वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद्
Council of Scientific & Industrial Research
राष्ट्रीय वांतरिक्ष प्रयोगशालाएं
National Aerospace Laboratories

CSIR - NAL Estd. 1959
ISO 9001 : 2015
Certified Organization

INVITATION FOR BIDS/NIT

Tender No. NAL/PUR/MSD/627/19-Y **Dated: 02-Mar-2020**

CSIR- National Aerospace Laboratories (NAL), Bengaluru, India is one of the premier laboratories under Council of Scientific and Industrial Research (CSIR), an autonomous body under Department of Scientific and Industrial Research, Government of India, New Delhi. CSIR-NAL is a Science and Knowledge based Research, Development and Consulting Organization. It is internationally known for its excellence in Scientific Research in Aerospace Engineering.

The Director, CSIR-NAL invites online quotation for procurement of the following item(s) for day to day research work.

Sl.No.	Description of Items	Unit	Quantity
01	**High Temperature (1400 degree C), Three Zone Horizontal, Split Tube Vacuum Furnace with Chiller. Please refer Annexure for detailed specification.**	Nos	01

Single / Double Bid	**Two Bid**
Bid Security (EMD) (in INR)	**Rs. 30000/-**
Performance Security	**10% of the purchase order value**

01. Tender Documents may be downloaded from Central Public Procurement Portal https://www.etenders.gov.in. Aspiring Bidders who have not enrolled/ registered in e- procurement should enroll/ register before participating through the website https://www.etenders.gov.in. The portal enrolment is free of cost. Bidders are advised to go through instructions provided at 'Instructions for online Bid Submission'.

02. Tenderers can access tender documents on the website (For searching in the NIC site https://www.etenders.gov.in, kindly go to Tender Search option, select tender type and select ' Council of Scientific and Industrial Research' in organization tab and select NAL-Bengaluru-CSIR in department type Thereafter, Click on "Search" button to view all CSIR-NAL, Bengaluru tenders). Select the appropriate tender and fill them with all relevant information and submit the completed tender document online on the website https://www/etenders.gov.in as per the schedule given in the next page.

03. Either the Indian Agent on behalf of the Foreign principal or the Foreign principal can bid directly in a tender but not both. However, the offer of the Indian Agent should also accompany the authorization letter from their principal. To maintain sanctity of tendering system, one Indian Agent cannot represent two different Foreign principals in one tender.

04. Unsolicited / conditional / unsigned tenders (Quotations) **shall not** be considered. Quotations received after the due date and time **shall be summarily rejected.**

05. The Bidder shall comply the terms and conditions of the tender, failing which, the offer shall be liable for rejection.

06. The Director, CSIR- National Aerospace Laboratories., Bengaluru reserves the right to accept any or all the tenders either in part or in full or to split the order without assigning any reasons there for.

Raman Kumar
(Section Officer S&P)

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CSIR-National Aerospace Laboratories, Bengaluru-560 017, INDIA

SCHEDULE CUM CRITICIAL DATE SHEET

1	Name of Organization	CSIR-National Aerospace Laboratories, Bengaluru	
2	Tender Reference No	NAL/PUR/MSD/627/19-Y dated: 02-Mar-2020	
3	Tender Type (Open/Limited/EOI/Auction/Single)	Limited Tender	
4	Type/Form of Contract (Work / Supply / Auction / Service / Buy / Empanelment / Sell)	Supply	
5	No of Covers (One/Two/Three/Four)	Two	
6	Tender Category (Services/Good/Works)	Goods	
7	Allow Resubmission (Only in online mode within scheduled period)	Yes	
8	Allow Withdrawal (Only in online mode within scheduled period)	Yes	
9	Allow Offline Submission	No	
10	Work Item Title	High Temperature (1400 degree C), Three Zone Horizontal, Split Tube Vacuum Furnace with Chiller.	
11	Work Description	High Temperature (1400 degree C), Three Zone Horizontal, Split Tube Vacuum Furnace with Chiller.	
12	Delivery Schedule	60 days from the date of purchase order	
13	Product Category (Civil Works / Electrical Works / Fleet Management / Computer Systems)	R & D Equipment	
14	Is Multi Currency Allowed	Yes	
15	a) Tender Publishing Date -	03-Mar-2020	1800 Hrs
	b) Document Download Start Date-	03-Mar-2020	1800 Hrs
	c) Bid Submission Start Date-	03-Mar-2020	1800Hrs
	d) Bid Submission End Date-	23-Mar-2020	1000 Hrs
	e) Bid Opening Date-	24-Mar-2020	1100 Hrs
16	Bid Validity Days	90 days	
17	Address for communication	Stores and Purchase Officer CSIR-National Aerospace Laboratories, HAL Airport Road, Kodihalli, Bengaluru - 560017	
18	Inviting Officer	Director, CSIR-NAL	
19	Contact No	25086040, 25086041	
20	E-mail Address	purchasek@nal.res.in	
21	Detailed specification of item	Refer Invitation for bids / NIT	
22	Tender Terms & Conditions & Instruction for online bid submission	The prospective bidders are requested to refer to the Standard Tender Document available on NAL Internet **(www.nal.res.in)** under the icon Tender-Purchase before formulating and submitting their bids	

Note:

a) ***Participation in this tender is by invitation only and is limited to the selected bidders. Unsolicited offers are liable to be ignored. However, bidders who desire to participate in such tenders in future may bring it to the notice of Procuring Entity and apply for registration.***

b) ***To get registered as an approved bidder with the procuring entity please refer our website*** www.nal.res.in ***and submit.***

NAL/PUR/MSD/627/19-Y ANNEXURE

High Temperature (1400°C), Three Zone, Horizontal, Split Tube Vacuum Furnace with Chiller

The split tube furnace is comprised of a furnace body which is hinged and splitted into two halves along its length with symmetric placement of heating elements on either side of the tube. This makes exchange of work tubes easier which is an important end use requirement. Detailed technical specification of the furnace is given below;

1. FEATURES		
1.1	Type	Horizontal Three Zone Split Type Tube Furnace
1.2	Control zone	Three
1.3	Design temperature (°C)	1400
1.4	Continuous working temperature (°C)	1300
1.5	Gas purging & Vacuum	For evacuation and refill
1.6	Dimension of Hot zone and constant Temperature zone OD x ID x L (mm) inside Tube	3 Zones of 300 mm length each as shown in Fig. 1. Total Length (L) of hot zone = 900 mm; Constant temperature zone (±3°C): Length 300 mm OD and ID as per the dimension of the Tube as specified later
1.7	Rate of Temperature Rise	Rate of heating in a step as per the process requirement from 2°C/minute to 10°C/minute from Room Temperature to 1300° C
2. BODY		
2.1	Construction	MS Body fabricated from 16" and 18" MS sheet, Powder coated for superior finish. Double layer steel body for low surface temperature.
2.2	Outer dimensions L x W x H (mm)	Approx 1800 x 850 x 1100
2.3	Skin temperature at 1300 °C	~ 60 °C
2.4	Number of cooling fans	2 Nos. in control panel
2.5	Number of air filters	1 in control panel
3. INSULATION		
3.1	Insulation type	All vacuum formed latest technology ceramic fiber board insulation for light weight and low energy consumption. Only those fiber materials are to be used which are not classified as carcinogenic according to TRGS 905, class 1 or 2.
3.2	Design	Modular Insulation Design which is easy to replace
3.3	Number of insulation layers	2
3.4	Hot face insulation temp rating (°C)	1600
4. HEATING ELEMENTS AND THERMOCOUPLE		
4.1	Heating element type	Alpha rod type SiC elements
4.2	Thermocouple type and number	R Type, suitably housed in protective Aluminasheath, Total number of thermocouple 03 for three different zones Thermocouple calibration certificate to be provided

5. CONTROL PANEL		
5.1	Temperature control system	Eurotherm 2416 or above to suit requirement as mentioned in 1.7 Three zones have three separate controllers and control system. Furnace can be cooled in controlled manner if cooling rate is less than natural cooling rate.
5.2	Temperature control accuracy	±1°C within constant temperature zone
5.3	Temperature Uniformity in the heated area with constant temperature zone	± 3 °C of set temperature

High Temperature (1400°C), Three Zone, Horizontal, Split Tube Vacuum Furnace with Chiller

5.4	Calibration	Furnace calibration report to be provided
5.5	Over temperature protection	Yes
5.6	Current limit + feedback	Yes
6. HOT ZONE TUBE, FLANGES, RADIATION SHIELD, UNIFORMITY		
6.1	Hot zone tubes (i) Alumina (ii) Quartz	 (i) ODxIDxL: 120x110x1600 mm with tolerance of +/- 5mm (ii) ODxIDxL: 150x145x1600 mm with tolerance of +/- 3mm
6.2	Flanges	a) SS flanges with double Viton O-ring for leak tightness. b) Flanges with provision for vacuum and gas purging. Vacuum provision with KF 25 vacuum port c) Flange specially designed for easy sample loading and unloading with hinge type support d) Flanges and tube to have heavy duty support e) Flange to have provision for carrying K Type thermocouple for in-situ temperature measurement of samples
6.3	Provision for evacuation port on flange	KF 25 Flange
6.4	Provision for gas inlet through the flange	Needle valves

7. VACUUM SYSTEM		
7.1	Vacuum pump	Rotary Vacuum Pump (HVI-250), Double stage, Direct Drive, Pumping Speed 250 liters per mint Motor Single phase 230 VAC, 0.5 HP, Oil charge (2ltrs)
7.2	25 mm diameter SS bellow for KF 25 end flange, 2 meter length	2 number
7.3	1-inch butterfly valve suitable for $x10^{-2}$ mbar vacuum	1 number for chamber isolation
7.4	KF 25 – KF 10 SS T joint	1 number
7.5	Pirani Gauge	1 number
7.6	KF-25/KF40 Clamps, ring, center ring	2 sets
7.7	KF-10 Clamps, ring, center ring	2 sets
8. CHILLER SYSTEM		
8.1	Water Chilling Unit	A chiller unit to chill the water to circulate the SS fittings for the Quartz tube for better vacuum and air purging is required.
8.2	Cooling Capacity	2000 Watts
8.3	Temp controller	Automatic on/off Microprocessor based PID/Digital temperature controller with set temperature
8.4	Display resolution & Control Sensitivity	0.1 °C
8.5	Control Readout	Actual and Set point
8.6	Cooling	• Single stage refrigeration system • Automatic cooling on/ off facility
8.7	Refrigerant	CFC Free R134a/ R404a
8.8	Working temperature range	5-10°C for secondary coolant (water)
8.9	Temperature range	Ambient to 5°C
8.10	Temperature uniformity	Better than +2°C

High Temperature (1400°C), Three Zone, Horizontal, Split Tube Vacuum Furnace with Chiller

8.11	Ambient temp. Recommendation	<30.0°C
8.12	Sensor	Pt 100 (RTD)- 3 wire
8.13	Stirrer/Pump cum stirrer	To maintain temperature uniformity & for circulation
8.14	Pumping capacity	10 lit per minute at zero head
8.15	Alarm type	Deviation high or low
8.16	Inner tank	Stainless steel 304 grade duly polished
8.17	Outer body	Mild steel with powder coating
8.18	Condenser	Fin and tube air cooled
8.19	Wheel mounting	The water chilling plant should be constructed with the wheel to move the equipment easily.

9. SPARES		
9.1	Sample placement rod	SS rod to place sample at center of hot zone

10. **Furnace design drawing:** Drawing should be submitted along with the technical bid for prior approval from NAL.
11. **Prior Supply Experience**: The firms, only those have previously supplied at least two, three zone split tube furnaces of 1400°C are eligible to submit their bids with complete details related to previous supply such as; the address of the host Institute, contact person and photograph of the supplied system.
12. **Predispatch Inspection**: The Furnace should be tested at vendor's place before dispatch
13. **Installation Requirement**: Vendor should provide the site preparation details for installation of the furnace
14. **Operation Manual**: Vendor should provide a manual with electrical drawing, standard operation procedures, troubleshooting etc.
15. **Acceptance Test**
    - Full scale temperature test as per specifications
    - Vacuum leak rate test at maximum temperature for both Quartz and Alumina Tube

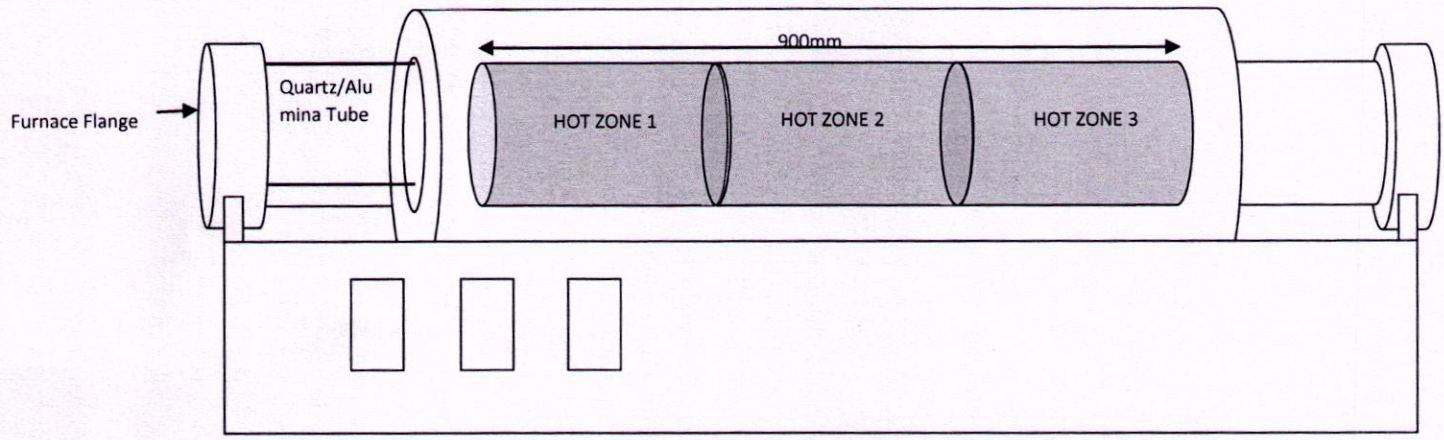

FIG 1. SCHEMATIC OF FURNACE AND ALUMINA TUBE ARRANGEMENT