

Government of India
Bhabha Atomic Research Centre
Chemical Technology Division

Ref: ChTD/PTS/DHP/1310

Date: 9/12/2021

Minor fabrication-Invitation of quotations

Sub: Fabrication, testing and supply of fractionation system and erection of cooling water line

Dear Sirs,

1. Sealed quotations are invited on behalf of the President of India for the minor fabrication work as per enclosed technical specification.
2. No insurance policy is required as no free issue material (FIM) is issued to the supplier.
3. Response to the tender enquiry shall be submitted in two parts viz. Part –A (Technical Bid) and Part-B (Price Bid) in separate envelopes.

4. **Part –A (Technical Bid)**

It shall include the following

- i. PAN and GST No of the supplier.
- ii. Compliance sheet/ list of deviation (if any) against the technical specifications, testing methods, delivery schedule, warranty, etc.
- iii. Product catalogue/data sheets of the offered components and/ or similar products indicating make, model number etc. each component.
- iv. Documents as mentioned in section 7 of technical specifications
- v. Past supply made to DAE & other organizations and should be submitted in the offer with purchase order nos., clients name, address & telephone number, brief description of the job with sketch, and date of completion
- vi. Party shall include the list of fabrication facilities they are having and number of qualified and experienced welders for SS and MS welding.

5. **Part-B (Price Bid)**

It shall include the following

- i. PAN and GST No of the supplier.
 - ii. Quotation mentioning lump-sum cost for fabrication, testing, supply of fractionation system and erection of cooling water line as per the technical requirements given in technical specification.
6. Tenders are required to be submitted in separate sealed and super scribed envelopes containing and indicating following

I	First envelope	Part-A (Technical Bid)
II	Second envelope	Part-B (Price Bid)

Both of the above sealed envelopes shall be put in a separate bigger envelope, which will be duly sealed and super scribed with the name of the work, name and address of the bidder , tender notice number and due date.

7. The quotations must be dispatched through Indian Post by speed post to reach to Head, Chemical Technology Division by 28/12/2021 at 14.00 Hours.
8. The address on the envelope should read

Head,

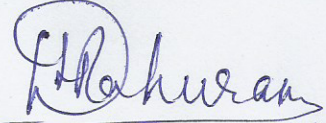
Chemical Technology Division

CEL-2, Bhabha Atomic Research Centre, Trombay

Mumbai - 400 085

Attn: D H Parshuram, SO/E, PTS, ChTD

9. Part A (Technical Bid) will be opened on 29/12/2021. Part-B (Price bid) of the tender will be opened at a later date after detailed evaluation of the technical bid.
10. The period of validity of the bidders' offer shall be minimum 90 days.
11. Supplier should clearly indicate delivery period and validity of the offer.
12. Quotations should be neatly typed and corrections are not acceptable. Offer should be printed on company's letter head showing contact details.
13. Any incomplete offer or offer received after due date will not be considered.



D H Parshuram
(SO/E, PTS, ChTD)

9/12/21

Encl: Technical Specification

Technical specification

Fabrication, Testing and Supply of distillation system and GI water line

Scope: The scope of the work includes fabrication, testing and supply of distillation system as given in sketch 1 with following technical specifications. The equipment shall conform in all respect to high standards of engineering practices and be capable of performing trouble free operation with vendor's guarantee in a manner acceptable to the purchaser.

Job 1. Vacuum distillation system

Reference sketch: sketch 1(Attached)

Material of construction: SS316L.

Quantity: 1 set

Temperature of operation: ambient to 250°C

Pressure of operation: 1×10^{-6} mbar to 1 bar (a)

Process fluid: Fluorinated oil

The fractionation system consist of two main parts a. boiler vessel b. condenser

a. Boilervessel :

- i. Made of 8'' NB 10 S pipe with top and bottom closures.
- ii. Top plate(10 mm thick) is having following nozzles
 - 1'' tube with tube cap
 - ½'' tube with tube cap
 - Nozzles for thermocouple insertion
 - Central 2'' NB 10S pipe connecting the boiler to the condenser
- iii. Bottom plate contains ½'' drain tube with isolation valve. The isolation ball valve should have ferrule fitting as end connection and leak rate Less than 10^{-9} mbar/lit sec.
- iv. The drain valve should be of good quality make ball valve of ½'' ferrule fitting as end connection. The valve shall come with material and pressure test certificates. The wetted parts of the valve should be either SS316L or PTFE.

b. Condenser

- i. Shell and tube condenser with following sizes
 - Shell size: 2.5'' NB 10S
 - Tube size: ½'' tube with 1.25mm thickness
 - Tube sheet thickness: 3 mm
 - Tube arrangement: Triangular pitch
- ii. ½'' tubes for Cooling water inlet and outlet on tube side.

c. Heaters

The party has to supply heaters with following specifications

Type: Jacket type

Size: compatible to tightly clamp on to 8'' NB pipe with lock clips.

Heating element: Nichrome

Height: 250 mm

Electrical wattage: 2 kW

Input: 230V AC 50 Hz, 1 phase

Maximum temperature: 300°C

Quantity: 3 no's

d. Support stand

The supporting stand for the fractionation system shall be made from MS. The support shall be able to with stand the weight of the fractionation system with 20 kg process material.

e. General notes:

- Distillation system will be operated at vacuum of 10^{-5} mbar. It will be tested with MSLD at order of 1×10^{-9} mbar lit/sec. Experience of high vacuum fabrication and welding is required.
- The welding of the condenser tubes to tube sheet is very critical. So extra care shall be provided for the welding of the same.
- Entire wetted surfaces shall have surface finish of N6 or better.
- Valves and fittings must be of reputed make like Baldota, Wintech etc. and shall be suited for the operation under high vacuum 10^{-5} mbar.

Job 2. Cooling water line

Scope of the job involves fabrication, erection, testing and commissioning of cooling water line for inlet and outlet with necessary supports from cooling tower of CEL-2 to R-02 , CEL-3 at ChTD with following credentials,

MoC: GI

Pipe size: 2" NB class C(Heavy)

Isolation valves: Ball valves of reputed make

Approximate travel length: 110 m

Bill of materials:

1	G.I. Pipe 2" Class C	110	Mtrs
2	Elbow 2" class C BW	20	Nos.
3	Tee 2" x 1"	10	Nos.
4	Pipe Clamps 2"	50	Nos.
5	Flanges 2"	8	Nos.
6	Flanges 1"	8	Nos.
7	Ball Valve 2"	3	Nos.
8	Ball Valve 1"	3	Nos.
10	Support ISA 75 : 35 mtr	238	Kg
11	Anchor Fastner M12x 60 mm	140	Nos.
12	Painting on pipes (2 coat enamel paint)	110	Mtrs

Hydro test pressure: 7.5 bar

- GI pipes shall be of reputed make like Jindal, TATA etc. Test certificates are required for all the materials
- The isolation valves to be provided at appropriate locations as informed during the time of fabrication.

- Supports for the cooling water line to be given at required locations with standard support fixtures.
- All fittings and material for the Cooling Tower water 2” Class C (Heavy) GI Inlet and Outlet/Return line will be in the scope of the fabricator.
- All bought out material must be from reputed make like Tata, Jindal, APL Apollo etc (pipes & structural material), Wintech, Baldota etc (Valves).

Job 3.Dismantling and installation of vessels

- Scope of the job involves safe dismantling of two vessels (approx. 120 kg weight, OD 550 mm, height: approx 1 m, each) from 2nd floor of a mezzanine structure (4.2 m height) with proper support.
- The dismantled vessels need to be relocated to a safe location as instructed by the Engineer in Charge.
- The job also involves installation of two similar vessels (to be given by BARC) at the location of dismantled vessels.
- The connecting piping/ tubing of the previous vessels need to be disconnected and reconnected back to the new vessels as instructed by the Engineer in charge.
- No. of piping/ tubing connections to the vessels are as follows,
 Tube connection through tube fitting: 20 nos
 Pipe connection through welded/ brazed joint pipes: 8 no’s (Maximum size 1”)
- The party needs to provide all the tools and tackles required for dismantling and erection of the vessels. No crane/chain-pulley system is available on site.

4. Material Testing:

- The material is SS 316L in all cases where it is not explicitly specified otherwise.
- All material tests (physical and chemical) shall be carried out in reputed govt. approved test laboratories.
- Tests will be witnessed by purchaser’s representative. Supplier should intimate 7 days in advance for witnessing the material testing.
- The fabricator shall submit the test certificates of pipes (SS and GI), tubes, fittings (SS and GI), valves, heaters etc or any other bought out items.
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5. Inspection and Testing:

- Inspection:** The said items shall be inspected to determine conformance with all the provisions of the above mentioned specifications with respect to the material, workmanship and cleanliness.
- Tests:**
 - General: The test procedure shall be approved by the purchaser. The manufacturer shall provide all the test equipments required. The purchaser or his authorized representative shall have access to the calibration certificate of the test equipment used for these testes. The random samples required for tests shall be selected by the purchaser or his authorized representative. The purchaser is free to ask for 100% test if required.

- ii. Dimensional Checks: The dimensions of the items should be as mentioned in the sketch.
- iii. The fractionation system shall be leak tight. The maximum allowable leak rate is 1×10^{-9} mbar litre/sec. The same shall be tested using He-MSLD.
- iv. Surface finish of N6 or better shall be provided at all parts of the fractionation system as it will be subjected to high vacuum applications.
- v. The fractionation system will be subjected to Pneumatic test at 1 bar (g).
- vi. Cooling water line will be subjected to Hydro test at 7 bar.

6. Applicable standards.

Applicable standards are as given below. In the event of certain specifications, drawing or data listed below conflict, the decision will be at the discretion of the purchaser.

- i. IS 808 Dimension of hot rolled steel beam, columns channels and angle sections.
- ii. IS 4923 Hollow steel sections for structural use-specification.
- iii. IS 2062 Steel for general structural purpose.
- iv. IS 9595 Recommendations for Metal arc welding of Carbon and Carbon Manganese Steel.
- v. IS 3658 Code of practice for Liquid Penetrant flaw detection.
- vi. IS 816 Code of practice for use of Metal Arc Welding for general construction in mild steel.
- vii. IS 817 Code of practice for training & Testing Metal arc welder.
- viii. IS 822 Code of practice for inspection of weld.
- ix. IS 2074 Ready mixed Paints, Red oxide, Zinc chromate priming.
- x. IS 7205 Safety code for Erection of structural steel work.
- xi. IS 7215 Tolerance for fabrication of steel structure.
- xii. IS 7307 Part 1 Approval test for welding procedure Part 1-Fusion welding of steel.
- xiii. IS 7318 Part 1 Approval tests for welders when welding procedure approval is no required Part 1 for Fusion Welding of steel.
- xiv. IS 5624 Specification for foundation bolts.5
- xv. IS 814: Welding consumables

7. General Notes:

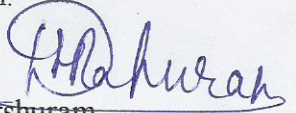
- i. All material will be in scope of fabricator.
- ii. Crane and other material handling equipments are not available at the site. Lifting tackles, scaffold, support structure to work at heights shall be arranged and in the scope of contractor.
- iii. All the material used in the works shall be new; first quality steel, free from laminations, seams, blisters and harmful defects and shall comply with appropriate Indian Standards.
- iv. The party must have adequate number of trained and skilled manpower, infrastructure for welding, testing, lifting tackles, scaffold to work at heights, tools, personal protective equipments (PPE) etc. Both SS and MS welders must be qualified welders
- v. The party must have experience in executing similar contracts conforming to the technical specification and cost.
- vi. All MS structure will be painted with red oxide followed by 2 coats of enamel paint of approved shade. Painting of GI water line with 2 coats of enamel paint of approved shade.
- vii. Rate(s) in the quotation shall be type written only and hand written rate shall not be considered.

- viii. Water and electricity shall be provided by BARC free of charge. Contactor is responsible for taking connection from the specified point by taking all the necessary safety precaution against damage to property, man, material or machine.
- ix. All workers of the contractor must have valid Police verification certificate (PVC) to enter and work inside BARC complex.
- x. All Contractors working inside BARC complex must be security vetted. If the contract or has not been security vetted previously, then he has to apply for security vetting to the security section of BARC.
- xi. BARC has a 5 day work system (Monday to Friday). The normal time for working inside BARC is from 9 am to 5.30 pm.
- xii. The contractor should follow safe work practices and provide appropriate personal protective equipment (PPE) to his workers including safety shoes, safety belts, face shields etc. BARC reserves the right to stop work due to lack of PPEs or in case of any safety violation.
- xiii. Contractor should have proper electrical equipments and mandatory to have electrical panel with MCB, ECB, without loose wire & contacts etc. as per Indian electrical standards to work safely on site. In absence of which the work will not be allowed and stopped.
- xiv. The quotations should be complete with all taxes, P & F charges, transportation, testing charges etc and the other charges if any, with complete breakup.
- xv. The purchaser reserves the right to place a part of full order of items mentioned in the tender enquiry.
- xvi. The parties shall give the details of their manufacturing capability for the item and facilities they have. These facilities shall be open to purchaser for evaluation before placement of order.
- xvii. The entire component shall be delivered at CTD Stores, Trombay, Mumbai after receiving clearance of Inspection certificate from purchasers' representative
- xviii. The waste/scrap generated during the dismantling/fabrication process needs to be transferred to designated place in BARC campus as informed by the EIC at the fabricators cost.
- xix. Party can contact on telephone number 022-25591869 for any clarifications in scope and detail of work to Mr. D H Parshuram.
- xx. **Completion period:4 month** from the date of receipt of work order. Failure on the part of the bidders by not adhering to delivery schedule will invite penalty.
- xxi. **Guarantee:** Each component shall be guaranteed against any defects for a minimum 12 months from the year from the date of completion & final acceptance of the total work.
- xxii. Head, Chemical Technology Division, BARC reserves the right to accept or reject any or all the quotations without assigning any reason thereof.

8. Evaluation and Acceptance Criteria

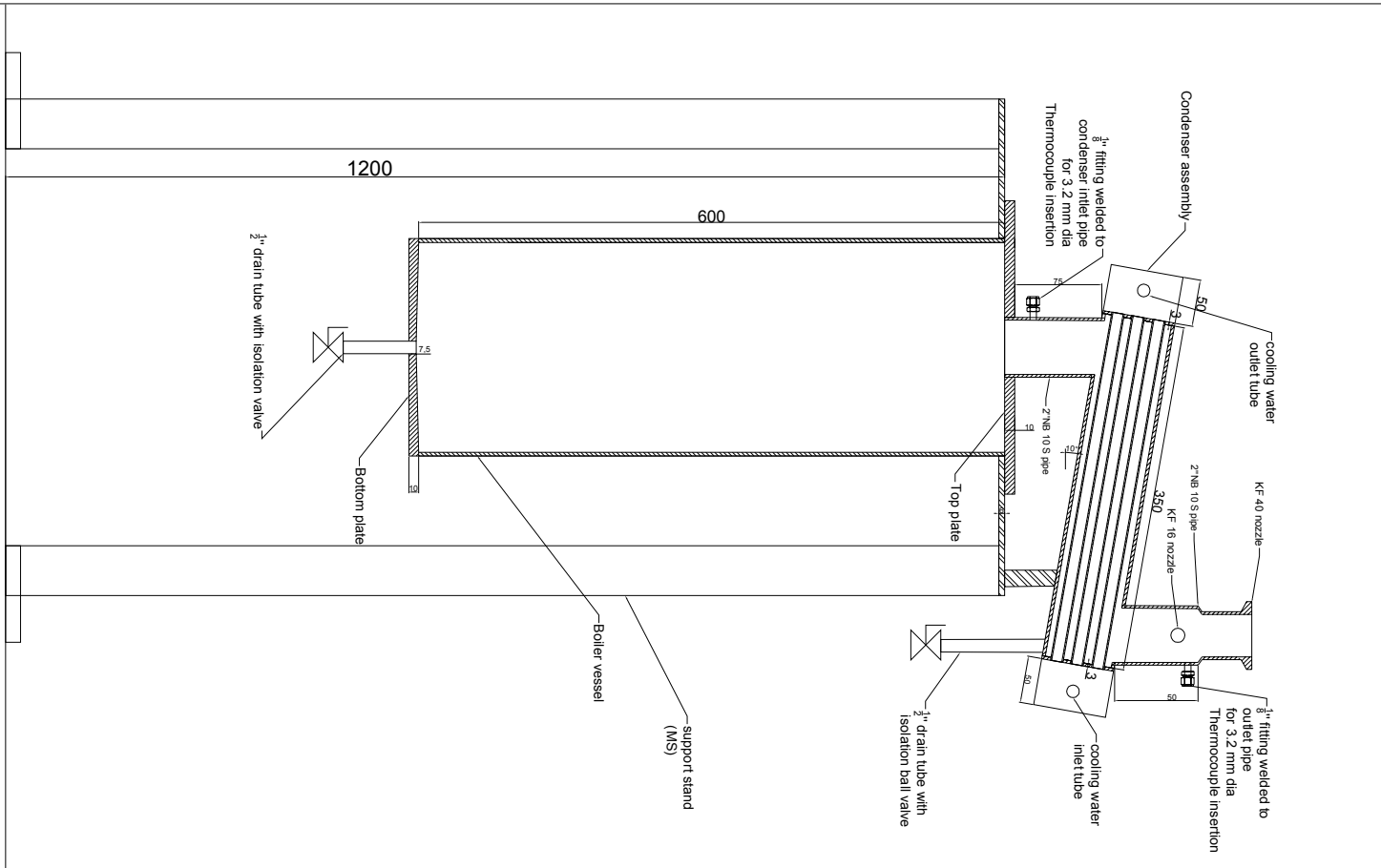
- i. The offer must meet all points as mentioned in the technical specification with respect to design, drawing, standards, material of construction, tests etc.
- ii. The party must have experience in executing similar contracts conforming to the technical specification and cost.
- iii. The party must have adequate number of trained and skilled manpower, infrastructure for welding, testing, lifting tackles, scaffold to work at heights, tools, personal protective equipments (PPE) etc. Both SS and MS welders must be qualified welders.

- iv. The manpower must have Police Verification Certificate (PVC) from police commissioner's office. No worker shall be allowed to work inside BARC without PVC.
- v. Past supply made to DAE & other organizations and should be submitted in the offer with purchase order nos., clients name, address & telephone number, brief description of the job with sketch, and date of completion.

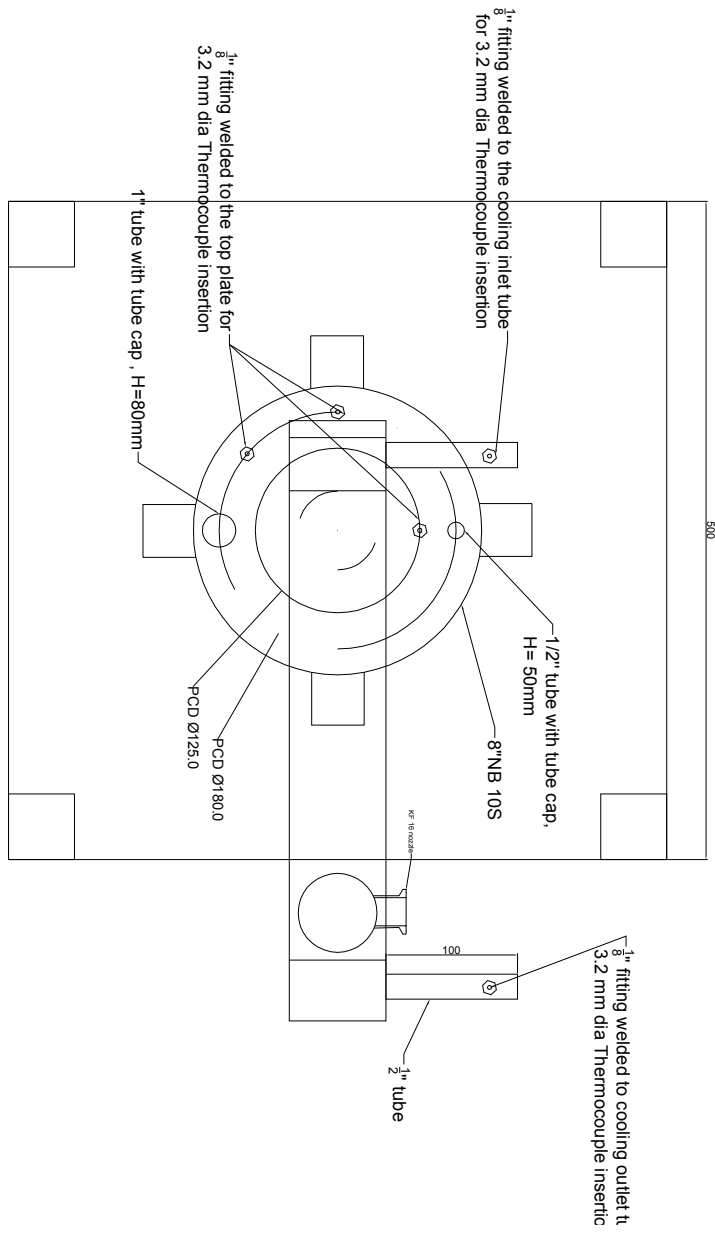

D H Parshuram
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Vertical c/s view

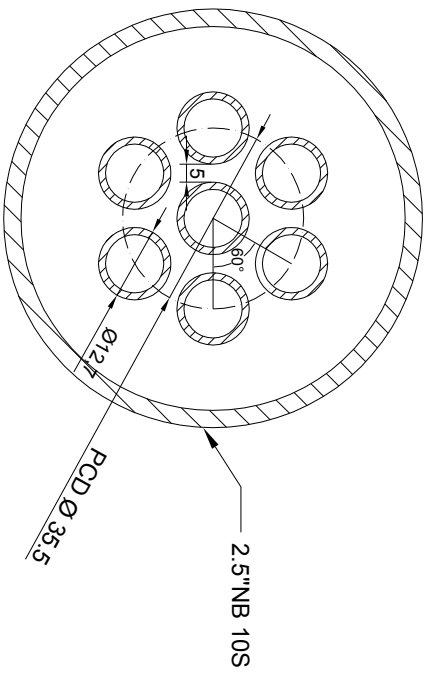


SKETCH 1



Top view

MCC: SS 316L
Qty: 1 set



Condenser c/s view