INSTITUTE FOR PLASMA RESEARCH

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TENDER NOTICE DATED 20-4-2009

Itemwise sealed tenders are invited from reputed and eligible parties for the following.

Sr. No	Tender Notice No.	Item	Quantity	Due Date & time of opening	Tender Fee (Rs.)	EMD (Rs.)
1.	IPR/TN/PUR/ 001/09-10	Supply, installation, testing and commissioning of Negative Ion NBI DM Cooling Water Distribution System	1 No.	1-6-2009 2.30 p.m.	200.00	20,000.00
2.	**IPR/TN/PUR/ 002/09-10**	**Design, fabrication, manufacturing and supply of Vacuum System**	**1 No.**	**2-6-2009 2.30 p.m.**	**200.00**	**10,000.00**
3.	IPR/TN/PUR/ 003/09-10	Supply and installation of Computer Workstations	5 Nos.	3-6-2009 2.30 p.m.	200.00	15,000.00
4.	IPR/TN/PUR/ 004/09-10	Supply and installation of 10 kVA UPS (True online) with Battery back-up	2 Nos.	4-6-2009 2.30 p.m.	100.00	5,000.00
5.	IPR/TN/PUR/ 005/09-10	Supply, installation, testing and commissioning of HDPE piping work of PE-100 grade, PN16 rated for NBI and LHCD Water Distribution Systems	1 No.	5-6-2009 2.30 p.m.	100.00	5,000.00

Tender documents are available on IPR Website **:** **www.ipr.res.in//purchasetenders.html.** Tenderers meeting the eligibility criteria mentioned in the tender documents may, at their option, download the tender documents from the website and submit their offer along with prescribed **Tender Fee (non refundable) and EMD** in the form of Demand Draft from any nationalized/scheduled bank drawn in favour of ***Institute for Plasma Research*** and payable at ***Ahmedabad*** as per the details given in the tender documents. In case party desires to collect the tender documents by post, they may contact the Purchase Officer along with prescribed tender fee. Tender documents will be issued upto **5-5-2009** The representative who is going to attend the tender opening should carry an authorization letter from the organization for participation in the tender opening.

TENDER NOTICE No.IPR/TN/PUR/002/09-10 DATED 20-04-2009

For **Design, fabrication, manufacturing and supply of Vacuum System – 1 No.**

NOTE:

1. Full details and specifications of the items and general instructions to be followed regarding submission of tenders are indicated in the tender documents.

2. **Proof for fulfillment of eligibility criteria mentioned hereunder should be submitted along with the tender. If the tender is submitted without valid documents, we shall not consider your offer. Tenders received without proof of eligibility criteria will be rejected.**

3. Tender documents can also be obtained by submitting a written request to the Purchase Officer together with prescribed tender fee, provided that the eligibility criteria is fulfilled. Last date for issue of Tender documents is 5-5-2009

4. While requesting for Tender Documents, such request shall indicate **the "REQUEST FOR TENDER DOCUMENTS AGAINST TENDER NOTICE NO.IPR/TN/PUR/ 002/09-10 DATED 20-4-2009".**

5. **The tender fee of Rs.200/- (non refundable) should be made in the form of DEMAND DRAFT from any nationalized/scheduled bank drawn in favour of *Institute for Plasma Research* and payable at *Ahmedabad*. Vendor's name and tender number shall be indicated on the reverse side of the Demand Draft.**

6. **DD should not be prior dated to the date of advertisement. Separate request letter and separate Demand Draft shall be sent for each tender.**

7. **Those who use the downloaded tender documents from IPR Website may submit the prescribed Tender Fee keeping in a separate envelope along with the tender.**

8. **Tenders received without the prescribed tender fee will be rejected.**

9. No request for the extension of due date will be considered.

10. Late/Delayed offers will not be accepted.

11. **Tenders in a sealed envelope superscribing the envelope with the above tender no., date, due date and brief description of tendered item along with EMD for Rs.10,000/- by way of Demand Draft from a nationalized/scheduled bank drawn in favour of *Institute for Plasma Research* and payable at *Ahmedabad* should be submitted to the *Purchase Officer* at the above address by 1.00 p.m. on 2nd June, 2009. Tenders received upto 1.00 p.m. on 2-6-2009 will be opened on the same day at 2.30 p.m. in the presence of attending tenderers.**

12. In the event of any date indicated above is a declared Holiday, the next working day shall become operative for the respective purpose mentioned herein.

13. IPR will not be responsible for any delay/loss of documents in transit.

14. Tenders received without the details asked for including proof of eligibility for participating in the tender may not be considered.

15. Tenderers should furnish/enclose full technical details/literature, delivery period and confirm the terms and conditions attached with the tender.

16. Those who do not meet with the eligibility criteria need not submit Tender.

17. Those who are quoting on behalf of their foreign Principals should submit a Proforma Invoice of Foreign Principals in foreign currency.

18. The Director, IPR reserves the right to accept or reject any offer in full or part thereof without assigning any reason thereof.

19. **Quotations received without EMD will not be considered.**

20. The representative who is going to attend the tender opening should carry an authorization letter from the organization for participation in the tender opening

ELIGIBILITY CRITERIA: The Vendor (i) should be a manufacturer and has supplied and commissioned similar type of vacuum system to reputed organizations (attach copy of purchase orders) and (ii) have required resources (manpower, equipments etc.) available to undertake such job and to provide after sales service/maintenance.

NOTE: Issue of tender documents does not mean that a vendor is qualified to submit tenders. IPR's decision to consider as to whether a vendor has met with the eligibility criteria is final.

INSTRUCTIONS TO BIDDERS AND TERMS AND CONDITIONS

1. The quotation and any order resulting from this tender/enquiry shall be governed by our Conditions of contract and supplier quoting this tender shall be deemed to have read and understood the same in toto.

2. Where counter terms and conditions have been offered by the supplier, the same shall not be deemed to have been accepted by us, unless our specific written acceptance thereof is obtained.

3. Tender Fee: Tenders received without the prescribed Tender Fee will be rejected.

4. **Clarifications:**
Any technical and commercial questions, information, clarifications, etc. that may be required pertaining to this Tender/enquiry may be obtained from the Purchaser before submitting the tender.

4.1 Bids shall be complete in all respects and shall include properly filled in prices, other specifications, schedules, relevant drawings and catalogues as necessary alongwith the bid covering letter, all in duplicate.

5. **Quotation:** Your quotation superscribing our tender/enquiry No., date, due date and short description of item should be submitted to the Purchase Officer, IPR in a sealed envelope on or before the due date. Late and delayed quotations will not be considered. IPR will not be responsible for postal delays or any other delays in receipt of quotation. Envelopes received without Tender number, date, due date and short description of item may be rejected. The quoted prices should be firm for a period of 120 days from due date for placing order. IPR is not bound to accept lowest rate/s. IPR reserves the right to place order on one or more parties irrespective of whether he is lowest or not. The scope of supply includes insurance by the Contractor/Supplier.

6. **Specifications:** Material should be offered strictly conforming to our specifications/drawings. Deviation, if any, should be clearly indicated by the supplier in their quotation. The supplier should also indicate the Make/Type number of the materials offered and catalogues, technical literature and samples, wherever necessary should accompany the quotation.

7. **Terms of prices:** Quotation should be submitted on door delivery basis without extra charge wherever possible. For quotations on Ex-Works, Ex-godown basis the approximate packing and forwarding charges should be indicated by the supplier. In the case of local suppliers, the material is to be delivered at our stores free of charge. Unit rate/s should be valid throughout the validity of purchase order/contract period for addition/deletion purposes. Break-up of price should be furnished. The quoted price should not be subject to price escalation for whatsoever reasons. The quoted price shall be firm, fixed and non-revisable during the validity/extended validity of purchase order/contract.

7.1 Prices are required to be quoted according to the units indicated in the tender form. When quotations are given in terms of units other than those specified in the tender form, relationship between the two sets of units must be furnished.

7.2 Wherever options are specified in the tender documents, IPR reserves the right to accept any option/s irrespective of whether all the vendors have quoted for all the options or not. The decision of IPR in this regard will be final.

8. Tender should be free from Correction and Erasures. Corrections, if any, must be attested. All amounts shall be indicated both in words as well as in figures. Where there is difference between amounts quoted in words and figures, amount quoted in words shall prevail.

9. IPR shall be under no obligation to accept the lowest or any tender and reserves the right of acceptance of the whole or any part of the tender or portion of the quantity offered and the tenderers shall supply the same at the rates quoted.

10. **Sales Tax etc.:** We have no "C" or "D" form. The percentage of Sales Tax/VAT, surcharge, if applicable, and other levies legally leviable and intended to be claimed should be clearly indicated in the tender. Where this is not done, no claim on these accounts would be admissible later.

10.1 **VAT Registration:** You may submit a copy of VAT Registration certificate along with your quotation (if applicable).

10.2. **Service Tax:** Wherever Service tax is applicable, it should be mentioned clearly. You may indicate percentage of Service Tax in your quotation.

10.3 **Excise Duty:** As per Notification No.10/97-CE (Central Excise) dated 1-3-1997, the Purchaser is entitled for availing Excise Duty exemption at present. Excise Duty Exemption Certificate, wherever applicable, and as per rules will be issued at the appropriate time. Hence Excise Duty should not be included in the BID. However, prevailing percentage of Excise Duty may be indicated.

10.4 **Octroi:** Octroi is not applicable in our case.

11. **Delivery Date:** The supplier must indicate the firm delivery date by which the materials will be despatched/delivered by them from the date of our order.

12. **Inspection:** Materials on its arrival at IPR will be inspected by Stores In-charge, and his decision in the matter will be final.

13. **Earnest Money Deposit (EMD):** Tenderer should furnish EMD for Rs.10,000/- (Rupees Ten thousand only) by way of Demand Draft from a nationalized/scheduled bank drawn in favour of ***Institute for Plasma Research*** and payable at ***Ahmedabad*** should be submitted along with quotation. Tender received without EMD will not be accepted.

13.1 EMD of unsuccessful Bidder will be returned after finalizing the Contract/placing Purchase order.

13.2 The EMD shall be forfeited in case the selected Bidder does not start the work within the time limit specified or fail to complete the work within the stipulated delivery period or fail to comply with any of the terms and conditions in the purchase order/contract.

14. **Payment:** Within 30 days from the date of acceptance. Wherever, advance payment is involved, it will be paid only against Bank Guarantee from Nationalised/Scheduled Bank.

15. No correspondence will be entertained within 30 days from the date of receipt of material and bills, whichever is later.

16. Quotation should be valid at least for 120 days from the date of opening of the tender.

17. Delivery periods be clearly indicated against each item separately.

18. **Guarantee:** The Stores/material/goods/equipment offered by the bidder should be guaranteed for a minimum period of twelve months, against defective materials, design, workmanship, operation or manufacture. For defects noticed during the Guarantee period, replacement/ rectification should be arranged free of cost within a reasonable period of such notification. In cases where our specifications call for a guarantee period more than 12 months specifically, then such a period shall apply.

19. **Security Deposit:** The successful Bidder will have to furnish to the Purchaser an interest free security deposit for 10% (Ten percent) of the order value in the form of Bank Guarantee of an equivalent amount from a nationalised/scheduled Bank within 15 days from the date of LOI/Purchase order and the said Guarantee should be

valid till the goods are accepted by IPR. The Security deposit shall be forfeited in case the selected Bidder does not start the work within the time limit specified or fail to complete the work within the stipulated delivery period or fail to comply with any of the terms and conditions in the purchase order/contract.

20. **Liquidated Damages:** In addition to forfeiting Security Deposit, Liquidated Damages for the delay shall be 1/2% (half percent) of the total order value for the delay of each week in the scheduled time of supply or the scheduled date of final completion for the work as the case may be, subject to a maximum of 5% (five percent) of total order value. Liquidated Damages will be recovered from the payment due to the supplier.

21. **Performance Bank Guarantee:** The Contractor/Supplier will have to furnish to the Purchaser (IPR) an interest free performance bank guarantee for 10% (Ten percent) of the order value/ contract value by Demand Draft or by way of providing a Bank Guarantee from a Nationalised/Scheduled Bank valid for a period of 12 months/guarantee period mentioned in the order from the date of installation/acceptance for satisfactory performance of the work carried out by the Contractor.

22. The Contractor/Supplier shall at all times indemnify the purchaser against all claims which may be made in respect of the stores/material/goods/equipment 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 failure of supply from whatever cause arising and the entire responsibility for sufficiency of all means used by him for the fulfillment of the contract.

23. **BAR/PERT Charts**:
To be provided as per the requirement of Purchaser.

24. **Sub-Contract:** All sub-contractors are required to be appraised and approved by the Purchaser before placement of orders by the Vendor.

25. **Jurisdiction:** The contract/Purchase order shall be governed by the Laws of India for the time being in force. The Courts of Ahmedabad only shall have jurisdiction to deal with and decide any legal or dispute arising out of this contract.

26. **Settlement of disputes:** Any disputes or difference arising out of or in connection with the Contract/Purchase order shall be to the extent possible settled amicably between the parties.

If amicable settlement cannot be reached then all disputed issues shall be settled by arbitration.

27. **Arbitration:** In the event of any dispute or difference arising under this Contract, the matter shall be referred to the Arbitrators one each nominated by the Purchaser and Contractor from their respective organisations. In case the said Arbitrators are not able to settle the dispute by themselves, the matter shall be referred to the Arbitrator mutually nominated by the Purchaser and the Contractor and whose decision will be final and binding on both the parties. The venue of arbitration will be IPR. Subject to as aforesaid the Arbitration Act, 1940 and the rules thereunder and any statutory modification thereof for the time being in force shall be deemed to apply to the Arbitration proceedings under this Contract.

28. **Permits and Licences:** The Contractor shall secure and pay for all permits and licence which he may require to comply with in respect of all laws, ordinances and regulations of the Government or Public Authorities in connection with the performance of his obligations under the Contract. The successful contractor shall be responsible for all damages and shall indemnify and save the Purchaser harmless from and against all claims for damages and liability which may arise due to his failure to comply with what is stated above.

29. **Training:** The successful tenderer shall, if required by the Purchaser, provide facilities for the practical training of Purchaser's engineering or technical personnel for their active association on the manufacturing process throughout the manufacturing period of the Contract/stores, number of such personnel to be mutually agreed upon.

30. **Operation/Instruction Manual:** Where operation/instruction manual is essential to enable the Purchaser to put the stores to proper use, the successful tenderer shall furnish such operation/instruction manual along with the stores.

31. **Test Certificate:** Wherever required, test certificates should be sent along with the despatch documents.

32. **Secrecy:**

32.1 All information, drawings, designs and specifications imparted to the bidder/successful contractor shall, at all times, remain the absolute property of the Purchaser, the bidder/successful contractor shall not use them for purposes other than for which they are provided for and shall treat all these documents as confidential. These shall not be reproduced in whole or in part for any other purpose.

32.2 The contractor shall use his best endeavours to ensure that such information are not divulged to third parties except where needed for the performance of the contract by the successful bidder with the prior consent of the Purchaser. In such cases, the successful contractor shall ensure and obtain similar obligation of confidence, from third parties in question.

33. **Indemnity:** The Contractor shall warrant and be deemed to have warranted that all stores supplied against this contract are free and clean of infringement of any Patent, copy right or trade mark and shall at all times indemnify the Purchaser against all claims which may be made in respect of the stores for infringement of any right protected by patent. Registration of design or Trade Mark and shall all risk of accidents of damage which may cause a failure of the supply from whatever cause arising and the entire responsibility for the sufficiency of all the means used by him for the fulfilment of the contract.

34. **Counter terms and conditions of Suppliers:** Where counter terms and conditions printed or cyclostyled conditions have been offered by the supplier, the same shall not be deemed to have been accepted by the Purchaser unless specific written acceptance thereof is obtained.

35. **Installation/commissioning/site works:** Wherever these activities are part of scope of work/specifications, Vendor should carryout out the same without any extra cost to IPR.

36. **Free Issue Material (FIM) (If specified in the tender documents):** Successful tenderer will have to furnish in the form a Bank Guarantee or in any other form as called for by the Purchaser towards adequate security for the materials/property provided/issued by the Purchaser as Free Issue Material (FIM) for the due execution of the contract. Successful bidder shall submit Bank Guarantee from a nationalized bank and arrange insurance for the cost of FIM at his expenses.

37. Late/delayed tenders will not be accepted. Incomplete tenders may be rejected at the discretion of IPR.

38. **IPR is not bound to accept the lowest tender. IPR reserves the right to select any vendor at its sole discretion.**

39. **Result of the tenders:** Unsuccessful tenderers will not be informed of the result of their tenders.

40. The Director, IPR reserves the right to accept or reject any quotation/tenders fully or partly without assigning any reason.

41. IPR reserves the right to place order on a single party or to split the order at its sole discretion.

We agree to the above terms and conditions.

Place:

Signature of Bidder with seal

Date:

Note: A copy of our terms and conditions duly signed should accompany your quotation.

Technical Specifications for Vacuum System

(1) Scope of work:

The scope of work comprises of preparation of fabrication drawings, fabrication, manufacturing, assembly, pre despatch inspection, supply and testing at IPR premises and final acceptance. The system should confirm to the technical specifications, drawings, standards listed, notes attached and tests/quality standards to satisfaction of the purchaser.

Schematic design drawings are supplied to the vendors. Vendors shall prepare detailed fabrication drawings wherever required giving all dimensions and tolerances based on the assembly requirements. These drawings (hard copy and soft copy) shall be submitted to the IPR for approval. No modifications in the design are permitted except in case where it is necessary to facilitate manufacturing, assembly, testing or erection provided such changes don't impair the functional accuracy and strength of the components. Such modifications backed up by calculations and drawings wherever necessary shall be submitted to the purchaser for approval, before implementation.

Any additions or revisions in the scope of work due to revision in the requirement of functions, designing and interface with other system; also form the part of the scope of work of the specifications.

All dimensions in the drawing are nominal except specified and they should confirm to vacuum standards. All dimensions are in mm.

The Vacuum system consists of the following parts.

1. Vacuum Chamber
2. Rotary Pump
3. Diffusion pump and Baffle valve
3. Gas dosing and Shut – off Valve
4. Connecting Bellows and gate valves
5. Digital Pirani pressure gauge
6. Digital Penning pressure gauge
7. Liquid Nitrogen Trap

Detailed technical specifications of the items are mentioned below.

2. Description of the Vacuum Chamber:

(a) Chamber Main Shell:

Vacuum chamber consists of a cylindrical shell (item 1 of drawing B) with various ports. Chamber is made of SS304 material and the required base pressure is ~5 x 10^{-6} mbar and operating pressure is of order of ~ 10^{-3} mbar. Vacuum chamber has to be made in a way that the leak testing (as mentioned in 2.4b) can be performed, with a base pressure of 5 x 10^{-6} mbar.

The chamber is a cylindrical enclosure of 500 mm diameter and 1000 mm length excluding the side port flanges. The thickness of the vessel should be 6 mm. It is preferred that the vacuum

chamber is made from seamless standard pipe whose dimensions are very close to the mentioned dimensions.

(b) Chamber Bottom Port for Pumping:

Chamber shell has one 150 mm pumping port (item 4 in drawings B and C) for connecting the diffusion pump at the bottom chamber wall. One 25 KF (item 9 in drawing C) standard port should be present on the extension of this pumping port to connect it to the rotary pump.

(c) Chamber Side Ports:

There should be 150 mm three ports (item 5 in drawings A, B and C) on the top, front and back of the chamber, each with two 16 mm threaded feedthroughs.

(d) Chamber End Ports:

Chamber shell has two end flanges (item 3 in drawing B). Each end flange contains one 16 mm feedthrough (item 11 in drawing A) at the centre and four ports, like
1. One 125 mm view port (item 6 in drawing B) with toughened glass (item 12 in drawing B) and viton o-ring sealing.
2. One 125 mm blank port (item 7 in drawing A).
3. Two 125 mm blank ports (item 8 in drawing B) each with 25 KF (item 9 in drawing C) and 16 KF (item 10 in drawing C) standard couplers.

The end flanges are provided with hinges and clamped on chamber. The hinged assembly should not allow flange deflection of more than 0.5 mm at the flange overhang.

(e) Chamber Stand Details:

Chamber is to be mounted in Horizontal position on a suitable rugged **Aluminium box pipe stand**. Stand height is to be adjusted in such a way that the **height** of the chamber support bracket (item 14 in drawing B) present on the bottom chamber should be 1200 mm from the ground. The aluminium stand should have provisions to accommodate the displays for digital pirani gauge and digital penning guage and the necessary circuit breakers and switches for the operation of pump and gauge. The front portion of the stand is to be covered with Al sheets of 2 mm thickness (with switches and display for gauge) and should be opened like a door. Whereas the remaining three sides should be covered with perforated Aluminium sheets for heat dissipation and should be bolted with the stand. The aluminium stand should be covered from top with 5mm Aluminium sheet. The stand should have castor wheels with breaks.

Note: All the standard and threaded couplers and view ports should have viton O-ring sealing as shown in the drawing. Suitable hooks are to be provided on the top of the chamber for lifting purpose. All ports are to be provided with blank flanges as shown in drawings. SS water cooling pipes to be additionally connected on the main chamber along with nipples at both ends.

(2.1) Fabrication and manufacturing specifications:

Following specifications are to be maintained during the fabrication.

The chamber and its all parts are to be made out of SS 304 only

2.1.1 It should follow I.S.I 2101 medium grade machining tolerances wherever tolerances are not mentioned.
2.1.2 All the sharp edges of flanges are to be chamfered at 45 degree and 1 mm.
2.1.3 All the components like flanges; pipes should be baked in an inert atmosphere of N2 purging to temp of 400 °C for 4 hrs to 8 hrs before welding and after final machining and welding for stress removal and for checking deformations.
2.1.4 Localised scratches/ roughness on the inside surfaces and flanges exposed to vacuum is not accepted.
2.1.5 All the vacuum components shall be cleaned only with detergent and acetone before leak test.
2.1.6 Surface finish details:
   a. The inner surface of chamber is to be finished to three-delta finish.
   b. Inside of the chamber is to be **electropolished**.
   c. Outer surface of chamber is to be finished to two-delta finish.
2.1.7 Following are the practices to be adopted during TIG welding
   a. All weld joints shown in drawing should be argon-welded types.
   b. Trapped volumes should be avoided.
   c. Full penetration weld should be employed.
   d. Interruption during welding should be reduced to minimum possible extent.
   e. If leak develops, weld should be ground to base metal and then be rewelded.
   f. All welds to be ground smooth and flushed with adjoining surfaces with convex curvature with adjoining wall every where.
   g. Butt welds are preferred over lap welds.
   h. If possible, filler material during welding should be avoided.
2.1.8 All the pipes used for ports should be seamless.
2.1.9 Entire surface exposed to vacuum side should be cleaned by washing off the buffing flux etc as specified in (2.1.5).

(2.2) Fastener and Seals:

All the fasteners are SS304 non-magnetic cold drawn. UTS 58 Kgf/cm2 and proof strength 48 Kgf/cm2.

(2.3) Inspection:

a. Material check for their **chemical composition** as well as mechanical properties should be as per the ASTM standards and should be checked for any internal defect or surface cracks by ultrasonic probe.

b. Necessary check like surface finish, assembly requirements, repeatability, straightness as well as other manufacturing requirements should be as per the design, standards and drawing specifications.

c. All the machined parts will be checked for **dimensional accuracy** before assembling and welding.

d. 100 % welding quality (as per 2.1.7. a – h) will be checked by **radiography**.

e. Surface finish will be checked by using **surface roughness** tester as per the drawing specifications.

f. All the dimensions will be inspected and should be maintained, as per the drawing and specifications mentioned, after welding.

g. All '0' Rings are **viton** with proper shore hardness and should be vacuum compatible.

Note: Test certificates of chemical composition of SS, radiography test of welding, viton O ring confirmation and surface roughness should be provided at the time of delivery to fulfil ISO norms.

(2.4) Testing at vendor's premises:

Following tests will be carried out during Pre-dispatch inspection apart from checks mentioned in Sr. no. 3.

a. Vacuum Test: After complete assembly the chamber will be tested at vacuum of 5 x 10^{-6} mbar.
b. Leak Test: The leak tightness should be of better than 10^{-8} torr-ltr/sec with the help of helium leak detector.

3. Vacuum system in its integrated form:

1. The vacuum chamber has to be mounted on the bracket which is bolted on the Aluminium stand. The diffusion pump should be connected to the center 150 mm dia. port of the bottom chamber along with chevron baffle valve and baffle valve.
2. Rotary pump should be connected to the 25 KF port just above the diffusion pump through a 1000 mm bellow and gate valve and mounted on the bottom of the stand.
2. Pirani and penning gauge should be connected to the 16KF coupler on the top of the chamber wall and its display should be mounted on the front cover of the aluminium stand. Another pirani guage is too connected at the T joint of rotary pump connected to the 25KF coupler.
3. The gas dosing valve and the vent valve should be connected to the 16KF coupler on the side end flange of the vacuum chamber through a cross connection; the unused one should be closed with a blank flange.
4. After the integration of the vacuum system, the vacuum chamber should be able to give a base pressure from atm. pressure to ~$5x10^{-6}$ mbar or below within 60 minutes or below.
5. Open the gas dosing valve and adjust the pressure between ~$1x10^{-4}$ to $1x10^{-3}$ mbar. The adjusted pressure should be constantly maintained.

4. Extras items

a. **One spare set** of viton "0' ring for the vacuum chamber is to be provided.
b. **One pirani guage head and display**
c. **One penning guage head and display**
d. **Two Bellow** of 25KF and 1 meter length
e. **One set of fasteners** of vacuum chamber
f. **2 heaters** for diffusion pump
g. **Once extra charge** of rotary pump oil
h. **Once extra charge** of diffusion pump oil

i. **One extra toughened glass for view port**
j. **One extraVent valve**
k. **Complete set of couplers, viton O rings, 25 KF and other blanks used in the vacuum system to be provided**
l. **One extra Gate valve**

5. Final acceptance at IPR:

a. Vacuum system will be inspected against the criteria mentioned in point 2.3 and 2.4.
b. All the accessories asked in purchase order will be done at vendor's premise.
c. The vacuum system will be accepted in its integrated form and checked as per section 3.

6. Packaging Requirements:

Vacuum system and its components and precision-machined parts are to be packed with a proper standard soft material to avoid damages to the machined surfaces, and other critical surface. The packing material shall be preferably foam/sponge, thermocol or equivalent. Packing should be sturdy and rigid enough to withstand shock and vibration during transportation of system.

7. Delivery Time:

It must be three months from the date of approval of drawing. Reduction in delivery time is highly appreciated.

Note:

a. **Make of all the items being integrated into the vacuum system should be mentioned in the quotation.**
b. **The entire system should have a warranty of two years from the date of acceptance at IPR and the after sales services during the warranty period should be provided at Ahmedabad/Gandhinagar.**
c. **Please return the Data sheets, duly filled in and signed by you with the specifications of the products along with the quotation.**

Specifications of Rotary Pump

Sr. No.	Description	Required specification	Party's (offered) specification	Deviation, if any
1.	Displacement speed (lpm)	≥ 300 litres per minute		
2.	Ultimate pressure (Gas Ballast Open)	~1 x 10^{-2} mbar		
3.	Ultimate pressure (Gas Ballast Closed)	≤5 x 10^{-4} mbar		
4.	Inlet port	25 KF standard coupler		
5.	Exhaust port	25 mm		
6.	Anti-suck electrochemical valve	provided		
7.	Safety cover, operating manual, lifting handle	provided		
8.	Test certificate	provided		
9.	MAKE	-		

Specifications of Diffusion Pump and Baffle valve

Sr. No.	Description	Required specification	Party's (offered) specification	Deviation, if any
1.	Pumping Speed (un Baffled)	1000 (± 10 %) lit /sec		
2.	Critical backing pressure	0.1 mbar		
3.	Liquid Nitrogen Trap	Provided		
4.	Inlet connection Flange ID	(should match with pumping port of chamber) 160 mm		
5.	Outlet Connection	KF25		
6.	Warm up time in minutes	≤ 30 minutes		
7.	Make			
	BAFFLE VALVE WITH WATER COOLED CHEVRON BAFFLE VALVE			
1.	Chevron baffle valve	To be matched directly with chamber Pumping port and the inlet port of the baffle valve		
2.	Inlet Port of baffle valve	should match directly with the chevron baffle valve		
3.	Outlet port of baffle valve	should match directly with the inlet port of diffusion pump		
4.	Cooling lines	should be provided on sides		
5.	Seal	Viton 'o' rings		
6.	Operating Manual	Provided		
7.	Make	-		

Specifications of Gas dosing and shut of valve

Sr. No.	Description	Required specification	Party's (offered) specification	Deviation, if any
1.	Integrated shut-off valve	Closing without change of flow setting		
2.	Differential pressure	≤ 2.5 bar		
3.	Flange (in)	DN 16 ISO-KF		
4.	Flange (out)	DN 16 ISO-KF		
5.	Gas flow max. controllable	≤ 1 x 10^{3} mbar l/s		
6.	Gas flow min. controllable	≥ 1 x 10^{-4} mbar l/s		
7.	Bakeout temperature	flanges 150 °C		
8.	Dead volume	≤ 0.04 cm3		
9.	Housing/needle/filter	Stainless Steel		
10.	Temperature (Operating)	≤ 80 ºC		
11.	Tightness	1x 10^{-9} mbar l/s		
13.	Make	-		

Specifications of Connecting Bellows, Gate valve and Vent valve

Sr. No.	Description	Required specification	Party's (offered) specification	Deviation, if any
	CONNECTING BELLOWS			
1.	Inner Diameter	25mm		
2.	Length	1000 mm		
3.	Thickness	0.5 mm (± 10 %)		
4.	Material	SS 304		
5.	Ends	Both ends should have 25 KF coupler, welded to the body		
6.	Pressure compatibility	Should be compatible to sustain 5 x 10^{-6} mbar		
7.	Make	-		
	GATE VALVE			
8.	Inlet/Outlet	KF 25		
9.	Operation	Manual, Multi-turn		
10.	Seal	Viton		
11.	Operating range	1 x 10^{3} – 5 x 10^{-6} mbar		
12.	Make	-		
	VENT VALVE			
13.	Opening	KF25		
14.	Make	-		

Specifications of Digital Pirani gauge

Sr. No.	Description	Required specification	Party's (offered) specification	Deviation, if any
1.	Pressure range	~$1x10^{3}$ mbar to$1x10^{-3}$ mbar		
2.	Capacity	Two Pirani Gauge sensor or 2 seperate sensors		
3.	Display	3 digit LED digital display and facility to accommodate two guage heads (preferred)		
4.	External set point controller	Provided		
5.	Operating Manual	Provided		
6.	Suitable power cords and cables	Provided		
7.	MAKE	-		

Specifications of Digital Penning gauge

Sr. No.	Description	Required specification	Party's (offered) specification	Deviation, if any
1.	Pressure Range	$1x\ 10^{-3}$ to $5x10^{-6}$ mbar		
2.	Capacity	One Penning Gauge Sensor		
3.	Display	3 digit LED digital display		
4.	Suitable power cords and interconnecting cables between sensor and display.	Provided		
5.	Operating manual	provided		
6.	MAKE	-		