



An ISO 9001
Company

Bharat Heavy Electricals Limited

(High Pressure Boiler Plant)

Tiruchirapalli – 620014, TAMIL NADU, INDIA

CAPITAL EQUIPMENT / MATERIALS MANAGEMENT

ENQUIRY

NOTICE INVITING TENDER

Phone: +91 431 257 74 21

Email : ykaruna@bhel.in

spsy@bhel.in

Web : www.bhel.com

TWO PART BID

Tender to be submitted in two Parts

Enquiry
Number:

2601900013

Enquiry
Date:

13.04.2019

Due date for submission
of quotation:

10.05.2019

You are requested to quote the Enquiry number date and due date in all your correspondence. This is only a request for quotation and not an order.

Please note that under any circumstances both delayed offer and late offers will not be considered. Hence vendors are requested to ensure that the offer should reach physically on or before 14.00 Hrs(IST) on the Date of tender opening. Tenders received after 14.00Hrs (IST) will not be considered for evaluation.

Item	Description	Quantity	(Indigenous Vendors) Matl. Will be Delivered to
10	Gas Manifold System for Industrial Gases. conditions applicable(To be downloaded from web site www.bhel.com or http://tenders.gov.in)	1.00 Set.	FOR, BHEL, Stores, High Pressure Boiler Plant, Tiruchirappalli - 620014

Important points to be taken care during submission of offer

- 1) Material shall be delivered to (By Indigenous vendors): As stated above.
- 2) By Foreign Vendors: CFR Chennai Seaport / Airport
- 3) Delivery required 2 Months (including PDI) from the date of purchase order.
- 4) Erection & Commissioning period required 3 Weeks from the date of intimation by BHEL to vendor for deputation of their Engineers for E&C.
- 5) EMD for this Tender will be (INR): 1,00,000.00
- 6) Compliance Forms. TRY/IMP/02 & TRY/IND/02A to be filled and enclosed along with the offer failing which, the offer will not be considered for evaluation.
- 7) All updates, amendments, corrigenda, etc., (if any), for each tender will be posted only on the above websites from time to time, as and when required, until each tender is opened. There will be no publication of such updates, amendments, corrigenda, etc., through newspapers or any other media.

BHEL's General guidelines / instructions (refer MM / CE / GENL / GENL / 001 - EMD) including bank guarantee formats and list of consortium banks, commercial terms check-list can be downloaded from BHEL web site www.bhel.com/tender/tender_home.php or from the Government tender website <https://eprocure.gov.in/epublish/app>) under Enquiry reference .

Tenders should be submitted before 14.00Hrs (IST) on the due date
Tenders will be opened at 14:30 hours on the due date
Tenders would be opened in presence of the tenderers who have submitted their offers and who may like to be present.

Yours faithfully,
For **BHARAT HEAVY ELECTRICALS LIMITED**

DGM / Capital Equipment / MM

S.PARTHASARATHY
MANAGER
CAPITAL EQUIPMENT / MM
BHEL, TRICHY-620014

GAS MANIFOLD SYSTEM FOR INDUSTRIAL GASES

PART A

QUALIFYING CRITERIA FOR THE SUPPLY OF 'GAS MANIFOLD SYSTEM'

SECTION – I

The BIDDER is expected to give complete details against each clause in the table given below and wherever necessary, an additional sheet may be attached (giving clear reference number) to cover the required details.

S. No.	PARTICULARS	VENDOR's RESPONSE
1.0	Number of Years of Experience of the BIDDER in the field of design, construction and supply of 'GAS MANIFOLD SYSTEM' for fabrication industries for welding	
2.0	Number of 'Gas Manifold Systems' installed and commissioned for supply of industrial gases	
3.0	Details on International Standards followed in Design, Fabrication and Testing of the System quoted	
4.0	Comprehensive Details on the Performance Testing that shall be carried out on the pressure regulators, wall mounting, tubes, etc., to be furnished with the Technical Offer.	
5.0	Details on SERVICE-AFTER-SALES Set-Up in India including the Addresses of Agents / Service Centres in India, to be furnished compulsorily.	
7.0	BIDDER to indicate the Country of Origin for the major components like pressure regulators, wall mounting, flash back arrester, gas mixing unit, etc.	

SECTION – II

The BIDDER has to compulsorily meet the following requirements to get qualified for submitting an offer for the 'Gas Manifold System for Industrial Gases'

S. No.	REQUIREMENTS	VENDOR's COMMENTS
8.0	The BIDDER shall have a minimum of FIVE Years of Continuous Experience in the Design, Manufacture, Installation & Commissioning of the Gas Manifold System for supply of Industrial Gases for Production/R&D. Supporting documents like PO copies/commissioning report, etc. to be attached with the offer	
9.0	The BIDDER should have commissioned	

GAS MANIFOLD SYSTEM FOR INDUSTRIAL GASES

	atleast two Gas Manifold Systems for supply of atleast two or more industrial gases as single or in combination to Customers in India or abroad. Details of the gas manifold system like the type of gases, etc. to be mentioned in the offer. Also, indicate the number of such machines sold in India.	
10.0	Reference of the Customer and Performance Certificate with full contact details of CONTACT PERSON, who are the End Users of the system (given under Clause No.9.0) of 'Gas Manifold System'	
11.0	BHEL reserves the right to verify the information provided by vendor. In case the information provided by vendor is found to be false/ incorrect, the offer shall be rejected.	

SECTION – III

The BIDDER has to comply with the following, for accepting the Technical Offer for scrutiny by the Purchaser:

S.No.	REQUIREMENTS	VENDOR's COMPLIANCE
12.0	The BIDDER shall submit the offer in TWO PARTS - Technical [with PART A & PART B] & Commercial and Price Bid.	
13.0	The Offer shall contain a comparative statement of Technical Specifications given by BHEL and the Offer Details submitted by the Bidder, against each clause. A just 'CONFIRMED' or 'COMPLIES' or 'YES' or 'NO-DEVIATION' or similar words in the technical comparative statement may lead to disqualification of the Technical Offer.	

S.No.	REQUIREMENTS	VENDOR's COMPLIANCE
14.0	The BIDDER shall assure a continuous support for SPARES and SERVICE for TEN Years, from the date of commissioning of the manifold system at BHEL Works.	
15.0	The Technical Offer shall be supported by Product Catalogue and Data Sheets in ORIGINAL and complete technical details	

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	/ literature on the QUOTED MODELS of Pressure regulators, valves, gas mixing unit, etc.	
16.0	The Commercial Offer (given with the Technical Offer) shall contain the Scope of Supply and the Un-Priced Part of the Price-Bid, for confirmation for the scope of supply.	
17.0	Earlier performance & field experience (service support) with BHEL (if any) will be a reckoning factor for the technical qualification of the OFFER.	

PART B**TECHNICAL SPECIFICATIONS FOR 'GAS MANIFOLD SYSTEMS FOR INDUSTRIAL GASES'**

AA. APPLICATION :			
Sl.No.	FEATURES /BHEL SPECIFICATION	OFFER BY BIDDER	DEVIATIONS
AA.1	The offered gas manifold systems shall be capable of supplying high purity industrial gases for laser materials processing stations, plasma arc welding station, transmission electron microscopy & its sample preparation station, scanning electron microscopy without any leakage. • One gas manifold system for supply of gases like Argon, Helium, Nitrogen, Oxygen and Carbon di oxide for materials processing like welding, hardening, cladding, etc. • One gas manifold system for supply of gases like Argon, Nitrogen, Oxygen and inflammable gases like Hydrogen and P10		
BB. GAS MANIFOLD 1 : [The scope of supply shall consist of the following]			
Sl.No.	FEATURES /BHEL SPECIFICATION	OFFER BY BIDDER	DEVIATIONS
BB.1	2 x 2 cylinders' manifolds for each gas of Ar, N ₂ , CO ₂ , O ₂ and 2 x 1 cylinders' manifold for He with the required accessories for supply of gases to materials processing station. The material of construction shall be SS 316L/316		
BB.2.	Manifold header with provisions to connect 2 cylinders each		
BB.3	High pressure cylinder isolation valves or non-return valve		
BB.4	High pressure cylinder hose for connecting each cylinder		
BB.5	Cylinder end check valves		
BB.6	Bank isolation valves		
BB.7	Bank pressure gauges		
BB.8	Safety valves		
BB.9	Middle and top frames for securing the cylinders individually		
BB.10	Tubing of SS 316/316L from a reputed supplier for required length and orbital TIG welded connections		

BB.11	Line isolation valves with integral fine filter		
BB.10	Wall mounting made of SS 316 with line pressure regulator, dial gauge, flow meter (0-40 lpm)		
BB.10	SS braided hoses for connections from wall mounting		
BB.11	Flash back arrestor for O ₂		

CC. SPECIFICATION : GAS MANIFOLD 1

Sl.No.	FEATURES	BHEL SPECIFICATION	OFFER BY BIDDER	DEVIATIONS
CC.1	Argon	2 x 2 cylinders' manifold with semiautomatic changeover system with built-in annunciation system, check valve, etc. The material of construction shall be SS 316/316L.	Vendor to confirm	
		Manifold header with provisions to connect cylinders – each 2 Nos.	Vendor to confirm	
		316/316L stainless steel tubing internally electro polished and of required dimensions (diameter and wall thickness) to maintain the pressure of 0-6 bar and flow rate of 0-40 lpm at the user end. Dimensions of the tubes to be clearly mentioned in the offer. Approximate length of the tubing shall be 40 m. Offer shall be preferably for every 4 m of length. If the offer is made for other length, it is to be clearly mentioned.	Vendor to specify and confirm	
		The SS tubes/pipes used shall be from a reputed supplier and the tube supplier TC to be attached	Vendor to confirm & comply	
		The tubes shall be completely orbital welded	Vendor to confirm	
		High pressure cylinder connecting hoses – 4 Nos	Vendor to confirm	
		Cylinder end check valves made of SS 316/316L – 6 Nos	Vendor to confirm	
		Bank isolation valves made of SS 316/316L – 2 Nos	Vendor to confirm	
		Bank pressure gauges made of stainless steel meeting the relevant ISO standards like ISO 5171 or equivalent – 2 Nos	Vendor to confirm	

		Integral safety relief valves made of SS 316/316L – 2 Nos	Vendor to confirm		
		Line isolation valve made of SS 316/316L with integral 20 µm particulate filter – 2 Nos	Vendor to confirm		
		Frames to hold every cylinder at the middle and top made of non-corrosive material of sufficient strength	Vendor to confirm		
		User end – Wall mounting made of SS 316 with line pressure regulator, dial gauge and flow meter (0-40 lpm (min)) – 3 sets	Vendor to confirm		
		One line pressure gauge (0-15 bar)	Vendor to confirm		
		The leak test on the line shall be carried out using snoop solution at all joints and randomly on the tubing to ensure the line to be leak proof	Vendor to confirm & comply		
		SS braided hoses with PTFE annular convoluted core with SS fitting assemblies for end point connection (wherever required)	Vendor to confirm		
		Legris flexible hoses of required dimensions to maintain the pressure and flow and push fit connectors, as required. Approximate length of tubing required shall be	Vendor to confirm		
		The international standards followed for manifolds, piping/tubing to be mentioned clearly	Vendor to specify		
CC.2.	Nitrogen	2 x 2 cylinders' manifold with semiautomatic changeover system with built-in annunciation system, check valve, etc. The material of construction shall be SS 316/316L.	Vendor to confirm		
		Manifold header with provisions to connect cylinders – each 2 Nos.	Vendor to confirm		

316/316L stainless steel tubing internally electro polished and of required dimensions (diameter and wall thickness) to maintain the pressure of 0-6 bar and flow rate of 0-40 lpm at the user end. Dimensions of the tubes to be clearly mentioned in the offer. Approximate length of the tubing shall be 40 m. Offer shall be preferably for every 4 m of length. If the offer is made for other length, it is to be clearly mentioned.	Vendor to specify and confirm
The SS tubes/pipes used shall be from a reputed supplier and the tube supplier TC to be attached	Vendor to confirm & comply
The tubes shall be completely orbital welded	Vendor to confirm
High pressure cylinder connecting hoses – 4 Nos	Vendor to confirm
Cylinder end check valves made of SS 316/316L – 6 Nos	Vendor to confirm
Bank isolation valves made of SS 316/316L – 2 Nos	Vendor to confirm
Bank pressure gauges made of stainless steel meeting the relevant ISO standards like ISO 5171 or equivalent – 2 Nos	Vendor to confirm
Integral safety relief valves made of SS 316/316L – 2 Nos	Vendor to confirm
Line isolation valve made of SS 316/316L with integral 20 µm particulate filter – 2 Nos	Vendor to confirm
Frames to hold each cylinder at the middle and top made of non-corrosive material of sufficient strength	Vendor to confirm
User end – Wall mounting made of SS 316/316L with line pressure regulator, dial gauge and flow meter (0-40 lpm (min)) – 3 sets	Vendor to confirm
One line pressure gauge (0-15 bar)	Vendor to confirm
The leak test on the line shall be carried out using snoop solution at all joints and randomly on the tubing to ensure the line to be leak proof	Vendor to confirm

		SS braided hoses with PTFE annular convoluted core with SS fitting assemblies for end point connection (wherever required)	Vendor to confirm		
		Legris flexible hoses of required dimensions to maintain the pressure and flow and push fit connectors, as required	Vendor to confirm		
		The international standards followed for manifolds, piping/tubing, to be mentioned clearly	Vendor to specify		
CC.3	Helium	2 x 1 cylinders' manifold with semiautomatic changeover system with built-in annunciation system, check valve, etc. The material of construction shall be SS 316/316L.	Vendor to confirm		
		Manifold header with provisions to connect cylinders – each 2 Nos.	Vendor to confirm		
		316/316L stainless steel tubing internally electro polished and of required dimensions (diameter and wall thickness) to maintain the pressure of 0-6 bar and flow rate of 0-40 lpm at the user end. Dimensions of the tubes to be clearly mentioned in the offer. Approximate length of the tubing shall be 40 m. Offer shall be preferably for every 4 m of length. If the offer is made for other length, it is to be clearly mentioned.	Vendor to specify and confirm		
		The SS tubes/pipes used shall be from a reputed supplier and the tube supplier TC to be attached	Vendor to confirm & comply		
		The tubes shall be completely orbital welded	Vendor to confirm		
		High pressure cylinder connecting hoses – 2 Nos	Vendor to confirm		
		Cylinder end check valves made of SS 316/316L – 2 Nos	Vendor to confirm		
		Bank isolation valves made of SS 316/316L– 2 Nos	Vendor to confirm		
		Bank pressure gauges made of stainless steel meeting the relevant ISO standards like ISO 5171 or equivalent – 2 Nos	Vendor to confirm		

		Integral safety relief valves made of SS 316/316L – 2 Nos	Vendor to confirm		
		Line isolation valve made of SS 316/316L with integral 20 µm particulate filter – 2 Nos	Vendor to confirm		
		Frames to hold the cylinders at the middle and top made of non-corrosive material of sufficient strength	Vendor to confirm		
		User end – Wall mounting made of SS 316 with line pressure regulator, dial gauge and flow meter (0-40 lpm (min)) – 2 set	Vendor to confirm		
		One line pressure gauge (0-15 bar)	Vendor to confirm		
		Leak test - The leak test on the line shall be carried out using N ₂ + He mixture AND snoop solution at all joints and randomly on the tubing to ensure the line to be leak proof	Vendor to confirm & comply		
		SS braided hoses with PTFE annular convoluted core with SS fitting assemblies for end point connection (wherever required)	Vendor to confirm		
		Legris flexible hoses of required dimensions to maintain the pressure and flow and push fit connectors, as required	Vendor to confirm		
		The international standards followed for manifolds, piping/tubing, to be mentioned clearly	Vendor to specify		
CC.4.	Carbon-di-oxide (CO₂)	2 x 2 cylinders' manifold with semiautomatic changeover system with built-in annunciation system, check valve, etc. The material of construction shall be SS 316/316L.	Vendor to confirm		
		Manifold header with provisions to connect cylinders – each 2 Nos.	Vendor to confirm		

316/316L stainless steel tubing internally electro polished and of required dimensions (diameter and wall thickness) to maintain the pressure of 0-6 bar and flow rate of 0-40 lpm at the user end. Dimensions of the tubes to be clearly mentioned in the offer. Approximate length of the tubing shall be 40 m. Offer shall be preferably for every 4 m of length. If the offer is made for other length, it is to be clearly mentioned.	Vendor to specify and confirm		
The SS tubes/pipes used shall be from a reputed supplier and the tube supplier TC to be attached	Vendor to confirm & comply		
The tubes shall be completely orbital welded	Vendor to confirm		
High pressure cylinder connecting hoses – 4 Nos	Vendor to confirm		
Cylinder end check valves made of SS 316/316L – 6 Nos	Vendor to confirm		
Bank isolation valves made of SS 316/316L – 2 Nos	Vendor to confirm		
Bank pressure gauges made of stainless steel meeting the relevant ISO standards like ISO 5171 or equivalent – 2 Nos	Vendor to confirm		
Integral safety relief valves made of SS 316/316L – 2 Nos	Vendor to confirm		
Line isolation valve made of SS 316/316L with integral 20 µm particulate filter – 2 Nos	Vendor to confirm		
Frames to hold the cylinders at the middle and top made of non-corrosive material of sufficient strength	Vendor to confirm		
User end – Wall mounting made of SS 316 with line pressure regulator, dial gauge and flow meter (0-40 lpm (min)) – 2 set	Vendor to confirm		
One line pressure gauge (0-15 bar)	Vendor to confirm		
Leak test - The leak test on the line shall be carried out using snoop solution at all joints and randomly on the tubing to ensure the line to be leak proof	Vendor to confirm & comply		

		SS braided hoses with PTFE annular convoluted core with SS fitting assemblies for end point connection (wherever required)	Vendor to confirm		
		Legris flexible hoses of required dimensions to maintain the pressure and flow and push fit connectors, as required	Vendor to confirm		
		The international standards followed for manifolds, piping/tubing, to be mentioned clearly	Vendor to specify		
CC.5.	Oxygen (O₂)	2 x 2 cylinders' manifold with semiautomatic changeover system with built-in annunciation system, check valve, etc. The material of construction shall be SS 316/316L.	Vendor to confirm		
		Manifold header with provisions to connect cylinders – each 2 Nos.	Vendor to confirm		
		316/316L stainless steel tubing internally electro polished and of required dimensions (diameter and wall thickness) to maintain the pressure of 0-6 bar and flow rate of 0-40 lpm at the user end. Dimensions of the tubes to be clearly mentioned in the offer. Approximate length of the tubing shall be 40 m. Offer shall be preferably for every 4 m of length. If the offer is made for other length, it is to be clearly mentioned.	Vendor to specify and confirm		
		The SS tubes/pipes used shall be from a reputed supplier and the tube supplier TC to be attached	Vendor to confirm & comply		
		The tubes shall be completely orbital welded	Vendor to confirm		
		High pressure cylinder connecting hoses – 4 Nos	Vendor to confirm		
		Cylinder end check valves made of SS 316/316L – 6 Nos	Vendor to confirm		
		Bank isolation valves made of SS 316/316L– 2 Nos	Vendor to confirm		
		Bank pressure gauges made of stainless steel meeting the relevant ISO standards like ISO 5171 or equivalent – 2 Nos	Vendor to confirm		

	Integral safety relief valves made of SS 316/316L – 2 Nos	Vendor to confirm	
	Line isolation valve made of SS 316/316L with integral 20 µm particulate filter – 2 Nos	Vendor to confirm	
	Frames to hold the cylinders at the middle and top made of non-corrosive material of sufficient strength	Vendor to confirm	
	User end – Wall mounting made of SS 316 with line pressure regulator, dial gauge and flow meter (0-40 lpm (min)) – 2 set	Vendor to confirm	
	One line pressure gauge (0-15 bar)	Vendor to confirm	
	Leak test - The leak test on the line shall be carried out using snoop solution at all joints and randomly on the tubing to ensure the line to be leak proof	Vendor to confirm	
	SS braided hoses with PTFE annular convoluted core with SS fitting assemblies for end point connection (wherever required)	Vendor to confirm	
	Legris flexible hoses of required dimensions to maintain the pressure and flow and push fit connectors, as required	Vendor to confirm	
	The international standards followed for manifolds, piping/tubing, to be mentioned clearly	Vendor to specify	

DD. Gas Manifold 2 - Ultra High Purity Gases for Lab [The scope of supply shall consist of the following]				
Sl.No.	FEATURES	BHEL SPECIFICATION	OFFER BY BIDDER	DEVIATIONS
DD.1.	2 x 1 cylinders manifolds for each gas of Ar, N ₂ and 1x1 cylinder manifold for P10, H ₂ , O ₂ with the required accessories for supply of ultra-high purity gases for electron microscopes			
DD.2.	Manifold header with provisions to connect 2 cylinders each for Argon and N ₂ and rest three gases with single cylinder			
DD.3.	High pressure cylinder isolation valves made of SS 316L/316			

PART-B: GAS MANIFOLD SYSTEMS FOR INDUSTRIAL GASES

DD.4.	High pressure cylinder hose for connecting each cylinder		
DD.5.	Cylinder end check valves made of SS 316L/316		
DD.6.	Bank isolation valves for Argon and N ₂ made of SS 316L/316		
DD.7.	Bank pressure gauges made of SS 316L/316		
DD.8.	Safety valves made of SS 316L/316		
DD.9.	Middle and top frames for securing the cylinders individually		
DD.10.	Tubing of SS 316/316L from a reputed supplier for required length and orbital TIG welded connections		
DD.11.	Line isolation valves with integral fine filter made of SS 316L/316		
DD.12.	Wall mounting made of SS 316 with line pressure regulator, dial gauge, flow meter (0-40 lpm)		
DD.13.	SS braided hoses for connections from wall mounting		
DD.14.	Flash back arrestor for H ₂ , P10 & O ₂		

EE. SPECIFICATION: GAS MANIFOLD 2

Sl.No.	FEATURES	BHEL SPECIFICATION		OFFER BY BIDDER	DEVIATIONS
EE.1.	Argon	2 x 1 cylinders' manifold with semiautomatic changeover system with built-in annunciation system, check valve, etc. The material of construction shall be SS 316/316L.	Vendor to confirm		
		Manifold header with provisions to connect cylinders – each 2 Nos.	Vendor to confirm		

316/316L stainless steel tubing internally electro polished and of required dimensions (diameter and wall thickness) to maintain the pressure of 0-6 bar and flow rate of 0-40 lpm at the user end. Dimensions of the tubes to be clearly mentioned in the offer. Approximate length of the tubing shall be 60 m. Offer shall be preferably for every 4 m of length. If the offer is made for other length, it is to be clearly mentioned.	Vendor to specify and confirm
The SS tubes/pipes used shall be from a reputed supplier and the tube supplier TC to be attached	Vendor to confirm & comply
The tubes shall be completely orbital welded	Vendor to confirm
High pressure cylinder connecting hoses – 2 Nos	Vendor to confirm
Cylinder end check valves made of SS 316/316L – 2 Nos	Vendor to confirm
Bank isolation valves made of SS 316/316L–2 Nos	Vendor to confirm
Bank pressure gauges made of stainless steel meeting the relevant ISO standards like ISO 5171 or equivalent – 2 Nos	Vendor to confirm
Integral safety relief valves made of SS 316/316L – 2 Nos	Vendor to confirm
Line isolation valve made of SS 316/316L with integral 20 µm particulate filter – 2 Nos	Vendor to confirm
Frames to hold the cylinders at the middle and top made of non-corroding material of sufficient strength	Vendor to confirm
User end – Wall mounting made of SS 316 with line pressure regulator, dial gauge and flow meter (0-40 lpm (min)) – 1 set	Vendor to confirm
One line pressure gauge (0-15 bar)	Vendor to confirm
The leak test on the line shall be carried out using snoop solution at all joints and randomly on the tubing to ensure the line to be leak proof	Vendor to confirm & comply

		SS braided hoses with PTFE annular convoluted core with SS fitting assemblies for end point connection (wherever required)	Vendor to confirm		
		Legris flexible hoses of required dimensions to maintain the pressure and flow and push fit connectors, as required.	Vendor to confirm		
		The international standards followed for manifolds, piping/tubing, to be mentioned clearly	Vendor to specify		
EE.2	Nitrogen	2 x 1 cylinders' manifold with semiautomatic changeover system with built-in annunciation system, check valve, etc. The material of construction shall be SS 316/316L.	Vendor to confirm		
		Manifold header with provisions to connect cylinders – each 2 Nos.	Vendor to confirm		
		316/316L stainless steel tubing internally electro polished and of required dimensions (diameter and wall thickness) to maintain the pressure of 0-6 bar and flow rate of 0-40 lpm at the user end. Dimensions of the tubes to be clearly mentioned in the offer. Approximate length of the tubing shall be 60 m. Offer shall be preferably for every 4 m of length. If the offer is made for other length, it is to be clearly mentioned.	Vendor to specify and confirm		
		The SS tubes/pipes used shall be from a reputed supplier and the tube supplier TC to be attached	Vendor to confirm & comply		
		The tubes shall be completely orbital welded	Vendor to confirm		
		High pressure cylinder connecting hoses – 2 Nos	Vendor to confirm		
		Cylinder end check valves made of SS 316/316L – 2 Nos	Vendor to confirm		
		Bank isolation valves made of SS 316/316L–2 Nos	Vendor to confirm		
		Bank pressure gauges made of stainless steel meeting the relevant ISO standards like ISO 5171 or equivalent – 2 Nos	Vendor to confirm		

		Integral safety relief valves made of SS 316/316L – 2 Nos	Vendor to confirm		
		Line isolation valve made of SS 316/316L with integral 20 µm particulate filter – 2 Nos	Vendor to confirm		
		Frames to hold the cylinders at the middle and top made of non-corroding material of sufficient strength	Vendor to confirm		
		User end – Wall mounting made of SS 316 with line pressure regulator, dial gauge and flow meter (0-40 lpm (min)) – 3 set	Vendor to confirm		
		One line pressure gauge (0-15 bar)	Vendor to confirm		
		The leak test on the line shall be carried out using snoop solution at all joints and randomly on the tubing to ensure the line to be leak proof	Vendor to confirm & comply		
		SS braided hoses with PTFE annular convoluted core with SS fitting assemblies for end point connection (wherever required)	Vendor to confirm		
		Legris flexible hoses of required dimensions to maintain the pressure and flow and push fit connectors, as required.	Vendor to confirm		
		The international standards followed for manifolds, piping/tubing, to be mentioned clearly	Vendor to specify		
EE.3	P10	1 x 1 cylinders' manifold with built-in annunciation system, check valve, etc. The material of construction shall be SS 316/316L.	Vendor to confirm		
		Manifold header with provisions to connect cylinder – 1 No.	Vendor to confirm		

316/316L stainless steel tubing internally electro polished and of required dimensions (diameter and wall thickness) to maintain the pressure of 0-6 bar and flow rate of 0-30 lpm at the user end. Dimensions of the tubes to be clearly mentioned in the offer. Approximate length of the tubing shall be 60 m. Offer shall be preferably for every 4 m of length. If the offer is made for other length, it is to be clearly mentioned.	Vendor to specify and confirm
The SS tubes/pipes used shall be from a reputed supplier and the tube supplier TC to be attached	Vendor to confirm & comply
The tubes shall be completely orbital welded	Vendor to confirm
High pressure cylinder connecting hoses – 1 No	Vendor to confirm
Cylinder end check valves made of SS 316/316L – 1 No	Vendor to confirm
Bank pressure gauge made of stainless steel meeting the relevant ISO standards like ISO 5171 or equivalent – 1 No	Vendor to confirm
Safety accessories pertaining to flammable gases.	Vendor to specify
Line isolation valve made of SS 316/316L with integral 20 µm particulate filter – 1 No.	Vendor to confirm
Frames to hold the cylinder at the middle and top made of non-corroding material of sufficient strength	Vendor to confirm
User end – Wall mounting made of SS 316 with line pressure regulator, dial gauge and flow meter (0-30 lpm (min)) – 1 set	Vendor to confirm
One line pressure gauge (0-15 bar)	Vendor to confirm
Leak test - The leak test on the line shall be carried out using N ₂ + He mixture and snoop solution at all joints and randomly on the tubing to ensure the line to be leak proof	Vendor to confirm & comply
SS braided hoses with PTFE annular convoluted core with SS fitting assemblies for end point connection (wherever required)	Vendor to confirm

		Legris flexible hoses of required dimensions to maintain the pressure and flow and push fit connectors, as required	Vendor to confirm		
		All other safety accessories required shall be clearly mentioned and offered	Vendor to confirm		
		The international standards followed for manifolds, piping/tubing, to be mentioned clearly	Vendor to specify		
EE.4	Hydrogen	1 x 1 cylinders' manifold with built-in annunciation system, check valve, etc. The material of construction shall be SS 316/316L.	Vendor to confirm		
		Manifold header with provisions to connect cylinder – 1 No.	Vendor to confirm		
		316/316L stainless steel tubing internally electro polished and of required dimensions (diameter and wall thickness) to maintain the pressure of 0-6 bar and flow rate of 0-30 lpm at the user end. Dimensions of the tubes to be clearly mentioned in the offer. Approximate length of the tubing shall be 60 m. Offer shall be preferably for every 4 m of length. If the offer is made for other length, it is to be clearly mentioned.	Vendor to specify and confirm		
		The SS tubes/pipes used shall be from a reputed supplier and the tube supplier TC to be attached	Vendor to confirm & comply		
		The tubes shall be completely orbital welded	Vendor to confirm		
		High pressure cylinder connecting hoses – 1 No	Vendor to confirm		
		Cylinder end check valves made of SS 316/316L – 1 No	Vendor to confirm		
		Bank pressure gauge made of stainless steel meeting the relevant ISO standards like ISO 5171 or equivalent – 1 No	Vendor to confirm		
		Safety accessories pertaining to flammable gases	Vendor to specify		
		Line isolation valve made of SS 316/316L with integral 20 µm particulate filter	Vendor to confirm		

		Frames to hold the cylinder at the middle and top made of non-corroding material of sufficient strength	Vendor to confirm		
		User end – Wall mounting made of SS 316 with line pressure regulator, dial gauge and flow meter (0-30 lpm (min)) – 1 set	Vendor to confirm		
		One line pressure gauge (0-15 bar)	Vendor to confirm		
		Leak test - The leak test on the line shall be carried out using N ₂ + He mixture and snoop solution at all joints and randomly on the tubing to ensure the line to be leak proof	Vendor to confirm & comply		
		SS braided hoses with PTFE annular convoluted core with SS fitting assemblies for end point connection (wherever required)	Vendor to confirm		
		Legris flexible hoses of required dimensions to maintain the pressure and flow and push fit connectors, as required	Vendor to confirm		
		The international standards followed for manifolds, piping/tubing, to be mentioned clearly	Vendor to specify		
EE.5	Oxygen	1 x 1 cylinders' manifold with built-in annunciation system, check valve, etc. The material of construction shall be SS 316/316L.	Vendor to confirm		
		Manifold header with provisions to connect cylinder – 1 No.	Vendor to confirm		
		316/316L stainless steel tubing internally electro polished and of required dimensions (diameter and wall thickness) to maintain the pressure of 0-6 bar and flow rate of 0-30 lpm at the user end. Dimensions of the tubes to be clearly mentioned in the offer. Approximate length of the tubing shall be 60 m. Offer shall be preferably for every 4 m of length. If the offer is made for other length, it is to be clearly mentioned.	Vendor to specify and confirm		

The SS tubes/pipes used shall be from a reputed supplier and the tube supplier TC to be attached	Vendor to confirm & comply
The tubes shall be completely orbital welded	Vendor to confirm
High pressure cylinder connecting hoses – 1 No	Vendor to confirm
Cylinder end check valves made of SS 316/316L – 1 No	Vendor to confirm
Bank pressure gauges made of stainless steel meeting the relevant ISO standards like ISO 5171 or equivalent – 1 No	Vendor to confirm
Integral safety relief valves made of SS 316/316L – 1 Nos	Vendor to confirm
Line isolation valve made of SS 316/316L with integral 20 µm particulate filter – 1 No	Vendor to confirm
Frames to hold the cylinders at the middle and top made of non-corroding material of sufficient strength	Vendor to confirm
User end – Wall mounting made of SS 316 with line pressure regulator, dial gauge and flow meter (0-40 lpm (min)) – 1 set	Vendor to confirm
One line pressure gauge (0-15 bar)	Vendor to confirm
Leak test - The leak test on the line shall be carried out using N ₂ + He mixture and snoop solution at all joints and randomly on the tubing to ensure the line to be leak proof	Vendor to confirm
SS braided hoses with PTFE annular convoluted core with SS fitting assemblies for end point connection (wherever required)	Vendor to confirm
Legris flexible hoses of required dimensions to maintain the pressure and flow and push fit connectors, as required	Vendor to confirm
The international standards followed for manifolds, piping/tubing, to be mentioned clearly	Vendor to specify

FF. EQUIPMENT SPECIFICATION : GAS MIXING UNIT				
Sl.No.	FEATURES	BHEL SPECIFICATION	OFFER BY BIDDER	DEVIATIONS
FF.1	Gas Mixing Unit	- A gas mixing unit, preferably from M/s WITT Gas for mixing the following gases in the proportion mentioned below - Ar - 0 - 100% - He - 0 - 100% - CO₂ - 0 - 100% - N₂ - 0 - 100% - O₂ - 0 - 20% - The details such as the flow rate or pressure possible to be clearly mentioned in the offer - SS braided hoses with PTFE annular convoluted core with SS fitting assemblies for end point connection (wherever required) - The gas mixing unit shall be mounted on a wheel base with the locking arrangement - The detailed catalogue to be submitted along with the offer		

GG. SPARES				
Sl.No.	FEATURES	BHEL SPECIFICATION	OFFER BY BIDDER	DEVIATIONS
GG.1.	Spares	All necessary spares and consumables for trouble free operation of the system for atleast two years to be supplied along with the machine. The spares shall include but not limited to the following - Push fit connectors - SS braided hoses - Legris hoses of different dimensions - Flow meters - High pressure cylinder hoses, etc.		
HH. INSTALLATION AND COMMISSIONING :				
S.No.	PARTICULARS	BHEL SPECIFICATION	OFFER BY BIDDER	DEVIATIONS

HH.1	Product Catalogues	Manual for Gas Mixing Unit, All the available product catalogues to be supplied along with the system		
HH.2	Language	English		

II. GENERAL POINTS :

S.No.	PARTICULARS	BHEL SPECIFICATION	OFFER BY BIDDER	DEVIATIONS
II.1	Commissioning	- Installation, Erection and commissioning should be carried out by the supplier at WRI - Leak tight test to be carried out in the presence of WRI personnel - The required flow rates for smooth functioning of the connected equipment to be demonstrated - Supplier should intimate their requirements from BHEL (if any) for erection and commissioning along with offer.		
II.2	Training	The Supplier's SERVICE ENGINEER shall give training in the Operation and Maintenance of the Manifold systems for BHEL Staff, after the successful commissioning of the entire system		
II.3	Warranty	The system shall have warranty for a minimum of 12 months from the date of commissioning at WRI/BHEL.		