



Bharat Heavy Electricals Limited

(High Pressure Boiler Plant)

Tiruchirappalli – 620014, TAMIL NADU, INDIA

RESEARCH & DEVELOPMENT

An ISO 9001
Company

MODIFICATION & ERECTION WORKS AT SUPER CRITICAL FACILITY	Phone: +91 431 257 8608 Fax : +91 431 252 0696 Email : saru@bheltry.co.in Web : www.bhel.com
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Reference Number: BHEL/R&D/MM/2811000003	Date: 10/03/2010	Due date for submission of quotation : 08/04/2010 by 14.00 Hours
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You are requested to quote the Enquiry number date and due date in all your correspondences. *This is only a request for quotation and not an order.*

BHEL/Trichy is looking for vendors for MODIFICATION & ERECTION WORKS AT SUPER CRITICAL FACILITY as per the technical specification and commercial terms & conditions attached.

Interested Fabricators / Manufacturers / Authorised dealers may send the offer on or before 08/04/2010, 14.00 Hours in two parts as requested in the specification.

Note: The offer should reach this office on or before the due date & we are not responsible for any postal delay. Late tender will not be considered.

S ARUMUGAM
SDGM/ R&D

Specification for Erection/Modification Works in Supercritical Test Facility

**BHARAT HEAVY ELECTRICALS LIMITED
MHD CAMPUS TIRUCHIRAPPALLI 620 014.
RESEARCH AND DEVELOPMENT**

Specification for Erection/Modification Works in Supercritical Test Facility (Also hosted in www.bhel.com)

The supercritical test facility was established in BHEL Trichy in Dec. 2008 in MHD campus. BHEL intend to make certain modifications in the supercritical test facility. The extent of pressure parts / non pressure parts modifications is detailed out the subsequent pages.

1.0 Scope of Work

The work content is as per Annexure A (3 pages) for IBR jobs and Annexure B (2 pages) for non-IBR jobs involving the following activities

- Handling of Erection materials and equipment from the storage yard (within 500 meters) to erection site
- Lifting, positioning, aligning, fixing /erecting the materials /equipment by fastening or welding as per the drawing / instruction form BHEL.
- Cutting / modification of raw materials / existing equipment / structure to suit new equipment.
- Fabrication of minor pipe line bends and supports
- Painting of steel surfaces including marking flow directions and writing of pipeline name with colours as specified by BHEL.
- Erection of Stainless Steel and alloy steel piping works involving IBR quality weld joints
- Dismantling and re-fixing of thermal insulation

2.0 Type of materials to be handled

Structural, Stainless Steel / Alloy steel pipe lines, tanks and components, including valves etc.

3.0 Responsibility of Contractor

3.1 Contractor has to bring sufficient quality and quantity of the following

- a. Material handling and lifting devices.
- b. Welding generators and consumables (BHEL can issue electrodes if available and deduct from the bill payable).
- c. Gas cutting set and consumables.
- d. Portable grinding equipment
- e. Paint.
- f. All required tools and tackles.
- g. All safety equipment for the personnel employed namely safety shoes, belt, helmet, goggles, gloves, first aid medicines etc.
- h. Electrical utilities required for the work.

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- i. Tools and plant
- 3.2 Radiography & heat treatment as per IBR also included in contractor's scope.
- 3.3 It is the responsibility of the contractor to arrange for required scaffolding
- 3.4 Any modification in structure / platform for removing and installing new equipments shall be in the scope of the contractor
- 3.5 It is the responsibility of the contractor to take care of the compensations for the injury or loss of life of personnel employed by him for the work. Insurance shall be in the scope of contractor.
- 3.6 All the men & equipment required for erection shall be in our general instruction of tender like ESI, PF etc. to their permanent employees in their contract shall be in contractor's scope.
- 3.7 Transportation should be arranged by the contractor for transportation of erection materials from Stores/ Storage yard to Erection site.
- 3.8 Accommodation, transport & canteen facilities for all the personnel are to be arranged by the contractor at his cost.
- 3.9 For storing contractor's materials as well as the materials drawn by him from our stores, the contractor should make suitable arrangements at their own risk.

4.0 Scope of BHEL

BHEL will provide all guidance and clarifications for erection; supply all materials and equipment, electrodes (if available), power, water and compressed air supply.

5.0 Billing

Bills can be submitted in parts for the 90% of the portion of work completed by the contractor with due certification of BHEL Engineer. However, the maximum number of bills for the entire contract shall be limited to three.

The billing will be only once for each category which may include all sorts of works like handling, lifting, aligning, cutting, welding, modifications, painting, etc.

6.0 Duration

The entire work is to be commenced within a week's time from the date of issue of order and completed within 2 months from the date of award of contract.

7.0 Work Location and content

Location: STF building in MHD Complex of BHEL, Tiruchirappalli.

Maximum work elevation: + 15 m from ground level.

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Maximum weight of a single component: 4 tons

Maximum size of a single component: 2.2M dia and 6.6M long

8.0 Inspection

Inspection of the erection, modification work will be carried out by BHEL site In-charge (or) his authorized persons at site.

9.0 Terms Of Payment

90% payment will be made only after completion of all categories of work in all aspects duly certified by the site In-charge.

Balance 10% payment will be made after commissioning of the system.

10.0 Submission of Bids

The bids shall be submitted on or before 08.04.10, 14:00 hrs as follows

1. Part I technical and unpriced commercial bid.
2. Part II price bid (unit rate as well as total rate should be filled in the BOM / price schedule).

Bid shall be submitted to:

**SDGM, MM/R&D,
MHD Complex,
BHART HEAVY ELECTRICALS LIMITED
TIRUCHY-620 014.**

11.0 Tender Opening

Offers shall be in two parts viz. (1) Technical Offer and (2) Financial Offer

Technical bid opening Date: 08.04.10 time: 14.30 HOURS at the office of SDGM, MM/R&D, MHD Complex, BHEL, Trichy-14

Financial bid opening date will be intimated to the technically qualified vendor after evaluation of Technical bids.

Bidders are advised to visit the erection site (STF Building) at MHD complex, Tiruchy-14, in order to understand the work content, assess the tools and plant requirement and to see the actual site conditions before submitting offer. For any clarifications and scope of work bidders may contact Shri S.Arumugam, SDGM/R&D (0431 – 2578608, 9442649123) or Shri R.Dhanuskodi. Manager/ R&D/ MHD Complex (0431 – 2578618, 9442502593).

Bidders may forward their sealed competitive offer reply along with EMD amount of Rs. 10,000/- pledged to BHEL, Tiruchy in Demand Draft or BHEL Cash Receipt and addressed to:

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**SDGM, MM/R&D,
MHD Complex,
BHART HEAVY ELECTRICALS LIMITED
TIRUCHY-620 014.**

The duly filled offer mentioning tender reference and date of opening on the envelope along with a list of recent works carried out in BHEL detailing the work, value, start and completion dates against schedule and the name of the BHEL engineer responsible for the work shall reach us in time. Quotation received after the stipulated time will not be considered. The offer shall be kept valid for a period of 3 months from the date of Tender Opening.

12.0 QUALITY CONTROL PROCEDURE FOR ERECTION

General standard adopted by BHEL or Quality checks shall be guidelines for erection. However, in some cases, the site Engineer shall decide the tolerance for checks and the same will be informed to the contractor in advance.

13.0 SPECIAL CONDITIONS OF CONTRACT

- 13.1 The intent of specification to provide erection services according to modern technique and codes. The mission of specific reference to any method equipment or material necessary for the proper and efficient erection of the plant shall not relieve the contractor of the responsibility of providing such facilities to complete the erection.
- 13.2 Should any error or ambiguity be discovered in the specification or information, the contractor shall clarify the same with the ScTF site in-charge of Bharat Heavy Electricals Ltd, Trichy before commencement of work. The BHEL Engineer's interpretation in such cases shall be final and binding on the contractor.
- 13.3 In case of any part work for which there is no specification as laid down in the contract, such work shall be carried out as per the instructions and requirement of the BHEL site Engineer.
- 13.4 The entire works or part of works shall not be off loaded or subcontracted except radiography and heat treatment.

14.0 Idle labour Charge And Period Of Completion

- 14.1 BHEL will have no liability to any stoppage caused in the work resulting in the labour of the contractor being idle either due to the above, maintenance work or breakdown of the erection equipment, tools and tackles to be supplied by Bharat Heavy Electricals Ltd if any, or due to other causes arising from the manner of execution of the work.
- 14.2 The erection will be deemed to be completed in all respect only when trial runs and acceptance of the equipment are over. The decision of the Bharat Heavy Electricals Ltd Engineer in this respect shall be final and binding on the contractor.

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15.0 Charges For Modification And Rectification

- 15.1 If any modification or rectification in the erection work is needed due to any change in or deviation from the design of the equipment, extra charge at agreed rates shall be paid, provided the same has not arisen directly or indirectly on account of the contractor's fault.
- 15.2 For the purpose of the extra payment for which the contractor is eligible, the tenderer shall indicate in his tender the single man-hour rate applicable to all categories of his workmen. The consumables used if any for the modification and rectification as approved by the Engineer-in-charge shall be in contractor's scope.
- 15.3 All other modification and rectification shall be carried out by the contractor at his own cost. The decision of the engineer whether the modification or rectification is of major in nature or not shall be final and binding on the contractor.
- 15.4 All works such as cleaning, leveling, aligning, assembly, temporary erection for checking, dismantling surface preparation, edge preparation of pipes and plates for welding, fitting, welding, cutting, grouting straightening at which in the Engineers opinion are incidental to the final satisfactory erection shall be carried out by the contractor for which no extra claim shall be allowed.

16.0 Contractor's Personnel

- 16.1 The contractor shall employ especially skilled labour in addition to semi skilled and unskilled labour required for erection work. In case, the labour strength has to be increased to complete the erection work within the stipulated period, no extra claim for payment under any circumstances will be entertained. The contractor shall employ only fully trained men with previous experience on similar jobs. Bharat Heavy Electricals Ltd reserves the right to decide the suitability of workers and other personnel who may be employed by the contractor.
- 16.2 It is the responsibility of the contractor to have the required number of qualified supervisory Engineering staff who can read drawings and execute the works as per the drawing and control contractor's labour force.
- 16.3 The supervisory staff employed by the contractor shall also ensure proper out turn of work and discipline by the labour to be put on the job by the contractor and in general see in coordination with the staff of BHEL.
- 16.4 The contractor shall be responsible for the better House keeping of his stores, work spot etc and he shall instruct his staff accordingly.
- 16.5 The contractor shall ensure that his workers and staff engaged on the erection work will work and behave in general conformity with the prevailing codes of discipline prescribed by the contractor for its own work and staff. The contractor shall retain the right to order for removing from its property any person not complying with safe legal and reasonable rules of behavior and operation of vehicles and equipment.
- 16.6 The contractor shall arrange for PF and ESI for his employees. All documents pertaining to the welfare of the employees shall be submitted to BHEL's welfare/other concerned

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department for scrutinizing & clearing before the start of the contract work. The contractor shall also arrange necessary insurance coverage for tools, tackles and other instruments and equipment required for erection. The contractor shall not claim for any damages for the above from BHEL.

17.0 Detailed Scope Of The Work And Responsibility Of The Contractor

- 17.1 The specification covers transportation of materials and equipment from the storage yard of site as well as from sub stores to the erection site and complete handling at erection site for erection.
- 17.2 The contractor has to make his own arrangements for all the tools and tackles, lifting devices, and transporting equipment required.
- 17.3 The contractor shall clearly register at the gate with security for the materials, tools, plant, tackles and lifting devices. No items will be permitted to take out of BHEL after completing works and without proper entry in the gate. The contractor shall furnish the copy of list of inward items to BHEL.
- 17.4 The entire surplus unused materials supplied (by Bharat Heavy Electricals Ltd) if any, shall be returned to BHEL in the condition in which they were received. The contractor shall, during the progress of work provide, erect and maintain necessary stores, office and temporary workshops required for the proper and efficient execution of the work at his own cost. The planning and layout of temporary building shall have the approval of BHEL Engineer.

18.0 Civil Work

Machine foundation and other necessary civil works will be provided by BHEL. However all minor adjustments of foundation levels, dressing and chipping of foundation surface etc as may be required for the erection of equipment will have to be carried out by the contractor at his own cost.

19.0 Erection

- 19.1 The scope of erection includes the transporting the material from the storage yard, alignment, welding, leveling, adjusting etc till the equipments are finally tested and approved for acceptance and are taken over by BHEL for putting into operation. The contractor shall provide himself all consumables in sufficient quantities like electrodes, oxygen and acetylene gas, kerosene, grease, sleepers, scaffolding materials, etc, required for the erection work. The materials supplied and used shall be the best quality and has the approval of BHEL.
- 19.2 Erection by contractor includes the following items of work among the other things.
 - a) Taking a proper inventory of all the equipment, machinery and other materials collected and stored at the work site for erection.

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- b) Checking up the equipment, machinery and other materials to ensure that they conform to the specifications laid down in the contract and drawings & also to make sure that they are in proper condition to be taken up for erection.
 - c) Arranging for the overhaul of any defective or unsuitable items of equipment, machinery of material.
 - d) Arranging for the procurement and ensure availability at site at the time of erection work all consumable construction materials for erection work as may be needed to execute the handling and erection work.
 - e) Engaging and allotting adequate number of engineers, erectors and workmen of all the required categories (supervisory, skilled, semiskilled, unskilled labour) for carrying out different items at different stages of the erection work. The contractor shall nominate one engineer/officer as representative of the contractor who will be posted to site when the contractor shall contact for any matter. Any notice to him shall deem to be the notice to contractor.
 - f) Checking up each individual item of the equipment as also each individual lines to ensure that the erection of these items have been properly carried out in conformity with the erection drawing and instruction as given by the contractor.
- 19.3 After all the installation and assembly work is completed, the entire plant assembly including the pipe lines shall be checked for leak test, to ensure that individual items of equipment including pipe lines have been properly installed. The pipe lines shall be checked up by tests to make sure that all the fittings, etc have been properly fitted up and that there are no leakages or wrong connection of interconnecting pipes etc. The testing shall be in accordance with Indian standards or accepted international standard. In the absence of either, the work shall conform to the best prevalent practice. Pre heating, post heating and radiography requirements for all IBR quality weld joints must be carried out as per the quality control procedures. The welders engaged for such works should have valid IBR certification.
- 19.4 It is only after the entire plant assembly has been thoroughly checked up on the lines indicated above and found satisfactory that the erection work shall be deemed to be completed and the equipment considered ready for commissioning. The authorized representatives of the contractor shall issue a certificate regarding the completion of the erection work to the effect that the whole plant has been tested properly.
- 19.5 The contractor will get allotted a suitable open space within a reasonable distance from the actual site of work for the storage of the equipment, materials required for the erection work of the plant. BHEL accepts no responsibility for the loss or damage to the contractor's materials arising from any reason. The responsibility of safeguarding against any such possible losses or damages rests with the contractor.
- 19.6 The contractor shall comply with provisions of the payment of wages act 1936, minimum wages act 1948, Employers liability Act 1938, workmen's compensation Act 1923, Industrial disputes act 1947, maternity benefit act 1961, and mines act 1970, or any modifications there-of or any other law relating thereto and rules made there under from time to time.

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- 19.7 BHEL does not accept any liability for any payment, towards the non payment wages & other payments in full / part to their workmen and staff. The contractor shall agree to indemnify and save BHEL from any such claim made directly or indirectly at any point of time.
- 19.8 BHEL does not accept any liability for any payment towards the reimbursement of loss or damage to the contractor's materials, for payment of any compensation for injuries including the loss of life to their workmen & staff, resulting from causes of circumstances which are not of contractor's making at any time during the period of erection.
- 19.9 The contractor shall bear all loss, expense and damage in connection with and agrees to indemnify and save BHEL harmless of, from and against all claims, demands, losses, expenses and judgments made or recovered by reason of liability imposed by law upon the contractor for damages because of personal injury, including death at any time resulting there from, sustained by any employee of the contractor or its sub contractor(s) and whether or not arising out of or in consequence of the performance of this contract, whether such injuries are due or claimed to be due to any negligence of the contractor, the contractor or his employees, agents, subcontractors or any other person.
- 19.10 The contractor shall take all reasonable care to protect the work under erection till such time the erected equipment are taken over by Bharat Heavy Electricals Ltd. Caution notices shall be displayed by the contractor to give warning to the person working at site or access to any part which may deem to be unsafe or hazardous.
- 19.11 In case of damage or loss to any equipment of any property there of BHEL caused by the contractor 's men, while handling and erecting the same due to negligence and carelessness on the part of the contractor's men, the responsibility of loss together with overhead will be recovered from the contractor's bill. The decision of the BHEL regarding the cause as well as the extent of cost of damage is final and conclusive.
- 19.12 Until the plant and equipment are deemed to have been taken over, the contractor shall be liable and shall deem to have agreed to identify BHEL the section of negligence of the fault of the contractor or his personnel.
- 19.13 The contractor shall execute the work in a most substantial and good workmanship. The contractor shall be responsible to ensure that the workmanship conform to dimensions and tolerances given in the drawings. If any dimension of the work is found to be defective the contractor shall rectify the same at his own cost.
- 19.14 Progress Report: Contractor shall provide daily progress report as required by site in-charge indicating the major activities and the stages of completion.

20.0 Cleaning of Equipment

- 20.1 The contractor shall clean thoroughly the internal surface of all equipment, ducts and piping before erection by wire brush & air blowing as per the instructions of BHEL Engineer.

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- 20.2 The contractor shall provide all labour, materials and instruments required for the test inspection. Defects arising out of faulty workmanship or faulty materials supplied by the contractor shall be replaced free of cost by the contractor.
- 20.3 From the time the materials are handed over to the contractor up to the time of completing the erection work and acceptance by BHEL all materials are under the custody and responsibility of the contractor.

21.0 Drawing And Documents

- 21.1 Upon award of contract, drawings/sketches shall be issued to the contractor by BHEL. All the drawing notes, which will be available with the site engineer and shall form an integral part of the contract.
- 21.2 Any documents, drawings/sketches, supplied by BHEL to the contractor in pursuance of this contract shall remain the property of BHEL and any information derived shall be regarded as secret and confidential and shall not without consent in writing of BHEL, be published or disclosed either in full or part to any third party or made use of by the contractor, except for the purpose of implementation of this contract. On completion of the work, the documents drawings etc shall be returned to BHEL in good condition.

22.0 Facilities Provided By BHEL

Area in open ground will be provided for storage of materials and equipments. Water including drinking water required for the labour will be supplied free of cost.

Permission for erection of temporary work sheds etc, at site will have to be obtained from BHEL in writing in advance. Subject to availability, electrical energy required for the work may be provided by BHEL free of cost at any one point at the site as decided by the Engineer In-charge. BHEL does not accept any liability whatsoever for non-supply, delay in supply, that there is no wastage of electrical energy, otherwise supply is liable to be stopped at contractor's risk and cost.

23.0 Safety Measures

- 23.1 A list containing the names of person who are working, their age, designation, pay, nature of work, is to be furnished immediately on receipt of work order.
- 23.2 In all matters of dispute the decision of the General Manager, BHEL, Tiruchy-14 shall be final and binding on the tenderer / contractor.
- 23.3 Some changes are likely in the quantities furnished as well as in the layout, design and specifications of the work. The rates quoted shall be deemed to be inclusive of all such contingencies.
- 23.4 All materials if any brought by the contractor for incorporation in the work shall be got inspected and approved by the Engineer In-charge before they are incorporated in the work.

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- 23.5 Sr.DGM /R&D or his duly authorised representative including a third party inspection agency shall have at all reasonable times access to the contractor's premises or works and shall have the power at all reasonable times to inspect and test any portion of the work or examine the materials and workmanship during their manufacture, erection and testing. The contractor shall give due notice in writing to the inspecting Engineer of BHEL when the materials to be supplied and incorporated are ready for inspection and test. No materials shall be incorporated in the work until the inspection Engineer has certified in writing that such materials have been inspected and approved by him.
- 23.6 The contractor shall closely scrutinize all the drawings issued in connection with the work by this organization and bring to the notice of the Engineer In-charge, any discrepancies/ omissions in the drawings before undertaking the actual work pertaining thereto.
- 23.7 The contractor should submit in advance every fortnight a detailed program of work to be undertaken from time to time strictly in conformity with the time and progress chart covering the entire constructed work and reschedule wherever necessary during the progress of the work so as to achieve the targets set. Periodical progress reports, once in every fortnight, should also be furnished by the contractor regarding the collection of materials issued and to be issued form and other relevant information as asked for by the Engineer /In-charge and other BHEL officer /office In-charge of the work.

24.0 Time-Essence of contract

- 24.1 The time and date of completion of the work as stipulated in this contract shall be deemed to be the essence of the contract. The vendor shall so organize his resources and perform his work so as to complete the contract not later than the date specified.
- 24.2 The general instructions to tenderers shall be deemed to form an integral part of the contract for the work to be entered into.

25.0 Delayed Execution

If the work is not completed within the due date as specified in the enquiry, due to the delay caused by the contractor even after making available all required equipment and material, a penalty of 0.5% for every week (or) part thereof beyond the due date subject to a maximum of 5% of total value of the order shall be recovered from the contractor's bill.

Annexure - A

Supercritical Test Facility- IBR quality works to be completed during the erection of Silver coated test section

Sl. No	Work	Work Estimate				Unit	Unit rate (Rs)	Total (Rs)
		OD mm	Thickness mm	Number of joints	Weld material combination			
	IBR quality works							
1	Dismantling existing insulation, cutting P22 HP header pipes, welding SS drain plug assembly and refixing of insulation in ambient heat exchanger	88.9	21	2	SS 304 Vs P22	No. of joints		
2	Dismantling existing insulation, cutting T91 header pipes, welding SS drain plug assembly and refixing of insulation in regenerative heat exchanger	63.5	12	4	SS 304 Vs T91	No. of joints		
3	Fabrication and erection of silver coated test section including cutting, drilling and welding	14	2.9	4	SS 347H to SS347H	No. of joints		
3a	Pressure tappings	6.3	1	4	SS 347H to SS347H	No. of joints		
3b	Pressure tapping lines	14	2.9	5	SS 347H to SS347H	No. of joints		
3b	Pressure tapping lines	21.3	4.78	2	SS 347H to P22	No. of joints		
3c	1/2" C4500 Spl Stop valve	21.3	4.78	8	P22 and F22	No. of joints		
3b	Power clamp holder	51	12	1	SS 347H to SS347H	No. of joints		

3c	Flanges	51	12	4	SS 347H to SS347H	No. of joints		
4	Providing piping for steam blowing which includes cutting, drilling, bending and welding in existing pipe line	51	12	4	SS 347H to SS347H and F22	No. of joints		
4a	1.5" Equal tee	51	12	3	SS347H and F22	No. of joints		
4b	1.5" Class 3000 Stop Valves	51	12	6	SS347H and F22	No. of joints		
5	Piping from NRV before mixer 1 to outlet of pre-heater 2 which includes cutting, drilling in existing pipe, bending and welding	21.3	4.78	1	SS347H and P22	No. of joints		
		14	2.9	2	SS 347H to SS347H	No. of joints		
5a	Connector 21.3/14	21.3	4.78	1	SS 304 and P22	No. of joints		
5b	Connector 21.3/14	14	2.9	1	SS 304 and SS 347H	No. of joints		
5c	1/2"-Class 4500, Stop Valve	21.3	4.78	4	P22 and F22	No. of joints		
6	Interconnection between circulating pump suction and common drain pipes for system flushing	63.5	12	2	T91 and T91	No. of joints		
6a	2" Equal Tee	63.5	12	3	T91 and F22	No. of joints		
6a	2" Class 3000, stop valve	63.5	12	6	T91 and F22	No. of joints		
7	Laying of by-pass lines for accumulator and pressuriser drains in the pressure reducing orifice portion	21.3	4.78	4	P22 and P22	No. of joints		
7a	1/2" C3000, F22 Spl, Stop valve	21.3	4.78	8	P22 and F22	No. of joints		

9	Provision of vent line from Safety valve line to common drain	21.3	4.78	3	P22 and P22	No. of joints		
9a	SS piping	14	2.9	2	SS347H and SS347H	No. of joints		
9b	Connector 21.3/14	21.3	4.78	1	SS 304 and P22	No. of joints		
9c	Connector 21.3/14	14	2.9	1	SS 304 and SS 347H	No. of joints		
9d	1/2" C4500 Spl Stop valve	21.3	4.78	4	P22 and F22	No. of joints		
10	Welding of SS pins in test section for power measurement	6		6	SS 304 to SS 347H	No. of joints		
11	Shifting of Pressure transmitter from accumulator feeding line to piston pump outlet	21.3	4.78	4	P22 and P22	No of joints		
12	Installing Pressure reducing orifice in accumulator drain line	21.3	4.78	1	SS347H and P22	No of joints		
	Total			101				

Note: Required raw materials, equipment, power and water would be provided by BHEL. The scope of work for the contractor involves material handling, pipe bending, cutting, edge preparation, positioning, aligning, heat treatment, welding, radiography and insulation. Necessary qualified working personnel, required tools, consumables and handling devices are under the scope of the contractor. Necessary pre heating, post heating and radiography requirements as per BHEL QCP and IBR requirements are to be met for all weld joints mentioned above in Annexure A. The work content variation would be +/- 10%.

Supercritical Test Facility- Non IBR quality works to be completed during the erection of Silver coated test section					
Sl. No	Work	Work Estimate			
		Total weight (in kg)	Unit	Unit rate (Rs)	Total Rate (Rs)
1	Cutting P22 and Gr.B pipes and welding drain plug assembly in ambient heat exchanger (Non IBR)	3.98	Per ton		
2	Removing existing Thermocouple clamps before cutting and refixing the same after completing welding of new test section	8.208 (24 locations)	Per location		
3	Removing existing power clamps before cutting and refixing the same after completing welding of new test section	132.128	Per ton		
4	Removing existing insulation before cutting and refixing the same after welding of new test section	278.672	Per ton		
5	Removing the aluminium casing before cutting and refixing the same after welding of new test section	10.552	Per ton		
6	Cutting and fabricating required lengths of structural components and erecting a support system for torque wrench lifting system	500	Per ton		

7	Dismantling of one feed water tank of the following size from existing location (Pilot Plant Bldg outer yard) to SCTF area outer area scope includes removal of pipelines, platform , handling, placing in position over civil foundation, leveling /aligning, minor grouting and other hurdles and SS welding for Providing additional flanged stubs (4 " – 1 No. & 2" 1 No) to connect the pump (Distance - 4 mtrs). Dia : 2200 mm Length : 6600 mm: Weight : 3500 Kgs	3500	lumpsum		
8	Mounting DP transmitters in test section	5 nos	Per no.		
9	Mounting pressure transmitters in piston pump outlet line	1 nos	Per no.		
			0		

Note: Required raw materials, equipment, power and water would be provided by BHEL. The scope of work for the contractor involves material handling, pipe bending, cutting, edge preparation, positioning, aligning, welding, and insulation. Necessary qualified working personnel, required tools, consumables and handling devices are under the scope of the contractor. The work content variation would be +/- 10%.