



CENTRE FOR NANO AND SOFT MATTER SCIENCES

Prof. U.R. Rao Road, Jalahalli, BENGALURU 560 013.

Autonomous Institution under the Dept. of Science & Technology, Govt. of India

INVITATION TO TENDER

No. PI/000104/19-20

12.07.2019

To

The Centre invites sealed tender/bid from your firm for supply, installation and commissioning of the following scientific equipment

Gas Lines and Gas Banks

The Tender Form in Annexure I to V may be submitted along with relevant Fees and Earnest Money Deposit (EMD). The terms and conditions may clearly be noted before submission of the tender.

The form in Annexure II may duly be completed and submitted in a **sealed outer cover**, containing two **separate sealed envelopes**, clearly marked as **“Techno-Commercial Bid (Annexure III)”** and **“Price Bid (Annexure IV)”**, for identification.

The tender shall be addressed to **The Administration and Finance Officer, Centre for Nano and Soft Matter Sciences, P.B.No. 1329, Prof. U.R.Rao Road, Jalahalli, Bengaluru – 560 013** marked with our tender reference number, due date and due time with stamp. The completed tender bids must reach this office in the combined sealed cover on or before **15.30 Hrs. of 17 July 2019**, through Speed Post / Courier / Registered Post/hand delivery.

Yours faithfully,

Sd/

Encl: as above.

Administration and Finance Officer

Annexure – I
GENERAL INSTRUCTIONS

1. Definitions :

- a. The terms 'Purchaser' shall mean the Administration and Finance Officer, Centre for Nano and Soft Matter Sciences, Bengaluru-560 013.
- b. The term 'Supplier' shall mean the person, firm or company with whom or with which the order for the supply of Items/Equipment is placed.
- c. The terms 'Purchase Order' shall mean the communication signed on behalf of the Purchaser by an officer duly authorized intimating the acceptance on behalf the Purchaser on the terms and conditions mentioned or referred to in the said communications accepting the tender or offer of the supplier for supply of Items/Equipment.

2. **Delivery of tender:** The offer in response to the tender invitation shall be made in two separate envelopes, the first envelope containing Annexure III along with Compliance Statement. The second envelope shall contain only Annexure IV. The two envelopes shall be super scribed with "**Techno-Commercial Bid**" and "**Price Bid**" respectively. The two envelopes may be put in one outer cover, sealed and addressed to **The Administration and Finance Officer, Centre for Nano and Soft Matter Sciences, P.B.No.1329, Prof. U.R.Rao Road, Jalahalli, Bengaluru – 560 013**. The tender reference number, due date and due time should be clearly mentioned on the outer cover.

The tender should be accompanied by Tender Application Fee of INR 2,000 and Earnest Money Deposit (EMD) as indicated in Annexure III. The application fee and EMD should be submitted separately by Demand Draft drawn in favor of "Centre for Nano and Soft Matter Sciences", payable at Bengaluru in a sealed envelope. Those firms which are eligible for claiming exemption in payment of EMD should furnish proper certificate in support of the exemption, having current validity.

3. **Receipt of tender:** The tender must reach this office by **15.30 hours** on the due date. Late and delayed Tenders will be liable to be rejected.
4. **Validity of the offer:** (a) The quotation should be valid for a minimum period of 120 days from the date of opening of tender. If the day up to which the offer is to remain open is declared a closed holiday, the offer shall remain open for acceptance till the next working day.

- (b) Quotations qualified by vague and indefinite expressions such as 'Subject to immediate acceptance', 'subject to prior sale' or any other riders will not be considered.
5. **Opening of tenders:** The firm shall be at liberty to authorize a representative to be present at the opening of the tender at the time and date as specified in the schedule. The name and address of the representative who would be attending the opening of the tender on behalf of the firm should be indicated in the tender or a proper letter of authority be produced before the meeting.
6. **Right of acceptance:** This Centre does not pledge itself and reserves to itself the right of accepting the whole or any part of tender or portion of the quantity offered and the firm shall supply the same at the rate quoted. In case any MOQ (Minimum Order Quantity or MOU (Minimum Order Unit) is applicable, the same should be mentioned specifically.
- (a) No correspondence /discussions /visits whatsoever will be entertained on the subject unless specifically called by this office after opening the tenders for technical discussions/ price negotiations. Any violation of this will render the quotations invalid and the firm is liable to be blacklisted.
- (b) The Purchaser reserves the right to call for techno-commercial/price negotiations. The firm should depute competent representative for such discussion / negotiations whenever called for and he shall be competent to take on the spot decisions.
- (c) The firm may give any of their commercial terms, if required in their techno-commercial offer only, and price quotation should contain only price.
- (d) Office stamps of tenderers must be affixed below their signatures.
- (e) 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.
- (f) The firm shall provide Banking information for payment or any other purpose
7. **Delayed supplies:** In case of delayed supplies, liquidated damages at the rate of 0.5 percent per week or part thereof of delay with a maximum of 5 percent of the value of supply order/contract will be levied.
8. **Extension of delivery time:** As soon as it is apparent that supply dates cannot be adhered to, an application shall be sent by the Supplier to the Purchaser. If failure, on the part of the Supplier to deliver the Items/Equipment in proper time shall have arisen from any cause which the Purchaser may admit as reasonable

ground for an extension of the time (and his decision shall be final he may allow such additional time as he considers it to be justified by the circumstances of the case). In case of Letter of Credit the banking charges for the LC amendment will be on suppliers account.

9. **Guarantee and replacement:** The Supplier shall guarantee that the Items/Equipment supplied shall comply fully with the specifications laid down, for material workmanship and performance. The Guarantee should be as mentioned in the specification.

10. **Acceptance of items/equipment:**

- a) Items supplied are subject to inspection and acceptance and the supplier should collect/replace the rejected items at his cost and risk.
- b) The Items/Equipment shall be tendered by the Supplier for inspection at such places as may be specified by the purchaser at the Suppliers own risk, expenses and cost.
- c) It is expressly agreed that the acceptance of Items/Equipment is subject to final approval by the Purchaser, whose decision shall be final.

11. **Banking charges:** All banking charges applicable outside India will be on **suppliers account**.

12. Please note that faxed/email quotations shall not be accepted under any circumstances.

TENDER FORM

Tender Ref. No.

To

The Administration and Finance Officer,
Centre for Nano and Soft Matter Sciences
P.B.No. 1329, Prof. U.R.Rao Road
Jalahalli
Bengaluru-560 013

I/We agree to furnish required supplies/services as detailed in the Techno-Commercial Bid or such portions thereof as you may specify in the Acceptance of Tender/Supply Order at the prices given in the Price Bid in accordance with the General Terms and Conditions governing the contract/supply order enclosed hereto duly accepted on receipt of order for the same.

I/We agree to hold this offer open until _____ and shall be bound to supply/commission/erect the equipment and dispatch the same within the specified period.

I/We agree to supply and commission/erect the equipment and complete the whole of the work and hand over to the purchaser within the period of _____ weeks, from the date of receipt of an intimation from you regarding acceptance of this tender/receipt of supply order.

I/We have understood the specifications and have drawn up the Techno-Commercial Bid in accordance with the requirements and have accordingly submitted the Price Bid.

I/We understand that CeNS reserves the right to reject any or all offers without assigning any reasons. It is also understood that the offers may be accepted either in whole or in part.

The details of remittance of Tender Application Fee and EMD are as under:

Details	Demand draft enclosed	Details of Demand darft		
		Demand Draft No. & Date	Bank	Branch
(i) Tender Application Fee (INR 2000/-)	Yes/No			
(ii) Earnest Money Deposit: (INR 1,00,000/-)	Yes/No			

If (ii) above is 'No', details of Certificate of exemption:

Date:

Signature and Seal of Supplier
Name & Address

TECHNO-COMMERCIAL BID

1. Tender Ref. No. : PI/000104/19-20 dated 12.07.2019
2. Name of Tenderer:
3. Due date & due time : **17.07.2019 @ 15.30 hours**
4. Opening date & time : **Will be notified in our website.**
5. The tender shall remain valid for acceptance for 120 days, from the date of tender opening.
6. Amount of EMD – INR 1,00,000/- } Demand Draft Nos. dtd.
7. Amount of Tender fee – INR 2,000 } Bank Branch
8. Schedule of requirements:

Sl.No.	Description	Quantity	Destination	Technical Specifications
			Bengaluru, INDIA	

CONDITIONS FOR TECHNO-COMMERCIAL BID**TECHNICAL**

1. a) All available Technical Literature(s), Catalogue(s) and other data in support of the specifications and details of the item(s) should be furnished along with the offer.
b) Approximate net and gross weight of the items offered shall be indicated in the offer. Packaging dimensional details should also be indicated in the offer.
c) Insurance against all the transit and handling risks on a 'WAREHOUSE to WAREHOUSE' basis for a sum equivalent to 110% of C & F Cost shall be separately indicated.
d) SPECIFICATIONS:
Items/Equipment offered should strictly conform to our specifications indicated in Annexure V. Deviations, if any should be clearly indicated by the Supplier in their quotation. The Supplier should also indicate the Make/type and provide catalogue(s), Technical literature(s) and sample(s), wherever necessary along with the quotations. Test certificates wherever necessary should be forwarded along with the supplies.
2. Any firm representing the principal supplier should submit authorized dealership certificate in original from the principal company.
3. Full details of supplies of the same equipment(s) made to users in India, if any shall be enclosed.
4. Full details of facility of service after sales available in India for the period covered by warranty and thereafter shall be furnished.

5. A complete set of instruction and operation manual should be supplied at the time of installation.
6. Final performance should be guaranteed at the site.
7. **Compliance Statement for the point-wise specifications in the format (Annexure-V) should mandatorily be enclosed.**
8. The Centre reserves the right to make its own assessment on any of the technical details provided and decide on the suitability of the equipment offered.

COMMERCIAL

1. Terms of payment:

A. For Imports:

- i. 90% through Letter of Credit with usance period of 30 days on proof of arrival of consignment OR through Wire Transfer against delivery. The balance 10% payment will be released after expiry of the applicable Warranty period.
- ii. The balance 10% can be considered for payment earlier, provided, a Performance Bank Guarantee for an equivalent amount of 10% of the Invoice value, having validity up to three months from the date of expiry of the applicable Warranty period, is submitted soon after installation and commissioning the equipment.

B. For Domestic Suppliers:

The payment in INR shall be made through NEFT/RTGS after successful installation and against submission of Performance Bank Guarantee equal to 10% value of the equipment, having validity up to a period of 3 months after expiry of Warranty. Complete details such as the bank account number/IFSC/SWIFT/Bank Address, etc. should be provided along with the price bid.

2. Duties, Taxes where legally leviable and intended to be claimed should be distinctly shown in the Tender.
3. **Duty Exemption:** Please note that the Purchaser is eligible for concessional Customs Duty, under the Govt. of India Notification **No. 11/280/1993-TU-V dated 29 April 2016.**
4. **Delivery period:** Delivery is the essence of the contract. The supplier should adhere to delivery schedule as indicated in the Purchase order, failing which Clause 7 of Annexure-I shall be enforced.

5. **Delivery terms:** Delivery should be to warehouse, CeNS.
6. In case Items/Equipment offered requires maintenance after the expiry of the warranty, the approximate charges for comprehensive as well as on-call basis maintenance should be indicated. Details of availability of local support should also be given.
7. **Packing, forwarding and insurance:** The supplier will be responsible for the stores being sufficiently and properly packed for transport by air, to withstand transit hazards and ensure safe arrival at the destination. The packing and marking shall be done by and at the expenses of the supplier. The Purchaser will not pay separately for transit insurance, all risks in transit being exclusively of the Supplier and the Purchaser shall pay only for such Items/Equipment as are actually received in good condition, in accordance with contract.
8. **Test certificate:** Wherever required, Test Certificate should be sent along with the relevant dispatch documents.
9. Prices are required to be quoted according to the units indicated in the annexed 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.

COMPLIANCE STATEMENT OF SPECIFICATIONS SHOULD BE SUBMITTED COMPULSORILY (IN ANNEXURE V).

PRICE BID

1. Tender Ref. No. : PI/000104/19-20 dated 12.07.2019
2. Name of tenderer :
3. Due date & due time : 17.07.2019 @ 15.30 hours
4. Opening date & time : **Will be notified in our website.**
5. The tender shall remain valid for acceptance for 120 days, from the date of tender opening.
6. Rates for items given in Techno-commercial offer at Schedule of Requirements are as follows. (Adhering to the Format given below is a pre-requisite for considering the quotations):

Sl.No.	Description	Product / Catalogue No.	Qty.	Unit Price	Total Cost
(i)	Brief description, basic price, without duties / taxes if any, of complete Items/Equipment with all accessories				
(ii)	Duties / Taxes				
(iii)	Packing & Forwarding				
(iv)	Freight & Insurance				
(v)	Handling charges, if any				
(vi)	Any other (please specify)				
(vii)	Total cost (in figures & words)				

OTHER CONDITIONS FOR PRICE BID

1. The price should be indicated on unit basis only. No unilateral revision in price will be admissible.
2. In case any of the subheads are included in the total cost, the same should be specified. Any exemption of duties / taxes / any other should be indicated. The Centre is eligible for concessional Customs Duty, under the Govt. of India Notification No. 11/280/1993-TU-V dated 29 April 2016.
3. Any optional item indicated in techno-commercial bids must be priced separately.
4. Currency in which the price is quoted must clearly be mentioned.

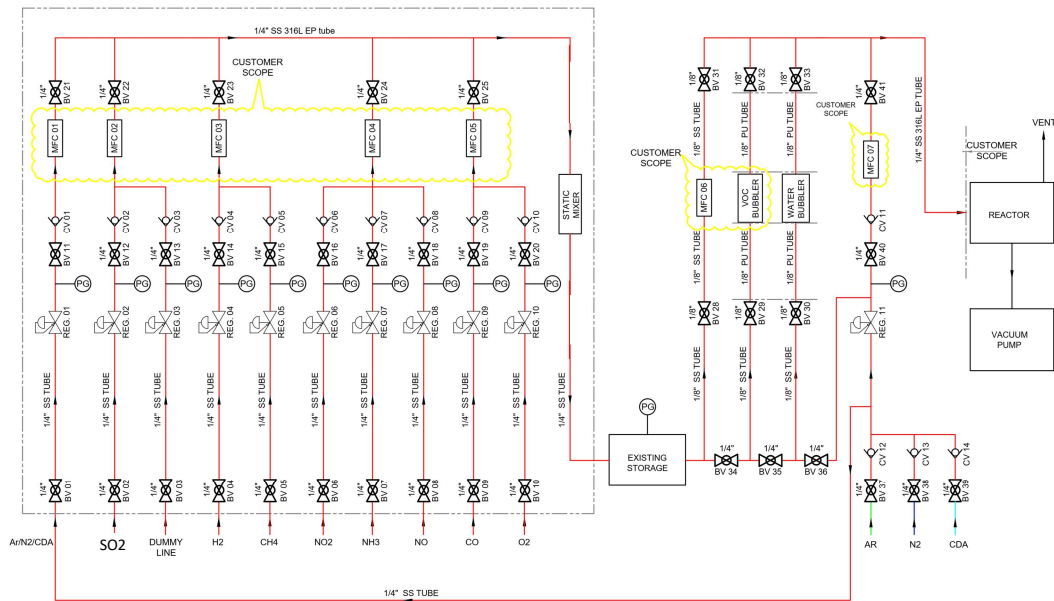
Technical Specifications

Annexure – I: Technical Specifications of Gas Manifold Panel, Tubing and Gas banks

1. Product Description:

Refer to the following diagram for the details.

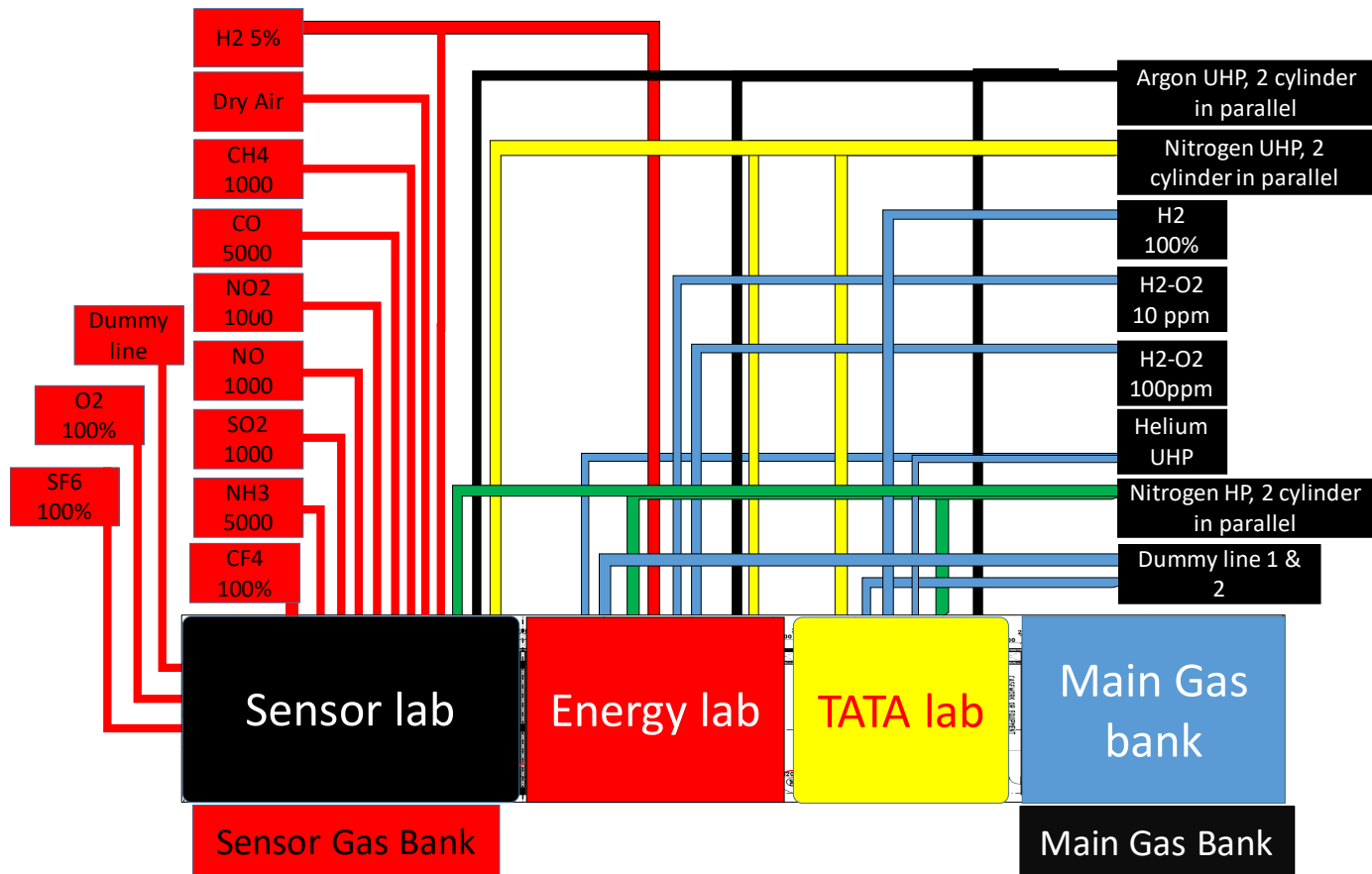
Drawing number 1: Gas mixing panel in sensor lab.



Key Points:

- This is the modification work of existing gas mixing panel available in CeNS Jalahalli campus.
- Some items available with us (list is provided) which should be included.
- The vendor should provide all low-pressure point of use regulators (0-10 bar).
- Vacuums pumps, mass flow controller units are at our scopes.
- VOC bubbler and water bubbler, is also at our scope. However, some space should be provided from one tube connection to another.
- Static mixer and water bubbler are optional. Its cost should be mentioned separately.

Drawing number 2: Tubing Layout



LIST OF GASES	
Sensor lab gas Bank	Main Gas bank
O ₂ 100%	UHP Argon (Ar)
Sulfur Hexafluoride (SF ₆)	UHP Nitrogen (N ₂)
H ₂ 5%	Hydrogen 100%
Dry Air	H ₂ -O ₂ 10 ppm
CF ₄	H ₂ -O ₂ 100 ppm
<u>Calibration Gases (500 ml cylinder)</u>	Helium (He) UHP
Methane (CH ₄) (1000 ppm)	HP Nitrogen (N ₂)
Carbon Monoxide (CO) (1000 ppm)	
Nitrogen Di Oxide (NO ₂) (1000 ppm)	
Nitric Oxide (NO) (1000 ppm)	
Sulphur Di oxide SO ₂	
Ammonia (NH ₃) (1000 ppm)	

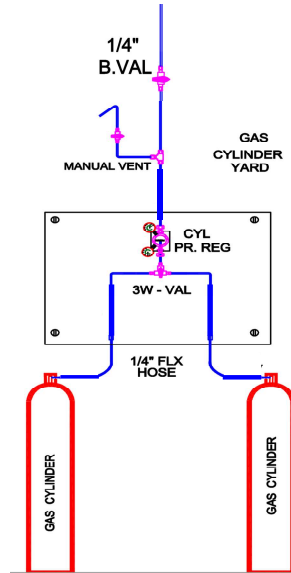
Key Points:

- Dummy line should be closed with a ball valve at the lab end two ends(Gas bank end and Lab end). However the main gas bank dummy line end needs to be connected till cylinder end with 'HP line with 1 cylinder' type.
- We will provide high pressure regulators that will be used for gas supply panels.

- We will provide high pressure regulators for all calibration gases as well.

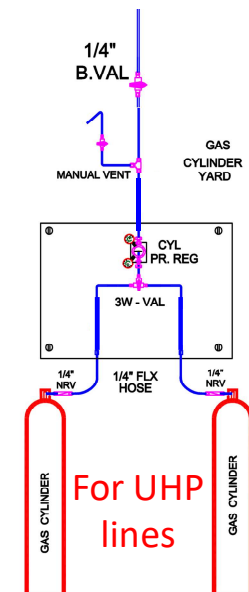
Drawing number 3: A typical cylinder connection layout for the HP lines with 2 cylinders in parallel.

Gas: Nitrogen HP



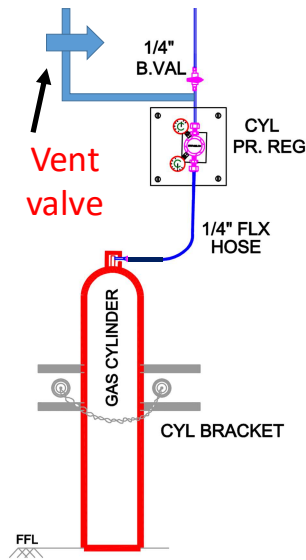
Drawing number 4: A typical cylinder connection layout for the UHP lines with 2 cylinders in parallel.

Gases: Ar UHP, N2 UHP



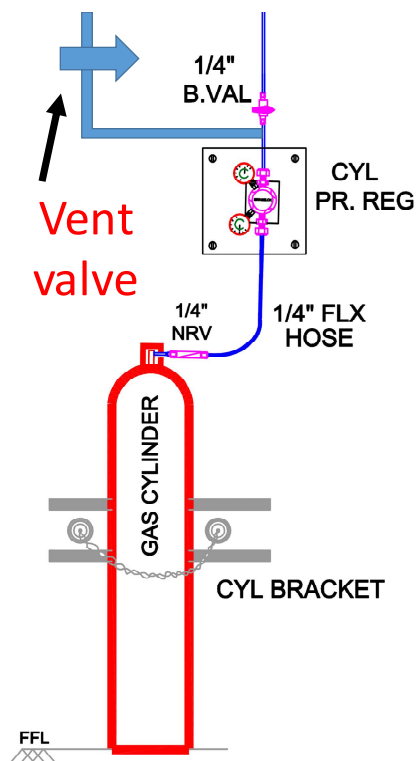
Drawing number 5: A typical cylinder connection layout for the HP lines with 1 cylinder.

Gases: SF6, O2, Dry Air, H2(100%), H2(5%), H2-O2 10PPM, H2-O2 100PPM, CF4.



Drawing number 6: A typical cylinder connection layout for the UHP lines with 1 cylinder.

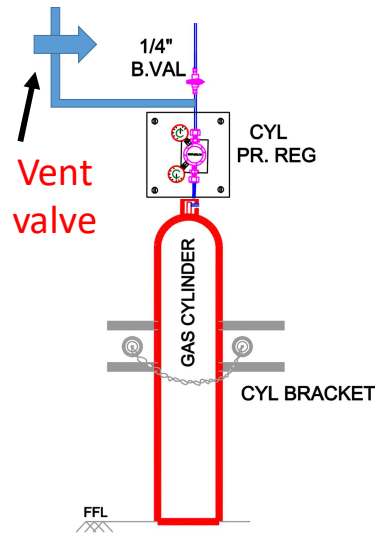
Gas: Helium



Drawing number 7: Layout for the reactive gas lines cylinders kept in Gas sensor gas bank

Cylinder size 500 ml. For these gases vent lines must reach rooftop.

Calibration gases: NH₃, SO₂, NO, NO₂, CO, CH₄



The gas manifold should be designed using the components with specifications given below:

(The final billing of the additional parts and components may be as per actuals)

List of item available at out end, which should be used judiciously.

S.N.	Description	Material Type	Qty
1	Flexible hose	SS 316	8
2	NRV 1/8 inch	SS 316	9
3	SS 1/8" OD BALL VALVE	SS 316	10
4	SS 1/4" OD BALL VALVE	SS316	9
5	High pressure point of use regulator at cylinder end (0-160 bar)	33 316	All required numbers.
6	Particle filter < 7um. ¼ inch connection	For Ar, CH ₄ , H ₂ , O ₂ , N ₂ , NO, NH ₃ , CO	10
7	Mass flow controller Units	NA	All required.
8	SS HIGH PRESSURE SS DOUBLE BRAIDED HOSE 1/4" OD ENDS		8 numbers

sl no	DESCRIPTION	SPECIFICATION	UNITS	TOTAL QTY
1	SS SEAMLESS TUBE 1/4" OD x 0.034" WT	SS 316 MOC & WT is 0.035 inch. Tubing shall have a minimum of 2.5% Molybdenum so as to ensure high resistance to corrosion. Tubing shall have carbon content < 0.030% & PREN (Pitting Resistance Equivalent Number) value should be 25 or more. Tubing hardness shall be max of HRB 80 & Tubing shall be dual certified as TP 316 / 316L. Also, tubing shall be clearly marked with heat code, lot code, outer diameter and wall thickness as in the inspection certificate. Tubes shall be certified as per NACE/ MR0175 for Hardness. Global certifications like ASTM A 269 Approved. Steel Making process should be electric furnace. 100% PMI test. Intergranular corrosion test acc to ASTM A-262 PR.E.	MTR	270
2	SS SEAMLESS TUBE 1/4" OD x 0.034" WT SC11 cleaned	OXY CLEANED SS 316 MOC & WT is 0.035 inch. Tubing shall have a minimum of 2.5% Molybdenum so as to ensure high resistance to corrosion. Tubing shall have carbon content < 0.030% & PREN (Pitting Resistance Equivalent Number) value should be 25 or more. Tubing hardness shall be max of HRB 80 & Tubing shall be dual certified as TP 316 / 316L. Also, tubing shall be clearly marked with heat code, lot code, outer diameter and wall thickness as in the inspection certificate. Tubes shall be certified as per NACE/ MR0175 for Hardness. Global certifications like ASTM A 269 Approved. Steel Making process should be electric furnace. 100% PMI test. Intergranular corrosion test acc to ASTM A-262 PR.	MTR	36
3	SS 1/4" OD UNION	All fitting components shall be roll stamped to identify manufacturer and material. Stainless Steel Tube Fittings made from bar stock (straight configurations) should meet ASTM A276 / ASME SA479 standards and those made from forgings (including elbows, crosses and tees) should meet ASTM A182 / ASME SA182 standards. Stainless Steel bar stock material from which fittings are made shall be restricted to a maximum carbon content of 0.05% to provide better weld ability and increased corrosion resistance. All metallic fittings shall have a gauge able shoulder. The gauge able shoulder will allow a Gap Inspection Gage to be inserted between the nut and shoulder. Should satisfy the requirements of ASTM F1387 Standards. The back ferrule shall have a machined recess on the inside diameter and shall have complete surface hardening to substantially reduce the required pull up torque. Chromium Percentage should be 17 or above for better corrosion resistance. Fittings should be dual certified for 316/316L. Note all the componnets supply should be under one brand except for tubing. All fittings should be covered under Life time warranty	NOS	55
4	SS 1/4" OD UNION SC11 cleaned	All fitting components shall be roll stamped to identify manufacturer and material. Stainless Steel Tube Fittings made from bar stock (straight configurations) should meet ASTM A276 / ASME SA479 standards and those made from forgings (including elbows, crosses and tees) should meet ASTM A182 / ASME SA182 standards. Stainless Steel bar stock material from which fittings are made shall be restricted to a maximum carbon content of 0.05% to provide better weld ability and increased corrosion resistance. All metallic fittings shall have a gauge able shoulder. The gauge able shoulder will allow a Gap Inspection Gage to be inserted between the nut and shoulder. Should satisfy the requirements of ASTM F1387 Standards. The back ferrule shall have a machined recess on the inside diameter and shall have complete surface hardening to substantially reduce the required pull up torque. Chromium Percentage should be 17 or above for better corrosion resistance. Fittings should be dual certified for 316/316L. Note all the componnets supply should be under one brand except for tubing. SC 11 CLEANED. LIFE TIME WARRANTY	NOS	6

5	SS 1/4" OD EQUAL TEE	All fitting components shall be roll stamped to identify manufacturer and material. Stainless Steel Tube Fittings made from bar stock (straight configurations) should meet ASTM A276 / ASME SA479 standards and those made from forgings (including elbows, crosses and tees) should meet ASTM A182 / ASME SA182 standards. Stainless Steel bar stock material from which fittings are made shall be restricted to a maximum carbon content of 0.05% to provide better weld ability and increased corrosion resistance. All metallic fittings shall have a gauge able shoulder. The gauge able shoulder will allow a Gap Inspection Gage to be inserted between the nut and shoulder. Should satisfy the requirements of ASTM F1387 Standards. The back ferrule shall have a machined recess on the inside diameter and shall have complete surface hardening to substantially reduce the required pull up torque. Chromium Percentage should be 17 or above for better corrosion resistance. Fittings should be dual certified for 316/316L. Note all the componnets supply should be under one brand except for tubing. LIFE TIME WARRANTY	NOS	2
6	SS 1/4" OD BALL VALVE	Stainless Steel 1-Piece Ball Valve, 0.6 Cv, 1/4 in. Tube Fitting end connections, Body material SS 316, Actuator type manual, standard cleaning & packaging process, Straight Flow pattren, 2 way ball valve, Lubricant Dow M111, Stainless Steel 1-Piece 40G Series Ball Valve, 0.6 Cv, 1/4 in. Swagelok Tube fitting, Orifice 0.125 in /3.2 mm, Modified PTFE Packing, Room Temperature Pressure Rating 2500 PSIG @ 100°F /172 BAR @ 37°C, Ring/Disc Material Stainless Steel, Handle Style lever, Life Time Warranty.	NOS	42
7	SS 1/4" OD NEEDLE VALVE SC11 cleaned	Integral-bonnet needle valve is factory tested with nitrogen at 1000 psig (69 bar). Seats have a maximum allowable leak rate of 0.1 std cm ³ /min. Cv value of the valve not lesser than 0.37. Needle valves should be cleaned and packaged in accordance with Special Cleaning. Room Temperature Pressure Rating 5000 PSIG @ 100°F /344 BAR @ 37°C. Handle Style Phenolic Knob. Lubricant Perf. Polyether/Tung. Disulfide (WL7), Material grade as per ASTM Specification. LIFE TIME WARRANTY	NOS	4
8	1/4" OD CHECK VALVE - NRV SC11 cleaned	Every check valve is factorytested for crack and reseal performance with a liquid leakdetector. Check valves are cycled six times prior to testing. Every valve is tested to ensure it seals within 5 sec at the appropriate reseal pressure. Stainless Steel Poppet 6000 psig (413 bar) Check Valve, 1/4 in. Swagelok Tube Fitting, 1 psig (0.07 bar). Room Temperature Pressure Rating 6000 PSIG @ 100°F /413 BAR @ 37°C. Valve material should be SS 316 MOC. Room Temperature Pressure Rating 6000 PSIG @ 100°F /413 BAR @ 37°C. Lubricant Christo-lube MCG 111 (WL8). Material grade as per ASTM specification. LIFE TIME WARRANTY	NOS	3
9	REDUCING TEE 1/4" OD x 1/8" x 1/4"	All fitting components shall be roll stamped to identify manufacturer and material. Stainless Steel Tube Fittings made from bar stock (straight configurations) should meet ASTM A276 / ASME SA479 standards and those made from forgings (including elbows, crosses and tees) should meet ASTM A182 / ASME SA182 standards. Stainless Steel bar stock material from which fittings are made shall be restricted to a maximum carbon content of 0.05% to provide better weld ability and increased corrosion resistance. All metallic fittings shall have a gauge able shoulder. The gauge able shoulder will allow a Gap Inspection Gage to be inserted between the nut and shoulder. Should satisfy the requirements of ASTM F1387 Standards. The back ferrule shall have a machined recess on the inside diameter and shall have complete surface hardening to substantially reduce the required pull up torque. Chromium Percentage should be 17 or above for better corrosion resistance. Fittings should be dual certified for 316/316L. Note all the componnets supply should be under one brand except for tubing. LIFE TIME WARRANTY	Nos	4
10	POINT OF USE REGULATOR - 0 TO 10 BAR	KPR Series regulator, 316 SS Body Material, Max Inlet Pressure: 17 bar, Outlet Range: 0 to 17.2 bar, 1/4 in FNPT I/L & O/L ports, PCTFE seat material, Cv: 0.06, Alloy X-750 diaphragm sensing mechanism, Captured vent, Knob handle. Every pressure regulator should be pressure tested with nitrogen. Pressure-reducing regulators should be inbuilt with 25 µm press fit filter. It can be removed to use the regulator in liquid service. LIFE TIME WARRANTY	Nos	7

11	POINT OF USE REGULATOR - 0 TO 10 BAR sc 11	KPR Series regulator, 316 SS, ASTM G93 Level E-cleaned Body Material, Max Inlet Pressure:17 bar, Outlet Range: 0 to 17.2 bar, 1/4 in FNPT I/L & O/L ports, PCTFE seat material, Cv: 0.02, Alloy X-750 diaphragm, sensing mechanism, No vent, Knob handle. Every pressure regulator should be pressure tested with nitrogen. Pressure-reducing regulators should be inbuilt with 25 µm press fit filter. It can be removed to use the regulator in liquid service. LIFE TIME WARRANTY	Nos	3
12	SS 316 FEMALE CONNECTOR 1/4"OD x 1/4" NPTF	All fitting components shall be roll stamped to identify manufacturer and material. Stainless Steel Tube Fittings made from bar stock (straight configurations) should meet ASTM A276 / ASME SA479 standards and those made from forgings (including elbows, crosses and tees) should meet ASTM A182 / ASME SA182 standards. Stainless Steel bar stock material from which fittings are made shall be restricted to a maximum carbon content of 0.05% to provide better weld ability and increased corrosion resistance. All metallic fittings shall have a gauge able shoulder. The gauge able shoulder will allow a Gap Inspection Gage to be inserted between the nut and shoulder. Should satisfy the requirements of ASTM F1387 Standards. The back ferrule shall have a machined recess on the inside diameter and shall have complete surface hardening to substantially reduce the required pull up torque. Chromium Percentage should be 17 or above for better corrosion resistance. Fittings should be dual certified for 316/316L. Note all the componnets supply should be under one brand except for tubing	Nos	9
13	SS 316 FEMALE CONNECTOR 1/4"OD x 1/4" NPTF - SC11 cleaned	All fitting components shall be roll stamped to identify manufacturer and material. Stainless Steel Tube Fittings made from bar stock (straight configurations) should meet ASTM A276 / ASME SA479 standards and those made from forgings (including elbows, crosses and tees) should meet ASTM A182 / ASME SA182 standards. Stainless Steel bar stock material from which fittings are made shall be restricted to a maximum carbon content of 0.05% to provide better weld ability and increased corrosion resistance. All metallic fittings shall have a gauge able shoulder. The gauge able shoulder will allow a Gap Inspection Gage to be inserted between the nut and shoulder. Should satisfy the requirements of ASTM F1387 Standards. The back ferrule shall have a machined recess on the inside diameter and shall have complete surface hardening to substantially reduce the required pull up torque. Chromium Percentage should be 17 or above for better corrosion resistance. Fittings should be dual certified for 316/316L. Note all the componnets supply should be under one brand except for tubing. SC 11 CLEANED	Nos	6
14	SS HIGH PRESSURE SS DOUBLE BRAIDED HOSE 1/4" OD ENDS	A multiple-layered flexible conduit through which fluid is conveyed from one point to another. Hose assembly is inboard helium leak tested to a maximum leak rate of 1×10^{-5} std cm ³ /s. End connections should be welded in accordance with ASME Boiler and Pressure Vessel Code Section IX. LIFE TIME WARRANTY	Nos	2
15	SS 316 MALE CONNECTOR 1/4" x 1/4" NPTF	All fitting components shall be roll stamped to identify manufacturer and material. Stainless Steel Tube Fittings made from bar stock (straight configurations) should meet ASTM A276 / ASME SA479 standards and those made from forgings (including elbows, crosses and tees) should meet ASTM A182 / ASME SA182 standards. Stainless Steel bar stock material from which fittings are made shall be restricted to a maximum carbon content of 0.05% to provide better weld ability and increased corrosion resistance. All metallic fittings shall have a gauge able shoulder. The gauge able shoulder will allow a Gap Inspection Gage to be inserted between the nut and shoulder. Should satisfy the requirements of ASTM F1387 Standards. The back ferrule shall have a machined recess on the inside diameter and shall have complete surface hardening to substantially reduce the required pull up torque. Chromium Percentage should be 17 or above for better corrosion resistance. Fittings should be dual certified for 316/316L. Note all the componnets supply should be under one brand except for tubing. LIFE TIME WARRANTY	Nos	16

16	SS 316 MALE CONNECTOR 1/4" x 1/4" NPTF SC11 cleaned	SC 11 CLEANED All fitting components shall be roll stamped to identify manufacturer and material. Stainless Steel Tube Fittings made from bar stock (straight configurations) should meet ASTM A276 / ASME SA479 standards and those made from forgings (including elbows, crosses and tees) should meet ASTM A182 / ASME SA182 standards. Stainless Steel bar stock material from which fittings are made shall be restricted to a maximum carbon content of 0.05% to provide better weld ability and increased corrosion resistance. All metallic fittings shall have a gauge able shoulder. The gauge able shoulder will allow a Gap Inspection Gage to be inserted between the nut and shoulder. Should satisfy the requirements of ASTM F1387 Standards. The back ferrule shall have a machined recess on the inside diameter and shall have complete surface hardening to substantially reduce the required pull up torque. Chromium Percentage should be 17 or above for better corrosion resistance. Fittings should be dual certified for 316/316L. Note all the componnets supply should be under one brand except for tubing. LIFE TIME WARRANTY	Nos	12
17	1/4" OD FERRUL SET	Body material SS 316 MOC, Cleaning process SC10, It Should be dual certified for both 316/316L, The back ferrule shall have a machined recess on the inside diameter and shall have complete surface hardening to substantially reduce the required pull up torque. Life Time Warranty	Nos	40

OTHER LABS				
S. no	DESCRIPTION		UNITS	TOTAL QTY
1	SS SEAMLESS TUBE 1/4" OD x 0.034" WT	SS 316 MOC & WT I s 0.035 inch.Tubing / 316L. Global certifications like ASTM A 269 Approved.. Intergranular corrosion test acc to ASTM A-262 PR.E LIFE TIME WARRANTY	MTR	300
3	SS 1/4" OD UNION	SS 316 – HIGH PRESSURE FITTINGS RANGE FROM 0 TO 150BAR ISO 9001-2008 Certified Company by TUV NORD. LIFE TIME WARRANTY	NOS	50
5	SS 1/4" OD EQUAL TEE	SS 316 – HIGH PRESSURE FITTINGS RANGE FROM 0 TO 150BAR ISO 9001-2008 Certified Company by TUV NORD. LIFE TIME WARRANTY	NOS	10
6	SS 1/4" OD BALL VALVE	SS 316 – HIGH PRESSURE FITTINGS RANGE FROM 0 TO 150BAR ISO 9001-2008 Certified Company by TUV NORD.. LIFE TIME WARRANTY	NOS	30
8	1/4" OD CHECK VALVE - NRV	SS 316 – HIGH PRESSURE FITTINGS RANGE FROM 0 TO 150BAR ISO 9001-2008 Certified Company by TUV NORD. LIFE TIME WARRANTY	NOS	12

12	POINT OF USE REGULATOR - 0 TO 10 BAR	SS 316 – HIGH PRESSURE FITTINGS RANGE FROM 0 TO 150BAR ISO 9001-2008 Certified Company by TUV NORD. LIFE TIME WARRANTY	Nos	3
14	SS 316 FEMALE CONNECTOR 1/4"OD x 1/4" NPTF -	SS 316 – HIGH PRESSURE FITTINGS RANGE FROM 0 TO 150BAR ISO 9001-2008 Certified Company by TUV NORD. LIFE TIME WARRANTY	Nos	6
15	SS HIGH PRESSURE SS DOUBLE BRAIDED HOSE 1/4" OD ENDS	SS 316 – HIGH PRESSURE FITTINGS RANGE FROM 0 TO 150BAR ISO 9001-2008 Certified Company by TUV NORD. LIFE TIME WARRANTY	Nos	8
17	SS 316 MALE CONNECTOR 1/4" x 1/4" NPTF	SS 316 – HIGH PRESSURE FITTINGS RANGE FROM 0 TO 150BAR ISO 9001-2008 Certified Company by TUV NORD. LIFE TIME WARRANTY	Nos	24
20	LINE PRESSURE GAUGE - 0 TO 10 BAR	WIKA – GAUGE – SS 304 WITH ¼" MALE ENDS	Nos	1
21	1/4" OD PVC STUFF CLAMPS WITH SUPPORTS	1/4" OD PVC STUFF CLAMPS	Nos	450
22	1/8" OD FERRUL SET	SS 316 NUT & FERRUL (FRONT& BACK)	Nos	30
23	SS 304 SHEET PANEL - 7FT x 7FT	SS 304 PANEL	Nos	1
24	BULL NOSE WITH NUT	BRASS CYINDER BULL NOSE	Nos	15
25	CYLINDER BRACKET	AS PER DRAWING	Nos	30
26	SS WALL MOUNTING PANEL FOR REGULATORS	SS 304 PANEL FOR BREGULATORS	Nos	25
27	CYLINDER YARD MS STURCTURE WITH ROOF	MS STRUCTURE – FOR CYLINDER YARD	Nos	2

2. Specifications:

1. All valves and fittings used in the Assembly should be International Standard stainless steel valves and fittings.
2. All NPT connections should be made using PTFE tape.
3. Drilling on the brick walls is not possible. Hence the supplier should plan to take support from the concrete beams/pillars/working tables.

3. Testing

The assembly should be pressure tested with Argon at Inlet pressure of 34.4 bar for duration of 24 hrs.

4. Cleaning / Processing

SC-10 (International Standard Standard Cleaning) or SC-11 (International Standard Special Cleaning) should be provided prior to assembly for all individual manufactured components.

5. Shipping and Handling

- All the items should be shipped to the Customer site at Shivanapur with appropriate packaging to protect from damage during transport.
- The existing gas mixing panel with gas sensing and vacuum unit (In CeNS, Jalahalli campus) should be modified as per the diagram "1".

6. DESIGN CONCEPT OF PROJECT

The current document will explain the design intent and approach for the overall implementation of the project for the subject work.

1. Precautions for Pure Oxygen gas

For Pure Oxygen gas, due precautions should be taken care while designing the pipe routing, selection of MOC, flow velocity (should not be more than 6 to 8 m/sec).

2. Precautions for Inert gases Gas

As the facility uses gases viz. Nitrogen, Argon and other gases, utmost care needs to be taken during installation, testing and commissioning stage to maintain the cleanliness and good installation procedures.

Gas Purifiers are recommended for Nitrogen, Argon and Helium gases to take care of impurities like H₂O, O₂, CO, CO₂ and NMHC below 1 ppm. Bidders should quote purifiers as optional.

3. Colour Coded labels for Gas lines:

The colour coded labels must be installed on each gas lines for identification. The gas line labels has to be done at every 6 mtrs of straight length and at every bend, tee and valve locations on the main / branch header.

7. ADDITIONAL SCOPE OF WORK:

Apart from the scope of work detailed as above, the vendor should also take care of the following:

1. Fabrication and fixing of necessary tubesupports
2. All incidental jobs connected with installation of tubing / piping such as cutting & casing in concrete and brick - work, drilling holes through walls, floors and making good the opening thus made for fixing pipe supports.
3. Co-operation with other agencies to ensure smooth implementation of the project. Due approval should be taken from the customer wherever necessary.
4. The vendor should repair of all damages that might be caused to the premises while execution of the subject contract during installation / erection / testing. Removal of all debris left by the vendor to the satisfaction of the customer.
5. Cleaning of all the completed tubing / piping work.
6. Arrange to bring to site any instruments / tools at vendor's cost, which will be necessary to establish satisfactory performance of the system, as a whole.
7. The vendor will ensure that the job executed conforms to the relevant Indian / International standards.

8. Misc:

1. The assembly must be installed by an OEM or its channel partner. The personnel conducting the installation should be formally certified by OEM and should have relevant certification. A copy of certification should be produced when requested.
2. Vendor should have local presence and conduct all the assembling activity at their facility in Bangalore.
3. Vendor should maintain substantial inventory of offered tubing's and 60% of the offered components.
4. Vendor should be available at customer premise to address any issue/ concern within 8 working hours.
5. Vendor should be able to provide CAD drawing for the complete assembly for our approval further to order placement. Assembling activity should begin further to receipt of our approval.
6. Vendor should provide limited life time warranty against manufacturing defects for material and workmanship for components and installation.
7. Vendor must have a very broad experience in the fabrication of high precision and high end gas handling units. They must have a history of supplying such high end instruments in various prestigious research institutions and companies such as IITs, IISc, NITs, IISER, etc
8. The MFCs will be provided from our end to the gas manifold manufacturing company, who gets the tender, while assembling the mentioned gas manifold unit.
9. The vendor shall have the ability to conduct Leak Audits and a record of having completed more than 30 audits in the previous 12-month period.
10. All the assembling activity should be as per ISO 9001 standards.
11. The vendor should also co-ordinate with the gas sensing chamber supplier (identified by us) for final integration of the gas manifold with the chamber and testing.