GOVERNMENT OF INDIA
BHABHA ATOMIC RESEARCH CENTRE
RADIOLOGICAL LABS
TROMBAY, MUMBAI-400 085

Ref: MFD/P-II/NFG/2017/ 268 **Date: 03.5.2017**

To

M/s.

NOTICE INVITING TENDER (NIT)

Sub:- "Design, Fabrication, and Supply of Custom made Vacuum Induction Heating Sub-System" for Radiological Laboratory at P-II Qty: One System. Scope of work Specification a per the Annexure-B

Dear Sirs.

We will be thankful if you may please arrange the quotation for fabrication and supply of above-mentioned items on or before **18.05.2017** with detailed terms & conditions. Relevant drawings may please be returned along with quotation. Specification as per the ANNEXURE attached herewith.Quotation is invited **only** from the original manufacturer doing the fabrication in his own factory

NOTE:-" QUOTATION SHOULD BEAR YOUR **CST, MST REGISTRATION No & PAN No** ON A **COMPANY LETTER-HEAD** FAILING WHICH, THE QUOTATION WILL BE **REJECTED"**

PLEASE SEND SEALED QUOTATION SUPERSCRIBING ON THE ENVELOPE THE "DUE DATE". By Spped Post Only To

An earliest reply shall be highly appreciated.

U.Venkatesan
SCIENTIFIC OFFICER (F)
MFD, NFG, RLG, BARC,
TROMBAY,MUMBAI – 400 085

Received/ posted above said enquiry on……..

U Venkatesan 03.5.17
Signature

Note :-

The goods proposed to be fabricated on this NIT (Notice Inviting Tender) are meant for research purpose of research institution under the Dept. of Atomic Energy and therefore the prices to quoted for product.

Should be exclusive of the excise duty. The purchaser will make available to the successful bidder with whom a work order is placed the excise duty exemption certificate duly signed by the authorised officer in the Dept.of Atomic Energy well before the dispatch of goods by the supplier. While submitting the offer the bidders should specify in his offer that the price quoted by him does not include any element of Excise duty subject to production of exemption certificate.

Where, however the prices quoted are inclusive of Excise Duty, the percentage/quantum of Excise Duty included in the quoted price should be specifically indicated in the tender.

ANNEXURE-B

NIT Ref: MFD/P-II/NFG/2017/268 Dated: 03.5.2017

Item: Design, Fabrication, supply of Custom made Vacuum Induction Heating Sub-System

Quantity: One System consisting of Item Nos 1 to 8 mentioned in the Annexure. Item wise specifications.

Scope Of Work:

Quality assurance of the raw material to be submitted for composition, purity etc. with the Laboratory test reports.

- All the welded joints to be subjected to x-ray radiography test to be conducted and report submitted.
- The Vacuum Induction Heating System shall have following main components:
- The Mould Chamber
- The Melting chamber
- (Melting chamber is constructed by integration of bottom flange and top flange and the quartz tube. Leak tightness achieved by placing the neoprene L-gaskets at the top and bottom surface mating with the SS flanges.)
- The Mounting Table
- Lifting arrangement (Mechanized)
- Ports for Thermocouple entry in the mould chamber
- Port for Lifting tube provided with scope for insertion of Thermocouple for measuring crucible temperature.
- Vacuum Pump
- Vacuum measuring gauges with meters.
- Installation, commissioning, and testing of the system to be carried out at BARC.

Item wise Specifications:

1. **Item:1** WATER COOLED SS TOP FLANGE WITH LIFTING ARRANGEMENT
   (Motor, centre Bolt +Limit switches)

   The top flange shall be provided with the lifting arrangement.
   The water cooling of the flange shall have the zig zag path inside the flange.
   All the weld joint shall be visible outside the flange (thus preventing any leakage of water inside the furnace chamber in case any weld failure)
   The welding qualification has to be demonstrated with supporting XRR test reports.
   The inside surface of the top flange have well mirror polished smooth surface ,when in contact with the neoprence gasket shall enable good vacuum tightness.
   The limit switches shall be provided to stop the upward movement of the chamber at a height of 325mm.
   Limit switch also to be provided at the mould chamber to shut off the motor when the melting chamber touches down.

Top flange shall have three slots welded for inserting the tie rods of three numbers,with wing-nut head.

2. **Item:2** WATER COOLED SS BOTTOM FLANGE

   The SS bottom flange shall have smooth mirror finish to give vacuum leak tightness while resting on the neoprene “O” ring at the Mould chamber.

   The bottom flange shall be provided with tri-slots for inserting the three tie-rods with which the bottom and the top flange hold the Quartz tube to complete the construction of the melting chamber.

   All the weld joint shall be visible outside the flange (thus preventing any leakage of water inside the furnace chamber in case any weld failure).

   The cooling water inlet and the outlet shall have standard bullet head joints.

3. **Item:3** SS LIFTING TUBE WITH SS BUSH T.C ASSEMBLY WITH HEXAGONAL NUT

   The Lifting tube of 25mm Outer dia shall have 2.5pitch male-thread at the bottom for engaging the Graphite stopper rod. Length of the tube shall be 450mm . The top end of the tube shall have ss bush type arrangement for engaging the thermocouple. The orifice shall be about 15mm diameter. The top end also will have male thread of 2.5 pitch for engaging the Lock nut tightening at the top of the top flange.

4. **Item:4** SS TIE RODS

   The purpose of three numbers of 15mm dia SS tie rods is to integrate the Quartz tube with the bottom and top flange and construct the melting chamber. The top end of tie rod shall have wing-nut arrangement.. Bottom end shall have rectangular stud welded which will engage into slot provided at the bottom flange of the melting chamber. The three tie rods shall be 120^0 apart.. The weld joint involved with the two flanges shall not impart any damage to the integrity of the flanges.

5. **Item:5** WATER COOLED MOULD CHAMBER 350MM Ht x 350mm Dia

   The mould chamber dimension shall be :

   The Inner diameter: 350mm

   Outer diameter: 352mm

   Mould chamber opening : 300mm

   Water cooling shall be on the outside with zig-zag path covering maximum surface area.

The entire chamber shall be leak-tight under positive and negative pressures.

Mould chamber shall be provided with 3 or 4 ports thermocouple penetration with o-ring seals to get vacuum tightness.

Base of the chamber shall be provided with a central pin to ensure vertical alignment of the mould with the connectors and crucible and the lifting tube bearing the graphite stopper rod.

One port shall be provided with 1" opening for the vacuum exhaust pipeline connections. Two numbers of isolation valves to be provided . One shall be near the mould chamber and the other near the vacuum pump. A port for housing the vacuum gauge head also to be provided.

6. **Item: 6** M.S.TABLE WITH SS TOPCOVER SHEET DIMENSION:

The dimension of the MS table shall be: 3000mm (L) x 1500(B) x 900mm(H). The top SS 304 cover sheet shall be of thickness 1.5mm with rounded bending edges. The M.S.Table shall have support legs of 50mm square pipe at the four corners. Perfect horizontality of the table top shall be ensured. The table should have load bearing capacity upto 300 Kg.

7. **Item:7** VAC GUAGE WITH KF COUPLING.

As mentioned in the item:5, vacuum guage shall be provided in the exhaust line of the mould chamber. KF coupling joints shall be used for connecting the SS bellows connections between the chamber and the vacuum pump. The size of the KF coupling shall be 1". The SS bellows shall be leak tested and the reports submitted to us for verification during inspection stage.

8. Lead lined SS canister: A SS canister of size, ID:250mm OD:256mm Ht: 300mm with Pb lining on the inner surface. The lead thickness shall be 1.5mm. A SS flange of thickness 5mm whall be welded at the top of the container with a grove for fixing "O" ring. The flange shall have eight numbers of tapped holes of M8size .The SS top cover of the the container shall be of thickness 5mmd and diameter 350mm . Shall have eight holes matching with the flange Neoprene O ring shall have cross section thickness about 2mm or as per the standard VOR size available. Container shall be tested for leak tightness .

COOLING WATER CIRCUITS:

A water distribution system consisting of inlet manifold shut off valves, thermal warning devices for individual water branches & differential pressure switch connected between inlet and outlet manifolds.

Other requirements:

Documents:

1. Meeting the specification requirements, the design sketch shall be prepred by the supplier and presented to BARC for approval prior to fabrication.
2. One set of documents consisting of a copy of the operation and maintenance manual complete with spare parts data, preventive maintenance schedule, circuit diagrams and description w.r.t the component symbols used in the circuit diagrams and the bill of materials, along with the guidelines / instructions for operations/maintenance and trouble shooting, shall be submitted within two months of the receipt of this order. Another two sets shall be submitted along with the equipment**.**

Installation and commissioning:

The supplier shall provide the necessary technical support during installation and commissioning.

Guarantee

The VIHS with all sub-systems shall be guaranteed for **One year** from the date of commissioning or 18 months from the date of supply for trouble free service and for free repairs/ replacement of parts / components/ subsystems during the guarantee period.