CSIR-NATIONAL METALLURGICAL LABORATORY

[COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH, CSIR]
BURMA MINES, JAMSHEDPUR, JHARKHAND - 831007
Ph.: 0657-2345132, website: http://www.nml.res.in E-mail: spo@nml.res.in

PURCHASE ORDER

To, **ANTS INNOVATIONS PVT LTD.,** **(MSE Category – "Small"),** **Unit No.1, 2 & 105, New Jivdani Industrial Estate No. 1, Off. Western Express Highway, Dhumal Nagar, Vasai(E), Palghar,** **Maharashtra–401208, India** **GST Regn. No.:- 27AAPCA0526K1ZJ** **Contact: 8956761574,** **Email: sales@antsinnovations.com**	P.O. No.	**P/NC/337/SS/DB/GEM/24-25**
	Date	**10.06.2025**
	Subject	**Purchase Order**
	Ref.:-	1. NML Enquiry No. P/NC/337/SS/DB/GEM/24-25 dt. 16.10.2024. **Tender floated on GeM-CPP Portal bearing Tender ID :- 2024_CSIR_211449_1** 2. Quotation Ref. No. Q/7858/CSIR-NML/ Induction Furnace/24-25 dt.18.10.2024 and subsequent emails dt. 23.12.24, 24.12.24, 15.05.2025, 04.06.25 and 05.06.2025

Dear Sir,

I am directed to request you to kindly supply, installation, commissioning & training the following material as the enclosed terms & conditions:-

(A) COST OF EQUIPMENT			
Sl. No.	**Description**	**Quantity**	**Total Price/ INR**
1.	Basic Price of Vacuum Induction Melting Furnace (Technical Specifications & Drawing are attached at Annexure-A) HSN - 85141000	01 (One) No.	54,00,000.00
2.	GST on Basic Price of Vacuum Induction Melting Furnace	@ 18%	9,72,000.00
TOTAL COST OF EQUIPMENT ON FOR NML JAMSHEDPUR BASIS			**63,72,000.00**

(B) NON COMPREHENSIVE ANNUAL MAINTENANCE CONTRACT CHARGES FOR 3 YEARS			
3.	Basic Rate for Non-Comprehensive AMC for 03 Years.		1,50,000.00
4.	GST on Basic Rate for Non-Comprehensive AMC for 03 Years		27,000.00
TOTAL NON COMPREHENSIVE AMC CHARGES FOR 3 YEARS			**1,77,000.00**

TOTAL CONTRACT VALUE [(A)+ (B)]		
Sl. No.	**Description**	**Total Price/ INR**
(A)	**TOTAL COST OF EQUIPMENT ON FOR NML JAMSHEDPUR BASIS INCLUDING GST @ 18%**	**63,72,000.00**
(B)	**NON-COMPREHENSIVE ANNUAL MAINTENANCE CONTRACT CHARGES FOR 3 YEARS INCLUDING GST @ 18%**	**1,77,000.00**
TOTAL FOR NML JAMSHEDPUR PRICE INCLUDING NON COMPREHENSIVE AMC CHARGES FOR 3 YEARS		**65,49,000.00**

This Contract/Purchase Order shall be governed by:-

(1) General Conditions of Contract and Special Conditions of Contract as detailed in the **Bid Document Ref. No. P/NC/337/SS/DB/GEM/24-25 dt. 16.10.2024 floated on CPP Portal bearing Tender ID :- 2024_CSIR_211449_1** and (2) Special Conditions of Contract enclosed with this Purchase Order.

The Order Acknowledgement must be submitted immediately and in any case, within 07 days from the date of placement of this Purchase Order. The Order Acknowledgement shall be made on letterhead of the firm mentioning detailed technical specifications as per Quotation and shall also contains declaration towards acceptance of all the terms & conditions of the Purchase Order.

Sd/-

Stores & Purchase Officer
For & on behalf of the Council of Scientific & Industrial Research

Enclo:

1. Technical Specifications etc.

Explanations
The following words and expressions used in this Tender Document shall have the meanings hereby assigned to them:

Purchaser	means CSIR-NATIONAL METALLURGICAL LABORATORY, BURMA MINES, JAMSHEDPUR, JHARKHAND - 831007
Manufacturer/Supplier	means M/s. Ants Innovations Private Limited, Maharashtra
Indian Agent	Nil.

1.	Delivery Term	FOR NML Jamshedpur (Door delivery at Warehouse, CSIR-NML, Jamshedpur)
2.	Purchase Order Value / Contract Price	**INR 65,49,000.00** (INR SIXTY FIVE LAKHS FORTY NINE THOUSAND ONLY)
3.	Transportation / Despatch	The ordered goods shall be delivered by Supplier at Warehouse of CSIR-NML, Jamshedpur and duly insured by Supplier on warehouse to warehouse basis covering all the risks including SRCC.
4.	Payment	**Payment shall be made in currency of the Contract in the following manner:** **100 % (Hundred Percent)** of the total value of goods (excluding AMC Charges) on FOR CSIR-NML basis, **i.e. Rs. 63,72,000.00** shall be paid through RTGS after successful installation, commissioning and training including completion of all contractual obligations subject to submission of PBG. **Payment terms of AMC for 03 Years (Non-Comprehensive in nature):-** 1. AMC Charges shall be paid on yearly basis through RTGS after completion of each AMC Year subject to satisfactory service certificate given by the concerned user and against submission of bills. 2. AMC Charges for the period of **3 years** is Rs. 1,50,000.00 + Rs. 27000.00 (GST @ 18%) = **Rs. 1,77,000.00**. Thus, an amount of Rs. 50,000.00 + Rs. 9,000.00 (GST @ 18%) = **Rs. 59,000.00** shall be paid as yearly AMC Charges after completion of each AMC Year subject to satisfactory performance. Each AMC year shall cover minimum 02 preventive + 01 breakdown visit.
5.	Banking Charges	All bank charges abroad shall be to the account of the beneficiary i.e. supplier and all bank charges in India shall be to the account of the purchaser.
6.	Performance Security	The Supplier shall furnish Performance Security for 3% of the contract price, i.e. **Rs. 1,96,470.00** before claiming payment. Other details of Performance Security are detailed at GCC Clause 2.13 of our tender document.
7.	Country of Origin	INDIA
8.	Port of Shipment	By Road.
9.	Road Permit / eWaybill	Will not be provided.

10.	Delivery period	**3 (Three) months from date of issue of Purchase Order.** **Denial Clause** (over and above levy of Liquidated Damage): any increase in statutory duties and / or upward rise in prices due to the PVC (Price Variation Clause) clause and / or any adverse fluctuation in foreign exchange are to be borne by the seller during the extended delivery period, while the purchaser reserves the right to get any benefit of a downward revisions in statutory duties, PVC and foreign exchange rate. Except as provided under the Force Majeure clause, a delay by the Supplier in the performance of its delivery obligations shall render the Supplier liable to the imposition of penalty pursuant to Penalty Clause unless an extension of time is agreed upon pursuant to above clause without the application of penalty clause.
11.	Warranty	**01 (One) Year on-site Comprehensive Warranty** from the date of completion of successful installation & commissioning and completion of all contractual obligation to the entire satisfaction of buyer.
12.	AMC	Consecutive **03-years Non-comprehensive AMC (minimum 02 preventive + 01 breakdown visit annually)** for equipment to be started immediately after expiry of **warranty period of 01 Year**. The services towards **minimum 2 nos. of Preventive Maintenance** are to be **carried out in both the halves of a year with a time period difference of 5 months.**
13.	Pre-installation visit	Firm's engineer will make the inspection for site readiness prior to shipment to expedite the installation.
14.	Installation & Commissioning	Installation and commissioning of the equipment will be initiated by the firm's engineers including acceptance test at site **within 30 days** from the date of supply of goods. **Firm must submit copy of Installation Certificate on Supplier's letterhead duly signed & stamped by both the firm's engineer and user of CSIR-NML indicating specific start date and completion date of Installation.** Delay beyond the prescribed period in completion of contractual obligations will attract the imposition of Liquidated Damage Clause as mentioned in this tender document.
15.	Training	It should be imparted to **Two (02) persons for Three (03) days** to the purchaser at purchaser's premises. It should be completed as per schedule mentioned under installation and commissioning.
16.	Acceptance	Supply of goods as per PO.
17.	LD Clause	It will be applicable for delay in delivery / ~~shipment~~, installation, commissioning and completion of all contractual obligations beyond deadlines as mentioned in our Bid Document GCC 2.27 read with the relevant SCC.
18.	Certificate for effecting payment	Firm will submit the installation and acceptance certificate indicating the completion of Installation, Commissioning & Training as well as duly signed by the user of CSIR-NML alongwith Invoice for effecting the payment.

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For & on behalf of the Council of Scientific & Industrial Research

SPECIAL CONDITIONS OF CONTRACT (SCC)

The following Special Conditions of Contract (SCC) shall supplement and / or amend the General Conditions of Contract (GCC). Whenever there is a conflict, the provisions herein shall prevail over those in the GCC.

SCC 1	The Purchaser is: Director, CSIR-NATIONAL METALLURGICAL LABORATORY, BURMA MINES, JAMSHEDPUR, JHARKHAND - 831007
SCC 2	The Supplier is: M/s. Ants Innovations Private Limited, Maharashtra
SCC 5	**Final Destination:** CSIR-NATIONAL METALLURGICAL LABORATORY, BURMA MINES, JAMSHEDPUR, JHARKHAND - 831007
SCC 6	**Order Acknowledgement/Confirmation:** The Order Acknowledgement must be submitted immediately and in any case, within 07 days from the date of placement of this Purchase Order. The Order Acknowledgement shall be made on letterhead of the firm mentioning detailed technical specifications as per Quotation and shall also contains declaration towards acceptance of all the terms & conditions of the Purchase Order.
SCC 7	**Performance Security:** The Supplier shall furnish Performance Security for **3% of the contract price,** i.e. **Rs. 1,96,470.00** before claiming balance payment. Other details of Performance Security are detailed at GCC Clause 2.13 of our tender document.
SCC 8	**Delivery / Shipment :** **3 (Three) months from date of issue of Purchase Order.** Denial Clause (over and above levy of Liquidated Damage): any increase in statutory duties and / or upward rise in prices due to the PVC (Price Variation Clause) clause and / or any adverse fluctuation in foreign exchange are to be borne by the seller during the extended delivery period, while the purchaser reserves the right to get any benefit of a downward revisions in statutory duties, PVC and foreign exchange rate. Except as provided under the Force Majeure clause, a delay by the Supplier in the performance of its delivery obligations shall render the Supplier liable to the imposition of penalty pursuant to Penalty Clause unless an extension of time is agreed upon pursuant to above clause without the application of penalty clause.
SCC 9	**Part supply will not be accepted.**
SCC 10	The **country of origin** of the Goods is INDIA
SCC 11	The **port of shipment** of the Goods is By Road.
SCC 12	The **mode of shipment:** By Road.
SCC 15	**Pre-installation visit** Firm's engineer will make the inspection for site readiness prior to shipment to expedite the installation. **Installation & Commissioning:** Installation and commissioning of the equipment will be initiated by the firm's engineers including acceptance test at site **within 30 days** from the date of supply of goods. **Firm must submit copy of Installation Certificate on Supplier's letterhead duly signed & stamped by both the firm's engineer and user of CSIR-NML indicating specific start date and completion date of Installation.** Delay beyond the prescribed period in completion of contractual obligations will attract the imposition of Liquidated Damage Clause as mentioned in this tender document.
SCC 16	**Training:** It should be imparted for **Two (02) persons for Three (03) days** to the purchaser at purchaser's premises. It should be completed as per schedule mentioned under installation and commissioning.
SCC 16	**Inspection and Tests:-** The Inspection tests prior to shipment of goods and at final acceptance at buyer's site.

	After the goods are manufactured and assembled, inspection and testing of the goods shall be carried out at the Supplier's plant by the Supplier prior to shipment to check whether the goods are in conformity with the technical specifications. Manufacturers Test Certificate with data sheet shall be issued to the effect and submit alongwith delivery documents. The acceptance test will be conducted by the Purchaser, their consultant or other such person nominated by the Purchaser at its option after the equipment is installed at Purchaser's site in the presence of supplier's representatives. The acceptance will involve trouble free operation. There shall not be any additional charges for carrying out acceptance test. No malfunction, partial or complete failure of any part of the equipment is expected to occur. The Supplier shall maintain necessary log in respect of the result of the test to establish to the entire satisfaction of the Purchaser, the successful completion of the test specified. In the event of the ordered item failing to pass the acceptance test, a period not exceeding two weeks will be given to rectify the defects and clear the acceptance test, failing which, the Purchaser reserve the right to get the equipment replaced by the Supplier at no extra cost to the Purchaser. Successful conduct and conclusion of the acceptance test for the installed goods and equipment shall also be the responsibility and at the cost of the Supplier. Before the goods and equipment are taken over by the Purchaser, the Supplier shall supply operation and maintenance Manuals together with Drawings of the goods and equipment built. These shall be in such details as will enable the Purchase to operate, maintain, adjust and repair all parts of the works as stated in the specifications. The Manuals and Drawings shall be in the ruling language (English) and in such form and numbers as stated in the Contract. Unless and otherwise agreed, the goods and equipment shall not be considered to be completed for the purposes of taking over until such Manuals and Drawing have been supplied to the Purchaser. On successful completion of acceptability test, receipt of deliverables, etc. and after the Purchaser is satisfied with the working of the equipment, the acceptance certificate signed by the Supplier and the representative of the Purchaser will be issued. The date on which such certificate is signed shall be deemed to be the date of successful commissioning of the equipment.
SCC 18	**Packing:** Please refer to Special Conditions of Contract (SCC) of our tender document.
SCC 19	**Shipping and other Documents** : Please refer to Special Conditions of Contract (SCC) of our tender document.
SCC 20	**Mode of dispatch:** ~~In case of supplies from within India, the mode of transportation shall be by Road.~~ In case of supplies from abroad, the mode of transportation shall be by Sea.
SCC 21	**Insurance:** The Insurance in respect of goods to cover all risks including SRCC upto final destination shall be borne by Supplier at its own costs.
SCC 22	**Warranty:** **01 (One) Year on-site Comprehensive Warranty** from the date of completion of successful installation & commissioning and completion of all contractual obligation to the entire satisfaction of buyer. Other details of Warranty are detailed at GCC Clause 2.21 of our tender document read with relevant SCC.
SCC 23	**Payment:** **<u>Payment shall be made in currency of the Contract in the following manner:</u>** **100 % (Hundred Percent)** of the total value of goods (excluding AMC Charges) on FOR CSIR-NML basis, **i.e. Rs. 63,72,000.00** shall be paid through RTGS after successful installation, commissioning and training including completion of all contractual obligations subject to submission of PBG.

	<u>Payment terms of AMC for 03 Years (Non-Comprehensive in nature):-</u> 1. **AMC Charges** shall be paid **on yearly basis** through RTGS **after completion of each AMC Year** subject to satisfactory service certificate given by the concerned user and against submission of bills. 2. AMC Charges for the period of **3 years** is Rs. 1,50,000.00 + Rs. 27000.00 (GST @ 18%) = **Rs. 1,77,000.00**. Thus, an amount of Rs. 50,000.00 + Rs. 9,000.00 (GST @ 18%) = **Rs. 59,000.00** shall be paid as yearly AMC Charges after completion of each AMC Year subject to satisfactory performance. Each AMC year shall cover **minimum 02 preventive + 01 breakdown visit**.
SCC 24	**Liquidated Damages** : Please refer to our tender document under GCC 2.27 read with the relevant SCC.

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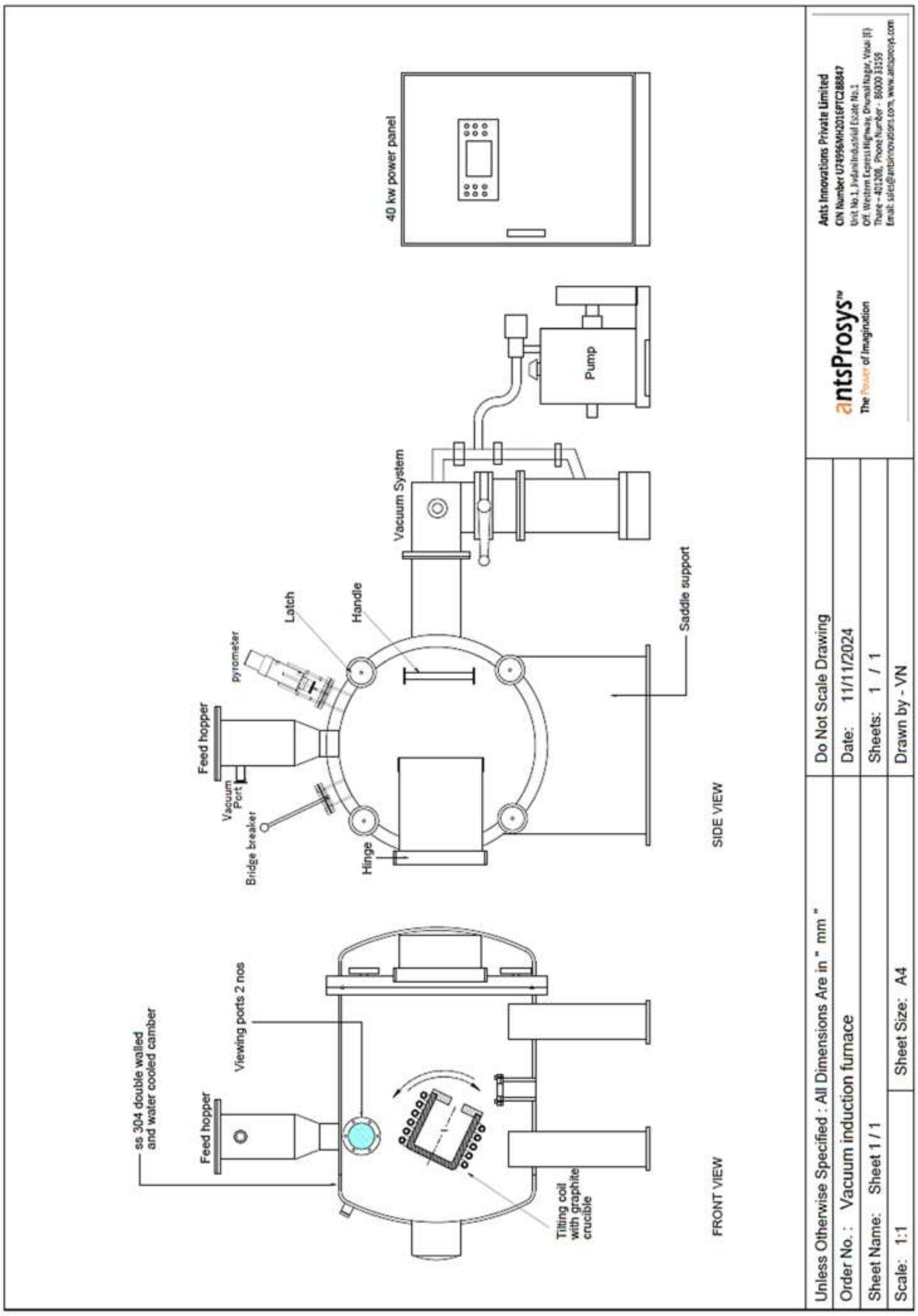
For & on behalf of the Council of Scientific & Industrial Research

Annexure-A



ss 304 double walled and water cooled camber
Feed hopper
Viewing ports 2 nos
Tilting coil with graphite crucible
FRONT VIEW
Bridge breaker
Vacuum Port
Feed hopper
pyrometer
Latch
Handle
Hinge
SIDE VIEW
Saddle support
Vacuum System
Pump
40 kw power panel
Unless Otherwise Specified : All Dimensions Are in " mm "
Order No. : Vacuum induction furnace
Sheet Name: Sheet 1 / 1
Scale: 1:1
Sheet Size: A4
Do Not Scale Drawing
Date: 11/11/2024
Sheets: 1 / 1
Drawn by - VN
antsProsys™
The Power of Imagination
Ants Innovations Private Limited

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Ants Innovations Pvt. Ltd.
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Email: sales@antsinnovations.com, www.antsprosys.com

Date: 18/10/2024

DETAILED TECHNICAL SPECIFICATIONS OF SYSTEM AS PER

Tender No : P/NC/337/SS/DB/GEM/24-25 Dated: 15/10/2024
Our Reference No : Q/7858/CSIR-NML/Induction Furnace/24-25

Dear Sir,

The proposed Vacuum induction furnace is designed for melting, casting and solidifying under vacuum or inert gas with a cast weight of up to approx. 10 kg equivalent of steel. Melting and casting to be performed under vacuum generated by a combination of mechanical pumps and oil booster pumps. The main function is melting and casting of ferrous and non-ferrous materials (copper alloys), high alloyed steels, high entropy alloys (alloys of transition materials with high contents of Ni, Co, Mn, Mo, V, Ti etc), super alloys under vacuum or protective gas atmosphere. The system consist of Chamber-type furnace design with well-proven, robust coaxial power feed- through and crucible tilting system.

Kindly find below our best offer for Vacuum Induction Melting and Tilting Furnace for melting of samples in controlled atmosphere and vacuum.

Salient Features:

1. A vacuum chamber and vacuum system for creating better than $1x10^{-2}$ mbar initial pressure (cold condition).
2. The chamber has facility for mechanized tilting the mold and casting.
3. Capacity to melt 10 Kg of Steel, Metals, Alloys, Oxides, Composites etc.
4. Melting crucible of Alumina of Capacity 1.25 Liter
5. Frequency Auto-Tuning features to ensure most optimized operation
6. Chiller 5 TR for water supply to furnace body and coils
7. Dual colour pyrometer to measure temperature of melt

1. Furnace Melting and Casting Chamber Details

1.1. The Chamber (single chamber in cylindrical shape) will be a double walled chamber made of Austenitic stainless steel (SS 304L) with proper water-cooling mechanism of suitable wall thickness. The chamber design shall comply with international pressure vessel standards for the operating vacuum and pressure.
1.2. The internal surfaces will be buffed and polished to minimize out-gassing.
1.3. All ports and chamber sealing would have Viton/Silicon/Nitride "0 "rings.
1.4. Vacuum chamber shall be fitted with inert gas manifold with solenoid operated inert gas Admittance ball valve on/off and compete with a by-pass needle values with pressure gauge,

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Pressure relief valve & absolute pressure sensor.

1.5. During melting the starting (cold start) operating pressure of the chamber would be in range of $5x10^{-3}$ mbar.

1.6. The chamber shall be provided with sufficient number of ports for various features lik evacuation, external illumination, viewing, power feed-through, gas inlet, crucible cover, alloyin addition and temperature measurements (contact/non-contact), bridge breaking etc.

1.7. The melt chamber door shall be accessible from the operating platform for easiness of cleaning, charging and servicing. The chamber door shall have a set of quick release clamps.

1.8. It shall have two observation ports conveniently placed, one to observe the melt and another to observe the mold during pouring.

1.9. A port with a quartz window, for mounting a two-color radiation Pyrometer suitably positione above the melt crucible shall be provided. The port shall have an isolation valve to preven coating of window.

1.10. The chamber shall have a charge chute with independent vacuum provision connected to melt chamber pumps, for bulk charging and minor alloying elements.

1.11. Later alloying with lumps for alloy adjustment shall be possible without breaking the vacuum o the inert gas atmosphere.

1.12. A manual operated dip thermocouple with vacuum lock shall be provided.

1.13. There shall be a suitable provision for bridge breaking operation during melting.

1.14. For casting, the coil with crucible and melt is to be tilted by means of a mechanized tilting mechanism to pour the melt into the mold. The fill level to be controlled through a viewing glass at the melt chamber.

1.15. The tilt angle ranges shall be 0° - 100° in the forward direction, and 0° - 10° in the backward direction. Suitable mechanized tilting mechanism is provided to ensure smooth and uniform pouring.

1.16. The mold table should be provided with holes of suitable size for fixing mold attachments.

1.17. Sliding system for the mold system shall be provided to accommodate Molds.

2. Rotary Based Vacuum

2.1. The ultimate vacuum level obtainable in the melt chamber shall be better than 10-2 mbar under clean, dry and empty conditions.

2.2. Appropriate Two stage rotary pump (> 60 m3/hr) of either HHV/FVT/HVI Reputed make shall be provided for the melt chamber.

2.3. Rigid pump-set with dust-resistant fore pump and large pumping capacity for short pump- down times will be provided.

2.4. The melt chamber pumping system is capable of taking loads usually encountered in melting of steel.

2.5. Suitable electro pneumatic vacuum valves shall be incorporated for sequential operation of pumping system. All vacuum lines and bellows shall be fabricated using stainless steel with

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suitable flanges for leak proof connection.

2.6. One Pirani (HHV/Reputed make) and Bourdon gauge (manual) shall be provided at suitable locations on the melt chamber.

3. Power Source

3.1. Suitable solid state power source with solid state frequency converter shall be provided. Medium Frequency IGBT (Insulated Gate Bipolar Transistor) Based Single power supply system with output power of 40 kW nominal and output frequency variable from 10 to 20 kHz. The power supply will have following protections. The unit would work at resonant frequency detected automatically. The rectification will be through SCR's (Silicon Controlled Rectifier).

- MCCB at the input
- Overload protection
- Inverter Current Limit
- Surge protection with snubber circuit
- Over temperature protection
- Cooling system interlock with pressure and temperature

The system will have following indications:-

- Overload trip at 80 amps
- Over Temperature trip if temperature of control circuit exceeds 50 deg C
- Cooling System Failure trip
- Frequency trip if operation is not happening at resonance frequency (determined by load)

The Panel meters provided will indicate :–

- DC Voltage
- DC Current

The Unit offered by us is a Series Inverter with matching Transformer & the control will be by variation of frequency. Other controls will include–

- Heat ON push button
- Heat OFF/RESET Push button
- Power Potentiometer

The Technical Specifications are –

- Input Voltage- 415V, 3 Phase, 50Hz, 60 Amperes max.
- Output kW- 40
- Output Frequency-From 10kHz Up to 20kHz

3.2. Heat Station with resonating capacitors and a matching transformers (This will be part of the unit)

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3.3. Water cooled Induction coil of copper, suitable for the Alumina crucible dia 90 mm, height 200 mm, suitable for 10 kg of steel duly coated and insulated. Maximum temperature for use with Alumina Crucible will be 1700 degree C. The working temperature with graphite crucible will be 1800 deg C.

3.4. Co-axial feed through and tilting lever would be provided with provision to connect the induction coil.

3.4. The power leads to coil connection shall be of quick disconnecting and connecting type

4. Water Cooling & Compressed Air (supplier scope)

4.1. Water cooling would be provided by a 10 TR Chilling System for the melt chamber, furnace coil, vacuum system and all the sub systems by means of a water chiller with soft (< 200 PPM) and good conducting (< 300 micro-ohms) water. Water cooling to Induction power supply would be exclusive.

4.2. The emergency water cooling unit should be provided to take care of cooling particularly Critical system components.

4.3. Supplier scope is limited to provide all the required and necessary accessories, hoses, pipes, valves etc to connect the water chiller.

4.4. A suitable capacity compressor to produce > 6 bar compressed air is to be provided for Necessary operation of all pneumatics associated with furnace system.
All pneumatic lines will be connected to the compressor through a FRL of reputed make

4.5. All pneumatic lines are to be connected to the compressor through a FRL of reputed make

5. Control and Automation

5.1. The furnace shall have basic HMI + PLC based control panel for operating the Induction Furnace and Vacuum Pumping system where as necessary safety interlocks for safe operation of the system shall be provided.

5.2. The PLC will utilize a PID temperature controller feedback circuit to work in conjunction with Dual Colour optical infrared pyrometer (measurement range of 800-2500 deg C) in water cooled body for measuring accurate temperature. Optical Pyrometer will be focused on crucible. PLC System is from Delta.

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6. Safety & Interlocks

6.1. The entire unit shall be provided with necessary safety features and interlocks (water flow switch, thermostats, pressure sensors, emergency cut off switch, pressure relief valves etc.) to protect all sub-systems and the operator from hazards due to electrical and pressure.

6.2. Suitable interlocks shall be provided at various levels and also the safe guards. The interlocks shall take care of sudden water disruption during melting and associated influences on various parts of water-cooling system.

Some typical interlocks required are:

- Safety release valve for over pressure.
- Interlock for Roughing Valve.
- Interlocking for Vent valve when the vacuum valve is open.

7. Pre-Dispatch Inspection (PDI at Our Works)

The system will be offered for inspection at our works at Vasai and only after your acceptance the system will be shipped to your site. During the PDI the following tests will be carried out.

The furnace shall be inspected at the site prior to dispatch for the following:

7.1. Ultimate vacuum under dry, clean and empty condition.
7.2. Leak rate under dry, clean and empty condition. All functional aspects as per accepted order
7.3. Melting, Tilting of mold and casting of 10 Kg of steel under vacuum and controlled atmosphere

8. Installation & Commissioning

Ants shall do the Installation and commissioning of the Furnace at customer site and Demonstrate few cycle and provide training to Operator. Travelling to site, Boarding, lodging, and Local transportation will not be charged extra.

9. Training

We shall provide training to your personal regarding operation and maintenance of the equipment during pre-dispatch inspection at our site and during commissioning at your site.

10. All included with this supply

10.1. Unloading of consignment
10.2. Incoming Wiring of 415 Volts, 80 Amperes through a fuse switch unit.
10.3. Any gas line related work
10.4. Any Civil Work

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10.5.Any air compressor for supplying air to operate valves

Spares for power supply are as below mentioned:

List of Spares (Optional)

1. IGBT Infineon FF400R12KE3
2. Alcon make 20MFD, 1000Amp Water Cooled Capacitor
3. Alcon Make 3MFD 1000VDC 2 Numbers
4. SMPS Select Make 24Volt 5 Amp
5. Firing Module
6. Diode 15Amp
7. PID Temperature Controller

antsProsys™
The Power of Imagination

Ants Innovations Private Limited
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Annexure–XIX
COMPLIANCE STATEMENT

Date: 18/10/2024

Tender No : P/NC/337/SS/DB/GEM/24-25
Our Reference No : Q/7858/CSIR-NML/Induction Furnace/24-25

Name of the Firm: Ants Innovations Private Limited

S. No.	Name of specifications/ part Accessories of tender enquiry	Specifications of quoted Model/ Item	Compliance whether "YES" or "NO"	Deviation, if any, to be indicated in unambiguous terms	Whether the compliance/ deviation is clearly mentioned in technical/ literature Page no. in OEM technical brochure
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 10kg equivalent of steel or 4.5kg equivalent of magnesium. • It should be compatible for ferrous and non-ferrous metals.	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 10kg equivalent of steel or 4.5kg equivalent of magnesium. • It would be compatible for ferrous and non-ferrous metals.	YES	NA	NA
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.	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.	YES	NA	NA
3	Melt capacity basis: Minimum 10kg of Fe or equivalent 4.5kg of magnesium	Melt capacity basis: Minimum 10kg of Fe or equivalent 4.5kg of magnesium	YES	NA	NA

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4	Operating temperature: 1700°C or higher	Operating temperature: 1700°C or higher	YES	NA	NA
5	Working Crucible: System should be compatible with 1. MgO crucible 2. Alumina crucible 3. Graphite crucible Furnace should be supplied with 2 number of item a.b.c. matching to the dimension suitable for induction coil	Working Crucible: System should be compatible with 1. MgO crucible 2. Alumina crucible 3. Graphite crucible Furnace would be supplied with 2 number of item a.b.c. matching to the dimension suitable for induction coil	YES	NA	NA
6	Induction coil: 1. Interchangeable water-cooled copper coils for ≥ 10kg of Fe based alloy melting or equivalent 4.5kg of magnesium 2. It should be duly coated to protect coils	Induction coil: 1. Interchangeable water-cooled copper coils for ≥ 10kg of Fe based alloy melting or equivalent 4.5kg of magnesium 2. It would be duly coated to protect coils	YES	NA	NA
7	Control: • PID Controller-based control system for measurement & control of the temperature of the melt, induction power, water system and other parameter during melting operation. • Control console with safely interlocks.	Control: • PID Controller-based control system for measurement & control of the temperature of the melt, induction power, water system and other parameter during melting operation. • Control console with safely interlocks.	YES	NA	NA
8	Vacuum System: • Suitable Rotary vacuum pump of reputed make should be provided to reach at least $5X10^{\wedge-3}$ mbar (at 30°C and dry condition) • Suitable gauge (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	Vacuum System: • Suitable Rotary vacuum pump of reputed make would be provided to reach at least $5X10^{\wedge-3}$ mbar (at 30°C and dry condition) • Suitable gauge (in mbar, preferably digital pirani gauges) and indicators would be provided with system. • Additional provisions should be kept in vacuum line to integrate the diffusion pumps of adequate	YES	NA	NA

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	rating to serve future requirements of $5X10^{-5}$ mbar. • Feedback control throttle valve to control vacuum.	rating to serve future requirements of $5X10^{-5}$ mbar. • Feedback control throttle valve to control vacuum.			
9	Temperature measurement: Suitable continuous temperature monitoring with feedback control system	Temperature measurement: IR Dual Colour optical Pyrometer for continuous temperature monitoring with feedback control system	YES	NA	NA
10	Melting time: <60 minutes for 10kg Fe-based alloy equivalent 4.5kg of Magnesium.	Melting time: <60 minutes for 10kg Fe-based alloy equivalent 4.5kg of Magnesium.	YES	NA	NA
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. (Manufacture shall provide Test certificate) • Water-cooled trap should be provided to the chamber for trapping high volatile metals. • The melting chamber should have following ports 1. Viewing port-minimum 2Nos 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 intel/outlet port 6. Crucible cover	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 would be of 10^{-5} mbar. (Manufacture will provide Test certificate) • Water-cooled trap would be provided to the chamber for trapping high volatile metals. • The melting chamber would have following ports 1. Viewing port-minimum 2Nos 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 intel/outlet port 6. Crucible cover	YES	NA	NA

	7. Power feed through port 8. Sampling port 9. Bridge breaker port 10. Thermocouple port Detailed drawing should be submitted along with the offer.	7. Power feed through port 8. Sampling port 9. Bridge breaker port 10. Thermocouple port Detailed drawing would 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 pyrometer for measuring accurate temperature. Auto/Manual switch to adjust the power either manually or depending upon the feedback from the thermocouple/optical pyrometer	Feedback Control System: PID programmable profile temperature controller feedback circuit to work in conjunction with thermocouple and optical pyrometer for measuring accurate temperature. Auto/Manual switch to adjust the power either manually or depending upon the feedback from the optical pyrometer	YES	NA	NA
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	Crucible tilting and casting: • Mechanized/Motorized tilting mechanism • Suitable mould would be provided for MG casting • Mould table would 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	YES	NA	NA
14	Power supply: 40kW induction power supply for melting ≥10kg of Fe-based alloys or equivalent 4.5kg of magnesium with fast control of input voltage and variable frequency to get smooth control of the temperature	Power supply: 40kW induction power supply for melting ≥10kg of Fe-based alloys or equivalent 4.5kg of magnesium with fast control of input voltage and variable frequency to get smooth control of the temperature	YES	NA	NA
15	Power Panel: • 40kW with suitable power supply system. • The power supply	Power Panel: • 40kW with suitable power supply system. • The power supply	YES	NA	NA

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	should have the following protections. ✓ MCCB at the input. ✓ Overloaded Protection. ✓ Inverter Current Limit. ✓ Surge protection with snubber circuit. ✓ Over temperature protection. ✓ Cooling temperature 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 progress flow control diagram. • The panel should be provided with local push for on-off for all the components of the induction melting furnace along with emergency control button.	would have the following protections. ✓ MCCB at the input. ✓ Overloaded Protection. ✓ Inverter Current Limit. ✓ Surge protection with snubber circuit. ✓ Over temperature protection. ✓ Cooling temperature interlocks with pressure and temperature. • The Panel meters would be provided to indicate ✓ DC Voltage. ✓ DC Current ✓ Energy meter • The panel would also be provided with plate showing components in progress flow control diagram. • The panel would be provided with local push 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 unprecedent damage.	Safety Controls: All the safety system would be provided to prevent unprecedent damage.	YES	NA	NA
17	Water cooling system: Suitable chiller with rate capacity to be provided for the melt chamber, furnace coil, vacuum system and all the sub system by means of water chiller Water cooling to Induction power supply would be exclusive.	Water cooling system: Suitable chiller with rate capacity to be provided for the melt chamber, furnace coil, vacuum system and all the sub system by means of water chiller Water cooling to Induction power supply would be exclusive.	YES	NA	NA
18	Warranty: • 1-Year comprehensive warranty after commissioning.	Warranty: • 1-Year comprehensive warranty after commissioning.	YES	NA	NA

	• AMC (2 Preventive + 1 breakdown) for the subsequent 3 years should be provided separately. • AMC cost will be considered for price comparison.	• AMC (2 Preventive + 1 breakdown) for the subsequent 3 years would 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. • Calibration certificate for thermocouples should be supplied.	Certification: • All these components (Pump, Induction Coil, pipeline valves, pressure gauge, and thermocouple) would be of International Standard and certified. • All electrical components in the equipment would be of reputed make, along with a CE stamp wherever available. • Calibration certificate for thermocouples would be supplied.	YES	NA	NA
20	Engineering drawing: Detail engineering drawing of the proposed setup is to be provided along with the technical bid for an evaluation.	Engineering drawing: Detail engineering drawing of the proposed setup is provided along with the technical bid for an evaluation.	YES	NA	NA
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 (Airline and water line) should be supplied	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 (Airline and water line) should be supplied	YES	NA	NA
	Additional Requirements:				
1	Scope of supply and incidental service: Installation, Training, and commissioning: a. 2-3day's of onsite operational and maintenance training	Scope of supply and incidental service: Installation, Training, and commissioning: a. 2-3day's of onsite operational and maintenance training	YES	NA	NA

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	at the NML, site for students/technical staff b. 3 successful trails as a part of the commissioning with own materials. c. 2 sets of operating manual and drawing, a hard copy and a soft copy, should be provided. d. Pre-installation requirement to be submitted during technical bid	at the NML, site for students/technical staff b. 3 successful trails as a part of the commissioning with own materials. c. 2 sets of operating manual and drawing, a hard copy and a soft copy, would be provided. d. Pre-installation requirement are 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.	Inspection and test: Pre-dispatch inspection will be done at our site. The final inspection will be at the NML, site during installation.	YES	NA	NA
3	Acceptance test: Demonstration of vacuum induction melting under mentioned parameters in the technical specification during commissioning trials.	Acceptance test: Demonstration of vacuum induction melting under mentioned parameters in the technical specification during commissioning trials.	YES	NA	NA
4	CSIR-NML scope: Site for installation and single-point power and water supply, gas cylinders for installation & commissioning trials	CSIR-NML scope: Site for installation and single-point power and water supply, gas cylinders for installation & commissioning trials	YES	NA	NA
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 spare of the proposed system for at least	following documents submitted 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 swould ensure the availability for spare of the proposed system for at least 5year's	YES	NA	NA

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	5year's 5. Foundation drawings and Foundation bolts may be Provided by.	5. Foundation drawings and Foundation bolts may be Provided by.			

Yours sincerely

Signature & Stamp
ASHWINI JAIN - DIRECTOR
ANTS INNOVATIONS PRIVATE LIMITED
UnitNo.1, 2 & 105, New JivdaniIndustrialEstateNo.1,
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Palghar, Maharashtra–401208
Date: 18/10/2024

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Date: 23/12/2024

To,
Shri Bhola Azad,
SPO, NML
Jamshedpur

Subject : Response to clarifications

Your reference: Clarifications in our bid against tender ref no. P/NC/337/SS/DB/GEM/ Dt. 16/12/24

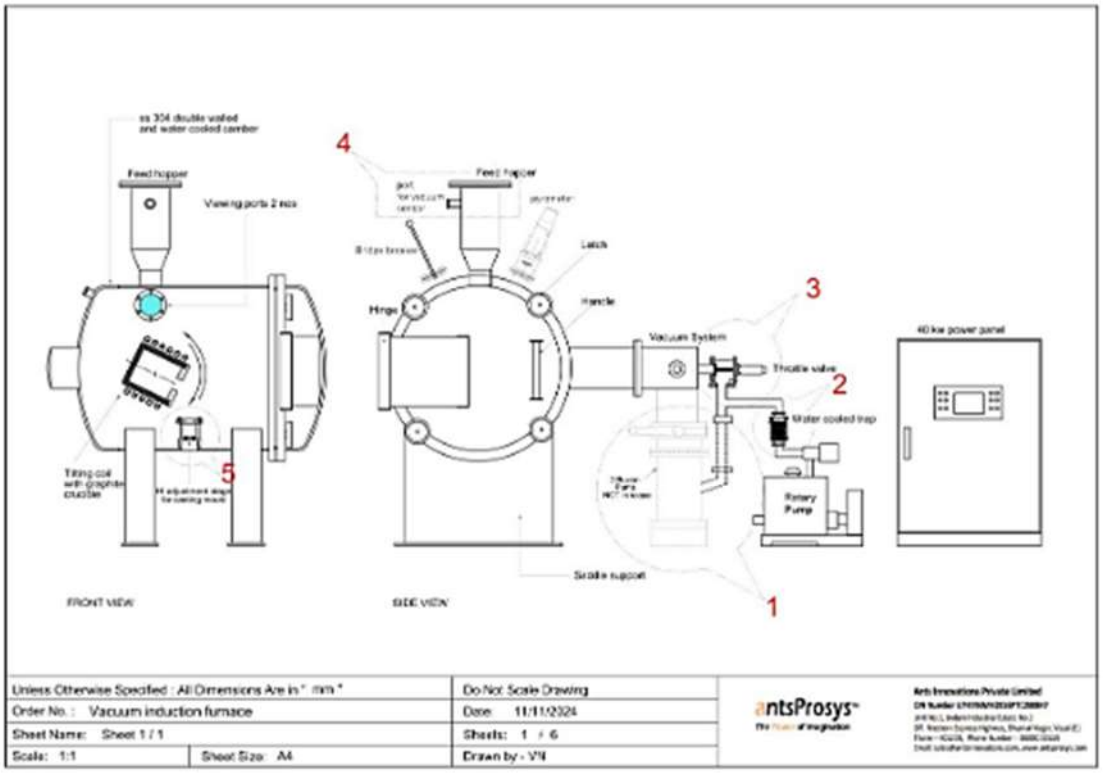
Our Reference: Q/7858/CSIR NML/Induction Furnace 1200/24-25

Dear Sir,

Thank you very much for letting us know your clarifications.

Kindly find below our response.

1. Proposed system will be able to reach at least $5x10^{-5}$ mbar at 30 deg C and dry condition.



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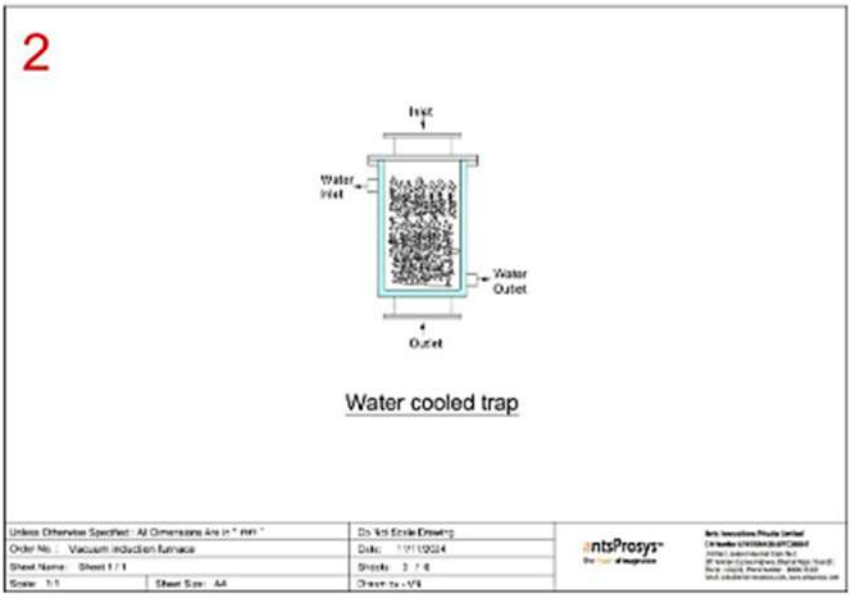
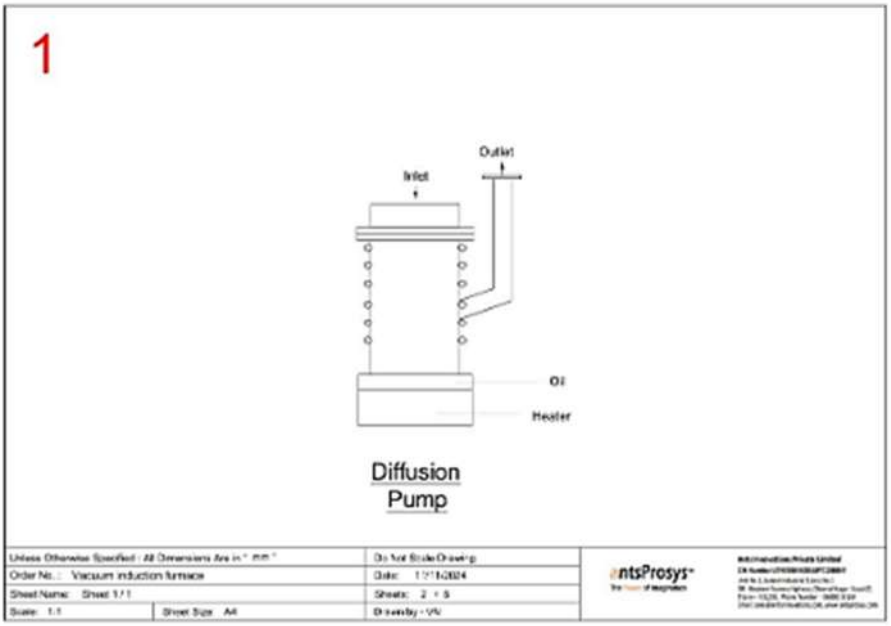
2. Kindly find below the drawing of water cooled trap in vacuum line for trapping high volatile metals.



3. We have kept a 75mm port with valve for addition on diffusion pump to furnace vacuum chamber. This port is shown in drawing and the DP is shown below.



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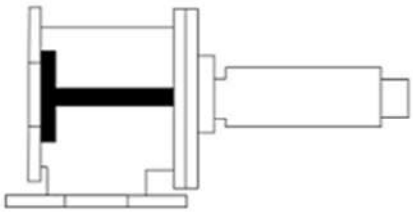
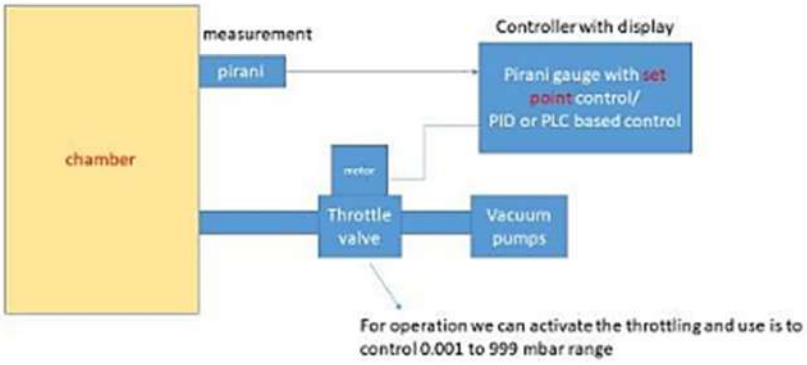
4. Kindly find below the drawing of Throttle valve which is provided in vacuum line connection to rotary pump. This valve will be controlled by a vacuum sensor which will sense the vacuum level at which the throttle valve will open and close to maintain the desired vacuum in chamber.



Throttle valve



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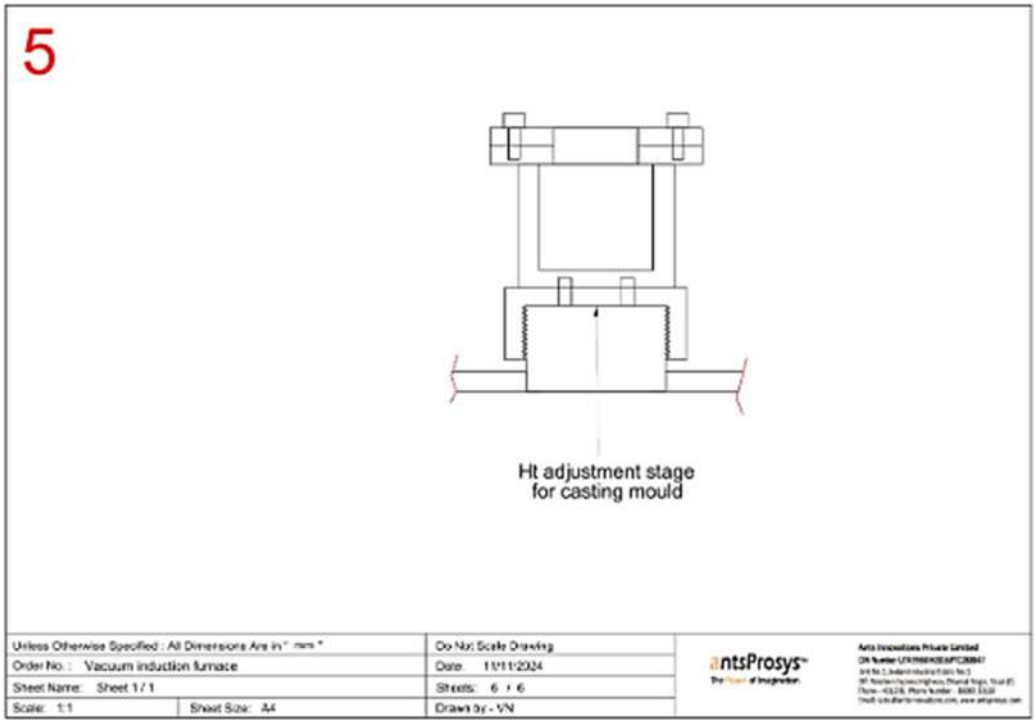
5. Find below the drawing of height adjustable casting mold provided with system



6. We comply to your tender requirement of payment terms.

7. We comply to your tender requirement submission of PBG and

8. We comply to your tender requirement of delivery period as per tender documents.

We look forward to this valued opportunity for serving you with our quality products and services,
In case of any query kindly revert,
Warm Regards,

Ashwini Jain
Director
Ants Innovations Pvt. Ltd