

**Government of India  
Bhabha Atomic Research Centre  
Atomic Fuels Division**

**Ref.AFD/ESAS/BP/22/33744**

**Date 08/03/2022**

**Sub: Tender enquiry for Fabrication, Supply, Installation, Testing and Commissioning of 10 kW, 18-45 kHz IGBT based power source for preheating of end plug by induction technique along with rod and coil movement mechanism.**

Sealed offers are invited for and on behalf of the President of India for “Fabrication, Supply, Installation, Testing and Commissioning of 10 kW, 18-45 kHz IGBT based induction heating power source for preheating of end plug by induction technique along with rod and coil movement mechanism as per specification in Annexure- I & II”.

**Terms and conditions:**

1. This tender will be processed in **Two-Part Bid System**.
2. The tender submitted should have two separately sealed envelopes viz.
  - 2.1. First Envelope shall contain **Technical Bid (Part-A)**. Technical Bid (Part-A) must be written on the Envelope.
  - 2.2. Second Envelope shall contain **Commercial Bid (Part-B)**. Commercial Bid (Part-B) must be written on the Envelope.
3. The sealed Technical Bid (Part-A) shall contain Technical details of the offer and compliance with respect to our technical requirement, clearly mentioning deviations, if any.
4. The sealed Commercial Bid (Part-B) shall contain the detailed quotation including basic cost, applicable taxes and commercial terms and conditions.
5. **Sealed envelopes of Technical Bid (Part -A) and Commercial Bid (Part -B) shall be kept in Single Sealed Cover/Envelop, which shall be treated as your offer against our enquiry.**
6. Offers received as (i) technical and commercial parts in one bid, or (ii) technical and commercial bids in single envelope, or (iii) unsealed bids will be treated as invalid and no further communication will be made to the vendor.
7. a) Your offer in sealed envelope bearing “**Tender Enquiry No. & Due Date**” should be sent to the following address, so as to **reach on or before 23/02/2022 by Registered/Speed post only.**

To,

Shri Bhupendra Patidar,  
Scientific Officer (F)  
Atomic Fuels Division  
Bhabha Atomic Research Centre  
Trombay, Mumbai 400 085.

- b) The contractor shall have to visit the site to comprehend the scope of work and equipment condition. The same will be arranged by the undersigned. The site can be visited on working days between 10:30am to 4:00 pm before due date. however prior intimation of at least three working days is necessary.(Tel : 022 25597410, email: [bpatidar@barc.gov.in](mailto:bpatidar@barc.gov.in))
- c) Supplier shall have previous experience of similar work with documentary evidence otherwise site visit will not be considered.
- d) The quotation submitted without site visit will not be considered.

**(B. Patidar)**

**SO/F, ES&AS, AFD**

**For & On behalf of President of India**

**Specification of “Fabrication, Supply, Installation, Testing and Commissioning of 10 kW, 18-45 kHz IGBT based power source for preheating of end plug by induction technique along with rod and coil movement mechanism”.**

**1. Technical Details of IGBT based induction heating power source**

- 1.1. Technology : Microprocessor controlled IGBT based inverter technology
- 1.2. Input Voltage : 415 V $\pm$  10%, 3 Phase,
- 1.3. Input frequency : 50 Hz  $\pm$  1.5%
- 1.4. Output Power : 10 kW
- 1.5. Continuous output control : 10 -100 %
- 1.6. Output Frequency : 18-45 kHz
- 1.7. Phase : Single
- 1.8. Ingress protection : IP21
- 1.9. Liquid coolant : 10 L
- 1.10. Control description
  - 1.10.1. USB connection for software update
  - 1.10.2. Digital display for status and fault monitoring
  - 1.10.3. Heating control lamp
  - 1.10.4. Cooling/Overheating control lamp
  - 1.10.5. Remote control lamp
  - 1.10.6. Plug connector remote panel
  - 1.10.7. Regulator control lamp
  - 1.10.8. Timer/Program –time setting control lamp
  - 1.10.9. Program – Power setting control lamp
  - 1.10.10. INFO control lamp
  - 1.10.11. Setting control lamp
  - 1.10.12. Encoder for infinite power setting 10-100%
- 1.11. Power Control: Output power should be controllable in “Manual” & “Auto” Modes.
  - 1.11.1. Manual Mode: In manual mode, the output power into the specimen shall be controlled (open loop) through a potentiometer, continuously, in the specified range.
  - 1.11.2. Auto Mode: In auto mode, the output power into the specimen shall be regulated in accordance with the requirements of the temperature profile. The actual temperature signal from temperature measuring device shall be

provided to temperature controller.

1.11.3. Programme mode: Programme mode allows the user to set the power depending on the duration in accordance with the process requirement.

**1.12. Coil details**

1.12.1. Coil Diameter : 26 mm or less

1.12.2. No. of turn : 8 or less

1.13. Dimensions: 400 mm (L) x 750 mm (W) x 750 mm (H) or less

1.14. Liquid cooled conducting lead : 2 meter or more

1.15. Supplier shall make mechanism to move the coil adjacent to welding joint during preheating at speed of 0.6 m/s or higher. The speed of the coil movement shall be adjustable as per process requirement.

**2. Technical Details of Rod rotation mechanism**

2.1. Rod movement mechanism shall be consists of trolley that can hold and rotate the rod during welding process. There shall be provision to rotate the rod at a speed of 0.5 RPM to 5 RPM.

2.2. The angular speed of the rod shall be controlled by variable frequency drive (VFD) and continuously adjustable with minimum range of 0.05 RPM.

2.3. VFD panel shall have provision for isolation device for avoiding interface of high frequency welding machine and VFD.

2.4. VFD used for controlling angular movement shall be of reputed make.

2.5. The rod rotation system shall be suitable for rotating rods as per attached drawings in Annexure II. The system shall grip the rods at minimum 4 positions. The grips shall be fabricated from Teflon/Nylon or similar material to avoid scratch marks on rods.

2.6. The rod rotation mechanism shall be design such that it will take minimum time for rod loading and unloading.

2.7. Some support shall be provided to End plug to maintain its straightness within 0.1 mm after preheating and welding.

**3. Scope of Work**

3.1. This work includes supply, installation & testing of 10 kW IGBT based induction heating power source.

3.2. This work also includes supply, installation & testing of VFD panel for rod linear and angular movement during heating and welding.

3.3. Supplier has to demonstrate the preheating of atleast 20 Nos. of aluminium rods up to 550 DegC within 30 sec. with good repeatability.

- 3.4. Optimization of coil linear and rod angular speed as per process requirement will be in scope of supplier.

**4. Schedule of Quantity**

<b>Sr. No.</b>	<b>Description</b>	<b>Quantity</b>
1	10 kW IGBT based induction heating power source alongwith liquid cooled cable lead and induction coil	1 No.
2	VFD panel for coil linear and rod rotary movement	1 No.
3	Trolley for Rod holding and movement	1 No.

**5. Inspection and testing at supplier site**

- 5.1. Before leaving the supplier work, whole system shall have been inspected and tested and the results recorded in test report in presence of purchaser.
- 5.2. Supplier has to demonstrate the preheating of atleast 5 Nos. of aluminium rods up to 550 DegC within 30 sec. with good repeatability.
- 5.3. Supplier shall demonstrate the functional check of coil linear and rod rotary movement mechanism.

**6. Installation and testing**

- 6.1. Supplier shall arrange all tools and safety switchgears require for installation and testing of IGBT based induction power source and rod movement mechanism.
- 6.2. Visual and functional check of IGBT based induction power source and rod movement mechanism will be carried out at purchaser site.
- 6.3. Cable lead testing as per IS,
- 6.3.1. Continuity test
- 6.3.2. Insulation resistance test
- 6.4. Interlock testing,
- 6.4.1. Low level of liquid coolant
- 6.4.2. Low pressure of liquid coolant
- 6.4.3. High temperature of liquid coolant
- 6.4.4. High temperature of semiconductor devices

**7. Documentation**

- 7.1. The manufacturer shall supply at least following drawing /documents.
- 7.1.1. Bill of material
- 7.1.2. Control and power line diagram

- 7.1.3. Transport, installation, commissioning, operation, maintenance instruction and fault finding procedure of IGBT based power source and VFD panel.
- 7.1.4. List of recommended spare parts
- 7.1.5. Test certificate of each components

## **8. Warranty**

- 8.1. Supplier shall provide minimum two years of warranty of 10 kW IGBT based induction heating power source.
- 8.2. Supplier shall provide minimum one year of warranty of VFD panel and other system components.

## **9. Packing and forwarding**

All the items shall be divided into several shipping sections for protection and ease of handling during transportation. The equipment shall be properly packed for transportation by ship or rail or trailer. Electrical items shall be wrapped in polyethylene sheet before being placed in the wooden crates or cases to prevent damage to the finish. This side up, centre of gravity, weight, owner particulars, purchase number, shall be clearly marked on the package together with other detail as per purchase order.

## **10. General terms and conditions:**

- 10.1. Offer evaluation procedure: - Only Valid Technical bids will be opened first and evaluated Commercial bids of only technically qualified vendors' will be opened and the lowest quoted offer shall be recommended for placing the work order.
- 10.2. Only Lump sum prices to be quoted in Commercial Bid (Part – B).
- 10.3. Offer should be valid for minimum 90 days otherwise it will be rejected.
- 10.4. Only Lump sum price to be quoted.
- 10.5. The completion period of this job should be within 4 months from the date of issue of work order.
- 10.6. Persons having valid Police Verification Certificate will only be allowed to enter BARC to execute the job.
- 10.7. The payment will be made after the satisfactory completion of the work.
- 10.8. From the bill amount, Income tax @2% and GST TDS @2% will be deducted.
- 10.9. Any delay which is attributed to the contractor is liable for penalty @0.5 % Per Week (Max 10%).

10.10. Quotations are to be printed on letter head / quotation format which should consist of GST registration number registered with local authority and PAN of the firm. Computer generated quotation shall be considered as invalid & rejected.

**Details and Confidentially & Publicity Clause**

I. No party shall disclose any information to any third party concerning the matters under this contract generally. In particular, any information identified as “proprietary” in nature by the disclosing party shall be kept strictly confidential by the receiving party and shall not be disclosed to any third party without the prior written consent of the original disclosing party.

This clause shall apply to the sub-contractor, consultant, adviser or employees engaged by a party with equal force

**II. “Restricted information” categories under section 18n of the Atomic Energy Act, 1962 and “Official Secret under Section 5 of the Official Secret Act, 1923: -**

Any contravention of the above-mentioned provisions by any contractor, sub-contractor, consultant, adviser or the employees of a contractor will invite penal consequence under the aforesaid legislation.

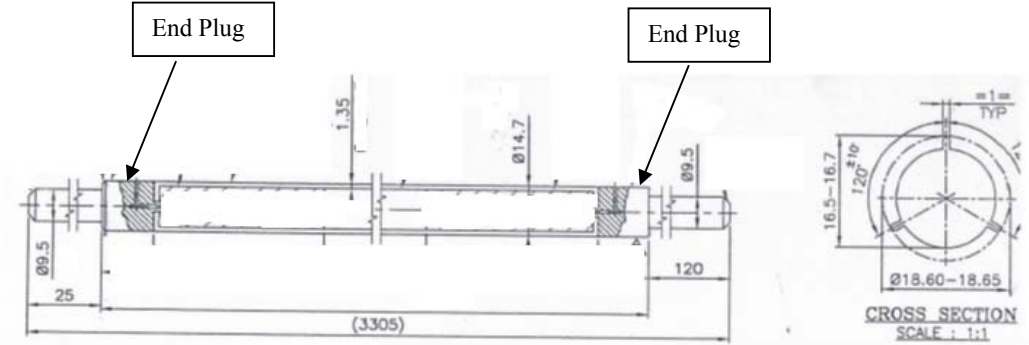
III. Prohibition against use of BARC’s name without permission for the publicity purpose:

**The contractor, sub-contractor, consultant, adviser or the employees engaged by the contractor, shall not use BARC’s name for any publicity purpose through any public media like press, Radio, T.V. or Internet without the prior written of BARC. Contractor shall obtain Police verification certificate for all his employees including his supervisors and workers engaged in the work.**

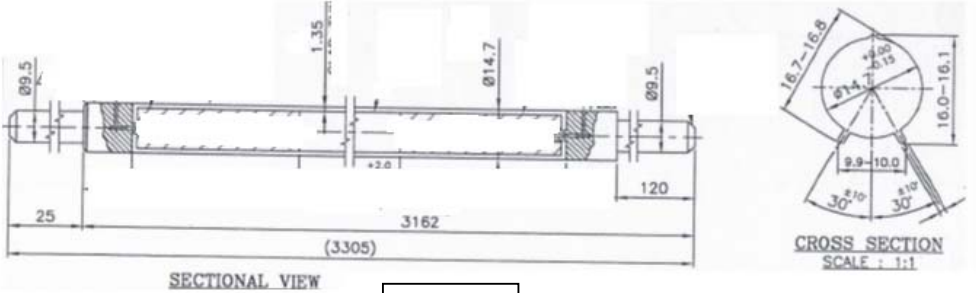
**(B. Patidar)**

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Type-1



Type-2

Note: All dimensions are in mm

Image of Aluminium Rod