# T E N D E R  S P E C I F I C A T I O N

| Sl No | Tender Specification Number | Unit Number & Project |
|---|---|---|
| 1 | **BHE/PW/PUR/KTI-BLR(Vertical Pkg) U 1/1040** | **150 MW Boiler Vertical Pkg** of **Unit 1** |
| 2 | **BHE/PW/PUR/KTI-BLR(Vertical Pkg) U 2/1041** | **150 MW Boiler Vertical Pkg** of **Unit 2** |

FOR

Collection of materials from BHEL/client's stores/storage yard; transportation to site of work; pre-erection checks, pre-assembly if necessary, erection, testing, assistances for commissioning & trial operation, handing over, assistance for performance guarantee test of Boiler and its Auxiliaries, Electrostatic Precipitator (ESP) Power Cycle Pipeline, Rotating Machines, insulation, final painting etc of Unit 1 & Unit 2 of 2x150 MW OPG Power Gujarat Private Ltd.

At

OPGPGPL Bhadreshawar TPP,

Distt. Kutch
(Gujarat).

**VOLUME – I**

## CONSISTING OF:

- **Notice Inviting Tender,**
- **Volume-IA : Technical Conditions of Contract-,**
- **Volume-IB : Special Conditions of Contract,**
- **Volume-IC : General Conditions of Contract**
- **Volume-ID : Forms & Procedures**

**Bharat Heavy Electricals Limited**
(*A Government of India Undertaking*)
Power Sector - Western Region
345-Kingsway, Nagpur-440001

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# Tender Specification Issue Details

# T E N D E R  S P E C I F I C A T I O N

| Sl No | Tender Specification Number | Unit Number & Project |
|---|---|---|
| 1 | **BHE/PW/PUR/KTI-BLR(Vertical Pkg) U 1/1040** | **150 MW Boiler Vertical Pkg** of **Unit 1** |
| 2 | **BHE/PW/PUR/KTI-BLR(Vertical Pkg) U 2/1041** | **150 MW Boiler Vertical Pkg** of **Unit 2** |

FOR

Collection of materials from BHEL/client's stores/storage yard; transportation to site of work; pre-erection checks, pre-assembly if necessary, erection, testing, assistances for commissioning & trial operation, handing over, assistance for performance guarantee test of Boiler and its Auxiliaries, Electrostatic Precipitator (ESP) Power Cycle Pipeline, Rotating Machines, insulation, final painting etc of Unit 1 & Unit 2 of 2x150 MW OPG Power Gujarat Private Ltd.

At

OPGPGPL Bhadreshawar TPP,

Distt. Kutch
(Gujarat).

EARNEST MONEY DEPOSIT: Refer Notice Inviting Tender

LAST DATE FOR TENDER SUBMISSION . Refer Notice Inviting Tender

**ERECTION WELDING SCHEDULE IS ISSUED TO:**

M/s. ……

……

PLEASE NOTE:
THESE TENDER SPECS DOCUMENTS ARE NOT TRANSFERABLE.

For Bharat Heavy Electricals Limited

AGM (Purchase)
Place: Nagpur
Date :

1040
&
1041

# NOTICE INVITING TENDER

(Document No PS:MSX:NIT:Rev 01 dated 1st Jun 2012)

Bharat Heavy Electricals Limited

Ref: BHE/PW/PUR/KTI-BLR(Vertical Pkg)/1040, 1041 Date: 05/09/2012

# NOTICE INVITING TENDER (NIT)

# NOTE: BIDDER MAY DOWNLOAD FROM WEB SITES OR PURCHASE TENDERS FROM THIS OFFICE ALSO

==========

To

Dear Sir/Madam

**Sub : NOTICE INVITING TENDER**

Sealed offers in two part bid system are invited from reputed & experienced bidders (meeting PRE QUALIFICATION CRITERIA as mentioned in Annexure-I) for the subject job by the undersigned on the behalf of BHARAT HEAVY ELECTRICALS LIMITED as per the tender document. Following points relevant to the tender may please be noted and complied with.

**1.0 Salient Features of NIT**

| SL NO | ISSUE | DESCRIPTION | |
|---|---|---|---|
| i | **TENDER NUMBER** | **BHE/PW/PUR/KTI-BLR(Vertical Pkg) U 1/1040**<br>**BHE/PW/PUR/KTI-BLR(Vertical Pkg) U 2/1041** | |
| ii | **Broad Scope of job** | Collection of materials from BHEL/client's stores/storage yard; transportation to site of work; pre-erection checks, pre-assembly if necessary, erection, testing, assistances for commissioning & trial operation, handing over, assistance for performance guarantee test of **Boiler and its Auxiliaries**, Electrostatic Precipitator (ESP) Power Cycle Pipeline, Rotating Machines, insulation, final painting etc of **Unit 1 & Unit 2 of 2x150 MW OPG Power Gujarat** Private Ltd At OPGPGPL Bhadreshawar TPP Distt. Kutch (Gujarat).<br><br>**(UNIT-1 and UNIT-2 shall be awarded to 2 separate agencies)** | |
| iii | **DETAILS OF TENDER DOCUMENT** | | |
| a | Volume-IA | *Technical Conditions of Contract (TCC) consisting of Scope of work, Technical Specification, Drawings, Procedures, Bill of Quantities, Terms of payment, etc* | *Applicable* |
| b | Volume-IB | *Special Conditions of Contract (SCC)* | *Applicable* |
| c | Volume-IC | *General Conditions of Contract (GCC)* | *Applicable* |
| d | Volume-ID | *Forms and Procedures* | |
| e | Volume-II | *Price Schedule (Absolute value).* | *Applicable* |
| iv | **Issue of Tender Documents** | ***1. Sale from BHEL PS WR office at NAGPUR :***<br>***Start : 05/09/2012:*** | *Applicable/* |

| | | | |
|---|---|---|---|
| | | ***Closes: 10/09/2012 , Time : 14.00 Hrs***<br>**2. From BHEL website (www.bhel.com)**<br>Tender documents will be available for downloading from website till due date of submission | ~~*Not applicable*~~ |
| **v** | **DUE DATE & TIME OF OFFER SUBMISSION** | ***Date : 10/09/2012 , Time : 15.00 Hrs***<br>***Place : BHEL PS Regional office at :Nagpur***<br>Tenders being submitted through representative shall be handed over to any of the following BHEL officials after making entry/registration at the reception:<br>RK Ranade/ Sr. Manager (Purchase)<br>Pratish Gee Varghese/Engineer(Purchase) | *Applicable* |
| **vi** | **OPENING OF TENDER** | ***Date : 10/09/2012 , Time : 16.00 Hrs***<br>*Notes:*<br>*(1) In case the due date of opening of tender becomes a non-working day, then the due date & time of offer submission and opening of tenders get extended to the next working day.*<br>*(2) Bidder may depute representative to witness the opening of tender* | *Applicable* |
| **vii** | **EMD AMOUNT** | *Rs 2,00,000/- (Rupees Two Lakhs Only)* | *Applicable* |
| **viii** | **COST OF TENDER** | *Rs 2000/-.* | *Applicable/~~Not Applicable~~* |
| **ix** | **LAST DATE FOR SEEKING CLARIFICATION** | *Atleast 3 days before the due date of offer submission*<br>*Along with soft version also, addressing to undersigned & to others as per contact address given below* | *Applicable* |
| **x** | **SCHEDULE OF Pre Bid Discussion (PBD)** | *Date :* | ~~*Applicable/*~~*Not applicable.* |
| **xi** | **INTEGRITY PACT & DETAILS OF INDEPENDENT EXTERNAL MONITOR (IEM)** | Shri Kanwarjit Singh, IRS (Rtd.)<br>D-6/12, Ground Floor,<br>Vasant Vihar,<br>New Delhi - 110 057<br>Email: kanwarfeb@gmail.com | *Applicable/~~Not applicable~~.* |
| **xii** | **Latest updates** | Latest updates on the important dates, Amendments, Correspondences, Corrigenda, Clarifications, Changes, Errata, Modifications, Revisions, etc to Tender Specifications will be hosted in BHEL webpage (www.bhel.com -->Tender Notifications →View Corrigendums) **and not in the newspapers**. Bidders to keep themselves updated with all such information | |

2.0 The offer shall be submitted as per the instructions of tender document and as detailed in this NIT. Bidders to note specifically that all pages of tender document, including these NIT pages of this particular tender together with subsequent correspondences shall be submitted by them, duly signed & stamped on each page, as part of offer. **Rates/Price including discounts/rebates, if any, mentioned anywhere/in any form in the techno-commercial offer other than the Price Bid, shall not be entertained.**

3.0 Unless specifically stated otherwise, bidder shall remit cost of tender and courier charges if applicable, in the form of Demand Draft drawn in favour of Bharat Heavy Electricals Ltd, payable at Power Sector Regional HQ at Nagpur

issuing the Tender, along with techno-commercial offer. Bidder may also choose to deposit the Tender document cost by cash at the Cash Office as stated above against sl no iv of 1, on any working day; and in such case copy of Cash receipt is to be enclosed with the Techno Commercial offer. Sale of tender Documents shall not take place on National Holidays, holidays declared by Central or State Governments and BHEL PS HQ at NAgpur, Sundays and second/ last Saturdays

4.0 Unless specifically stated otherwise, bidder shall deposit EMD through Demand Draft/Pay Order in favour of Bharat Heavy Electricals Ltd, payable at Nagpur. For other details and for 'One Time EMD' please refer General Conditions of Contract.

5.0 **Procedure for Submission of Tenders**: The Tenderers must submit their Tenders to Officer inviting Tender, as detailed below:

- PART-I consisting of 'PART-I A (Techno Commercial Bid)' & 'PART-I B (EMD/COST of TENDER)' in two separate sealed and superscribed envelopes (ENVELOPE-I & ENVELOPE-II)
- PART-II (Price Bid) – in sealed and superscribed envelope (ENVELOPE-III)
- One set of tender documents shall be retained by the bidder for their reference

6.0 The contents for ENVELOPES and the superscription for each sealed cover/Envelope are as given below. **(All pages to be signed and stamped)**

| Sl no | Description | Remarks |
|---|---|---|
| | **Part-I A** | |
| | **ENVELOPE – I superscribed as** :<br>PART-I (TECHNO COMMERCIAL BID)<br>TENDER NO :<br>NAME OF WORK :<br>PROJECT:<br>DUE DATE OF SUBMISSION:<br><br>**CONTAINING THE FOLLOWING**:- | |
| i. | Covering letter/Offer forwarding letter of Tenderer. | |
| ii. | Duly filled-in `No Deviation Certificate' as per prescribed format to be placed after document under sl no (i) above.<br><br>**Note:**<br>a. In case of any deviation, the same should be submitted separately for technical & commercial parts, indicating respective clauses of tender against which deviation is taken by bidder. The list of such deviation shall be placed after document under sl no (i) above. It shall be specifically noted that deviation recorded elsewhere shall not be entertained.<br>b. BHEL reserves the right to accept/reject the deviations without assigning any reasons, and BHEL decision is final and binding.<br>i). In case of acceptance of the deviations, appropriate loading shall be done by BHEL<br>ii). In case of unacceptable deviations, BHEL reserves the right to reject the tender | |
| iii. | Supporting documents/ annexure/ schedules/ drawing etc as required in line with Pre-Qualification criteria.<br><br>It shall be specifically noted that all documents as per above shall be indexed | |

| | | |
|---|---|---|
| | properly and credential certificates issued by clients shall distinctly bear the name of organization, contact ph no, FAX no, etc. | |
| iv. | All Amendments/Correspondences/Corrigenda/Clarifications/Changes/ Errata etc pertinent to this NIT. | |
| v. | Integrity Pact Agreement (Duly signed by the authorized signatory) | If applicable |
| vi. | Duly filled-in annexures, formats etc as required under this Tender Specification/NIT | |
| vii. | Notice inviting Tender (NIT) | |
| viii. | Volume – I A : Technical Conditions of Contract (TCC) consisting of Scope of work, Technical Specification, Drawings, Procedures, Bill of Quantities, Terms of payment, etc | |
| ix. | Volume – I B : Special Conditions of Contract (SCC) | |
| x. | Volume – I C : General Conditions of Contract (GCC) | |
| xi. | Volume – I D : Forms & Procedures | |
| xii. | Volume – II (UNPRICED – without disclosing rates/price, but mentioning only 'QUOTED' or 'UNQUOTED' against each item | |
| xiii. | Any other details preferred by bidder with proper indexing. | |

| | **PART-I B** | |
|---|---|---|
| | **ENVELOPE – II superscribed as**:<br>PART-I (EMD/COST of TENDER)<br>TENDER NO :<br>NAME OF WORK :<br>PROJECT:<br>DUE DATE OF SUBMISSION:<br><br>**CONTAINING THE FOLLOWING**:- | |
| i. | 1. Earnest Money Deposit (EMD) in the form as indicated in this Tender<br>**OR**<br>Documentary evidence for 'One Time EMD' with the Power Sector Region of BHEL floating the Tender<br><br>2. Cost of Tender ( Demand Draft or copy of Cash Receipt as the case may be) | |

| | **PART-II** | |
|---|---|---|
| | **PRICE BID** consisting of the following shall be enclosed | |
| | **ENVELOPE-III**<br>superscribed as:<br>PART-II (PRICE BID)<br>TENDER NO :<br>NAME OF WORK :<br>PROJECT:<br>DUE DATE OF SUBMISSION:<br><br>**CONTAINING THE FOLLOWING** | |
| i | Covering letter/Offer forwarding letter of Tenderer enclosed in Part-I | |
| ii | Volume II – PRICE BID ( Duly Filled in Schedule of Rates – rate/price to be entered in words as well as figures) | |

| | **OUTER COVER** | |
|---|---|---|
| | **ENVELOPE-IV** (MAIN ENVELOPE / OUTER ENVELOPE)<br>superscribed as:<br>TECHNO-COMMERCIAL BID, PRICE BID & EMD<br>TENDER NO:<br>NAME OF WORK:<br>PROJECT:<br>DUE DATE OF SUBMISSION:<br><br>**CONTAINING THE FOLLOWING:** | |
| i | ○ Envelopes I<br>○ Envelopes II<br>○ Envelopes III | |

SPECIAL NOTE : All documents/ annexures submitted with the offer shall be properly annexed and placed in respective places of the offer as per enclosure list mentioned in the covering letter. BHEL shall not be responsible for any missing documents.

7.0 Deviation with respect to tender clauses and additional clauses/suggestions in Techno-commercial bid / Price bid shall NOT be considered by BHEL. Bidders are requested to positively comply with the same.

8.0 BHEL reserves the right to accept or reject any or all Offers without assigning any reasons thereof. BHEL also reserves the right to cancel the Tender wholly or partly without assigning any reason thereof. Also BHEL shall not entertain any correspondence from bidders in this matter (except for the refund of EMD).

**9.0 Assessment of Capacity of Bidders:**
**Bidders capacity for executing the job under tender shall be assessed 'LOAD' wise and 'PERFORMANCE' wise as per the following:**

I. **LOAD**: Load takes into consideration **ALL** the contracts of the Bidder under execution with BHEL Regions, irrespective of whether they are similar to the tendered scope or not. The 'Load' is the sum of the unit wise identified packages (refer Table-1) for contracts with BHEL Regions. The cut off month for reckoning 'Load' shall be the month, two (2) months preceding the month corresponding to the 'latest date of bid submission', in the following manner:

(Note: For example if latest bid submission is in Aug 2011, then the 'load' shall be calculated upto and inclusive of June 2011)

i). Total number of Packages

Total number of Packages in hand = P
Where
- P is the sum of all unit wise identified packages under execution with BHEL Regions as of the cut off month defined above, including packages yet to be commenced.

ii) Weightage "A" assigned to bidders based on Total number of Packages 'P':
a) If 'P' = 0-9, : "A" will be equal to '4'
b) If 'P' = 10-18, : "A" will be equal to '3'
c) If 'P' = 19-36, : "A" will be equal to '2'

d) If 'P' = 37-60, : "A" will be equal to '1'
e) If 'P' is above 60 : "A" will be equal to '0'

II. **PERFORMANCE**: Here 'Monthly Performance' of the bidder for all the packages (**under execution**/ executed during the 'Period of Assessment' in all the Power Sector Regions of BHEL) **SIMILAR** to the packages covered under the tendered scope, excepting packages not commenced shall be taken into consideration. The 'Period of Assessment' shall be 6 months preceding the cut off month. The cut off month for reckoning 'Period of Assessment' shall be the month two (2) months preceding the month corresponding to the 'latest date of bid submission', in the following manner:

**(Note**: For example if 'latest date of bid submission' is in Aug 2011, then the 'performance' shall be assessed for a 6 month period upto and inclusive of June 2011, for all the unit wise identified packages (refer Table I)

i). Calculation of Overall 'Performance Rating' for 'similar Package/Packages' for the tendered scope under execution at Power Sector Regions:
This shall be obtained by summing up the 'Monthly Performance Evaluation' scores obtained by the bidder in all Regions for all the similar Package/packages', divided by the total number of Package months for which evaluation should have been done, as per procedure below:

a) $P_1$, $P_2$, $P_3$ , $P_4$ , $P_5$ , …. $P_N$ etc be the packages (**under execution**/ executed during the 'Period of Assessment' in all Regions) **SIMILAR** to the packages covered under the tendered scope, excepting packages not commenced. Total number of similar packages for all Regions = $\mathbf{P_T}$ ( ie $P_T = P_1 + P_2 + P_3 + P_4 + .. P_N$ )

b) Number of Months '$T_1$' for which 'Monthly Performance Evaluation' as per relevant formats, should have been done in the 'Period of Assessment' for the corresponding similar package $P_1$. Similarly $T_2$ for package $P_2$, $T_3$ for package $P_3$, etc for the tendered scope. Now calculate cumulative total months '$\mathbf{T_T}$' for total similar Packages '$\mathbf{P_T}$' for all Regions ( i.e $\mathbf{T_T} = T_1 + T_2 + T_3 + T_4 + .. T_N$ )

c) Sum '$S_1$ ' of 'Monthly Performance Evaluation' Scores ($S_{1\text{-}1}$, $S_{1\text{-}2}$, $S_{1\text{-}3}$, $S_{1\text{-}4}$, $S_{1\text{-}5}$,…. $S_{1\text{-}N}$ ) for similar package $P_1$, for the 'period of assessment' '$T_1$' (i.e $S_1 = S_{1\text{-}1} + S_{1\text{-}2} + S_{1\text{-}3} + S_{1\text{-}4} + S_{1\text{-}5} + \ldots S_{1\text{-}N}$). Similarly $S_2$ for package $P_2$ for period $T_2$, $S_3$ for package $P_3$ for period $T_3$, etc for the tendered scope for all Regions. Now calculate cumulative sum '$S_T$' of 'Monthly Performance Evaluation' Scores for total similar Packages '$\mathbf{P_T}$' for all Regions (i.e '$S_T$'= $S_1 + S_2 + S_3 + S_4 + S_5 + \ldots S_N$.)

d) **Overall Performance Rating** '$\mathbf{R_{BEHL}}$**' for the similar Package/Packages** (**under execution**/ executed during the 'Period of Assessment') in all the Power Sector Regions of BHEL)**:**

$$= \frac{\textbf{Aggregate of Performance scores for all similar packages in all the Regions}}{\textbf{Aggregate of months for each of the similar package for which performance should have been evaluated in all the Regions}}$$

$$= \frac{S_T}{T_T}$$

**e) Bidders to note that the risk of non evaluation or non availability of the 'Monthly Performance Evaluation' reports as per relevant formats is to be borne by the Bidder**

**f) Table showing methodology for calculating 'a', 'b' and 'c' above**

| Sl no | Item Description | Details for all Regions | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|
| (i) | (ii) | (iii) | (iv) | (v) | (vi) | (vii) | (viii) | (ix) | (x) |
| 1 | Similar Packages for all Regions → | $P_1$ | $P_2$ | $P_3$ | $P_4$ | $P_5$ | … | $P_N$ | Total No of similar packages for all Regions = $\mathbf{P_T}$ ie Sum (Σ) of columns (iii) to (ix) |
| 2 | Number of Months for which 'Monthly Performance Evaluation' as per relevant formats should have been done in the 'period of assessment for corresponding similar Package ( as in row 1) | $T_1$ | $T_2$ | $T_3$ | $T_4$ | $T_5$ | … | $T_N$ | Sum (Σ) of columns (iii) to (ix) = $\mathbf{T_T}$ |
| 3 | Monthly performance scores for the corresponding period (as in Row 2) | $S_{1-1}$, $S_{1-2}$, $S_{1-3}$, $S_{1-4}$, … $S_{1-T1}$ | $S_{2-1}$, $S_{2-2}$, $S_{2-3}$, $S_{2-4}$, … $S_{2-T2}$ | $S_{3-1}$, $S_{3-2}$, $S_{3-3}$, $S_{3-4}$, … $S_{3-T3}$ | $S_{4-1}$, $S_{4-2}$, $S_{4-3}$, $S_{4-4}$, … $S_{4-T4}$ | $S_{5-1}$, $S_{5-2}$, $S_{5-3}$, $S_{5-4}$, … $S_{5-T5}$ | .. … … … … | $S_{N-1}$, $S_{N-2}$, $S_{N-3}$, $S_{N-4}$, … $S_{N-TN}$ | --- |
| 4 | Sum of Monthly Performance scores of the corresponding Package for the corresponding period (as in row-3) | $S_1$ | $S_2$ | $S_3$ | $S_4$ | $S_5$ | … | $S_N$ | Sum (Σ) of columns (iii) to (ix) = $\mathbf{S_T}$ |

ii) Weightage "B" assigned to bidders based on Overall Performance Rating ($R_{BHEL}$) at Power Sector Regions, for the respective Package:

a) If $\mathbf{R_{BHEL}}$ is ≥ 80%, "B" will be equal to '6'
b) If $\mathbf{R_{BHEL}}$ is ≥ 75% < 80%, "B" will be equal to '5'
c) If $\mathbf{R_{BHEL}}$ is ≥ 70% < 75%, "B" will be equal to '4'
d) If $\mathbf{R_{BHEL}}$ is ≥ 65% < 70%, "B" will be equal to '3'
e) If $\mathbf{R_{BHEL}}$ is ≥ 60% < 65%, "B" will be equal to '2'
f) If $\mathbf{R_{BHEL}}$ is < 60%, "B" will be equal to '0'

**III. 'Assessment of Capacity of Bidder' to be Qualified for the tender:**

**Shall be based on the sum of the weightages obtained in 'LOAD' (A) and 'PERFORMANCE' (B) as below:**

**a) If the sum (A+B) is 6 or above for each of the applicable Package, then the Bidder is considered 'Qualified' for the tender**

**b) If the sum (A+B) is less than 6 for any of the applicable Package, then the Bidder is considered 'NOT Qualified' for the tender**

IV. **Explanatory note**:

a) Similar package means Boiler or ESP or Piping or Turbine or Civil or Structure or Electrical or CI, etc at the individual level irrespective of rating of Plant, and irrespective of whether the subject tender is a single package or as part of combined/composite packages. Normally Boiler, ESP, Piping, Turbine, Electrical, CI, Civil, Structure, etc is considered individual level of package. For example in case the tendered scope is a Boiler Vertical Package comprising of Boiler, ESP and Power Cycle Piping (i.e the 'identified packages as per Table-1 below), the 'PERFORMANCE' part against sl no II above, needs to be evaluated considering all the identified packages (ie Boiler, ESP and Power Cycle Piping) and finally the Bidder's capacity to execute the tendered scope is assessed in line with III above

b) Identified Packages (Unit wise)

**Table-1**

| | Civil | Electrical & CI | Mechanical |
|---|---|---|---|
| | i). Enabling works<br>ii). Pile and Pile Caps<br>iii). Civil Works including foundations<br>iv). Structural Steel Fabrication & Erection<br>v). Chimney<br>vi). Cooling Tower<br>vii). Others (Civil) | i). Electrical<br>ii). CI<br>iii). Others (Elec & CI) | i). Boiler & Aux (All types including CW Piping if applicable)<br>ii). Power Cycle Piping/Critical Piping<br>iii). LP Piping<br>iv). ESP<br>v). Steam Turbine Generator set & Aux<br>vi). Gas Turbine Generator set & Aux<br>vii). Hydro Turbine Generator set & Aux<br>viii). Turbo Blower (including Steam Turbine)<br>ix). Material Handling<br>x). Material Management<br>xi). Material Handling & Material Management<br>xii). Others (Mechanical) |

c) Vendors who are first timers to any BHEL Region, may be considered subject to satisfying other tender conditions. Eligibility of the party for the next tender of any package in that Region, shall be subject to the bidder satisfying the 'Assessment of Capacity of Bidder' for a period of first **nine months** after commencement of work or contract duration whatever is lesser.

In case the first timer is executing any other packages in any BHEL Region, then the performance evaluation will be based on the data available for the other packages though not similar, for the 'Period of assessment', for the purpose of 'Assessment of Capacity of Bidder'

d) Vendors who are not first timers and who have not been executing any package or packages similar to the packages under the tender in the 'Period of assessment', shall be considered qualified subject to them satisfying all other tender conditions.

e) In the unlikely event of all bidders shortlisted against Technical and Financial Qualification criteria not meeting the criteria on 'Assessment of Capacity of Bidders' detailed above, OR leads to a single tender response on applying the criteria of 'Assessment of Capacity of Bidders', then BHEL at its discretion, reserves the right to consider the further processing of the Tender based on the **Overall Performance Rating** '$R_{BHEL}$**'** only**.**

f) 'Under execution' shall mean works in progress as per the following:

i. upto Boiler Steam Blowing in case of Steam Generator and Auxilliaries

ii. upto Synchronisation in case of all other works excepting sl no (i) and (iii)

iii. upto execution of at least 75% of anticipated contract value (unit wise), in case of Enabling works or Civil & Structures.

Note : BHEL at its discretion can extend (or reduce in exceptional cases in line with Contract conditions) the period defined against (i), (ii) and (iii) above, depending upon the balance scope of work to be completed.

g) Performance evaluation in CL 9 above is applicable to Prime bidder and consortium partner (or Technical tie up partner) for their respective scope of work

10.0 Since the job shall be executed at site**,** bidders must visit site/ work area and study the job content, facilities available, availability of materials, prevailing site conditions including law & order situation, applicable wage structure, wage rules, etc before quoting for this tender. They may also consult this office before submitting their offers, for any clarifications regarding scope of work, facilities available at sites or on terms and conditions.

11.0 For any clarification on the tender document, the bidder may seek the same in writing or through e-mail, as per specified format, within the scheduled date for seeking clarification, from the office of the undersigned. BHEL shall not be responsible for receipt of queries after due date of seeking clarification due to postal delay or any other delays. Any clarification / query received after last date for seeking clarification may not be normally entertained by BHEL and no time extension will be given.

12.0 BHEL may decide holding of pre-bid discussion [PBD] with all intending bidders as per date indicated in the NIT. The bidder shall ensure participation for the same at the appointed time, date and place as may be decided by BHEL. Bidders shall plan their visit accordingly. The outcome of pre-bid discussion (PBD) shall also form part of tender.

13.0 In the event of any conflict between requirement of any clause of this specification/ documents/drawings/data sheets etc or requirements of different codes/standards specified, the same to be brought to the knowledge of BHEL in writing for clarification before due date of seeking clarification (whichever is applicable), otherwise, interpretation by BHEL shall prevail. Any typing error/missing pages/ other clerical errors in the tender documents, noticed must be pointed out before pre-bid meeting/submission of offer, else BHEL's interpretation shall prevail.

14.0 Unless specifically mentioned otherwise, bidder's quoted price shall deemed to be in compliance with tender including PBD.

15.0 Bidders shall submit Integrity Pact Agreement (Duly signed by authorized signatory who signs in the offer), **if applicable**, along with techno-commercial bid. This pact shall be considered as a preliminary qualification for further participation. **The names and other details of Independent External Monitor (IEM) for the subject tender is as given at point (1) above.**

16.0 The Bidder has to satisfy the Pre Qualifying Requirements stipulated for this Tender in order to be qualified. The Price Bids of only those bidders will be opened who will be qualified for the subject job on the basis of satisfying the Pre Qualification Criteria specified in this NIT as per Annexure-I (as applicable), past performance etc. and date of opening of price bids shall be intimated to only such bidders. BHEL reserves the right not to consider offers of parties under HOLD.

**17.0** In case BHEL decides on a `Public Opening', the date & time of opening of the sealed PRICE BID shall be intimated to the qualified bidders and in such a case, bidder may depute one authorised representative to witness the price bid

opening. BHEL reserves the right to open 'in-camera' the 'PRICE BID' of any or all Unsuccessful/Disqualified bidders under intimation to the respective bidders.

18.0 Validity of the offer shall be for **six months** from the latest due date of offer submission (including extension, if any) unless specified otherwise.

19.0 BHEL reserves the right to decide the successful bidder on the basis of Reverse Auction process. In such case all qualified bidders will be intimated regarding procedure/ modality for Reverse Auction process prior to Reverse Auction and price will be decided as per the rules for Reverse Auction. .

However, if reverse auction process is unsuccessful as defined in the RA rules/procedures, or for whatsoever reason, then the sealed 'PRICE BIDs' will be opened for deciding the successful bidder. BHEL's decision in this regard will be final and binding on bidder.

20.0 On submission of offer, further consideration will be subject to compliance to tender & qualifying requirement and customer's acceptance, as applicable.

21.0 In case the bidder is an "Indian Agent of Foreign Principals", 'Agency agreement has to be submitted along with Bid, detailing the role of the agent along with the terms of payment for agency commission in INR, along with supporting documents.

22.0 The bidders shall not enter into any undisclosed M.O.U. or any understanding amongst themselves with respect to tender.

23.0 Consortium Bidding (or Technical Tie up) shall be allowed only if specified in Pre Qualifying Requirement (PQR) criteria, and in such a case the following shall be complied with:

23.1 Prime Bidder and Consortium Partner or partners are required to enter into a consortium agreement with a validity period of six months initially. In case the consortium is awarded the contract, then the Consortium Agreement between the Prime Bidder and Consortium Partner or partners shall be extended till contractual completion period including extension periods if any applicable.

23.2 'Stand alone' bidder cannot become a '**Prime Bidder' or a 'Consortium bidder' or 'Technical Tie up bidder' in a consortium (or Technical Tie up) bidding**. Prime bidder shall neither be a consortium partner to other prime bidder nor take any other consortium partners. However, consortium partner may enter into consortium agreement with other prime bidders. In case of non compliance, consortium bids of such Prime bidders will be rejected.

23.3 Number of partners for a consortium Bidding (or Technical Tie up) shall be as specified in the PQR

23.4 Prime Bidder shall be as specified in the Pre Qualification Requirement, else the bidder who has the major share of work

23.5 In order to be qualified for the tender, Prime Bidder and Consortium partner or partners shall satisfy (i) the Technical 'Pre Qualifying Requirements' specified for the respective package, (ii) "Assessment of Capacity of Bidder' as specified in clause 9.0

23.6 Prime Bidder shall comply with additional 'Technical' criteria of PQR as defined in 'Explanatory Notes for the PQR'

23.7 Prime Bidder shall comply with all other Pre Qualifying criteria for the Tender unless otherwise specified

23.8 In case customer approval is required, then Prime Bidder and Consortium Partner or partners shall have to be individually approved by Customer for being considered for the tender.

23.9 Prime Bidder shall be responsible for the overall execution of the contract

23.10 In case of award of job, Performance shall be evaluated for Prime Bidder and Consortium Partner or partners for their respective scope of work(s) as per prescribed formats

23.11 In case the Consortium partner or partners back out, their SDs shall be encashed by BHEL. In such a case, other consortium partner or partners meeting the PQR have to be engaged by the Prime Bidder, and if not, the respective work will be withdrawn and executed on risk and cost basis of the Prime Bidder. The new consortium partner or partners shall submit fresh SDs as applicable.

23.12 In case the prime Bidder withdraws, the whole contract shall be considered cancelled and short closed.

23.13 After execution of work, the work experience shall be assigned to the Prime Bidder and the consortium partner or partners for their respective scope of work. After successful execution of two similar works with the same consortium partner or partners under direct orders of BHEL, the Prime Bidder shall be eligible for becoming a 'stand alone' bidder for similar works, subject to certification from BHEL about the active involvement of the Prime Bidder for satisfactory execution of the works.

23.14 The consortium partner shall submit SD equivalent to 2% of the total contract value in addition to the SD to be submitted by the prime Bidder for the total contract value. In case there are two consortium partners, then each partner shall submit SD equivalent to 1% of the total contract value in addition to the SD to be submitted by the prime Bidder for the total contract value.

23.15 In case of a Technical Tie up, all the clauses applicable for the Consortium partner shall be applicable for the Technical Tie up partner also

24.0 The bidder shall submit documents in support of possession of 'Qualifying Requirements' duly self certified and stamped by the authorized signatory, indexed and properly linked in the format for PQR. In case BHEL requires any other documents/proofs, these shall be submitted immediately.

25.0 The bidder may have to produce original document for verification if so decided by BHEL.

26.0 Order of Precedence

In the event of any ambiguity or conflict between the Tender Documents, the order of precedence shall be in the order below:

a. Amendments/Clarifications/Corrigenda/Errata etc issued in respect of the tender documents by BHEL
b. Notice Inviting Tender (NIT)
c. Price Bid
d. Technical Conditions of Contract (TCC)—Volume-1A
e. Special Conditions of Contract (SCC) —Volume-1B
f. General Conditions of Contract (GCC) —Volume-1C
g. Forms and Procedures —Volume-1D

for BHARAT HEAVY ELECTRICALS LTD

AGM/Purchase

**Enclosure**

01. Annexure-1: Pre Qualifying criteria.
02. Annexure-2: Check List .
03 Annexure=3: Integrity Pact
04 Annexure-4: Important Infor
05 Other Tender documents as per this NIT.

**ANNEXURE - 1**

## PRE QUALIFYING REQUIREMENTS

| | |
|---|---|
| JOB | Collection of materials from BHEL/client's stores/storage yard; transportation to site of work; pre-erection checks, pre-assembly if necessary, erection, testing, assistances for commissioning & trial operation, handing over, assistance for performance guarantee test of **Boiler and its Auxiliaries**, Electrostatic Precipitator (ESP) Power Cycle Pipeline, Rotating Machines, insulation, final painting etc of **Unit 1 & Unit 2 of 2x150 MW OPG Power Gujarat** Private Ltd At OPGPGPL Bhadreshawar TPP Distt. Kutch (Gujarat).<br><br>**(UNIT-1 and UNIT-2 shall be awarded to 2 separate agencies)** |
| TENDER NO | **BHE/PW/PUR/KTI-BLR(Vertical Pkg) U 1/1040**<br>**BHE/PW/PUR/KTI-BLR(Vertical Pkg) U 2/1041** |

| **SL NO** | **PRE QUALIFICATION CRITERIA** | **Bidders claim in respect of fulfilling the PQR Criteria** | |
|---|---|---|---|
| | | **Name and Description of qualifying criteria** | Page no of supporting document. **Bidder must fill up this column as per applicability** |
| A | Submission of Integrity Pact duly signed (if applicable)<br>(Note: To be submitted by Prime Bidder & Consortium/Technical Tie up partner jointly in case Consortium bidding is permitted, otherwise by the sole bidder) | APPLICABLE | |
| B | **Technical**<br><br>**B.1** Erection Testing & Commissioning (E T & C) of Atleast One Boiler (Consisting of Pressure Parts, Structures/ESP and IBR/Power Cycle Piping, of the same Unit as a Stand alone bidder) of rating 200 TPH or above.<br>OR<br>**B.2** E T & C of ESP and Power Cycle Piping of One Unit of Rating 100 MW or above<br>OR<br>**B.3** E T and C of ESP or Power Cycle Piping of a Unit of rating 190 MW or above subject to:<br>Entering into a Technical Tie Up with another agency who has experience of Boiler & Power Cycle Piping OR Boiler & ESP respectively, of a unit of rating 190 MW or above<br>OR<br>**B.4** E T & C of Atleast One STG of 190 MW or higher, under direct order of BHEL subject to:-<br>**a)** Experience of E T & C of Boiler (Consisting of | APPLICABLE | |

| | | | |
|---|---|---|---|
| | Pressure Parts, Structures/ESP and IBR/Power Cycle Piping, of the same Unit as a Stand alone bidder) of atleast 100 TPH<br>OR<br>**b)** Entering into a Technical Tie Up with an agency who has experience of E T & C of Boiler Structures and Pressure Parts or IBR/Power Cycle Piping of 100 MW or above with his own T&Ps and consumables | | |
| C-1 | **Financial**<br>**TURNOVER**<br>Bidders must have achieved an average annual financial turnover (Audited) of **Rs 480 Lakhs** or more over last three Financial Years (FY) i.e. 2009-2010, 2010-2011, 2011-12 OR 2008-2009, 2009-2010 and 2010-11 if Annual Accounts for FY 2011-12 are not audited. | APPLICABLE | |
| C-2 | NETWORTH (only in case of Companies)<br>Net worth of the Bidder based on the latest Audited Accounts as furnished for 'C-1' above should be positive | APPLICABLE | |
| C-3 | PROFIT<br>Bidder must have earned cash profit in any one of the three Financial Years as applicable in the last three Financial Years defined in 'C-1 above based on latest Audited Accounts. | APPLICABLE | |
| D | Assessment of Capacity of Bidder to execute the work as per sl no 9 of NIT (if applicable) | APPLICABLE | By BHEL |
| E | Approval of Customer (if applicable)<br>**Note:** Names of bidders (including consortium/Technical Tie up partners in case consortium bidding is permitted) who stand qualified after compliance of criteria A to D shall be forwarded to customer for their approval. | NOT APPLICABLE | BY BHEL |
| F | Price Bid Opening<br>**Note:** Price Bids of only those bidders shall be opened who stand qualified after compliance of criteria A to E | APPLICABLE | BY BHEL |
| F | Technical Tie up criteria (if applicable) | APPLICABLE | |
| | **Explanatory Notes for the PQR (unless otherwise specified in the PQR):**<br>1. Bidder to submit Audited Balance Sheet and Profit and Loss Account for the respective years as indicated against C-1 above along with all annexures<br>2. In case audited Financial statements have not been submitted for all the three years as indicated against C-1 above, then the applicable audited statements submitted by the bidders against the requisite three years, will be averaged for three years i.e total divided by three.<br>3. C-2:-NETWORTH : Shall be calculated based on the latest Audited Accounts as furnished for C-1 above. Net worth = Paid up share capital + Reserves. (Net worth is required to be evaluated in case of companies)<br>4. C-3:- PROFIT : shall be NET profit (PAT + Non cash expenditure viz depreciation) earned during any one of the three financial years as in C-1 above<br>5. ~~'Additional' Criteria in respect of 'Technical' criteria of PQR (as in 'B' above) for Civil, Electrical, CI, unless otherwise~~ | | |

~~specified :~~

~~1. Bidder should have executed similar work of any one of the following:~~

~~a. One (1) work of value not less than Rs XXX~~

~~OR~~

~~b. Two (2) works of not less than Rs YYY~~

~~OR~~

~~c. Three (3) works of not less than Rs ZZZ~~

~~(Value XXX, YYY, ZZZ shall be as indicated by BHEL~~

~~2. 'Similar' work for criteria 5 above means~~

~~a. Civil or Structures or Civil & Structures or Chimney respectively as applicable to the tendered scope in respect of 'CIVIL' Works~~

~~b. Electrical works in respect of 'ELECTRICAL'~~

~~c. CI works in respect of 'CI' Works~~

~~d. Material Handling and/or Management works in respect of 'MM' works~~

6. Time period for achievement of the 'Technical' criteria of PQR (as in 'B' above) will be the last 7 years ending on the 'latest date' of Bid submission
7. 'EXECUTED' means the Vendor should have achieved the criteria specified in the Technical criteria of PQR (as in 'B' above) even if the Contract has not been completed or closed
8. Unless otherwise specified, for the purpose of 'Technical' criteria of PQR ( as in 'B' above), the word 'EXECUTED' means:
    1. "BOILER LIGHT UP" in respect of Boiler & Aux and ESP
    2. "SYNCHRONISATION" in respect of STG/GTG and 'SPINNING' in case of HTG
    3. "STEAM BLOWING COMPLETION" in respect of at least Main Steam Line of Power Cycle Piping
    4. "HYDRAULIC TEST" of the system in respect of Structures, Pressure parts/IBR Piping
    5. ~~"CHARGING" in respect of power Transformers, Bus ducts, HT/LT switchgears~~
    6. ~~"Completion of RCC Shell and liner (steel or brick as per tendered scope) up to the HEIGHT specified using slip form" in case of RCC Chimney.~~
    7. ~~Achievement of physical Quantities as per respective PQRs in respect of Civil & Structures and Piling Works~~
    8. ~~'Readiness for coal Filling" in respect of Bunker Structure Work.~~
9. Boiler means HRSG or WHRB or any other types of Steam Generator
10. Critical/Power Cycle piping means Main Steam, Hot Reheat, Cold Reheat, HP Bypass, LP Bypass lines
11. For the purpose of evaluation of the PQR, one MW shall be considered equivalent to 3.5TPH where ever rating of HRSG/BOILER is mentioned in MW. Similarly, where ever rating of Gas Turbine is mentioned in terms of Frame size, ISO rating in terms of MW shall be considered for evaluation.
12. In case the experience/PO/WO certificate enclosed by bidders do not have separate break up prices for the E&C portion of Electrical and CI Works, (i.e. the certificates enclosed are for composite order for supply and erection of Electrical & CI and other works if any), then value of Erection and Commissioning for the Electrical & CI portion shall be considered as 15% of the supply & erection of Electrical & CI, unless otherwise specifically indicated in the PQR.
13. ~~Scope for capital overhaul of STG shall cover Bearing Inspection work and overhauling of all cylinders of the Turbine unless otherwise specifically indicated in the PQR.~~
14. ~~.~~ In case the tendered scope is not a Pulverised Fuel Boiler, experience of Oil/Gas Fired Boilers also can be considered unless otherwise specifically indicated in the PQR~~.~~

BIDDER SHALL SUBMIT ABOVE PRE-QUALIFICATION CRITERIA FORMAT, DULY FILLED-IN, SPECIFYING RESPECTIVE ANNEXURE NUMBER AGAINST EACH CRITERIA AND FURNISH RELEVANT DOCUMENT INCLUSIVE OF WORK OREDER AND WORK COMPLETION CERTIFICATE ETC IN THE RESPECTIVE ANNEXURES IN THEIR OFFER.

**ANNEXURE - 2**

## CHECK LIST

**NOTE:- Tenderers are required to fill in the following details and no column should be left blank**

| | | | |
|---|---|---|---|
| 1 | Name and Address of the Tenderer | | |
| 2 | Details about type of the Firm/Company | | |
| 3.a | Details of Contact person for this Tender | Name : Mr/Ms<br>Designation:<br>Telephone No:<br>Mobile No:<br>Email ID:<br>Fax No: | |
| 3.b | Details of alternate Contact person for this Tender | Name : Mr/Ms<br>Designation:<br>Telephone No:<br>Mobile No:<br>Email ID:<br>Fax No: | |
| 4 | EMD DETAILS | DD No: Date :<br>Bank : Amount:<br>Please tick ( √ ) whichever applicable:-<br>ONE TIME EMD / ONLY FOR THIS TENDER | |
| 5 | Validity of Offer | TO BE VALID FOR SIX MONTHS FROM DUE DATE | |
| | | APPLICABILITY (BY BHEL) | ENCLOSED BY BIDDER |
| 6 | Whether the format for compliance with **PRE QUALIFICATION CRITERIA** (ANNEXURE-I) is understood and filled with proper supporting documents referenced in the specified format | Applicable | YES / NO |
| 7 | Audited profit and Loss Account for the last three years | Applicable | YES/NO |
| 8 | Copy of PAN Card | Applicable | YES/NO |
| 9 | Whether all pages of the Tender documents including annexures, appendices etc are read understood and signed | Applicable | YES/NO |
| 10 | Integrity Pact | Applicable | YES/NO |
| 11 | Declaration by Authorised Signatory | Applicable | YES/NO |
| 12 | No Deviation Certificate | Applicable | YES/NO |
| 13 | Declaration confirming knowledge about Site Conditions | Applicable | YES/NO |
| 14 | Declaration for relation in BHEL | Applicable | YES/NO |
| 15 | Non Disclosure Certificate | Applicable | YES/NO |

| | | | |
|---|---|---|---|
| 16 | Bank Account Details for E-Payment | Applicable | YES/NO |
| 17 | Capacity Evaluation of Bidder for current Tender | Applicable/ | YES/NO |
| 18 | Tie Ups/Consortium Agreement are submitted as per format | Applicable | YES/NO |
| 19 | Power of Attorney for Submission of Tender/Signing Contract Agreement | Applicable | YES/NO |
| 20 | Analysis of Unit rates | Applicable | YES/NO |

NOTE : STRIKE OFF 'YES' OR 'NO', AS APPLICABLE. TENDER NOT ACCOMPANIED BY THE PRESCRIBED **ABOVE APPLICABLE DOCUMENTS** ARE LIABLE TO BE SUMMARILY REJECTED.

**DATE :**

**AUTHORISED SIGNATORY**
**(With Name, Designation and Company seal)**

**ANNEXURE - 3**

# INTEGRITY PACT

## Between

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

## And

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

## Preamble

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

_____

_____

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

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

### Section 1 - Commitments of the Principal

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

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

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

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

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

## Section 2 – Commitments of the Bidder(s)/ Contractor(s)

2.1 The Bidder(s)/ Contractor(s) commit himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the tender process and during the contract execution.

2.1.1 the Bidder(s)/ Contractor(s) will not, directly or through any other person or firm, offer, promise or give to the Principal or to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material, immaterial or any other benefit which he / she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.

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

2.1.3 The Bidder(s)/ Contractor(s) will not commit any penal offence under the relevant IPC/PC Act; further the Bidder(s)/ Contractor(s) will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.

2.1.4 The Bidders (s)/ Contractor(s) will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.

2.2 The Bidder(s)/ Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.

**Section 3 – Disqualification from tender process and execution from future contracts**

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

**Section 4 – Compensation for Damages**

4.1 If the Principal has disqualified the Bidder from the tender process prior to the award according to Section 3, the Principal is entitled to demand and recover the damages equivalent to Earnest Money Deposit/ Bid Security.

4.2 If the Principal has terminated the contract according to Section 3, or if the Principal is entitled to terminate the contract according to Section 3, the Principal shall be entitled to demand and recover from the Contractor liquidated damages equivalent to 5% of the contract value or the amount equivalent to Security Deposit/ Performance Bank Guarantee, whichever is higher.

**Section 5 – Previous Transgression**

5.1 The Bidder declares that no previous transgressions occurred in the last 3 years with any other company in any country conforming to the anti-corruption approach or with any other Public Sector Enterprise in India that could justify his exclusion from the tender process.

5.2 If the Bidder makes incorrect statement on his subject, he can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason.

**Section 6 – Equal treatment of all Bidders/ Contractors/ Sub-Contractors**

6.1 The Bidder(s)/ Contractor(s) undertake(s) to obtain from his sub-contractors a commitment consistent with this Integrity Pact and report Compliance to the Principal. This commitment shall be taken only from those sub-contractors whose contract value is more than 20% of Bidder's/ Contractor's contract value with the Principal. The Bidder(s)/Contractor(s) shall continue to remain responsible for any default by his Sub-contractor(s).

6.2 The Principal will enter into agreements with identical conditions as this one with all Bidders and Contractors.

6.3 The Principal will disqualify from the tender process all bidders who do not sign this pact or violate its provisions.

## Section -7 Criminal Charges against violating Bidders/ Contractors/ Sub-contractors

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

## Section – 8 Independent External Monitor(s)

8.1 The Principal appoints competent and credible Independent External Monitor for this Pact. The task of the Monitor is to review independently and objectively, whether and to what extent the parties comply with the obligations under this agreement.

8.2 The Monitor is not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the CMD, BHEL.

8.3 The Bidder(s)/ Contractors(s) accepts that the Monitor has the right to access without restriction to all contract documentation of the Principal including that provided by the Bidder(s)/ Contractor(s). The Bidder(s)/Contractor(s) will grant the monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his contract documentation. The same is applicable to Sub-contractor(s). The Monitor is under contractual obligation to treat the information and documents of the Bidder(s)/ Contractor(s)/ Sib-contractor(s) with confidentiality.

8.4 The Principal will provide to the Monitor sufficient information about all meetings among the parties related to the contract provided such meeting could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the Monitor the option to participate in such meetings.

8.5 As soon as the Monitor notices, or believes to notice, a violation of this agreement, he will so inform the Management of the Principal and request the Management to discontinue or take corrective action, or heal the situation, or to take other relevant action. The Monitor can in this regard submit non-binding recommendations. Beyond this, the Monitor has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action.

8.6 The Monitor will submit a written report to the CMD, BHEL within 8 to 10 weeks from the date of reference or intimation to him by the Principal and, should the occasion arise, submit proposals for correcting problematic situations.

8.7 The CMD, BHEL shall decide the compensation to be paid to the Monitor and its terms and conditions.

8.8 If the Monitor has reported to the CMD, BHEL, a substantiated suspicion of an offence under relevant IPC/PC Act, and the CMD, BHEL has not, within reasonable time, taken visible action to proceed against such offence or reported it to the Vigilance Office, the Monitor may also transmit this information directly to the Central Vigilance Commissioner, Government of India.

8.9 The number of Independent External Monitor(s) shall be decided by the CMD, BHEL.

8.10 The word 'Monitor' would include both singular and plural.

## Section 9 – Pact Duration

9.1 This Pact begins and shall be binding on and from the submission of bid(s) by bidder(s). It expires for the Contractor 12 months after the last payment under the respective contract and for all other Bidders 6 months after the contract has been awarded.

9.2 If any claim is made/ lodged during this time, the same shall be binding and continue to be valid despite the lapse of this pact as specified as above, unless it is discharged/ determined by the CMD, BHEL.

## Section 10 – Other Provisions

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

10.2 Changes and supplements as well as termination notices need to be made in writing. Side agreements have not been made.

10.3 If the contractor is a partnership or a consortium, this agreement must be signed by all partners or consortium members.

10.4 Should one or several provisions of this agreement turn out to be invalid, the reminder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.

10.5 Only those Bidders/ Contractors who have entered into this agreement with the Principal would be competent to participate in the bidding. In other words, entering into this agreement would be a preliminary qualification.

| | |
|---|---|
| For & On Behalf of the Principal | For & On Behalf of the Bidder/ Contractor |
| (Office Seal) | (Office Seal) |

# ANNEXURE 4: IMPORTANT INFORMATION

1. The offers of the bidders who are on the banned list as also the offer of the bidders, who engage the services of the banned firms, shall be rejected. The list of banned firms is available on BHEL web site ( www.bhel.com ---> Tender Notification -→ List of Banned Firms )

2. **This is a combined tender for E & C of 2 units of 150 MW Boiler (Unit 1 & 2 at OPG Kutch Project).**

   i Tender specification (Volume I) is common for both units **(Unit 1 & 2)**.
   ii **Unit 1 & Unit 2** shall be awarded to separate agencies.
   iii **Bidder has to submit price for E & C of ONE UNIT of 150 MW Boiler Vertical Package as indicated in the Price Bid.**
   iv L-1 Bidder shall be considered for award of Unit-1.
   v For award of UNIT-2, next bidder in the order of their price competitiveness ( i.e L-2, then L-3 and hence forth) shall be given an option to match their price/rate, with the Awarded/Finalised price/rate of UNIT 1. In case none of the bidders agree to match the Awarded price/RATE of UNIT-1, then BHEL may consider awarding the UNIT-2 to L-1 bidder or opt any other suitable method to finalize UNIT-2.

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&
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# TECHNICAL CONDITIONS OF CONTRACT (TCC)

BHARAT HEAVY ELECTRICALS LIMITED

# TECHNICAL CONDITIONS OF CONTRACT (TCC)
# CONTENTS

| 1.0 | Project Information |
|---|---|

1: Purchaser : M/s OPG POWER GUJARAT Pvt. Ltd. (OPGPGPL)

2: Project Title : 2X150 MW OPG Power Gujarat Project, Kutch

**Location & Approach**

3: Location : Village-Bhadreshwar, Dist-Kutch, State–Gujarat(India)

4: Address Details : 2x150 MW OPG Power Gujarat Pvt. Ltd.
Village – Bhadreshwar, Taluka – Mundra, Dist.- Kutch
Pin Code- 370 411, Gujarat State, India"

4: Nearest Railway Station : Gandhidham

5: Road approach : Ahmedabad -NH / SH

6: Nearest airport : Kandla / Bhuj

7: Nearest port : Kandla / Mundra

8: Data of Seismic Design : As per IS 1893

9: Rainfall : 600 m

10: Ambient air temperature (Average) :

a) Maximum : 48 C

b) Minimum : 8 C

11: Soil Bearing Capacity : 20 T/M2

12: Average Relative Humidity : 50 – 85 %

13: Climatic Condition : Tropical Climate.

The Bidder shall visit site and get acquainted himself with the conditions prevailing at site before submission of the bid. The information given here in under are for general guidance and shall not be contractually binding on BHEL/ Owner. All relevant site data/information as may be necessary shall have to be obtained /collected by the Bidder.

**Note: The T&P shall be deployed by the contractor as per soil condition. The soil at Kutch is very loose and sandy. Contractor may kindly take note of this.**

**2.0** The work under the scope of these specifications is broadly as follows.

Collection of materials from BHEL/Customer's stores/Storage yard; transportation to site of work; pre-erection checks, pre-assembly if necessary, erection, testing, assistances for commissioning & trial operation, handing over, assistance for performance guarantee test of Boiler and its Auxiliaries, Electrostatic Precipitator (ESP) Power Cycle Pipeline, final painting etc of each unit of 2x150 MW OPG Power Gujarat Private Ltd. at Bhadreshwar, Distt. Kutch (Gujarat).

Following named systems are broadly in scope of the present contract:

i) Boiler supporting structures.
ii) Stairs, Platforms, Hand Rails, Toe Guards etc.
iii) Boiler pressure parts.
iv) Boiler trim & integral piping and mountings
v) Fuel oil Pumps & pipeline
vi) Non-pressure parts
vii) Rotating machines (e.g. Mills, Fans, & Motors etc. with their drives, lube oil system, approach platform, ladder/stair, canopy etc.)
viii) Pulverised fuel pipeline (plain as well as ceramic lined) with special couplings.
ix) External structures (e.g. duct supporting, pipe rack structure, elevator structure etc).
x) Handling arrangements for rotating machines & other equipment.
xi) Power Cycle Pipeline.
xii) Low Pressure (Air & Water) Pipeline
xiii) HP by-pass system (Valves, Control Fluid system with pipeline).
xiv) De-aerating Heater & Feed Water Storage Tank with associated structures and platforms
xv) Electrostatic precipitator with stairways, galleries, roof & side cladding.
xvi) HP & LP chemical dozing systems.
xvii) Roof & Side Cladding (metapoly sheet) of Boiler & Elevator.
xviii) Insulation and Cladding.
xix) Application of final paint on non-insulated surfaces.

For details of various sub-systems, please refer relevant Appendix. Please note that there is possibility of deletion or inclusion of some sub-systems with regard to the scope of contract.

**NOTE: BOTH THE UNITS TO BE AWARDED SEPARATELY TO SEPARATE AGENCIES.**

| Sl.No | Description<br>PART I | Scope / to be taken care by | | *Remarks* |
|---|---|---|---|---|
| | | **BHEL** | **Bidder** | |
| 3.1 | **ESTABLISHMENT** | | | |
| 3.1.1 | **FOR CONSTRUCTION PURPOSE**: | | | |
| a | Open space for office (as per availability) | Yes | | Location will be finalized after joint survey with owner |
| b | Open space for storage (as per availability) | Yes | | Location will be finalized after joint survey with owner |
| c | Construction of bidder's office, canteen and storage building including supply of materials and other services | | Yes | |
| d | Bidder's all office equipments, office / store / canteen consumables | | Yes | |
| e | Canteen facilities for the bidder's staff, supervisors and engineers etc | | Yes | |
| f | Fire fighting equipments like buckets, extinguishers etc | | Yes | |
| g | Fencing of storage area, office, canteen etc of the bidder | | Yes | |
| 3.1.2 | **FOR LIVING PURPOSES OF THE BIDDER** | | | |
| a | Open space for labour colony (as per availability) | | Yes | Electricity, Water etc for Labour colony is also in the scope of Contractor |

| Sl.No | Description<br>PART I | Scope / to be taken care by | | *Remarks* |
|---|---|---|---|---|
| | | **BHEL** | **Bidder** | |
| b | Labour Colony with internal roads, sanitation, complying with statutory requirements | | Yes | |
| 3.2.0 | **ELECTRICITY** | | | |
| 3.2.1 | **Electricity For construction purposes 3 Phase** of Voltage 415/440 V | | | FREE |
| a | Single point source | Yes | | at one point near the erection site |
| b | Further distribution including all materials, Energy Meter, Protection devices and its service | | Yes | |
| c | Duties and deposits including statutory clearances if applicable | | Yes | |
| 3.2.2 | **Electricity for the office, stores, canteen etc of the bidder** | | | FREE |
| a | Single point source | Yes | | |
| b | Further distribution including all materials, Energy Meter, Protection devices and its service | | Yes | |
| c | Duties and deposits including statutory clearances if applicable | | Yes | |

| Sl.No | Description<br>PART I | Scope / to be taken care by | | *Remarks* |
|---|---|---|---|---|
| | | **BHEL** | **Bidder** | |
| 3.2.3 | **Electricity for living accommodation of the bidder's staff, engineers, supervisors etc** | | Yes | Bidder to make his own arrangement |
| a | Single point source | | Yes | |
| b | Further distribution including all materials, Energy Meter, Protection devices and its service | | Yes | |
| c | Duties and deposits including statutory clearances if applicable | | Yes | |
| 3.3.0 | **WATER SUPPLY** | | | |
| 3.3.1 | **For construction purposes: (to be specified whether chargeable or free)** | Yes | | FREE |
| a | Making the water available at single point | Yes | | . |
| b | Further distribution as per the requirement of work including supply of materials and execution | | Yes | |
| 3.3.2 | **Water supply for bidder's office, stores, canteen etc** | | | FREE |
| a | Making the water available at single point | Yes | | |

| Sl.No | Description<br>PART I | Scope / to be taken care by | | *Remarks* |
|---|---|---|---|---|
| | | **BHEL** | **Bidder** | |
| b | Further distribution as per the requirement of work including supply of materials and execution | | Yes | |
| 3.3.3 | **Water supply for Living Purpose** | Yes | | FREE |
| a | Making the water available at single point | Yes | | |
| b | Further distribution as per the requirement of work including supply of materials and execution | | Yes | |
| 3.4.0 | **LIGHTING** | | | |
| a | For construction work (supply of all the necessary materials)<br>1. At office/storage area<br>2. At the preassembly area<br>3. At the construction site /area | | Yes | |
| b | For construction work (execution of the lighting work/ arrangements)<br>1. At office/storage area<br>2. At the preassembly area<br>3 At the construction site /area | | Yes | |
| c | Providing the necessary consumables like bulbs, switches, etc during the course of project work | | Yes | |

| Sl.No | Description<br>PART I | Scope / to be taken care by | | *Remarks* |
|---|---|---|---|---|
| | | **BHEL** | **Bidder** | |
| d | Lighting for the living purposes of the bidder at the colony / quarters | | Yes | |
| 3.5.0 | **COMMUNICATION FACILITIES FOR SITE OPERATIONS OF THE BIDDER** | | | |
| a | Telephone, fax, internet, intranet, e-mail etc | | Yes | **Internet facility by customer on chargable basis** |
| 3.6.0 | **COMPRESSED AIR wherever required for the work** | | Yes | |
| 3.7.0 | **Demobilization of all the above facilities** | | **YES** | |
| 3.8.0 | **TRANSPORTATION** | | | |
| a | For site personnel of the bidder | | Yes | |
| B | For bidder's equipments and consumables (T&P, Consumables etc) | | Yes | |

| Sl.No | Description<br><br>**PART II**<br><br>**3.9.0 ERECTION FACILITIES** | Scope / to be taken care by | | *Remarks* |
|---|---|---|---|---|
| | | **BHEL** | **Bidder** | |
| 3.9.1 | Engineering works for construction: | | | |
| a | Providing the erection/constructions drawings for all the equipments covered under this scope | Yes | | **For Details Pl refer Chapter-II-** |
| b | Drawings for construction methods | Yes | Yes | In consultation with BHEL |
| c | As-built drawings – where ever deviations observed and executed and also based on the decisions taken at site- example – routing of small bore pipes | Yes | | |
| d | Shipping lists etc for reference and planning the activities | Yes | | |
| e | Preparation of site erection schedules and other input requirements | | Yes | In consultation with BHEL |
| f | Review of performance and revision of site erection schedules in order to achieve the end dates and other commitments | Yes | Yes | In consultation with BHEL |
| g | Weekly erection schedules based on Sl No. e | | Yes | In consultation with BHEL |

| Sl.No | Description<br><br>**PART II**<br><br>**3.9.0 ERECTION FACILITIES** | Scope / to be taken care by | | *Remarks* |
|---|---|---|---|---|
| | | **BHEL** | **Bidder** | |
| h | Daily erection / work plan based on Sl No. g | | Yes | In consultation with BHEL |
| i | Periodic visit of the senior official of the bidder to site to review the progress so that works are completed as per schedule. It is suggested this review by the senior official of the bidder should be done once in every two months. | | Yes | |
| j | Preparation of preassembly bay | | Yes | |
| k | ~~Laying of racks for gantry crane if provided by BHEL or brought by the contractor/bidder himself~~ | | | |
| L | Arranging the materials required for preassembly | | Yes | |

| SN | DESCRIPTION | CAPACITY (MINIMUM) | MINIMUM QUANTITY (For one unit) |
|---|---|---|---|
| 1 | Crawler Crane* | 40 MT | 01 No. – From the first month of BES. |
| 2 | Pick & Carry Crane* | 10 MT | 02 No. – From the first month of BES. |
| 3 | Diesel Fork Lift | 3T | From the BES |
| 4 | Trailer with Flat Bed* | 22 MT | 1 No. – From the BES |
| 5 | Tractor Trolley* | 15T | 02 No.- From the BES |
| **6** | **Multi Sheave Pulley Block** | **100T** | **04 Nos.- For Boiler Drum Lifting Purpose. Qty. may vary to suit site condition.** |
| **7** | **Single Sheave Pulley Block** | **8T** | **10 Nos.- For Boiler Drum Lifting Purpose. Qty. may vary to suit site condition.** |
| **8** | **Electric Winch with wire rope** | **10T** | **02 Nos. - For Boiler Drum Lifting Purpose.** |
| 9 | Passenger cum Goods Elevator to reach up to boiler drum floor | 1 MT | 01 NO. WITHIN 1 MONTH OF DRUM LIFTING |
| 10 | Air Compressor (Electric/Diesel operated) | 140 CFM, 7 Kg/cm$^2$ | 1 No. from first month |
| 11 | Hydro Test Pump | 250 Kg/cm$^2$ | 01 Set |
| 12 | Welding Machine & TIG Welding Set | As required | As required |
| 13 | 3-Phase Distribution Board with Complete Set Up for Drawl of Construction Power | | As required |
| 14 | Power Cable for drawl of Construction Power | As required | As required |
| 15 | Pre Heating / Stress Relieving Set (Heating Control Panel, Cables, Heating Elements, Thermometers etc.) | As required | As required |
| 16 | Radiography Arrangement with Radioactive Isotope Source | Iridium-192/Co 60 | As required |
| 17 | Theodolite of Required Accuracy | To ensure verticality of structural columns | As reuired |
| 18 | Arrangement of UT for high thickness joint | | As reuired |
| 19 | Self Drilling Cum Tapping Machine for Screws of Boiler Roof Sheets | As required | As required |
| 20 | Acid Cleaning & other Chemical circulation pumps | As required | As required |
| 21 | Electro-hydraulic pipe bending machine | | As required |

| SN | DESCRIPTION | CAPACITY (MINIMUM) | MINIMUM QUANTITY (For one unit) |
|---|---|---|---|
| 22 | Welding Generator (Electrical) & Rectifiers | 300 Ampere rating | As required |
| 23 | Welding Generator (Diesel Operated) | 300 Ampere rating | As required |
| 24 | Radiography Film Viewer | As required | As required |
| 25 | Hydraulic Pipe Bending Machine (manual) | | As required |
| 26 | Baking Oven with thermostat and temperature gauge for welding electrodes | As required | As required |
| 27 | Holding Oven with thermostat and temperature gauge for welding electrodes | As required | As required |
| 28 | Portable Oven for welding electrodes | As required | As required |
| 29 | Electric Winch | 5MT<br>1MT | 02 Nos.<br>02 Nos. |
| 26 | Hand Winch | 1 Ton | 02 Nos. |
| 27 | Scaffolding Materials | As required | As required |
| 28 | Profile making M/c | Suitable for working at various heights | Adequate qty for parallel working in multiple work fronts. |
| 29 | Nibbling M/c | | As required |
| 30 | Shearing M/c | | As required |
| 31 | Water Pump to lift water to top of boiler | As required | As required |
| 32 | Portable Grinding M/c | As required | 1 Set |
| 33 | Portable Drilling M/c | Up to 15 MT Capacity | As required |
| 34 | Chain Pulley Blocks | As required | As required |
| 35 | Fire retardant Tarpaulines | As required | As required |
| 36 | Fire Extinguisher | As Required | As required |

**Note: The soil at Kutch is very loose and sandy and the T&P shall be provided by the contractor suiting to the soil conditions.**

**PASSENGER CUM GOODS ELEVATOR**

Contractor, as part of his T&P, shall arrange, install, operate and maintain 1 MT capacity passanger-cum-goods elevator in one boiler to facilitate access to various platform elevations upto top floor/boiler drum floor. The elevator shall conform to the national standard and industrial safety code as applicable. These shall be deployed at the time of Boiler Drum erection in consultation with BHEL site engineer.
The probable suppliers for the elevator are:

1. M/s Avon cranes pvt ltd, Gurgaon
2. M/s Mekaster engineering & equipment pvt ltd, Halol

Laying of sleepers and rails and routine maintenance of the dip trolley system including assembly and dismantling are in Contractor's scope.

**B: MEASURING AND MONITORING DEVICES (MMD):**

As per requirement to be finalized at site, shall meet the requirements as per field quality plan and other erection, testing related activities.

Note:

1. The list indicated above is only suggestive and not exhaustive. Contractor shall deploy all other T&P and mmd as well that are necessary for proper execution of work under erection & commissioning of work under the scope.

2. Scaffolding Material arranged by material shall be of steel material.

| SN | Description | Capacity | Quantity | Remarks |
|---|---|---|---|---|
| (i) | HLHR | HLHR | 1 No. | Refer Notes |
| (ii) | Crawler Crane | ~120 MT | 2 No. | 1No. – To be deployed from BES<br>1 no. – To be deployed from 3rd month from BES. |
| (iii) | Crawler Crane | 75 MT | 2 No. | To be deployed form BES |
| (iii) | Huck Power Rig | As required | 2 No. | For ESP work.<br>See Note 6 here |
| (iv) | Induction Heating Equipment | As required | 6 Nos. (As required) | For welding of P-91 pipeline.<br>See Note 6 here |
| (v) | Air-leak test set up | As required | 1 SET | For leakage test of ESP |

Notes:

1 The above crane and T&P shall be used in both units (U-1 & U-2 ) on sharing basis .

2 HLHR crane will be used generally for erection of boiler ceiling structures and equipment/components above boiler ceiling structure or components/equipment beyond the reach of other cranes or non-availability of other BHEL cranes or for activities that essentially require services of this crane as decided by BHEL. This crane will accordingly be deployed at appropriate time as decided by BHEL for suitable duration and for intended purpose

3 All these cranes are to be used on sharing basis with other agencies working in the project. Contractor shall furnish his requisition for particular crane to BHEL sufficiently in advance to ensure proper planning and timely deployment. Decision of BHEL for allocation of cranes to different agencies in the project will be based on the overall interest of the project and priority of the activity. Such decision will be binding on the contractor.

4 Contractor shall make necessary arrangements like laying of sleepers; minor earth filling & consolidation; assembly & dismantling of heavy lift attachment, boom, jib etc for movement and operation of the crane.

5 BHEL will obtain all the above listed cranes on hiring basis including operating and maintenance crew. Bidder shall arrange for fuel (HSD) in his own cost. Since the cranes are to be used on sharing basis with other agencies of BHEL, the fuel/cost of fuel shall be shared in proportion to usage at mutually agreed rates

6 Contractor shall transport the equipments from BHEL stores, install, operate, carry out preventive as well as breakdown maintenance, dismantle after use and return to BHEL stores.

7 Certain tools / components / consumables for Huck Bolting M/c and Induction Heating M/c shall have to be arranged by the contractor in his cost.

## 6.1 TIME SCHEDULE & MOBILIZATION

### 6.1.1 INITIAL MOBILIZATION

After receipt of fax LOI, Contractor shall discuss with Project Manager / Construction Manager regarding initial mobilization. Contractor shall mobilize necessary resources within 2 weeks of issue of fax letter of intent or as per the directive of Project Manager / Construction Manager. Such resources shall be progressively augmented to match the schedule of milestones and commissioning.

### 6.1.2 MOBILIZATION FOR ERECTION, TESTING, ASSISTANCE FOR COMMISSIONING ETC.

The activities for erection, testing etc. shall be started as per directions of Construction Manager of BHEL. Contractor shall mobilize further resources (in addition to those required for activities under clause no. 6.1.1) as per requirement to commence the work of erection, testing etc. of boiler and auxiliaries and progressively augment the resources to match schedule of the project.

### 6.1.3 COMMENCEMENT OF CONTRACT PERIOD AND TENTATIVE SCHEDULE

**Erection/placement on its' designated foundation/location, of the first major permanent equipment/component/column covered in the scope of these specifications shall be recognized as "start of contract period".** Smaller items like packer plates, shims, anchors, inserts etc. will not be considered as start of contract period.

The Contractor has to subsequently augment his resources in such a manner that following major milestones of erection & commission are achieved on specified schedules:

| SN | MAJOR MILESTONE | TENTATIVE COMPLETION SCHEDULE FROM BES FOR UNIT # 1&2 |
|---|---|---|
| 1 | BOILER DRUM LIFTING | 4th Month |
| 2 | BOILER HYDRAULIC TEST | 11th Month |
| 3 | BOILER LIGHT UP | 17th Month |
| 4 | STEAM BLOWING | 19th Month |
| 5 | SYNCHRONIZATION | 20th Month |
| 6 | STABILIZATION OF THE PLANT OPERATION, COMPLETION OF ALL FACILITIES & PERFORMANCE GUARANTEE TEST | 21st Month |

**NOTE: SINCE BOILER & ESP FOUNDATION FOR BOTH UNITS (UNIT-1 & UNIT-2) ARE READY, AGENCY HAS TO MOBILIZE WITHIN LEAST POSSIBLE TIME AT SITE AFTER RECEIPT OF LOI.**

In order to meet above schedule in general, and any other intermediate targets set, to meet customer/ project schedule requirements, Contractor shall arrange & augment all necessary resources from time to time on the instructions of BHEL.

### 6.1.4 **CONTRACT PERIOD**

The contract period for completion of entire work (For both the units) under scope shall be **21 (Twenty One) months** from the "start of contract period as specified earlier.

The period from the commencement of preparatory work for erection till the actual "start of contract period" shall not be reckoned for the above purpose.

The progressive payment for erection, testing and commissioning on accepted price of contract value will be released as per the break up given hereinafter

The progressive payment for erection, testing and commissioning on accepted price of contract value will be released as per the break up given hereinafter:

**12.1.1 E & C OF BOILER AND AUXILIARIES, PIPING, FABRICATED STRUCTURES ETC**

# TERMS OF PAYMENT FOR STEAM GENERATOR

| SL NO | Contract (Main Package) Identitification ----> | Boiler | | | | Rotating Machine | ESP | | PIPING | | | INSULATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Rate schedule Identification -------->** | Structure | Pressure Parts | Non Pressure Parts (upto ESP inlet Funnel) | Air Pre Heaters | 1) RM 2) Handling Eqpts | ESP | NPP (ESP outlet Funnel to Chimney) | 1)P-91 2) AS 3) CS (HP) 4) CS (LP) 5) SS | Hangers & Supports | Temporary Piping 1) Steam Blowing 2) Chemical Cleaning | 1) Castable & Pourable 2) Iron Components 3) Wool mattresses 4) Aluminium sheeting |
| **I** | **PRO RATA PAYMENTS (85%)** | | | | | | | | | | | |
| 1.1 | ON PRE-ASSEMBLY WHEREVER APPLICABLE ( IF NOT APPLICABLE, THIS PORTION SHALL BE CLUBBED WITH PLACEMENT IN POSITION) | 20 | 20 | 25 | | 15 | 15 | 15 | 20 | 15 | | -- |
| 1.2 | PLACEMENT IN POSITION | 15 | 10 | 10 | | 20 | 20 | 10 | 20 | 25 | | 50 |
| 1.3 | ALIGNMENT | 15 | 15 | 10 | | 20 | 15 | 15 | 10 | 15 | | 15 |
| 1.4 | WELDING/BOLTING/FIXING | 15 | 20 | 15 | | 20 | 20 | 30 | 15 | 30 | | 20 |
| 1.5 | COMPLETION OF NON DESTRUCTIVE EXAMINATION & STRESS RELIEVING/ HEAT TREATMENT (if not applicable, then this portion to be paid along with welding) | 5 | 10 | -- | | -- | -- | -- | 5 | | | -- |
| 1.6 | ON DRUM LIFTING | 0 | | | | | | | | | | |
| 1.7 | COMPLETION OF ATTACHMENT WELDING, FIN WELDING, SUPPORTS | | 5 | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.8 | COMPLETION OF ROOF SKIN CASING | | 5 | | | | | | | | | |
| 1.9 | INSTALLATION OF TEMPORARY PIPING | | | | | | | | | | 60 | |
| 1.10 | DISMANTLING OF TEMPORARY PIPING, EDGE PREPARATION AND RETURN TO BHEL STORES, AREA CLEANING | | | | | | | | | | 25 | |
| 1.11 | HANGERS & SUPPORTS ETC WHEREVER NECESSARY AS PER DRG | | -- | 25 | | -- | -- | 15 | 10 | | | -- |
| 1.12 | COMPLETION OF FURNACE ALIGNMENT AND FIRE BALL CHECKING | 5 | | | | | | | | | | |
| 1.13 | COMPLETION OF BACK PASS ALIGNMENT | 5 | | | | | | | | | | |
| 1.14 | COMPLETION OF VIBRATION SNUBBERS, MECHANICAL SPACERS, CASSETTE BAFFLES, STEAM COOLED SPACERS | 5 | | | | | | | | | | |
| 1.15 | COMPLETION OF HOPPERS ALONG WITH ALL DOORS, HEATING ELEMENTS, POKING DOORS, ETC | | -- | 0 | | -- | 5 | | -- | | | -- |
| 1.16 | COMPLETION OF INNER, OUTER ROOF INSULATOR HOUSING, RECTIFIER TRANSFORMERS, PENT HOUSE MONO RAILS, HOISTS ETC | | -- | -- | | -- | 5 | -- | -- | | | -- |
| 1.17 | ERECTION OF EMITTING AND COLLECTING RAPPING SYSTEM WITH ALL DRIVES | | -- | -- | | -- | 5 | -- | -- | | | -- |
| 1.18 | EQUIPMENT TRIAL OPERATION | | | | | 10 | | | | | | |
| 1.19 | HYDRAULIC TEST OR PNEUMATIC TEST | | | | | | | | 3 | | | |
| 1.20 | FLOATING OF LINES, FINAL ADJUSTMENT OF SUPPORTS FOR COLD AND HOT VALUES (if not applicable, this portion to be clubbed along with hydraulic test/pneumatic test) | | | | | | | | 2 | | | |
| | | | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.21 | **AIR PRE HEATERS (PG 52)FROM THE TOTAL AMOUNT PAYABLE FOR THE PGMA WEIGHT AT TONNAGE RATES, PAYMENT WILL BE REGULATED AS UNDER:** | | | | | | | | | | | |
| 1.21.1 | COMPLETION OF SUPPORT STEEL SQUARENESS AND LEVELLING, EXPANSION ARRANGEMENT, HOUSING PANEL ERECTION AND ALIGNMENT, ERECTION, ALIGNMENT AND WELDING OF PEDESTALS | | | | 11 | | | | | | | |
| 1.21.2 | COMPLETION OF ERECTION, ALIGNMENT AND WELDING OF SUPPORT BEARING, GUIDE BEARING, ROTOR POST, BOTTOM AND TOP CENTRE SECTIONS, HOT AND COLD END CONNECTING PLATES | | | | 14 | | | | | | | |
| 1.21.3 | COMPLETION OF ERECTION AND ALIGNMENT OF MODULES | | | | 15 | | | | | | | |
| 1.21.4 | COMPLETION OF ERECTION, ALIGNMENT AND WELDING OF PIN RACK ASSEMBLY AND DRIVE ASSEMBLY | | | | 12 | | | | | | | |
| 1.21.5 | COMPLETION OF SEALS SETTING | | | | 17 | | | | | | | |
| 1.21.6 | ERECTION, ALIGNMENT AND WELDING OF LUBE OIL SYSTEMS, CLEANING DEVICE, FIRE SENSING DEVICE, DELUGE AND WATER WASH LINES, OBSERVATION PORT AND LIGHTING ASSEMBLIES AND OTHER ACCESSORIES | | | | 13 | | | | | | | |
| 1.21.7 | COMPLETION OF PGMA | | | | 1 | | | | | | | |
| 1.21.8 | AIR PREHEATER TRIAL RUN | | | | 2 | | | | | | | |
| | **TOTAL FOR PRO RATA PAYMENTS (TOTAL 85%)** | **85** | **85** | **85** | **85** | **85** | **85** | **85** | **85** | **85** | **85** | **85** |
| | | | | | | | | | | | | |
| **II** | **STAGE/MILESTONE PAYMENTS (15%)** | | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.1 | AIR & GAS TIGHTNESS TEST | | -- | 5 | | -- | 1 | 5 | -- | | | -- |
| 2.2 | GAS DISTRIBUTION TEST | | -- | -- | | -- | 1 | -- | -- | | | -- |
| 2.3 | CHARGING OF ESP FIELDS | | -- | -- | | -- | 4 | -- | -- | | | -- |
| 2.4 | COMPLETION OF AIR & GAS TIGHTNESS TEST FOR FURNACE | | 2 | | | | | | | | | |
| 2.5 | BOILER HYDRAULIC TEST (DRAINABLE) | 0 | 2 | | | | | | | | | |
| 2.6 | BOILER HYDRAULIC TEST (NON DRAINABLE) | | 1 | | | | | | | | | |
| 2.7 | REHEATER COILS HYDRAULIC TEST | | 2 | | | | | | | | | |
| 2.8 | CLEAN AIR FLOW TEST | | | | | 1 | | | | | | |
| 2.9 | Boiler Light Up | 0 | 1 | | 2 | 1 | | | 1 | 1 | | 1 |
| 2.10 | ABO | | 1 | 1 | 2 | 1 | | 1 | 1 | 1 | | 1 |
| 2.11 | Steam Blowing | 0 | | 2 | 1 | 1 | | | 1 | 1 | | 1 |
| 2.12. | SVF | | 2 | | 2 | | | | 1 | 1 | | 1 |
| 2.13 | Oil Flushing (TG) | | | | | | | | | | | |
| 2.14 | Barring Gear (TG) | | | | | | | | | | | |
| 2.15 | Rolling and Synchronisation | 0 | | | | | | | | 1 | | |
| 2.16 | Coal Firing | | | 2 | 2 | 2 | 2 | 2 | | 1 | | 1 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.17 | Full Load | | | | | 1 | | | 1 | 1 | | 1 |
| 2.18 | Trial Operation of Unit | | | | | 2 | 1 | 2 | 2 | 2 | | 2 |
| 2.19 | Completion of sheet covering for Boiler roof, burner roof, lift shaft cladding, completion of gutters | 3 | | | | | | | | | | |
| 2.20 | Completion of all drains and vents to respective locations and placement of instrument sensors after steam blowing | | | | | | | | 2 | | | |
| 2.21 | Painting | 6 | 0 | 1 | 1 | 2 | 2 | 1 | 2 | 1 | | 0 |
| 2.22 | Area cleaning, temporary structures cutting/removal and return of scrap | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | | 3 |
| 2.23 | Punch List points/pending points liquidation | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | | 1 |
| 2.24 | Submission of 'As Built Drawings' | | | | | | | | | | | |
| 2.25 | Material Reconciliation | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 15 | 2 |
| 2.26 | Completion of Contractual Obligation | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | 1 |
| | **TOTAL FOR STAGE/MILESTONE PAYMENTS (15%)** | **15** | **15** | **15** | **15** | **15** | **15** | **15** | **15** | **15** | **15** | **15** |
| | **TOTAL I + II** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** |
| | *INCLUDING NDE AND SR/HT WHERE EVER APPLICABLE (IF APPLICABLE, WEIGHTAGE OF 10%) | | | | | | | | | | | |

**NOTES:**

1. Besides product groups indicated herein, there is likelihood of addition of new product groups by BHEL' s unit for release of some items, integral to this work. Tenderers' quoted unit rates shall be applicable for such product groups also.

2. The weights given against PGMA's listed above are tentative. It may change after detailed engineering is done. Rate quoted by the Contractor shall not change due to variation in weight of individual PGMA.

3. BHEL' s decision with regard to classification of a particular product group for applicable rate category shall be final & binding on the Contractor.

## 8.0 TAXES, DUTIES, LEVIES (Consolidated Rev 01 dated 04/08/2012)

### 8.1. For All types of works excepting works covered under sl no 8.2

**8.1.1**

The contractor shall pay all (save the specific exclusions as enumerated in this contract) taxes, fees, license charges, deposits, duties, tools, royalty, commissions or other charges which may be levied on the input goods & services consumed and output goods & services delivered in course of his operations in executing the contract. In case BHEL is forced to pay any of such taxes, BHEL shall have the right to recover the same from his bills or otherwise as deemed fit.

**However, provisions regarding Service Tax and Value Added Tax (VAT) on output services and goods shall be as per following clauses.**

### 8.1.2 Service Tax & Cess on Service Tax

Contractor's price/rates shall be exclusive of Service Tax and Cess on Services. In case, it becomes mandatory for the contractor under provisions of relevant act/law to collect the Service Tax & Cess from BHEL and pay the same to the concerned tax authorities, such applicable amount will be paid by BHEL at the prevailing Service Tax Rate (presently 12.36 %) on the admitted bill value.

**Contractor shall submit to BHEL documentary evidence of Service Tax registration certificate specifying name of services covered under this contract. Contractor shall submit serially numbered Service Tax and Cess Invoice, signed by him or a person authorized by him in respect of taxable service provided, and shall contain the following, namely,**

1. **The name, address and the registration number of the contractor,**
2. **The name and address of the party receiving taxable service,**
3. **Description, classification and value of taxable service provided and,**
4. **The service tax payable thereon.**

**All the Four conditions shall be fulfilled in the invoice before release of service tax payment.**

**Wherever, more than one route/option are available for discharge of service tax liability under a particular service, (e.g. "works contract Service"), contractor shall obtain prior written consent from BHEL site before billing the amount towards Service Tax.**

### 8.1.3 VAT (Sales Tax /WCT)

As regards Value Added Tax (VAT)/CST on transfer of property in goods involved in Works Contract (previously known as Works Contract Tax) applicable as per local laws, the price quoted by the contractor shall be inclusive of the same and in no case input or output VAT/CST will be reimbursed extra.

In any case the Contractor shall register himself with the respective Sales Tax authorities of the state and submit proof of such registration to BHEL along with the first RA bill. Contractor will submit all the details of VAT/CST paid for the contract in the prescribed format of the respective state VAT laws. Also, the

contractor will issue the tax Invoices to BHEL as per the Tax laws of respective state on monthly basis. Contractor shall also be required to furnish to BHEL necessary proof of VAT remittance on monthly basis.

Deduction of tax at source shall be made as per the provisions of law and is to be construed as an advance tax paid by the contractor and no reimbursement thereof will be made.

Further, if BHEL, at the instance of customer or otherwise adopts the specific route for discharging output VAT liability itself, benefit of the reduction in liability of the contractor will be passed on to BHEL.

In case, BHEL is forced to pay any VAT liability on behalf of contractor, the same will be recovered from contractor's bill or otherwise as deemed fit

~~**8.2 'Enabling Works'**~~

~~The contractor shall pay all (save the specific exclusions as enumerated in this contract) taxes, fees, license charges, deposits, duties, tools, royalty, commissions or other charges which may be levied on the input goods & services consumed and output goods & services delivered in course of his operations in executing the contract. In case BHEL is forced to pay any of such taxes, BHEL shall have the right to recover the same from his bills or otherwise as deemed fit. ( **i.e. rates quoted by bidder shall be inclusive of Service Tax, VAT/WCT and all other taxes and duties** )~~

**8.3 New Taxes/Levies**

In case the Government imposes any new levy/tax on the output service/ goods/work after award of the contract, the same shall be reimbursed by BHEL at actual.

In case any new tax/levy/duty etc. becomes applicable after the date of Bidder's offer, the Bidder/Contractor must convey its impact on his price duly substantiated by documentary evidence in support of the same **before opening of Price Bid**. Claim for any such impact after opening the Price Bid will not be considered by BHEL for reimbursement of tax or reassessment of offer.

No reimbursement/recovery on account of increase/reduction in the rate of taxes, levies, duties etc. on input goods/services/work shall be made. Such impact shall be taken care of by the Price Variation/Adjustment Clause (PVC) if any. In case PVC is not applicable for the contract, Bidder has to make his own assessment of the impact of future variation if any, in rates of taxes/duties/ levies etc. in his price bid.

**8.4 BUILDING & OTHER CONSTRUCTION WORKERS (REGULATION OF EMPLOYMENT AND CONDITIONS OF SERVICE) ACT, 1996 (BOCW Act) AND RULES OF 1998 READ WITH BUILDING & OTHER CONSTRUCTION WORKERS CESS Act, 1996 & CESS RULES, 1998.**

In case any portion of work involves execution through building or construction workers, then compliance to the above titled Acts shall be ensured by the contractor and contractor shall obtain license and deposit the cess under the Act. In the circumstances it may be ensured as under:-

i. It shall be the sole responsibility of the contractor in the capacity of employer to forthwith (within a period of 15 days from the award of work) apply for a licence to the Competent Authority under the BOCW Act and obtain proper certificate thereof by specifying the scope of its work. It shall also be responsibility of the contractor to furnish a copy of such certificate of licence / permission to BHEL within a period of one month from the date of award of contract.

ii. It shall be the sole responsibility of the contractor as employer to ensure compliance of all the statutory obligations under these act and rules including that of payment / deposit of 1% cess on the extant of work involving building or construction workers engaged by the contractor within a period of one month from the receipt of payment.

iii. It shall be the responsibility of the sub-contractor to furnish the receipts / challans towards deposit of the cess together with the number, name and other details of beneficiaries (building workers) engaged by the sub-contractor during the preceding month.

It shall be the absolute responsibility of the sub-contractor to make payment of all statutory payments & compensations to its workers including that is provided under the Workmen's Compensation Act, 1923.

**DRAWINGS:**

**Following drawings are attached at the end of Vol IA**

1. General Arrangement of boiler Sectional Side Elevation

   Drawing No. – 0-00-022-75171/Rev05

2. General Arrangement of boiler Sectional Plan

   Drawing No. – 0-00-022-75172/Rev04

10.0 EXLUSIONS

The following listed activities are specific exclusions from the scope of work under this tender specification-

1. Erection of LP By-pass valve & CRH NRV with Hydraulic System
2. Erection of Interceptor Valves
3. Spray Insulation of Steam Turbines
4. Electrical components such as push-buttons, junction boxes etc.
5. E&C work of cable trays, cables and earthing etc
6. Control panels, EPMS, MCC etc.
7. Electrical & C&I items of equipment handling system
8. All electrical and control & instrumentation items except those specified elsewhere in these specifications.
9. Civil works except to the extent specifically indicated elsewhere in this tender.
10. Supply of primer and paints for final painting
11. Pneumatic copper tubing and fittings thereof.
12. Testing and commissioning of heating elements, thermostats, HV rectifier transformers.
13. Electrical and C&I items of variable frequency drives as provided elsewhere in these specifications.

**TRICHY SUPPLY**

| Sl No. | PGMA | Description | Weight (in Kg) |
|---|---|---|---|
| **Structures (Rate Schedule Identifier Sl No. 1.1 of Rate Schedule)** | | | |
| 1 | 35010 | Foundation Materials-Boiler | 11,233 |
| 2 | 35110 | Main Columns Left | 106,972 |
| 3 | 35120 | Main Columns Right | 106,980 |
| 4 | 35130 | Main columns Middle | 58,738 |
| 5 | 35140 | Auxiliary Column-Left Side | 38,592 |
| 6 | 35150 | Auxiliary Column-Right Side | 38,592 |
| 7 | 35160 | Air heater Columns | 29,255 |
| 8 | 35190 | Girder Pin Connection | 3,208 |
| 9 | 35210 | Boiler Ceiling Structure - Fabricated | 165,506 |
| 10 | 35220 | Boiler Ceiling Structure – Rolled Beams | 52,477 |
| 11 | 35230 | Boiler Ceiling Structure – Bracings | 7,051 |
| 12 | 35310 | Horizontal Bracing I Mbl | 11,839 |
| 13 | 35320 | Horizontal Bracing II Mbl | 23,077 |
| 14 | 35330 | Horizontal Bracing III Mbl | 11,368 |
| 15 | 35340 | Horizontal Bracing IV Mbl | 12,740 |
| 16 | 35350 | Horizontal Bracing V Mbl | 11,478 |
| 17 | 35380 | Landing Platforms | 45,258 |
| 18 | 35390 | Platform at Drum Floor Level | 21,446 |
| 19 | 35441 | Horizontal Beams-Lower | 58,724 |
| 20 | 35443 | Horizontal Beams-Upper | 53,325 |
| 21 | 35511 | Front Bracing-Lower | 19,696 |
| 22 | 35513 | Front Bracing-Upper | 15,059 |
| 23 | 35521 | Side Bracing-Lower | 53,801 |
| 24 | 35523 | Side Bracing-Upper | 50,803 |
| 25 | 35531 | Rear Bracing-Lower | 29,235 |
| 26 | 35533 | Rear Bracing-Upper | 20,444 |
| 27 | 35610 | Boiler Roof Structure | 74,072 |
| 28 | 35611 | Boiler Roof Sheeting | 22,752 |
| 29 | 35700 | HSFG Fasteners for PG 35 | 3,565 |
| 30 | 35811 | Floor Grills and Guard Plate | 48,033 |
| 31 | 35820 | Stairs | 12,458 |
| 32 | 35851 | Hand Rails and Posts | 12,808 |
| 33 | 35993 | Consumables and erection materials | 12,984 |
| 34 | 36110 | Air Pre-heater Frames | 65,365 |
| 35 | 36310 | Main Mbl Floor 11th Level | 13,138 |
| 36 | 36311 | Main Floor I Mbl 1st Pass | 28,874 |

| | | | |
|---|---|---|---|
| 37 | 36320 | Main Floor 12th Level | 23,796 |
| 38 | 36321 | Main Floor II Mbl Ist Pass | 29,063 |
| 39 | 36330 | Main Floor 13th Level | 23,185 |
| 40 | 36331 | Main Floor III Mbl 1st Pass | 22,271 |
| 41 | 36332 | Main Floor III Mbl 2nd Pass | 26,383 |
| 42 | 36340 | Main Floor 14th Level | 20,513 |
| 43 | 36341 | Main Floor IV Mbl 1st Pass | 25,046 |
| 44 | 36350 | Main Floor 15th Level | 5,875 |
| 45 | 36351 | Main Floor V Mbl 1st Pass | 15,002 |
| 46 | 36391 | Miscellaneous Platforms-Part I | 48,816 |
| 47 | 36392 | Miscellaneous Platforms-Part II | 52,000 |
| 48 | 36393 | Misc Structure | 11,000 |
| 49 | 36610 | Boiler roof Structure | 19,069 |
| 50 | 36611 | Boiler Roof Sheeting | 120 |
| 51 | 36620 | Boiler Side Cladding Structure | 4,905 |
| 52 | 36740 | Posts & Hangers | 15,678 |
| 53 | 36813 | Floor grills & Guard Plate-Upper | 96,402 |
| 54 | 36820 | Stairs & Ladders | 6,307 |
| 55 | 36853 | Hand Rails & Posts-Upper | 58,540 |
| 56 | 36993 | Consumables & Erection Material | 18,000 |
| 57 | 38210 | Inter Connecting Platforms between Boiler/Elevat | 45,000 |
| 58 | 38299 | Mill Handling Monorail | 62,000 |
| 59 | 38310 | Connecting Platforms To Mill Deaerator Bay | 45,000 |
| 60 | 38410 | Mill Maintenance Platforms | 60,000 |
| 61 | 38810 | Floor Grills & Guard Plates | 24,000 |
| 62 | 38850 | Hand Rails & Hand Rail Posts | 15,000 |
| | | **SUB TOTAL (STRUCTURES - TRY SUPPLY)** | **2,123,917** |

| **Pressure Parts (Rate Schedule Identifier Sl No. 1.2 of Rate Schedule)** | | | |
|---|---|---|---|
| **Sl No.** | **PGMA** | **Description** | **Weight (in KG)** |
| 1 | 04124 | Upper Drum Without Intl Id 49-60 | 87,311 |
| 2 | 04144 | Upper Drum Sspn Id 49-60 | 4,939 |
| 3 | 04988 | Drum-Commissioning Spares | 4 |
| 4 | 05137 | Water Wall Inlet Front Lower Header | 6,715 |
| 5 | 05147 | Water Wall Inlet Rear Lower Header | 6,622 |
| 6 | 05155 | Inlet Side Lower Water wall Header | 13,290 |
| 7 | 05175 | Inlet Extended Side Lower Water Wall Header | 1,285 |
| 8 | 05227 | Water wall Rear Hanger Outlet Header | 2,172 |
| 9 | 05229 | Water wall Rear Screen tube Outlet Header | 3,897 |
| 10 | 05231 | Outlet Front Upper Ww Header | 2,729 |

| | | | |
|---|---|---|---|
| 11 | 05251 | Outlet Side Upper Ww Header | 5,121 |
| 12 | 06400 | Unclassified Burner Panel | 11,629 |
| 13 | 06631 | Front Upper Ww Pnl | 33,815 |
| 14 | 06637 | Water wall Lower Front Panel | 14,993 |
| 15 | 06641 | Rear Upper Ww Pnl | 19,112 |
| 16 | 06647 | Rear Lower Ww Pnl | 14,993 |
| 17 | 06651 | Side Upper Ww Pnl | 38,026 |
| 18 | 06655 | Side Lower Ww Pnl | 24,655 |
| 19 | 06670 | Extended Side Ww Pnl | 6,477 |
| 20 | 07108 | Downcomer Piping-Upper Portion | 26,866 |
| 21 | 07109 | Downcomer Piping-Lower Portion | 31,816 |
| 22 | 07215 | Relief Tubes From Side Wall Outlet Header | 11,721 |
| 23 | 07216 | Relief Tubes From Rear Hanger Header | 13,387 |
| 24 | 07218 | Relief Tubes From Front Outlet Header | 5,374 |
| 25 | 07223 | Furnace Screen Tubes | 14,107 |
| 26 | 07225 | Furnace Rear Hanger Tubes | 5,472 |
| 27 | 07226 | Furnace Rear Arch Tubes | 11,501 |
| 28 | 07231 | Lower Corner Transition Tubes | 1,278 |
| 29 | 07232 | Upper Corner Transition Tubes | 448 |
| 30 | 07401 | Water wall Suspension | 11,466 |
| 31 | 07410 | Downcomer Suspension | 1,968 |
| 32 | 07420 | Downcomer Guides | 2,128 |
| 33 | 07431 | Riser Tube Support | 2,110 |
| 34 | 07500 | Misc Components - Pressure Parts | 197 |
| 35 | 07601 | Pressure Seals | 695 |
| 36 | 07700 | Bulked BPS items for PG 04 to 07 | 624 |
| 37 | 07991 | Indigenous Electrodes | 30 |
| 38 | 07992 | Imported Electrodes | 35 |
| 39 | 07993 | Consumables & Erection Materials | 596 |
| 40 | 08101 | Furnace Upper Buckstays | 90,308 |
| 41 | 08104 | Furnace Intermediate Buckstay | 5,398 |
| 42 | 08107 | Furnace Lower Buckstays | 24,732 |
| 43 | 08111 | Furnace Rear Arch Buckstay | 1,813 |
| 44 | 08400 | Furnace Guide | 18,000 |
| 45 | 08700 | Ex. Movements Measurement Components | 307 |
| 46 | 08900 | Furnace Key Buckstay | 2,451 |
| 47 | 08904 | Windbox Connecting Duct Trusswork | 4,850 |
| 48 | 09001 | Seal Boxes For Furnace Opening | 5,234 |
| 49 | 09002 | Seal Boxes For Instrument Inserts | 1,390 |
| 50 | 09003 | Material For Instrument Inserts | 204 |

| | | | |
|---|---|---|---|
| 51 | 10135 | Horizontal Spaced Shinlet Header | 5,470 |
| 52 | 10174 | Vertical Spaced Sh Centre Inlet Header | 8,130 |
| 53 | 10178 | Vertical Platen Sh inlet Header | 4,235 |
| 54 | 10182 | Sh Rear Wall Inlet Header | 2,447 |
| 55 | 10183 | Sh Frontwall Inlet Header | 3,113 |
| 56 | 10184 | Sh Extended Side Wall Inlet Header | 612 |
| 57 | 10185 | Sh Rear Roof Inlet Header | 2,139 |
| 58 | 10191 | Sh Radiant Wall Roof Inlet Hdr | 2,080 |
| 59 | 10235 | Horizntl Spaced Sh Outlet Header | 7,410 |
| 60 | 10274 | Vertical Spaced Sh Centre Outlet Header | 13,496 |
| 61 | 10278 | Vertical Platen Sh Outlet Header | 7,121 |
| 62 | 10283 | Sh Frontwall Outlet Header | 3,375 |
| 63 | 10284 | Sh Extended Side Wall Outlet Header | 968 |
| 64 | 10291 | Sh Radiant Wall Roof Outlet Hdr | 2,591 |
| 65 | 10687 | Sh Radiant Wall Junction Header | 2,178 |
| 66 | 11236 | Sh Hori Spaced Coil Upper + Attch | 107,215 |
| 67 | 11237 | Sh Hori Spaced Coil Inter + Attch | 90,901 |
| 68 | 11274 | Sh Rear Vertical Spaced Coil + Attachment | 34,662 |
| 69 | 11278 | Sh Vertical Platen Coil Centre + attch. | 41,961 |
| 70 | 11682 | Sh Rear Wall Panels | 16,454 |
| 71 | 11683 | Sh Side Wall Panels | 25,214 |
| 72 | 11684 | Sh Extended Side Wall Panels | 2,703 |
| 73 | 11685 | Sh Front Wall Panels | 11,931 |
| 74 | 11687 | Sh Rear Roof Panels | 6,763 |
| 75 | 11691 | Sh Radiant Wall Roofpanels | 13,762 |
| 76 | 11694 | S.H.Extended Bottom Panels | 2,130 |
| 77 | 12174 | Sh Vertical Platen Inlet Pipes | 3,884 |
| 78 | 12184 | Roof Inlet Sh Pipes | 2,092 |
| 79 | 12535 | Sh Hor Sapaced Hanger Tube | 26,604 |
| 80 | 12803 | Sh Steam Cooled Spacer Tubes | 790 |
| 81 | 12805 | Super Heater Hanger Tubes | 2,922 |
| 82 | 12850 | Sh Conn Pipes-Saturated | 3,776 |
| 83 | 12852 | Sh Desh Links | 3,800 |
| 84 | 12900 | Sh Desh | 1,064 |
| 85 | 12903 | 5h Miscl Components | 29,485 |
| 86 | 12906 | Sh Suprts For Lines & Links | 3,775 |
| 87 | 12914 | Suspension Of Sh Radiant Roof Headers | 437 |
| 88 | 12917 | Suspension Of Radiant Roof | 1,727 |
| 89 | 12924 | Suspension Of Sh Back Pass Headers | 7,555 |
| 90 | 12928 | Suspension Of Sh Rear Wall | 4,160 |

| | | | |
|---|---|---|---|
| 91 | 12944 | Suspension Of Sh Platen Headers | 1,821 |
| 92 | 12948 | Suspension Of Vertical Spaced Assembly | 8,011 |
| 93 | 12954 | Suspension Of Vertical Spaced Headers | 4,061 |
| 94 | 12968 | Suspension Of Platen Assembly | 6,113 |
| 95 | 12991 | Indigenous Electrodes | 44 |
| 96 | 12992 | Imported Electrodes | 68 |
| 97 | 12993 | Consumables & Erection Materials | 709 |
| 98 | 15174 | Reheater Vert Spaced Inlet Header Rhh1 | 4,200 |
| 99 | 15274 | Reheater Vert Spaced Outlet Header Rhh | 6,900 |
| 100 | 16275 | Rh Vertical Spaced Front Coil + Att | 31,280 |
| 101 | 16277 | Vert Rear Platen Rhcoil Assy Attach | 42,020 |
| 102 | 17904 | Rh Hdr Suprts & Suspensions Above Roof | 2,586 |
| 103 | 17919 | Rh Front Suspension | 3,627 |
| 104 | 17929 | Rh Rear Suspension | 6,394 |
| 105 | 17991 | Indegenous Electrodes | 20 |
| 106 | 17992 | Rh Site Electrodes Imported | 35 |
| 107 | 18001 | Furnace Roof Skin Casing | 7,135 |
| 108 | 18010 | Pr Pts Attachmnts In Furn Roof Skn Cas | 1,805 |
| 109 | 18020 | Vibration Snubbers | 54 |
| 110 | 19114 | Coils And Supports Of Upper P.Tube Ec | 111,947 |
| 111 | 19124 | Coils And Supports Of Lower P.Tube Ec | 106,404 |
| 112 | 19701 | Inlet Eco Headers | 3,095 |
| 113 | 19702 | Outlet Eco Headers | 1,968 |
| 114 | 19753 | Headers Of Rear Intert Eco | 3,022 |
| 115 | 19763 | Headers Of Front Intert Eco | 3,022 |
| 116 | 19802 | Eco Hanger Tubes | 5,603 |
| 117 | 19850 | Eco Feed Pipe | 2,070 |
| 118 | 19851 | Eco Links To Drum | 5,270 |
| 119 | 19904 | Eco Suprts & Suspensions Above Roof | 14,753 |
| 120 | 19905 | Eco Suprts & Suspensions Below Roof | 3,605 |
| 121 | 19906 | Eco Suprts For Lines & Links | 680 |
| 122 | 19907 | Eco Supports/Feed Pipe Suspension | 535 |
| 123 | 19992 | Imported Electrodes | 35 |
| 124 | 21600 | Soot Blower Piping And Fittings | 6,965 |
| 125 | 21601 | Soot blower Piping Supports | 4,000 |
| 126 | 21700 | Bulked Bps Components For Sb Piping | 750 |
| 127 | 21800 | Sb Valves (Bhel) | 470 |
| 128 | 21825 | Sb Valves (Sub Delivery) | 250 |
| 129 | 21850 | Soot Blower Safety Valve (Bhel) | 23 |
| 130 | 21992 | Imported Electrodes | 50 |

| | | | |
|---|---|---|---|
| 131 | 24260 | Valves (Bhel) Rh Uty Blr | 7,820 |
| 132 | 24265 | Valves & Fittings (Sd) Rh Blr | 2,645 |
| 133 | 24273 | Direct Water Level Gauge-Lp | 264 |
| 134 | 24275 | Headers For Trim Piping | 1,700 |
| 135 | 24280 | Erv And Safety Valves(Bhel) | 2,080 |
| 136 | 24285 | Safety Valve/Erv Silencers(Bhel) | 13,612 |
| 137 | 24700 | Bulked Bps Components For Trim Pipes | 305 |
| 138 | 24992 | Imported Electrodes | 25 |
| 139 | 24993 | Consumables & Erection Materials | 8 |
| 140 | 24994 | Name Plates | 177 |
| 141 | 28220 | Doors | 4,200 |
| 142 | 31010 | Skin Casing Comps Welded To Pressure P | 2,400 |
| 143 | 31102 | Furnace Bottom Skin Casing | 750 |
| 144 | 31104 | Furnace Rear Arch Skin Casing | 4,150 |
| 145 | 31105 | Second Pass Skin Casing | 250 |
| 146 | 32010 | Fixing Comp For Blr Pr Parts Insul | 7,000 |
| 147 | 32310 | Fixing Comp For Air Ducts Insul | 22,000 |
| 148 | 42001 | Pneumatic Fittings | 32 |
| 149 | 42002 | Steam Blow Materials | 1,004 |
| 150 | 42005 | Instrument Fittings | 296 |
| 151 | 42010 | Lfo Pump Set | 2,836 |
| 152 | 42020 | Hfo Pump Set | 6,975 |
| 153 | 42030 | Hfo Heater Set | 12,000 |
| 154 | 42046 | Drain Oil Pump-Motor Assy | 400 |
| 155 | 42065 | Drain Oil Tank | 1,347 |
| 156 | 42070 | Burner Station Skid Assembly | 4,825 |
| 207 | 42120 | Piping, Pump House-Fuel Oil | 2,500 |
| 208 | 42128 | Piping,Pump House Steam - Ibr | 500 |
| 209 | 42150 | Piping, Operating Floor Hfo & Tracer | 3,000 |
| 210 | 42152 | Piping,Opr'G Floor Lfo | 1,200 |
| 211 | 42154 | Piping,Opr'G Floor Drain Oil | 1,500 |
| 212 | 42157 | Piping,Opr'G Floor Atm Air | 800 |
| 213 | 42158 | Piping,Opr'G Floor Steam-Ibr | 1,630 |
| 210 | 42200 | Sub delivery Fuel Oil System | 1,500 |
| 211 | 42300 | Bhel Valve F.O. System | 600 |
| 212 | 42358 | Bhel Valve,Opr'G Floor Stm-Ibr | 400 |
| 213 | 42700 | Bps Fasteners | 500 |
| 214 | 42988 | Oil&Gas System Commissioning Spare | 50 |
| 213 | 42992 | Imported Electrodes | 10 |
| 214 | 45220 | Wind Box Assembly 22-In Width | 44,320 |

| | | | |
|---|---|---|---|
| 215 | 45221 | Wind Box Support 22-In Width | 5,056 |
| 216 | 97297 | Mtm Clamps And Pads | 76 |
| | | **SUB TOTAL (Pressure Parts -TRY SUPPLY)** | **1,669,566** |

**Non Pressure Parts (Upto ESP Inlet Funnel) (Rate Schedule Identifier Sl No. 1.3 of Rate Schedule)**

| | | | |
|---|---|---|---|
| 1 | 20001 | Long Retractable Soot Blower T30 Mark | 16,701 |
| 2 | 20004 | Wall Box Non Pressurised For Lrsb Mk I | 630 |
| 3 | 20201 | Wall Deslagger Rw5e | 8,553 |
| 4 | 20204 | Wall Box Non Pressurised For Rw5e | 989 |
| 5 | 20794 | Wall Box Non pressurised For Temp Prob | 32 |
| 6 | 20972 | Temp Probe Duplex With Power Trcack&Ac | 627 |
| 7 | 30103 | Seal Plate Assy | 1,500 |
| 8 | 30105 | Furnace Bottom Enclosure Framing | 3,100 |
| 9 | 30211 | Furnace Rear Arch Enclosure Framing | 1,700 |
| 10 | 30212 | Furnace Extd Side Bottom Enclosure Fra | 6,000 |
| 11 | 30215 | Main Boiler | 2,600 |
| 12 | 30219 | Vertical Roof Enclosure Framing | 35,000 |
| 13 | 30220 | Deck Support And Seals | 14,700 |
| 14 | 41350 | Air Cooled Oil Gun Assy, | 800 |
| 15 | 41390 | Oil Gun Vice Assy And Rack | 836 |
| 16 | 41500 | High Energy Arc Igniter | 446 |
| 17 | 41988 | Oil&Gas Burner Commissioning Spare | 16 |
| 18 | 43004 | Assy Comp Scanner & Gun Air System | 1,600 |
| 19 | 43005 | Assy Comp Mill Seal Air System | 2,500 |
| 20 | 43104 | M/C Comp Scanner & Gun Air System | 8,500 |
| 21 | 43105 | M/C Comp Mill Seal Air System | 12,000 |
| 22 | 43200 | Subdel,Ignitor&Scanner Air System | 2,500 |
| 23 | 47201 | Fuel Piping Supports With 20-In Pipe | 12,000 |
| 24 | 47203 | Pipe Couplings Orifice & Misc Items | 18,000 |
| 25 | 47209 | St Pipes Shop Bends For Rest Of The Mi | 150,000 |
| 26 | 48012 | Rect  Duct Bet F.D Fan And Airheater | 31,033 |
| 27 | 48014 | Expn Piecesbet F.D Fan And Airheater | 1,375 |
| 28 | 48015 | Supportsetcbet F.D Fan And Airheater | 2,065 |
| 29 | 48112 | Rect Ducts Pri Fan To Airheater Prisid | 29,955 |
| 30 | 48114 | Expn Piecespri Fan To Airheater Prisid | 1,052 |
| 31 | 48115 | Supportsetcpri Fan To Airheater Prisid | 3,355 |
| 32 | 48141 | Seal Air Hag And Id Fan Outgate | 2,700 |
| 33 | 48142 | Rect Duct  Coldairbus(Temp Air To Mill | 18,367 |
| 34 | 48144 | Expn Piecescoldairbus(Temp Air To Mill | 1,572 |
| 35 | 48145 | Supportsetccoldairbus(Temp Air To Mill | 2,020 |

| | | | |
|---|---|---|---|
| 36 | 48200 | Instrument Tappings On Ducting | 2,180 |
| 37 | 48202 | Rect Ducts air heater To Wind box duct | 30,900 |
| 38 | 48204 | Expn Pieces air heater To Windbox duct | 8,800 |
| 39 | 48205 | Supportsetcairheater To Windboxduct | 3,000 |
| 40 | 48207 | Flow meters For Secondary Air Flow | 5,101 |
| 41 | 48212 | Wind Box Connecting Ducts - Rectangula | 9,000 |
| 42 | 48214 | Expn Pieces windbox Connecting Duct | 2,300 |
| 43 | 48222 | Rect Duct-Airheater Priside to hotair B | 38,700 |
| 44 | 48224 | Expn Pieces air heater Priside to hotair B | 5,400 |
| 45 | 48225 | Supports For Hot P.A (Ah To Hot Bus) | 8,100 |
| 46 | 48382 | Rect Duct Economiser To Airheater2nop | 29,500 |
| 47 | 48384 | Expn Pieces economiser To Airheater2nop | 7,500 |
| 48 | 48385 | Supportsetceconomiser To Airheater2nop | 14,000 |
| 49 | 48432 | Rect Duct Airheater Boiler Outlet-Gas | 14,163 |
| 50 | 48434 | Expn Pieces air heater Boiler Outlet-Gas | 4,441 |
| 51 | 48435 | Supportsetcairheater Boiler Outlet-Gas | 1,620 |
| 52 | 48462 | Rect Duct Boiler Outlet To Elec Precp | 75,157 |
| 53 | 48464 | Expn Pieces boiler Outlet To Elec Precp | 9,326 |
| 54 | 48465 | Bof To Ep Ducting Supports | 5,833 |
| 55 | 48662 | Rect Duct Hot Air Bus To Mills | 22,178 |
| 56 | 48664 | Expn Pieces hot Air Bus To Mills | 2,606 |
| 57 | 48665 | Supports For Hot Pa To Mills | 535 |
| 58 | 48667 | Venturi-Primary Air Flow | 4,700 |
| 59 | 48700 | Bulked Bps Components | 2,502 |
| 60 | 48993 | Erection Materials | 4,765 |
| 61 | 99400 | Airheater, Steamcoil Air heater Handling E | 850 |
| 62 | 99512 | Furnace Cradle 2 Wall Covrage Electr | 1,100 |
| **SUB TOTAL (Non Pressure Parts (Upto ESP Inlet Funnel)- TRY SUPPLY)** | | | **709,081** |

| **Rotating Machine (Rate Schedule Identifier Sl No. 2.1 of Rate Schedule)** | | | |
|---|---|---|---|
| 1 | 65070 | Belt Type Volumetric Feeder 7ft. Cd | 30,000 |
| 2 | 67204 | Raw Coal Gates Needle Type | 2,500 |
| 3 | 67272 | Coal Valve-36 Inch Motor Operated | 4,700 |
| 4 | 67276 | Raw Coal Gate Chain Op 36" Circular | 5,000 |
| 5 | 67283 | Feeder Outlet Isolation Gate | 6,500 |
| 6 | 67801 | Down Spout | 13,000 |
| 7 | 67802 | Bunker Emptying Chute | 10,000 |
| 8 | 67803 | Feed Pipe To Mill | 4,000 |
| | | **SUB TOTAL (Rotating Machines - TRY SUPPLY)** | **75,700** |

| | | | |
|---|---|---|---|
| **Handling Equipment of Rotating Machines (Rate Schedule Identifier Sl No. 2.2 of Rate Schedule)** | | | |
| 1 | 99099 | Misc Chain Pulley Blocks | 100 |
| 2 | 99100 | Fan Handling Equipment | 23,000 |
| **SUB TOTAL (Handling Equipment of Rotating Machines - TRY SUPPLY)** | | | **23,100** |

| | | | |
|---|---|---|---|
| **Non Pressure Parts ( ESP Outlet funnel to chimney)(Rate Schedule Identifier Sl No. 3.2 of Rate Schedule)** | | | |
| 1 | 39012 | Foundation Materials I.D.Duct Supports | 9,000 |
| 2 | 39100 | Column Frames For Ducting Before Esp | 110,000 |
| 3 | 39140 | Column Frames Near I.D. Fan | 140,000 |
| 4 | 39150 | Col Frames Betn I.D.Fan And Chimney | 33,000 |
| 7 | 39300 | Platforms - External Structure | 40,000 |
| 8 | 39301 | Struc And Platform For Fans | 5,000 |
| 9 | 39302 | Struc For Motor Hood Covering | 5,671 |
| 10 | 39303 | Monorail Beam for Fans | 45,000 |
| 11 | 39700 | Hsfg Fasteners For Pg 39 | 400 |
| 12 | 39810 | Floor Grill | 10,000 |
| 13 | 39820 | Stairs | 4,000 |
| 14 | 39850 | Hand Rail And Hand Rail Posts | 9,000 |
| 15 | 39993 | Consumables & Erection Materials | 5,500 |
| 16 | 48482 | Rect Ducts-Elec Prptr/M.S To Inddraftf | 53,754 |
| 17 | 48484 | Expn Pieceselec Prptr/M.S To Inddraftf | 8,063 |
| 18 | 48485 | Supportsetcelec Prptr/M.S To Inddraftf | 4,791 |
| 19 | 48492 | Rect Duct Ind Draft Fan To Chimney | 48,756 |
| 20 | 48494 | Expn Piecesind Draft Fan To Chimney | 3,525 |
| 21 | 48495 | I.D.System Duct Supports | 4,140 |
| **SUB TOTAL (Non Pressure Parts ( ESP Outlet funnel to chimney)- TRY SUPPLY)** | | | **539,600** |

| Piping - AS (Rate Schedule Identifier Sl No. 4.2 of Rate Schedule) | | | |
|---|---|---|---|
| 1 | 24200 | Boiler Trim Piping And Fittings | 24,345 |
| 2 | 24215 | Spray Water System Cc Rh Blr | 2,405 |
| 3 | 24316 | RH Desh | 746 |
| | | **SUB TOTAL (Piping - AS - TRY SUPPLY)** | **27,496** |

| Piping - CS (LP) (Rate Schedule Identifier Sl No. 4.4 of Rate Schedule) | | | |
|---|---|---|---|
| 1 | 24220 | Safety Valve Esc Pipe&Drain - Cc Rh Bl | 8,666 |
| 2 | 24225 | Silencer Support-Safety Valves | 6,710 |
| 3 | 24235 | Silencer & Support-Starting Vent - Cc Rh Blr | 1,565 |
| 4 | 24240 | Sample Cooler And Supports | 675 |
| 5 | 24350 | Boiler Filling Piping | 1,000 |
| | | **SUB TOTAL (Piping - CS (LP) - TRY SUPPLY)** | **18,616** |

| Piping-Hangers and Supports (Rate Schedule Identifier Sl No. 4.6 of Rate Schedule) | | | |
|---|---|---|---|
| 1 | 24201 | Boiler Trim Piping Supports | 6,324 |
| 2 | 24351 | Hangers And Supports Of Blr Filling Pipe | 450 |
| | | **SUB TOTAL (Piping-Hangers and Supports - TRY SUPPLY)** | **6,774** |

| Insulation - Insulation (Rate Schedule Identifier Sl No. 5.1 of Rate Schedule) | | | |
|---|---|---|---|
| 1 | 33924 | Misc Eqpts Asbestos Materials | 200 |
| 2 | 33975 | Misc Eqpts Sealing Compound | 200 |
| | | **SUB TOTAL (Insulation - Insulation - TRY SUPPLY)** | **400** |

| Insulation - Pourable and Castable (Rate Schedule Identifier Sl No. 5.2 of Rate Schedule) | | | |
|---|---|---|---|
| 1 | 33201 | Main Blr Formed Refractory Is8 | 500 |
| 2 | 33212 | Main Blr Castable Refractory Gr C | 55,000 |
| 3 | 33230 | Main Blr Pourable Insulation | 70,000 |
| | | **SUB TOTAL (Insulation - Pourable and Castable - TRY SUPPLY)** | **125,500** |

| Insulation - Iron Parts (Rate Schedule Identifier Sl No. 5.3 of Rate Schedule) |
|---|

| | | | |
|---|---|---|---|
| 1 | 33970 | Misc Eqpts Expanded Metal | 3,000 |
| 2 | 33971 | Misc Eqpts Woven Wire Cloth | 400 |
| | | **SUB TOTAL (Insulation - Iron Parts - TRY SUPPLY)** | **3,400** |

| | | | |
|---|---|---|---|
| **Insulation - Wool mattress (Rate Schedule Identifier Sl No. 5.5 of Rate Schedule)** | | | |
| 1 | 33021 | Blr Pr Parts Mineral Wool | 42,000 |
| 2 | 33321 | Air Ducts Mineral Wool | 40,500 |
| | | **SUB TOTAL (Insulation - Wool mattress - TRY SUPPLY)** | **82,500** |

| | |
|---|---|
| **TOTAL TRICHY SUPPLY** | **5,405,650** |

**BAP RANIPET SUPPLY**

| Sl No. | PGMA | Description | Weight (in Kg) |
|---|---|---|---|
| **Pressure Parts (Rate Schedule Identifier Sl No. 1.2 of Rate Schedule)** | | | |
| 1 | 50510 | STEAM COIL A P H | 6,000 |
| 2 | 52000 | SPECIAL TOOLS/CONTRA | 608 |
| 3 | 52010 | LARG AH-ROTOR ASSY | 58,722 |
| 6 | 52013 | LARG AH-ROTORSEALS | 2,121 |
| 7 | 52024 | Cold Basket & ELEMENT | 42,894 |
| 8 | 52030 | LARG AH-ROTORHOUSING | 31,968 |
| 9 | 52041 | HOT END CONN PLATE | 35,135 |
| 10 | 52042 | COLD END CONN PLATE | 42,166 |
| 11 | 52054 | LARG AH-AXIAL SEAL | 199 |
| 12 | 52055 | LARG AH-BY PASS SEAL | 773 |
| 13 | 52100 | LARGE AH ROTOR DRIVE | 3,176 |
| 14 | 52211 | LARG AH-AIRSEAL PIPE | 673 |
| 15 | 52220 | LARG AH-GENS DETAILS | 2,564 |
| 16 | 52261 | LARG AH-GUIDE BEARNG | 2,920 |
| 17 | 52262 | LARG AH-SUPRT BEARNG | 3,824 |
| 18 | 52271 | OIL PIPING GUIDE BRG | 516 |
| 19 | 52272 | OIL PIPING SUPRT BRG | 537 |
| 20 | 52274 | LUB OIL CIRCULATION UN | 1,102 |
| 21 | 52301 | WASH MANIFLD GAS INL | 426 |
| 22 | 52302 | WASH MANIFLD GAS OUT | 398 |
| 23 | 52326 | CLEANG EQPT GAS OUT | 135 |
| 24 | 52329 | CLE EQPT DRIVE UNIT | 1,556 |

| | | | |
|---|---|---|---|
| 25 | 52600 | LARGE AH E,C&I COMPONE | 128 |
| 26 | 52988 | LARG AH COMMISSIONING | 103 |
| | | **SUB TOTAL (Pressure Parts - BAP RANIPET SUPPLY)** | **238,644** |

**Non Pressure Parts (Upto ESP Inlet Funnel) (Rate Schedule Identifier Sl No. 1.3 of Rate Schedule)**

| | | | |
|---|---|---|---|
| 1 | 57013 | DAMPERS BET FD FAN & A | 5,260 |
| 2 | 57033 | SA SCAPH INLET DAMPER | 1,845 |
| 3 | 57063 | SA SCAPH OUTLET DAMPER | 1,845 |
| 4 | 57110 | GUILLOTENE GATE PA FAN | 7,024 |
| 5 | 57113 | DAMPERS BETWEEN PAFAN | 2,596 |
| 6 | 57143 | DAMPER COLD AIR BUS(TE | 1,355 |
| 7 | 57160 | COLD AIRGATE, AIRBUS T | 3,000 |
| 8 | 57203 | DAMP APH TO WINDBOX DU | 2,969 |
| 9 | 57209 | MTG BKT FOR CL DAMPER | 2,632 |
| 10 | 57223 | DAMP APH PRIMARY SIDE | 2,227 |
| 11 | 57270 | GUILLOTENE GATE DUCT T | 10,634 |
| 12 | 57273 | DAMPER BOILER OUTLET | 3,546 |
| 13 | 57383 | FLUE GAS SAH INLET DAM | 9,414 |
| 14 | 57433 | DAMPER APH BOILER OUTL | 8,824 |
| 15 | 57460 | GUILLOTENE GATE EP INL | 10,321 |
| 16 | 57466 | PLATFORMS AND LADDERS | 14,530 |
| 17 | 57491 | BLOWER WITH MOTOR | 600 |
| 18 | 57577 | ELECT ACTUATOR FOR GAT | 5200 |
| 22 | 57988 | DUCTS COMMISSIONING SP | 20 |
| | | **SUB TOTAL (Non Pressure Parts (Upto ESP Inlet Funnel) - BAP RANIPET SUPPLY)** | **93,842** |

| **Rotating Machine (Rate Schedule Identifier Sl No. 2.1 of Rate Schedule)** | | | |
|---|---|---|---|
| 1 | 55011 | FD FAN FOUNDATION MATL | 964 |
| 2 | 55017 | FD FAN C&I ITEMS | 34 |
| 3 | 55031 | PA FAN FOUNDATION MATL | 1,287 |
| 4 | 55037 | PA FAN C&I ITEMS | 44 |
| 5 | 55214 | 1REAC FDFAN1600-2000 | 13,185 |
| 7 | 55334 | 2 REACT PA FAN | 23,405 |
| 8 | 55810 | AXIAL FDFAN COUPLING | 650 |
| 9 | 55830 | AXL PAFAN COUPLING | 852 |
| 10 | 55910 | AXL FDFAN ACCESSORY | 3,755 |
| 11 | 55911 | AXIAL FDFAN SILENCER | 18,547 |
| 12 | 55930 | AXL PAFAN ACCESSORY | 3,755 |

| | | | |
|---|---|---|---|
| 13 | 55931 | PA FAN SILENCER | 23,393 |
| 14 | 56000 | TOOLS & FIXTURE/CONT | 500 |
| 15 | 56021 | ID FAN FOUNDATION MATL | 2,593 |
| 16 | 56027 | ID FAN C&I ITEMS | 34 |
| 17 | 56091 | RAD FAN-FIRST FILL LUB | 7,000 |
| 18 | 56171 | SEALAIRFAN BCSS<1000 | 6,011 |
| 19 | 56224 | BAC 2 SUC ID FAN | 52,024 |
| 20 | 56820 | RADL IDFAN COUPLING | 7,500 |
| 21 | 56988 | RADIAL FAN COMMG SPA | 25 |
| **SUB TOTAL (Rotating Machine - BAP RANIPET SUPPLY)** | | | **165,558** |

| **ESP (Rate Schedule Identifier Sl No. 3.1 of Rate Schedule)** | | | |
|---|---|---|---|
| 1 | 77401 | ROLL/SLIDE SUPPORTS | 7,072 |
| 2 | 77405 | ESP-SUB-DELIVERY COMPO | 138 |
| 3 | 77406 | INSULATOR HOUSING AS | 12,763 |
| 4 | 77408 | GAS DIST. ASSY | 20,414 |
| 5 | 77409 | GD-RAPPING MECHANISM | 3,952 |
| 6 | 77410 | GD_DRIVE ARRANGEMENT | 229 |
| 7 | 77411 | GAS SCREEN-EP | 10,502 |
| 8 | 77413 | EMIT SYST SUSPENSION | 4,430 |
| 9 | 77414 | SUPPORT INSULATORS | 1,920 |
| 10 | 77415 | EMITTING ELECTRODES | 7,717 |
| 11 | 77416 | EMIT ELECT RAPP MECH | 9,968 |
| 12 | 77417 | DRIVE ARGT. FOR EMIT. | 8,480 |
| 13 | 77419 | COL ELEC SUSPENSION | 37,317 |
| 14 | 77420 | COLLECTING ELECTRODE | 361,620 |
| 15 | 77421 | EMIT SYS FRAME-TOP | 37,440 |
| 16 | 77422 | EMIT SYS FRAME BOTOM | 42,220 |
| 17 | 77423 | INSPECTION DOORS | 3,404 |
| 18 | 77424 | SHOCK BARS | 27,481 |
| 19 | 77425 | COLL ELECT RAPP MECH | 26,199 |
| 20 | 77426 | COLL ELEC RAPP DRIVE | 1,853 |
| 21 | 77428 | ESP ROOF PANELS | 41,238 |
| 22 | 77430 | ELECTRICAL SD COMPTS | 800 |
| 23 | 77431 | GEARED MOTORS FOR RAPP | 6,015 |
| 24 | 77432 | EMIT SYS FRAME-MIDLE | 58,654 |
| 25 | 77437 | JUNCTION BOX & PUSH BU | 483 |
| 26 | 77442 | OUTER ROOF-EP | 83,087 |
| 27 | 77443 | HOPPER RIDGES | 17,329 |
| 28 | 77444 | HOPPER UPPER PART | 92,809 |

| | | | |
|---|---|---|---|
| 29 | 77445 | HOP MLD&LOWER PART | 112,240 |
| 30 | 77446 | INSULATOR SUPP PANEL | 32,533 |
| 31 | 77447 | ROOF PANEL ASSY | 43,234 |
| 32 | 77448 | CASING STRUCTURE | 114,454 |
| 33 | 77449 | CASING SHELL/PANEL | 270,003 |
| 34 | 77450 | INLET-OUTLET FUNNEL | 55,824 |
| 35 | 77456 | PENT HOUSE FOR E P | 11,832 |
| 36 | 77457 | SPLITTER&GUIDE VANES | 8,561 |
| 37 | 77459 | CONTROL ROOM-INSERTS | 16,700 |
| 38 | 77461 | EP PERF TEST EQUIPT | 211 |
| 39 | 77463 | ASH LEVEL INDICATOR | 293 |
| 40 | 77465 | APP PLATFORM-HOPPER | 38,112 |
| 41 | 77466 | WATER WASHING SYSTEM | 901 |
| 42 | 77472 | INTERLOCKS-EP | 650 |
| 43 | 77473 | ELECTRICALLY OPERTD HO | 2,057 |
| 44 | 77476 | OPACITY MONITOR & ACCE | 28,800 |
| 45 | 77477 | LT SWITCH BOARD/ESP SW | 7,086 |
| 46 | 77478 | BAPCON & ACCESSORIES | 179 |
| 47 | 77480 | FOUNDATION MATLS FOR E | 4,937 |
| 48 | 77481 | SUPPOTING STRUCTURES F | 141,364 |
| 49 | 77490 | HEATING ELEMENTS | 985 |
| 50 | 77492 | AUXILIARY CONTROL PANE | 7,700 |
| 51 | 77988 | COMMISSIONING SPARES | 560 |
| 54 | 77996 | TOOLS & TACKLES | 102 |
| | | **SUB TOTAL (ESP - BAP RANIPET SUPPLY)** | **1,824,852** |

| **Non Pressure Parts ( ESP Outlet funnel to chimney)(Rate Schedule Identifier Sl No. 3.2 of Rate Schedule)** | | | |
|---|---|---|---|
| 1 | 57470 | EP OUTLET GATE | 8,763 |
| 2 | 57480 | ID FAN INLET GATE | 9,329 |
| 3 | 57490 | GUILLOTENE GATE ID FAN | 9,196 |
| 4 | 89610 | EP GALLERIES&STAIRS | 25,057 |
| 5 | 89611 | ESP ROOF HANDRAILS | 3,203 |
| | | **SUB TOTAL (Non Pressure Parts ( ESP Outlet funnel to chimney) - BAP RANIPET)** | **55,548** |

| **Sl No.** | **PGMA** | **Description** | **Weight (in Kg)** |
|---|---|---|---|
| **Insulation -Aluminium Cladding Sheets (Rate Schedule Identifier Sl No. 5.4 of Rate Schedule)** | | | |

| | | | |
|---|---|---|---|
| 1 | 77468 | FIXING COMP. FOR ESP I | 43,440 |
| **SUB TOTAL (Insulation -Aluminium Cladding Sheets - BAP RANIPET SUPPLY)** | | | **43,440** |
| | | | |
| **Insulation - Wool mattress (Rate Schedule Identifier Sl No. 5.5 of Rate Schedule)** | | | |
| 1 | 77467 | MIN WOOL FOR ESP INSUL | 60,760 |
| **SUB TOTAL (Insulation - Wool mattress - BAP RANIPET SUPPLY)** | | | **60,760** |

| | |
|---|---|
| **TOTAL RANIPET SUPPLY** | **2,482,644** |

**PC CHENNAI SUPPLY**

| **Piping - P91 (Rate Schedule Identifier Sl No. 4.1 of Rate Schedule)** | | | | **IBR** |
|---|---|---|---|---|
| 1 | 80300 | MS FROM SUPERHEATER TO BOILER STOP VALVE | 8,000 | I |
| 2 | 80301 | MS FROM BOILER STOP VALVE TO ESV | 36,000 | I |
| 3 | 80304 | MS HEADER TO HPBP VALVE | 4,300 | I |
| 4 | 80310 | HRH FROM REHEATER TO INTERCEPTOR VALVE | 73,000 | I |
| 5 | 80312 | LPBP VALVE UPSTREAM & DOWNSTREAM | 19,600 | I |
| 6 | 80320 | CRH FROM TURBINE TO REHEATER | 22,800 | I |
| **SUB TOTAL (Piping - P91 - PC CHENNAI SUPPLY)** | | | **163,700** | |

| **Piping - AS (Rate Schedule Identifier Sl No. 4.2 of Rate Schedule)** | | | | **IBR** |
|---|---|---|---|---|
| 1 | 80303 | MS HEADER TO AUX PRDS | 4,620 | I |
| 2 | 80307 | HP & LP BYPASS WARM UP | 600 | I |
| 3 | 80320 | CRH FROM TURBINE TO REHEATER | 22,800 | I |
| 4 | 80321 | HPBP VALVE TO CRH PIPING | 5,200 | I |
| 5 | 80336 | EXTRACTION STEAM TO HP HEATER NO.1 | 1,100 | I |
| 6 | 80901 | SUB DELIVERY VALVES FOR LIGHT UP | 1,050 | N |
| 7 | 80992 | IMPORTED ELECTRODES | 3,000 | N |
| **SUB TOTAL (Piping - AS - PC CHENNAI SUPPLY)** | | | **38,370** | |

| **Sl No.** | **PGMA** | **Description** | **Weight (in Kg)** | **IBR** |
|---|---|---|---|---|
| **Piping - CS (HP) (Rate Schedule Identifier Sl No. 4.3 of Rate Schedule)** | | | | |
| 1 | 80322 | CRH PIPING TO DEAERATING HEATER | 4,200 | I |
| 2 | 80331 | EXTRACTION STEAM TO LP HEATER-2 | 3,100 | I |
| 3 | 80332 | EXTRACTION STEAM TO LP HEATER-3 | 1,600 | I |

| | | | | |
|---|---|---|---|---|
| 4 | 80335 | EXTRACTION STEAM TO DEAERATING HEATER | 2,700 | I |
| 5 | 80337 | EXTRACTION STEAM TO HP HEATER-2 | 800 | I |
| 6 | 80340 | AUX STEAM HEADER | 1,100 | I |
| 7 | 80341 | AUX STEAM HEADER INTERCONN BETWEEN UNITS | 15,000 | I |
| 8 | 80342 | AUX STEAM TO SCAPH | 1,800 | I |
| 9 | 80344 | AUX STEAM TO FO SYSTEM TP | 8,000 | I |
| 10 | 80345 | AUX STEAM TO DEAERATING HEATER | 3,850 | I |
| 11 | 80347 | AUX STEAM TO SJAE | 1,400 | I |
| 12 | 80349 | AUX STEAM TO GLAND SEALS - TG SCOPE | 725 | I |
| 13 | 80351 | AUX STEAM TO UNLISTED USERS - SG SCOPE | 4,000 | I |
| 14 | 80355 | STEAM TRACING PIPING | 3,000 | I |
| 15 | 80395 | AUX STEAM TO FUEL OIL ATOMISING | 900 | I |
| 16 | 80418 | ERECTION MATERIALS FOR INSTRUMENTS | 120 | N |
| 17 | 80420 | BOILER FEED PUMP SUCTION | 4,210 | N |
| 18 | 80421 | BOILER FEED PUMP RECIRCULATION | 3,800 | I |
| 19 | 80423 | BOILER FEED PUMP TO HPH INCLUDING BYPASS | 20,700 | I |
| 20 | 80424 | BFD BETWEEN HTRS & GROUP PROTECTION VLV | 6,800 | I |
| 21 | 80425 | BFD FROM FINAL HPH TO SG TP | 30,000 | I |
| 22 | 80430 | SPRAY WATER TO HPBP | 305 | I |
| 23 | 80431 | SPRAY WATER TO AUX PRDS | 700 | I |
| 24 | 80432 | SPRAY WATER TO BOILER DESH UPTO SG TP | 600 | I |
| 25 | 80450 | CBD AND EMERGENCY DRUM DRAIN | 3,000 | I |
| 26 | 80451 | BOILER INTEGRAL PIPING DRAINS | 650 | I |
| 27 | 80452 | HP PIPING DRAINS - SG SCOPE | 9,900 | I |
| 28 | 80454 | SCAPH DRAINS | 800 | N |
| 29 | 80992 | IMPORTED ELECTRODES | 3,000 | N |
| 30 | 81120 | HIGH PRESSURE DOSING SYSTEM | 3,000 | N |
| 31 | 81411 | DIRECT GAUGES FOR STEAM LINES | 700 | N |
| | | **SUB TOTAL (Piping - CS (HP) - PC CHENNAI SUPPLY)** | **140,460** | |
| **Sl No.** | **PGMA** | **Description** | **Weight (in Kg)** | **IBR** |
| **Piping - CS (LP) (Rate Schedule Identifier Sl No. 4.4 of Rate Schedule)** | | | | |
| 2 | 80364 | CBD TANK VENT TO SYSTEM | 300 | I |
| 3 | 80365 | CBD TANK VENT/SV EXHAUST TO ATMOSPHERE | 80 | N |
| 4 | 80366 | IBD TANK VENT TO ATMOSPHERE | 4,500 | N |
| 6 | 80373 | AUX STEAM HEADER SV EXHAUST | 1,200 | N |
| 7 | 80375 | UNLISTED SV EXHAUSTS - TG SCOPE | 9,620 | N |
| 9 | 80381 | HP HEATER VENTS - TG SCOPE | 1,600 | N |
| | 80388 | CONDENSER AIR EVACUATION PIPING | 2,000 | N |
| 13 | 80400 | CONDENSATE SUCTION | 1,900 | N |
| 14 | 80401 | CD FROM PUMP TO LPH1/DC INLET TEE&RECIR | 14,420 | N |

| | | | | |
|---|---|---|---|---|
| 17 | 80407 | CONDENSATE FOR SEALING OF VACUUM | 1,900 | N |
| 18 | 80408 | CONDENSATE DUMP FROM HEADER | 1,800 | N |
| 23 | 80442 | GLAND STEAM COOLER DRAINS | 400 | N |
| 24 | 80443 | LP HEATER-1 TO CONDENSER | 1,200 | N |
| 25 | 80444 | LP HEATER-2/3/4/5 DRAINS&DRIP PUMP INCL | 1,600 | N |
| 26 | 80446 | DEAERATING HEATER OVER FLOW AND DRAIN | 2,100 | N |
| 27 | 80447 | HP HEATER DRAINS | 3,000 | N |
| 29 | 80449 | TG CYCLE PIPING DRAINS & VENTS | 3,300 | N |
| 30 | 80453 | LP PIPING DRAINS - SG SCOPE | 4,000 | I |
| 31 | 80455 | DRAIN FROM UNLISTED EQPT/VESSEL-SG SCOPE | 1,600 | N |
| 34 | 80460 | SG AUX COOLING WATER UNIT SYSTEM | 27,000 | N |
| 35 | 80463 | TG AUX COOLING WATER | 19,200 | N |
| 36 | 80468 | MAIN CIRCULATION WATER PIPING | 20,000 | N |
| | 80471 | BOILER WATER WASH TO AND FROM UNIT | 6,500 | N |
| 39 | 80480 | FIRE WATER-OTHER AREAS | 7,000 | N |
| 40 | 80493 | HP FLASH TANK VENT TO CONDENSER | 1,400 | N |
| 43 | 80610 | SERVICE AIR-COMP SUCT & DIS TO RECEIVER | 5,000 | N |
| 44 | 80612 | SERVICE AIR FOR INDIVIDUAL UNITS | 1,100 | N |
| 45 | 80614 | INST AIR COMP SUC & DIS TO RECEIVER | 5,000 | N |
| 46 | 80616 | INSTRUMENT AIR FOR INDIVIDUAL UNIT | 8,500 | N |
| 47 | 80650 | FUEL OIL SUPPLY AND RETURN PIPING | 25,000 | N |
| 48 | 80673 | LUBE OIL PIPING SYSTEM | 5,800 | N |
| 49 | 80901 | SUB DELIVERY VALVES FOR LIGHT UP | 1,050 | N |
| 51 | 81412 | DIRECT GAUGES FOR NON-STEAM LINES | 600 | N |
| 52 | 81414 | LOCAL CONTROL EQPT FOR NON-STEAM LINES | 150 | N |
| 53 | 81415 | TEST THERMOWELLS | 85 | N |
| | | **SUB TOTAL (Piping - CS (LP) - CHENNAI SUPPLY)** | **189,905** | |

| **Piping - SS (Rate Schedule Identifier Sl No. 4.5 of Rate Schedule)** | | | | **IBR** |
|---|---|---|---|---|
| 1 | 80600 | HIGH PRESSURE DOSING PIPING | 400 | N |
| 2 | 80601 | LOW PRESSURE DOSING PIPING | 30 | N |
| | | **SUB TOTAL (Piping - SS - PC CHENNAI SUPPLY)** | **430** | |

| **Piping- Hangers and Supports (Rate Schedule Identifier Sl No. 4.6 of Rate Schedule)** | | | | **IBR** |
|---|---|---|---|---|
| 1 | 80920 | H&S FOR HYDRO TEST | 2,200 | N |
| 2 | 80921 | H&S FOR LIGHT UP STEAM LINE | 40,000 | N |
| 3 | 80928 | H&S FOR BOILER LIGHT UP - TG | 22,000 | N |

| | | | | |
|---|---|---|---|---|
| 4 | 80930 | H&S FOR SYNCHRONISATION - TG | 16,000 | N |
| 5 | 80933 | H & S FOR LP PIPING | 3,100 | N |
| 6 | 81003 | CONTINUOUS BLOW DOWN EXPANDER-D1500 MM | 2,400 | I |
| 7 | 81008 | INTERMITTENT BLOW DOWN EXPANDER-D2000 MM | 4,300 | N |
| 8 | 81432 | CONSUMABLES AND ERECTION MATERIALS | 10 | N |
| **SUB TOTAL (Piping- Hangers and Supports - PC CHENNAI SUPPLY)** | | | **90,010** | |

| **Insulation - Insulation (Rate Schedule Identifier Sl No. 5.1 of Rate Schedule)** | | | | **IBR** |
|---|---|---|---|---|
| 1 | 81341 | SEALING COMPOUND FOR INSL | 300 | N |
| **SUB TOTAL (Insulation - Insulation - PC CHENNAI SUPPLY)** | | | **300** | |
| | | | | |
| **Sl No.** | **PGMA** | **Description** | **Weight (in Kg)** | **IBR** |
| **Insulation - Iron Parts (Rate Schedule Identifier Sl No. 5.3 of Rate Schedule)** | | | | |
| 1 | 81318 | FIX COM FOR MISCELLANEOUS PPG INSULATION | 800 | N |
| **SUB TOTAL (Insulation - Iron Parts - PC CHENNAI SUPPLY)** | | | **800** | |

| **Insulation -Aluminum Cladding Sheets (Rate Schedule Identifier Sl No. 5.4 of Rate Schedule)** | | | | **IBR** |
|---|---|---|---|---|
| 1 | 81350 | ALUMINIUM CLADDING FOR INSULATION | 10,000 | N |
| **SUB TOTAL (Insulation -Aluminium Cladding Sheets - PC CHENNAI SUPPLY)** | | | **10,000** | |

| **Insulation - Wool mattress (Rate Schedule Identifier Sl No. 5.5 of Rate Schedule)** | | | | **IBR** |
|---|---|---|---|---|
| 1 | 81325 | MINERAL WOOL MATTRESS | 15,000 | N |
| **SUB TOTAL (Insulation - Wool mattress - PC CHENNAI SUPPLY)** | | | **15,000** | |

| **TOTAL CHENNAI SUPPLY** | **648,975** |
|---|---|

**HYDERABAD SUPPLY**

| **Rotating Machines (Rate Schedule Identifier Sl No. 2.1 of Rate Schedule)** | | | |
|---|---|---|---|
| 1 | 61080 | Journal Assembly | 82,650 |
| 2 | 61180 | Mill Drive and Bowl Assembly | 127,500 |
| 3 | 61280 | Mill Side and Liner Assembly | 76,000 |
| 4 | 61380 | Classifier Assembly | 91,130 |
| 5 | 61580 | Tramp Iron Spout | 550 |
| 5 | 61480 | MDV Assembly | 42,500 |
| 6 | 61780 | Mill Motor Coupling | 1,100 |

| | | | |
|---|---|---|---|
| 8 | 61680 | Pyrite Hopper | 3,050 |
| **SUB TOTAL (Rotating Machines - HYDERABAD SUPPLY)** | | | **424,480** |
| **TOTAL HYDERABAD SUPPLY** | | | **424,480** |

**HERP VARANASI SUPPLY**

| | | | |
|---|---|---|---|
| **Rotating Machines (Rate Schedule Identifier Sl No. 2.1 of Rate Schedule)** | | | |
| 7 | 61980 | Foundation Fastener Assy. | 6,000 |
| 7 | 67400 | Seal Air Header Assy. | 2,880 |
| 3 | 61804 | Tools and Accessories (per Unit) | 1,000 |
| **SUB TOTAL (Rotating Machines - HERP VARANASI SUPPLY)** | | | **9,880** |
| **TOTAL - HERP VARANASI SUPPLY** | | | **9,880** |

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**CBU BANGALORE SUPPLY**

| **Non Pressure Parts (Upto ESP Inlet Funnel) (Rate Schedule Identifier Sl No. 1.3 of Rate Schedule)** | | |
|---|---|---|
| **Sl no.** | **Description** | **Weight (in KG)** |
| 1 | Ceramic Lined Coal Pipe Bends and Pipes under CBU, Bangalore | **100,000** |

**IS-MOTOR SUPPLY**

| | | |
|---|---|---|
| **Rotating Machines (Rate Schedule Identifier Sl No. 2.1 of Rate Schedule)** | | |
| 1 | ID Fan Motor | 20,000 |
| 2 | FD Fan Motor | 9,000 |
| 3 | PA Fan Motor | 15,600 |
| 4 | Mill Motors | 40,000 |
| **TOTAL - IS MOTOR SUPPLY** | | **84,600** |

**PEM SUPPLY**

| **Sl no.** | **Item** | **Weight (in KG)** |
|---|---|---|
| **Insulation - Wool Mattress (Rate Schedule Identifier Sl No. 5.5 of Rate Schedule)** | | |
| 1 | Bonded mineral (Rock) wool mattresses Tonnage | 134,000 |
| **Insulation - Aluminium Cladding Sheets (Rate Schedule Identifier Sl No. 5.4 of Rate Schedule)** | | |
| 1 | Al sheets Tonnage | 33,000 |

| Insulation - Iron Parts (Rate Schedule Identifier Sl No. 5.3 of Rate Schedule) | | |
|---|---|---|
| 1 | Ancillary Material Tonnage | 15000 |
| **TOTAL PEM SUPPLY** | | **182,000** |

*** Rate Schedule Identified for PGMAs of Piping and Insulation are Indicative only and based on envisaged material specification. Payment shall be made on the basis of material specification of actual material received and erected at site.**

Summary of Package Unit wise:

| SN | Package | Trichy | PC - Chennai | BAP - RPT | Hyderabad | HERP - Varanasi | CBU | Jhansi | IS - Motor | PEM | **Total Wt.(KG)** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.1 | Structure | 2123917 | | | | | | | | | **2,123,917** |
| 1.2 | Pressure Parts | 1669566 | | 238644 | | | | | | | **1,908,210** |
| 1.3 | Non Pressure Parts (Upto ESP Inlet Funnel) | 709081 | | 93842 | | | 100000 | | | | **902,923** |
| 2.1 | Rotating Machines | 75700 | | 165558 | 424480 | 9880 | | | 84600 | | **760,218** |
| 2.2 | Handling Equipment of Rotating Machines | 23100 | | | | | | | | | **23,100** |
| 3.1 | ESP | | | 1824852 | | | | | | | **1,824,852** |
| 3.2 | Non Pressure Parts (ESP Outlet Funnel to Chimney) | 539600 | | 55548 | | | | | | | **595,148** |
| 4.1 | Piping - P91 | | 163700 | | | | | | | | **163,700** |
| 4.2 | Piping - AS | 27496 | 38370 | | | | | | | | **65,866** |
| 4.3 | Piping - CS (HP) | | 140460 | | | | | | | | **140,460** |
| 4.4 | Piping - CS (LP) | 18616 | 189905 | | | | | | | | **208,521** |
| 4.5 | Piping - SS | | 430 | | | | | | | | **430** |
| 4.6 | Piping - Hangers and Support | 6774 | 90010 | | | | | | | | **96,784** |
| 4.7 | Piping - Temporary (Steam Blowing) | | | | | | | | | | **75,000** |
| 4.8 | Piping - Temporary (Chemical Cleaning) | | | | | | | | | | **50,000** |
| 5.1 | Insulation | 400 | 300 | | | | | | | | **700** |
| 5.2 | Pourable and Castable | 125500 | | | | | | | | | **125,500** |
| 5.3 | Iron Parts | 3400 | 800 | | | | | | | 15000 | **19,200** |
| 5.4 | Aluminium Cladding Sheets | | 10000 | 43440 | | | | | | 33000 | **86,440** |
| 5.5 | Wool Mattress | 82500 | 15000 | 60760 | | | | | | 134000 | **292,260** |
| **Total =** | | **5405650** | **648975** | **2482644** | **424480** | **9880** | **100000** | | **84600** | **182000** | **9,463,229** |

**Total Wt. in MT for One Unit = 9463.229 MT**

**The weight details are same for both the units.**

NOTES:

1. Besides product groups indicated herein, there is likelihood of addition of new product groups by BHEL' s unit for release of some items, integral to this work. Tenderers' quoted unit rates shall be applicable for such product groups also.

2. BHEL's decision with regard to classification of a particular product group for applicable rate category shall be final & binding on the contractor.

3. Besides the above, weight of all temporary piping, valves, pumps, tanks and other miscellaneous equipments etc for carrying out hydraulic test, chemical cleaning, steam blowing and other tests, as stated elsewhere will get added.

4. # - Electrical & C&I items of handling system (PG99) is excluded from the scope of work.

5. The weights mentioned are indicative and actual weights may vary

**NOTE:**

**SEPARATE DOCUMENT FOR HP, P-91 AND OTHER IBR WELD JOINTS IS AVAILABLE. THE DOCUMENT IS TAKEN AS A REFERENCE FROM 6X150 MW HINDALCO MAHAN PROJECT. IT WILL BE APPLICABLE FOR THIS PROJECT ALSO. HOWEVER DUE TO BULKIER SIZE OF THE DOCUMENT, SAME IS NOT UPLOADED IN THE WEB. BIDDERS ARE REQUESTED TO OBTAIN THE REFERRED DOCUMENT FOR BHEL PSWR NAGPUR OFFICE.**

**(THE DETAILS OF JOINTS IN THE SAID DOCUMENT ARE FOR ONE UNIT ONLY.)**

**GENERAL REQUIREMENTS – COMMON TO ALL WORK**

11.1
The intent of specification is to provide services according to the most modern and proven techniques and codes. The omission of specific reference to any method, equipment or material necessary for proper and efficient execution of this work shall not relieve the Contractor of the responsibility of providing such facilities to complete the work without any extra compensation.

11.2
The terminal points decided by BHEL shall be final and binding on the Contractor for deciding the scope of work and effecting payment for the work done.

11.3
The work shall be executed under the usual conditions affecting major power plant construction and in conjunction with numerous other operations at site. The Contractor and his personnel shall cooperate with personnel of BHEL, BHEL'S Customer, Customer's consultants and other Contractors, coordinating his work with others and proceed in a manner that shall not delay or hinder the progress of work of the project as a whole.

11.4
The work covered under this specification is of highly sophisticated nature, requiring the best quality workmanship, supervision, engineering and construction management. The Contractor should ensure proper planning and successful & timely completion of the work to meet the overall project schedule. The Contractor must deploy adequate quantity of tools & plants, modern / latest construction aids etc. He must also deploy adequate trained, qualified and experienced supervisory staff and skilled personnel.

11.5
Contractor shall erect and commission all the equipments and auxiliaries as per the sequence & methodology prescribed by BHEL depending upon the technical requirements. Availability of materials and fronts will decide this. BHEL Engineer's decision regarding correctness of the work and method of working shall be final and binding on the Contractor. No claims for extra payment from the Contractor will be entertained on the ground of deviation from the methods / sequence adopted in erection of similar sets elsewhere.

11.6
All necessary certificates and licenses, permits & clearances required to carry out this work from the respective statutory/ local authorities are to be arranged by the Contractor at his cost in time to ensure smooth progress of work.

11.7
The boiler shall be erected as per relevant provisions of latest Indian Boiler Regulations (IBR) and amendments/addendums thereof, if any.

11.8
The work shall conform to dimensions and tolerances specified in the various drawings / documents that will be provided during various stages of erection. If any portion of work is found to be defective in workmanship, not conforming to drawings or other stipulations due to Contractor's fault, the Contractor shall dismantle and re-do the work duly replacing the defective materials at his cost, failing which the work will be got done by BHEL and recoveries will be

effected from the Contractor's bills towards expenditure incurred including cost of materials and departmental overheads of BHEL.

11.9
The Contractor shall perform any services, tests etc, which may not be specified but nevertheless, required for the completion of work within quoted rates.

11.10
All necessary certificates and licenses required for carrying out this work are to be arranged by the Contractor expeditiously.

11.11
The Contractor shall execute the work in the most substantial and workman like manner. The stores shall be handled with care and diligence.

11.12
BHEL reserves right to recover from the Contractor any loss which arises out of undue delay / discrepancy / shortage / damage or any other causes due to Contractor's lapse during any stage of work. Any loss to BHEL due to Contractor's lapse shall have to be made good by the Contractor.

11.13
All cranes, transport equipment, handling equipment, tools, tackles, fixtures, equipment, manpower, supervisors/engineers, consumables etc, except otherwise specified as BHEL scope of free issue, required for this scope of work shall be provided by the Contractor. All expenditure including taxes and incidentals in this connection will have to be borne by Contractor unless otherwise specified in the relevant clauses. The Contractor's quoted rates should be inclusive of all such contingencies.

11.14
During the course of erection, testing and commissioning certain rework / modification / rectification / repair / fabrication etc may become necessary on account of feed back / revision of drawing etc. This will also include modifications / re-works suggested by BHEL / customer / other inspection group. Contractor shall carry out such rework / modification / rectification / fabrication / repair etc promptly and expeditiously. Daily log sheets signed by BHEL engineer and indicating the details of work carried out, man-hours etc shall be maintained by the Contractor for such reworks. Claim of Contractor if any, for such works will be governed by relevant clauses of 'General Conditions of Contract'.

11.15
All works such as cleaning, leveling, aligning, trial assembly, dismantling of certain equipments / components for checking and cleaning, surface preparation, fabrication of structures, tubes and pipes as per general engineering practice and as per BHEL Engineer's instructions at site, cutting, gouging, weld depositing, grinding, straightening, chamfering, filing, chipping, drilling, reaming, scrapping, lapping, fitting up etc as may be applicable in such erection works and which are treated incidental to the erection works and necessary to complete the work satisfactorily, shall be carried out by the Contractor as part of the work within the quoted rates.

11.16
The Contractor shall make all fixtures, temporary supports, steel structures required for jigs & fixtures, anchors for load and guide pulleys required for the work. Contractor shall arrange necessary steel for such usage. Only the steel for making temporary structure ( cat head ) for drum lifting will be provided by BHEL in random sizes materials available at site.

11.17
The Contractor shall take delivery of the components, equipments, chemicals, and lubricants etc from the BHEL stores/ storage area after getting the approval of BHEL Engineer on standard indent forms of BHEL. Complete and detailed account of the materials and equipments after usage shall be submitted to the BHEL and reconciled periodically.

11.18
Contractor shall plan and transport equipments, components from storage to erection site and erect them in such a manner and sequence that material accumulation at site does not lead to congestion at site of work. Materials shall be stacked neatly, preserved and stored in the Contractor's shed and at work areas in an orderly manner. In case it is necessary to shift and re-stack the materials kept at work areas/ site to enable other agencies to carry out their work or for any other reason, same shall be done by Contractor most expeditiously as incidental to work.

11.19
Plant materials should not be used for any temporary supports / scaffolding/ preparing pre-assembly bed etc.

11.20
The details of equipments to be erected under this contract is generally as per the schedule given in relevant clauses. These details are approximate and meant only to give a general idea to the tenderer about the magnitude of the work involved. Actual quantum and type of equipments will be based on the relevant erection documents which will be furnished to the Contractor in due course of erection and the weight and quantity as per the relevant engineering documents will only be admissible for the billing purpose.

11.21
Hangers & suspensions, supports etc for tubes, piping, & ducts etc will be supplied in running / random lengths / sizes which shall be cut to suitable sizes and adjusted as required.

11.22
Spring suspension / constant load hangers may have to be pre-assembled for required load and erection carried out as per instructions of BHEL. Adjustments, removal of temporary arrests/locks, cutting of excess thread length of hanger tie-rod etc have to be carried out as and when required. load setting of spring hangers, as per BHEL's documents/instructions, during various stages of erection & testing and after floating of piping/ducting during cold and hot condition will have to be done as part of work. This exercise may have to be repeated till satisfactory results are achieved.

11.23

Contractor shall lay/install the field-routed/small-bore pipelines to suit site condition/ requirement. Before laying/installing such pipelines, the contractor shall prepare necessary sketch for routing these pipe lines and get the same approved by BHEL. Contractor must take care of the location/layout of other systems and equipment before preparing such sketch to avoid interference. There is a possibility of minor change in routing such pipelines even after completion of erection; contractor shall carry out the same without any extra cost to BHEL.

11.24
Welding of necessary instrumentation tapping points, thermowell, thermocouple pad, metal temp pad and clamps, root valve, condensing vessel, flow metering & measurement devices, and control valves to be provided on boiler & its auxiliaries and piping are covered within the scope of this specification. The installation of all the above items will be Contractor's responsibility even if:

a) Items are not specifically indicated under the respective product groups as given in the technical specifications.
b) Items are supplied by an agency other than BHEL.

Pre-heating, NDE, and Post weld heat treatment for above shall be done as per the specifications as part of work.

11.25
Certain instrumentation like pressure switches, air sets, filters, regulators, pressure gauges, junction boxes, power cylinders, dial thermometers, flow meters, valve actuators, flow indicators, centrifugal/speed switches of motors, accumulators etc are received in assembled condition as integral part of equipments. Contractor shall dismount such instruments for calibration and hand over the same to BHEL. C & I erection agency will do storage / re-erection calibration etc.

11.26
Fixing and seal welding of thermowells & plugs before Hydro test/ steam blowing of equipment or other piping system is within the scope of work. Contractor shall also remove the seal welded plugs by process of grinding and fix and seal weld thermowells after hydro test/steam blowing of lines as part of work.

11.27
Actuators/drives of valves, dampers, gates, powered vanes etc may have to be serviced, lubricated, before erection, during pre-commissioning & commissioning, including carrying out minor adjustments required as incidental to the work.

11.28
All electrical motors have to be tested for IR & PI values prior to the trial run. Where required, dry out may have to be carried out by using external heating source. Contractor shall make all arrangements in this regard and complete the work as instructed. BHEL will provide the motorized insulation testers.

11.29

In installation of various equipments it may become necessary to install these on temporary supports/ hanger due to various reasons including non-availability of suspension materials. Contractor shall install such temporary suspensions/hangers and later on shift the relevant equipments to their respective permanent hangers/ suspensions/ supports as incidental to work. Requisite materials for such temporary arrangements will be provided by BHEL on free - returnable basis which shall be returned to BHEL after the use.

11.30
The work shall be carried out strictly in accordance to the “Field Quality Plan” approved by BHEL/client. Contractor, jointly with BHEL, shall prepare all necessary records of measurements/readings/ protocols etc.

11.31
All works such as cleaning, levelling, aligning, trial assembly, dismantling of certain equipments / components for checking and cleaning, surface preparation, fabrication of sheets, tubes and pipes as per the general engineering practice and as per BHEL engineers instructions at site, cutting, weld desposing, grinding, straightening, chamfering, filing, chipping, drilling, reaming, scraping, lapping, fitting up etc as may be applicable in such erection works and which are treated incidental to the erection work and necessary to complete the work satisfactorily shall be carried out by the Contractor as part of the work.

11.32
Interconnection/ hookup, if any, with the existing system shall form part of work. Such interconnections, hookups may require shut down of running plant and the relevant work have to be completed within such planned shutdowns. This may call for working with enhanced resources and on extended hours. Contractor's offer shall cover all such contingencies.

11.33
Contractor shall regulate flow of material to and from site in such a manner and sequence that material accumulation at site does not lead to congestion at site. in case it is necessary to shift and restack the materials kept at work areas / site to enable other agencies to carry out their work or further any other reason, it shall be done by the Contractor most expeditiously. No claim for extra payment for such work will be entertained.

11.34
It may so happen that certain components like manhole doors , hanger etc may be supplied in loose items. They need to be assembled as per relevent drawings or as per advise of BHEL engineer prior to erection. This forms the part of the scope of work.

11.35
The Contractor shall have total responsibility for all equipment and materials in his custody at Contractor’s stores, loose, semi-assembled, assembled or erected by him at site. He shall effectively protect the finished works from action of weather and from damages or defacement and shall also cover the finished parts immediately on completion of work as per BHEL engineer’s instructions. The machine surfaces/finished surfaces should be greased and covered.

11.36

BHEL is operating web based computerized site operation management system (SOMS) that includes, inter-alia, issue of materials, daily progress reporting, Contractor's running monthly billing and material reconciliation through a computerized data management system. Contractor shall install necessary hardware to hook-up with the BHEL's system and use the same for his scope of work.

In the event the computerized SOMS is inoperative for any reasons, the Contractor shall take delivery of materials from the storage area/sheds of BHEL/customer after getting the approval of the engineer/customer on standard indent forms to be specified by BHEL/customer. All these records however shall be updated in the SOMS as and when the soms is reactivated/normalized.

11.37

Gases like argon, oxygen, acetylene etc that are required for erection related activities shall be arranged by the Contractor at his cost. For T-91 material site weld joints argon as per grade-3 of is 5760: 1998 with oxygen and water vapour restricted to max 6 ppm each and with argon purity level of minimum 99.99% shall be arranged and used by the Contractor. The supply should accompany test certificate for the batch indicating individual element 'ppm' level and overall purity level.

11.38

Nitrogen gas, if required, for preservation of boiler and nitrogen capping during chemical cleaning process, will be provided by BHEL free of charge. Contractor shall arrange necessary connector, nipple, regulator, header and piping for usage of such gas from cylinders.

11.39

All lubricants and chemicals required for testing, preservation, chemical cleaning / acid cleaning, oil flushing, and the lubricants for trial runs of the equipments and trial operation of the unit will be supplied by BHEL free of charges.

## 11.40 MEASUREMENT OF THE WORK COMPLETED

A) Where payment is to be made on the basis of weight, the weight per unit given in the BHEL document only shall be taken in to consideration. In case such an information is not available in BHEL documents, then the latest relevant indian standards in this regard may be applied.

B) Spares, surplus quantity, erection contingency materials will not be paid for unless the same has been consumed in place of regular item of measurable work as per the rate schedule.

C) Where the payment is made on the basis of item rate, actual executed quantity measured jointly shall only be paid for.

D) It is clarified that as far as weight constituted by welding consumables and other consumables supplied by BHEL as well as by the Contractor, shall not be considered for payment.

E) BHEL engineer's decision regarding stage of payment corresponding to progress of work, calculation of weight etc will be final and binding on the Contractor.

F) No separate payment shall be made for grouting of equipments, structures etc specified elsewhere in these specifications.

G) No separate payment will be made for the weight/volume of lubricant, oils, chemicals, gases, water, preservatives etc.

H) No payment will be made for the special tools (e.g. Furnace platfoms – sky climbers, passenger elevator) etc used in various activities of this work.

I) No payment will be made for weight of rubber lining.

J) Weight of packers and shims which become permanent part of equipment, both figuring in shipping list and those fabricated at site will be paid for on shipping list based actual weight.

K) Certain optimized assemblies / or modules may be made, assembling products from two or more different product group main assembly and dispatched. Payment for erection of these optimized assemblies / or modules will be regulated as per the weight of individual product group main assemblies contributing to the total weight of the module or optimized assembly at the quoted rate for the respective product group main assemblies, in the rate schedule.

**Note: The soil at Kutch is very loose and sandy. All the T&P shall be deployed by the contractor suiting to the soil conditions.**

## 12 DETAILS OF SCOPE OF WORK FOR BOILER & AUXILIARIES & PIPING

The scope of work is further detailed in the specifications hereinafter.

### 12.1 PRESSURE PARTS

A) Installation of temporary structure for drum lifting is in the scope of the Contractor's work. The required steel for the purpose will be provided in random sizes by BHEL free of charge. These shall be fabricated to suit the requirement, erected and welded as part of work. NDT has to be carried out as per instructions. These structures have to be dismantled at appropriate stage and returned to BHEL as per the instructions of BHEL engineer. Also, the relevant area of permanent structures have to be finished as instructed/ as per relevant codes of practice. Payment for above will be made at the rate accepted for structures; no separate payment will be made for fabrication, dismantling and finishing work and return of materials.

B) Pressure parts components like headers, panels, coils, loose tubes etc have to be flushed/blown with compressed air, checked for dimensional accuracy and configuration and minor rectifications, if necessary will have to be done before erection. This will involve making appropriate bed of steel structures over the concrete blocks/ steel pedestals. Necessary steel, concrete blocks shall be arranged by the Contractor. bed shall be fabricated as per BHEL requirement.

C) Normally the high pressure valves will have prepared edges for welding. But, if it becomes necessary, the Contractor shall prepare new edges or recondition the edges by grinding or chamfering to match the corresponding tubes and pipes. No gas cutting will be permitted. All fittings like "T" pieces, weld neck flanges, reducers, etc shall be suitably matched with pipes for welding ( This is applicable to piping work also).

D) Welding of all attachments on pressure parts including those required for insulation work is in the scope of work.

E) Surfaces inside seal box and other areas that are to be applied with castable refarctory lining shall be painted with black bitumen paint before boxing up and application of refractory. Seal boxes need to be partially cut open in order to pour refractory. Contractor shall carry out necessary cutting and seal welding of such cutouts. Contractor shall provide the black bitumen paint of required specification for such applications.

F) Furnace area and heat recovery area of flue gas passage has to be made leak proof by seal welding. Air leak test by pressurization has to be conducted to prove effectiveness of the seal weld and soap bubble or any other similar test will have to be carried out for the entire seal welds to ascertain the effective sealing is achieved. The tests may have to be repeated till satisfactory result is achieved.

G) If required, the pressure parts, after initial erection and tests, will have to be preserved by either dry or wet preservation procedure. Contractor shall erect the piping & valves and provide necessary assistance for the same. Required piping, valves and preservative (gas / chemicals) will be provided by BHEL as free issue.

H) The drum internals, if already installed, may have to be removed to facilitate inspection by statutory authorities and chemical cleaning. The drum internals are to be preserved properly and re-fitted at appropriate stage as part of work.

I) Superheater and/or reheater system will have HP butt weld joints of T-91 material. Welding of these HP joints shall involve pre-heating and post heating by resistance heating, argon purging of joints during welding process and full TIG weld. Contractor should follow required procedure for T91 welding NDT, etc.

J) **BOILER DRUM** : Boiler drum may need to be led from the point of unloading to the cavity of boiler. The same is in the Contractor's scope and shall make all arrangements, including fabrication of saddle if required. Structural materials required for the same will be provided by BHEL on free-returnable basis.

**Boiler drum is to be lifted using electric winch and pulley. Contractor to engage services of expert agency to lift the boiler drum by this method. Contractor shall make necessary tie up with the agency well in advance and deploy the expert agency and other resources well in time to suit the milestone requirement.**

K) Corrections in the profiles of scalloped plates/bars, skin casing, seal plates etc. for proper matching with mating parts, wherever required, shall be done as incidental to the work.

## 12.2 TRIM & INTEGRAL PIPING OF BOILER AND POWER CYCLE PIPING

12.2.1
The work on various piping systems will include cutting to required length, edge preparation, laying, fixing & welding of the pipes / elbows / fittings/ valves etc. in the pipeline, fixing & adjustment of supports / anchors / shock absorbers and carrying out all other activities / work to complete the erection and also carrying out all pre-commissioning / commissioning operations mentioned in the specification as per BHEL Engineers instructions and / or as per approved drawings / documents.

12.2.2
Tubes or pipes wherever deemed convenient, will be sent in random lengths. These shall be cut and edge prepared to suit the site conditions and the layouts. Fittings like bends tees, elbows, reducers, flanges etc will be supplied as loose items. However, bends of tube size up to NB. 65 mm will have to be formed at site as incidental to work.

12.2.3
All drains / vents / relief/ escape / safety valve exhaust piping etc to various tanks / sewage / drain canal / flash box / sump / atmosphere etc from the stubs on the piping and equipments are covered in the scope of work.

12.2.4
Connection (either flanged, bolted or welded) of piping to the terminal points/equipments etc is in the scope of work even though such terminal point/equipment may not form part of this work. All NDE including radiography of joints so made, post-weld-heat-treatment if any, are also within

the scope of work/specification. The terminal points work is inclusive of cutting of existing lines, if required, edge preparation, welding/blanking and hook up work.

12.2.5
It should be ensured that all the terminal point connections are done without transferring any undue load or strain to the other equipments. Necessary protocols have to be prepared for such fit-up alongwith BHEL/customer representative before connecting. All NDE including radiography of joints so made, post weld heat treatment if any, is also within the scope of work/ specification.

12.2.6
Mechanical freeness of valves have to be ensured prior to erection.

12.2.7
The above provisions shall be applicable, mutatis - mutandis, to other piping systems e.g. Fuel oil piping, Lub oil piping of rotating M/c ACW lines etc.

12.2.8
Main Steam pipeline up to turbine including the strainer and terminal joint with turbine is included in the scope of work. The material will be SA-335 P-91. Bidder shall follow BHEL approved procedure for welding, pre heating, PWHT & NDT of SA-335 P-91 material. Detailed procedure will be issued to the contractor. The main steam pipeline between strainer and turbine does not undergo steam blowing, therefore this pipeline must be throwly cleaned of dust, scale, burr, any foreign materials and deposits by manual and mechanical cleaning method. Contractor shall take atmost care in the cleaning activity so as to ensure that no undesirable particle enters inside the turbine. Contractor shall obtain specific written clearance from BHEL before and after the cleaning activity.

12.2.9 Following items of work shall also form part of piping erection:

a. Installation & removal of isolating devices/ NRVS and removal & re-fixing of internals required for hydraulic testing, pre-commissioning and commissioning activities. required gaskets will be supplied by BHEL free of cost.

b. Matching of flanges for achieving parallelism and alignment resorting to heat correction or other suitable methods as per instructions of BHEL engineers.

c. To locate the cause of vibrations in pumps or other auxiliaries and to carry out necessary corrections in piping and its supports. This may involve cutting, fresh edge preparation, welding, radiography, stress relieving, etc., of suction, discharge, re-circulating and other connected piping and its supports at a number of place.

d. Fabrication and erection of racks and steel supports for all the piping including critical piping. Steel for this purpose will be supplied by BHEL.

e. Erection, welding, NDE and stress relieving of certain equipments, e.g. flow nozzles, control valves etc, after completion of certain activities e.g. chemical

cleaning, steam blowing etc is part of work. This may involve removal of portions from the already erected pipelines in order to introduce these equipments and resultant edge preparation etc shall be incidental to work. No separate/ additional payment is envisaged for cutting, welding and edge preparation in this regard. The removed pieces of pipes shall be returned to BHEL stores with proper cleaning, dressing and identification marking.

f. Welding of root valves with small length of piping to the pressure, flow and level tapping points on piping or flow nozzles / orifices / metering elements fixed on piping.

g. Opening of valve actuators, dismantling of actuators from the valves, refitting and rendering assistance connected with the electrical and mechanical problems.

h. Fixing and welding including due NDE & PWHT etc of carrier plates on to the pipes.

12.2.10
As far as possible pre-assy of piping on ground is to be done. The erection of various piping may have to be started from any random reference instead of the terminal points inorder to meet certain completion commitments.

12.2.11
The location of drain headers, valves, stations, steam traps of piping as indicated in the BHEL drawings are suggestive only. The final location and routings shall be decided to suit the site conditions. While routing such lines and fixing the stations, it has to be erected so as to provide easy accessibility and free path for the purpose of easy operation and maintenance. These locations shall be acceptable to the client. Sometimes, the locations of stations and routing of lines may have to be changed as per the site conditions. All such works shall be carried out expeditiously as per the instructions of BHEL Engineer. The decision of BHEL Engineer is final and binding on the Contractor.

12.2.12
The rate quoted in rate schedule is also inclusive of pre-heating, welding, post heating, post weld heat treatment/ stress relieving and NDE of piping.

12.2.13
Erection of piping systems shall involve co-ordination with the erection of the turbine, turbo-generator, condenser, boiler, boiler feed pumps and other major equipments. Wherever required, approval of concerned BHEL Engineer/other erection agency must be obtained prior to making piping interface connections to such equipments. Sequence of work shall be carefully planned to minimize interference with other groups working in the same area. Actual sequence to be followed shall be subject to the approval of BHEL Engineer and BHEL Engineer may direct the Contractor to reschedule his work to suit the status of the site work.

12.2.14
While erecting the field run pipes, the Contractor shall check the accessibility of valves, instruments tapping points and maintain minimum head room requirement and other necessary clearance from the adjoining work areas to avoid interferences.

12.2.15
All pipelines shall be given proper slope towards the drain points during erection. For maintaining the slopes as given in the drawings for larger thickness and larger dia pipelines, edge preparation for welding may have to be altered suitably to achieve the slope.

12.2.16
All pipelines shall be provided, as per the instructions of BHEL Engineer, with suitable Vent and the drain points with valve (s) on the highest and lower points of the pipe run although may not be specifically mentioned in the drawing.

12.2.17
It may become necessary to make & install temporary spool pieces for certain process requirements. Contractor's scope shall include preparation, erection, fit-up, welding, NDE etc and dismantling of such spool pieces at appropriate stage without any additional payment.

12.2.18
Contractor shall take atmost care and work in co-ordination with BHEL's turbine erection egency to ensure that no undesirable stress/force/load gets tranfered to turbine or any other rotating machine that is connected to the pipelines in scope of this contract.

12.2.19
Normally, hangers setting in cold condition are done by simulation adding additional temporary weight, which will be roughly equal to the weight of the insulation. Attachment of temporary weights and floating of the joints in the simulation test to be treated as part of job. hanger settings have to be repeated for achieving free-floating joints. Hanger adjustments to be repeated for steam blowing by resetting hot and cold values if required. This may have to be repeated several times after steam blowing and synchronization. The weights will be supplied by BHEL. Contractor has to transport from BHEL stores and return the same after completion of work. No extra claim on this account will be entertained.

## 12.3 ROTATING MACHINERY

a Specifications covered under the following para and also other relevant specifications contained in other paras elsewhere in this tender document will be applicable for rotating machines like FD / ID / PA fans, Air pre heaters, Seal air fans, Blowers, Coal mills, Fuel Feeders, HP & LP dosing pump skids and other similar auxiliaries.

b All lubricants for testing, preservation and lubricants for Trial runs of the equipments shall be supplied by BHEL as free issue. All services including labour shall be provided by the Contractor for drawing these from BHEL / customer's stores, transporting, handling, filling, emptying, re-filling, accounting and return of surplus lubricants / empty containers / old & used lubricants after draining etc. Contractor should clean the spilled / leaking lubricants thoroughly, consumables for such cleaning will be in Contractor's scope.

c All rotating machinery and equipments shall be cleaned, lubricated, checked for their smooth rotation, if necessary, by dismantling and re-fitting before erection. also, the equipments may have to be checked for clearances, tolerances at any stage of the work including during testing, commissioning etc. shaft of the rotating machines shall be rotated periodically to avoid damages. All these shall be part of work.

d Trial run of the drives in un-coupled state and then coupled with equipment has to be done after necessary alignment.

e Forced lube oil systems including lube oil piping of drives, rotating equipments etc form part of the work under these specifications. Hydraulic test of oil coolers, oil piping etc are in the scope of work. Where required cooler may have to be dismantled for hydraulic test and re-erected thereafter as part of work.

f Certain rotating machinery, after testing, pre-commissioning may have to be re-aligned/hot aligned and vital clearances re-set. This may necessitate disconnection of cabling, removal of certain instruments etc and restoration thereafter.

g Protective lubricant coats / fill provided on / in the critical area of equipments have to removed at appropriate stage and regular lubricants, after removal / cleaning of protective coat / fill, as per specifications should be filled / applied. cleaning / flushing agents / oils will be provided by BHEL.

h Chemical cleaning, steam blowing and air drying of the connecting pipes for the lube oil system has to be carried out wherever required as per instruction manuals / drawings. chemicals, suiting BHEL specification, for such chemical cleaning is in the scope of Contractor.

i Even though rotating machines may be grouted to foundation using non-shrink grout mix, blue matching of packer plates / shims with foundation / between packers / equipment base should be done as incidental to work wherever instructed by BHEL Engineer.

j) Skid mounted equipments may need checking, re-setting due to various reasons as incidental to work.

k) There are five bowl mills for each boiler, all located in the mill & bunker bay between the boiler and the ESP.

## 12.4 ERECTION OF ELECTROSTATIC PRECIPITATOR

12.4.1
Wherever called for, pre-assembly of supporting structures, casing walls, inlet outlet funnels, hoppers etc have to be done, on ground.

12.12
Loading of collecting electrodes either from top or bottom, to be decided suiting site conditions, shall be done with due care as per instructions.

12.4.3
Straightness of all collecting electrodes has to be checked on ground prior to loading in to the field.

12.4.4
Bundle of collecting electrodes should be handled only with special lifting beam and slings supplied for the purpose.

12.4.5
BHEL will supply Huck bolting M/c with necessary auxiliaries free of charges. However, electrical connections, operation etc shall be arranged by the Contractor.

12.4.6
Clearances as prescribed amongst collecting electrodes and with casing walls have to be maintained. spot heating of collecting electrodes, wherever called for, shall be done as part of work to achieve the required clearances.

12.4.7
Erection, alignment/ fixing in final position, of high voltage rectifiers of ESP is in the scope of work. However testing & commissioning will be done by other agency.

12.4.8
Installation of high voltage interlocks (excepting rotary switch interlock of switchgear panels) is in the scope of work.

12.4.9
Complete erection, alignment, testing, pre-commissioning and commission etc for drive motors of collecting electrodes and emitting electrode rapping mechanism is in the scope of work.

12.4.10 **AIR LEAK TEST**
After erection of ESP and before clearing for insulation, air leak test has to be carried out. Necessary equipment like, air blower, ventury and instrumentation etc. will be provided by BHEL free of charges. Handling at stores, transport, erection, commissinoning and carrying out the leakage test, attending to the leakages till satisfactory sealing / leak proofness shall be in scope of the work. Contractor shall dismantle the test equipments and return to BHEL stores in good condition after due reconciliation, cleaning and servicing. No separate/ additional payment is envisaged for the above.

## 12.5 MAIN SUPPORTING STRUCTURES, EXTERNAL STRUCTURES, ELEVATOR STRUCTURES, STAIRWAYS, GALLERIES & PLATFORMS & HANDLING ARRANGEMENT

12.5.1
Contractor shall supply and erect one number passenger cum goods elevator of 1 MT capacity to reach upto the boiler drum level to facilitate erection, movement of person and goods etc. the arrangement shall confirm to applicable safety norms. Contractor shall dismantle and take the elevator back after completion of work. The elevator shall be made ready at the time of drum lifting.

12.5.2
Boiler main supporting structures has to be erected in a sequential manner.

12.5.3
Quality norms with regard to verticality of column, inter-alia, have to be adhered to strictly, at various stages of erection.

12.5.4
Stiffening / strengthening of main supporting structure, if any, due to deviation in verticality of columns post drum lifting, shall be carried out, including fabrication, if any. necessary steel for this will be provided in random sizes by BHEL as free issue. Payment for such stiffening/ strengthening shall be made for weight certified by BHEL engineer at the item rate applicable to structures, provided the deviation has occurred for the reasons not attributable to the Contractor.

12.5.5
Each of the ceiling girders will be sent in 2 to 3 pieces and will have to be assembled, welded and NDE & PWHT (Stress Relieving) done on ground prior to their erection in position.

12.5.6
It is likely that, in deviation from prescribed sequence, erection of certain elements of structure may be deferred for later stage, to facilitate, say crane boom reach to higher elevation, passage of drum during drum lifting etc. this may necessitate temporary installation of some structural steels at appropriate locations to keep the stability of structure intact. such temporary installations shall be removed subsequently and returned to BHEL stores/ storage yard. Finishing work in the related permanent structures shall be done as per the instruction of BHEL engineer. BHEL will provide necessary steels on free issue basis in random sizes for such installations, which shall be fabricated by the Contractor to suit the requirement.

Payment for such installations shall be made on the accepted tonnage rate of structures. No separate payment will be made for fabrication, removal & return of the materials to BHEL stores.

12.5.7
In some cases, the structural material will be supplied in random lengths, which have to be fabricated to suit the requirement as incidental to work. Also, it may sometimes be necessary to remove some of the erected members to facilitate erection of bigger/ pre-assembled equipments. In such cases, the removal and re-erection of such members as agreed by the BHEL Engineer will have to be done by the Contractor as incidental to work.

12.5.8
**Contractor shall arrange materials required for temporary cat ladders & working platforms** during erection of columns, platforms and other structural components. Such arrangements shall, as far as possible, be only of clamping & bolting type, as welding on columns etc will not be permitted. After the completion of work these shall be removed.

12.5.9
All the hand rails and toe guards shall be provided as per drawings and site requirement. hand rails supplied in running lengths shall be suitably cut, edge prepared and welded. also, hand

rails/ guards may have to be provided from the safety point of view in certain places though not indicated in the erection drawings. The weld joints of hand rails shall be ground smooth to flush finish.

12.5.10
Electroforged floor grills will be supplied for this project. These may have to be cut to suit requirement. Cutting shall be done only by mechanical cutters **and not by gas cutting**. Cold galvanizing compound is to be applied on the cut surface/edge. Cold galvanizing paint will be supplied by BHEL free of cost.

Fixing of floor grills shall be done by self-tapping screws **and not by weldable studs.** Special purpose electrically operated hand tools are available in the market for this, which drills, taps and fixes the screws in a single operation. BHEL will supply the necessary self-drilling-cum-tapping screws ans fixing clips. Contractor shall deploy the **drilling cum fixing machine** required for this purpose as a regular scope of work.

12.5.11
The Contractor shall also install additional platforms of permanent nature for approaching different equipment as per the site requirement and to meet O&M requirements, though these may not indicated in the erection drawings. Materials required for such platforms will be supplied by BHEL in random sizes on free issue basis. These have to be fabricated to suit the requirement. Payment only for erected weight as certified by BHEL engineer shall be made at the rate applicable for structures. No payment is envisaged for fabrication of structures.

12.5.12
All relevant provisions as above shall apply, mutatis-mutandis, to the work of external structures, interconnecting structures, elevator structures, esp stairways and gallaries & equipment handling system etc.

## 12.6 OTHER PRODUCTS AND SYSTEMS AND COMMON REQUIREMENTS

a) The ducting covered under this scope of work is flue gas ducting up to boiler outlet flange, boiler outlet flange to ESP, ESP to ID fans to chimney, hot and cold secondary air ducting from FD fans outlet to wind box, hot and cold primary air ducting from PA fans to mills including interconnections, flowmeters, dampers/gates and their drives, supports and suspensions etc for these systems.

b) Ducts / expansion bellows (metallic & non-metallic) are normally supplied in loose components / segments and these are to be assembled and welded/ jointed at site before erection. The fabric portion of non-metallic expansion joints (NMEJ) namely bolster, fabric belt and canopy shall be installed by Contractor under supervision/guidence of equipment supplier/BHEL for the first few cases. Contractor shall ensure that all subsequent NMEJ are assembled with due care and proper procedure. In simillar manner all joints, connecting ducts, expansion pieces and dampers shall be seal welded. these welds have to be made leak proof and tested as per technical instruction / requirement.

c) Certain structural items like silencer supports, roof cladding structure, platform etc will be supplied in running lengths which shall be cut to required suitable sizes and adjusted/trimmed as part of work.

d) Contractor has to make canopies for motors, actuators, lub oil units, control valves, etc. material for this will be supplied in random lengths / sizes. no separate payment for fabrication is envisaged. only the erection tonnage rate applicable for structure will be paid for this work.

e) BHEL will supply Metapoly Sheets for roof and side cladding of Boiler and elevator structure. These sheets are to be fixed with self tapping screws (supplied by BHEL) in similar manner as in case of Galvanized floor grills. Contractor shall deploy the drilling cum fixing machine required for this purpose as a regular scope of work.

f) ID fans are provided with variable frequency drives. Contractor has to erect & commission the only the motor and other mechanical components like coupling etc. Panels, transformers, cabling etc are not in this work specification.

g) Actuator / drives of dampers, gates etc may have to be serviced, lubricated before erection, during precommissioning and commissioning, including carrying out adjustments required as incidental of the work.

h) All welded joints should be painted with anticorrosive paint / primer immediately after completion of all work. Necessary paints and other consumables for the above work are in the scope of the Contractor.

i) Spring suspension / constant load hangers may have to be preassembled for required load and erection carried out as per instruction of BHEL. adjustments, removal of temporary arrests / locks, cutting of excess thread length of hanger, tie rod etc, have to be carried out as and when required. Load setting of spring hangers, as per BHEL's documents / instructions, during various stage of erection and testing and after floating of piping / ducting during cold and hot condition will have to be done. This exercise may have to be repeated till satisfactory results are achieved.

j) Hangers and suspensions, support steels for ducts and other equipments, piping etc will be supplied in running/random lengths/ sizes, which shall be cut to suitable sizes and adjusted as required.

k) Touch up and preservative paintng of all components issued to and/or erected by Contractor shall form part of scope of work. The Contractor shall arrange all paints, primer and consumables, T&P and facilities.

## 13 PREPARATION OF FOUNDATIONS, AND GROUTING OF EQUIPMENT OF BOILER & AUXILIARIES

13.1
Building foundations and other necessary civil works for supporting structures, equipments etc will be provided by BHEL / Customer. The checking of dimensional accuracy, axes, elevation, levels etc, with reference to bench marks of foundations and anchor bolt pits have to be checked and logged by the Contractor. The permanent benchmark / reference marks will have to be transferred to new locations with sufficient care to maintain the accuracy and protected / preserved with adequate care (to enable rechecking at later dates) as per BHEL instruction.

Minor adjustment of foundation level, dressing and chipping of foundation surfaces and blue-matching (wherever required) for of all equipments as per BHEL Engineers instructions, should be done by the Contractor as part of the work. Contractor/BHEL shall prepare protocols before taking over the foundations. Dressing and chipping of foundations upto 35mm for achieving proper levels will be within the scope of work/specification.

13.2
All temporary foundations and anchor points required for installing erection Equipments and winches, foundations for pumps, tanks etc are in the scope of Contractor. All building materials like cement, steel including reinforcement bars, grits cements etc for such temporary foundations shall have to be arranged by the Contractor within the quoted rates. All such foundations shall be demolished and normal ground conditions restored after the usage.

Neutralization pit for EDTA cleaning is to be made by the Contractor. After completion of job pit has to be dismantled and area is to be leveled before handing over of area to owner.

Effluent to be disposed off safely from neutralizing pit to safe area as per instruction of BHEL Engineer.

13.3
Contractor shall carry out scrapping and blue matching of embedded plates/ packers of rotating equipments. Chipping and the leveling of concrete surfaces, fine dressing up to the extent required to obtain contact between packer and concrete, is also covered in the scope of this work. Scrapping, chipping and matching shall be done so as to achieve prescribed percentage of contact between the two surfaces.

13.4
BHEL will provide free of cost only the shims and packer plates (either machined or plain) which go as permanent part of the equipment. Certain packer plates and shims over and above the quantity received as a part of supplies from manufacturing units of BHEL, will have to be cut out from steel plates / steel sheets at site to meet site requirement. Contractor shall cut and prepare packers and shims by gas cutting / chiseling / grinding and de-burr the same. However, machining of the packers wherever necessary, shall be arranged by contractor.

13.5
Complete grouting of structures equipments, including anchor/ foundation bolts, beneath base, base hollows etc, as may be applicable, is included in the scope of Contractor. Arranging all labour, building materials including cement, ordinary portland as well as quick setting – free flow

- non-shrink grout mix (e.g. conbextra gp1/gp2), form work, shuttering, and any other requirements is in the Contractor's scope. Contractor shall obtain approval of BHEL for cement (ordinary portland as-well-as quick setting – free flow- non-shrink grout mix) prior to use. Cleaning of foundation surfaces, pocket holes and anchor bolt pits and de-watering and making them free of oil, grease, sand and other foreign materials by soda washing, water washing, compressed air and other approved methods are within the scope of this specification/ work.

13.6
After the grouting has finally set and cured, alignment of equipments involved shall be checked again to verify for any disturbance or any other reason. if required, de-coupling of equipments has to be done for conducting the verification. in case any disturbance is noticed the cause, if any, shall be removed and re-alignment done as part of work.

## 14 WELDING, RADIOGRAPHY AND OTHER NON-DESTRUCTIVE TESTING, POST WELD HEAT TREATMENT

### 14.1 WELDING

14.1.1
Installation of equipment involves good quality welding, NDE checks, post weld heat treatment etc. Contractor's personnel engaged should have adequate qualification on the above works.

14.1.2
The method of welding (viz) arc, TIG or other method will be indicated in the detailed drawing/documents. BHEL Engineer will have the option of changing the method of welding as per site requirement.

14.1.3
Welding of high pressure joints shall be done by IBR certified high pressure welders who have been permitted by CIB of state concerned for deployment at the site of work.

14.1.4
Welding of all attachments to pressure parts, piping shall be done only by the qualified and approved welders.

14.1.5
Before any welder is engaged on work, he shall be tested and qualified by BHEL/ customer, though they may possess the IBR/other certificate. BHEL reserves the right to reject any welder without assigning any reason. All the expenditure in testing/qualification of the Contractor's welder shall be borne by Contractor.

14.1.6
Unsatisfactory and continuous poor performance may result in discontinuation of concerned welder.

14.1.7
The welded surface shall be cleaned of slag and painted with primer paint to prevent rusting, corrosion. for this consumables like paint /primer etc will be in the Contractor's scope.

14.1.8
HP joint fit-up, should be protected, where required, by use of tapes/protective paint as may be prescribed by BHEL. The Contractor shall arrange consumables like protective paints/tapes etc.

14.1.9
The Contractor shall maintain welding records in the form as prescribed by BHEL containing all necessary details, and submit the same to the BHEL Engineer as required. Interpretation of the BHEL Engineer regarding acceptability of the welds shall be final.

14.1.10

In the case of P-91 pipe welding, Contractor shall deploy welders having experience in welding of P-91 material. The welders engaged by Contractor if not qualified for P-91 welding will be trained by BHEL at BHEL welding research institute (WRI) trichy and allowed to work only after

passing the required test arranged by BHEL. All the expenditure towards such qualification including cost of training, traveling expenses, stay etc., shall be borne by the Contractor.

14.1.11
Joint fit up will be a stage of inspection. where required, joints shall be offered for visual inspection after root run. Subsequent welding should be made only after the approval of root run.

**14.1.12 SOCKET WELDING :**

In execution of this work, considerable number of socket weld joints is involved. The exact quantity of such socket welds or probable variation in the quantum cannot be furnished. The tenderer shall take notice of this while quoting as no extra claim on this account will be entertained. The socket welding on HP parts/ HP piping shall be done by the IBR qualified welders. Contractor has to adhere to the procedures/specification as indicated in the drawing for socket welding.

14.1.13
Welding electrodes have to be stored in enclosures having temperature and humidity control arrangements. This enclosure shall meet BHEL specifications.

14.1.14
Welding electrodes, prior to their use, call for baking for specified period and will have to be held at specified temperature for specified period. Also, during execution, the welding electrodes have to be carried in portable ovens.

**14.2 HEAT TREATMENT:**

14.2.1
For the purpose of temperature recording of stress relieving process, thermocouples have to be attached to the weld joint. The number of temperature measuring points and locations shall be as per the standards of BHEL. Thermocouples have to be attached using capacitor discharge type portable thermocouple attachment unit. Contractor shall arrange sufficient number of thermocouple attachment units.

14.2.2
Contractor should provide temperature indicator / temperature recorder for measuring temperature during pre-heating for welding or for controlling temperature of metal for hot correction etc. The temperature recorders should be preferably of solid state type.

14.2.3
Heat treatment may be required to be carried out at any time (day or night) to ensure the continuity of the process. The Contractor shall make all necessary arrangements including labourer required for the same as per directions of BHEL.

14.2.4
In certain cases only the pre-heating of weld joints may be called for.

14.2.5
For weld joints of heavy structural sections, if heat treatment is required, the same shall be carried out as part of the work.

14.2.6
Checking effectiveness of stress relieving by hardness tests (by digital hardness tester or other approved test methods as per BHEL Engineer's instruction) including necessary testing equipments is within the scope of the work / specification.

14.2.7
Preheating, inter-pass heating, post weld heating and stress relieving after welding are part of erection work and shall be performed by the Contractor in accordance with BHEL engineer's instructions. Where the electric resistance heating method is adopted Contractor shall make all arrangement including heating equipment with automatic recording devices, all heating elements, thermocouples and attachment units, graph sheets, thermal chalks, & insulating materials like mineral wool, asbestos cloth, ceramic beads, asbestos ropes etc, required for all heating and stress relieving works.

14.2.8
All the recorded graphs for heat treatment shall be handed over to BHEL/ IBR authorities and due clearances obtained.

14.2.9
During welding & post weld heat treatment of main steam piping (P-91 material), the induction heating process shall continue un-interrupted. therefore, contactor shall arrange back-up DG set to take care of power interruptions during the process.

14.2.10
Results of these processes shall be verified/ validated as per requirements of BHEL/client.

## 14.3 NON DESTRUCTIVE EXAMINATION:

14.3.1
Contractor shall provide all resources and make all arrangements for the radiographic examination of welds for this work. for reasons of safety, invariably the radiography work will be carried out after the normal working hours and close of other site activities only. in this regard, the Contractor has to adhere to the safety rules / regulations laid by barc authorities from time to time.

14.3.2
Radiography inspection of welds shall be performed in accordance with requirements and recommendation of BHEL Engineer. The minimum quantum of radiographic inspection shall be as per provision of IBR/BHEL's erection documents. they may, however be increased depending upon the performance of the individual welder at the discretion of BHEL engineer/boiler inspecting authority. Bidder shall also arreage the UT equipment with recording facility at his own cost. usage of UT equipment shall be as per direction of BHEL engineer. Records of UT shall be produced as per site requirement.

14.3.3
All x-ray / gamma ray films of weld joints shall be preserved properly and be handed over to BHEL/ IBR authorities and requisite clearances shall be obtained by the Contractor.

14.3.4
The field welded joints shall be subject to Dye-penetrant/MPT/RT/ other non-destructive examination as specified in the respective engineering documents/ as instructed by BHEL.

14.3.5
Where required, surface preparation, like smooth grinding of welded area, prior to Radiography shall be done. it may also become necessary to adopt inter-layer radiography/MPT/UT depending upon the site/ technical requirement necessitating interruptions in continuity of the work and making necessary arrangements for carrying out the above work. the Contractor shall take all this into account in his offer. the required ndt method/procedure will be decided by BHEL engineer at site.

14.3.6
Tenderer shall note that 100% radiography shall be taken on all high pressure welding till such time the welders' performance is found by BHEL Engineers to be satisfactory. Subsequently, subject to consistency in welder's performance. the percentage of radiography will be based on BHEL's standard practice/code requirement. The defects shall be rectified immediately and to the satisfaction of BHEL engineer. The decision of BHEL engineer regarding acceptance / rejecting the joints will be final and binding on the Contractor.

14.3.7
100% radiograph of certain sizes in piping have to be taken as per BHEL standards/ drawings.

14.3.8
For carrying out ultrasonic testing of welding joints of large size tubes and pipes, it will be necessary to prepare surface by grinding and buffing a smooth finish and contour as necessary. The Contractor's scope of work includes such preparation as incidental to work.

14.3.9
After stress relieving 5% of UT for all critical lines and 2% of UT for other alloy steel lines to be taken to ensure soundness of joints particularly stress relieving cracks. No separate payment will be made.

14.3.10
Contractor may have to undertake radiography with cobalt-60 isotope camera in certain cases. However, for any reason if use of Cobalt-60 is not possible then these joints shall be checked by radiography after completion of welding up to suitable part of thickness with IR–192 other suitable source. Subsequently after completing the joint UT to be done. For this Contractor has to deploy level–II operator certified by BARC.

14.3.11
In the case of P-91 piping wherever radiography is not possible, alternatively ultrasonic test has to be carried out apart from other NDE checks.

14.3.12
For piping of thickness less than 25 mm no radiography plugs will be provided. radiography shots to be taken by double wall technique or any other method to be adopted in consultation with BHEL engineer at site.

14.3.13
No separate payment for any NDE activities, radiography, is envisaged.

## 15 LINING AND INSULATION

Application of insulation, finishing, cladding and outer casing etc of the following:

1. Main Boiler
2. Boiler Auxiliaries including ESP.
3. Pipelines, Tanks & Vessels.
4. Other Equipment including BOIs, though not listed above but required for completion of any system in scope.

15.1
The work shall conform to dimension and tolerances specified in the various drawing. and documents that will be provided during the execution. if any portion of the work is found to be defective in workmanship or not conforming to drawings or other specifications, the Contractor shall dismantle and re-do the work duly replacing the defective materials at his cost. failing which the work will be got done by engaging other agencies or departmentally and recoveries will be dedected from Contractor's bills towards expenditure incurred including 30% departmental charges.

15.2
The terminal points as decided by BHEL shall be final and binding on the Contractor.

15.3
All insulation and refractory materials including iron components and outer sheet casing materials, cladding sheets etc required will be supplied by BHEL and the same have to be erected/ applied as per the drawings and specifications of BHEL by the Contractor.

15.4
The Contractor shall provide all the necessary scaffolding materials, temporary structures and necessary safety devices etc, during all stages of work. Scaffolding materials (poles, gratings etc) shall be of light weight construction. Contractor shall arrange steel pipes & clamps with accessories like base plate attachment, fixing pins, struts etc for scaffolding required for this work. However, BHEL's decision in this regard shall be final and binding. Contractor shall arrange the scaffolding materials in sufficient quantity.

The Contractor shall provide the required quantity of wire, nails, and planks for formwork and other materials for shuttering and curing works.

15.5
Contractor shall observe all precaution for laying, curing etc of pourable insulation. the Contractor at his own cost shall redo any defective works found.

15.6
Wool insulation is received at site as loose bonded mattresses in standard sizes. These are to be dressed/cut to suite the equipments. Multiple layers of wool have to be applied as directed and as per drawings and specifications for all equipments/ systems covered under the scope of work.

15.6
Cutting & dressing of insulation bricks to suit the site area of application is incidental to work.

15.7
Removable type of insulation has to be provided for valves fittings, expansion joints etc as per drawing or as directed by BHEL Engineer.

15.8
The cladding and outer casing are aluminium sheets. All relevant specifications and procedures with regards to beading, sealing etc for alunimium sheets have to be adhered to.

15.9
Cladding/outer casing shall be fixed expeditiously, so as to avoid damage to the insulation from the weather.

15.10
The overlapping surface of outer casing/cladding sheet shall be coated with sealing compound, which will be supplied by BHEL free of cost.

15.11
To take care of bimetal corrosion due to variety of metals in contact of each other viz retainer to support, support to outer casing/cladding, cladding-to-cladding etc, suitable paints specified by BHEL, to be applied and/or neoprene rubber packing/strips or any other insert may have to be fixed as required.

15.12
The Contractor shall leave certain gaps and openings while doing the work as per the instructions of BHEL Engineer to facilitate inspection by boiler inspector or during commissioning to fix gauges, fittings, instruments etc. these gaps will have to be finished as per drawings at later date by the Contractor at his cost.

Contractor shall cut open works in needed as per BHEL Engineer's instructions during commissioning for inspection, checking and make good the works after inspection is over without any extra payment.

15.13
A log book shall be maintained by the Contractor for the clearance of the area for application of refractory and insulation. where the Contractor dose the work on his own accord without prior permission. the work should be re-done, at his own cost, where necessitated.

15.14
Wastage allowance for the material issued are envisaged as follows:

| | | | | |
|---|---|---|---|---|
| ➢ | a | Pourable & castable insulation | - | 2% |
| ➢ | b | Insulation bricks and motor | - | 2% |
| ➢ | c | Wool mattresses | - | 2% |
| ➢ | d | Cladding sheets | - | 2% |

The wastage allowance will be applicable on the net issued quantity i.e. total quantity issued reduced by the quantity returned to stores as unused/fresh item. Contractor shall reconcile the material issues periodically as prescribed by BHEL site. Payment for the done will be regulated as per provision given in 'Terms of Payment'.

15.15
The following works are also included in the scope of this contract.

Cutting of cladding sheets as per the profile of the equipment and painting on inner surface two coats of bituminous paint. Paint will be supplied by Contractor.

Cutting of the wool mattresses to the required shape and application of finishing cement of required thickness wherever required.

15.16
Insulation work of temporary piping for alkali boil out, steam blowing and chemical cleaning has to be carried out at site. The same have to be removed and returned to the BHEL stores after the completion of activity. Rates quoted for application of wool for boiler and auxiliaries will be applicable for this work also. No separate payment will be made for removal of temporary insulation and return of the same to BHEL stores/yard.

15.17
In certain instances, co-ordinated/phased application of castable refractory/ insulation on pressure parts etc may be necessitated in consideration of sequence of activities of other erection agencies. Contractor shall do such phased work as may be directed by BHEL.

15.18
Prior to application of refractory bituminous painting on the pressure parts and other area is under Contractor scope. The bituminous paint will be supplied by Contractor. No separate payment will be made for application of paint.

## 16 PAINTING

16.1
Components of the Boiler & Auxiliaries will in general be supplied by BHEL with one coat of Primer and two coats of finish paint applied at the manufacturing shop; contractor shall apply one coat of finish paint on all such components (which are not insulated) after erection at site unless and otherwise the shop coating is damaged in the meanwhile. Following types of paints shall be used for this project.
1) Structure: Chlorinated Rubber
2) Safety Valves and their exhaust pipes: Heat Resistant Aluminium
3) Equipments: Epoxy / Chlorinated Rubber
6.1
In addition to components/equipment as above, there could be limited few without any prior protective coating. Such components shall first be thoroughly cleaned of all dirt, rust, scale, grease, oil and other surface deposits by wire brushing, scraping, washing, wiping with solvent or any appropriate method and the same being inspected and approved by BHEL followed by application of one coat of primer. Afterwards, the above parts shall be over-coated with two layers of Chlorinated Rubber paint as per application procedure prescribed by the paint manufacturer.

16.2 Touch-up painting on damaged areas -

a) For coatings damaged up to metal surface

Surface preparation shall be carried out by manual cleaning. minimum 6 inches adjoining area with existing coating shall be roughened by wire brushing, emery paper rubbing etc., for best adhesion of patch primer.

Primer coat of touch-up primer to be applied by brush immediately after the surface preparation.

Over this primer coat, finish coat and final finish coat shall be applied as covered above by brush within maximum seven ( 7 ) days of application of touch up primer.

Painting scheme is enclosed for information at **Annexure-III**. However, for execution only the latest document shall be applicable and no claim whatsoever shall be entertained in case of any variance between such documents. Similarly, documents as provided progressively during the execution of work for all other products/ equipments etc shall be applicable.

16.3
Painting of welded areas / painting of areas exposed after removal of temporary supports / touch-up painting on damaged areas of employer's structures, where inter-connection, welding / modification etc. has been carried out by the bidder.

(a.) clean the surface to remove flux spatters and loose rust, loose coatings in the adjoining areas of weld seams by wire brush and emery paper.

(b.) painting procedure to be followed as mentioned above for touch-up painting on damaged areas.

16.4
The scope of work includes painting of colour bands, lettering, marking and signs for direction of flow/rotation, names etc of approved colours as per the standard colour codes and specifications specified in tender specification or as advised by BHEL/customer engineer at site for the equipments/ components covered in these specifications. Applicable paints and primer shall be supplied by BHEL.

16.5
All exposed metal parts of the equipment including piping, structures, hand railing, grating etc shall be thoroughly cleaned off dust, rust, scales and other foreign materials by manual or mechanised wire brushing, scrapping, sand blasting etc and the same being inspected and approved by BHEL/customer engineer before application of primer. Afterwards, the above parts shall be finish painted with specified number of coats as per specification.

16.6
In certain isolated instances where it is not possible to clean the equipments as explained above, cleaning by grinding might have to be resorted to. No damage to the equipment/components should be caused.

16.7
Surface to be painted should be free of oil and grease. It should be removed by using suitable cleaning agents including permitted solvents. Surface cleaned by chemical agent, if required, shall be treated further as prescribed in use of such cleaning agents. The Contractor at his own cost shall provide all the consumables and application implements.

16.8
During the preparation of surface, if the shop coat is damage by chemical cleaning or by mechanical means, Contractor shall repair the same free of cost to BHEL. BHEL will make available only the primer and paints free of any charge to Contractor.

16.9
Specified drying time shall be permitted from one to another coat.

16.10
This work requires working at higher altitudes from ground level to as high as 90 m and more. The work spread is also substantial involving substantial run of structures and piping. Contractor shall take sufficient precautions to avoid any accident and hazard in all respects. the ropes, ladders, scaffolding materials, clamps etc and climber used should be of standard quality for safe and smooth execution of work.

16.11
Contractor shall carry out the work in such a way that other erected equipment, structure, civil foundations and other property are not damaged. For damages in any of such cases due to lapses by Contractor, BHEL shall have the right to recover the cost of such damages from the Contractor.

16.12
Contractor shall take due care to cover/protect the equipment which are already painted while carrying out the painting of other adjacent equipment. If so happens, it shall be cleaned and repainted by the Contractor without any extra charges.

16.13
In general, painting of structural parts and colour bands, lettering, marking of direction of flow/rotation etc will be carried out by brush painting. However, areas/equipment inaccessible for manual painting have to be painted by spray painting. The decision of BHEL engineer, in this regard, shall be final and binding on the Contractor. For the purpose of spray painting, air at one point will be made available by BHEL free. Laying of air hose pipe and any other line required shall be done by Contractor at his cost. The Contractor shall provide spray equipment set.

16.14
The Contractor shall provide all the necessary scaffolding materials, temporary structures and necessary safety devices etc, during execution of the work.

16.15
Final painting work shall be started after obtaining clearance from BHEL engineers and as per his instructions.

**16.16 PRIMER AND PAINTS FOR FINAL PAINTING**

All primer and paints required for final painting shall be supplied by BHEL free of charges.

The Contractor , however, shall provide account of all the items issued to him and return all primer, paints etc remaining extra over the normal requirement with proper identification tags in a packed condition to BHEL stores. In case of any misuse or excess use over the normal requirement, BHEL reserves the right to recover the cost of such misuse/ excess use. Decision of BHEL Engineer in this regard will be final and binding on the Contractor.

17.1
Testing, pre-commissioning, & commissioning will involve, though not limited to these, various testing e.g. hydro-static pressure, pressure decay tests, leak test, trial runs of equipments; flushing by air, water, oil, steam as applicable; checking/setting various clearances/ parameters, ensuring operation of various equipments free of undue restrictions, chemical **(EDTA)** cleaning & alkali boil out of boiler, steam blowing of the boiler and the critical piping, floating of safety valves, coal firing, trial operation and loading etc are some of these activities. All the activities for commissioning of the set, as informed by BHEL from time to time shall be completed.

17.2
All these tests should be repeated till all the equipments satisfy the requirement / obligations of BHEL to their client and also the relevant statutory authority.

17.3
Contractor shall lay / install necessary temporary piping, pumps, valves, blanks, gauges, cables, switches etc for conduct of hydraulic / pressure test, chemical cleaning, steam / air blowing etc. this may involve cutting of some portion of existing piping / valves, placing of rubber wedges / blanks in the valves and other openings, fabrication and installation of temporary tanks for chemical mixing, temporary access platforms to mixing tanks etc. Where required, bends have to be fabricated / formed at site from random length / size of pipes / structural steel. temporary installation itself has to be tested, tried, and subject to non-destructive examinations as per the instructions of BHEL as part of work**.**

No payment will be made for temporary installations made for hydraulic testing of various systems & piping. Similarly no payment will be made for electrical installations made for any temporary system.

17.4
All materials, equipments necessary for installation of temporary system as above will be supplied by BHEL as free returnable issue in random sizes / lengths. however, servicing, fabrication, erection, dismantling of the same after completion of the process, and handing over back to BHEL stores will be the responsibility of the Contractor.

In accounting of materials following wastage allowances are provided:

1. Structural items : 5%
2. Pipes : 3%

No wastage allowance for valves & other equiptments.

17.5
Fabrication, fit-up, pre-heating, welding, post-weld heating and post-weld-heat treatment if any, of requisite blanks for conduct of hydraulic test / leakage test is part of work. similarly, removal of blanks, restoration and normalization of the concerned system / line is to be done as part of work. BHEL will provide the material for blanks free of charge. No separate payment is envisaged for these activities.

17.6

Overhauling, cleaning, servicing of tanks, pumps, equipments, valves, during erection and commissioning stages are in the scope of work. Gaskets, packing & spares for replacement will be provided free of charges by BHEL.

17.7
After chemical cleaning / pickling of lubricating system (including oil piping, oil tank and other fittings) of rotating machines, oil flushing for lubricating systems as per instructions of BHEL engineer shall be carried out. Cleaning of oil tank of lubricating oil system of rotating machinery before and after oil flushing is in the scope of work.

17.8
Transportation of oil drums from customer's / BHEL's stores, filling of oil for flushing, first fill of lubricants and subsequent topping up during trials, tests and commissioning is included in the scope of this contract. The Contractor shall have to return all the empty drums to the customer / BHEL stores. Similarly, for various pre-commissioning / commissioning activities / processes mentioned in various clauses, transport of chemicals from BHEL / customer's stores, charging of chemicals into the system and returning of remaining chemicals and the empty containers of the chemicals to customer / BHEL stores is the responsibility of the Contractor.

17.9
During trial runs/ tests, pre-commissioning / commissioning, replacing / changing mechanical / other seals of equipments like pumps, removal and cleaning / replacing of filters etc is within the scope of work. Replacement spares for this purpose will be provided by BHEL.

17.10
In case any defect is noticed during tests, trial runs of all equipments and their auxiliaries, such as interferences, rubbing, loose components, abnormal noise or vibration, strain on connected equipment etc the Contractor shall immediately attend to these defects and take necessary corrective measures. readjustment and/or realignment, if necessary, shall be done as per BHEL engineer's instructions. Claim, if any, for these works shall be governed by relevant clauses of special conditions of contract provided the cause of such work is not attributable to the Contractor.

17.11
- ✓ Contractor shall cut / open / dismantle work, if needed, as per BHEL Engineer's instructions during commissioning for inspection, checking and make good the works after inspection is over.

- ✓ Similarly, during the course of erection, if certain portion of equipments erected by the Contractor has to be undone for enabling other Contractors / agencies of BHEL / customer to carry out their work, Contractor shall carry out such jobs expeditiously and promptly and make good the job after completion of work by other Contractors / agencies of BHEL / customer as per BHEL engineer's / agencies of BHEL / customers instructions. Claims, if any, in this regard shall be governed as per relevant clauses of 'General Conditions of Contract.

17.12
During this period, though BHEL/ client's staff will also be associated in the work, the Contractor's responsibility will be to arrange for complete requirement of men and required tools

and plants, consumables, scaffolding and approaches etc till such time the commissioned unit undergoes trial operations.

17.13
Commissioning activities will continue till the completion of trial operation. During this period Contractor shall make available the services of separate dedicated workforce comprising of suitable skilled and semi-skilled / un-skilled workmen and supervisory staff alongwith necessary tools and plants, consumables etc.

17.14
It shall be specifically noted that the Contractor may have to work round the clock during the pre-commissioning and commissioning period alongwith BHEL Engineers and hence considerable overtime payment is involved. The Contractor's quoted rates shall be inclusive of all these factors.

17.15
The Contractor shall carry out any other tests as desired by BHEL engineer on erected equipment covered under the scope of this contract during testing, pre-commissioning and commissioning, to demonstrate the completion of any part or whole of work performed by the Contractor.

17.16
At various stages of completion boiler has to be preserved against corrosion either by wet preservation or by dry preservation as per the requirement of BHEL Engineer. Contractor shall carry out all the incidental jobs like filling up of water, dozing of chemicals and pressurizing the system to the required pressure, change of gas refills etc. The boilers have a permanent $N_2$ blanketing arrangement.

During this period, though BHEL/ client's staff will also be associated in the work, the Contractor's responsibility will be to arrange for complete requirement of men and required tools and plants, consumables, scaffolding and approaches etc., till such time the commissioned unit is taken over.

17.17
Commissioning activities will continue till the completion of trial run, trial operation. During this period Contractor shall make available the services of separate dedicated labor force comprising of suitable skilled and semi/un-skilled hands along with necessary tools and plants, consumables etc.

17.18
It shall be specifically noted that the Contractor may have to work round the clock during the pre-commissioning and commissioning period along with BHEL engineers and hence considerable overtime payment is involved. The Contractor's quoted rates shall be inclusive of all these factors.

17.19
Conduct of performance guarantee test is in the scope of work. Contractor shall install all necessary tapping points, instruments etc and provide necessary assistance in this regard**.**

In case PG test is getting delayed beyond the contract period ( normal plus extension if any ) due to reasons not attributable to the Contractor, PG test issue will be mutually discussed and and commercially settled. However intallation of necessary tapping points, impulse pipes, approaches etc are to be completed by the Contractor.

17.20
The Contractor shall carry out any other tests as desired by BHEL engineer on erected equipment covered under the scope of this contract during testing, pre-commissioning and commissioning, to demonstrate the completion of any part or whole of work performed by the Contractor.

## 18.1 PRESERVATION & PROTECTION OF COMPONENTS

BHEL will issue majority of the plant equipment/components duly applied with primer and one coat of finish paint at shop. Components/equipment that will finally remain exposed to atmosphere will be coated with Chlorinated Rubber painting system (except the steam system silencers and their exhaust pipes – provided with heat resistant aluminum paint); while the remaining components will be coated with synthetic enamel paint. During the course of activities at site, the shop coat of paint may get peeled off/burnt. Contractor at all stages of work, shall ensure appropriate preservation of all such equipment/ component that are in his custody including those erected by him by way of applying touch up paint coating. Such preservation shall conform to preservation procedure of BHEL (if any), else according to the instructions of BHEL engineer. BHEL will provide the necessary primer and paint for Chlorinated Rubber paint system free of charges; while contractor shall arrange for the preservation materials for all other types of surfaces including machined surfaces in his cost.

18.2
The contractor shall make suitable security arrangements including employment of security personnel and ensure protection of all materials/ equipment in their custody and installed equipments from theft/fire/pilferage and any other damages and losses.

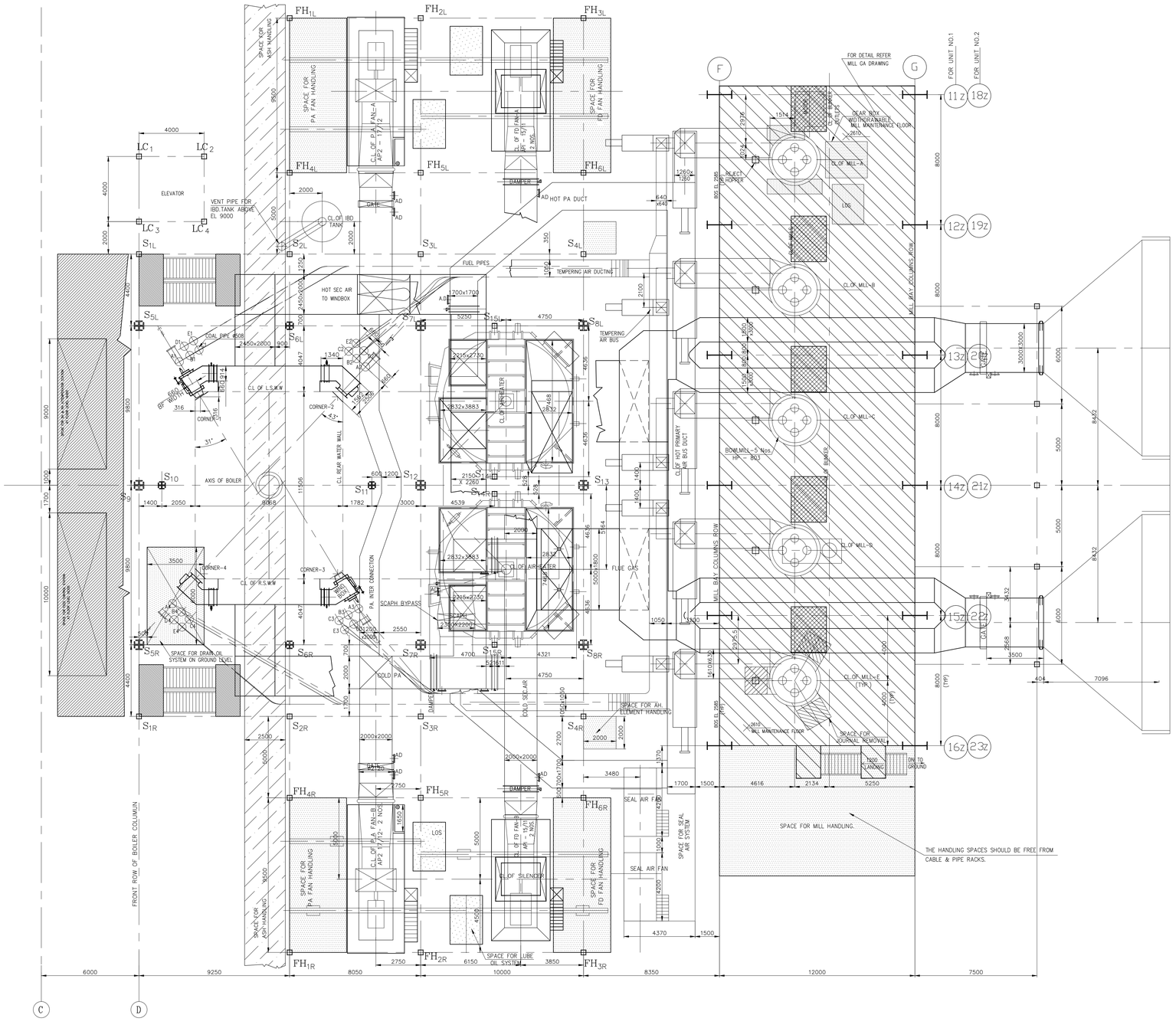
18.3
Contractor shall collect all scrap materials periodically from various area of work site, deposit the same at one place earmarked at site or shift the same to a place earmarked in BHEL/ client's stores. In case of failure of contractor in compliance of this requirement, BHEL will make suitable arrangement at contractor's risk and cost.

18.4
The entire surplus, damaged, unused materials, packaging materials / containers, special transporting frames, gunny bags, etc shall be returned to BHEL stores by the contractor.

18.5
The contractor shall not waste any materials issued to him. In case it is observed at any stage that the wastage/excess utilisation of materials is not within the permissible limits, recovery for the excess quantity used or wasted will be effected with departmental charges from the contractor. Decision of BHEL on this will be final and binding on the contractor.

18.6
For any class of work for which no specifications have been laid down in these specifications, work shall be executed as per the instructions of BHEL.

DRAWING NO. 0-00-022-75172




## NOTE

FOR LEGEND, REFERENCE DRAWINGS AND OTHER DETAILS REFER GENERAL ARRANGEMENT OF BOILER SECTIONAL SIDE ELEVATION DRAWING No 0-00-022-75171

CUSTOMER NO. : 0170 TO 0171

| REV. | DATE | ALTERED | CHECKED | APPROVED |
|---|---|---|---|---|
| 04 | 30.09.2010 | ELUMALAI | T.DEEPAK | M.C |

- MILL BAY FFL REVISED TO (-)0.200M AS PER TCE Lr. dtd 12.08.10 AND TCE REMARKS dtd 23.02.10.
- MILL BAY COLUMN DESIGNATION UPDATED.

| REV. | DATE | ALTD | G.RAMA |
|---|---|---|---|
| 03 | 04-06-2010 | CHD&APPD: | M.Chidam |

- MILL MAINTENANCE PLATFORM SCOPE REVISED.
- DWG. REVISED AS PER TCE Lr.No.713 DTD 04-05-2010.

| REV. | DATE | ALTD | G.RAMA |
|---|---|---|---|
| 02 | 15-03-2010 | CHD&APPD: | M.Chidam |

- IBD VENT ELEVATION INDICATED.
- TITLE BLOCK REVISED. DRG UPDATED AS PER TCE COMMENTS LR: 709 DTD.23/02/2010.
- SEAL AIR SYSTEM RELOCATED TO NEAR MILL HANDLING SPACE.
- MILL MAINTENANCE FLOOR INDICATED.

| REV. | DATE | ALTD | G.RAMA |
|---|---|---|---|
| 01 | 18-01-2010 | CHD&APPD: | M.Chidam |

- BOILER STAIR CASE UPDATED.
- DUCTING UPDATED.
- SPACE FOR SEAL AIR FAN RELOCATED.
- IBD TANK RELOCATED. DRG UPDATED AS PER TCE COMMENTS LR: 701 DTD.14/08/2009.



CUSTOMER:

OPG POWER GUJARAT Pvt LTD

OPG POWER GUJARAT Pvt LTD., BHADRESHWAR
2X150MW STEAM GENERATOR

TITLE :

GENERAL ARRANGEMENT OF BOILER SECTIONAL PLAN

TCE Consulting Engineers Limited
MUMBAI

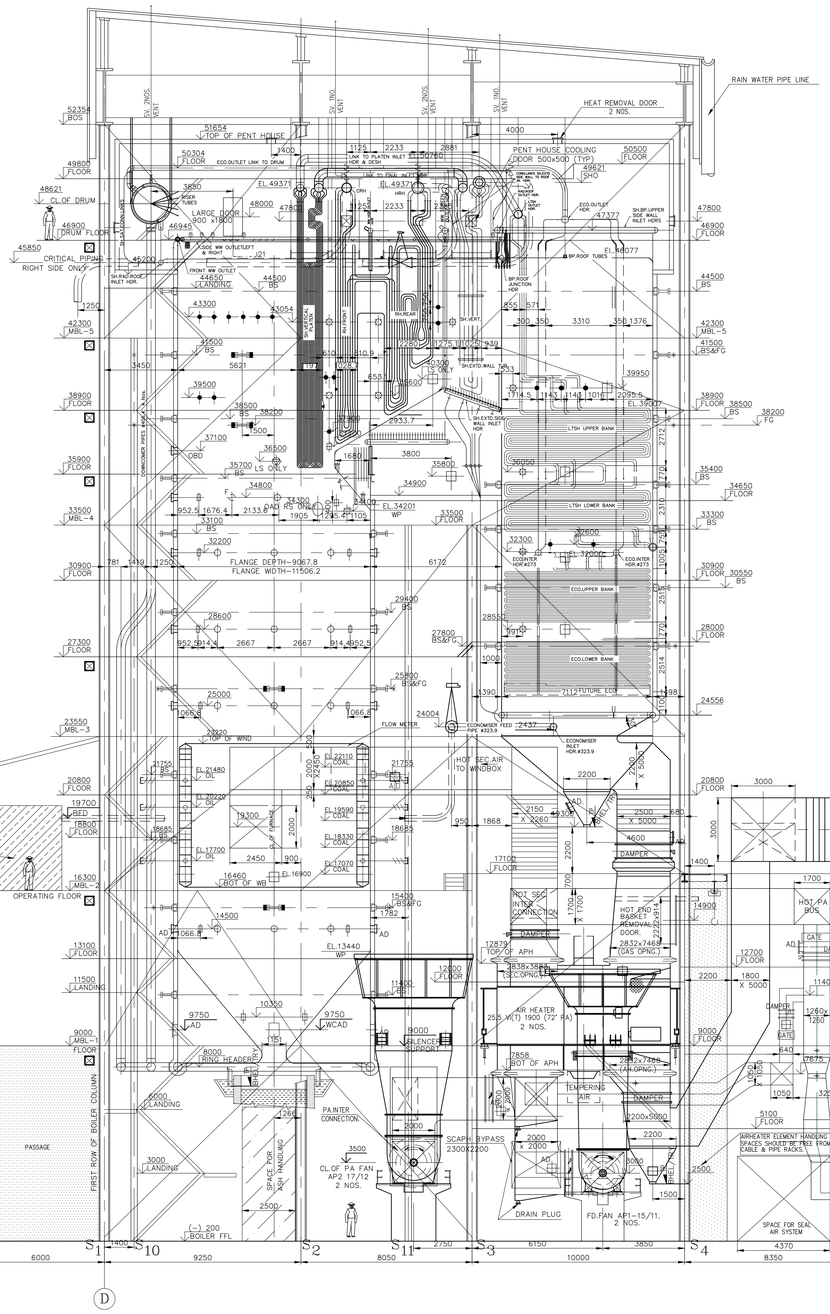
BHARAT HEAVY ELECTRICALS LIMITED
BOILER PLANT UNIT; TIRUCHIRAPALLI-620014

355-030

| | | NAME | SIGN. | DATE |
|---|---|---|---|---|
| FIRST ANGLE | SCALE 1:100 | | | |
| | DRAWN. | K.Rajendran | | 16/07/09 |
| | CHECKED | T.Deepak | | 17/07/09 |
| ALL DIMENSIONS ARE IN mm | APPROVED | M.Chidambaram | | 17/07/09 |

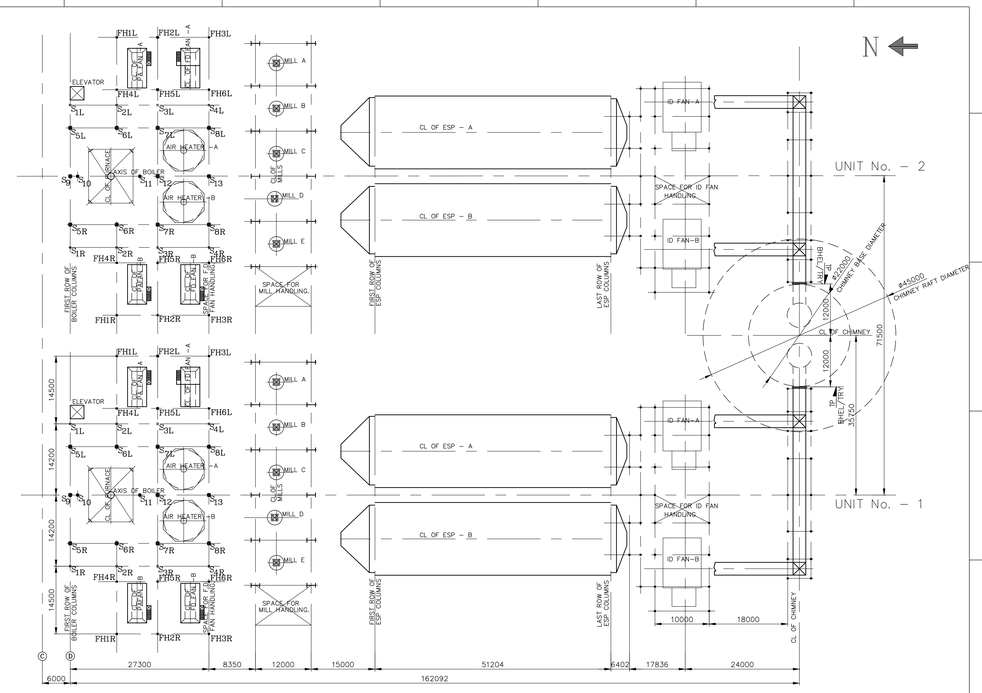
DRAWING NO. 0-00-022-75172 | SHEET NO. 1 OFF 1 | REV. 04

DRAWING NO. 0-00-022-75171




## LEGEND

| SL.No. | SYMBOL | ABBREVIATION | DESCRIPTION |
|---|---|---|---|
| 01 | TP | TP | TERMINAL POINT UNDER BOILER SCOPE OF SUPPLY. |
| 02 | | OBD | OBSERVATION DOOR |
| 03 | | LRSB | LONG RETRACTABLE SOOT BLOWER |
| 04 | | WB | WALL BLOWER |
| 05 | F | | FUTURE WALL BLOWER |
| 06 | | IN | INSTRUMENT INSERT |
| 07 | | OAD | OVAL ACCESS DOOR |
| 08 | | AD. | ACCESS DOOR |
| 09 | | BS | BUCKSTAY |
| 10 | | – | FURNACE GUIDE |
| 11 | | FG. | FURNACE GUIDE ON SIDE WALL |
| 12 | | MBL | MAIN BRACE LEVEL |
| 13 | | | ELEVATOR LANDING (By Customer) |




## KEYPLAN OF BOILERS

SCALE : NTS

| | REFERENCE DRAWINGS | |
|---|---|---|
| 01 | GENERAL ARRGT. OF BOILER SECTIONAL PLAN | 0-00-022-75172 |
| 02 | TP. DETAILS FOR MS, HRH,CRH & FW. LINES | 0-00-020-75173 |
| 03 | LOCATION OF FURNACE OPENINGS & BUCKSTAYS | 0-00-020-75174 |
| 04 | LAYOUT OF COLD AIR DUCTING | 0-00-020-75175 |
| 05 | LAYOUT OF HOT AIR DUCTING | 0-00-020-75176 |
| 06 | LAYOUT OF FLUE GAS DUCTING | 0-00-020-75177 |
| 07 | LAYOUT OF ID SYSTEM ELEVATION | 0-00-020-75178 |
| 08 | LAYOUT OF ID SYSTEM PLAN | 0-00-020-75179 |
| 09 | FLOOR PLAN AT EL. 5100 | 0-00-021-75180 |
| 10 | FLOOR PLAN AT EL. 9000 | 0-00-021-75181 |
| 11 | FLOOR PLAN AT EL. 13100 & 12200 | 0-00-021-75153 |
| 12 | FLOOR PLAN AT EL. 16300 & 17100 | 0-00-021-75183 |
| 13 | FLOOR PLAN AT EL. 20800 & 23550 | 0-00-021-75184 |
| 14 | FLOOR PLAN AT EL. 27300 & 30900 | 0-00-021-75185 |
| 15 | FLOOR PLAN AT EL. 33500 | 0-00-021-75186 |
| 16 | FLOOR PLAN AT EL. 35900 & 38900 | 0-00-021-75187 |
| 17 | FLOOR PLAN AT EL. 42300 | 0-00-021-75188 |
| 18 | FLOOR PLAN AT EL. 46900 & 49800 | 0-00-021-75189 |

## NOTE

01. ALL ELEVATIONS ARE W.R.T EL 0.000M WHICH CORRESPONDS TO RL + -----

| REV. | DATE | ALTERED | CHECKED | APPROVED |
|---|---|---|---|---|
| 05 | 20.12.2011 | A.A | T.D | M.C |

- HOT SEC. HORIZONTAL DUCT TO WINDBOX LOWERED BY 200mm TO CL EL. 22050.
- FLOOR EL.35100 LOWERED BY 450mm TO EL.34650 AS PER STRUCTURES EMAIL DTD.19-09-11.
- OBD AT EL.37200 REVISED TO 37100.
- FURNACE GUIDE EL 38200 REVISED.

| REV. | DATE | ALTERED | CHECKED | APPROVED |
|---|---|---|---|---|
| 04 | 30.09.2010 | ELUMALAI | T.DEEPAK | M.C |

- MILL BAY FFL REVISED TO (–)0.200M AS PER TCE Lr. dtd 12.08.10 AND TCE REMARKS dtd 23.02.10.
- D-ROW TO CL OF CHIMNEY DISTANCE REVISED TO 162092 IN KEY PLAN.
- KEY PLAN UPDATED.

| REV. | DATE | ALTD | G.RAMA |
|---|---|---|---|
| 03 | 04-06-2010 | CHD&APPD: | M.Chidam |

- SEAL AIR FAN LOCATION UPDATED.
- REF DWG SL. NO. 11 CORRECTED.
- COMMON STACK INCORPORATED AS PER TCE e-MAIL DTD.06/05/10.
- WB AT EL.34800 FUTURE REVISED AS PRESENT NEAR OAD IN SIDE ELEVATION.
- DWG. REVISED AS PER Lr NO. 713 DTD. 04/05/10.

| REV. | DATE | ALTD | G.RAMA |
|---|---|---|---|
| 02 | 15-03-2010 | CHD&APPD: | M.Chidam |

- SV VENT INDICATED.
- TITLE BLOCK REVISED.
- DRG UPDATED AS PER TCE COMMENTS LR: 709 DTD.23/02/2010.
- LARGE DOOR 900X1800 INDICATED AT EL 48000 IN PENTHOUSE.
- ELEVATOR INDICATED IN KEY PLAN.

| REV. | DATE | ALTD | G.RAMA |
|---|---|---|---|
| 01 | 18-01-2010 | CHD&APPD: | M.Chidam |

- UNIT NO INTERCHANGED IN KEY PLAN.
- BOILER STAIR CASE UPDATED.
- DUCTING UPDATED.
- BS,N,LRSB,WB,& AD LOCATION UPDATED.
- ELEVATOR LANDING LEVEL INDICATED.
- ECO HOPPER BOTTOM LEVEL REVISED.
- BOILER/ESP FFL INDICATED ASPER TCE REPLY.
- RAIN WATER PIPE INDICATED.
- BETWEEN UNIT DISTANCE REVISED AS PER MOM 25 AUG 2009.
- DRG UPDATED AS PER TCE COMMENTS LR: 701 DTD.14/08/2009.



CUSTOMER NO. : 0170 TO 0171

CUSTOMER:

OPG POWER GUJARAT Pvt LTD

OPG POWER GUJARAT Pvt LTD., BHADRESHWAR

2X150MW STEAM GENERATOR

TITLE :

GENERAL ARRANGEMENT OF BOILER SECTIONAL SIDE ELEVATION

TCE Consulting Engineers Limited

MUMBAI

BHARAT HEAVY ELECTRICALS LIMITED

BOILER PLANT UNIT; TIRUCHIRAPALLI–620014

355–030

| FIRST ANGLE | SCALE | | NAME | SIGN. | DATE |
|---|---|---|---|---|---|
| | 1:100 | DRAWN | K.Rajendran | | 16/07/09 |
| | | CHECKED | T.Deepak | | 17/07/09 |
| ALL DIMENSIONS ARE IN mm | | APPROVED | M.Chidambaram | | 17/07/09 |

DRAWING NO. 0-00-022-75171 SHEET NO. 1 OFF 1 REV. 05