भारत सरकार/Government of India
अंतरिक्ष विभाग/Department of Space
द्रव नोदन प्रणाली केंद्र
LIQUID PROPULSION SYSTEMS CENTRE
एच ए एल II स्टेज, 80 फीट रोड
HAL II STAGE, 80 FEET ROAD,
बेंगलूरु/BANGALORE-560 008.
फोन सं./Phone No.080 25037171/140
ई-मेल/Email: purchase@lpscb.gov.in

दिनांक/Date: 15.04.2026

लोक निविदा सूचना सं. एल बी2025000409-01 दिनांक 15.04.2026
PUBLIC TENDER NOTICE NO. LB2025000409-01 DATED 15.04.2026

एल पी एस सी, तुमकुरु में निर्वाती शुष्कन का अभिकल्पन, संविरचन, परीक्षण, आपुर्ति, प्रतिस्थापन एवं चालू करने के लिए निविदा

Tender for Design, Fabrication, Testing, Supply, Installation and Commissioning of Vacuum Drying Oven at LPSC-Tumakuru

निविदा वर्गीकरण: लोक निविदा
Tender Classification: PUBLIC TENDER

निविदा की निर्धारित तिथियाँ/TENDER SCHEDULE

बोली प्रस्तुति की आरंभिक तिथि/Bid Submission Start Date	:	15.04.2026 10:00
बोली स्पष्टीकरण की नियत तिथि/Bid Clarification Due Date	:	23.04.2026 16:00
बोली प्रस्तुतीकरण की नियत तिथि/Bid Submission Due Date	:	05.05.2026 14:00
बोली खुलने की तिथि/Bid Opening Date	:	05.05.2026 14:30
मूल्य बोली खुलने की तिथि / Price Bid Opening Date	:	20.05.2026 14:00

निविदा दस्तावेज़ https://www.isro.gov.in/ OR https://eproc.vssc.gov.in या इसरो ई-प्रापण पोर्टल से डाउनलोड किए जा सकते हैं।/Tender documents can be downloaded from https://www.isro.gov.in/ OR https://eproc.vssc.gov.in or ISRO E-Procurement Portal.

हस्ताक्षरित/Signed
क्रय व भंडार अधिकारी/Purchase & Stores Officer

GOVERNMENT OF INDIA
DEPARTMENT OF SPACE
LIQUID PROPULSION SYSTEMS CENTRE (LPSC-B)
BANGALORE

Tender for Design, Fabrication, Testing, Supply, Installation and Commissioning of Vacuum Drying Oven at LPSC-Tumakuru

Bids to be submitted online

Tender No.: LPSC-B/Liquid Propulsion Systems Centre, Bengaluru/LB202500040901 dated 15-04-2026

A. Tender Details

Tender No :	**LPSC-B/Liquid Propulsion Systems Centre, Bengaluru/LB202500040901**
Tender Date :	**15-04-2026**
Tender Classification:	**GOODS**
Purchase Entity :	**Liquid Propulsion Systems Centre, Bengaluru**
Centre :	**LIQUID PROPULSION SYSTEMS CENTRE (LPSC-B)**

Design, Fabrication, Testing, Supply, Installation and Commissioning of Vacuum Drying Oven at LPSC-Tumakuru

Design, Fabrication, Testing, Supply, Installation and Commissioning of Vacuum Drying Oven at LPSC-Tumakuru

A.1 Tender Schedule

Bid Submission Start Date :	**15-04-2026 10:00**
Bid Clarification Due Date :	**23-04-2026 16:00**
Bid Submission Due Date :	**05-05-2026 14:00**
Bid Opening Date :	**05-05-2026 14:30**
Price Bid Opening Date :	**20-05-2026 14:00**

B. Tender Attachments

NA

Instructions To Vendors

1. Instructions to Vendors

1. LPSC(B) invites offers through eprocurement portal (https://eproc.isro.gov.in) for the supply / service of items as listed in the Tender document.

2. Prospective vendors interested in participating in the tendering process need to get registered in the e-procurement portal by using Digital Signature Certificate. Offers submitted through our online portal only shall be considered and offers received through fax or email or in person shall not be considered.

3. The Tenderers are requested to update their address and contact details, if necessary and submit the Bids online at least two days prior to closing date to avoid last minute system / network related problems. In case of any technical issues, tenderers may contact helpdesk team (Tel: 0471 2565454, email: eprocure@vssc.gov.in, egps@lpscb.gov.in) for resolution. Request for the extension of the due date for such instances shall not be considered.

4. GST @ 5% is applicable for following goods mentioned under Sl. No. 243B as per Department of Revenue Notification No. 25/2018 - Integrated Tax (Rate) dated 31/12/2018 (Amendment to Notification Nos. 07/2018 dated 25/01/2018 and 01/2017 dated 28/06/2017) and Department of Revenue Notification No. 24/2018 - Central Tax (Rate) dated 31/12/2018 (Amendment to Notification Nos. 06/2018 dated 25/01/2018 and 01/2017 dated 28/06/2017) and Government of Karnataka Notification No. 24/2018 dated 31/12/2018 (Amendment to Notification Nos. 06/2018 dated 25/01/2018 and 01/2017 dated 29/06/2017).
"Scientific and technical instruments, apparatus, equipment, accessories, parts, components, spares, tools, mock ups and modules, raw material and consumables required for Launch Vehicles and Satellites and Payloads"

5. LPSC(B), ISRO is eligible for Customs Duty Concession vide Notification No. 50/2017-Customs dated 30/06/2017 (Sl. No. 539), Notification No. 5/2018-Customs dated 25/01/2018 (Sl. No. 539A) and Notification No. 05/2025-Customs dated 01/02/2025 (Sl. No. 539A). Necessary Customs Duty Concession Certificate shall be provided if applicable.

6. Offer Validity: The offer shall be valid for a period of 90 days (for Single Part Tender) and 120 days (for Two Part Tender) from the date of opening of the tender or any other period as specified in the Tender document. Offers with lesser validity period than that specified are liable for exclusion from the

procurement process.

7. In case of Two Part Tender, Tenderers shall not mention any kind of price element in Techno-Commercial Bid. If any Price element is mentioned in the Techno-Commercial bid, their offer shall be liable for rejection.

8. LPSC(B) reserves the right to accept or reject any quotation in part or in full or part without assigning any reason thereof. LPSC(B) shall be under no obligation to accept the lowest tender and reserves the right to accept whole or any part of the tender or part of the quantity offered and the Tenderers shall supply the same at the rates quoted.

9. Bank Details: Tenderer shall provide their bank details such as IFSC code, IBAN No. , SWIFT etc. along with their offer which shall be not be changed till completion of supply/service.

10. Applicable Law: The Contract shall be governed by Indian Law for the time being in force and jurisdiction shall lie in the Courts of India.

11. Only Class-I and Class-II Local suppliers as per Public Procurement Policy (Preference to Make in India) Order, 2017 are eligible to participate in the bid unless otherwise specified in the Tender document.

12. As far as implementation of Public Procurement Policy (Preference to Make in India) Order, 2017 is concerned, the Office Orders vide No. P-45021/2/2017-B.E-II dated 15/06/2017, which is partially modified by Order No. P-45021/2/2017-PP(BE-II) dated 28/05/2018, Order No. P-45021/2/2017-PP(BE-II) dated 29/05/2019, Order No. P-45021/2/2017-PP (BE-II) dated 04/06/2020 and Order No. P-45021/2/2017-PP (BE-II) dated 16/09/2020 and subsequent Amendments issued by the Department for Promotion of Industries and Internal Trade (DPIIT), Ministry of Commerce and Industry regarding Class-I / Class-II local suppliers, Purchase preference, verification of local contents etc. shall be applicable to this tender unless otherwise specified in the Tender document.
Therefore, bidders may ensure compliance of the same while submitting tenders.

13. Price Preference shall be extended to the MSEs under the Public Procurement Policy for MSEs formulated under the Micro, Small and Medium Enterprises Development Act, 2006 unless otherwise specified in the Tender document. Such MSEs shall produce documentary proof of registration as per provisions of the Policy i.e. registration with District Industries Centre (DIC) or Khadi and Village Industries Commission (KVIC) or Khadi and Industries Board (KVIB) or Coir Board or National Small Industries Commission (NSIC) or Directorate of Handicrafts and Handlooms or Udyog Aadhar Memorandum or any other body specified by Ministry of MSME.

14. As per the Rule 144 (xi) of General Financial Rules,2017, any bidder from a country which shares a land border with India will be eligible to bid in this tender, only if the bidder is registered with the

Competent Authority. Competent Authority for the purpose of registration shall be the Registration Committee constituted by the Department for Promotion of Industry and Internal Trade (DPIIT).

15. Resolution of Disputes: Any dispute, disagreement or question arising out of or relating to or in consequence of the contract or to its fulfillment, or the validity of enforcement thereof which cannot be settled mutually, or the settlement of which is not herein specifically provided for, shall within 30 (thirty) days from the date either party informs the other in writing that such dispute or disagreement exists be referred to arbitration by the sole arbitrator. The Arbitrator shall be appointed as per the Indian Arbitration and Conciliation Act 1996 and proceedings will be conducted in Bangalore. The Arbitration proceedings shall be conducted in accordance with and subject to the Arbitration and Conciliation Act 1996 (Act 26 of 1996) as amended from time to time and the decision of the Arbitrator shall be final and binding on the parties thereto. Each party shall bear its own cost of preparing and presenting its case. The cost of Arbitration including the fees and expenses of the Arbitrator shall be shared equally by the parties unless the award provides otherwise. Subject to provisions of this clause, the courts at Bangalore shall have exclusive jurisdiction. Performance under this Contract shall, however continue during Arbitration proceeding and no payment due or payable by the parties hereto shall be withheld unless any such payment is/or forms a part of the subject matter of the Arbitration proceedings.

16. Force Majeure: Neither party shall bear responsibility for the complete or partial non-performance of any of his obligations if the non-performance results from such force majeure circumstances such as, but not restricted to, flood, fire, earthquake, civil commotion, sabotage, explosion, epidemic, quarantine restriction, strike, lock-out, freight embargo, acts of the Government, acts of public enemy and other acts of God as well as war or revolution, military operation, blockade, acts or actions of State authorities or any other circumstance beyond the control of the parties provided the other party is notified in writing within 21 days from the date of commencement of the unforeseeable event.

2. Local Content Declaration

1. DECLARATION OF LOCAL CONTENT
(To be given on company letter head with self certification - For tender value below Rs. 10 Crores
(To be given by Statutory Auditor or Cost Auditor or Cost Accountant or CA - For tender value above Rs. 10 Crores)
Date:
To,
Sub: Declaration of Local content
Tender Ref No:
Name of Tender:
1. Country of Origin of Goods being offered:
2. We hereby declare that items offered has -----% local content:
3. Details of Local Value additions:
4. Address At which Local value addition is being made:

"Local Content" means the amount of value added in India which shall, be the total value of the item being offered minus the value of the imported content in the item (including all customs duties) as a proportion of the total value, in percent.
It is certified that the above mentioned Local content is excluding the following (a) (b) & (c):
a. Imported items sourced locally from resellers/distributors are excluded from calculation of the above local content.
b. The license fees/royalties paid/ technical charges paid out of India shall be excluded from local content calculation.
c. Procurement/Supply of repackaged/refurbished/rebranded imported products as understood commonly shall be treated as reselling of imported products and shall be excluded from calculation of local content. The definition of repackaged /refurbished/rebranded imported products is as follows; Refurbishing means repair or reconditioning of an imported product does not amount to manufacture because no new goods come into existence. Repackaging means repacking of imported goods from bulk pack to smaller packs would not ordinarily amount to manufacture of a new item. Rebranding means relabeling or renaming or change in symbol or logo/makes or corporate image of a company/organization/ firm for an imported product would amount to rebranding.

It is certified that as per DPIITs OM Ref P-45021/102/2019-BE-II-Paart(1)(E-50310) Dtd. 04/03/2021 the local content mentioned above, by which we are Class-I local suppliers / Class-ll local suppliers, does not contain services such as transportation, insurance, installation, commissioning, training and after sales service support like AMC / value addition.
"False declaration will be in breach of Code of Integrity under Rule175(1)(i)(h)of the General Financial Rules for which a bidder or its successors can be debarred for up to two years as per Rule 151 (iii) of the General Financial Rules along with such other actions as may be permissible under law."

Yours faithfully,
(Signature of the Bidder/OEM with Official seal)

C. Bid Templates

C.1 Technical Bid - Design, Fabrication, Testing, Supply, Installation and Commissioning of Vacuum Drying Oven at LPSC-Tumakuru

1. SUPPLY OF VACUUM OVEN

Item specifications for SUPPLY OF VACUUM OVEN

Sl No	Specification	Value	Compliance	Offered Specification	Remark
1	Refer uploaded tender document		-		

Document : RFP

Document : Compliance sheet

Common Specifications (Applicable for all items)

Sl No	Specification	Value	Compliance	Offered Specification	Remark
1	Refer uploaded tender document		-		

Supporting Documents required from Vendor

1. Refer uploaded tender document - Section E

5 additional documents can be uploaded by the vendor

C.2 Commercial Terms / Bid

Sl. No.	Description	Compliance	Vendor Terms
1	Refer uploaded tender document	Yes / No / Explain	
2	Goods and Services Tax (GST): Kindly mention percentage of GST considered in your offer along with HSN Code.	Yes / No / Explain	
3	Delivery Terms: FOR LPSC, Tumakuru	Yes / No / Explain	
4	Delivery Period: Items shall be supplied and installed and site acceptance tested within 6 months from the approval of drawings by LPSC. Drawings and necessary documents for clearance shall be submitted for approval within 1 month from placement of P.O.	Yes / No / Explain	
5	Payment Terms: 100% payment shall be made within 30 days of receipt and acceptance including installation, if any, of the items at our site.	Yes / No / Explain	
6	Liquidated Damages (LD): If the ordered items are not supplied within the delivery schedule, LD shall be levied from your bill @ 0.5% of the order value per week or 0.5% of the value of the stores for which the delivery is delayed for each week of delay subject to a maximum of 5% of the order value. However, in case of inordinate delay in completion period, LD @ 10% shall be recovered.	Yes / No / Explain	
7	Warranty: The items shall be warranted for a minimum period of 36 months from the date of supply or acceptance of items at our site which ever is later. Necessary warranty certificate shall be furnished along with the supply.	Yes / No / Explain	
8	Performance Bank Guarantee (PBG): You have to submit PBG towards fulfilment of warranty obligations and performance of the system for 3% of the Order Value from a Nationalized / Scheduled Bank on non-judicial stamp paper of appropriate value valid till the completion of warranty period plus 60 days as per the format provided by Department.	Yes / No / Explain	

9	Security Deposit (SD): You have to furnish a Bank Guarantee from a Nationalized / Scheduled Bank on non-judicial stamp paper of appropriate value for 3% of the order value within 10 days of receipt of order towards the faithful execution of the order valid till the completion of the scope of work as per order plus sixty days (as claim period). SD shall be returned to you immediately on execution of the order satisfactorily as per order terms. In case of non-performance / poor performance, the amount shall be withheld.	Yes / No / Explain	
10	SD cum PBG: In case, if parties are unable to provide two separate BGs, i.e. one for SD and one for PBG, they can submit a combined BG for SD & PBG within 10 days of receipt of order for 3% of order value valid till the completion of total contractual obligation (i.e. supply period plus warranty period plus 60 days) as per the format provided by the Department.	Yes / No / Explain	
11	Insurance: Being a Government of India Department, Insurance is not required at our cost. Please ensure the safe delivery of the ordered item with proper AIR / SEA / ROAD worthy packing.	Yes / No / Explain	
12	Free Issue Material (FIM), if applicable: You have to submit Bank Guarantee for a value equivalent to FIM (if applicable) from a Nationalized / Scheduled Bank on non-judicial stamp paper of appropriate value towards issue of FIM. The BG shall be valid till receipt and acceptance of supply and satisfactory accounting of FIM.	Yes / No / Explain	
13	Address, contact details like Telephone Number, e-mail, etc. on which order to be placed.	Yes / No / Explain	
14	Details of Principal: Address, contact details like Telephone Number, e-mail, etc. (if applicable)	Yes / No / Explain	
15	Bank Details: Bank name, Branch address, Account No., IFSC Code, IBAN Number, SWIFT, etc.	Yes / No / Explain	
16	Local Content (%): Please mention the percentage of Local Content and the location where local value addition takes place (Kindly enclose self-certification document in the prescribed format)	Yes / No / Explain	

17	MSE Status: Kindly mention the classification under MSE and submit supporting documentation (if applicable)	Yes / No / Explain	
18	Validity of offer: 180 days (06 Months) from the date of opening of tender or as specified in the Tender Document. Note: Please ignore sl. no. 06 of attached Annexure (Instruction to vendor)	Yes / No / Explain	
19	Non-Comprehensive AMC: We reserve the right to enter into a separate AMC after completion of warranty period. Kindly include your cost of Non-Comprehensive AMC for a period of three years after expiry of warranty period.	Yes / No / Explain	
20	Preventive Maintenance: One preventive maintenance visit in 06 months i.e. total of 06 visits during the contract period.	Yes / No / Explain	
21	Breakdown Maintenance: The breakdown calls shall be attended within 48 hours of intimation. (Although unlimited free breakdown calls are stipulated, Party may indicate the number of free breakdown visits considered in their offer and for additional breakdown visits, party may quote the charges separately on per day / per visit basis)	Yes / No / Explain	
22	Payment Terms for AMC: Maintenance charges shall be paid within 30 days after completion of each satisfactory Maintenance against submission of Invoice and Service report duly certified by the End User Division.	Yes / No / Explain	
23	Security Deposit (SD) for AMC: You have to furnish a Bank Guarantee from a Nationalized / Scheduled Bank on non-judicial stamp paper of appropriate value for 3% of the AMC value within 10 days of receipt of order towards the faithful execution of the order valid till the completion of the scope of work as per order plus sixty days (as claim period).	Yes / No / Explain	
24	Down-time Compensation: If the service provider fails to attend the breakdown within stipulated time i.e. within 24 hours of intimation, down-time compensation shall be levied at the rate of 0.5% of the Annual Maintenance Charges for every day of delay subject to a maximum of 5% of the Contract Value.	Yes / No / Explain	

25	Liquidated Damages for scheduled maintenance: In case service provider fails to perform the scheduled maintenance within specified interval, Liquidated Damages shall be levied at the rate of 0.5% of the per visit charges for every week of delay subject to a maximum of 5% of the Contract Value.	Yes / No / Explain	
26	Maintenance shall be carried out at our premises only. In case any item has to be taken to your premises for repairs, necessary Bank Guarantee for the value of the item shall be furnished, and valid till returning of the item.	Yes / No / Explain	
27	During AMC, in the event of damages to our property or injury to our personnel due to the negligence of your employees, the responsibility shall solely rest with you.	Yes / No / Explain	
28	Income Tax, as applicable shall be deducted from your bill, at source.	Yes / No / Explain	
29	Country of Origin:	Yes / No / Explain	
30	Any other terms	Yes / No / Explain	

C.3 Price Bid

Sl. No.	Item	Quantity	Unit Price	Currency	Total Price	Remark
1	SUPPLY OF VACUUM OVEN	1.00 Nos.		-		

Common charges (Applicable for all items)

Additional Costs, if any (Value)	
P & F Charges	
Freight if any (Value)	
Installation & Configuration	
Other Costs, if any (Value)	

REQUEST FOR PROPOSAL FOR DESIGN, FABRICATION, TESTING, INSTALLATION AND COMMISSIONING OF VACUUM DRYING OVEN AT LPSC-TUMAKURU

Table of Contents

PART A: TECHNICAL SPECIFICATIONS	
A. SCOPE OF WORK	
	Design, Fabrication, Testing, Installation and Commissioning of Vacuum Drying Oven at LPSC-Tumakuru as per specifications.
B. DETAILED SCOPE OF WORK	
1.	Design of Vacuum drying oven (chamber) with necessary user ports, suction port, view port, instrumentation port, etc.
2.	Submission of design drawings to LPSC for clearance of ports' location, support structure design and housing of all other components.
3.	Design of vacuum pumping system by a combination of backing pump and roots pump, submission of selection criteria for the pumps and design calculations documents and obtain approval from LPSC.
4.	Design of vacuum feed lines, bellows and necessary supporting frames, stands for placing vacuum pumps. The placement layout shall be suitable for easy maintenance. The drawings for the same shall be submitted and approval from LPSC to be obtained.
5.	Design calculations of heating elements, type of heating elements, and power consumption shall be submitted to LPSC for approval.
6.	Fabrication of chamber, support structures, feed lines, control cabinets, etc as per approved design.
7.	Submission of conformance certificates for materials that shall be used for fabrication of drying oven.
8.	Supply of EP gate valves, vacuum gauges and controllers, pressure transmitters and display, pneumatic clamps, HMI, PLC, control components, feed through, etc. as per design.
9.	Supply of glass for front view port & illumination lamp, Viton O-rings as per design and their integration with system.
10.	The PLC system shall have necessary interlocks which shall be approved from LPSC.
11.	Gate valves to be fitted with micro switches, which provide the signal on the valve fully closed position so that even if the electrical signal gives any wrong status, the micro switches will not allow other operation to be carried out.
12.	Carrying out Pre Dispatch Inspection (PDI)
13.	Transportation of all integrated items to MPTTF Tumakuru and installation of the Vacuum drying oven.
14.	Carrying out routing of exhaust lines of vacuum pumps to outside the facility. Feedlines for the same shall be procured and supplied
15.	Carrying out Site Acceptance Testing (SAT): Demonstration of vacuum levels, leak rate, Temperature rate, maximum temperature and complete system performance.
C. GENERAL	
1.	Standard/recommended fabrication & assembly procedures and construction practices shall be adopted.
2.	High quality workmanship using well trained, well qualified certified personnel and well supervisory manpower shall be employed.
3.	Any non-conformance observed during the execution phase shall be reported to LPSC formally through a non-conformance report along with the root cause.
4.	All O-rings shall be of Viton material with suitable hardness and shall be baked as per standards. All O-rings must be inspected for minor cracks etc., prior to use. **Note:** 3 set of spare O-rings of complete system shall be supplied along with system (included in the total cost of system)
5.	Vendor shall submit the final bill of materials, layout of the system to LPSC and obtain approval

	before commencing the fabrication.
6.	All vacuum feed lines, valves, bellows, and chamber shall be of SS304 L construction.
7.	The vendor shall quote for specified make/model only for bought out items. Deviation if any must be notified in the compliance statement.
8.	The vendor shall bring all tools, consumables, and manpower required for installation and commissioning of the system.
9.	All material used in the manufacturing shall be of high quality, free from defects and imperfection, of recent manufacture and unused.
10.	All necessary fittings, assembly hardware, accessories such as clamps foundation bolts, terminal for electrical connections, cable glands, junction box, brackets, hangers screws, nuts, bolts, washers etc. which are useful and necessary for assembly and efficient working of system, shall be supplied by the vendor and the cost of the same shall be deemed to be included in the quote, whether specifically mentioned in the tender document or not.
11.	Any material and labor which may be necessary to complete the installation and commissioning work in accordance with the intent of the specification shall be furnished by the vendor without any extra cost.
12.	The instruments and accessories used during the commissioning and validation shall be calibrated.
13.	The vendor shall produce relevant certificate to prove the capability of the instruments / accessories fit for validation.
14.	Any other utilities for installation & commissioning of system need to be specified clearly.

D. TECHNICAL SPECIFICATIONS

SN.	Description	Specification/Remarks
1.	Vacuum Drying Oven inner shape	Cubical
2.	Configuration	Double walled construction
3.	Orientation	Horizontal front loading type
4.	**Design code**	Design as per ASME, Sec VIII, Div. 1 & 2 and weld qualification and procedure shall be as per sec IX.
5.	Design Pressure (internal)	$1x10^{-4}$ mbar to 1.5 bar **Note:** 1.5 bar to be considered for design purpose.
6.	Working Pressure	$1x10^{-3}$ mbar
7.	Global leak rate	≤ $1x10^{-2}$ mbar l/s (To be demonstrated in PDI. Test Media: Helium. MSLD and helium under scope of vendor) at ambient conditions
8.	Vacuum Drying Oven inner dimension (LxBxH)	400mm x 400mm x 400mm
9.	Design Temperature of inner volume	20 - 250 °C
10.	Outer wall temperature	Less than 30°C in operating conditions (inner wall at 250 °C).
11.	Material of construction	AISI 304L (Avoid non-metallic materials inside the oven including Graphite and paints)
12.	Insulation	Suitable insulation shall be provided between the walls to maintain the outer wall temperature within 30 °C
13.	Inner surface finish	Polished & buffed smooth Mirror Finish
14.	Outer surface finish	Mirror Finish
15.	Chamber/Oven door	a) Door shall be hinged to chamber and opened right to left manually. b) Inner surface of the door to be provided with polished stainless steel SS304L. c) High temperature resistance Viton O-rings shall be provided to ensure complete sealing. d) Front door shall have one viewing port of dia100 mm. Borosilicate glass shall be provided. Make of borosilicate glass **M/s MDC** e) Suitable pneumatic clamp shall be provided for door lock.

		f) Additional manual hinge locks for door locking shall be provided. g) Limit switch shall be provided for open/close indication. h) Base of the oven shall be 800 mm above the ground level.
16.	Inner chamber details	3 Nos. of perforated trays easily removable of 1.5mm thick of SS 304 material shall be provided with equal spaced inside the oven.
17.	Support Structure	a) Oven chamber shall be mounted on support structure. b) MS power coated structure (Color : White) c) Suitable anti-vibration mounting pads shall be provided to chamber lugs for rigidity. d) The structure shall be suitably designed for housing all the pumps, feed lines, valves, gauges & controllers, control components (PLC, contactors, relays, etc.), HMI, etc. e) Suitable fans, to dissipate heat from the pump compartment and control panel compartment, shall be provided.
18.	Schematic & Dimensions	Tentative Schematic & dimensions for the vacuum drying oven is depicted in figure 1.
19.	Welding	All welds shall be as per ASTM standards
20.	**Job Details**	**Size:** a) Width : 250 mm b) Depth : 250 mm c) Height : 200 mm (Hot Zone may be designed for this job size) **Mass:** 5kg max
21.	**Heaters & Heating Details**	
a.	Heating element	Cartridge type with Kanthal A1 element Qty & Power: As required (500W, 6 Nos. minimum).
b.	Operating Temperature	170 °C±5 °C
c.	Maximum Temperature	250 °C
d.	Temperature Uniformity	Homogenous Temperature uniformity throughout the chamber (±5 °C)
e.	Heating Rate	2 °C per minute
f.	Cooling	Natural slow cooling
g.	Power System for Heating Elements	Suitable power supply. 220V ±10%, single phase, 50Hz or 415V ±10%, three phase, 50Hz Thyristor power controller for hot zone
22.	Illumination	Oven shall have provision for illumination of oven to view the object. This illumination control shall be done through HMI. Suitable lamp, port and borosilicate glass shall be provided.
23.	**Vacuum Pumps**	
a.	Ultimate Vacuum	≤$1x10^{-3}$ mbar
b.	Gas to be pumped out	Air
c.	Pumping speed	250 m^3/hr (Minimum). To obtain the ultimate vacuum of <$1x10^{-3}$ mbar as per the pump down time requirement.
d.	Pump down time	≤ 30min
e.	Total number of pumps	Backing & Roots pump (1 no. each)
f.	Backing pump	Suitable to meet the backing requirements of roots pump and to meet the pump down time requirements. **Oil free pumps only shall be supplied**. **Make:** M/s Leybold / Pfeiffer/Edwards
g.	Additional requirements	Additional temperature sensor for monitoring Roughing Pump temperature with alarms should be provided.
h.	Roots pump	To obtain the ultimate vacuum of ≤ 1 $x10^{-3}$ mbar as per the pump down requirement. **Make:** M/s Leybold / Pfeiffer/Edwards

i.	Cooling of Pumps (backing and roots)	Air / Water cooled. Hoses/tubes for water cooling shall be procured and connected to water manifold in the facility if required. The length of tubes is approximately 100 m.
24.	Bellows & Plumbing	AISI 304L. Vacuum feed line to be made of seamless pipes; bellows should be hydro formed. Size and numbers shall be as per design.
25.	Exhaust routing	The exhaust of backing pump shall be routed to outside the facility. Pipe lines for the same shall be procured and installed with necessary supports.
26.	**Valves**	
a.	Isolation valve	Electro-pneumatically operated gate valve of suitable size (same as roots pump inlet)
b.	Vent Valve	Electro-pneumatically operated gate valve for venting of chamber (from vacuum to ambient) Size: 1” A suitable 25 micron air filter shall be placed before the valve.
c.	Make and material	**Make:** VAT/Leybold/GNB **Material (Gate & Body):** SS304
d.	Note	All valves shall have micro-switch for position indication of valves. The output of the micro-switches shall be used as feed back in safety interlocks.
27.	**Gauges & Pressure transmitters**	
a.	Pirani gauge	**1 gauge + 1 spare (included in scope of supply)** **Make**: Pfieffer / Inficon
b.	Gauge controller	2 channel gauge controller. **Make:** Pfieffer / Inficon **Note**: gauge and controller shall be of same make.
c.	Pressure Transmitter & Display	**Pressure transmitter** Range: 0-1 bar (absolute) Accuracy: <± 0.3% FSO Excitation voltage: 24 VDC Output: 4 – 20 mA, 2 wire config. Wetted material: SS304 **Display for pressure transmitter** Suitable display shall be provided. Excitation for the transmitter shall be provided by the display. **Make:** Keller/Wika/Druck
28.	**Thermocouple feed through (QTY: 1 No.)**	15 pin K-type thermocouple feed through Double ended (Air & vacuum side connectors included) Wired mating connectors (inside and outside) shall be provided. Wire length 1m.
a.	Make:	Plugin /Douglas
b.	Number of contacts	15 (Chromel/Alumel contacts)
c.	Voltage rating	600VDC
d.	Current rating	≥5A
e.	AWG of contact	22 - 24 AWG
f.	Contact type	Crimp type, Chromel/Alumel contacts
g.	Vacuum side plug	Shell made of SS, Chromel/Alumel crimp contact with insulation
h.	Air side plug	Shell made of SS, Chromel/Alumel crimp contact with insulation
i.	Housing type	Circular

j.	Housing material	Stainless steel
k.	'O' ring material	Viton
l.	Leak rate	1x 10^{-7} mbarl/ sec or better
m.	Insulation resistance	5000 MΩ
n.	Operating temperature	20 ° C to +105 ° C
o.	Vacuum range	Better than 1x10^{-4} mbar
29.	**Power feed through (QTY: 1 No.)**	9 pin power feed through Double ended (Air & vacuum side connectors included) Wired mating connectors (inside and outside) shall be provided. Wire length 1m.
a.	Make:	Plugin /Douglas
b.	Number of contacts	9
c.	Voltage rating	600VDC
d.	Current rating	≥13 A
e.	AWG of contact	16 - 18 AWG
f.	Contact type	Crimp type, gold plated
g.	Vacuum side plug	Shell made of SS, gold plated crimp contact with insulation
h.	Air side plug	Shell made of SS, gold plated crimp contact with insulation
i.	Housing type	Circular
j.	Housing material	Stainless steel
k.	'O' ring material	Viton
l.	Leak rate	1x10^{-7} mbarl / sec or better
m.	Insulation resistance	5000 MΩ
n.	Operating temperature	20 ° C to +105 ° C
o.	Vacuum range	Better than 1x10^{-4} mbar
30.	**Mechanical feed through (QTY: 2 Nos.)**	2 Tubes per feed through. Material: SS304L Tube size: ¼" x 1 No. and 3/8" x 1 No. each per feed through. Welding of tubes to feed through shall be done via a sleeve The tubes shall have compressed ferrule fittings (SS304) on both ends and closed with end caps.
31.	**PORTS**	
a.	Pumping port	One pumping port of suitable size (equal to the size of booster pump mouth) shall be provided at the back of the chamber.
b.	View port	One view port of diameter 100 mm, on chamber door (to view the job from outside).
c.	Gauge & Transmitter port	A port of suitable size to accommodate a pirani gauge & absolute pressure transmitter shall be provided.
d.	Instrumentation port	One port of suitable size to accommodate all electrical feed through (thermocouple & power: 1 each) on left side of the chamber.
e.	Mechanical feed through port	One port of suitable size to accommodate the mechanical feed through on left side of the chamber.
f.	Illumination port	Shall be placed suitably to illuminate the whole inner chamber.
32.	**Control System**	
a.	PLC based control system	a) The control system for sequencing and controlling the pumping system, opening of chamber, venting of chamber and heating of oven with process interlocks shall be automated using PLC. b) All safety and operational interlocks should be provided through PLC. c) **Make:** Siemens /Allen Bradely /Honeywell / Schneider
b.	PID controller for temperature	Temperature uniformity @±5°C shall be achieved and maintained throughout the chamber homogeneously Over temperature controller shall be provided for over

		temperature protection. **Make:** Eurotherm/ Honeywell /Yokogawa / Siemens
c.	Thermocouple for temperature measurement	Thermocouple for Temperature measurement shall be done through PLC with +/- 1°C accuracy. **Make:** Omega/TE connectivity. **QTY:** 3 Nos (minimum)
d.	Control Cabinet	a) Control cabinet shall be housed in the support structure. b) Shall be fabricated out of mild steel sheets & neatly powder coated meeting IP-54 class protection. c) The control console shall be divided into three segments with power panel, vacuum panel and Oven heating & cooling control panel. d) The control cabinet shall be housed with all instrumentation system like all control switches, gauges, controllers, PLC, HMI(15 inch) etc, contactors, relays etc. ergonomically integrated into a console so that the system can be operated and maintained conveniently. e) Vacuum gauge controller/displays shall be mounted in the control cabinet.
e.	Control Console with Mimics	a) The HMI should display entire Oven schematic using MIMIC diagram. b) Status indication for all pumps, valves, vacuum chamber door opening and closing, heater status, oven temperature, etc., shall be shown in HMI system. c) All process parameters are to be displayed. d) The control console shall incorporate auto / manual vacuum and temperature controller in a mimic diagram with indication. e) The entire sequence of the Vacuum oven operations shall be indicated by process flowchart/mimic diagram.
f.	Manual override	Provision for manual override shall be given for Interlocks & Heating rate for both Auto mode/Manual mode
g.	HMI	**Make:** Siemens or Prolific **Size**: 15” Touch operated
h.	Contactors	Electromagnetic or solid-state relays for over-temperature cut-off. Make: Fuji/ ABB/ Omron/ Siemens/ Schneider
i.	Fuses	HRC fuses for incoming power supply, separate fuses for heater circuit, blower and control circuit.
33.	**Third Party Inspection**	Under scope of supply
a.	Raw material Inspection	Certificate for raw material shall be provided.
b.	X-Ray test	All weld joints shall be subjected to radiography tests as per standards. Certificate shall be provided.
c.	Dimensional Inspections	All the dimensions indicated in the fabrication drawing have to be inspected for its conformance.
34.	**Safety interlocks**	
a.	Pneumatic clamp shall be released for chamber door opening only if the chamber pressure & temperature is ambient.	
b.	Pumps shall not be switched on until the limit switch shows chamber door close indication.	
c.	Chamber isolation valve shall open only if chamber door is closed.	
d.	Vent valve shall open only when chamber isolation valve is closed and oven temperature is less than 80°C.	
e.	Sequencing of pump operations.	
f.	Sequencing of heating.	
g.	Electrical Power fails / Restart on resuming power (manually selectable).	
h.	Pneumatic Pressure failure.	

i.	Vacuum oven door open/ Door closing confirmation	
j.	Any Vacuum pump failure.	
k.	Ground Fault (job touching on the heating element) Alarm/ Switch off heating	
l.	Over Temperature Alarm/ Switch off Heating.	
m.	Program end Control. Alarm to operator, no restart of any system automatically.	
n.	System shall have necessary protection against single phasing reverse phasing, power failures, and under/over voltages	
o.	Apart from the above, standard safety interlocks shall be incorporated. Further, any other interlocks requirement shall be communicated during PDR and PDI which shall be incorporated	
p.	**Action on power failure**	**Close all valves & Hold the program**
q.	Alarms	All Alarms shall have Audio & Visual display. Alarms shall be provided for: a) Backing pump temperature high. b) Over temperature of system. c) Ground Fault – job touching the heating element etc. d) Pneumatic Pressure Low/ High.
35.	Handling provision	Suitable hooks at the top shall be provided for lifting the complete system using crane and provision for sliding palette truck below the system shall be provided.
36.	Calibration of sensors and Equipments	All vacuum, temperature, and pressure sensors and instruments shall be calibrated in accredited lab and certificates shall be supplied.

E. DOCUMENTS TO BE SUBMITTED	
a.	**Documents to be included in the offer:**
1.	Technical Compliance statement to all specifications and tender clauses. (point by point).
2.	Full details of subsystems including bought out items.
3.	Detailed specification datasheets of vacuum pumps, vacuum gauge and controller, bellows, electro-pneumatic gate valves, pneumatic clamp, heating element, pressure transmitter and display, feed through (thermocouple and power), HMI, PID controller, PLC, thermocouples, Power supply etc.,
4.	Schematic (PID) of complete system comprising of oven, pumps, valves, gauges, bellows, etc.
5.	Schematic (PID) of PLC and instrumentation
6.	Calculation for Chamber oven thickness depicting adequacy for vacuum operations.
7.	Pump down curve
8.	Pumping speed curve.
9.	Details of Power interface
10.	Details of Pneumatic pressure requirement
11.	Detailed specifications of all sub systems
12.	All relevant catalogues with specifications of the items
13.	Overall plan of project execution with details of facilities/capabilities available for timely completion of the project in all respects.
14.	Other documents as mentioned in commercial part
15.	Any other relevant document (technical and commercial) for offer evaluation.
b.	**Documents to be submitted after placement of order**
1.	Detailed design drawings of the Vacuum Oven.
2.	Electrical power interface and details.
3.	Air connection interface details etc.
4.	Material conformance certificate from an accredited agency.
5.	Complete set of drawings with all dimensions'/circuits details of A. Oven Chamber & pump system B. Pneumatic System

	C. Heating System D. Electrical Power System E. Dimensions of O-rings and grooves F. PLC Control System G. All Circuit wiring Diagrams H. All fabrication drawings I. Software documentation	
6.	Detailed Technical specifications of all sub systems.	
7.	All relevant catalogues with specifications of the items.	
8.	List of imported items and source of supply.	
9.	All other relevant documents.	
10.	One set of detailed operation and maintenance manuals along with necessary drawings in hard and soft copy.	
11.	One set of detailed safety manuals along with necessary drawings in hard and soft copy.	
12.	Original gauge calibration certificate for all the gauges / instruments.	
13.	**Training**	Operation & maintenance (hands on) training for operating staff at LPSC, Tumakuru site. (at least 2 personnel on-site during installation)

F. INSPECTION, ACCEPTANCE, AND RESPONSIBILITIES

1.	**Pre Delivery Inspection (PDI)** System shall be integrated at vendor's site and then conduct the following minimum tests in the presence of LPSC personnel. a) Inspection of all deliverables as per bill of material. b) Verification of the material test reports. c) Review of the Third party inspection reports of the various NDI carried out on the welds. d) Visual inspection & Dimensional inspection. e) Operation of vacuum system f) Global leak rate test g) Heating the Oven up to 170 °C h) Demonstration of Vacuum levels at ambient conditions. i) Heater cutoff at set temperature j) All performance tests as per the specification detailed above shall be demonstrated. k) MSLD and Helium required for testing is under vendor scope. However, a detailed mutually agreed test plan shall be derived to conduct the above PDI.
2.	**Site acceptance testing (SAT)** System shall be transported, installed and commissioned at the premises of LPSC, Tumakuru, and the following minimum tests shall be carried out in LPSC. a) Visual inspection. b) Physical verification for all components and subsystems. c) Individual & global leak rate tests. d) Vacuum level demonstration at ambient conditions e) Heater cutoff at set temperature f) Verification of safety interlocks. g) Heating the Oven up to 170 °C h) Successful demonstration of complete system in integrated mode. i) MSLD and Helium for testing is under vendor scope.
3.	**Acceptance Criteria** a) Heating the empty Oven to the operating temperature for specified continuous time of operation. b) Operation of vacuum system and verification of ultimate vacuum. c) Heating the oven for various temperature ranges up to 170^{o}C d) Operation of vacuum drying oven through HMI.

	e) Submission of all listed documents.
4.	**Responsibilities of vendor**
a.	Design, fabricate, supply, integration, installation, testing and commissioning of vacuum oven, pumping system in LPSC, Tumakuru as per specification.
b.	To organize for third party inspection at various stages as per the tender document.
c.	The vendor shall integrate, install and commission the vacuum oven in the LPSC, Tumakuru premises as per specifications mentioned in the scope of work.
d.	To conduct the Pre delivery Inspection (PDI) and Site Acceptance test (SAT) and as per the tender document.
e.	To furnish a detailed drawing after the design to LPSC for reviewing the design and final approval.
f.	To provide the overall dimension of the system, and requirements of civil works if any.
g.	To provide a complete documentation in English.
h.	To provide training to LPSC personnel in order to familiarize them with the system in operation, preventive maintenance and to understand the safety aspects involved.
i.	To assure the guarantee supply of spares of for a period of 10 years from the date of commissioning.
j.	To provide the equipment's/machines warranty period of 36 months from the date of commissioning at LPSC, Tumakuru.
5.	**Responsibilities of LPSC**
a.	To provide consumables like water, electricity, power supply rating, etc.
b.	Required building as per the layout will be provided.
c.	To review and approve the design of the entire vacuum drying oven.
d.	To provide dispatch clearance after reviewing all the relevant documents of pre delivery inspection for the integrated system.
e.	To provide final acceptance matrix and evaluation of the system.
f.	To provide final acceptance of the system based on the acceptance test data analysis and review committee clearance
G. ANNUAL MAINTENANCE CONTRACT	
1.	The Annual Maintenance Contract (AMC) is a Non-Comprehensive type, which includes preventive and break down maintenances. AMC comes into effect after the completion of three years of Warranty period. Separate quote to be provided by the vendor for the AMC. The details of AMC are provided below. Cost of AMC is included in the total cost of the system
2.	Duration of AMC: 2years
3.	Frequency of visits: Once in 6 months and Total visits: 4 visits in two years.
4.	**General:** i. Inspection and general cleaning of the complete Vacuum drying oven. ii. Inspection of gaskets and O-rings and replacing, if required. iii. Check the air admittance valves & isolation valves iv. Apply vacuum grease for O-rings if required. v. Checking of temperature set point controller. vi. Checking of heating rate. vii. Checking of proper functioning heater by measuring current, voltages, etc., viii. Demonstration of ultimate vacuum.
5.	**Vacuum pumps** i. Check the health of the pumps, condition of oil, oil level etc., if required change the oil or top up to required level. ii. Inspect the health of the pump motor by measuring current consumption, pump sound, temperature and vibration. iii. Check the health of the bearing and replace if required. iv. Check the vacuum of the pump at the inlet of each pump. v. Check the chilled water flow and temperature (as per pump specification, if applicable).
6.	**Transmitters/gauges/etc.,**

	i. Check and clean the gauges/ transmitters & controller and reassemble ii. Check the electrical connection. iii. Verify the set point reference with respect to hardware & software as per safety interlock of chamber operation. iv. Check the measurement signal outputs vs pressure v. Check the measurement status indication. vi. Check for zero drift, if necessary adjust zero. vii. Calibration of all gauges and transmitters once in a year and provide necessary certificate.
7.	**PLC and vacuum console panel** i. Check the functioning of all relays, contactors and MCBs etc. installed on control console panels on regular basis by enabling the command from the mimics on the touch screen. ii. If any malfunctioning of relays, contactors, MCBs are found, service it or replace with the new one. iii. Earthing of all electrical systems including for motor, pumps all instrumentation panels, electrical panels, control panel, transformer Earthing. iv. Verification of PLC analog inputs/ outputs, digital input/ outputs. v. Functional verification of control system. vi. Verification of all safety interlocks and general performance of complete Vacuum drying oven. vii. Any other additional general checks/ tests required for smooth functioning of system to be included. viii. LPSC will provide necessary consumables like vacuum pump oil, vacuum grease etc. for performing preventive maintenance.
8.	**Breakdown maintenance** i. Party has to attend six numbers of breakdown calls in two years at free of cost ii. Break down maintenance call has to be attended within 48 hours from the time of intimation/complain iii. If essential spares are not available with LPSC for the restoration of system during any breakdown call, a separate purchase order will be placed on party for the required essential spares for which rates as submitted along with AMC quotation will be taken. A prior approval has to be taken for supply of emergency essential spares from LPSC.
9.	**Work details:** i. Checking the complete system against the break down defects. ii. Identifying the nature of problems. iii. Rectifying the identified problems and set right of the system. iv. Satisfactory demonstration of performance of Vacuum drying oven. v. List of spares, components, consumables required for repair / service / running of the system to be provided by the party. vi. The required items for the break down maintenance will provided by LPSC. vii. Any other additional general checks/ tests required for smooth functioning of system to be included. viii. The spares inventory shall be checked by the party periodically and requirement of spares shall be indicated to LPSC accordingly. ix. The Vendor/agent shall attend to the break down maintenance within 48 hours of intimation from LPSC
10.	The list of essential spares required for the trouble free operation of vacuum oven and other associated utilities for system are given below. **Separate quote to be provided for the spares which is optional and is not included in the total cost of system.**

	Item	**QTY**
a.	Heater	1 No.
b.	Borosilicate glass (suitable for port size of 100 mm)	1 No.
c.	Illumination port borosilicate glass	1 No
d.	Vacuum grease	1 kg
e.	Vacuum oil for pumps (roots and backing pump gear box if required)	5 ltrs
f.	Pump isolation valve (same make as supply)	1 No.

g.	Vent valve (same make as supply)	1 No.
h.	Pirani gauge	2 Nos.
i.	Fuses, contactors & relays	1 set
j.	25 micron filters	2 Nos.
k.	Limit switch	1 No.
l.	2 Channel Gauge controller	1 No.

H. BILL OF MATERIALS

	Following are the major bill of materials	
	Item	**QTY**
1.	Vacuum Oven	1 No
2.	Dummy flanges (1 each for all sizes)	7 Nos
3.	Backing Pump	1 No
4.	Roots Pump	1 No
5.	Feedlines, Bellows, Frames, Stands, Cabinets	1 Set
6.	Heating element	6 Nos
7.	Isolation valve with micro switch	1 No
8.	Vent valve with micro switch	1 No
9.	Vacuum gauges	2 Nos
10.	2 Channel vacuum gauge controller	1 No
11.	Transmitter & Display	1 Set
12.	Pneumatic clamps	1 No
13.	HMI	1 No
14.	PLC, contactors, relays, etc.	1 Set
15.	Exhaust lines	1 Set
16.	O-rings	4 Sets
17.	Borosilicate Glass (view port, dia 100 mm)	1 No
18.	Illumination lamp	1 No
19.	Illumination port borosilicate glass	1 No
20.	Temperature controller	1 No
21.	Thermocouple feed through	1 No
22.	Thermocouple	3 Nos
23.	Power feed through	1 No
24.	Mechanical feed through	2 Nos
25.	Limit switch	1 No
26.	Perforated Trays	3 Nos
27.	25 micron filter	1 No

PART B: COMMMERCIAL TERMS

1.	**PRICE** The prices are FIRM and FIXED. On receipt of order, Vendor has to prepare detailed work break-up and schedule chart (in consultation with LPSC) and submit to LPSC for our acceptance.
2.	**WARRANTY** The total system shall be warranted for total performance and failure-free operation for a period of 36 months from date of final acceptance of system by LPSC/ISRO.
3.	**SECRECY** The drawings and documents sent along with this tender form part of vital documents and same should be kept on top secret. Under any situations, contractor should not part with or transfer the technology/contents of drawings and documents whatsoever to any 3rd party/agency without our prior consent. If at any time, it is brought to our notice that the secrecy have been transferred by you intentionally or otherwise to any third party /agency, contractor shall be liable to indemnify the loss/ damage to Government of India.
4.	**INDEMNITY**

	Contractor shall warrant and be deemed to have warranted that all the items supplied against this tender are free and clean of any infringement of any patent, copy right or trademark and shall at all times indemnify LPSC against all claims which may be made in respect of the items for infringement of any right protected by patent registration of design or trade mark and shall take all risk of accidents or damage which may cause a failure of the supply from whatsoever cause arising and the entire responsibility for the sufficiency of all the means used for executing the Purchase Order.
5.	**DELIVERY SCHEDULE** Items shall be supplied and installed and site acceptance tested within 6 months from the approval of drawings by LPSC. Drawings and necessary documents for clearance shall be submitted for approval within 1 months from placement of P.O.
6.	**DELIVERY TERMS** Item to be procured, integrated and installed at LPSC, Tumakuru
7.	**PAYMENT TERMS** 100% of payment after receipt of all items and installation, commissioning & acceptance at Department site.
8.	**VALIDITY** The quoted price should be valid for a period of 6 months from the date of opening of the technical and commercial quotation.
9.	**HERITAGE CLAUSE** Party should have executed similar works at aerospace industries. Proof should be submitted for the same. Note: Similar nature indicates that party should have supplied vacuum chamber/vacuum ovens, vacuum pumps, valves, gauges etc. all together for a single project & successful demonstration of supplied system. Further the supplied system should have specifications similar to that of the tender document.
10.	**NON COMPLIANCE** 1. While submitting technical bid, suppliers are requested to include full details of the system offered including details of pumping system offered, makes of vacuum pumps, their capacities, quantity etc. in addition to details of gauges, valves, control system, heaters etc. 2. Details of items given in section E should be submitted along with the technical offer. Not providing the details will be considered as non-compliance. 3. Vendor shall provide technical offer consisting of specifications of all components along with necessary supporting datasheets/proofs. Merely providing a compliance statement document will be considered as non-compliance 4. Failing the above points shall be considered as non compliance.
11.	**AMC CLAUSES & CONDITIONS** On successful completion of warranty, a separate purchase order for non-comprehensive AMC will be placed at the same rate quoted by the vendor during the submission of offer. However, LPSC reserves the right to choose whether to place Purchase order or not, after the warranty period completion.
a.	**Type of contract** The proposed annual maintenance contract shall be of Non –comprehensive type.
b.	**Period of contract** AMC Contract shall be valid for a period of two years after completion of warranty period of 3 years. However, LPSC shall be open to terminate the contract at any time by giving one month notice.
c.	**Scope of Maintenance** **Preventive maintenance** Preventive maintenance shall be carried out two times in a year with six months of interval. **Break down maintenance** Party has to attend six numbers of breakdown calls in two years at free of cost under AMC within

	48 hrs of reporting, during the AMC period. Details of AMC are provided in section G.
d.	**General terms & conditions** A. In the event of damages to our property or injury to our personnel due to the negligence of your employees, the responsibility shall solely rests with you. B. The Department shall not be responsible for any injury to your personnel, or damage to your property caused at our site. C. Compliance matrix for the above conditions shall be provided.
12.	**GENERAL CONDITIONS TO THE VENDORS** The execution of the complete project is on turnkey basis as per the specifications and requirements deliberated in previous sections. The response to the tender is in the form of two separate offers, one as 'Technical offer' and other as 'Commercial offer'. Both the offers are to be submitted simultaneously. In order to understand the vendors profile for execution of the project, following information shall be provided to LPSC along with the technical offer.
a.	List of sub-contractors and major equipment suppliers for this project execution.
b.	Local office in India or authorized Indian agents details to be provided for ease of project executions and AMC point of view.
c.	Any modifications in the system till installation shall meet the technical specification of the tender document and prior approval to be obtained from LPSC. Further the modifications made shall be technically equal or superior w.r.t. to the original offer and should not have any additional cost implication.
d.	During the evaluation of technical bids alternatives/options/suggestions shall be confirmed in technical offer to meet the system specifications. As the contract is for fixed price, no provision for addition/reduction in charges will be entertained after opening the price bid.
e.	LPSC/ISRO may incorporate specific provisions and conditions before ordering with mutual consent. These provisions will deal with delivery schedule, specifications demonstration criteria, financial provision, quality control procedures, specific provisions relating to imported items, penalty clauses, etc.
f.	Any information kept vague or not furnished shall be treated as non-compliance with the requirements of the vendor and hence tender are liable for rejection.
13.	**FOLLOWING DOCUMENTS SHALL BE SUBMITTED BY THE VENDOR ALONG WITH TECHNICAL OFFER (PART-A)** 1. Compliance matrix of each specification as given in this document. 2. List and details of non-compliance of specifications by the vendor if any. 3. Confirmation of scope of supply as given in this document by vendor. 4. Overall plan of project execution with details of facilities/capabilities available for timely completion of the project in all respects. 5. Major equipment specification and their source of supply and part number. 6. List of Indian associates or partners, consultants, subcontractors, major equipment suppliers, proposal to be involved in this project, the past experience, competence and extent of the involvement. 7. Details of utilities to be provided by LPSC/ISRO and time stages at which these are required by the contractor 8. Commercial Terms such as delivery date, taxes, duties payable, place of delivery, payment term, validity, guarantee etc. and scope of supply shall not be covered in this part. Please enclose a copy of the details indicated in price quotation (WITHOUT PRICES OR BY MASKING THE PRICE) mainly to know the items/ specifications for which you have indicated prices in price bid. This part should not contain prices.
14.	**FOLLOWING DOCUMENTS SHALL BE SUBMITTED ALONG WITH COMMERCIAL OFFER (PART-B)** The Vendor shall take note of following points in respect of commercial matters relating to this turn-key project. 1. The Vendor responding to this tender, shall submit comprehensive commercial price bid in a

	separate document meeting all the requirements specified therein. 2. This contract is proposed to be firm and fixed price contract and no price escalation will be permitted during the period of contract. 3. Vendor shall not be allowed to change any item from imported to indigenous or vice versa without prior approval of LPSC after Purchase Order is placed. 4. The Vendor is chosen on the basis of suitability of techno-commercial merits. The scope of contract will cover the turnkey execution of the total system. 5. Vendor shall furnish all details as called for in this chapter giving due justification. Any information kept vague or not furnished shall be treated as non-compliance with the requirements of the Vendor and hence tender is liable for rejection 6. The offer should include the following documents: a) The total cost of the systems including fabrication, supply, installation, commissioning and testing. b) Break up of cost for Vacuum oven, pumps, valves, gauges, controllers, PLC based control system, control cabinet, heater, etc., c) Break up of various elements like design, direct material, direct labor, overheads, etc d) For all items, vendor shall furnish separate details like equipment cost in foreign currency, foreign exchange conversion rate, equipment cost in Indian rupees without, customs duty/Excise duty etc. e) Transportation charges, taxes, government levies shall be specified separately. f) Installation & commissioning charges shall be specified separately. g) Separate quote for the AMC for the period of 2 years after warranty period. h) Separate quote for the spares required for vacuum system shall be specified separately. Spares price quote shall be valid till expiry of AMC. i) Acceptance to furnish warranty certificate for the period of 3 years, from the date of installation, commissioning and acceptance of the total system. j) Acceptance to the commercial clauses and conditions. k) Any other information relevant to this tender.
15.	**INSTRUCTIONS TO TENDERERS FOR SUBMITTING TWO PART TENDERS** Offer shall be submitted in two parts as following: 1. Techno-commercial part (without price details). 2. Commercial part (Price offer).

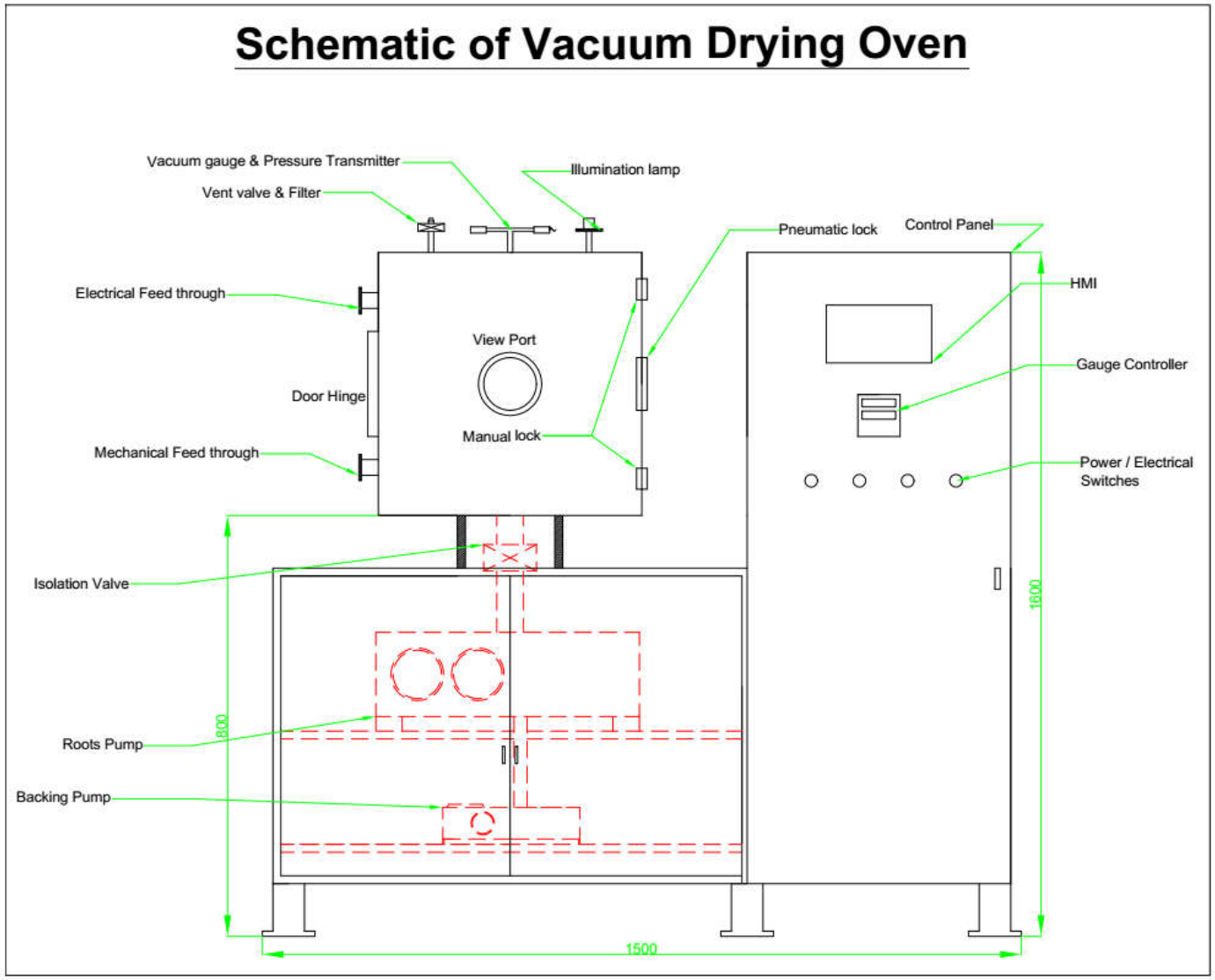

Figure 1: Schematic of Vacuum Drying Oven

	Specifications & Description	Compliance
PART A: TECHNICAL SPECIFICATIONS		
A.	**SCOPE OF WORK** **Design, Fabrication, Testing, Installation and Commissioning of Vacuum Drying Oven at LPSC-Tumakuru as per specifications.**	
B.	**DETAILED SCOPE OF WORK**	
1.	Design of Vacuum drying oven (chamber) with necessary user ports, suction port, view port, instrumentation port, etc.	
2.	Submission of design drawings to LPSC for clearance of ports' location, support structure design and housing of all other components.	
3.	Design of vacuum pumping system by a combination of backing pump and roots pump, submission of selection criteria for the pumps and design calculations documents and obtain approval from LPSC.	
4.	Design of vacuum feed lines, bellows and necessary supporting frames, stands for placing vacuum pumps. The placement layout shall be suitable for easy maintenance. The drawings for the same shall be submitted and approval from LPSC to be obtained.	
5.	Design calculations of heating elements, type of heating elements, and power consumption shall be submitted to LPSC for approval.	
6.	Fabrication of chamber, support structures, feed lines, control cabinets, etc as per approved design.	
7.	Submission of conformance certificates for materials that shall be used for fabrication of drying oven.	
8.	Supply of EP gate valves, vacuum gauges and controllers, pressure transmitters and display, pneumatic clamps, HMI, PLC, control components, feed through, etc. as per design.	
9.	Supply of glass for front view port & illumination lamp, Viton O-rings as per design and their integration with system.	
10.	The PLC system shall have necessary interlocks which shall be approved from LPSC.	
11.	Gate valves to be fitted with micro switches, which provide the signal on the valve fully closed position so that even if the electrical signal gives any wrong status, the micro switches will not allow other operation to be carried out.	
12.	Carrying out Pre Dispatch Inspection (PDI)	
13.	Transportation of all integrated items to MPTTF Tumakuru and installation of the Vacuum drying oven.	
14.	Carrying out routing of exhaust lines of vacuum pumps to outside the facility. Feedlines for the same shall be procured and supplied	
15.	Carrying out Site Acceptance Testing (SAT): Demonstration of vacuum levels, leak rate, Temperature rate, maximum temperature and complete system performance.	
C.	**GENERAL**	
1.	Standard/recommended fabrication & assembly procedures and construction practices shall be adopted.	
2.	High quality workmanship using well trained, well qualified certified personnel and well supervisory manpower shall be employed.	
3.	Any non-conformance observed during the execution phase shall be reported to LPSC formally through a non-conformance report along with the root cause.	
4.	All O-rings shall be of Viton material with suitable hardness and shall be baked as per standards. All O-rings must be inspected for minor cracks etc., prior to use. **Note:** 3 set of spare O-rings of complete system shall be supplied along with system (included in the total cost of system)	

	Specifications & Description		Compliance
5.	Vendor shall submit the final bill of materials, layout of the system to LPSC and obtain approval before commencing the fabrication.		
6.	All vacuum feed lines, valves, bellows, and chamber shall be of SS304 L construction.		
7.	The vendor shall quote for specified make/model only for bought out items. Deviation if any must be notified in the compliance statement.		
8.	The vendor shall bring all tools, consumables, and manpower required for installation and commissioning of the system.		
9.	All material used in the manufacturing shall be of high quality, free from defects and imperfection, of recent manufacture and unused.		
10.	All necessary fittings, assembly hardware, accessories such as clamps foundation bolts, terminal for electrical connections, cable glands, junction box, brackets, hangers screws, nuts, bolts, washers etc. which are useful and necessary for assembly and efficient working of system, shall be supplied by the vendor and the cost of the same shall be deemed to be included in the quote, whether specifically mentioned in the tender document or not.		
11.	Any material and labor which may be necessary to complete the installation and commissioning work in accordance with the intent of the specification shall be furnished by the vendor without any extra cost.		
12.	The instruments and accessories used during the commissioning and validation shall be calibrated.		
13.	The vendor shall produce relevant certificate to prove the capability of the instruments / accessories fit for validation.		
14.	Any other utilities for installation & commissioning of system need to be specified clearly.		
D.	**TECHNICAL SPECIFICATIONS**		
SN.	**Description**	**Specification/Remarks**	
1.	Vacuum Drying Oven inner shape	Cubical	
2.	Configuration	Double walled construction	
3.	Orientation	Horizontal front loading type	
4.	**Design code**	Design as per ASME, Sec VIII, Div. 1 & 2 and weld qualification and procedure shall be as per sec IX.	
5.	Design Pressure (internal)	$1x10^{-4}$ mbar to 1.5 bar **Note:** 1.5 bar to be considered for design purpose.	
6.	Working Pressure	$1x10^{-3}$ mbar	
7.	Global leak rate	≤ $1x10^{-2}$ mbar l/s (To be demonstrated in PDI. Test Media: Helium. MSLD and helium under scope of vendor) at ambient conditions	
8.	Vacuum Drying Oven inner dimension (LxBxH)	400mm x 400mm x 400mm	
9.	Design Temperature of inner volume	20 - 250 °C	
10.	Outer wall temperature	Less than 30°C in operating conditions (inner wall at 250 °C).	
11.	Material of	AISI 304L	

	Specifications & Description		Compliance
	construction	(Avoid non-metallic materials inside the oven including Graphite and paints)	
12.	Insulation	Suitable insulation shall be provided between the walls to maintain the outer wall temperature within 30 °C	
13.	Inner surface finish	Polished & buffed smooth Mirror Finish	
14.	Outer surface finish	Mirror Finish	
15.	Chamber/Oven door	a) Door shall be hinged to chamber and opened right to left manually. b) Inner surface of the door to be provided with polished stainless steel SS304L. c) High temperature resistance Viton O-rings shall be provided to ensure complete sealing. d) Front door shall have one viewing port of dia100 mm. Borosilicate glass shall be provided. Make of borosilicate glass **M/s MDC** e) Suitable pneumatic clamp shall be provided for door lock. f) Additional manual hinge locks for door locking shall be provided. g) Limit switch shall be provided for open/close indication. h) Base of the oven shall be 800 mm above the ground level.	
16.	Inner chamber details	3 Nos. of perforated trays easily removable of 1.5mm thick of SS 304 material shall be provided with equal spaced inside the oven.	
17.	Support Structure	a) Oven chamber shall be mounted on support structure. b) MS power coated structure (Color : White) c) Suitable anti-vibration mounting pads shall be provided to chamber lugs for rigidity. d) The structure shall be suitably designed for housing all the pumps, feed lines, valves, gauges & controllers, control components (PLC, contactors, relays, etc.), HMI, etc. e) Suitable fans, to dissipate heat from the pump compartment and control panel compartment, shall be provided.	
18.	Schematic & Dimensions	Tentative Schematic & dimensions for the vacuum drying oven is depicted in figure 1.	
19.	Welding	All welds shall be as per ASTM standards	
20.	**Job Details**	**Size:** a) Width : 250 mm b) Depth : 250 mm c) Height : 200 mm (Hot Zone may be designed for this job size) **Mass:** 5kg max	
21.	**Heaters & Heating Details**		
a.	Heating element	Cartridge type with Kanthal A1 element Qty & Power: As required (500W, 6 Nos. minimum).	
b.	Operating Temperature	170 °C±5 °C	

		Specifications & Description	Compliance
c.	Maximum Temperature	250 °C	
d.	Temperature Uniformity	Homogenous Temperature uniformity throughout the chamber (±5 °C)	
e.	Heating Rate	2 °C per minute	
f.	Cooling	Natural slow cooling	
g.	Power System for Heating Elements	Suitable power supply. 220V ±10%, single phase, 50Hz or 415V ±10%, three phase, 50Hz Thyristor power controller for hot zone	
22.	Illumination	Oven shall have provision for illumination of oven to view the object. This illumination control shall be done through HMI. Suitable lamp, port and borosilicate glass shall be provided.	
23.	**Vacuum Pumps**		
a.	Ultimate Vacuum	≤1x10^{-3} mbar	
b.	Gas to be pumped out	Air	
c.	Pumping speed	250 m^3/hr (Minimum). To obtain the ultimate vacuum of <1x10^{-3} mbar as per the pump down time requirement.	
d.	Pump down time	≤ 30min	
e.	Total number of pumps	Backing & Roots pump (1 no. each)	
f.	Backing pump	Suitable to meet the backing requirements of roots pump and to meet the pump down time requirements. **Oil free pumps only shall be supplied**. **Make:** M/s Leybold / Pfeiffer/Edwards	
g.	Additional requirements	Additional temperature sensor for monitoring Roughing Pump temperature with alarms should be provided.	
h.	Roots pump	To obtain the ultimate vacuum of ≤ 1 x10^{-3} mbar as per the pump down requirement. **Make:** M/s Leybold / Pfeiffer/Edwards	
i.	Cooling of Pumps (backing and roots)	Air / Water cooled. Hoses/tubes for water cooling shall be procured and connected to water manifold in the facility if required. The length of tubes is approximately 100 m.	
24.	Bellows & Plumbing	AISI 304L. Vacuum feed line to be made of seamless pipes; bellows should be hydro formed. Size and numbers shall be as per design.	
25.	Exhaust routing	The exhaust of backing pump shall be routed to outside the facility. Pipe lines for the same shall be procured and installed with necessary supports.	
26.	**Valves**		
a.	Isolation valve	Electro-pneumatically operated gate valve of suitable size (same as roots pump inlet)	

		Specifications & Description	Compliance
b.	Vent Valve	Electro-pneumatically operated gate valve for venting of chamber (from vacuum to ambient) Size: 1” A suitable 25 micron air filter shall be placed before the valve.	
c.	Make and material	**Make:** VAT/Leybold/GNB **Material (Gate & Body):** SS304	
d.	Note	All valves shall have micro-switch for position indication of valves. The output of the micro-switches shall be used as feed back in safety interlocks.	
27.	**Gauges & Pressure transmitters**		
a.	Pirani gauge	**1 gauge + 1 spare (included in scope of supply)** **Make**: Pfieffer / Inficon	
b.	Gauge controller	2 channel gauge controller. **Make:** Pfieffer / Inficon **Note**: gauge and controller shall be of same make.	
c.	Pressure Transmitter & Display	**Pressure transmitter** Range: 0-1 bar (absolute) Accuracy: <± 0.3% FSO Excitation voltage: 24 VDC Output: 4 – 20 mA, 2 wire config. Wetted material: SS304 **Display for pressure transmitter** Suitable display shall be provided. Excitation for the transmitter shall be provided by the display. **Make:** Keller/Wika/Druck	
28.	**Thermocouple feed through (QTY: 1 No.)**	15 pin K-type thermocouple feed through Double ended (Air & vacuum side connectors included) Wired mating connectors (inside and outside) shall be provided. Wire length 1m.	
a.	Make:	Plugin /Douglas	
b.	Number of contacts	15 (Chromel/Alumel contacts)	
c.	Voltage rating	600VDC	
d.	Current rating	≥5A	
e.	AWG of contact	22 - 24 AWG	
f.	Contact type	Crimp type, Chromel/Alumel contacts	
g.	Vacuum side plug	Shell made of SS, Chromel/Alumel crimp contact with insulation	
h.	Air side plug	Shell made of SS, Chromel/Alumel crimp contact with insulation	
i.	Housing type	Circular	
j.	Housing material	Stainless steel	

	Specifications & Description		Compliance
k.	'O' ring material	Viton	
l.	Leak rate	1x 10^{-7} mbarl/ sec or better	
m.	Insulation resistance	5000 MΩ	
n.	Operating temperature	20 ° C to +105 ° C	
o.	Vacuum range	Better than 1x10^{-4} mbar	
29.	**Power feed through (QTY: 1 No.)**	9 pin power feed through Double ended (Air & vacuum side connectors included) Wired mating connectors (inside and outside) shall be provided. Wire length 1m.	
a.	Make:	Plugin /Douglas	
b.	Number of contacts	9	
c.	Voltage rating	600VDC	
d.	Current rating	≥13 A	
e.	AWG of contact	16 - 18 AWG	
f.	Contact type	Crimp type, gold plated	
g.	Vacuum side plug	Shell made of SS, gold plated crimp contact with insulation	
h.	Air side plug	Shell made of SS, gold plated crimp contact with insulation	
i.	Housing type	Circular	
j.	Housing material	Stainless steel	
k.	'O' ring material	Viton	
l.	Leak rate	1x10^{-7} mbarl / sec or better	
m.	Insulation resistance	5000 MΩ	
n.	Operating temperature	20 ° C to +105 ° C	
o.	Vacuum range	Better than 1x10^{-4} mbar	
30.	**Mechanical feed through (QTY: 2 Nos.)**	2 Tubes per feed through. Material: SS304L Tube size: ¼” x 1 No. and 3/8” x 1 No. each per feed through. Welding of tubes to feed through shall be done via a sleeve The tubes shall have compressed ferrule fittings (SS304) on both ends and closed with end caps.	
31.	**PORTS**		
a.	Pumping port	One pumping port of suitable size (equal to the size of booster pump mouth) shall be provided at the back of the chamber.	
b.	View port	One view port of diameter 100 mm, on chamber door (to view the job from outside).	
c.	Gauge & Transmitter port	A port of suitable size to accommodate a pirani gauge & absolute pressure transmitter shall be provided.	
d.	Instrumentation port	One port of suitable size to accommodate all electrical feed through (thermocouple & power: 1 each) on left side of the chamber.	

	Specifications & Description		Compliance
e.	Mechanical feed through port	One port of suitable size to accommodate the mechanical feed through on left side of the chamber.	
f.	Illumination port	Shall be placed suitably to illuminate the whole inner chamber.	
32.	**Control System**		
a.	PLC based control system	a) The control system for sequencing and controlling the pumping system, opening of chamber, venting of chamber and heating of oven with process interlocks shall be automated using PLC. b) All safety and operational interlocks should be provided through PLC. c) **Make:** Siemens /Allen Bradely /Honeywell / Schneider	
b.	PID controller for temperature	Temperature uniformity @±5°C shall be achieved and maintained throughout the chamber homogeneously Over temperature controller shall be provided for over temperature protection. **Make:** Eurotherm/ Honeywell /Yokogawa / Siemens	
c.	Thermocouple for temperature measurement	Thermocouple for Temperature measurement shall be done through PLC with +/- 1°C accuracy. **Make:** Omega/TE connectivity. **QTY:** 3 Nos (minimum)	
d.	Control Cabinet	a) Control cabinet shall be housed in the support structure. b) Shall be fabricated out of mild steel sheets & neatly powder coated meeting IP-54 class protection. c) The control console shall be divided into three segments with power panel, vacuum panel and Oven heating & cooling control panel. d) The control cabinet shall be housed with all instrumentation system like all control switches, gauges, controllers, PLC, HMI(15 inch) etc, contactors, relays etc. ergonomically integrated into a console so that the system can be operated and maintained conveniently. e) Vacuum gauge controller/displays shall be mounted in the control cabinet.	
e.	Control Console with Mimics	a) The HMI should display entire Oven schematic using MIMIC diagram. b) Status indication for all pumps, valves, vacuum chamber door opening and closing, heater status, oven temperature, etc., shall be shown in HMI system. c) All process parameters are to be displayed. d) The control console shall incorporate auto / manual vacuum and temperature controller in a mimic diagram with indication. e) The entire sequence of the Vacuum oven operations shall be indicated by process flowchart/mimic diagram.	
f.	Manual override	Provision for manual override shall be given for Interlocks & Heating rate for both Auto mode/Manual mode	
g.	HMI	**Make:** Siemens or Prolific **Size**: 15” Touch operated	
h.	Contactors	Electromagnetic or solid-state relays for over-temperature cut-off. Make: Fuji/ ABB/ Omron/ Siemens/ Schneider	

	Specifications & Description		Compliance
i.	Fuses	HRC fuses for incoming power supply, separate fuses for heater circuit, blower and control circuit.	
33.	**Third Party Inspection**	Under scope of supply	
a.	Raw material Inspection	Certificate for raw material shall be provided.	
b.	X-Ray test	All weld joints shall be subjected to radiography tests as per standards. Certificate shall be provided.	
c.	Dimensional Inspections	All the dimensions indicated in the fabrication drawing have to be inspected for its conformance.	
34.	**Safety interlocks**		
a.	Pneumatic clamp shall be released for chamber door opening only if the chamber pressure & temperature is ambient.		
b.	Pumps shall not be switched on until the limit switch shows chamber door close indication.		
c.	Chamber isolation valve shall open only if chamber door is closed.		
d.	Vent valve shall open only when chamber isolation valve is closed and oven temperature is less than 80°C.		
e.	Sequencing of pump operations.		
f.	Sequencing of heating.		
g.	Electrical Power fails / Restart on resuming power (manually selectable).		
h.	Pneumatic Pressure failure.		
i.	Vacuum oven door open/ Door closing confirmation		
j.	Any Vacuum pump failure.		
k.	Ground Fault (job touching on the heating element) Alarm/ Switch off heating		
l.	Over Temperature Alarm/ Switch off Heating.		
m.	Program end Control. Alarm to operator, no restart of any system automatically.		
n.	System shall have necessary protection against single phasing reverse phasing, power failures, and under/over voltages		
o.	Apart from the above, standard safety interlocks shall be incorporated. Further, any other interlocks requirement shall be communicated during PDR and PDI which shall be incorporated		
p.	**Action on power failure**	**Close all valves & Hold the program**	
q.	Alarms	All Alarms shall have Audio & Visual display. Alarms shall be provided for: a) Backing pump temperature high. b) Over temperature of system. c) Ground Fault – job touching the heating element etc. d) Pneumatic Pressure Low/ High.	
35.	Handling provision	Suitable hooks at the top shall be provided for lifting the complete system using crane and provision for sliding palette truck below the system shall be provided.	
36.	Calibration of sensors and Equipments	All vacuum, temperature, and pressure sensors and instruments shall be calibrated in accredited lab and certificates shall be supplied.	

	Specifications & Description	Compliance
E.	**DOCUMENTS TO BE SUBMITTED**	
a.	**Documents to be included in the offer:**	
1.	Technical Compliance statement to all specifications and tender clauses. (point by point).	
2.	Full details of subsystems including bought out items.	
3.	Detailed specification datasheets of vacuum pumps, vacuum gauge and controller, bellows, electro-pneumatic gate valves, pneumatic clamp, heating element, pressure transmitter and display, feed through (thermocouple and power), HMI, PID controller, PLC, thermocouples, Power supply etc.,	
4.	Schematic (PID) of complete system comprising of oven, pumps, valves, gauges, bellows, etc.	
5.	Schematic (PID) of PLC and instrumentation	
6.	Calculation for Chamber oven thickness depicting adequacy for vacuum operations.	
7.	Pump down curve	
8.	Pumping speed curve.	
9.	Details of Power interface	
10.	Details of Pneumatic pressure requirement	
11.	Detailed specifications of all sub systems	
12.	All relevant catalogues with specifications of the items	
13.	Overall plan of project execution with details of facilities/capabilities available for timely completion of the project in all respects.	
14.	Other documents as mentioned in commercial part	
15.	Any other relevant document (technical and commercial) for offer evaluation.	
b.	**Documents to be submitted after placement of order**	
1.	Detailed design drawings of the Vacuum Oven.	
2.	Electrical power interface and details.	
3.	Air connection interface details etc.	
4.	Material conformance certificate from an accredited agency.	
5.	Complete set of drawings with all dimensions'/circuits details of A. Oven Chamber & pump system B. Pneumatic System C. Heating System D. Electrical Power System E. Dimensions of O-rings and grooves F. PLC Control System G. All Circuit wiring Diagrams H. All fabrication drawings I. Software documentation	
6.	Detailed Technical specifications of all sub systems.	
7.	All relevant catalogues with specifications of the items.	
8.	List of imported items and source of supply.	

	Specifications & Description		Compliance
9.	All other relevant documents.		
10.	One set of detailed operation and maintenance manuals along with necessary drawings in hard and soft copy.		
11.	One set of detailed safety manuals along with necessary drawings in hard and soft copy.		
12.	Original gauge calibration certificate for all the gauges / instruments.		
13.	**Training**	Operation & maintenance (hands on) training for operating staff at LPSC, Tumakuru site. (at least 2 personnel on-site during installation)	
F.	**INSPECTION, ACCEPTANCE, AND RESPONSIBILITIES**		
1.	**Pre Delivery Inspection (PDI)** System shall be integrated at vendor's site and then conduct the following minimum tests in the presence of LPSC personnel. a) Inspection of all deliverables as per bill of material. b) Verification of the material test reports. c) Review of the Third party inspection reports of the various NDI carried out on the welds. d) Visual inspection & Dimensional inspection. e) Operation of vacuum system f) Global leak rate test g) Heating the Oven up to 170 °C h) Demonstration of Vacuum levels at ambient conditions. i) Heater cutoff at set temperature j) All performance tests as per the specification detailed above shall be demonstrated. k) MSLD and Helium required for testing is under vendor scope. However, a detailed mutually agreed test plan shall be derived to conduct the above PDI.		
2.	**Site acceptance testing (SAT)** System shall be transported, installed and commissioned at the premises of LPSC, Tumakuru, and the following minimum tests shall be carried out in LPSC. a) Visual inspection. b) Physical verification for all components and subsystems. c) Individual & global leak rate tests. d) Vacuum level demonstration at ambient conditions e) Heater cutoff at set temperature f) Verification of safety interlocks. g) Heating the Oven up to 170 °C h) Successful demonstration of complete system in integrated mode. i) MSLD and Helium for testing is under vendor scope.		
3.	**Acceptance Criteria** a) Heating the empty Oven to the operating temperature for specified continuous time of operation. b) Operation of vacuum system and verification of ultimate vacuum.		

	Specifications & Description	Compliance
	c) Heating the oven for various temperature ranges up to 170^{o}C d) Operation of vacuum drying oven through HMI. e) Submission of all listed documents.	
4.	**Responsibilities of vendor**	
a.	Design, fabricate, supply, integration, installation, testing and commissioning of vacuum oven, pumping system in LPSC, Tumakuru as per specification.	
b.	To organize for third party inspection at various stages as per the tender document.	
c.	The vendor shall integrate, install and commission the vacuum oven in the LPSC, Tumakuru premises as per specifications mentioned in the scope of work.	
d.	To conduct the Pre delivery Inspection (PDI) and Site Acceptance test (SAT) and as per the tender document.	
e.	To furnish a detailed drawing after the design to LPSC for reviewing the design and final approval.	
f.	To provide the overall dimension of the system, and requirements of civil works if any.	
g.	To provide a complete documentation in English.	
h.	To provide training to LPSC personnel in order to familiarize them with the system in operation, preventive maintenance and to understand the safety aspects involved.	
i.	To assure the guarantee supply of spares of for a period of 10 years from the date of commissioning.	
j.	To provide the equipment's/machines warranty period of 36 months from the date of commissioning at LPSC, Tumakuru.	
5.	**Responsibilities of LPSC**	
a.	To provide consumables like water, electricity, power supply rating, etc.	
b.	Required building as per the layout will be provided.	
c.	To review and approve the design of the entire vacuum drying oven.	
d.	To provide dispatch clearance after reviewing all the relevant documents of pre delivery inspection for the integrated system.	
e.	To provide final acceptance matrix and evaluation of the system.	
f.	To provide final acceptance of the system based on the acceptance test data analysis and review committee clearance	
G.	**ANNUAL MAINTENANCE CONTRACT**	
1.	The Annual Maintenance Contract (AMC) is a Non-Comprehensive type, which includes preventive and break down maintenances. AMC comes into effect after the completion of three years of Warranty period. Separate quote to be provided by the vendor for the AMC. The details of AMC are provided below. Cost of AMC is included in the total cost of the system	
2.	Duration of AMC: 2years	
3.	Frequency of visits: Once in 6 months and Total visits: 4 visits in two years.	
4.	**General:** i. Inspection and general cleaning of the complete Vacuum drying oven. ii. Inspection of gaskets and O-rings and replacing, if required. iii. Check the air admittance valves & isolation valves iv. Apply vacuum grease for O-rings if required. v. Checking of temperature set point controller. vi. Checking of heating rate.	

	Specifications & Description	Compliance
	vii. Checking of proper functioning heater by measuring current, voltages, etc., viii. Demonstration of ultimate vacuum.	
5.	**Vacuum pumps** i. Check the health of the pumps, condition of oil, oil level etc., if required change the oil or top up to required level. ii. Inspect the health of the pump motor by measuring current consumption, pump sound, temperature and vibration. iii. Check the health of the bearing and replace if required. iv. Check the vacuum of the pump at the inlet of each pump. v. Check the chilled water flow and temperature (as per pump specification, if applicable).	
6.	**Transmitters/gauges/etc.,** i. Check and clean the gauges/ transmitters & controller and reassemble ii. Check the electrical connection. iii. Verify the set point reference with respect to hardware & software as per safety interlock of chamber operation. iv. Check the measurement signal outputs vs pressure v. Check the measurement status indication. vi. Check for zero drift, if necessary adjust zero. vii. Calibration of all gauges and transmitters once in a year and provide necessary certificate.	
7.	**PLC and vacuum console panel** i. Check the functioning of all relays, contactors and MCBs etc. installed on control console panels on regular basis by enabling the command from the mimics on the touch screen. ii. If any malfunctioning of relays, contactors, MCBs are found, service it or replace with the new one. iii. Earthing of all electrical systems including for motor, pumps all instrumentation panels, electrical panels, control panel, transformer Earthing. iv. Verification of PLC analog inputs/ outputs, digital input/ outputs. v. Functional verification of control system. vi. Verification of all safety interlocks and general performance of complete Vacuum drying oven. vii. Any other additional general checks/ tests required for smooth functioning of system to be included. viii. LPSC will provide necessary consumables like vacuum pump oil, vacuum grease etc. for performing preventive maintenance.	
8.	**Breakdown maintenance** i. Party has to attend six numbers of breakdown calls in two years at free of cost ii. Break down maintenance call has to be attended within 48 hours from the time of intimation/complain iii. If essential spares are not available with LPSC for the restoration of system during any breakdown call, a separate purchase order will be placed on party for the required essential spares for which rates as submitted along with AMC quotation will be taken. A prior approval has to be taken for supply of emergency essential spares from LPSC.	
9.	**Work details:** i. Checking the complete system against the break down defects. ii. Identifying the nature of problems. iii. Rectifying the identified problems and set right of the system. iv. Satisfactory demonstration of performance of Vacuum drying oven.	

Specifications & Description			Compliance
	v. List of spares, components, consumables required for repair / service / running of the system to be provided by the party. vi. The required items for the break down maintenance will provided by LPSC. vii. Any other additional general checks/ tests required for smooth functioning of system to be included. viii. The spares inventory shall be checked by the party periodically and requirement of spares shall be indicated to LPSC accordingly. ix. The Vendor/agent shall attend to the break down maintenance within 48 hours of intimation from LPSC		
10.	The list of essential spares required for the trouble free operation of vacuum oven and other associated utilities for system are given below. **Separate quote to be provided for the spares which is optional and is not included in the total cost of system.**		
	Item	**QTY**	
a.	Heater	1 No.	
b.	Borosilicate glass (suitable for port size of 100 mm)	1 No.	
c.	Illumination port borosilicate glass	1 No	
d.	Vacuum grease	1 kg	
e.	Vacuum oil for pumps (roots and backing pump gear box if required)	5 ltrs	
f.	Pump isolation valve (same make as supply)	1 No.	
g.	Vent valve (same make as supply)	1 No.	
h.	Pirani gauge	2 Nos.	
i.	Fuses, contactors & relays	1 set	
j.	25 micron filters	2 Nos.	
k.	Limit switch	1 No.	
l.	2 Channel Gauge controller	1 No.	
H.	**BILL OF MATERIALS**		
	Following are the major bill of materials		
	Item	**QTY**	
1.	Vacuum Oven	1 No	
2.	Dummy flanges (1 each for all sizes)	7 Nos	
3.	Backing Pump	1 No	
4.	Roots Pump	1 No	
5.	Feedlines, Bellows, Frames, Stands, Cabinets	1 Set	
6.	Heating element	6 Nos	
7.	Isolation valve with micro switch	1 No	
8.	Vent valve with micro switch	1 No	
9.	Vacuum gauges	2 Nos	
10.	2 Channel vacuum gauge controller	1 No	
11.	Transmitter & Display	1 Set	

Specifications & Description			Compliance
12.	Pneumatic clamps	1 No	
13.	HMI	1 No	
14.	PLC, contactors, relays, etc.	1 Set	
15.	Exhaust lines	1 Set	
16.	O-rings	4 Sets	
17.	Borosilicate Glass (view port, dia 100 mm)	1 No	
18.	Illumination lamp	1 No	
19.	Illumination port borosilicate glass	1 No	
20.	Temperature controller	1 No	
21.	Thermocouple feed through	1 No	
22.	Thermocouple	3 Nos	
23.	Power feed through	1 No	
24.	Mechanical feed through	2 Nos	
25.	Limit switch	1 No	
26.	Perforated Trays	3 Nos	
27.	25 micron filter	1 No	
PART B: COMMMERCIAL TERMS			
1.	**PRICE** The prices are FIRM and FIXED. On receipt of order, Vendor has to prepare detailed work break-up and schedule chart (in consultation with LPSC) and submit to LPSC for our acceptance.		
2.	**WARRANTY** The total system shall be warranted for total performance and failure-free operation for a period of 36 months from date of final acceptance of system by LPSC/ISRO.		
3.	**SECRECY** The drawings and documents sent along with this tender form part of vital documents and same should be kept on top secret. Under any situations, contractor should not part with or transfer the technology/contents of drawings and documents whatsoever to any 3rd party/agency without our prior consent. If at any time, it is brought to our notice that the secrecy have been transferred by you intentionally or otherwise to any third party /agency, contractor shall be liable to indemnify the loss/ damage to Government of India.		
4.	**INDEMNITY** Contractor shall warrant and be deemed to have warranted that all the items supplied against this tender are free and clean of any infringement of any patent, copy right or trademark and shall at all times indemnify LPSC against all claims which may be made in respect of the items for infringement of any right protected by patent registration of design or trade mark and shall take all risk of accidents or damage which may cause a failure of the supply from whatsoever cause arising and the entire responsibility for the sufficiency of all the means used for executing the Purchase Order.		
5.	**DELIVERY SCHEDULE** Items shall be supplied and installed and site acceptance tested within 6 months from the approval of drawings by LPSC. Drawings and necessary documents for clearance shall be submitted for approval within 1 months from placement of P.O.		

	Specifications & Description	Compliance
6.	**DELIVERY TERMS** Item to be procured, integrated and installed at LPSC, Tumakuru	
7.	**PAYMENT TERMS** 100% of payment after receipt of all items and installation, commissioning & acceptance at Department site.	
8.	**VALIDITY** The quoted price should be valid for a period of 6 months from the date of opening of the technical and commercial quotation.	
9.	**HERITAGE CLAUSE** Party should have executed similar works at aerospace industries. Proof should be submitted for the same. Note: Similar nature indicates that party should have supplied vacuum chamber/vacuum ovens, vacuum pumps, valves, gauges etc. all together for a single project & successful demonstration of supplied system. Further the supplied system should have specifications similar to that of the tender document.	
10.	**NON COMPLIANCE** 1. While submitting technical bid, suppliers are requested to include full details of the system offered including details of pumping system offered, makes of vacuum pumps, their capacities, quantity etc. in addition to details of gauges, valves, control system, heaters etc. 2. Details of items given in section E should be submitted along with the technical offer. Not providing the details will be considered as non-compliance. 3. Vendor shall provide technical offer consisting of specifications of all components along with necessary supporting datasheets/proofs. Merely providing a compliance statement document will be considered as non-compliance 4. Failing the above points shall be considered as non compliance.	
11.	**AMC CLAUSES & CONDITIONS** On successful completion of warranty, a separate purchase order for non-comprehensive AMC will be placed at the same rate quoted by the vendor during the submission of offer. However, LPSC reserves the right to choose whether to place Purchase order or not, after the warranty period completion.	
a.	**Type of contract** The proposed annual maintenance contract shall be of Non –comprehensive type.	
b.	**Period of contract** AMC Contract shall be valid for a period of two years after completion of warranty period of 3 years. However, LPSC shall be open to terminate the contract at any time by giving one month notice.	
c.	**Scope of Maintenance** **Preventive maintenance** Preventive maintenance shall be carried out two times in a year with six months of interval. **Break down maintenance** Party has to attend six numbers of breakdown calls in two years at free of cost under AMC within 48 hrs of reporting, during the AMC period. Details of AMC are provided in section G.	
d.	**General terms & conditions** A. In the event of damages to our property or injury to our personnel due to the negligence of your employees, the responsibility shall solely rests with you.	

	Specifications & Description	Compliance
	B. The Department shall not be responsible for any injury to your personnel, or damage to your property caused at our site. C. Compliance matrix for the above conditions shall be provided.	
12.	**GENERAL CONDITIONS TO THE VENDORS** The execution of the complete project is on turnkey basis as per the specifications and requirements deliberated in previous sections. The response to the tender is in the form of two separate offers, one as 'Technical offer' and other as 'Commercial offer'. Both the offers are to be submitted simultaneously. In order to understand the vendors profile for execution of the project, following information shall be provided to LPSC along with the technical offer.	
a.	List of sub-contractors and major equipment suppliers for this project execution.	
b.	Local office in India or authorized Indian agents details to be provided for ease of project executions and AMC point of view.	
c.	Any modifications in the system till installation shall meet the technical specification of the tender document and prior approval to be obtained from LPSC. Further the modifications made shall be technically equal or superior w.r.t. to the original offer and should not have any additional cost implication.	
d.	During the evaluation of technical bids alternatives/options/suggestions shall be confirmed in technical offer to meet the system specifications. As the contract is for fixed price, no provision for addition/reduction in charges will be entertained after opening the price bid.	
e.	LPSC/ISRO may incorporate specific provisions and conditions before ordering with mutual consent. These provisions will deal with delivery schedule, specifications demonstration criteria, financial provision, quality control procedures, specific provisions relating to imported items, penalty clauses, etc.	
f.	Any information kept vague or not furnished shall be treated as non-compliance with the requirements of the vendor and hence tender are liable for rejection.	
13.	**FOLLOWING DOCUMENTS SHALL BE SUBMITTED BY THE VENDOR ALONG WITH TECHNICAL OFFER (PART-A)** 1. Compliance matrix of each specification as given in this document. 2. List and details of non-compliance of specifications by the vendor if any. 3. Confirmation of scope of supply as given in this document by vendor. 4. Overall plan of project execution with details of facilities/capabilities available for timely completion of the project in all respects. 5. Major equipment specification and their source of supply and part number. 6. List of Indian associates or partners, consultants, subcontractors, major equipment suppliers, proposal to be involved in this project, the past experience, competence and extent of the involvement. 7. Details of utilities to be provided by LPSC/ISRO and time stages at which these are required by the contractor 8. Commercial Terms such as delivery date, taxes, duties payable, place of delivery, payment term, validity, guarantee etc. and scope of supply shall not be covered in this part. Please enclose a copy of the details indicated in price quotation (WITHOUT PRICES OR BY MASKING THE PRICE) mainly to know the items/ specifications for which you have indicated prices in price bid. This part should not contain prices.	
14.	**FOLLOWING DOCUMENTS SHALL BE SUBMITTED ALONG WITH COMMERCIAL OFFER (PART-B)** The Vendor shall take note of following points in respect of commercial matters relating to this turn-key project.	

	Specifications & Description	Compliance
	1. The Vendor responding to this tender, shall submit comprehensive commercial price bid in a separate document meeting all the requirements specified therein. 2. This contract is proposed to be firm and fixed price contract and no price escalation will be permitted during the period of contract. 3. Vendor shall not be allowed to change any item from imported to indigenous or vice versa without prior approval of LPSC after Purchase Order is placed. 4. The Vendor is chosen on the basis of suitability of techno-commercial merits. The scope of contract will cover the turnkey execution of the total system. 5. Vendor shall furnish all details as called for in this chapter giving due justification. Any information kept vague or not furnished shall be treated as non-compliance with the requirements of the Vendor and hence tender is liable for rejection 6. The offer should include the following documents: a) The total cost of the systems including fabrication, supply, installation, commissioning and testing. b) Break up of cost for Vacuum oven, pumps, valves, gauges, controllers, PLC based control system, control cabinet, heater, etc., c) Break up of various elements like design, direct material, direct labor, overheads, etc d) For all items, vendor shall furnish separate details like equipment cost in foreign currency, foreign exchange conversion rate, equipment cost in Indian rupees without, customs duty/Excise duty etc. e) Transportation charges, taxes, government levies shall be specified separately. f) Installation & commissioning charges shall be specified separately. g) Separate quote for the AMC for the period of 2 years after warranty period. h) Separate quote for the spares required for vacuum system shall be specified separately. Spares price quote shall be valid till expiry of AMC. i) Acceptance to furnish warranty certificate for the period of 3 years, from the date of installation, commissioning and acceptance of the total system. j) Acceptance to the commercial clauses and conditions. k) Any other information relevant to this tender.	
15.	**INSTRUCTIONS TO TENDERERS FOR SUBMITTING TWO PART TENDERS** Offer shall be submitted in two parts as following: 1. Techno-commercial part (without price details). 2. Commercial part (Price offer).	