TO AFR. (INTER CONNECTING PIPES BY VENDOR)

ACCESSORIES DATA: (VENDOR SCOPE) Δ

- SOLENOID VALVE (SOV): DUAL COIL, HEAVY DUTY, 5 PORT, 2 WAY CURRENT RATING, REFER BHFL TECH SPECN. ASCO/ROTEX
- AIR FILTER REGULATOR (AFR): 3/8" SIZE METALIC BOWLAIR SUPPLY: 0-7 BAR, 2NO+2NC, 240V AC-5A, / 0.5A 220V DC IP 65 / IP 55 3/4" NPT(F) CABLE ENTRY, MAKE: HONEYWELL, OMRON, QTY=2 Nos.
- LIMIT SWITCH (LS): ELECTRICAL TERMINAL FOR LS & SOV, 3/8" PVC COVERED COPPER
- JUNCTION BOX (JB): SUITABLE FOR COMPANION FLANGES SHOWN IN "DETAIL-R".
- FASTENERS: GASKETS
- GASKETS MATERIAL: SILICONE RUBBER 40/70A SHORE A DUROMETER OR NON-A-SBESTOS GASKET OF ARAMID FIBRE WITH NBR BINDER OR HIGHER GRADE MEETING THE DESIGN REQUIREMENT.

REV. NO

REV. NO	DATE	ALT	CHG	APPROVED	REV. NO	DATE	ALT	CHG	APPROVED
02	01.08.17	WV	WV	GSK	01	28.11.12	ARK	GSK	MTP/JVA

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TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT

Bharat Heavy Electricals Ltd
UNIT: HIGH PRESSURE BOILER PLANT
TRUCHIRAPALLI - 620014

SCALE

NIS

WEIGHT (kg)

620014

TITLE

COAL SHUT-OFF GATE
(PNEUMATIC OPERATED)

DRWING NO :

2-47-003-01439

REV

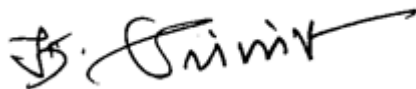
02

PROJECT	2x660 MW UDANGUDI TPP-STAGE I
	OWNER: TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED 5 th Floor, Western Wing, NPKRR Maaligai 144, Anna Salai, Chennai-600002.
	OWNER'S CONSULTANT: DESEIN PRIVATE LIMITED DESEIN HOUSE, GREATER KAILASH-II, NEW DELHI
	BHARAT HEAVY ELECTRICALS LTD
TITLE	Painting schedule for Boiler components
DOCUMENT NO:	PL: C3 - PS/ 1729, Rev.01 Dated 31.08.18

	UDANGUDI 2 X 660 MW SUPER CRITICAL THERMAL POWER PROJECT STAGE-I
Category: I	APPROVED
Lr.No.CE/Projects-II/SE/C/UP/EE/M/F.UP Engg/D. /18 dt .2018.	
Approval conveyed herein neither relieves the Vendor/Contractor of his contractual obligations and his responsibilities for correctness of dimensions, materials of construction, weights, quantities, design details, assembly fits conforming to the relevant codes and standards as per the specification and performance requirements nor does it limit the purchaser's rights under the contract.	
CHIEF ENGINEER/PROJECTS-1 TANGEDCO, CHENNAI-02	



**TANGEDCO UDANGUDI SUPERCRITICAL THERMAL POWER
PROJECT, 2X660MW STAGE-I, THOOTHUKUDI DIST, TAMILNADU
CUSTOMER NO: U6/1729 & 1730, UNIT – I & II
PAINTING SCHEDULE**

Prepared by	K. Srinivasan Senior Engineer/ Plant Lab		Document No: PL: C3 - PS/ 1729
Reviewed by	S Thiagarajan AGM/ PE/ FB		Revision No: 01 Dated: 31-08-2018
Approved by	A. Santhakumari AGM / Plant Lab		Sheet No. 01 of 13

m:\ chem. \ contracts 15\ UDANGUDI-TANGEDCO 2X660 MW STPP\psword_00.doc

RECORD OF REVISIONS

Rev. No	Date	Details of revision	Remarks
00	25-05-2018	New	Prepared in line with bid resolutions between TANGEDCO/ FICHTNER & BHEL on BID spec No. SE/C/ UP / EE/E/OT N0.01/2015-16, Ref: Annexure - 3, Try-Quality, 2x660MW UDANGUDI TPS, STAGE-I.
01	31-08-2018	Sl No 7 – Brush painting indicated as per comments. Sl. No. 8 - working temperature of the Items indicated in the bottom. Sl. no. 10 - Surface cleaning before galvanization is indicated. Sheet 13 - Repair procedure for damages in the painted components is included.	Modified as per comments for CAT. III approval by TANGEDCO 'Letter for comments on painting schedule of SG' Ref: Lr. No. CE/Pr-II/SE/C/UP/EE /M/AEE/M/F.Engg/D.350/18, dt. 30.08.2018.

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	<u>Collector & Separator Vessels (Except Internals), Supports</u> 04 –321,323,547;	SSPC-SP3/ Power Tool Cleaning	Red Oxide Zinc Phosphate Primer (Alkyd Base) to IS 12744 DFT= 30 μm per coat	1	--	--	Synthetic Enamel paint (Long Oil Alkyd) to IS 2932 DFT= 20 μm per coat	2	International orange shade No:592 of IS 5	70
2 PS5B	<u>Collector & Separator Vessels internals and Dd items (threaded and machined surfaces only)</u> 04-347;07-302,331,361,362,393; 08-911,912,913;09-303,304;12-306,314; 12-317,324,327,328,344,348,354,393; 17-304,306,319;19-306,307;21-602,605,700; 24-352,700,803,818,827,842; 28-700;32-700;35-190,700,701;36-700; 39-700;41-710;42-700,710;43-710; 45-710;47-710;48-019,700; 65-710;67-710; <u>Foundation materials:</u> 35-010, 39-012	SSPC – SP3 Power Tool Cleaning	Rust Preventive Fluid to PR: CHEM: 09 – 04 DFT=20 μm per coat	2	--	--	--	--	--	40
3 PS19A4	<u>Buck stays</u> 07-509;08-001,003,006,007,111,380,501, 08-503,901,910; <u>Boiler supporting structures, Columns, Girders, Bracings</u> 34-100,200,300,390,400,500; 35-111,112,121,122,130,140,150,211, 212, 35-213,214,221,222,231,232,311,312,321, 35-322,331,332,341,342,351,352,361,362, 35- 381 to 387, 390, 35-441 to 447, 451 to 457, 511 to 517 35-521 to 527;35-531 to 537, 993,995;	Blast cleaning to SA2 ½ (Near white metal) with surface profile 35-50 μm	Inorganic Ethyl Zinc Silicate Primer DFT=75 μm per coat	1	Epoxy Based MIO Pigmented Intermediate Coat DFT=100 μm per coat	2	#Aliphatic acrylic Polyurethane paint to DFT 50 μm	#1	Dark admiralty Grey Shade No: 632 of IS5	325

To be applied at site

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 PS19A4 (Contd.)	<u>Galleries, Stair-ways & inter connecting Walkways</u> 36-110,130,150,311,312,313,314,315,316, 36-321,322,323,324,325,326,331,332,333, 36-334,335,336,337,338,341,342,343,344, 36-345,346,351,352,353,354,355,356,361, 36-362,363,364,365,366; 36-391 to 395 36-610,613,620,740; 38-210,299,310,381,410,510,610,611,710; <u>ID system structures.</u> 39-101,102,141,142,150,299,300,301, 39-304,305,306,993; <u>Duct supports</u> 48-015,115,145, 205,225,235,265,385, 48-435,465,485,495,665;	Blast cleaning to SA2 ½ (Near white metal) with surface profile 35-50 μm	Inorganic Ethyl Zinc Silicate Primer DFT=75 μm per coat	1	Epoxy Based MIO Pigmented Intermediate Coat DFT=100 μm per coat	2	#Aliphatic acrylic Polyurethane paint to DFT 50 μm	#1	Dark admiralty Grey Shade No: 632 of IS5	325
4 PS3	<u>Components >95° C Insulated other than components in Sl.No.7 &9</u> Ring Headers, Down Comers, Hot air Headers outside the gas path etc. 05-155,227,231,251,327,330,350; 07-110,125,223,231,232,317; 10-174,178,191,195,274,278,283, 10-284,285, 10-291,295; 12-178,850,852,900; 15-136,178,236,278; 17-476;18-001,002,010,701; 19-701,702,903;21-600;24-811,824,828; 24-836,837;42-020,030,128,150,158;	SSPC-SP3/ Power Tool Cleaning	Red Oxide Zinc Phosphate Primer (Alkyd Base) to IS 12744 DFT= 30 μm per coat	2	--	--	--	--	Red oxide	60

To be applied at site

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: 48-018,202,204,207,208,212,214; 48-222,224,232,234,262,264,662,664,667; Flue Gas: 48-372,382,384,386, 432,434; 48-462,464,482, 484 ,492,494;	SSPC-SP3/ Power Tool Cleaning	Red Oxide Zinc phosphate Primer (Alkyd Base) to IS 12744 DFT= 30 μm per coat	2	--	--	--	--	Red oxide	60
5 PS 9B1	<u>Components >95° C uninsulated other than components coming in gas path.</u> Temp: >95°C & <400°C 20-511; 24-807,820,860,865,867; 42-200,300,358; Instrument tappings, doors 48-200,915;	Blast cleaning to SA2 ½ (Near white metal) with surface profile 35-50 μm	Inorganic Ethyl Zinc Silicate Primer DFT=75 μm per coat	1	--	--	Heat Resistant Aluminium Paint to IS 13183 Gr.II DFT=20 μm per coat	2	Aluminum	115
6 PS 10	Components uninsulated other than components coming in gas path. Temp: >400°C & <600°C 09-003,004,005,503; 28-220;	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 20 μm per coat	1	Aluminum	40
7 PS2	<u>Loose tubes, SH, RH & Eco. coils</u> 11-074,078,095,374,378,406,416,467,469; 11-487,491,494,606,684,694,716,718; 11-767,769,787,791,967; 11-969,991;12-179,184,187,368,395,403,405,495; 12-514,524,544, 548,554,568; 12-800,803,805,903,914,917,924,927,928,944,948; 12-954,968; 16-079,201,202,203,270,379; 19-814,824,853,914,924;	SSPC – SP2 or SSPC – SP3 Hand tool / Power tool cleaning	Red Oxide Zinc Phosphate Dip coat primer to PR: CHEM: 09 – 03 DFT=35 μm per coat	1*	--	--	--	--	Red Oxide	35

*-Wherever dip painting is not possible, 2 coats of brush painting of Red oxide Zinc Phosphate primer to a coating thickness of 60 μ 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	Components < 95° C –Other than components in SL.No.3. Miscellaneous and casing sheets 07-409,431,460,461,462,502,503,531,560,561; 12-906,907; 17-919; 21-601,604,606; 24-350,351,354,800,801,804,805,806,808,809; 24-810,815,817,825,826,835,840,841,855; 24-950,955,960;30-233,234;35-995; 36-611,621; 39-302; 04-147; Fuel firing: 41-350,390,500; Steam blowing piping 42-001,002,005,010,046,065,070,120,152,154; 42-157; 43-004,104,105,200; 45-200,801,802,804,805,858; 47- 261,263,858; Duct plates, expansion joints 48-911,912; Coal Feeding 65-736; 67-204,272,276,283,801,802,803; 95-088,089,091,485;96-186;97-585,591,592; Impulse lines: 24-800; Seal air ducting: 43-005, 105; Cold Air duct:48-012,014,112,114,141; Tempering Air: 48-142,144;	SSPC-SP3/ Power Tool Cleaning	Red Oxide Zinc Phosphate Primer (Alkyd Base) to IS 12744 DFT= 30 μm per coat	1	--	--	Synthetic Enamel paint (Long Oil Alkyd) to IS 2932 DFT= 20 μm per coat	2	Smoke Grey Shade No: 692 of IS5	70

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	<u>Components >95° C coming in the gas path, Headers, Commissioning Spares & erection Materials etc.,</u> 05-137,147;06-400,401,431,434,437,441,444; 06-447,451,453,455,500,501,731,732; 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; 11-474; 12-993;17-174,474,504,506,900,903; 19-704,753,763,783,793,802,850,851; 20-988,998; 21-987; 24-822,823, 987,989, 993; 30-105,211,215,219,223,224,235; 31-010,104; 32-010,210,810; 37-010;42-858;48-993; 65-200; 67-200;96-193; 97-282,590; 99-501; 41-988; 42-988;	SSPC-SP3/ Power Tool Cleaning	Red Oxide Zinc Phosphate Primer (Alkyd Base) to IS 12744 DFT= 30 μm per coat	2	--	--	--	--	Red oxide	60
10 PS6	<u>Hand rails and posts, ladders / rungs</u> 34-810,820,850; 35-821,822,823,851; 36-820,851,852,853; 38-820,850;39-820,850; <u>Floor Grills, Step treads</u> 35 – 811,812;36-811,812,813,814; 38 – 810;39 – 810;	Acid pickling to SSPC-SP8	Hot dip Galvanizing to a coating weight of 610 g/m ² (minimum) and to a coating thickness of 85.0 microns (minimum). Refer Notes given below **							

Notes **: The Guard plates, Hood Ladders and Stringer channels 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	
11 PS 10	<u>Cast carbon steel valves (Conventional)</u> <u>Cast alloy steel valves (Conventional)</u> <u>All API valves, QCNRV, SV & SRV Silencers,</u> 21-800,825, 24-885; Safety valves & ERV 21-850; 24-880,881;	SSPC-SP3/ Power Tool Cleaning	Heat Resistant Aluminium Paint to IS 13183 Gr. I	1	--	--	Heat Resistant Aluminium Paint to IS 13183 Gr. I	1	Aluminum	40
	Forged valves	Chemical cleaning	Phosphating to a coating weight of 1500 mg per Sq.ft.	--	--	--	--	--	--	--
1AS1	<u>Soot Blower components</u> 20-051,054,201,204,794,962;	SSPC-SP3/ Power Tool Cleaning	HB Chlorinated Rubber based Zinc Phosphate Primer DFT= 50 μm per coat	1	--	--	Syn. Enamel paint (Long Oil Alkyd) to IS 2932 DFT= 20 μm per coat	2	Verdigris Green Shade No. 280 of IS5	90
	HP / LP system	SSPC-SP3/ Power Tool Cleaning	Heat Resistant Aluminium Paint to IS 13183 Gr.I	2	--	--	--	--	--	40

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 PS15	<u>For CLH & VLH*</u> PGs 07,08,12,17,19,21,24,47,48 &80 07-402,403,405,505;12-517,528; 17-519,904,906 19-506,507,904,905, 906,907; 24-353; 48-206,395;	Blast cleaning to SA2 ½ (Near white metal) with surface profile 35-50 μm	Epoxy zinc rich primer To IS 14589 Gr. II %VS=35, (min) DFT=40 microns per coat	1	--	--	Aliphatic acrylic Poly-urethane paint %VS=40.0 (min) DFT=30.0 microns per coat	1	Phirozi Blue Shade No. 176 of IS5	70
13 PS33A	<u>Components > 95°C, un-insulated Fuel pipes</u> 47-269;	Blast cleaning to SA2 ½ (Near white metal) with surface profile 35-50 μm	Inorganic Ethyl Zinc Silicate Primer DFT=75 μm per coat	1	Heat Resistant Aluminium Paint to IS 13183 Gr.II DFT=25 μm per coat	2	Heat Resistant Aluminium Paint to IS 13183 Gr.II DFT=20 μm per coat	1	Aluminum	145
14 PS 5B	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=20 μm per coat	2	--	--	--	--	--	40

*- 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 doc. No. Vol-II Section 2-25 Painting_R0.
5. PGMA's under Sub-Vendor items are not indicated. For all bought-out and sub-vendors items including PGMA's 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 Schemes is valid for only Customer No: U6/1729 & 1730, TANGEDCO UDANGUDI STPP - 2X660 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 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. 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, 35-391,392,393 shall be PS 1AE i.e. 1 coat of Red oxide Zinc Phosphate primer (Alkyd Base) to IS 12744-DFT-30 μ and 2 coats of Synthetic Enamel paint (Long Oil Alkyd) to IS 2932-DFT-2X20 μ Shade Yellow –Shade No. 356 of IS 5- Total DFT 70 μ . These are to be cut & removed at site after erection. (It excludes components covered under Sr. No. 3 & 10 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 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 ≤ 5 mm, surface preparation can be power tool cleaning to St3 and painting shall be in line with Sl. No. 8.
23. Handrails, step treads of PGMA under Sl. No. 3 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. Painting of bunker structures to be in line with painting scheme of supporting structures (Sl. No. 3).
26. Faying surfaces of bolted connection (Friction Grip, Slip- Critical) shall be masked to prevent application of coating. Joints to be site welded shall have no paint applied within 100 mm of welding zone. Similarly, where Friction grip fasteners are to be used no painting shall be provided. On completion of the joint, the surfaces shall receive the paint as specified.

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	Aliphatic acrylic polyurethane paint to IS 13213 (latest)	13	2	40	30-50	Phirozi – Blue/ Dark admiralty grey	176/ 632	Spray	24
3	Heat resistant Aluminium paint to IS 13183 Grade I/II (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	HB Chlorinated Rubber Based Zinc Phosphate Primer-Colour Grey	8	1	40	50	Grey	--	Brush / Spray	12
10	Epoxy based polyamide cured MIO pigmented intermediate coat.	8	2	60	100	Brown	--	Spray	24
11	Inorganic ethyl zinc silicate primer to IS 14946 (%Zn on dry film= 75min)	8	2	60	75	Grey	--	Spray only	16

Brush painting is accepted, if recommended by the paint suppliers. The covering capacity of paints specified is only approximate. The paints and Rust Preventive fluid shall be procured from BHEL's approved suppliers. **Values are indicative.

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: 3	Power tool cleaning to bare metal	Epoxy zinc rich primer to IS 14589 Grade II	2 Total DFT 75 μ (min)	As given in scheme	2	As given in scheme	1	As given in scheme	325
2	Paint damaged components fall under Sl.no: 1,2,4,5,6,7,8,9,11,12,13.	Power tool cleaning to bare metal	As given in scheme	As given in scheme	As given in scheme	As given in scheme	As given in scheme	As given in scheme	As given in scheme	As given in scheme