INSTITUTE FOR PLASMA RESEARCH

NEAR INDIRA BRIDGE, BHAT, GANDHINAGAR 382 428
GUJARAT STATE
Phone: 079 23962021, 23962023 Fax: 079 23962277

TENDER NOTICE DATED 18-8-2010

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

Sr. No	Tender Notice No.	Item	Qty.	Due Date & Time for Submission of tender	Due Date & Time for Opening of tender	Tender Fee	EMD (Rs.)
1.	IPR/TN/PUR/ 016/10-11	Programmable Automation Controller (PAC)/ Programmable Logic Controller (PLC) with Engineering & Operator Station	1 No.	29-9-2010 by 1.00 p.m.	29-9-2010 2.30 p.m.	500.00	35000.00
2.	**IPR/TN/PUR/ 017/10-11 (TWO PART TENDER)**	**Design, fabrication, installation and commissioning of 80K Helium Gas Supply System**	**1 No.**	**30-9-2010 by 1.00 p.m.**	**30-9-2010 2.30 p.m.**	**1000.00**	**200000.00**

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 **17-9-2010.** Representative who is going to attend the tender opening should carry an authorization letter from the organization for participation in the tender opening failing which he will not be allowed to attend the tender opening.

TENDER NOTICE No.IPR/TN/PUR/017/10-11 DATED 18-08-2010 (TWO PART)

For Design, fabrication, installation and commissioning of 80K Helium Gas Supply System

NOTE: THIS IS A TWO PART TENDER. KINDLY SUBMIT PART-A (TECHNICAL BID & COMMERCIAL TERMS AND CONDITIONS) AND (PART-B) PRICE BID SEPARATELY IN TWO DIFFERENT ENVELOPES SUPERSCRIBING TECHNICAL BID AND PRICE BID IN ONE SINGLE ENVELOPE

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 17-9-2010.

4. While requesting for Tender Documents, such request shall indicate **the "REQUEST FOR TENDER DOCUMENTS AGAINST TENDER NOTICE NO.IPR/TN/PUR/017/10-11 DATED 18-08-2010".**

5. **The tender fee of Rs.1000/- (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. **Tender in a sealed envelope (Technical Bid, Commercial terms and conditions and EMD [Part-A] in one envelope and Price Bid [Part-B] in another envelope) superscribing the envelope with the above tender no., date, due date and brief description of tendered item should be submitted to the *Purchase Officer* at the above address by 1.00 p.m. on 30th September, 2010. Part-A (Technical Bid along**

with Tender Fee of Rs.1000/-, commercial terms and conditions and EMD for Rs.2,00,000/-) received upto 1.00 p.m. on 30-9-2010 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. AUTHORITY LETTER

a. The representative who is going to attend the tender opening should carry an authorization letter from the organization for participation in the tender opening failing which he will not be allowed to participate in the tender opening.

b. The tenderers representative, who reaches the venue of the tender opening late, i.e. after the starting time specified for opening of the tenders, may not be allowed to take part in the tender opening. It should be noted that only one representative of each tenderer will be permitted to participate in the tender opening.

ELIGIBILITY CRITERIA:

1) Vendor should have the technology, knowledge and background in Cryogenic systems, transfer lines, vacuum technology and in all the relevant fields /areas covered in the scope of work (attach proof).
2) Prior experience of similar nature of job covering the scope of work as stipulated herein namely Design, Analysis, Fabrication, testing, installation and commissioning of similar system is a must. The vendor shall have executed similar jobs to reputed organizations or government organizations such as ISRO, DAE, DST etc. with a single purchase order of Rs.40 lakhs or more in last three years (attach copy of purchase orders).

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.

TENDER DOCUMENT
FOR
80 K HELIUM GAS SUPPLY SYSTEM

CONTENTS

1. INTRODUCTION

The Institute for Plasma Research is establishing a large Cryopump System This system has many subsystems/components like large radiation shield, baffles etc. These subsystems and components are to be continuously cooled and maintained at the nominal temperature of 80 K absorbing all the heat transmitted to them. In order to meet this requirement, an 80 K Helium Gas Supply System is to be established near to the Cryopump system at IPR. It is proposed to establish this system by competent outside agency. This document gives the functional requirement, description of the envisaged system, salient specification of the major equipments & components, the requirement of establishing and commissioning the system, the quality assurance plan etc.

2. FUNCTIONAL REQUIREMENT

The helium supply system shall be designed to following requirements. The system to be cooled such as radiation shield, baffles etc are hereafter referred as Thermal System (TS).

Inlet temperature of GHe to Thermal System : 80 K
Maximum outlet temperature oh GHe from TS : 85 K
Operating Heat Load on Thermal System : 5 kW
Operating flow rate of GHe : 200 g/s
Design flow rate of GHe : 220 g/s
Operating Pressure in helium circuit : 0.5 MPa (g)
Pressure drop in the system load at 200 kg/s : 0.05 MPa.

In addition to the heat load of Thermal System, the heat in-leak to the helium supply system through the helium circulator, the lines, valves & components etc are to be accounted in the design of cooling system. The heat leak load from the helium circulator is about **8.5** kW and that from the pipelines & valves etc shall be limited to **1.5** kW.

SYSYEM REQUIREMENT

Typical Heat load are –

Sr No	Description	Heat Load
1	System Load (Cryopump)	5 KW
2	Heat load from Cold Helium Circulator	8.5 KW*
3	Transfer line(Maximum)	0.5 KW*
4	Heat Loads from Valve etc	1KW*
5	**Total**	**15 KW**

The system shall be designed for a heat load of 20K. The 80K circulator shall have a flow rate upto 450 gm/sec and shall typically operate at nominal flow rate of 200 gm/sc.

The proposed system shall have provisions to regulate the flow rate of helium gas through the

**Nominal (Vendor to confirm and design the total system based on actual heat loads with 10 % margin.*

gets cooled and shall reach the rated operating flow rate when the system is completely cooled. To meet this requirement, the helium circulator needs to have variable speed drive as well as the circuit shall have necessary flow control devices. During cooling of circuit, Thermal System and fluid in it, cooled helium gas has to be supplied to the circuit.

The fluid circuits shall have provisions to clean the entire circuit including the Thermal System to bring down the moisture, nitrogen and oxygen contents compatible to helium circulator. The circuit shall have necessary safety provisions to protect circuit as well as the Thermal System from excessive pressure build up due to inadvertent heat in-leak or any other possible reasons. All the equipments, pipelines and components shall have the best thermal insulation so that the heat load on the cooler and thereby the consumption of coolant fluid during operation is kept minimum. The circuit will have an online moisture analyzer to analyze the moisture content in the gas being circulated. Though the operating pressure is 0.5 MPa, the circuit shall withstand the maximum possible delivery pressure of the circulator but the safety devices shall be rated for the operating pressure.

The helium supply system shall be designed in such a way that the entire operations except initial preparatory works can be carried out remotely from the command & control panel. The system shall have adequate instrumentation such as pressure transmitters, temperature sensors, flow meter etc so that the entire operations can be commanded from the console and the performance of all the equipments as well as the system can be remotely monitored from the control panel. The circuits shall have necessary built in control system to ensure smooth performance as well as safe functioning of the system & equipments.

3. SCHEMATIC DIAGRAM .

A preliminary schematic diagram of the helium supply system is given in the annexure. This has to be developed into a complete working Process & Instrumentation Diagram (P&ID) incorporating all the functional requirements by the vendor while submitting the tender. The major subsystems are the following.

- Helium gas storage
- Helium circulator
- Helium gas circulator
- Liquid Nitrogen storage
- Fluid circuits comprising SI lines & flow components
- Command & control system

4. DECRIPTION OF SUBSYSTEMS

4.1 Helium Storage

The helium gas is stored in required number of 50 liter cylinders. The capacity of helium storage shall be sufficient for 5 filling of the entire circuit including the Thermal System at 80 K taking into account the minimum required pressure in the storage cylinders to supply the make up fluid during cooling. The storage system shall have necessary pressure regulation & monitoring systems to maintain the required operating pressure in the circuits. Supply of required number of helium cylinders as well as helium gas for commissioning of the system is in the scope of bidder. Since the helium gas is passed through the circulator at 80 K, this gas shall be of high purity suitable for trouble free operation of helium circulator at 80 K. The required specification of the helium gas is given below.

Total purity	: ≥ 99.995 %
Ne	: ≤ 23 ppm
N_2 + Ar	: ≤ 14 ppm
H_2O	: ≤ 9 ppm (DPT 212 K)
Hydrocarbons as CH_4	: ≤ 5 ppm
O_2	: ≤ 3 ppm
H_2	: ≤ 1 ppm
CO_2	: ≤ 1 ppm
CO	: ≤ 1 ppm
Oil	: ≤ 3 mg/Nm3

This specification is in line with Grade A of MIL- P-27407-A except for the additional spec on oil. Particulate matter shall be as per class 6.

4.2 Helium Circulator

The helium circulator is required to circulate the cold helium gas through the entire circuit including the Thermal System and the heat exchanger. It shall develop adequate DP to compensate for the pressure loss in the complete circuit at the design flow rate. It shall be directly driven from motor without coupling. It shall be hermetically sealed which eliminates the need for mechanical seal and ensures containment of process fluid and maximizes reliability. The circulator shall be located in a separate vacuum enclosure to minimize the heat in-leak in to the cold helium fluid during operation. It shall have required built-in safety system & sensors which ensure its safe operation. The details of built-in safety systems are to be brought out while bidding. The cold circulator shall be provided with a variable speed drive for remote step less control of the helium gas flow rate in the cooling loop. The electrical supply to the motor will be from 415 V / 240 V, 50-60 Hz AC supply. The power connection to the motor, signal from the sensors of the circulator shall be routed through prewired electrical feed thro connectors mounted on the vacuum chamber. Salient specifications of the circulator are given here.

Fluid	: Single phase Helium
Operating suction pressure	: 0.5MPa (g)
Operating delivery pressure	: 0.65 MPa (g)
Maximum suction Pressure	: 1.7 MPa (g)
Maxium delivery pressure	: 1.8 MPa (g)
Operating flow rate	: 200 g/s
Maximum flow rate	: 450 g/s
DP at design flow rate	: 0.15 MPa.
Operating temperature	: 80 K
Compatible Temperature	: 80 K to 300 K.

Duty Cycle : Heavy duty. The circulator will be required to operate for a month continuously.

Note: Though operating suction pressure & flow rate are only 0.5 MPa. & 200 g/s, higher maximum suction pressure & flow rate are given keeping future requirements in mind.

4.3. LN2 Heat Exchanger

The warm helium gas coming out from the Thermal System is at about 85 K and this will be further heated up to higher temperature depending upon the heat load in the helium circulator and the pipeline. This warm gas has to be cooled in the LN2 exchanger to a temperature less than 80 K so that the gas enters the Thermal System at 80 K. The required inlet & outlet temperatures are to be finalized by the bidder taking into account these heat loads. The design flow rate is 220 g/s. In addition, this exchanger has to cool the make up helium gas from 300 K to 80 K. This helium flow will be required during cooling of circuit & Thermal System. The required flow rate of this helium gas has to be estimated by the bidder.

The heat exchanger is suggested to be pool type where the cooling coil is immersed in LN2 pool. The volume of the bath shall be adequate to ensure complete immersion of the cooling coils and to hold adequate liquid for 8 hours of operation without filling LN2. The pool is kept at atmospheric pressure and hence the LN2 is at its boiling point at atmospheric pressure. The boil off nitrogen due to the heat load from the exchanger coil as well from the heat in-leak in to the exchanger is let into atmosphere. In order to minimize the heat in-leak to the exchanger, the bath shall have vacuum jacketed multilayer super insulation. It is provided with a level sensor of differential pressure type. The LN2 level in the bath is to be always maintained above the surface of the cooling coils by automatic filling system using the level sensor. Make up liquid nitrogen to the bath should be added from a stationary liquid nitrogen tank through an electro-pneumatic ON / OFF or control valve.

The bath will have pressure transmitter, overflow line, drain line etc. It shall have built-in safety systems such as relief valve & rupture disc. Though the operating pressure of the bath is atmospheric, it shall be designed for an internal pressure of 3 bar (g). The vacuum jacket should have static vacuum level better than 0.10 Torre at ambient temperature and expected to be less than ~0.005 Torre in operating condition filled with liquid nitrogen.

4.4. LN2 Storage

The liquid nitrogen storage and its pressurization system from which the LN_2 is fed to the heat exchanger are in the scope of IPR. However the super insulated LN_2 lines along with necessary valves from the storage to the heat exchanger is in the scope of bidder. The distance between the storage and heat exchanger is about 60 m.

4.5 Flow Components and Pipelines

The valves such as manual, electro-pneumatic and control valves shall be from reputed manufacturers such as Velan, Burkert etc. All the valves are to be globe valves. The salient specifications for them are as follow.

Manual Valves

Size	: As per line size
Type	: Globe valve.
Pressure Rating	: Based on MAWP given, supplier shall specify.
Stem extension:	As per BS 6364 for all cryogenic valves.
Stem Seal (Dynamic)	: By Bellows with redundant gland packing for all helium valves. By gland packing only for LN2/GN2 valves
Jacket	All cold helium and LN2 lines shall have vacuum jacket with multilayer insulation.
Permissible leak across: body	10^{-9} Pa – m^3 **/ s** for bellow sealed globe valves 10^{-07} Pa - m^3 **/ s** for valves with gland packing.
Permissible leak across seat	: 10^{-07} Pa – m^3 **/ s** for resilient seated globe valves.

Material of Construction:

Body	: ASTM A 182 F 304 L / A 351 CF 3
Bellows	:Stainless steel 316 L / 316 Ti / 321/
Gland packing	PTFE
Plug and seat inserts:	PCTFE (KELF) / Vespel / Polycarbonate

Design Code & Mfg	ASME B 16.34
Test code	ASME B 16.34
Tests	The valves shall have certificates for material, bellow cycle life test, hydraulic test, pneumatic test, MSLD leak test and function test
Cleanliness:	All the interior flow surfaces of the valves shall be degreased and cleaned for oxygen service..
Marking:	All the valves shall be assigned a tag number and the same shall be legibly attached to each valve.

Electro-pneumatic Valves

Every electro-pneumatic valve shall have the valve, pneumatic actuator, solenoid valve and two limit switches with the following salient specifications.

Valves **: T**he specifications are as above.

Actuator **:** Single acting, spring return, diaphragm type. Normal instrument pressure is 0.45 to 0.6 MPa (g). Stroking time (full open to full close travel time and vice versa) for the valves shall' be between 3 to 5 sec. Each actuator shall have a filter suitable for the actuator.

Solenoid Valve:

Voltage: 24 +- 3 volt DC
Service gas: Air at 0.45 to 0.7 MPa.
Response time: 100 msec (max).
Current : 500 mA (max)
Service life: > 50,000 operations.
Time for continuous operation: 24 hours.
Operating temperature: 0 to 45 deg. C
Manual override: To be provided by a screw.

Limit Switch

Every valve shall be provided with a pair of switches for ON/OFF positions. The limit switch shall be actuated by valve stem position. Each limit switch shall have two pairs of change over contacts; each rated for interrupting 1 amps at 240 V AC & 48 V DC. Contact capacity is 0.25 An on resistive circuits for at least 1 million operations. The limit switches shall be housed in weatherproof NEMA 3 enclosures with gasket covers. Enclosure classification shall be of IP-65. These limit switches shall be suitable up to 70 C.

Control Valve

The control valve shall have a valve, actuator, two limit switches, air filter & regulator, electro-pneumatic convertor and electronic position transmitter. The specification for valve is same as before except that the leak tightness across the seat is class VI for the resilient seat and the valve plug is of equal percentage characteristics. Specifications for actuator and limit switches are same as above.

Air filter & Regulator: Diaphragm relieving type, 5 micron & case is as per IP 54.

Electro-pneumatic Convertor: The valve positioner shall operate in conjunction with pneumatically operated control valve and its pneumatic actuator. Its features shall match the requirements of the control valve. The positioner shall have the flexibility of changing its action from direct to reverse and vise versa at site.
Accuracy-0.5 % of span, linearity- 0.25 % of span, repeatability- 0.25 % of span, response time ≤ 0.2 s, input resistance ≤ 200 ohms, case is as per IP 65 vide IS 2147, air supply 1.4 bar, output air capacity 6 Nm3/hr.

i. The positioner will be supplied with dry compressed air at 1.4 kg.cm^2 (gauge) pressure under normal condition, but be capable of full stroking of the valve even when the supply pressure drops to 1.1 kg/cm^2 (gauge). The positioner shall balance the input signal with the valve stem position to obtain accurate positioning action.

ii. Electro-pneumatic positioners shall be suitable for input signal range of 4-20 mA DC unless otherwise mentioned in the valve specification sheet. The maximum input impedance shall not exceed 600 ohms.

iii. The output signal shall be proportional to the input signal through out the range. Linearity shall be better than ± 1% of the output span.

iv. Repeatability and threshold sensitivity shall be better than ± 0.05% of the output span.

Electronic Position Transmitter

The position transmitter shall be as per the following specifications.

i. Two-wire position transmitter shall deliver 4-20mA DC output into a load of 500 ohm (min.) at 24V DC supply
ii. Protection class shall be of IP 65.
iii. Material (base) shall be of Aluminum alloys.
iv. Sensing device shall be of LVDT type.
v. This electronic position transmitter should qualify 70 ° C operations. Tests shall be done as per IS 9001.

Pipelines

All the cryogenic pipelines shall be vacuum jacketed super insulated lines. The material of construction is SS 304 L. They shall be provided with bellows in the inner line to compensate for thermal contraction of the lines during low temperature operation. The line shall be provided evacuation cum vacuum measurement port.

4.6. Transmitters & Sensors

The P&ID for the helium supply circuit shall have the required monitoring instruments such as pressure transmitters, temperature sensors, flow meters, level sensors, moisture meter etc so that the entire operation can be carried out remotely and its performance can be continuously monitored and recorded. Also the helium circulator shall have tachometer to monitor its speed. Salient specifications of some of these instruments are given for reference. However, detailed procurement specifications need to be generated by the successful bidder and got them approved by IPR before procurement.

Pressure Transmitters

Type	: 2 wire electronic smart type.
Accuracy	: ± 0.25% of calibration span.
Long term reproducibility	: ± 0.25% of upper range.
Repeatability	: 0.05 % of span
Case	: IP 65 as per IS 13947.
Power finish	: 24 V DC over Hart ± 2%
Output signal	: 4-20 mA DC @ 60 Ohm load.
Sensing element	: SS 316/304
Wetted Parts	: SS 316/304
Make	: Rosemont/MDF or equivalent.

Temperature Sensor

All the temperature sensors are surface mounted sensors mounted on the inner pipelines.

Type	: General purpose Resistance Temperature Detector
R_0 (Nominal)	: 100 ohms
Sensing Element	: High purity platinum wire of 100 ohms at 0 C with a temperature coefficient of 0.00385 ohms/ohm-C (IEC 751)
RTD assembly material	: Stainless steel and flexible polyimide insulation.
Accuracy	: RTD assembly accuracy of $\pm$ 0.50 ohms or 0.50 % of temperature whichever is more.
Response Time (65 % response)	: 0.2 0 second on material surface
Self heating error	: ≤1 C with dissipating power of 25 mW (ASTM-E-44)
Insulation Resistance	: The resistance between outer sensor insulation and the common lead wire is 50 mega ohms minimum with 50 V DC as per ASTM-E-644.
Lead Wire	: 3 wire configuration. 26 AWG standard nickel plated copper conductor of required length, PFA Teflon insulated 3 conductor ribbon cable.
Make	: Rosemont, Scientific Instruments, RdF, Auxitrol or equivalent

Flow meter

Flow meter is required to measure the flow rate of helium gas being circulated.

Type : DP type, mass flow meter or vortex meter suitable for 80K.
Fluid : Helium gas at 80 K
Flow range: 30 to 250 g/s at 80 K & 5 bar (g).
Accuracy : $\pm$ 1 % of full range.
Make : Micrometer, Rosemont, GE Sensing Technology, Endress + Hausser

4.7 Safety Aspects

The helium supply system shall have the following built in safety systems for its safe operation –

- Relief valves and rupture discs on the cooler rated for the design pressure of the vessel.
- Relief valves in the segments of lines where entrapment of cold fluid is possible.
- The electro-pneumatic and control valves shall take the safe position in case of power failure.
- In addition following parameters are to be monitored and if they go beyond said values which may result in failure of the system, they shall trigger to shut the operation –
- \- Low/high voltage supply to circulator
- \- Degrading vacuum level in the vessel containing the circulator
- Continuous monitoring of moisture level in the helium fluid
- Oxygen monitor in the building housing the system

4.8 Control System

The system shall be equipped with an automated control system with display which shall allow following function to be performed.

- Cool down of components from room temperature to 80 K in controlled manner.
- Filling and draining of liquid nitrogen
- Start, stop and speed variation of the cold helium gas circulator
- Liquid nitrogen level in the heat exchanger
- Nitrogen pressure in the heat exchanger
- Temperature and pressure of the recalculating helium gas in the circuit at strategic mutually decided locations
- The supply of operating panels includes within its scope all the pressure and temperature and level sensors as may be required for smooth and safe operation of the complete helium gas recalculating system

5. SUPPLIER'S SCOPE OF WORK

The scope of works for the supplier consists of the following tasks.

i. Process Design: Design and estimation of process parameters for the 80 K helium system. Development of detailed P&ID. Selection of required instrumentation in terms of pressure, temperature, flow measurements with proper justification. The P&ID must contain all the safety aspects for the systems and for power failure mode.

ii. Engineering and Design: Design of the complete system including the design of cryogenic lines, vessels, heat exchangers etc, design of mounting structures & supports, flexibility analysis of complete piping networks during cooling & steady state operations. Generation of procurement specifications for all the equipments, components, pipelines etc.

iii. Procurement and Supply: Vendor shall procure all the required material and equipments including sensors, transmitters, instrumentation, cables etc. Supply of spares for two years of service of the system is also in the scope of the vendor.

iv. Fabrication, Installation & Commissioning of the entire system including the required modifications.

v. Codes and Standards: For the design, fabrication and testing of equipments, components & pipelines, the corresponding sections of ASME code shall be followed.

vi. Quality Assurance and Quality Control: The bidder shall submit Quality Assurance plan (QAP) to IPR for the approval with detailed time schedule for entire scope of work. The quality assurance plan shall include all the stages starting from specification and covering material procurement, identification of raw material, fabrication of equipments and up to final acceptance. Design & engineering, fabrication, testing, inspection, erection etc shall be covered in Quality Assurance plan (QAP) which will be submitted to IPR for final approval. IPR reserves the right to appoint a third party for inspection/testing of work done. Contractor shall have no objection for third party inspection and testing. The cost for third party inspection will be borne by IPR. Sub contractors (if any) are required to be appraised and approved by IPR before placement of contract job to the sub contractor.

The commissioning of 80 K system will include achieving vacuum in the order of $1x10^{-8}$ mbar lit/sec and thermal cycling followed by leak tests. In case of non-achievement of desired vacuum level, it is contractor's responsibility to check for any source of leakages in welding or any other area and rectify it.

In case of unsatisfactory work, deviations from actual desired parameters after inspection and testing stages, they need to be rectified by rework by contractor on their own expense and keeping in mind that those re-works shall not delay the scheduled activities.

vii. Acceptance Criteria: The vendor is responsible to achieve the performance of the 80 K helium system as per the specification of the system. Final performance test shall be carried out under the supervision of IPR representatives. Results of the final performance test along with evaluation of the performance from the test results shall be submitted by the vendor to IPR for their approval. Once the rated performance of the entire assembly is achieved with Thermal System, the 80 K helium supply system is treated as accepted by IPR.

viii. Guarantee: Vendor shall give guarantee for the performance of the equipments, components and pipelines of the entire system as per their specifications for a period of 18 months from the date of final acceptance. During this period, if any fault occurs, vendor shall rectify it at no extra cost.

6. GENERAL TERMS AND CONDITIONS

The successful bidder shall submit detailed design of the system with appropriate calculation and data sheet to IPR for approval.

Detailed manufacturing design will be submitted to IPR subsequently for approval before fabrication.

The successful bidder shall take approvals for purchase items like Cold Circulator, valves, sensors etc from IPR. For this purpose data sheet for these items shall be submitted to IPR. The items shall be procured from parties approved by IPR.

The bidder shall make the provision /arrangement for the required pumping system, leak detector, liquid nitrogen etc in-house or through outsourcing agency for conducting acceptance test at their factory. After the completion of inspection and testing of manufactured system, complete inspection and test report shall be submitted to IPR for issuing dispatch clearance.

Any deviation / discrepancy / change by the bidder should be submitted to IPR. Bidder shall submit to IPR a list of material, design, inspection plan, quality assurance plan, material procurement schedule, manufacturing schedule and release for fabrication. Procurement of all equipment's, material, etc required for the fabrication, inspection and testing shall be in the scope of bidder. IPR authority / representative shall have access to all manufacturing facilities, inspection and testing facilities, tools, drawings etc.; during all stages of manufacture. IPR / its authorized representative reserve the right to add any supplementary requirements like random sample testing of raw material.

Safety issues: bidder shall submit the details of Safety norms/precautions followed for site activities.

Various inspection stages will be identified jointly by IPR and contractor and will be followed throughout project till its complete execution.

Spares for all the equipments and components required for successful operation of the system for 2 years shall be provided by the bidder.

7. DELIVERY

Six months from the time of order placement.

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 enquiry 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 **MANNER AND METHOD FOR SUBMISSION OF TENDERS**

5.1 All tenders in response to this invitation shall be submitted in TWO PARTS as under and in the different envelopes.

5.1.1 **PART-A (TECHNO-COMMERCIAL):** This part of the tender shall include/contain all technical details, technical specifications, drawings and also the commercial terms and conditions of contract for the supplies to be made and the services to be rendered **EXCLUDING ANY PRICE DETAILS THEREOF.**

5.1.2 **PART-B (PRICE):** This art should contain only the prices of the stores offered for the services to be rendered.

5.2 **Part-A (Techo-commercial)** should contain/include only technical specifications, technical details, literature, reference to earlier supplies of similar equipment, drawings, quantity, time required for submission and approval of drawings, manufacturing and delivery schedule, inspection/testing procedure, itemized list of spares and quantity (without price) recommended by the tenderer for purchase, term of price, mode and terms of payment, mode of dispatch, the quantum/percentage of statutory levies payable by the purchaser as extra and all related commercial terms and conditions for the supplies and for the services like erection and commissioning to be rendered by the tenderers. This part of the tender, i.e. Part-A (Techno-commercial) shall be enclosed separately in an envelope duly sealed and superscribed with the purchaser's tender number and the last date and time specified for receipt and opening indicated in the instruction sheet of this tender document. The tenderer shall take special care NOT TO MIX UP the price of the stores in this part of the tender.

5.3 **Part-B (Price)** shall include/contain only price, price break-up, freight/safe delivery charges, charges for training of the Purchaser's engineers wherever applicable, lumpsum charges for erection and commissioning work or per diem charges for the supervision of erection and commissioning work as is envisaged in the Purchaser's tender document, testing charges, third party inspection charges, etc. This part of the tender, i.e. Part-B (Price) shall be enclosed separately in an envelope duly sealed and superscribed with the Purchaser's tender number and the last date and time specified for receipt and opening of the tenders as in the tender document.

5.4 **I**f tenderer includes prices of any nature in Part-A (Techno-commercial) of the tender such offers areliable for rejection without any notice to the tenderers.

5.6 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 **Customs Duty:** The purchaser is entitled for Customs Duty exemption under Notification No.51/96-Custom dated 23-7-1996 and can place order directly on foreign manufacturers. Necessary Customs Duty Exemption Certificate, wherever applicable, and as per the rules will be issued at appropriate time. Hence, Customs Duty should not be included in the BID. However, prevailing percentage of Customs Duty may be indicated.

Wherever, against a requirement, both indigenous as well as imported offers are received, the offers for imported stores will be evaluated on the basis of the total landed cost after loading the custom duty and other levies as may be applicable from time to time for taking purchase decision.

Offers from Indian Agents on behalf of foreign suppliers: In case athe tender is submitted by an Indian supplier/Indian agent on behalf of their foreign supplier/ principals, following documents should be submitted with the tender, failing which, their offer is liable to be ignored.

a) Photocopy of he Agency Agreement between the Principals and the Indian Agent showing the percentage or the quantum of agency commission payable and a Letter of Authority from the Principals authorizing the Indian Agents to submit the tender on their behalf.
b) The type and nature of after sales services to be rendered by the Indian Agent

The Indian Agents are allowed to quote on behalf of only one foreign Principal/ Supplier against this tender.

10.5 TDS/WCT will be deducted as per Income tax Rules.

10.6 **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):**

The Bidder shall submit interest free Earnest Money Deposit (EMD) for Rs.2,00,000/- (Rupees Two lakhs only) by way of Demand Draft from a nationalized/scheduled bank issued in favour of ***"Institute for Plasma Research***" and payable at **Ahmedabad**. **Tender received without EMD will be rejected at the discretion of IPR.**

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

14.2 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.

14.3 **Exemption from payment of EMD:** Firms who are registered with DGS&D and NSIC are exempted from payment of EMD subject to submission of valid registration certificate with the bid. **Tenders received without the valid registration certificate will be rejected.**

15. **Payment:**

15.1 10% of supply portion as advance against submission of Bank Guarantee for an equivalent amount from a nationalized/scheduled commercial Bank. This payment will be made only after signing the contract/Purchase order and submission of Security Deposit.

15.2 10% of supply portion after approval of major drawings by IPR and on receipt of Bank Guarantee for an equivalent amount from a nationalized/scheduled commercial bank.

15.3 60% of supply portion against delivery of material at IPR site, its verification by IPR representative and on receipt of Proforma Invoice in triplicate.

15.4. 20% along with 100% of installation and commissioning charges within 30 days from the date of final acceptance and on receipt of Performance Bank guarantee for 10% of the contract value from a nationalized/scheduled commercial bank.

15.5 **Advance payments other than mentioned above will be loaded with interest @ 12% p.a. upto the delivery period quoted.**

Wherever, advance payment is involved, it will be paid only against submission of Bank Guarantee from a Nationalised Bank. Bank Guarantees should be furnished as per IPR format.

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

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

18. **Guarantee:** The Stores/material/goods/equipment offered by the bidder should be guaranteed for a minimum period of twelve months from the date of acceptance, 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 commercial 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 commercial 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, 1996 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. **<u>Result of the tenders:</u>** 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:

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

PART-B

PRICE BID FORMAT

(Bidders are requested to offer their price bid in the following format)

S.No	Description	Quantity	Unit cost (Rs.)	Total price (Rs.)
1	Design, Procure, Fabrication, Establishing, Supply, Erection and Commissioning of 80 K helium gas supply system with all the items mentioned in the scope of supply	1 No.		
2.	Installation and commissioning charges (including unloading, shifting, handling with accessories) **(Quote Lumpsum charge)**	Lumpsum		
3.	Other charges, if any.			
			Total Rs.	

	Indicate percentage except Freight		
	Percentage	**Included**	**Excluded**
Packing and forwarding			
Excise Duty			
Sales Tax/VAT			
Insurance			
Service Tax on Sr.No.2 above			
Freight	**Rs.**		

Place:

Signature of Bidder with seal

Date :