

# **SPECIAL CLAUSES OF CONTRACT**

## **For Rate contract of Servicing jobs**

### **01- % BREAK UP OF TOTAL OVERHAULING JOB.**

1. Bidder shall quote for capital overhauling of , one major package , which shall comprise of individual parts for different modules/components with specified percentages allotted as below:

#### **A. OVERHAULING OF 200/210 MW LMW Design TG**

HP Module	-	18 %
IP Module	-	18 %
LP Module	-	15 %
Generator	-	20 %
Valves	-	15 %
Bearing insp.	-	14 % (general overhauling activities)
Total	-	100 %

Further, when 4 or less packages (out of the above 6 packages) shall be carried out, the additional compensation for mobilization and other fixed costs shall be decided as below:-

If only one package is done, payment made shall be, % of that part + 10%.

1. If two packages are done, payment made shall be, % of those parts + 08%.
2. If three packages are done, payment made shall be, % of those parts + 06%.
3. If four packages are done, payment made shall be, % of those parts + 04%.
4. If five or six packages are done, no additional payment shall be made.

**Other than these constituent packages, rates for optional packages as below shall be applicable as percentage of the capital overhaul value:**

a)	Replacement of LP Casing bellows.	- 15 %
b)	Assistance in MPI/NFT of free-standing blades of LP Rotor.	- 07.5%
c)	Inspection of seals of generator without threading out of rotor.	- 05 %
d)	Assistance in slow speed balancing of rotors.	- 02.5 %
e)	Providing EOT crane operators for round the clock operation per day basis.	- 03 %
f)	Providing Induction heating Machine for opening & retightening of Parting plane studs of H.P./ IP or both	09%

( Note-BHEL reserves the right to arrange the Induction Machine on their own. This will be informed at the time of actual placement of order as per the rotation.)

## **B. OVERHAULING OF 120 MW /125MW KWU Design TG**

HP Module	-	23 %
IP Module	-	18 %
LP Module	-	15 %
Generator	-	18 %
Valves & Strainers-		12 % (10% for Valves & 02% for Strainers)
Bearing insp.	-	14 % (general overhauling activities)
Total	-	100 %

Further, when 4 or less packages (out of the above 6 packages) shall be carried out, the additional compensation to cover for mobilization and other fixed costs shall be decided as specified above for 200/210/MW LMW Machine..

**Other than these constituent packages, rates for optional packages as below shall be applicable as percentage of the capital overhaul value:**

- |  |          |
|--|----------|
| a) Replacement of LP Casing bellows.   | - 20 %   |
| b) Assistance in MPI/NFT of free-standing blades of LP Rotor.                  | - 10 %   |
| c) Inspection of seals of generator without threading out of rotor.            | - 06.5 % |
| d) Assistance in slow speed balancing of rotors.                               | - 03.5 % |
| e) Providing EOT crane operators for round the clock operation per day basis.- | 03 %     |
| f) Providing Induction heating Machine for opening & retightening of           |          |
| Parting plane studs of H.P./ IP or both  | 12%      |

( Note-BHEL reserves the right to arrange the Induction Machine on their own. This will be informed at the time of actual placement of order as per the rotation.)

## **C. OVERHAULING OF 190/195/200/210 MW/250 MWKWU Design TG**

HP Module	-	23 %
IP Module	-	18 %
LP Module	-	15 %

Generator	-	18 %
Valves & Strainers-		12 % (10% for Valves & 02% for Strainers)
Bearing insp.	-	14 % (general overhauling activities)
Total	-	100 %

Further, when 4 or less packages (out of the above 6 packages) shall be carried out, the additional compensation to cover for mobilization and other fixed costs shall be decided as specified above for 200/210/MW LMW Machine..

Time schedule for total overhaul package and the six constituent packages shall be specified. For combinations of packages, time period shall be decided mutually. Payment terms for main capital overhauling package shall be based on percentages given in the same. As no percentage is allotted specifically for commissioning, up to 90% payment shall be made up to physical completion of job and final 10% payment shall be made after commissioning of the Unit and SD after completion of guarantee/ warranty period. For combinations of packages, percentage allocation shall be decided mutually before placement of order.

**Other than these constituent packages, rates for optional packages as below shall be applicable as percentage of the capital overhaul value:**

- |    |  |          |
|----|--|----------|
| a) | Replacement of LP Casing bellows.  | - 15 %   |
| b) | Assistance in MPI/NFT of free-standing blades of LP Rotor.   | - 07.5 % |
| c) | Inspection of seals of generator without threading out of rotor.   | - 05 %   |
| d) | Assistance in slow speed balancing of rotors.  | - 02.5 % |
| e) | Providing EOT crane operators for round the clock operation per day basis.-                                  | 02.25%   |
| f) | Providing Induction heating Machine for opening & retightening of<br>Parting plane studs of H.P./ IP or both | 10.5%    |

( Note-BHEL reserves the right to arrange the Induction Machine on their own. This will be informed at the time of actual placement of order as per the rotation.)

#### **D. OVERHAULING OF 500 MW/490 MW KWU Design TG**

HP Module	-	20 %
IP Module	-	16 %
LP Module	-	15 %
Generator	-	23 %
Valves & Strainers	-	12 % (10% for Valves & 02% for Strainers)
Bearing insp.	-	14 % (general overhauling activities)

Total - 100 %

Further, when 4 or less packages (out of the above 6 packages) shall be carried out, the additional compensation to cover for mobilization and other fixed costs shall be decided as specified above for 200/210 MW LMW Machine.

**Other than these constituent packages, rates for optional packages as below shall be applicable as percentage of the capital overhaul value:**

- |    |  |        |
|----|--|--------|
| a) | Replacement of LP Casing bellows.  | - 12 % |
| b) | Assistance in MPI/NFT of free-standing blades of LP Rotor.   | - 06 % |
| c) | Inspection of seals of generator without threading out of rotor.   | - 04 % |
| d) | Assistance in slow speed balancing of rotors.  | - 02 % |
| e) | Providing EOT crane operators for round the clock operation per day basis.                                   | - 02 % |
| f) | Providing Induction heating Machine for opening & retightening of<br>Parting plane studs of H.P./ IP or both | 09%    |

( Note-BHEL reserves the right to arrange the Induction Machine on their own. This will be informed at the time of actual placement of order as per the rotation.)

**E. Other than these constituent packages, rates shall be quoted for these additional packages:**

E1. Providing experts (with >20 years of experience in same field) on per day basis.

**F.** For Chemical cleaning rate shall be quoted for single stage chemical cleaning. For Second stage chemical cleaning 20 % of quoted rates for first stage chemical cleaning will be paid in case double stage chemical cleaning is required.

**G.** OVERHAULING OF AIR PRE HEATER

**H.** ELECTRICAL / DIAGNOSTIC TEST ON GENERATOR & NFT / MPI TEST  
OF TURBINE BLADES WITH REQUIRED TESTING EQUIPMENTS/ INSTRUMENTS

**I.** VIBRATION ANALYSIS & BALANCING OF TURBINE/GENERATOR ALONGWITH  
INSTRUMENT

**J.** THERMAL INSULATION OF TURBINE

**K.** OPENING AND CLOSING OF HP AND IP CASINGS BY INDUCTION HEATING

## **02 - The PRICE VARIATION CLAUSE:**

### **PRICE VARIATION COMPENSATION**

In order to take care of variation in cost of execution of work , due to variation in the index of LABOUR, Price Variation Formula as described herein shall be applicable half yearly from the date of commencement of rate contract

85% component of accepted rate/price of each module & zone for rate contract shall be adjusted/updated for variation in labour indices at the start of 7<sup>th</sup> month from the date of commencement of rate contract and subsequently at the start of 13<sup>th</sup> month, 19<sup>th</sup> month & so on up to the full rate contract period mentioned.

The remaining 15% shall be treated as fixed component.

Half yearly revised accepted rate/price due to variation in index shall be determined /arrived on the basis of the following notional formula, in respect of the identified components viz LABOUR

$$P = P_o[0.15+0.85 * XN/X_o]$$

Where

P=Applicable revised rate for various items/modules of rate contract due to variation in the Index for Labour at the start of 7<sup>th</sup>, 13<sup>th</sup>, 19<sup>th</sup> month from the commencement of rate contract.

P<sub>o</sub>=Accepted rate for various items/modules of rate contract at the time of entering into rate contract

XN = Monthly all India average consumer price index numbers for Industrial Workers published by Labour Bureau, Ministry of Labour and Employment, Government of India Index No for Labour for the previous month at the start of 7<sup>th</sup>, 13<sup>th</sup>, 19<sup>th</sup> month from the commencement of rate contract.

X<sub>o</sub> = Monthly all India average consumer price index numbers for Industrial Workers published by Labour Bureau, Ministry of Labour and Employment, Government of India, as on base date

Base date shall be calendar month of the latest date of submission of Tender.

PVC shall not be payable for the ORC amount, Supplementary/Additional Items, Extra works executed on man day rates basis.

Note;

Rate revision of accepted original rate (at the time of entering into rate contract) shall be arrived by applying above PVC formula ( after every six months) and shall remain firm for next six months. Thus, after six months, accepted original price/rate will be updated accordingly again for the next six months.

### **03 - ORC Clause:**

No ORC shall be paid in the event of the completion period being extended for any reason whatsoever.

### **04 - Formation of small sub regions for Rate Contract**

All the regions are further divided into four sub regions.

The sub regions within the regions for Rate Contract will be as following-

**A - Power Sector Northern Region-**

- N1 - Delhi
- N2 - U.P. except NTPC
- N3 - Punjab, Haryana, Rajastha
- N4 - NTPC Unchahar, Shaktinagar

**B - Power Sector Western Region-**

- W1 - Maharashtra & Gujarat Electricity Board
- W2 - M.P. & Chhattisgarh Electricity Board
- W3 - NTPC Korba, Vindhyachal, Sipat
- W4 - REL Dahanu & JPL Raigarh

**C - Power Sector Eastern Region**

- E1 - Ib valley, Tata
- E2 - Bihar & Jharkhand
- E3 - Durgapur, Bakreshwar, Mejia, Santaldih, C.E.S.C Kolkata
- E4 - Kolaghat, Farakka, Bandel

**D - Power Sector Southern Region**

- S1 – Andhra Pradesh & Karnataka
- S2 – Tamil Nadu & Kerala
- S3 - Orissa
- S4 – NTPC

Hence all the bidders will quote rates for each sub-regions as above.

**05 - A. Performance Bank Guarantee**

Once the vendor has entered into a Rate Contract for any module in any region, the vendor has to submit a Performance Bank Guarantee for Rs. 5,00,000/- ( Rs. Five Lakhs only) common for all region for the entire tenure of the rate contract i.e. 2 years. If the rate contract is extended, the vendor shall extend the Bank Guarantee. The Bank Guarantee shall be released after the completion of tenure of the Rate Contract.

**05 - B. EMD**

The bidders who are submitting their Price Bids shall be required to submit a EMD of Rs. 1,00,000/- (Rupees One Lakh only) with the Price Bids. However, vendors who are having One-Time EMD of Rs. 1,00,000/- with any Power Sector Region for Services jobs or One-Time EMD of Rs. 2,00,000/- with any Power Sector Region for Project jobs shall not be required to submit the EMD. The proof of such deposit to be produced alongwith the price bid. EMD amount shall be released after the successful bidder gives their acceptance for the Rate Contract. However, One-Time EMD amounts shall remain with BHEL.

## **05 - C. Finalization of Rate Contract and Allocation of Job:**

- a) Once the Price Bids are submitted and evaluated by BHEL, the L1 prices for all modules for all sub-regions shall be decided. These L1 prices shall be counter-offered to other bidders for their acceptance. The panel for any particular module for any particular sub-region shall comprise of all the Bidders, who have accepted the L1 price (except the bidder, who had given the highest bid earlier). Once empanelled, all the empanelled bidders shall submit Performance Bank Guarantee within a period of one month after intimation by BHEL.
- b) The distribution of jobs in any particular module in any particular sub-region shall be as given below:-
  - 1) The original L1 bidder shall be awarded the first two jobs in each cycle.
  - 2) The other bidders shall be awarded one job each in the order of their rating (L2, L3, L4, etc.) as per the original price bids. The date of customer order on BHEL will be the criteria for deciding the chronology of the order to be placed on successful bidders.
  - 3) If a vendor skips one job which comes to them in rotation, they will lose one job in the next rotation. If the vendor skips two jobs, they will not be considered for that category of jobs in that region for that year. If the vendor skips three jobs, they will be eliminated from the panel for rate contract for that region.

## **05 - D.**

The allocation and award of job shall be subject to approval of the customer on every occasion. The vendor, who has lost a job due to such rejection by customer, shall be awarded the next job in that rotation.

## **05 - E.**

Mobilization time shall be 3 days for all modules from the date of intimation by BHEL.

## **05 - F. Termination of Rate Contract:**

BHEL reserves the right to suspend/terminate the Rate Contract at any time during the tenure of the Rate Contract without assigning any reasons, whatsoever. No compensation shall be payable to the empanelled vendors in this regard.

## **05- G. Facility to be provided by the successful bidders during execution of the job-**

All T&P required / recommended for the work against this tender shall have to be mobilized by the contractor fully at their expense within the quoted price.

Any special T&P i.e. T&P made available by the manufacture of the equipment to the customer can be made available to the contractor free of charges by BHEL subject to availability at site.

Any consumables required / recommended for the work against this tender shall have to be mobilized by the contractor fully at their expenses within the quoted price.

Regarding other facilities for the contractors the following table clarifies adequately. Vendor are expected to quote considering these without any deviations from the provisions of "Notice Inviting Tender".

01	Water	√Free of Charges	On Chargeable basis	Cannot be provided
02	Power	√Free of Charges	On Chargeable basis	Cannot be provided
03	Storage Space	√Free of Charges	On Chargeable basis	Cannot be provided
04	Covered Space	√Free of Charges	On Chargeable basis	Cannot be provided
05	Uncovered Space	√Free of Charges	On Chargeable basis	Cannot be provided
06	E.O.T. Crane	√Free of Charges	On Chargeable basis	Cannot be provided
07	Residential accommodation for sub-contractors' personnel. ( if available from the customer)	Free of Charges	√On Chargeable basis ** see note	√Cannot be provided
08	Compressed air	√Free of Charges	On Chargeable basis	√Cannot be provided
09	Work shop facilities (As available with Customer)	√Free of Charges	On Chargeable basis	√Cannot be provided
10	Other material handling equipment	√Free of Charges	On Chargeable basis	√Cannot be provided
11	Trailor	√Free of Charges	On Chargeable basis	√Cannot be provided
12	Wooden Sleepers	Free of Charges	On Chargeable basis	√Cannot be provided
13	Tarpaulins	Free of Charges	On Chargeable basis	√Cannot be provided
14	Scaffolding materials	Free of Charges	On Chargeable basis	√Cannot be provided

- 15 No advance is payable to the contractors for mobilizing the site. Any payment can be made only against running bills as per payment terms.

## 05 –H DECLARATION OF THE BIDDERS

### ( TO BE SUBMITTED BY BIDDERS ALONGWITH EXPRESSION OF INTEREST)

01. I, .....hereby certify that all the information and date furnished by me with regard to this Tender No. .... are true and complete to the best of my knowledge.
02. I have gone through the tender specifications, scope of work, terms and conditions mentioned in Annexure as well as General and Special conditions of contract and various stipulations in detail and agree to abide by them and comply with the requirements and intent of specifications.



03. I also certify that there have been no deviations from the tender requirements in the bid submitted against this tender.
04. I further certify that I am duly authorized representative of the under mentioned bidder and hold a valid power of attorney to this effect, a copy of which is enclosed.

Signature :

Name :

Date :

Designation :

Seal :

Bidder's Name and address

### **05 – I Essential condition to be fulfilled by successful bidder during execution**

01. Successful bidder has to arrange 6 copies of overhauling reports which will include various protocols with necessary data / MOMs / important correspondences / log sheets etc. and the books shall be spiral bound with thick acetate papers in front and back along with BHEL logo printed suitably on thick art paper at the front.
02. Bidder has to arrange to provide PC with internet connection through mobile, with colour printer and Xerox paper as required for taking print out compatible with WINDOWS XP, VISTA or, WINDOWS -7 or, latest version prevailing at the time of execution loaded with necessary softwares, up-to-date anti-virus during entire period of execution of job at site, for preparing /maintaining / up keeping of various correspondences/ protocols/log sheets etc. . PC shall be operated by PC operator conversant with AUTOCAD and other softwares to be arranged by the successful bidder within the scope . All data thus stored during the execution of job shall be transferred to detachable Pen drive , ( 4Gb capacity) and handed over to Resident Manager at site after the Overhauling for submission to Customer.
03. Successful bidder is to render services for proper up-keepment of BHEL site office as required.  
Full time office boy is required to be provided by the successful bidder at site for up keepment of site office.
04. After dismantling and during execution of the job, successful bidder has to suitably tag the components and sub-assemblies for trace ability and store properly before final assembly.
05. Process control of Special Processes like Welding and Heat Treatment shall be carried by successful bidder..
06. Proper segregation, identification, tagging and up-keep of all dismantled items at work site during job execution have to be done by successful bidder.
07. Successful bidder is to obtain necessary "No Dues" certificates from BHEL'customer/ before de-mobilisation from site.

08. Successful bidder is to comply with all the statutory and regulatory norms, rules and practices as applicable for the job/site.
09. Successful bidder shall provide valid calibration certificates for IMTEs, fitness certificates for T & Ps and Construction Equipment ( e.g. wire ropes, hand operated chain pulley blocks, pulling and lifting machines, electric welding generators, arc welding transformers etc.). Calibration of IMTEs is to be arranged from the accredited agencies. Calibration certificates should have the traceability as per national/ international standards. At work site the IMTEs, T&Ps and Construction Equipment shall be checked/tested/inspected by BHEL engineers.
10. Successful bidder should follow all safety norms at work site.
11. Any NDT within the scope shall be completed without any extra cost .
12. The successful bidder has to arrange a full set of First Aid kit for attending to manpower deployed by him at site as per requirement.
13. The successful bidder is to arrange extra illumination at work site to augment the existing site illumination if required to enable round-the-clock safe working.
14. Successful bidder has to submit the following documents on and during execution of the job:
  - a) Labour license for the subject work.
  - b) Insurance coverage of the total workers engaged for the job.
  - c) Monthly wage certificate of the total work force.
  - d) EPF for the workers engaged.
  - e) Submit safety plan.
  - f) Submit bar chart / job completion schedule .
15. Successful bidder has to obtain “No Objection Certificates” from concerned departments and P&A department of customer.
16. In case any part of the job is not required to be carried out, a deduction will be effected as per percentage shown against those items.
17. Any related work not detailed under the above schedule of work but found essential for completion of the job has to be executed by vendor free of cost.
18. Assistance to be provided including supply of consumables etc. during carrying out of electrical testings viz. ELCID test / TAN DELTA test / RSO test of generator rotor etc.
19. Disposal of scrap/ waste/ insulation generated while overhauling / repair work to be disposed off at predetermined place as indicated by customer, by the bidder including transportation of the waste.
20. Defect liability period against bad workmanship shall be 6 (six) months from the date of synchronization/achieving full load of the machine. During this period if any re work are required to be carried out, then the same are to be done by the successful bidder. The successful bidder shall be responsible for timely execution and quality of overhauling /servicing/ repair job and shall stand guarantee against any defect due to bad workmanship. Once defect is registered within defect liability period, the successful bidder has to rectify the same free of cost during next available opportunity without any time limitation.

## **06 – LIST OF CONSUMABLES, T&P (To be provided by subcontractor)**

### **06-A1 - LIST OF CONSUMABLES TO BE ARRANGED BY CONTRACTOR FOR OVERHAULING OF TURBINE / GENERATOR**

(The list is indicative only and not exhaustive)

01. Kerosene oil.
02. Rustolene.
03. Petrol / white Petrol / Benzylne / CRC.
04. Grease / Graphite Grease.
05. Hacksaw Blades.
06. Waste cloth / Cotton.
07. Marking / lint free cloth / Muslin.
08. Asbestos cloth / Asbestos cord.
09. Prussian blue.
10. Graphite (flaked) powder / Molybdate / Mosil.
11. Cardium compound.
12. Holdtite / shellac / Gasket sealing compound.
13. Lead wire 1.0 m / 1.5 mm / 0.5 mm.
14. Liquid soap.
15. Carborandum grinding paste coarse /fine / Diamond lapping paste.
16. Emery papers / Rolls.
17. Cut off wheels.
18. Grinding wheels.
19. Oil stones, Mounted wheels, rotary cutters.
20. D.P. test chemicals.
21. Gas Cylinders for cutting / welding.
22. Chalk pieces, marking pens, thermo chalks upto 400c.
23. Insulation tape, Johnson Tapes.
24. Sander discs and wheels.
25. Polythene sheets. Tarpaulin
26. Araldite, M. Seal, Instabond, Dendrite & Ana bond 666
27. CRC 2-26, white spirit. CRC-Lectra clean
28. Electric fuse wire, cables for the connections.
29. Material for Blast cleaning purposes (A1203, alumina, Sand or Ash etc).
30. Orthophosphoric Acid for stator core clean & Felt.
31. Enerpack make Hydraulic jack of 50 / 100 T, 4 Nos. each.
32. Spray Gun for varnishing
33. Steel grip tap
34. Becktol varnish of Dr Beck for Stator/Rotor/Exciter
35. Material required for Welding ie. Welding rods etc

#### **NOTE**

The above list is only indicative & not exhaustive. Arrangement for any other consumables required for completion of the job shall be the responsibility of the contractor & shall be arranged by him.

### **06-A2 - LIST OF TOOLS AND PLANTS TO BE ARRANGED BY CONTRACTOR FOR OVERHAULING OF TG SET**

01. Taper gauge, slip gauge set, depth gauge and depth micrometer.
02. Feeler gauge sets, feeler strips of 0.03 to 0.10 mm size.
03. One set of 2 meter long feeler gauge strips (0.05 to 1.0 mm).

04. Dial indicators with magnetic bases (at least 2 dials of diameter 40 mm travels-5 mm).
05. Micrometers (inside and outside up to 300 mm, 450 mm, 600 mm, 1000 mm).
06. Telescopic gauge (2 sets). Bevel protractor and combination sets.
07. Try square.
08. Set of parallel blocks / V blocks.
09. Vernier calipers, (150 and 300 mm), measuring steel tapes and 5 meters steel rulers.
10. Precision spirit level (with micro head).
11. 2 sets of D.E. and Ring spanners (6-36mm).
12. 2 sets of ox spanners (6 to 20 mm and 22-50 mm).
13. Allen keys of various sizes (from 2mm. onwards).
14. D.P. Test Kit (with consumables).
15. Crowbars tin cutters, pliers (cutting plier, nose plier, grip plier circlip- outside and inside).
16. Screw drivers and sledge hammers -10 lbs –1 lbs.
17. Adjustable wrenches, pipe wrenches and heck saws.
18. Single ended spanners (36 mm and above).
19. Flat, half round, triangular bearing scrappers-8", to 12".
20. Files flat round, half round and square, rough and smooth (sizes 6", 9" and 12").
21. Bench Grinders, straight grinders GQ4 and GQ6, Angle grinders.
22. Reamers up to 30 mm. Taper reamers.
23. Drilling machine with magnetic stand upto-30 mm with drill bits.
24. Flexible grinders with grinding stones and cutters of different Shapes and sizes, Angles Grinders and Sander machine.
25. Number punch, letter punch, centre punch and hole punches etc.
26. Steel wire brushes, wire brush wheels, nylon wire brushes and painting brushes.
27. Reamers and honing tools with proper jigs and fixtures for carrying out coupling hole reaming / honing as required.
28. Lifting devices eye bolts, D-shackles, slings of various sizes Guide rods etc.
29. Chain pulley blocks upto 5 tons pull / lift.
30. Copper / Brass rods dia ½" to 1 ½"X450 mm.
31. Tap and die sets 6 to 36 mm.
32. Surface plate 450 X 450 mm.
33. Torch light / hand lamps with cables, 230/ 24 V transformer.
34. Torque wrench and torque multiplier.
35. Wooden mallet, Nylon Mallet.
36. Hand glover- asbestos, Manila rope, asbestos cloth leather and Rubber gloves.
37. Set of needle files.
38. Air blower – electric.
39. Electric drills - ¼", ½", and 5/8".
40. Ball pen hammer of various sizes.
41. Gas cutting and heating set with torches regulators, hoses and cylinder minimum two sets).
42. Hydraulic Jacks of 50T, 100T etc as required.
43. Arc welding generator / rectiformers with regulator, cables, Electrode holders and shields, TIG welding holders.
44. Pneumatic – grinders.
45. Hose pipes for compressed air.
46. Bench vices.
47. Hydraulic jacks 5, 10, 25 and 50 tons capacity, screw jack 5 to 10 tons.
48. Ash blasting of diaphragm liners etc.
49. Ash blasting nozzles with hose pipes and tarpaulin for covering and covering arrangement while carrying out blasting so that dust dose not flies off.
50. Hydraulic pump for testing coolers and 500 V megger.
51. Electric Switchboards and flood light arrangement with fuse boxes and isolating switches, plugs and sockets.

52. In addition to above T & P contractor will be required to fabricate fixtures such as pullers etc. for removal of any other equipment related to the scope of work.
53. Ash / sand blasting equipment.
54. Pedestal fans / air coolers.
55. Wooden sleepers.
56. Magnifying glass.
57. Plastic helmets, Fibre helmet.
58. Gas cutting / welding goggles, grinding goggles.
59. Bearing pullers.
60. Tarpaulin.
61. Welding Transformers /Generator /welding tools.
62. Any other T & P as per requirement and as per our General and special condition of contracts.

**NOTE**

The above list is only indicative & not exhaustive. Arrangement for any other T & P required for completion of the job shall be the responsibility of the contractor & shall be arranged by him.

**06 A3 - POST OPERATIONAL CHEMICAL CLEANING OF BOILER**

**A3-1 - REQUIREMENT OF CHEMICALS FOR ACID CLEANING FOR 500 MW**

Sl.No.	Chemical
1	Tri sodium phosphate ( $\text{Na}_3\text{PO}_4 \cdot 12\text{H}_2\text{O}$ ) BIS 573-1992
2	Di Sodium Phosphate ( $\text{Na}_2\text{HPO}_4 \cdot 7 \text{H}_2\text{O}$ ) BIS 566 - 1997
3	Hydrochloric acid, commercial grade, 31% minimum, BIS : 265 : 1993
4	Inhibitor
5	Ammonium bifluoride, 97 % minimum, BIS:13119:1991
6	Thiourea, 97% minimum
7	Citric acid, 95% minimum, BIS: 5464:1995
8	Liquor ammonia, Sp.Gr. 0.91, 25% by wt., BIS: 799:1985
9	Hydrazine hydrate, 80% minimum, BIS: 12086:1987
10	Nitrogen gas cylinders, .3 m <sup>3</sup> capacity, BIS:1747:1972
11	Bleaching powder, BIS:1065:1989
12	Sodium hydroxide flakes, 98% minimum, BIS :252:1991
13	Lime, 80% minimum, BIS: 1540, Part II, 1990
14	Potassium Bromate, 97% minimum
15	Ammonium carbonate, BIS:5316:1998

**Quantities to be arrived after deposit analysis of Tube Samples**

**A3-2- REQUIREMENT OF CHEMICALS FOR ACID CLEANING FOR 200/210/250 MW**

Sl. No.	Description of Chemicals
1	Tri sodium phosphate ( $\text{Na}_3\text{PO}_4 \cdot 12\text{H}_2\text{O}$ ) BIS 573-1992
2	Di Sodium Phosphate ( $\text{Na}_2\text{HPO}_4 \cdot 12 \text{H}_2\text{O}$ )BIS 566 -1997
3	Potassium Bromate, 97% minimum
4	Ammonium Carbonate, BIS:5316:1998

5	Hydrochloric acid, commercial grade, 31% minimum, BIS : 265 : 1993
6	Inhibitor
7	Ammonium bifluoride, 97 % minimum, BIS: 13119:1991
8	Thiourea, 97% minimum
9	Citric acid, 95% minimum, BIS: 5464:1970
10	Liquor ammonia, Sp.Gr. 0.91, 25% by wt., BIS: 799:1972
11	Hydrazine hydrate, 80% minimum, BIS: 12086:1987
12	Sodium carbonate, 90%,minimum,BIS:151:1972
13	Nitrogen gas cylinders,6.3 m <sup>3</sup> capacity, BIS:1747:1972
14	Bleaching powder, BIS:1065:1971
15	Sodium hydroxide flakes, 98% minimum, BIS :252:1991
16	Lime, 80% minimum, BIS: 1540, Part II, 1990

**Quantities to be arrived after deposit analysis of Tube Samples**

**06-A4 – 1 LIST OF T & P REQUIRED FOR AIR PREHEATER OVERHAULING JOBS**

Sl. No.	Description	Quantity
01.	Welding Generator / Rectifier	5 Nos.
02.	Portable Grinding Machines of assorted sizes / types	5 Nos.
03.	Welding cable	As required
04.	Gas cutting set	5 sets
05.	Chain pulley blocks 3MT/5MT/10MT cap.	20 Nos./10 Nos./ 05 Nos.
06.	Lifting tackles including slings of assorted sizes	As per requirement
07.	Pulling Machines / Hook chooks	06 Nos.
08.	24V lamps with cable and plug tops	10 Nos.
09.	Hydra Crane 8 MT/15 MT cap.	01 No. each
10.	Tractor / Trailer 10 MT cap.	01 No.
11.	Electric Winch 5T/10T cap.	04 Nos./2 Nos.
12.	Torque Wrench with Torque Multiplier	01 no. each (35 kg.M/65 kg.M)
13.	Slogging spanners 52 mm & 54 mm	4 Nos. each.
14.	Master Level of 0.02 mm LC	02 Nos.
15.	Vernier calipers 0-150 m 0-300 M 0-600 M	02 Nos. 02 Nos. 01 No.
16.	Inside Micrometer up to 600 mm	01 No.
17.	Outside Micrometer up to 600 mm range	01 No.
18.	Measuring Tape up to 15 M length	04 Nos.
19.	Dial Gauges	03 Nos.
20.	Grinding Machine AG-7 & GQ 4	8 Nos. / 4 Nos.
21.	Diesel / Pneumatic grinders	2 Nos.
22.	Tap set M 39 x 3	1 Set.
23.	Filler gauge (loose) 200 mm long	4 Nos.
24.	Main Circuit Breaker	1 No.
25.	Hammers of different wts.	05 Nos
26.	D-shackles & Slings of different sizes	As required
27.	Hydraulic Jacks – 50 T	05 Nos

**NOTE**

The above list is only indicative & not exhaustive. Arrangement for any other T&P required for completion of the job shall be the responsibility of the contractor & shall be arranged by him.

**A4-2 –LIST OF CONSUMABLES FOR AIR PREHEATER OVERHAULING**

Kerosene/Diesel.

Rustolene.

CTC.

Waste cloth/Cotton.

Marking cloth.

Cutoff wheels / Grinding wheels.

Mounted wheels/ rotary cutters.

Insulation tape / Johnson tape.

Sander discs and wheels.

Polyethylene sheets.

Electric fuse wire and cables.

Cutting Electrodes.

Welding Electrodes (E7018).

DA and Oxygen gases.

Paints for painting.

**6A-5 T&P For Electrical / Diagnostic Test of Generator & MPI/NFT of Turbine****Blades**

All the equipments/ Instruments required for completion of the job shall be arranged by the bidders.

**6A-6 T&P For Vibration Analysis & Balancing of the Turbine / Generator**

All the equipments/ Instruments required for completion of the job shall be arranged by the bidders. ( balancing weight if required will be provided by BHEL/ Customer )

**6A-7 Consumables T&P, to be provided by the bidders for Insulation**

All the materials required for completion of the job along with & T& P/ equipments required for completion of the job shall be arranged by the bidders.

**NOTE**

The above list is only indicative & not exhaustive. Arrangement for any other consumables required for completion of the job shall be the responsibility of the contractor & shall be arranged by him.

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