

भारत सरकार/GOVERNMENT OF INDIA

अंतरिक्ष वभाग/DEPARTMENT OF SPACE

क्रय यूनिट-III/PURCHASE UNIT-III

वक्रम साराभाई अंतरिक्ष केंद्र/VIKRAM SARABHAI SPACE CENTRE

तिरुवनंतपुरम/THIRUVANANTHAPURAM - 695 022

वजा. सं. वीएसएससी/एसपीआरई-क्रय - दि. 16/12/2024

ADVT. NO. VSSC/SPRE-PUR DT. 16/12/2024

भारत के राष्ट्रपति के लए तथा उनकी ओर से वरिष्ठ प्रधान, क्रय एवं भंडार, वक्रम साराभाई अंतरिक्ष केंद्र (वीएसएससी), तिरुवनंतपुरम, निम्न ल खत के लए ई-प्रापण के माध्यम से (क्रम सं. 1 के लए) नि वदाएं आमंत्रित करता है: -

For & on behalf of the President of India, the Sr. Head Purchase & Stores, Vikram Sarabhai Space Centre (VSSC), Thiruvananthapuram invites Tenders through e-procurement (for Sl. No. 1) for the following: -

क्रम सं. Sl. No	निविदा सं. Tender No.	वर्णन / Description	मात्रा Qty.	नि वदा शुल्क Tender Fee
1	VSSC/PURCHASE UNIT III (SPRE)/ASOE/VS2024005985 [लोक नि वदा - दो भाग/PUBLIC TENDER- TWO PART]	ऊष्मा-निर्वात कक्ष की अ भकल्पना, प्राप्ति, संस्थापन, कमीशनिंग और निष्पादन प्रदर्शन Design, realization, installation, commissioning and performance demonstration of Thermo-Vacuum Chamber	1 सं.No.	लागू नहीं / NA

वशेष टिप्पणी/Special Note:-

वदेशी वक्रेताओं को नि वदा प्रस्तुत करने की अनुमति नहीं है। मेक इन इंडिया नीति के अनुसार केवल श्रेणी-I और श्रेणी-II के स्थानीय आपूर्तिकार इस बोली में भाग लेने हेतु पात्र हैं। वदेशी ओईएम से सीधे प्राप्त उद्धरणों/या वदेशी ओईएमओं की ओर से उद्धरण प्रस्तुत कर रहे एजेंटों को इस नि वदा में भाग लेने की अनुमति नहीं है।

Foreign vendors are not permitted to quote. Only Class-I and Class-II Local suppliers as per Make in India Policy are eligible to participate in the bid. Quotations directly from foreign OEM/ or from agents quoting on behalf of foreign OEMs are not allowed to participate in this tender.

क्रम सं. Sl. No.	बोली प्रस्तुत करने की समय-सीमा Time limit for submission of Bid	बोली खोलने की ति थ Bid Opening date
1.	दिनांक 27.01.2025 [14:00 बजे तक]	दिनांक 27.01.2025 [14:01 बजे ]

क्रम सं. 01 के लए, ब्यौरे इसरो ई-प्रापण पोर्टल <https://eproc.vssc.gov.in> पर उपलब्ध हैं।  
For Sl. No. 01, details are available on ISRO e-procurement portal <https://eproc.vssc.gov.in>.

शुद्धिपत्र, यदि कोई हो तो, हमारे वेबसाइट [www.vssc.gov.in](http://www.vssc.gov.in) / [www.isro.gov.in](http://www.isro.gov.in) में मात्र प्रकाशित किया जाएगा।

**Corrigendum, if any will be published in our websites : [www.vssc.gov.in](http://www.vssc.gov.in) / [www.isro.gov.in](http://www.isro.gov.in) only.**

हस्ताक्षरित /Sd/-

वरि. प्रधान, क्रय एवं भंडार / Sr. Head, Purchase & Stores

E-Tenders are invited for the above mentioned procurements through our E-procurement site <https://eproc.vssc.gov.in>. Bids can be submitted before the due dates mentioned.

Only online tenders will be accepted. No manual / Postal / e-mail / fax offers will be entertained. No manual tender document will be issued. Parties interested to participate in this e-Tender are required to register themselves as vendors, if not already registered, in our e-procurement portal <https://eproc.vssc.gov.in> by downloading plugins and help demos listed on the home page of the e-procurement link mentioned above to complete the vendor registration process. They can seek help from help desk 0471-2565454 also as provided in the home page of e-procurement portal in case of any problem for registration and subsequent process. Vendors may please note that without registering in our e-procurement portal, they will not be able to quote for this e-tender.

Important Notice: Tender will be automatically closed on the due date if at least one offer is received. If the tender could not be opened on the first day due to any technical snag, it will be opened on the subsequent day as per the schedule.

This being a Two Part Tender, Cost shall be mentioned in the Price Bid Only. All the documents being uploaded like quote split up details, AMC cost etc should not contain the rates/costs. However, a copy of your PRICE BID, AMC quote etc WITHOUT PRICE SHALL BE UPLOADED in the Documents Solicited from the Vendor Field [available in Bid forms] TO KNOW THE PATTERN OF QUOTE. [ENSURE NOT TO MENTION ANY PRICE, OTHERWISE THE QUOTE WILL BE INVALID].

**THE TECHNICAL DOCUMENTS NEED TO BE ATTACHED ONLINE AS A SINGLE PDF FILE WITHOUT ANY PRICE INFORMATION, TECHNICAL BID CONTAINING PRICE DETAILS WILL BE TREATED AS REJECTED.**

**GOVERNMENT OF INDIA  
DEPARTMENT OF SPACE  
VIKRAM SARABHAI SPACE CENTRE (VSSC)  
THIRUVANANTHAPURAM**

**Tender for Design, realization, installation, commissioning and  
performance demonstration of Thermo-Vacuum Chamber**

**Bids to be submitted online**

**Tender No.: VSSC/PURCHASE UNIT III (SPRE)/VS202400598501 dated 13-12-2024**

## A. Tender Details

Tender No :	<b>VSSC/PURCHASE UNIT III (SPRE)/VS202400598501</b>
Tender Date :	<b>13-12-2024</b>
Tender Classification:	<b>GOODS</b>
Purchase Entity :	<b>PURCHASE UNIT III (SPRE)</b>
Centre :	<b>VIKRAM SARABHAI SPACE CENTRE (VSSC)</b>

### **Design, realization, installation, commissioning and performance demonstration of Thermo-Vacuum Chamber**

This Tender is for the Design, realization, installation, commissioning and performance demonstration of Thermo-Vacuum Chamber

This tender is proposed as a DOMESTIC PUBLIC TENDER. This tender is restricted only to Class-I and Class-II Local Suppliers as defined under DPIIT Order dtd 04/06/2020- Preference to Make in India Order-2017 Revision. Non-Local Suppliers need not quote.

Foreign OEMs/Agents quoting on behalf of Foreign OEMs are not permitted to quote. High Sea Sales Quotes not permitted. The bids shall be in INR only.

Tenderers are advised NOT TO UPLOAD any documents revealing the price of the main equipment, accessories, spares or AMC. They are however, requested to upload UNPRICED BIDS (i.e. Price details masked) showing appropriate break-up of components of main equipment, individual accessories and spares as desired. And the price break-up (Main Equipment, Essential Spares, AMC Cost) shall be uploaded in PRICE BID RELATED column.

This is a TWO-PART tender i.e. Techno-Commercial Bid (Part-I) and Price Bid (Part-II) shall be submitted separately. All technical and commercial terms and conditions shall be furnished in the Techno-Commercial Bid while price shall be indicated only in the Price Bid. Uploading price details anywhere else other than the price-bid related document shall lead to unconditional rejection of the tender. Please make note of the same.

Purchase preference to eligible vendors are applicable as per extant notifications issued by the Government of India.

The Class-I/Class-II Local suppliers, at the time of submitting their offer, shall also indicate percentage of local content and provide self-certification that the item (s) offered meets the local content requirement for Class-I/Class-II Local Suppliers as the case may be. They shall also give details of location (s) at which the local value addition is made.

In cases if the item(s) offered exceed Rs. 10 Crores, the Class-I/Class-II Local Suppliers shall provide a Certificate from the statutory auditor or cost auditor of the company (in case of companies) or from a

practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of local content.

False Declarations will be in breach of the Code of Integrity under Rule 175 (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.

Technical Bids will be opened at the scheduled due date & time. No further intimation will be sent in this regard. The schedule for price bid opening shown is only indicative. Price bids will only be opened in the case of parties who have been techno-commercially accepted, the details of which will be communicated at a later stage.

## **A.1 Tender Schedule**

Bid Submission Start Date : **13-12-2024 13:00**

Bid Clarification Due Date : **15-01-2025 17:02**

Bid Submission Due Date : **27-01-2025 14:00**

Bid Opening Date : **27-01-2025 14:01**

Price Bid Opening Date : **10-02-2025 12:02**

## **B. Tender Attachments**

### **Technical Write-up/Drawings**

**Document : Compliance matrix**

**Document : Layout of LN2 yard and SIV lines**

**Document : Commercial terms and conditions**

**Document : Technical Specifications**

### **Instructions To Vendors**

#### **5. Instructions to Vendors**

1. Last minute clarification on tenders will not be entertained.
2. This is an E Tender. Hence Postal/Fax/Email tenders will not be accepted.

#### **6. PPP Make in India(Non- Divisible Items-Class I & II Local Suppliers Only)**

1. In line with Public Procurement (Preference to Make in India), Order 2017 & its amendments issued by Govt. of India from time to time with a view to support the Indian industries, ISRO has implemented "Purchase Preference Policy". The "Purchase Preference" is applicable for the "Class-I Local Supplier" for the goods/ services/ works covered in this tender, subject to the following terms & conditions:-
2. a) The subject item falls under Non-divisible category. b) The offers sought only from Class-I & Class-II local suppliers
3. Definitions: A supplier or service provider, whose goods, services or works offered for procurement, has local content: a)Equal to or more than 50% : Class-I local supplier. b)Minimum 20% but less than 50% : Class-II local supplier. c) Less than 20% : Non-local supplier.
4. 'Local content' means the amount of value added in India (i.e. indigenous items/services added in the offered products/ services/ works) be the total value of the item offered (excluding net domestic indirect taxes) minus the value of imported content in the item (including all customs duties/IGST) as a proportion of the total value (excluding net domestic indirect taxes), in percent.
5. The margin of Purchase Preference shall be up to 20%.

6. 'Margin of purchase preference' means the maximum extent to which the price quoted by the "Class-I local supplier" above the L1 (landed cost).
7. 'L1' means the lowest technically accepted tender / bid / quotation (i.e. lowest landed cost including duties, taxes and freight & Insurance).
8. Works means all works as per Rule 130 of GFR- 2017, and will also include 'turnkey works'. Works includes Engineering, Procurement and Construction (EPC) contracts and services include System Integrator (SI) contracts.
9. Purchase Preference Policy:- Goods/Works which are not divisible (ie., required quantity is 1 or as a package) and Services:
- a) If L1 is from a 'Class-I local supplier', the contract will be awarded to L1 bidder.
  - b) If L1 is not from a 'Class-I local supplier', the lowest bidder among the 'Class-I local supplier' will be invited to match the L1 price subject to local supplier's quoted price falling within the margin of purchase preference (i.e. 20%) and the contract shall be awarded to such 'Class-I local supplier' subject to matching the L1 price (inclusive of duties, taxes and freight & insurance).
  - c) In case such lowest eligible 'Class-I local supplier' fails to match the L1 price, the 'Class-I local supplier' with the next higher bid within the margin of purchase preference shall be invited to match the L1 price and so on, and order/contract shall be awarded accordingly. In case where none of the 'Class-I local supplier' within the margin of purchase preference agree to match the L1 price, then the order/contract shall be awarded to the original L1 Bidder.
10. The 'Class-I & II local supplier' should provide a "Self Certification" along with technical offer indicating that the item offered meets the minimum local content [as per Sl. No.(3)] as called for in the tender and provide the percentage of local content along with details of the location(s) at which the local value addition is made. In case of two bid tenders, it is mandatory to indicate compliance to MLC(minimum Local Content) in technical bid zone.
11. The ink-signed certificate shall be provided on vendors letter head along with the offer (in case of online tender, copy of ink-signed certificate shall be uploaded along with your offer under concerned tab. Original in Hard copy shall be produced on request). In case of non-submission of certificate, the purchase preference shall not apply.
12. A committee (with an external expert from a practicing cost accountant or practicing chartered accountant, if required) constituted for independent verification shall verify the self-declarations & auditor's / accountant's certificates on random basis, as per the requirements.
13. In cases the quoted price is in excess of Rs.1000 Lakhs (including duties, taxes and freight & Insurance) the 'Class-I & II local supplier shall provide a certificate from the statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing

chartered accountant (in case of suppliers other than companies) giving the percentage of local content.

14. In case of a complaint received from any local supplier indicating a need for review / verification of Local content of successful vendor / awarded vendor, for accepting a complaint from such complainant (w.r.t the false declaration given by the successful vendor on the local content), a complaint fee of Rs.2Lakhs or 1% of the locally manufactured items being procured (subject to a maximum Rs. 5Lakhs), whichever was higher, to be paid by demand draft by the complainant. In case, the complaint is found to be incorrect, the complaint fee shall be forfeited. In case, the complaint is upheld and found to be substantially correct, deposited fee of the complainant would be refunded without any interest.

15. False declarations will be in breach of code of the integrity for which a bidder or its successor's will not be eligible/debarred for purchase preference from further tenders / pending tenders for two years along with other actions as may be applicable.

16. The Public Procurement (Preference to Make in India), Order 2017 issued by Govt. of India indicates that if there are any general or specific restrictive clauses to restrict participation of Indian companies in those countries procurement tenders, reciprocity clause need to be invoked as per the order. Hence, if ISRO or Govt. of India come across that Indian suppliers of an item are not allowed to participate and / or compete in procurement by your government, the bid submitted by you will be not be considered and excluded from eligibility for procurement. Please note this point.

## **7. Local Content Declaration Format (In your Letter Head)**

1. In line with the Government Public Procurement Order No. P/45021/2/2017-BE-II dtd . 15.06.2017 , as amended from time to time, and as applicable on the date of submission of tender, we hereby certify that , we M/s. \_\_\_\_\_ are local supplier meeting the requirement of minimum local content, \_\_\_\_\_%, as defined above in the orders for the material against Tender Enquiry No. \_\_\_\_ dtd. \_\_\_\_ . The HSN No. of the item supplied is \_\_\_\_\_

2. Percentage of Local value addition , involved in the item are:

\_\_\_\_\_

3. This is also certified that the following factors are excluded in the above percentage:  
(strike out which are not applicable)

1. imported item sourced locally from resellers/distributors (value in \_\_\_\_% including tax, if applicable)
2. The license fee/royalties paid/technical charges paid out of india. (value in\_\_\_\_% including tax, if applicable)
3. Repackaged/refurbished/rebranded imported products (value in \_\_\_\_% including tax, if applicable)

4. The details of location at which the value addition will be made is as follows :

\_\_\_\_\_  
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5. We also understand that , false declarations will be in breach of code of integrity, under rule 175 (1) (i) (h), of the General Financial Rules, for which a bidder, or its successors can be debarred for up to 3 years under Rule 151 (iii) of the GFR along with such other actions as may be permissible under law.

6. For (company name)

Authorised Signatory.

### **8. Specific Terms and Conditions to Tender (MII Compliant)**

1. (I) Please quote applicable GST separately.

2. (II) Our standard delivery term is FOR, VSSC. In case any vendor offers delivery term of Ex-works, Packing and Forwarding charges if any should be indicated separately either as a percentage of the quoted rate or as a Lumpsum amount.

3. (III) Our standard payment term is 100% within 30 days after receipt and acceptance of the items at our site (after installation and commissioning in cases where installation and commissioning is required).

4. (IV) Liquidated Damages: The delivery period quoted should be realistic. The delivery period so quoted and mentioned in the order is the essence of the order/contract. In case of delay in delivery of material as per the delivery schedule, Liquidated Damage @ 0.5% per week or part thereof on the undelivered portion subject to a maximum of 10% of the contract value shall be levied. Wherever, installation and commissioning is also involved, the supply will be deemed to have been completed only when the entire Stores is supplied, installed and accepted.

5. (V) Performance Bank Guarantee: Wherever products offered carry warranty, the warranty should be for one year or as per manufacturers standard warranty term. Against such cases, please confirm submission of Performance Bank Guarantee. The Performance Bank Guarantee should be for 3% of the order value covering the warranty period obtained from any Scheduled Bank on Rs.200/- Non Judicial Stamp Paper and should be valid beyond 2 months from the completion of the warranty period. Alternately vendors can request for withholding 3% payment till completion of the warranty period.

6. (VI) Security Deposit: Wherever the offer value is Rs. 5.00 Lakhs or above, the successful tenderer should submit Security Deposit @ 3% of the order value by way of Bank Guarantee / FD Receipt. The Bank Guarantee shall be obtained from any Scheduled Bank on Rs.200/- Non Judicial Stamp Paper

and should be valid beyond 2 months from the completion of all contractual obligations. If the Contractor is called upon by the Purchaser to deposit, Security and the Contractor fails to provide the security within the period specified, such failure shall constitute a breach of the Contract, and the Purchaser shall be entitled to make other arrangements for the re-purchase of the stores Contracted at the risk of the Contractor. In case if Security Deposit is submitted and the contractor fails to execute the order, then the security deposit will be forfeited.

7. (VII) Note: SD, LD and PBG clauses are mandatory and offers of the vendors who have not agreed for the above conditions will be excluded from the procurement process. Micro and Small Vendors are not exempted from the submission of Security Deposit. Only Govt Departments/PSUs/PSEs can submit Indemnity Bond instead of Bank Guarantee towards SD/PBG.

8. (VIII) Please upload the Technical Details / Catalogue / Data Sheets (wherever applicable)

9. (IX) The offer should be valid for a period of minimum 90 days from the date of opening of Tender and 180 Days for PT Two Part (120 Days for Technical Bid and 60 Days for Price Bid from the date of opening).

10. (X) In order to avail of the benefits extended to by Govt. of India to the Micro and Small Sectors, please submit attested copy of the valid Entrepreneur Memorandum Part-II signed by the General Manager, District Industries Centre / Udyog Adhar / NSIC Registration Certification along with your offer.

11. (XI) If any bidder submits forged / false document along with the tender, offer of such vendors will be summarily rejected and such bidders will be blacklisted for all future tenders.

12. (XII) Wherever samples are required to be submitted along with the quotation, offer without sample will not be considered.

13. (XIII) The other attached forms are our standard terms and conditions, which are to be complied with. If any conflict arise between the specific terms and standard terms, then in those cases, the specific terms will prevail over the standard terms.

14. (XIX) Purchase preference to eligible vendors are applicable as per extant notifications issued by the Government of India.

15. (XV) Foreign OEMs/Agents quoting on behalf of Foreign OEMs are not permitted to quote. High Sea Sales Quotes not permitted. The bids shall be in INR only.

16. (XVI) Definitions: A supplier or service provider, whose goods, services or works offered for procurement, has local content: a) Equal to or more than 50% : Class-I local supplier. b) Minimum 20%

but less than 50% : Class-II local supplier. c) Less than 20% : Non-local supplier.

17. (XVII) Local content means the amount of value added in India (i.e. indigenous items/services added in the offered products/services/works) be the total value of the item offered (excluding net domestic indirect taxes) minus the value of imported content in the item (including all customs duties/IGST) as a proportion of the total value (excluding net domestic indirect taxes), in percent. Indicate extent of Minimum Local Content in offered product/service and location of such value additions.

18. (XVIII) The Class-I & II local supplier should provide a Self Certification along with your offer in PDF format indicating that the item offered meets the minimum local content as called for in the tender as mentioned above and provide the % of local content along with details of the location(s) at which the local value addition is made. In case of two part tenders, it is mandatory to indicate compliance to MLC(minimum local content) in technical bid itself.

19. (XIX) The Class-I/Class-II Local suppliers, at the time of submitting their offer, shall also indicate percentage of local content and provide self-certification that the item (s) offered meets the local content requirement for Class-I/Class-II Local Suppliers as the case may be. They shall also give details of location (s) at which the local value addition is made.

20. (XX) In cases if the item(s) offered exceed Rs. 10 Crores, the Class-I/Class-II Local Suppliers shall provide a Certificate from the statutory auditor or cost auditor of the company (in case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of local content.

21. (XXI) False Declarations will be in breach of the Code of Integrity under Rule 175 (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.

22. (XXII) Purchase Preference Policy:- Goods/Works which are divisible in nature (required quantity is greater than 1 or not a package basis): i. If L1 is 'Class-1 local supplier', the order/contract for full quantity shall be awarded to L1 bidder. ii. If L1 bid is not from a 'Class-I local supplier', 50% of the order quantity shall be awarded to L1. Thereafter, the lowest bidder among the 'Class-I local supplier' will be invited to match the L1 price for the remaining 50% quantity subject to the Class-I local supplier's quoted price falling within the margin of purchase preference (i.e. 20%) and contract for that quantity shall be awarded to such Class-I local supplier subject to matching the L1 price (inclusive of duties, taxes and freight & insurance). iii. In case such lowest eligible 'Class-I local supplier' fails to match the L1 price or accepts less than the offered quantity, the next higher 'Class-I local supplier' within the margin of purchase preference shall be invited to match the L1 price for remaining quantity and so on, and contract shall be awarded accordingly. In cases where none of the 'Class-I local

supplier' within the margin of purchase agree to match L1 price, in such cases 100% quantity shall be ordered on original L1 bidder. iv. In case no offers are received from 'Class-I local supplier' or none of the 'Class-I local supplier' falls within the margin of purchase preference of 20%, the order shall be processed on L1 vendor. v. In case L1 bidder (not a 'Class-I local supplier') is not accepting splitting of order on 50:50 basis, in that case the order/contract shall be awarded to such 'Class-I local supplier' for full quantity subject to matching the L1 price. vi. Regarding MSEs (Indian vendors): a) The following additional aspect as indicated below would be applicable for procurement which are falls under divisible category (i.e., not applicable for indivisible category), in case of participation of MSEs in the tendering who are also complying to the Minimum Local Content (MLC) stipulated in the tender. b) If any Indian vendor satisfies the requirement of MSEs stipulation and also falls within the purchase preference margin as called for in MSME policy (in case of matching L1 price) will be considered for ordering 25% of tendered quantity, the balance quantity / works will be considered for distribution amongst all bidders (including MSEs) as per the purchase preference policy. c) In case no MSEs qualifies for purchase preference or do not match with L1 price then the total tendered quantity will be distributed amongst all bidders as per the purchase preference policy.

23. Purchase Preference Policy:- Goods/Works which are not divisible in nature (required quantity is 1 or on a package basis):

(i). If L1 is 'Class-1 local supplier', the order/contract for full quantity shall be awarded to L1 bidder. (ii). If L1 bid is not from a 'Class-I local supplier', then, the lowest bidder among the 'Class-I local supplier' will be invited to match the L1 price subject to the Class-I local supplier's quoted price falling within the margin of purchase preference (i.e. 20%) and contract for that quantity shall be awarded to such Class-I local supplier subject to matching the L1 price (inclusive of duties, taxes and freight & insurance). (iii). In case such lowest eligible 'Class-I local supplier' fails to match the L1 price , the next higher 'Class-I local supplier' within the margin of purchase 'preference shall be invited to match the L1 price and so on, and contract shall be awarded accordingly. In cases where none of the 'Class-I local supplier' within the margin of purchase agree to match L1 price, in such cases the contract shall be placed on original L1 bidder. (iv). In case no offers are received from 'Class-I local supplier' or none of the 'Class-I local supplier' falls within the margin of purchase preference of 20%, the order shall be processed on L1 vendor.

9. This is a TWO-PART tender i.e. Techno-Commercial Bid (Part-I) and Price Bid (Part-II) shall be submitted separately. All technical and commercial terms and conditions shall be furnished in the Techno-Commercial Bid while price shall be indicated only in the Price Bid. Uploading price details anywhere else other than the price-bid shall lead to unconditional rejection of the tender. Please make note of the same.

10. Technical Bids will be opened at the scheduled due date & time. No further intimation will be sent in this regard. The schedule for price bid opening shown is only indicative. Price bids will only be opened in the case of parties who have been techno-commercially accepted, the details of which will be communicated at a later stage.

## **11. Conditions for BIDDER FROM A COUNTRY WHICH SHARES LAND BORDER WITH INDIA**

1. 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).

2. Any false declaration and non-compliance of the above would be a ground for immediate rejection of offer or termination of the contract and further legal action in accordance with the laws.

3.

Validity of Registration: Registration should be valid at the time of submission of bids and should be valid at the time of placement of order.

## C. Bid Templates

### C.1 Technical Bid - Design, realization, installation, commissioning and performance demonstration of Thermo-Vacuum Chamber

#### 1. Thermo-Vacuum System : Fully automated Thermo Vacuum Chamber as per attached specification document

#### Item specifications for Thermo-Vacuum System : Fully automated Thermo Vacuum Chamber as per attached specification document

SI No	Specification	Value	Compliance	Offered Specification	Remark
1	1. Scope of work	Scope of work includes design, realization, installation, commissioning and performance demonstration of a thermo-vacuum chamber at VSSC/ ISRO, Thiruvananthapuram as per trailing specifications. Scope of supply also includes supply of auxiliary subsystems listed in the tender and routing of all lines for the passage of LN2, GN2 and other fluids. Supplier shall obtain license from PESO for design, realization & installation of LN2 tank.	Yes / No / Explain		
2	2. General description of equipment	-	Yes / No / Explain		
3	2.1 Range of testing	Temperature range of 153 K to 423 K at 5x10 <sup>-7</sup> mbar vacuum level.	Yes / No / Explain		
4	2.2 Major subsystems	Vacuum pumping system, thermal system (including Thermal Conditioning Unit) and PLC based SCADA system	Yes / No / Explain		

5	2.3 Auxiliary systems	Liquid nitrogen tanks, gaseous nitrogen tanks, super-insulated vacuum jacketed lines, air compressor and chiller	Yes / No / Explain		
6	3. Vacuum chamber details	-	Yes / No / Explain		
7	3.1 Vacuum Chamber design	-	Yes / No / Explain		
8	a. Chamber configuration	The chamber shall be cylindrical with a tori-spherical end dish.	Yes / No / Explain		
9	b. Chamber design	It shall be designed for external pressure operation (internal pressure of $5 \times 10^{-7}$ mbar absolute and external pressure of 1.01325 bar absolute at 35 degC)	Yes / No / Explain		
10	c. Material	The vacuum chamber and all vacuum chamber subsystems inside the chamber (except the thermal shroud) shall be constructed using stainless steel (AISI 304L). The vendor shall provide a material test certificate from NABL certified laboratory, stating mechanical and chemical properties of material used with traceability.	Yes / No / Explain		
11	d. Vacuum flanges	Flanges of vacuum system shall be CF type with metallic gaskets for all vacuum pumps, vacuum gauges and instrumentation feedthrough.	Yes / No / Explain		

12	e. Internal configuration	The internal dimensions of the chamber shall be arrived at considering test space dimensions and clearances required to accommodate thermal shroud, fluid lines, water vapour panel and instrumentation cables.	Yes / No / Explain		
13	f. Clamps	The chamber front dish shall be clamped using manual clamps (4 Nos.). There shall be an open/ close status indication in the control console.	Yes / No / Explain		
14	g. Welding	All joints shall be TIG welded, using certified filler rods and high-purity argon/ helium shield gas.	Yes / No / Explain		
15	h. Weld joint leak rate	All welded joints shall be leak tested with a Helium Mass Spectrometer Leak Detector to an Individual leak rate of better than $1 \times 10^{-9}$ mbar L/s of Helium.	Yes / No / Explain		
16	i. Handling	Necessary provisions shall be provided for the handling of the chamber.	Yes / No / Explain		
17	j. Chamber door	The chamber door shall be a tori-spherical dished door with flange and the opening stroke shall allow complete access to the thermal plate	Yes / No / Explain		
18	k. Rear dish	Rear dish shall be welded to the chamber.	Yes / No / Explain		
19	l. O-ring	O-ring on the chamber door shall be moulded type and uniform compression of the O-ring shall be ensured.	Yes / No / Explain		

20	3.2 Vacuum chamber dimension	-	Yes / No / Explain		
21	a. Diameter and depth	Chamber dimensions (1m diameter x 1.2m depth approx.) shall house the mouse trap thermal shroud and test article resting on the thermal plate.	Yes / No / Explain		
22	b. Chamber axis height	The Chamber axis height from ground level shall be 1200 mm.	Yes / No / Explain		
23	3.3 Vacuum chamber orientation	The chamber shall be oriented horizontally and mounted on a stainless-steel structure meeting all structural requirements.	Yes / No / Explain		
24	3.4 Test space requirement	-	Yes / No / Explain		
25	a. Thermal shroud	The thermal shroud shall be mouse trap shaped, with a flat thermal plate of width 600 mm - 620 mm and depth 1000 mm - 1100 mm on which the test article will be placed.	Yes / No / Explain		
26	B. Thermal plate	The thickness of the thermal plate shall be designed to ensure temperature uniformity across the thermal plate.	Yes / No / Explain		
27	3.5 Internal surface finish details	-	Yes / No / Explain		
28	a. Internal surface	3Δ (three triangle) finish for chamber internal surfaces and all hardware exposed to vacuum.	Yes / No / Explain		
29	b. Emissivity	The infrared emissivity of the internal surfaces of the chamber shall be within 0.10.	Yes / No / Explain		

30	3.6 Painting	Surfaces of hardware exposed to outside environment shall be first coated with zinc chromate primer followed by two coats of polyurethane paint.	Yes / No / Explain		
31	3.7 Vacuum chamber ports	All ports shall have metallic gaskets and shall be fitted with specified feed-through. Dummy flanges shall be provided for all ports, including feed-through ports. Details of vacuum chamber ports are shown in Table No. 1 & Fig No. 2.	Yes / No / Explain		
32	4. Vacuum pumping system	The offered vacuum system shall have a roughing skid (Rotary and Roots pump connected in series), turbomolecular pumps (TMP), cryo pumps, air admittance system, electro-pneumatic gate valves & angle valves, vacuum monitoring & control system. Roughing skid shall also be used as a backing pump for TMPs and the Cryo pump shall be provided with a dedicated backing pump. A single chain consists of one roughing skid, one TMP and a cryo pumping chain.	Yes / No / Explain		
33	4.1 Vacuum system design	-	Yes / No / Explain		

34	a. Time to achieve vacuum level	Vacuum pumping system shall be designed to achieve a vacuum of $1 \times 10^{-6}$ mbar from ambient within 90 minutes for double chain and within 180 minutes for single chain respectively, without using water vapour panel.	Yes / No / Explain		
35	b. Vacuum level at 380K	Vacuum pumping system shall be capable of achieving $1 \times 10^{-6}$ mbar within 180 minutes when the thermal shroud temperature is 380 K, without using water vapour panel.	Yes / No / Explain		
36	c. Vacuum demonstration	Ultimate vacuum shall be demonstrated with vacuum chamber backfilled with GN2 gas.	Yes / No / Explain		
37	d. Vacuum pump connection	Vacuum pump shall be connected to the vacuum chamber through vacuum isolation gate valves, SS piping of suitable size and flexible bellows.	Yes / No / Explain		
38	e. Continuous operation	Pumping system shall have adequate pumping capacity and redundancy for continuous operation up to 400 hours at a stretch.	Yes / No / Explain		
39	f. Vacuum level control	The vacuum level in the chamber shall be controlled by PLC. It shall be fully automatic and provided with interlocks for safe operation, including in the manual mode.	Yes / No / Explain		
40	4.2 Rough Vacuum system configuration (Qty.- 2 Nos.)	-	Yes / No / Explain		
41	a. Roughing skid vacuum level	Roughing skids shall be capable of achieving a vacuum level of $5 \times 10^{-3}$ mbar.	Yes / No / Explain		

42	b. Roots pump integration	Roots pumps shall be integrated with an overflow valve to enable switch on together with the backing pump even at atmospheric pressure.	Yes / No / Explain		
43	c. Vacuum gauge between roots and rotary	A vacuum gauge shall be provided between roots pump and rotary vane pump.	Yes / No / Explain		
44	4.3 Turbo Molecular Pump (TMP) configuration (Qty.- 2 Nos.)	-	Yes / No / Explain		
45	a. Minimum pumping speed	The minimum pumping speed for TMP shall be 1200 Litre/sec	Yes / No / Explain		
46	b. Backing pump	The backing line of each TMPs shall be connected to roughing skid with isolation valves as shown in fig 3.	Yes / No / Explain		
47	c. vacuum level	TMP shall be capable of achieving a vacuum level of less than $1 \times 10^{-7}$ mbar.	Yes / No / Explain		
48	d. TMP body	TMP body shall be of stainless steel and connected to cylindrical chamber body through CF type flange and shall have an appropriate cooling system.	Yes / No / Explain		
49	e. Controller	Each TMP shall have a standalone controller mounted in a rack, which shall be provided with a voltage stabilizer and spike arrestor.	Yes / No / Explain		
50	4.4 Cryo pumping system configuration (Qty.- 1 No.)	-	Yes / No / Explain		

51	a. Working	Cryo pump shall be based on G-M cycle for its two stages along with the Helium compressor. The Cryo pump shall be connected to the chamber through electro pneumatic gate valve.	Yes / No / Explain		
52	b. Vacuum level	The Cryo pump shall be capable of achieving a vacuum level of less than $1 \times 10^{-7}$ mbar.	Yes / No / Explain		
53	c. Cryo pump control system	The control system shall control the cryogenic pump at its cooling, heating and regeneration & vacuum pumping stages.	Yes / No / Explain		
54	d. Cryo pump regeneration	The Cryogenic pump shall be regenerated using a dedicated dry vacuum pump with adequate water vapour capacity.	Yes / No / Explain		
55	e. Cryo compressor	Cryo compressor shall have an appropriate cooling mechanism (If water cooling is selected, necessary plumbing lines also shall be in the Supplier's scope).	Yes / No / Explain		
56	4.5 Vacuum Isolation valve	Based on the system design, vendor shall provide appropriately sized vacuum valves. The vendor has to provide additional gate valves, if necessary. Stainless steel body valves with CF interfaces to be provided for pumps having CF flanges.	Yes / No / Explain		

57	4.6 Water vapour panel	Removable water vapour panel shall be located between the thermal shroud and the vacuum chamber. It shall be provided with necessary electro-pneumatic valves, temperature sensors with flexible inlet & outlet tubing and a heating system for removing the condensate after the operation.	Yes / No / Explain		
58	4.7 Material for vacuum pipeline	Seamless pipes shall be made of SS 304L whereas flexible bellows shall be made of 316 L. It shall be suitably sized for the highest conductance.	Yes / No / Explain		
59	4.8 Re-pressurization System	For re-pressurizing the chamber after the test/ process, an air admittance valve EPV7 with 10 µm inlet filters shall be provided. It shall be designed such that the chamber is brought to atmospheric pressure in 10 minutes. Provision for admitting nitrogen gas through EPV 9 to be provided as redundant re-pressurisation system.	Yes / No / Explain		
60	5. Thermal system	When the vacuum chamber is maintained in operational vacuum ( $5.0 \times 10^{-7}$ mbar), the thermal shroud & thermal plate shall be heated or cooled by circulating GN2 to achieve set temperature.	Yes / No / Explain		
61	5.1 General specifications of Thermal system	-	Yes / No / Explain		
62	a. Operating temperature	153 K to 423 K	Yes / No / Explain		

63	b. Temperature uniformity on end closure and thermal plate	Better than $\pm 2$ K at steady state and better than $\pm 15$ K at transient state	Yes / No / Explain		
64	c. Control accuracy(difference between set temperature and average of 3 temperatures measured at centre plane of the cylindrical shroud).	$\pm 1$ K	Yes / No / Explain		
65	d. Ramp rate (hot & cold)	Up to 3 K / minute. Provision for set 1 K/ min, 2 K / minute and 3 K / minute (increment of 1 K / minute).	Yes / No / Explain		
66	e. Measurement sensor	3 wire film type RTD as per IEC 60751 class B.	Yes / No / Explain		
67	f. Cooling / heating fluid	Low pressure closed loop GN2 (153 K to 423 K).	Yes / No / Explain		
68	g. Heat load expected from test article	Total heat load 1 kW (active and passive)	Yes / No / Explain		
69	h. Mounting of the thermal shroud and thermal plate	Thermal plate and thermal shroud shall be with demountable circulating fluid inlet/outlet feed lines to enable easy removal from the chamber for maintenance & cleaning purposes. Joints to be easily accessible for the operator.	Yes / No / Explain		
70	i. Temperature profile	The thermal system shall be capable to follow any set linear temperature profile in the range of 153 K to 423 K (with multiple cycles over the entire range) without manual intervention.	Yes / No / Explain		
71	j. There shall be an interlock to prevent the operation of thermal system when chamber pressure is higher than $1 \times 10^{-3}$ mbar.	Yes	Yes / No / Explain		

72	k. Super-insulated vacuum jacketed lines (SIV) to be used in the thermal conditioning unit to maximum possible extent to prevent heat-in-leak. For certain cases where super-insulated vacuum jacketed lines are not feasible inside the unit (to be decided in consultation with the Purchaser), such lines shall be properly insulated with Aerogel insulation having water vapour barrier.	Yes	Yes / No / Explain		
73	l. Thermal shroud and thermal plate with parts such as liquid feedthrough shall be designed for thermal cycling in the range of 77 K to 423 K.	Yes	Yes / No / Explain		
74	m. Necessary bellows / flexible joints shall be provided for preventing thermal stresses during long-duration thermal cycling operations.	Yes	Yes / No / Explain		
75	n. There shall be provision to use a temperature sensor on the test article as a control sensor (selectable from consoles).	Yes	Yes / No / Explain		
76	5.2 Specifications of thermal shroud	-	Yes / No / Explain		
77	a. Shroud shall be inflated to form annular gap and to be laser welded/ resistance spot welded. TIG welding at the edges of the shroud.	Yes	Yes / No / Explain		

78	b. Shroud panels shall be designed for thermal cycling from 77 K to 423 K and internal pressure of at least 2 times the pressure of circulating GN2.	Yes	Yes / No / Explain		
79	c. The thermal plate shall have an internal channel for circulating GN2 for cooling / heating the test article.	Yes	Yes / No / Explain		
80	d. The thermal plate shall be capable of carrying a test article weighing at least 15 kg. It shall have an array (4 rows x 4 columns of 50 mm x 50 mm) of threaded holes (M6 x1x 10 deep) to mount the test article.	Yes	Yes / No / Explain		
81	e. Shape and construction	Mouse trap shape, double embossed type, laser welded & inflated/ resistance spot welded & moulded. Each sheet shall be at least 1.5 mm thick.	Yes / No / Explain		
82	f. Size	The shroud shall be able to house a test article with a maximum envelope of 600-620 mm (width) x 1000-1100 mm (depth) x 450 mm (height) on the thermal plate.	Yes / No / Explain		
83	g. End shrouds	Two separate active shroud panels to be attached with the front and rear dish of chamber.	Yes / No / Explain		
84	h. Material of construction	SS316L	Yes / No / Explain		

85	i. Leak tightness	Leak tightness of the welded joints in the shroud, thermal plate, and feedthrough shall be better than $5 \times 10^{-9}$ mbar L/s of Helium. It will be demonstrated again after thermal cycling at VSSC site	Yes / No / Explain		
86	j. Painting	a) Test space environment including the inner surface of shroud, both active end shrouds and top surface of thermal plate shall be coated with appropriate paint (such as Aeroglaze Z306) with an infrared emissivity of 0.9 meeting the out-gassing requirements for space environment (TML:< 1%). b) Outside the main shroud, active end shrouds and thermal plate shall be electro-polished.	Yes / No / Explain		

87	6. Auxiliary system details	<p>The auxiliary system consists of Liquid Nitrogen Storage tank, a gaseous Nitrogen Storage tank (as per the design of TCU), an air compressor, and coolant water circulator. The scope includes obtaining the necessary license from PESO according to prevailing SMPV (U) rules. Super-insulated lines of adequate size shall be used for transferring Liquid Nitrogen from the storage tank to TCU. Adequate pressure sensors shall be provided in the LN2 transfer lines. Safety relief valves shall be provided on the LN2 transfer lines where there is chance for trapping LN2 by the closing of upstream and downstream valves. A tentative layout of the LN2 storage yard is shown in Fig.8 for obtaining PESO License. Space for installing one more LN2 tank of 6 kL capacity shall be provided inside the yard (additional LN2 tank not in the present scope of work). The fencing and foundation/ civil works for the tank is in the scope of VSSC. The design drawings/inputs shall be given by the vendor well in advance for civil works. The specifications for various sub-systems are given below:</p>	Yes / No / Explain		
88	6.1 Liquid Nitrogen tank (1 no.)	-	Yes / No / Explain		

89	a) Orientation	Vertical	Yes / No / Explain		
90	b) Storage capacity	6,000 litre (Water capacity)	Yes / No / Explain		
91	c) Design Standard tank and piping	ASME SEC. VIII Division I, ASME B31.3 or equivalent	Yes / No / Explain		
92	d) The outer diameter of Dewar	2 meters (max.)	Yes / No / Explain		
93	e) Insulation	Multilayer, super insulation with vacuum	Yes / No / Explain		
94	f) evaporation loss rate	better than 0.25% of gross volume/day.	Yes / No / Explain		
95	g) Maximum working pressure	As required for TCU operation (with adequate margin to take care of pressure drop etc.).	Yes / No / Explain		
96	h) Design pressure	With standard margin over maximum working pressure as per applicable codes.	Yes / No / Explain		
97	i) Material of construction of valves, devices, valve handles, tags	SS316L/ bronze	Yes / No / Explain		
98	j) Automated operation	Provision for automated operation of LN2 tank from GUI/ SCADA console (Pressurization, Filling, Draining & venting) shall be included. Additional manual isolation valves shall be provided for all these operations.	Yes / No / Explain		
99	k) Suitable drain points with blow-down valves shall be provided on LN2 / circuits at suitable locations for initial purging to drive out any resident moisture due to the stoppage of the system for a long duration.	Yes	Yes / No / Explain		

100	l) Safety provisions	Two Safety relief valves and two burst discs shall be provided for the inner vessel, and one Safety Device for outer vessel. Safety relief valves shall be provided for the lines in LN2 tank circuit where there is a chance for trapping LN2 during operation (by closing upstream and downstream valves).	Yes / No / Explain		
101	m) Filling and drawing lines	Permanently connected to thermal conditioning unit with SIV lines. Additional drain points shall be provided with necessary isolation valve for drawing LN2 for purposes other than the Thermal conditioning system.	Yes / No / Explain		
102	n) Pressure, level, and flow indications	Digital readout of level, flow, and pressure gauges with necessary redundancy and facility for automatic logging of data with respect to time shall be provided. This is in addition to mechanical differential pressure gauges and pressure gauges fitted on the tank.	Yes / No / Explain		
103	o) Instruments/ control valves	Instruments/ control valves positioned outdoors shall have an adequate ingress protection rating.	Yes / No / Explain		
104	p) Outside surfaces of hardware exposed to ambient environment shall be first coated with zinc chromate primer followed by two coats of polyurethane paint.	Yes	Yes / No / Explain		
105	6.2 Air compressor to actuate electro pneumatic valves (1 no.)	-	Yes / No / Explain		

106	a) A rotary screw air compressor of adequate capacity shall be provided.	Yes	Yes / No / Explain		
107	b) A compressed air reservoir of adequate capacity and a refrigerated air dryer compatible for the selected air compressor shall be provided.	Yes	Yes / No / Explain		
108	c) A FRL unit shall be provided at the outlet of the dryer.	Yes	Yes / No / Explain		
109	d) An automated drain valve with a timer shall be provided for the reservoir and dryer.	Yes	Yes / No / Explain		
110	e) Compressed air lines shall be of stainless steel. Flexible PU tubes shall be used for short lengths near to actuators & valves.	Yes	Yes / No / Explain		
111	6.3 Chiller for cryo pump compressor (1 no.)	-	Yes / No / Explain		
112	a) A closed-circuit water chiller unit of adequate capacity shall be provided.	Yes	Yes / No / Explain		
113	b) Chiller capacity shall be worked out based on all service requirements in extreme test conditions. Detailed breakup of the cooling requirement shall be submitted.	Yes	Yes / No / Explain		
114	c) There shall be a margin of 50% over the required cooling capacity.	Yes	Yes / No / Explain		
115	d) The chiller shall operate efficiently in the extreme environment at the VSSC site (40° C & 90% RH).	Yes	Yes / No / Explain		
116	e) Necessary additives shall be used for preventing corrosion in pump cooling paths/ channels.	Yes	Yes / No / Explain		

117	7. Control and instrumentation system	-	Yes / No / Explain		
118	7.1 PLC modules with its execution software	PLC (Programmable Logic Controller) with associated software shall be used for real time monitoring and control of all equipment in the system.	Yes / No / Explain		
119	7.2 Electrical Power distribution and switching panel	Electrical Power distribution and switching panel is in the scope of the supplier. Hence supplier shall install it to facilitate power distribution for all the electrical equipment through appropriately sized starters/relays, switches etc. to ensure proper switching of all equipment and safety of personnel and equipment.	Yes / No / Explain		
120	a) Special earthing	Special earthing & routing shall be in the scope of the supplier. Earthing pit alone will be in the scope of VSSC.	Yes / No / Explain		
121	7.3 Control and instrumentation panel	-	Yes / No / Explain		
122	a) Control of vacuum and temperature	Vacuum and temperature shall be controlled from the control and instrumentation panel located close (3 to 5m) to the chamber facilitating the operators to control and monitor the operation of the chamber.	Yes / No / Explain		

123	b) Electrical cabling	The electrical cabling to and from the panels shall be done professionally as per industry standards and shall be ensured that the routing and clamping doesn't interfere with routine operations and facilitate periodic maintenance and repair works	Yes / No / Explain		
124	c) Identification tag for cables	Every input and output cable shall be properly identified and tagged. Detailed documentation of the electrical wiring and interconnections shall be provided.	Yes / No / Explain		
125	d) PLC	PLC (Programmable Logic Controller) for real time monitoring and control of all equipment in the system.	Yes / No / Explain		
126	e) Instrumentation related requirements	All instrumentation related to vacuum gauges, temperature sensors, gate valve position indicator, LN2 consumption status monitoring etc shall be positioned in a rack. All instruments shall have provision for automation through an instrument interface like Ethernet/USB etc. The output from all these instruments shall be acquired in a PC through Ethernet/USB interface for monitoring and storage.	Yes / No / Explain		

127	f) Temperature profile	There shall be provision for generating different temperature test profiles (Time vs Temperature) using graphical user interface (GUI) in the control PC. There shall be provision for storing a minimum of 20 such test profiles.	Yes / No / Explain		
128	g) PC software	The PC/computer system in the console shall be provided with suitable PLC/ GUI software along with license in the name of ISRO to fulfil the following tasks:	Yes / No / Explain		
129	Mimic diagrams	Mimic diagrams displaying functional status of all system components and safety interlocks. Mimic diagram shall display the state of main process regulation loops such as shroud and thermal plate temperature control.	Yes / No / Explain		
130	Display and storage	Display and storage of all test facility functional data, alarm condition, messages etc.	Yes / No / Explain		
131	Display of temperature profile	Display of temperature profiles on shroud and test article with proper scaling of temperature profiles.	Yes / No / Explain		
132	Program generation	Customizable program for vacuum and temperature profiles for its generation, storage and execution.	Yes / No / Explain		

133	7.4 PC based Data Acquisition System	A PC based Data Acquisition System (DAS) shall monitor and display the temperature data from all the thermocouples/RTDs fixed on the test article and the thermal shroud & thermal plate inside the chamber and also the vacuum parameters of the system. The control and data acquisition PC can be the same.	Yes / No / Explain		
134	a) Data logging	The data logging system shall have a fail-safe mechanism not to lose any test data during electrical power failure/system failure condition.	Yes / No / Explain		
135	b) A PC based data logging system	Supply of a PC based data logging system with following specifications is in the scope of supply of party.	Yes / No / Explain		
136	Processer	Intel core i5, 12th gen. or latest	Yes / No / Explain		
137	RAM	8 GB or higher	Yes / No / Explain		
138	Hard disk	2 TB (SSD)	Yes / No / Explain		
139	Monitor	LED 26" with wide angle view	Yes / No / Explain		
140	Operating System	Windows 11	Yes / No / Explain		
141	c) On screen display feature	On screen displays shall include real time plot of vacuum system, thermal system and auxiliary systems data.	Yes / No / Explain		
142	7.5 Control software	-	Yes / No / Explain		
143	a) Operation modes	There shall be provision for 3 modes of operations - Auto mode, Semi auto mode and manual mode.	Yes / No / Explain		

144	b) Auto mode	The temperature and vacuum shall be controlled based on a predefined test profile without any manual intervention.	Yes / No / Explain		
145	c) Semi auto mode	It shall allow the generation of a new test profile, edit (change parameters and set points) an existing one and save in its memory.	Yes / No / Explain		
146	d) Manual mode (Expert mode)	Each sub system shall be operated in manual mode (expert mode) and shall be protected with necessary passwords.	Yes / No / Explain		
147	e) Provision for switching over of mode	There shall be provision for switching over to manual mode from the current mode (Auto /Semi auto mode) without any interference in the process of the test.	Yes / No / Explain		
148	7.6 Data acquisition software	-	Yes / No / Explain		
149	a) Real time Data acquisition of temperature and pressure with respect to time	Yes	Yes / No / Explain		
150	b) All functions selectable by menus and icons	Yes	Yes / No / Explain		
151	c) Real time graphics and numerical data presentation of selected channels	Yes	Yes / No / Explain		
152	d) Data shall be stored in hard disk periodically for later retrieval	Yes	Yes / No / Explain		
153	e) Data file generation, management and storage	Yes	Yes / No / Explain		

154	f) Report generation (in MS Word format)	All the data generated during the testing shall be updated in a standard templet provided by VSSC. An extra copy of software(s) developed for this system shall be provided in installable form to take care of any exigency arising due to software corruption/ malfunction.	Yes / No / Explain		
155	7.7 Vacuum sensors and instrumentation	The pressure / vacuum at various locations including inside the chamber has to be measured using vacuum gauges.	Yes / No / Explain		
156	a) Vacuum gauge	Adequate numbers of vacuum gauge (Bayard-Alpert Pirani Capacitance Diaphragm Gauge) shall be intrgrated with the vacuum system for monitoring the chamber pressure and controlling the entire pumping chain.	Yes / No / Explain		
157	B) Vacuum readout	Suitable monitoring/display units having standard PC interfaces shall be provided along with the vacuum gauges.	Yes / No / Explain		
158	7.8 Temperature sensors and Instrumentation:	-	Yes / No / Explain		

159	a) Type of thermocouple	T-type thermocouples (24AWG), 6 Numbers each to be placed on the shroud and Thermal plate for temperature monitoring. T type thermocouples for shroud temperature monitoring to be located on the shroud surface inside the chamber and connections taken through thermocouple feedthrough with miniature T/C connectors at both ends of the feed through harness. Thermocouple and suitable accessories for installing the thermocouples and other sensor shall be sourced from reputed international brands	Yes / No / Explain		
160	b) Thermocouple feed through	T-Type Thermocouple Feed through(3 Nos.) and K-Type Thermocouple feed through (2 Nos.) with connectors on both sides are to be provided for test article temperature monitoring.	Yes / No / Explain		
161	c) Connector and feed through leak rate	The connectors and feed through shall be compact and sealed (maximum admissible leak rate per feed through: $1 \times 10^{-9}$ mbar l/s) and shall be thermal vacuum compatible.	Yes / No / Explain		
162	d) Sensor location	All the temperature sensors located on the shroud surface shall be installed in such a way that they can be removed for calibration and can be replaced after calibration without affecting the performance.	Yes / No / Explain		

163	e) Temperature control	The thermal plate/ test article temperature shall be controlled by precise heating or cooling using PLC controller.	Yes / No / Explain		
164	8. Online UPS system	The system shall have minimum 30 min. backup. Within this time all systems like PLCs, control system equipment etc shall be switched to safe mode, in case of power failure.	Yes / No / Explain		
165	9. Electrical feed through:	The chambers need to be provided with electrical feed through of suitable rating for routing signals and power to and from the device under test. 120 channels electric feed through for device testing, 10 A rating (for each pin), with mating connectors on both sides shall be provided. Each feedthrough shall be identified by a unique number and tag. Each wire in the harness shall also be tagged. At both the ends the harness of each feed through shall be terminated on to 32 pin ITT D type gold plated connectors.	Yes / No / Explain		
166	10. Sources details	Vendor shall select the equipment/system from the suppliers given below. Equivalent brands are not permitted without prior approval from VSSC.	Yes / No / Explain		

167	10.1 Thermal shrouds	M/s. Tranter USA ,M/s. VG UK, M/s. Bemco inc, USA, M/s. Ziemannsecathen, France, M/s. Magod Laser machining (P) Ltd., Banglore , India ,M/s. FIC spa , Italy & M/s. Angelantoni test technologies , Italy.	Yes / No / Explain		
168	10.2 Thermal plate	M/s. Bemco, USA ,M/s. Ziemannsecathen, France ,M/s. FIC spa , Italy, M/s. Telstar, Spain & M/s. Angelantoni test technologies, Italy	Yes / No / Explain		
169	10.3 Thermal Conditioning system	M/s CSL, Leige,Belgium M/s Telstar , Spain ,M/s Intespace , France ,M/s Angelantoni test technologies, Italy & M/s. Dynavac, USA	Yes / No / Explain		
170	10.4 Cryo pumps and Turbo molecular pump	M/s. Leybold vacuum Germany ,M/s. HSR , Germany ,M/s. CTI cryogenics, Japan &.M/s. Pfeiffer vacuum GmbH, Germany	Yes / No / Explain		
171	10.5 Roughing and roots pump	M/s. Pfeiffer vacuum GmbH, Germany, M/s. Leybold vacuum Germany& M/s. Agilent technologies USA	Yes / No / Explain		
172	10.6 Vacuum gate valves	M/s.VAT Vakuumentile AG, Switzerland., M/s. Pfeiffer vacuum GmbH, M/s. Leybold vacuum Germany& M/s.GNB corporation,USA	Yes / No / Explain		
173	10.7 Electrical panel / Instruments	1.19" Racks: Rittal 2. Electrical Power panel and switch gear: ABB, L&T, Siemens 3. The PLC/GUI: Siemens, Allen Bradley, Fanuc or L&T.	Yes / No / Explain		

174	10.8 Data Acquisition system	Keithley, Siemens, Allen Bradley, ABB, Yokogawa, Schneider, National Instruments	Yes / No / Explain		
175	10.9 PLC	Siemens, Allen Bradley, ABB, Schneider	Yes / No / Explain		
176	10.10 Vacuum gauges and monitors	M/s. Pfeiffer vacuum GmbH, Germany ,M/s. Leybold vacuum Germany ,M/s.Inficon, USA & M/s.MKS, UK	Yes / No / Explain		
177	10.11 Hermetic thermocouples, heater and power feedthrough	M/s.Douglas Electrical components inc,USA ,M/s.PLUGin,France, M/s.MDC Vacuum products,USA& M/s. Pfeiffer vacuum GmbH, Germany	Yes / No / Explain		
178	10.12 Thermocouples, thermocouple connector, RTDs and thermistors	M/s.Omega, USA & M/s.TC,UK, Minco	Yes / No / Explain		
179	10.13 cartridge heater	M/s. Electricfor , M/s.Kamenev & M/s.Thermocoax, Minco	Yes / No / Explain		
180	10.14 Temperature controller & power controllers	M/s.EurothermLtd.	Yes / No / Explain		
181	10.15 Thermal paint	M/s.Aeroglaze (Z306) & M/s Spefun paintings &coatings	Yes / No / Explain		
182	10.16 view port (as an assembly only)	M/s. Pfeiffer vacuum GmbH, M/s. Leybold vacuum M/s. Agilent technologies , , MDC Vacuum	Yes / No / Explain		
183	10.17 Sources of supply for compact air compressor	M/s.Atlascopco, M/s Elgi compressor,M/s Chicago Pneumatics, & M/s. Ingersoll Rand,	Yes / No / Explain		
184	10.18 water chiller	M/s Eurodifroid, France, M/s Werner Finley, M/s Huber, M/s Julabo	Yes / No / Explain		
185	10.19 LN2 Dewar	M/s Inox ,India ,M/s Shell n tube,India ,M/s VRV ,India, M/s Super cryogenics System(P) Limited,India& M/s Cryostartanks and vessel Pvt Ltd India	Yes / No / Explain		

186	10.20 Flexibl bellows,clamps,claw clamps,centeringring ,O ring	M/s Mawasa, M/s Pfeiffer Vacuum GmbH, M/s Leybold Vacuum, Parker	Yes / No / Explain		
187	10.21 Blowers	M/s Fima & M/s Barber-Nichols AS PART OF TCU	Yes / No / Explain		
188	10.22 Cryo valves	M/s Herose ,Germany, M/s Burkert ,Germany , UAS M/s Habonium,Israel	Yes / No / Explain		
189	10.23 Pressure gauges	M/s Wika& M/s Emerson, M/s Ashcroft	Yes / No / Explain		
190	10.24 safety relief valves	M/s Herose ,Germany &Rego , USA	Yes / No / Explain		
191	10.25 Differential gauges	M/s Wika, M/S Dwyer, M/s Ashcroft	Yes / No / Explain		
192	10.26 level transmitter /Pressure Transmitter	M/s Yokogawa Japan, M/s Hioki,Japan& M/s GE, USA	Yes / No / Explain		
193	9.27 process control valve	M/s flowserve,USA& M/s Burkert Germany	Yes / No / Explain		
194	10.28 burst disc	M/s BS & B	Yes / No / Explain		
195	10.29 Super insulated vacuum jacketed lines	M/s cryodiffusion, France, Cryopal, France, M/s Cryo Fab ,USA ,M/s Inox, India & M/s shell N tube, India	Yes / No / Explain		
196	10.30 Switch gears and circuit breakers	M/s Siemens, Germany, M/s Schneider Germany ,M/s ABB & M/s ALLEN Bradley	Yes / No / Explain		
197	10.31 online UPS	M/s Schneider,Germany, M/s Reilo, M/s Pillar ,Germany &M/s. APC	Yes / No / Explain		
198	10.32 Computer	M/s Hewlett packard HP & M/s Siemens Germany, M/s DELL,M/s IBM	Yes / No / Explain		
199	10.33 Actuators	M/s Schubert and salzer ,M/s Festo,Germany& M/s Bosch Rexroth, Germany	Yes / No / Explain		
200	10.34 cryo solenoid valves	M/s Weka& M/s Burkert Germany	Yes / No / Explain		

201	10.35 Pneumatic solenoid valves	M/s Festo ,Germany & M/s Rockwell Automation, USA	Yes / No / Explain		
202	10.36 Pneumatic PU tubes	M/s Festo ,Germany & M/s Legris ,France	Yes / No / Explain		
203	10.37 Needle valves/Manual valves	M/s Festo ,Germany ,M/s Legris France & M/s Swagelok	Yes / No / Explain		
204	10.38 Ball Valves/Manual valves	M/s Festo ,Germany & M/s Legris France	Yes / No / Explain		
205	10.39 Air admittance valves	M/s VAT ,Switzerland, M/s GNB,USA ,M/s Pfeiffer Vacuum GmbH & M/s Leybold Vacuum Germany	Yes / No / Explain		
206	11. General terms & conditions	-	Yes / No / Explain		
207	11.1 Bidding process	The quote shall be presented in TWO parts namely, Techno – Commercial bid and Price bid. Each bid shall be separately sealed and clearly identified.	Yes / No / Explain		

208	11.2 Techno-commercial bid	<p>Techno-commercial Bid shall contain the following - (a) The design methodology and specific details of calculations, (b) Schematic of the proposed vacuum pumping system, thermal system, LN2 storage tanks &amp; supply lines. Details shall be given including rating, make of each components / valves / sub systems, (c) Materials used and the standards followed in design, (d) Details on previous experience in realizing and supplying similar automatic thermo vacuum chambers along with its thermal system to ISRO/DRDO or other reputed firms. (e) List of essential spares which are provided along with the chamber. (f) details of schedule, milestones &amp; Gantt chart depicting all important stages and time required for each</p>	Yes / No / Explain		
209	11.3 Supplier item manufacturing location	<p>Vendor shall specify whether the previously supplied systems were (a) fully designed and manufactured at vendor's works, or (b) Integrated from outsourced subsystems, if so, provide details.</p>	Yes / No / Explain		

210	11.4 Documentary evidence	Vendor shall submit the documentary evidence from the concerned customers' for the satisfactory performance of the 1000 mm dia X 800 mm depth or higher capacity Thermovacuum chambers without any major breakdown over the past 5 years.	Yes / No / Explain		
211	11.5 Right to Visit	VSSC reserves the right to visit vendor's or his customers' premises where the systems have been supplied, for verification of the information provided by the vendor in the technical bid and other infrastructure facilities claimed. Incomplete technical bid of the vendor, which does not meet technical requirements mentioned in this tender is liable to be rejected.	Yes / No / Explain		
212	11.6 Price bid	Price bid shall contain the following - (a) Price for the complete system, (b) Cost breakup of all subsystems, (c) Cost breakup of the essential spare parts proposed for the trouble-free operation of the chamber for a period of 10 years (minimum), (d) List & Cost of the items sourced within India, (e) Annual Maintenance Contract (AMC) charges for a period of 7 years after warranty period. This amount will also be taken into consideration for determining the lowest quote.	Yes / No / Explain		

213	11.7 Offer details	The offer shall be for the complete design, fabrication, demonstration of main parameters / specifications at vendor's site, transportation to site, handling at site, integrating, testing & demonstrating all sub system & total performance, installation, final acceptance testing and commissioning of the Thermo vacuum chamber. Mutually agreed third party certification from BVQI / LLOYDS is required at design and at all stages of fabrication from raw material identification till testing at pre delivery inspection stage. All equipment and consumables required (except for the exclusions stated in the scope of VSSC) will be in the scope of the supplier.	Yes / No / Explain		
214	11.8 Complete Offer of Total system	Offer shall be for the total system and incomplete/ partial offers will not be considered.	Yes / No / Explain		
215	11.9 Layout diagram	Vendor shall provide a layout diagram of the proposed system showing major equipment with the minimum floor area / space required for installation along with the offer.	Yes / No / Explain		
216	11.10 Technical catalogue, Literature & Data sheet	Vendor shall attach technical catalogs, literature and detailed data sheets of all items offered by the vendor in support of their technical offer.	Yes / No / Explain		

217	11.11 Service centre	Vendor shall have Service Centre in India for pre/post guarantee/warranty service back up. Vendor shall submit detailed list of Service Centre/s.	Yes / No / Explain		
218	11.12 Technical Presentation	Vendor shall be ready to give a technical presentation to the Technical Committee formed for the purpose of finalizing the procurement at VSSC Thiruvananthapuram . The vendor shall be intimated 15 days in advance for this presentation. This intimation will be sent to the vendor only after the technical evaluation of the proposal and examining its technical suitability.	Yes / No / Explain		
219	11.13 Acceptance Test Plan & schedule	Vendor shall give full details of his proposed Acceptance Test Plan & schedule of activities at vendor's site and at VSSC site, Thiruvananthapuram	Yes / No / Explain		
220	11.14 Third party inspection	Vendor shall confirm compliance to all the specifications witnessed by mutually agreed Third Party Inspection Agency (TPIA) and the inspection / tests reports thus generated and vouched by TPIA shall be provided to VSSC well in advance for scrutiny before proceeding for witnessing tests at vendor's site.	Yes / No / Explain		

221	11.15 Vendor responsibilities detail	(a) Safe transportation of total system; warehouse to warehouse insurance to be provided by vendor, (b) Supervise unloading and handling of the system at VSSC site, Thiruvananthapuram, (c) Installation and commissioning of total system at VSSC site at Thiruvananthapuram adhering to all safety regulations, (d) Installation and commissioning of total system at VSSC site at Thiruvananthapuram adhering to all safety regulations.	Yes / No / Explain		
222	11.16 Prior approval for fabrication drawingsApproval	After placement of order, vendor shall submit the fabrication drawing for the vacuum chamber and thermal system and shall get prior approval from VSSC before starting the fabrication works.	Yes / No / Explain		
223	11.17 QA/QC Plan	Necessary QA / QC plan shall be prepared by the vendor and the same shall be approved before start of fabrication.	Yes / No / Explain		
224	11.18 Pre-dispatch inspection	Pre-dispatch inspection shall be carried out by VSSC Engineers at vendor's site. As part of pre-dispatch acceptance, Vendor shall carry out and demonstrate salient specifications as per Factory Acceptance Test Plan in presence of VSSC Engineers at their works/site.	Yes / No / Explain		
225	11.19 Inspection and factory acceptance test plan	-	Yes / No / Explain		

226	a) Performance demonstration of system	Six thermal cycles as per the system qualification test profile at extreme temperature levels shall be performed on a dummy test article of rated mass and heat dissipation and the results shall comply with the performance specifications provided. Provision shall be available at supplier's site for repeated cooling & heating of thermal shroud and demonstrating the performance of the total system	Yes / No / Explain		
227	b) Leak tightness demonstration	Leak tightness of chamber shall be demonstrated. Demonstration of leak tightness on the already proof pressure tested (witnessed by TPIA) thermal shroud & thermal plate after ensuring that it is subjected to a minimum of three cycles of thermal cycling.	Yes / No / Explain		
228	Inspection & Acceptance Test Plan	-	Yes / No / Explain		
229	a) Chamber Leak Tightness	Demonstration of Chamber leak tightness	Yes / No / Explain		
230	b) Thermal shroud & thermal plate leak tightness	Demonstration of thermal shroud & thermal plate leak tightness after ensuring that it is subjected to a minimum of three cycles of thermal cycling.	Yes / No / Explain		

231	c) Demonstration of all specifications & performance	Demonstration of all specifications & performance shall be done during site acceptance test for a typical full duration test profile as given in figure 2 in specification document.	Yes / No / Explain		
232	d) Functioning of all interlocks	Functioning of all interlocks shall be demonstrated.	Yes / No / Explain		
233	e) Safe shut down	Safe shut down & revival in the event of electrical power failure shall be demonstrated.	Yes / No / Explain		
234	f) Safety alarms	All Safety alarms & its acknowledgment shall be demonstrated.	Yes / No / Explain		
235	g) Software re-installation	Software re-installation shall be demonstrated (if is transported to VSSC in Pre-installed condition). Necessary passwords shall be given to VSSC during commissioning of the facility.	Yes / No / Explain		
236	11.20 Installation, operation and maintenance documentation	Installation, operation and maintenance manuals of all systems shall be supplied with the system. CAD drawings and circuit diagrams relevant to maintenance shall also be included.	Yes / No / Explain		
237	11.21 Details of consumbles	Vendor shall provide the details of the consumables, such as liquid nitrogen, helium gas required to demonstrate the performance of the chamber at VSSC, Thiruvananthapuram at the time of installation and commissioning.	Yes / No / Explain		

238	11.22 Delivery Period	Vendor shall deliver and commission the Thermovacuum Chamber at VSSC meeting the abovementioned specifications and interface requirements within a period of twelve months from the date of release of purchase order.	Yes / No / Explain		
239	11.23 Warranty	The supplier shall provide a performance warranty of minimum 3 years, from the date of installation, commissioning and acceptance at VSSC, for the entire system against any failure or any failure in meeting the overall performance specifications of the system.	Yes / No / Explain		
240	11.24 Training	Vendor shall impart detailed training for operation, trouble shooting and maintenance of the system to Engineers & Technicians at VSSC, Thiruvananthapuram at no extra cost.	Yes / No / Explain		
241	11.25 Guarantee	All the equipment offered by the vendor shall have free guarantee support of at least one year from the date of installation and acceptance of total system at VSSC, Thiruvananthapuram .	Yes / No / Explain		
242	11.26 Maintenance	All maintenance related issues shall be addressed within 3 days from the date of intimation from VSSC.	Yes / No / Explain		
243	11.27 Online support	There shall be provision for carrying out diagnostics remotely through VPN.	Yes / No / Explain		

244	11.28 Liquidated Damages (LD)	LD shall be levied beyond the date of delivery mentioned in this order @ 0.5% per week or part thereof on the undelivered portion subject to a maximum of 10% of the contract value.	Yes / No / Explain		
245	11.29 Security Deposit	Upon receipt of this order, part shall submit a Bank Guarantee towards Security Deposit within 2 weeks along with order acknowledgement, equivalent to 10% of the order value in Rs.200/- NJ Stamp Paper (as per format attached). This shall be valid up to a period of 60 days from the date of supply and shall be returned upon completion of all contractual obligations.	Yes / No / Explain		

### Supporting Documents required from Vendor

1. Detailed cost splitup including foreign components (Price Bid Related)
2. Overall equipment layout including all systems
3. Product catalog
4. Detailed Techno commercial offer (without price details)
5. Declaration regarding the percentage of local content (or value addition) in the item offered.
6. Detailed Compliance Matrix vis-a-vis the item specification in tenders.
7. Unpriced Bid showing the split up of main equipment, accessories, essential spares as applicable
8. Additional Documents from Vendor.

5 additional documents can be uploaded by the vendor

## C.2 Commercial Terms / Bid

Sl. No.	Description	Compliance	Vendor Terms
1	As per attached tender specification document	Yes / No / Explain	
2	Taxes and other costs,	Yes / No / Explain	
3	Security Deposit (Applicable if Offer Value is Rs. 5 Lakhs or above. MSME/NSIC Units are NOT EXEMPTED from the payment of SD. Bank Guarantee @ 3% of Order Value valid till 60 days from the date of supply to be submitted. Mandatory compliance required. Only Government Bodies/PSUs/PSEs can submit Indentity Bond in lieu of BG. In the event of non-performance of contractual obligations, SD will be forfeited).	Yes / No / Explain	
4	Delivery Terms.	Yes / No / Explain	
5	Mention the time required for readiness of the item for PDI on receipt of the PO	Yes / No / Explain	
6	Mention the time required for supply of the the item at our site after PDI clearance	Yes / No / Explain	
7	Mention the time required for installation & commissioning of the item after receipt of intimation of site readiness	Yes / No / Explain	
8	Liquidated Damages (Applicable beyond the delivery period mentioned in this tender @ 0.5% per week or part thereof on the undelivered portion subject to a maximum of 10% of the contract value. Mandatory compliance required).	Yes / No / Explain	
9	Warranty (Confirm acceptance for a period of 3 years)	Yes / No / Explain	

10	Performance Bank Guarantee (PBG) Bank Guarantee @ 3% of Order Value valid till the completion of warranty period plus 2 months claim period to be submitted. Mandatory compliance required. Only Government Bodies/PSUs/PSEs can submit Indemnity Bond in lieu of BG. In the event of non-performance of warranty obligations, PBG will be forfeited).	Yes / No / Explain	
11	Confirm acceptance of AMC for a period of 7 years. Mention the scope of AMC - No. of visits for Break down & Maintenance per year. (AMC cost shall only be mentioned in the specific slot in the price bid.)	Yes / No / Explain	
12	List of essential spares for the trouble free operation of the equipment to be uploaded (Without price details). Price of the essential spares shall be uploaded only in the "price bid related " column. (The price of essential spare will not be considered for arriving at L1)	Yes / No / Explain	
13	Payment Term: (Our Default payment term: For indigenous orders: 100% within 30 days after receipt and acceptance of item at our site. NOTE: CONSEQUENT TO COVID 19 PANDEMIC AND AS PER EXTANT GUIDELINES FROM DEPARTMENT OF SPACE, NO ADVANCE PAYMENT IS PAYABLE TO THIS TENDER).	Yes / No / Explain	
14	Definitions: A supplier or service provider, whose goods, services or works offered for procurement, has local content: a) Equal to or more than 50% : Class-I local supplier. b) More than 20% but less than 50% : Class-II local supplier. c) Less than or equal to 20% : Non-local supplier. Mention your category.	Yes / No / Explain	
15	Local content means the amount of value added in India (i.e. indigenous items/services added in the offered products/services/works) be the total value of the item offered (excluding net domestic indirect taxes) minus the value of imported content in the item (including all customs duties/IGST) as a proportion of the total value (excluding net domestic indirect taxes), in percent. Indicate extent of Minimum Local Content in offered product/service and location of such value additions.	Yes / No / Explain	

16	The Class-I & II local supplier should provide a Self Certification along with your offer in PDF format indicating that the item offered meets the minimum local content as called for in the tender as mentioned above and provide the % of local content along with details of the location(s) at which the local value addition is made. In case of two part tenders, it is mandatory to indicate compliance to MLC(minimum local content) in technical bid itself. Confirm attachment of Self declaration along with the offer.	Yes / No / Explain	
17	PO Placement Address (with Name and Contact Details of sales person concerned).	Yes / No / Explain	
18	Currency of Quote and Country of Origin should be mentioned here.	Yes / No / Explain	
19	Any Other Terms	Yes / No / Explain	
20	Offer Validity	Yes / No / Explain	

### C.3 Price Bid

Sl. No.	Item	Quantity	Unit Price	Currency	Total Price	Remark
1	Thermo-Vacuum System : Fully automated Thermo Vacuum Chamber as per attached specification document	1.00 Nos.		-		

### Common charges (Applicable for all items)

<b>Freight charge</b>	
<b>P&amp;F Charges</b>	
<b>Installation Charges</b>	
<b>AMC Charges for 1st Year after warranty period</b>	

<b>AMC Charges for 2nd Year after warranty period</b>	
<b>AMC Charges for 3rd Year after warranty period</b>	
<b>AMC Charges for 4th Year after warranty period</b>	
<b>AMC Charges for 5th Year after warranty period</b>	
<b>AMC Charges for 6th Year after warranty period</b>	
<b>AMC Charges for 7th Year after warranty period</b>	