सीएसआईआर - राष्ट्रीय धातुकर्म प्रयोगशाला
CSIR - NATIONAL METALLURGICAL LABORATORY
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CORRIGENDUM

Tender Reference No. :- P/NC/337/SS/DB/GEM/24-25
Tender ID :- 2024_CSIR_211449_1
Item Name :- Vacuum Induction Melting Furnace

NOTE: The Bids must be submitted in the Central Public Procurement Portal (URL:https://etenders.gov.in/eprocure/app) only. Manual/Offline bids shall not be accepted under any circumstances. Bidders should quote in INR only.

Consequent to the Pre-Bid Meeting held on 23/10/2024, the technical specification is revised as follows.

Revised Technical Specification of Vacuum Induction Melting Furnace after Pre-Bid Conference.

S.No	Item	Description
1.	General Description	• The proposed vacuum induction furnace is designed for melting, casting and solidifying under vacuum or inert gas with a cast weight of minimum 10 kg equivalent of steel or 4.5 kg equivalent of magnesium. • It should be compatible for ferrous and non-ferrous metals.
2.	Purpose	Vacuum Induction Melting Furnace with control atmosphere for following purpose: 1. To melt and refine the Mg based alloy 2. To melt and refine the iron-based alloy
3.	Melt capacity basis	Minimum 10 kg of Fe or equivalent 4.5 kg of Magnesium
4.	Operating temperature	1700^{O}C or higher
5.	Working crucible	System should be compatible with a. MgOcrucible b. Alumina crucible c. Graphite crucible

		furnace to be supplied with twosets of crucible of a,b, and c, matching to the dimension suitable for the induction coil.
6.	Induction coil	• Interchangeable water-cooled copper coil for ≥ 10 kg of Fe-based alloy melting or equivalent 4.5 kg of Magnesium • It should be duly coated to protect coils
7.	Control	• PID Controller-based control system for measurement& control of the temperature of the melt, induction power, water systems, and other parameters duringmelting operation. • Control console with safety interlocks
8.	Vacuum system	• Suitable rotary vacuum pumps of reputed make should be provided to reach at least 5 X 10^-3 mbar (at 30 °C and dry condition) • Suitable gauges (in mbar, preferably digital pirani gauges) and indicators should be provided with system. • Additional provisions should be kept in vacuum line to integrate the diffusion pumps of adequate rating to serve future requirements of 10^{-5} mbar. • Feedback control throttle valve to control vacuum
9.	Temperature measurements	Suitablecontinuous temperature monitoring with feedback control system
10.	Melting time	<60 minutes for 10 kg Fe-based alloy or equivalent 4.5 kg of Magnesium
11.	Chamber for controlling atmosphere	• Vacuum chamber made of SS 304 (suitable material - double walled and water cooled chamber) • The vacuum holding capacity of designed and fabricated Chamber should be of 10^{-5} mbar. (Manufacturer shall provide Test certificate). • Water-cooled trap or suitable equivalent trap should be

		provided to the chamber for trapping high volatile metals. • The melting chamber should have following ports 1. Viewing port- minimum 2 Nos 2. Material charging port and chamber(with independent vacuum provision) for alloying/material addition-1 Nos 3. Port for pyrometer 4. Vacuum/evacuation port 5. Gas inlet/outlet port 6. Crucible cover 7. Power feed through port 8. Sampling port 9. Bridge breaker port 10. Thermocouple port • Detailed drawing should be submitted along with the offer.
12.	Feedback Control System	• PID programmable profile temperature controller feedback circuit to work in conjunction with thermocouple and optical colored pyrometer for measuring accurate temperature. • Auto/ Manual switch to adjust the power either manually or depending upon the feedback from the thermocouple/optical pyrometer
13.	Crucible tilting and casting	• Mechanized/Motorized tilting mechanism • Suitable mould should be provided for Mg casting • Mould table should be provided with holes of suitable size for fixing mould attachments • Suitable height adjustment provision for the mould system • Tilt angle: 0-100 degree forward and 0-10 in backward or better
14.	Power supply	40kW induction power supply for melting ≥10 kg of Fe-based alloys or equivalent 4.5 kg of Magnesium with fast control of input voltage and variable frequency to get smooth control of the temperature

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15.	Power Panel	• 40kW with suitable power supply system. • The power supply should have the following protections. ✓ MCCB at the input ✓ Overload protection. ✓ Inverter Current Limit. ✓ Surge protection with snubber circuit. ✓ Over temperature protection. ✓ Cooling system interlocks with pressure and temperature • The Panel meters should be provided to indicate – ✓ DC Voltage. ✓ DC Current ✓ Energy meter • The panel should also be provided with plate showing components in Process flow control diagram • The panel should be provided with local push button for on-off for all the components of the induction melting furnace along with emergency control button
16.	Safety controls	All the safety system should be provided to prevent unprecedented damage
17.	Water cooling system	Suitable chiller with rated capacity to be provided for the melt chamber, furnace coil, vacuum system and all the sub systems by means of water chiller Water cooling to Induction power supply would be exclusive
18.	Warranty	• 1-year comprehensive warranty after commissioning. • AMC (2 Preventive + 1 breakdown) for the subsequent 3 years should be provided separately. • AMC cost will be considered for price comparison
19	Certification	• All these components (Pump, Induction coil, pipeline valves, pressure gauge, and thermocouple) should be of International Standard and certified. • All electrical components in the equipment should be of reputed make, along with a CE stamp.

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		• Calibration certificates for thermocouples should be supplied.
20	Engineering drawing	Detail engineering drawing of the proposed setup is to be provided along with the technical bid for an evaluation
21	Accessories	• Air compressor should be included in the cost while submitting commercial bid. • Any other requirement for the installation or running of the complete system should be quoted in the commercial bid • All the lines (Air line and water line) should be supplied

Additional Requirements:

1	Scope of supply and incidental services: Installation, training, and commissioning	a) 2-3 days of onsite operational and maintenance training at the NML site for students/technical staff b) 3 successful trials as a part of the commissioning with own materials. c) 2 sets of operating manuals and drawings,a hard copy and a soft copy, should be provided d) Pre-installation requirement to be submitted during Technical bid
2	Inspection and test	Pre-dispatch inspection will be done at the bidder's site.The final inspection will be at the NML site during installation.
3	Acceptance test	Demonstration ofvacuum induction melting under mentioned parameters in the technical specification during commissioning trials.
4	CSIR-NML scope	Site for installation and single-point power and water supply. gas cylinders for installation & commissioning trials.
5	Other requirements	• Vendor should submit the following during technical bid 1. Technical compliance statement 2. Point wise responses for the offered equipment to the technical requirements 3. Details of noise from the system and electromagnetic field leakage 4. OEM should ensure the availability for spares of

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		the proposed system for at least 5 years. 5. Foundation drawings & foundation bolt may be provided.

The bidders are requested to submit their bid based on this revised technical specifications.

All other terms and conditions shall remain same.

Stores & Purchase Officer,
CSIR-NML, Jamshedpur