

Indian Institute of Technology, Delhi

Notice Inviting Quotation

Date: 20th March, 2013

Sealed quotations are invited for a “**INDUCTION MELTING FURNACE SYSTEM**”. The quotations should be submitted in a sealed cover (separate bids: technical and commercial) to **Prof. Naresh Bhatnagar**, Head, Central Workshop, Indian Institute of Technology Delhi, Hauz Khas, New Delhi 110016 on or before 10.04.2013 (Wednesday). Late submission will not be considered. **Those who have submitted earlier should submit again.**

The sealed Quotations are to be submitted in one envelope having two separate envelopes for;

A- Technical Quote (Technical Specifications only)

B- Financial Quote (Technical & Financial)

Both the envelopes A & B should be enclosed in an outer envelope, which should be sealed and addressed to, clearly mentioned on top right of the envelope “Quotation for **INDUCTION MELTING FURNACE SYSTEM**”.

Institute reserves the right to accept or reject any of the offers without assigning any reasons. The detailed specifications of each individual component of the system are given below:

Specifications for INDUCTION MELTING FURNACE SYSTEM

I. 30 KW/9600 HZ Solid State Power supply

(Solid state power supply should be designed such that it should be suitable for Vacuum furnace later).

The system should include:

1. Cabinet

With micro switches to provide illumination on the monitor board and shut off power. Water and power connections through the top.

2. Circuit Breaker Protection

a) MCCB mounted in the cabinet to serve as isolation from the main line. To be equipped with a manual on/ off switch.

b) Fast acting semi-conductor fuses (*Instantaneous fast acting MCCB to be used for circuit protection*)

3. Rectifier Section with Filter

- a) High power Diodes with snubbers for rectification. *(This rectifier should be designed to minimize line harmonics compared to phase controlled rectifier. Tenderer to guarantee power factor better than 0.95 at all power levels)*
- b) Air core encapsulated current limiting reactor.
- c) DC capacitors located in capacitor section. *(This design of converter and filter section should be such that it should reduce losses)*
- d) Power supply design should be voltage fed series tuned.

4. Inverter Section

- a) This section should contain inverter panel containing high power inverter SCRs with snubbers, parallel diodes and DI/DT reactors *(This should provide full power throughout the melt cycle.)*
- b) Water cooled high frequency output transformer (HFT) is to be provided for safety

5. Capacitor Section

- a) Cabinet should contain all the required DC filters and medium frequency AC capacitors, pressure switch, installed in each capacitor, indicating lamp to notify the operator when the capacitor pressure switch has been actuated, etc.

6. Control and Monitor System

- a) A direct reading kilowatt meter.
- b) One main control board for controlling of the equipment which eliminates electronic complexity and simplifies maintenance.
- c) ON/OFF push buttons on the control door.
- d) One power control knob on the control door to set the desired power level.

7. Internal Closed Water System (Inside the cabinet)

This system should contain one plate type water heat exchanger with expansion tank and built-in water level indicator, one mono block non-ferrous pump, one set of feed manifold with temperature and pressure switches and one drain manifold with temperature sensors for different paths of cooling system. One deionizer cartridge for continuous purification of internal water.

II. – Melting Furnaces for Steel (1650 Deg C)

Furnace – I

One no 25 kg Geared type Manual Tilt Table mount furnace

Table mount, manually tilted coreless melting furnace for housing and providing rigid support to the induction coil enclosed in asbestos free insulating sheet. This coreless table mount furnace without shunts design to help in reducing energy loss. A knee-high table to place the furnace at convenient slagging height and stands firmly anchored to the floor. The furnace should be positioned anywhere in the lab within the length of the power leads. The smaller unit

should have hand grips for pouring or a two-man shank or a trunion and table-stanchion arrangement.

Sets of flexible water cooled power leads for connection between the power induction coil and panel bus bar. Water cooled leads should be with asbestos sleeves for protection against metal splash.

Furnace – II - Melting Furnance for Aluminum (800 Deg C)

8 kg aluminum capacity push- out type furnace

Push out furnace should be of removable crucible type. Crucible should serve as the pouring ladle with just enough metal to pour a few moulds at a time to avoid temperature loss and eliminate the need for a ladle transfer. For safety and minimum maintenance, the push out furnace should have readily cleanable refractory overflow- receptacles to control metal spillage, protect the cylinders and even contain the entire melt, should a crucible break. Coils to be lined with refractory cement to guard against spillage and to reduce heat losses.

The furnace is to be mounted over a pit which allows access to the crucible rams and into which the duct carrying the water and bus-bars from the control cabinet can be joined.

III. – Furnace Selector switches

Furnace selector switch required for transferring the power from one furnace to other.

IV. – Open loop water cooling system

Water cooling system should consists of

- a. High efficient Cooling Tower
- b. Set of Pumps
- c. Set of pipes and fittings
- d. Two nos Syntex Tanks 1000 lt.

V. – Graphite Crucibles

12 nos. Graphite Crucibles for max 8 kg molten metal capacity

VI. – Required Refractory material

Refractory material for for two heats for 25 kg furnace

VII. – Set of spares

One set of spares

Terms and Conditions

Envelope A: Technical Quote: The following details are to be enclosed (Mention clearly on this envelope – Technical Quote)

1. Letter from the manufacturer specifically to quote for this tender is to be attached for the authenticity of dealership/ agency and the dealer should be an authorized service provider.

2. Technical brochures mentioning all details with complete address of the principals.
3. A compliance statement for required specifications should be attached.
4. Firm MUST provide a compliance statement vis-à-vis specifications in a “tabular form” clearly stating the compliance and giving justification, if any supported by technical literature with clear reference of page number, paragraph or lines. This statement must be signed, with the company seal, by the tenderer for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification of the tender. The quotation should be complete in all respects. (as per IIT-Delhi rules).
5. Any optional equipment / accessory advised to be included , if otherwise mentioned.
6. a) List and addresses of organizations [in India and abroad – with contact landline numbers] where the equipment has been supplied in last 3 years. b) Address in India where a live demonstration of the instrument can be arranged, if possible.
7. a) Details of similar equipment supplied to preferably Indian Institute of Technology/ National Institute of Technology/Indian Institute of Science, India specifying the Department/centre/lab to which the equipment was supplied, with references. b) Mention if the equipment is being maintained by your organization. Address of the technical office, in India, with telephone and FAX numbers. Please clarify the type of support available in India.
8. If quote is for imported equipment, Sole Agency-ship certificate on the letterhead of the principal company with current dates, if quotation is from an Indian Agent.
9. In the case the items are proprietary products of the company, a proprietary item certificate stating the same may be provided.
10. Specifications form should be similar to the given major specifications.

Envelope B: Financial Quote: The following details are to be enclosed/ ensured. (Mention clearly on this envelope – Financial Quote)

1. The quotations for the equipment in foreign exchange, if it is to be imported. The cost of spares and optional equipment are to be quoted separately. The cost should be based on FOB, Factory. If equipment is indigenous, the quote should be in INR.
2. Taxes, terms and conditions should be clearly mentioned.
3. Institute makes payment after delivery and successful installation. The payment is by RTGS for which NEFT form need to be duly filled and complied. In case the payment terms are different, it should be mentioned clearly. If equipment is to be imported, the address of the company in whose name the LC is to be opened should be stated.

4. Payment terms and conditions should be clearly mentioned. No advance payment is given by IIT Delhi for capital equipments.
5. Vendor should get a fresh certificate directly from their product principal's clearly mentioning about warranty for three years of the equipment to be delivered from the date of installation.
6. The details of the AMC after the warranty period should be clearly mentioned.
7. Cost for Installation and training at site, if needed, to be provided.
8. Validity of the quotation should be at least four months. Vendors will do the installation and demonstration of the equipment at IIT Delhi premises without any additional charges.
9. The delivery period to be clearly specified and should be at the earliest.

Prof. Naresh Bhatnagar

Head, Central workshop

IIT Delhi - 110016