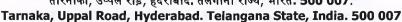


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(वैज्ञानिक तथा औद्योगिक अनुसंघान परिषद) / (Council of Scientific and Industrial Research) तारनाका, उप्पल रोड़, हैदराबाद. तेलंगाना राज्य, भारत. 500 007.





PURCHASE ORDER

No: PUR/IICT/0681/24-25/EQPT/2720

Date: 17-01-2025

To

M/s. AdiChem Technology Pvt Ltd 301, Shree Ganesh Avenue Building Gangapur Road,Sector –C, Nashik-422013

Ph:+90280 78783/9075078783

Email:info@adichemtechnology.com

Sub;- Supply Installation and Commissioning of "Customized High Pressure Tubular Reactor System"- reg.

Ref: - 1. Our Tender Enquiry No. PUR/IICT/0681/24-25/EQPT DT.14.08.2024 and CPPP tender enquiry No.2024_CSIR_204898_1Dt.14.08.2024.

2. Your bid reference No:AQ-2425/E-148 DT.02.09.24.

Dear Sirs,

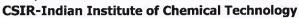
Kindly supply the following item(s) strictly as per the terms and conditions.

SI. No	DESCRIPTION OF MATERIAL	Quantity	Price in - (₹)	Total Amount in (₹)
1.	Customized High Pressure Tubular Reactor System	1No.	66,80,000.00	66,80,000.00
	(Detailed Specifications and other items and accessories as per Annexure enclosed)	د عرباً الحراد ورف السداد		
				66,80,000.00
		A	dd GST @18%	12,02,400.00
	E TOTAL OF THE PARTY OF THE PAR	OR CSIR-II	CT, Hyderabad	78,82,400.00

TERMS & CONDITIONS:

- **1. Prices:** FOR CSIR-IICT Inclusive of all taxes, duties etc., Hyderabad. Unloading the consignment at our site is your cost.
- 2. Order Acknowledgement: Kindly send order acknowledgement within 15 days

दुरभाष/Tel: +91-40-27193461, 27193228; फैक्स/Fax: +91-40-27193147 ईमेल/ Email: cosp@iict.res.in; csiriicthyd@csiriict.in वेबसाईट/website:www.iictindia.org





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through Email: cosp@iict.res.in and csiriicthyd@csiriict.in mention PO No. in the subject line. If you notice any discrepancy/typographical error etc. in this order, you must immediately request for its amendment/correction. Further along with duly signed and stamped copy of this P.O. as token of acceptance of terms and conditions of this P.O. You are also required to sign a contract agreement in pursuance of this Purchase Order in the prescribed format on a Non-Judicial Stamp paper of Rs 200/-(contract form attached)

- 3. Taxes and Levies: Price includes GST@18% also
- **4. Delivery Period**: The ordered material should be supplied within the delivery period of 16-18 weeks from the date of receipt of the Purchase Order.
- 5. PAYMENT TERMS:I) 80% through RTGS /NEFT or online mode against supply in complete quantity of ordered items in good condition as per ordered specifications and terms, subject to its joint inspection in the presence of suppliers service engineers/ representative and its confirmations and acceptance by CSIR IICT user Scientist.

 II) Balance 20% through RTGS /NEFT or online mode after successful completion

of installation and commission and final acceptance of End User, our Bankers State Bank of India, IICT Branch, Hyderabad, successful Installation, subject to submission of prescribed PBG.

- 6. Warranty: Warranty should be furnished for 12 months from the date of successful installation and commissioning of the equipment and subject to final acceptance of the same by the CSIR-IICT user. If CSIR IICT wants to enter into CAMC/AMC in future after warranty period the amount for AMC charges shall not exceed CAMC/AMC Charges indicated in quotation (if any) and the same will not be paid in advance and the same shall be paid on bill basis only.
- 7. Performance Bank Guarantee: 5% PBG valid till 60 days beyond the prescribed warranty period starting from the date of final installation and commissioning to be submitted within 21 days from the date of the Purchase Order, failing which order may be cancelled at the discretion of CSIR IICT.
- 8. INSTALLATION, COMMISSIONING AND DEMONSTRATION: A qualified and factory-trained service engineer should commission the supplied equipment free of cost within *one* month from the date of receipt of the ordered goods and onsite application training to be provided for 2 persons 3 working days at CSIR IICT., Telangana, India. Supplier has to inform pre-installation requirements if any for site readiness within 10 days of receipt of this mail.
 - LD clause: Timely supply is the essence of stipulation in the delivery period of our purchase order, for our requirements have got a direct bearing with time targeted research work. By any measure, if there is any delay in delivery of the

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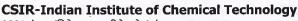
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ordered material(s), a sum equivalent to **0.5** (**point five**) per cent of contract value for each week of delay or part thereof until actual delivery will be deducted from the contract value as liquidated damages, subject to the maximum deduction **of 10** (**ten**) **per cent** of P.O. Value. CSIR IICT is also at liberty to consider the termination of the contract of the items is not delivered within the delivery period without assigning any reason thereof.

- 10. CSIR-IICT-GST No: 36AAATC2716R2ZF
 PAN No. AAATC2716R TAN No. HYDI00674C
- 11. Availability of spares and service engineer support shall be conformed for a period of 10 years as part of after sales and service support on applicable charges after warranty period.
- 12. The dispute settlement mechanism/arbitration proceedings shall be Concluded as under:
 - a) If any dispute or difference arises between the parties hereto as to the construction, interpretation, effect and implication of any provision ofthis agreement including the rights or liabilities or any claim or demand of any party against other or in regard to any other matter under these presents but excluding any matters, decisions or determination of which is expressly provided for in this Agreement, such disputes or differences shall be referred to Delhi International Arbitration Centre (DIAC), New Delhi. A reference to the Arbitration under this Clause shall be deemed to be submission within the meaning of the Arbitration and Conciliation Act, 1996 and the rules framed thereunder for the time being in force. Each party shall bear and pay its own cost of the arbitration proceedings unless the Arbitrators otherwise decides in the Award.
 - b) In the case of a dispute between the purchaser and a Foreign Supplier, the dispute shall be settled by arbitration in accordance withprovision of sub-clause (a) above. But if this is not acceptable to the supplier then the dispute shall be settled in accordance with provisions of UNCITRAL (United Nations Commission on International Trade Law) Arbitration Rules.

The venue of the arbitration shall be the place from where the purchaseorder or contract is issued.(for further information please refer to our Tender Document)

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- 13. Jurisdiction All disputes related to this tender shall be subject to the local court of competent jurisdiction at HYDERABAD, Telangana, India only.
- The terms and conditions and tender specifications and clarification there off as contained in the tender document shall form part of this purchase order .However, Incase of any discrepancy between this P.O. and Tender terms this purchase order (P.O.) shall prevail.

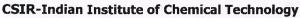
Yours faithfully, For & on behalf of CSIR,

(Dharmendra Kumar)
Controller of Stores & Purchase

Note: Kindly, mention our purchase order reference number for all your future correspondence so as to enable us to avoid any delay while tracking/clearing the material(s).

<u>Budget Head</u>: GAP-1013 for Rs.78,82,400/- (Rupees Seventy Eight lakhs Eighty Two Thousand Four Hundred only)

1. Indentor's copy: Dr.A.Venugopal (CFC Divn) 2. Accounts copy; 3. Office copy; 4. Guard File copy 5. Spare copy;





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NO.PUR/IICT/0681/24-25/EQPT/2720

DT.17.01.2025

Technical Specifications

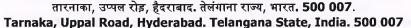
SI.No.	Description
01	SUPPLY OF CUSTOMIZED HIGH PRESSURE TUBULAR REACTOR SYSTEM
	A. Gas flow Section
	B. Liquid flow Section
	C. Pre-treatment Section
	D. Reactor Section
	E. Separation Section
	F. Product Section
	G. Control Section
	H. Structure
A)	A. GAS FLOW SECTION:
	Gas flow section will be designed for Six gases (CO With Iron Penta
	Carbonyl Trap, CO2, CO2 with badger controller, H2, N2, And CH4) and
	these gases will be controlled via mass flow Controller. Mass Flow
	Controller are in lined with Bulk Head Union, Filter, Pressure Gauge, and
	Ball Valve And Check Value.
	Below are the details of Mass Flow Controller;
	A.1 Mass Flow Controller (CO With Iron Penta Carbonyl Trap): Gas Flow Met
	for Above gas,
	Make : Bronkhorst/Brooks
	Contact Part M.O.C. : SS316
	Gas Flow Range : 5-200 ML/MIN
	Maximum inlet pressure : 100 Barg
	Maximum Operating Conditions : 97 Barg
	Design temperature : 70°C
	Design pressure : 100Barg
	End Connections: 1/8" OD
	Inline filter size : 60 Micron
	Inline Pressure Gauge Range : 0 to 100 Barg
	Inline Check Valve rating: 10 psi cracking pressure
	• Qty: 1 Nos
	A.2 Mass Flow Controller (Carbon Dioxide Gas):
	Mass Flow Controller for CO ₂ gas,
	Make : Bronkhorst/Brooks
	Contact Part M.O.C. : SS316
	Gas Flow Range : 5-200 ML/MIN

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Maximum inlet pressure : 45 Barg @ Amb Temperature

Maximum Operating Conditions: 42 Barg @ Amb Temperature

Design temperature: 70 °C

· Design pressure : Barg

End Connections: 1/8" OD

• Inline filter size : 60 Micron

Inline Pressure Gauge Range: 0 to 100 Barg

Inline Check Valve rating: 10 psi cracking pressure

Qty: 1 Nos

A.3 Coriolis Mass Flow Controller CO2 GAS with badger controller

Flow Meter for CO2 with badger controller gas,

Make : Bronkhorst/Brooks

Contact Part M.O.C.: SS 316

Gas Flow Range : 5-200 ML/MIN

Maximum inlet pressure: 100 Barg @ Amb Temperature

Maximum Operating Conditions: 97 Barg @ Amb Temperature

Design temperature: 70 °C

End Connections: 1/8" OD

Inline filter size: 60 Micron

Inline Pressure Gauge Range: 0 to 100 Barg

Inline Check Valve rating: 10 psi cracking pressure

• Qty: 1 Nos

A.4 Mass Flow Controller (Hydrogen):

Mass Flow Controller for H2 gas,

• Make: Bronkhorst/Brooks

Contact Part M.O.C.: SS316

Gas Flow Range: 15-800 ML/MIN

• Maximum inlet pressure: 100 Barg @ Amb Temperature

Maximum Operating Conditions: 97 Barg @ Amb Temperature

Design temperature: 70 °C

Design pressure : Barg

End Connections: 1/8" OD

• Inline filter size : 60 Micron

Inline Pressure Gauge Range: 0 to 100 Barg

• Inline Check Valve rating: 10 psi cracking pressure

Qty: 2 Nos

A.5 Mass Flow Controller (Nitrogen): Mass Flow Controller for N2 gas,

Make: Bronkhorst/Brooks

Contact Part M.O.C.: SS316

Gas Flow Range : 5-200 ML/MIN

Maximum inlet pressure: 100 Barg @ Amb Temperature

Maximum Operating Conditions: 97 Barg @ Amb Temperature

Design temperature: 70°C

The





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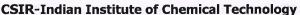
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	Design pressure : 100 Barg
	End Connections : 1/8" OD
	Inline filter size : 60 Micron
	Inline Pressure Gauge Range : 0 to 100 Barg
	Inline Check Valve rating: 10 psi cracking pressure
	• Qty: 1 Nos
	MINISTER PROPERTY AND ADDRESS OF THE PROPERTY ADDRESS OF THE PROPERTY AND ADDRESS OF THE PROPERTY ADDRESS OF THE PROPERTY AND ADDRESS OF THE PROPERTY ADDRESS
	A-6 Mass Flow Controller (Methane):
	Mass Flow Controller for CH₄ gas,
	Make : Bronkhorst/Brooks
	Contact Part M.O.C. : SS316
	Gas Flow Range : 5-200 ML/MIN
	Maximum inlet pressure : 100 Barg @ Amb Temperature
	Maximum Operating Conditions : 97 Barg @ Amb Temperature
	Design temperature : 70 °C
	Design pressure : 100 Barg
	• End Connections : 1/8" OD
	Inline filter size : 60 Micron
	Inline Pressure Gauge Range : 0 to 100 Barg
	 Inline Check Valve rating: 10 psi cracking pressure Qty: 1 Nos
	• Qty . 1 Nos
B)	B. LIQUID FLOW SECTION:
,	B.1 Feed Tank:
	Feed Tank Capacity: 2 to 3 Lit
	Feed Tank M.O.C: SS 316
	Process Fluid : Water
	B.2 HPLC Pump:
	The pump is used for liquid feeding to the premixed where the mixing of gases ar
	vaporized liquid takes place.
	Flow Range : 0.01-10 ML/MIN
	Design temp: 100°c
	MOC : Suitable for Liquid.
	Design Pressure : 120 Barg
	Operating Pressure: 100 Bar
	Type : Single Piston pump
	• Qty: 1 Nos
	Make : Teledyne/ Equivalent
	Communication : SCADA Compatible RS 232
C)	C. PRE-TREAMENT SECTION:
- /	The gases will pass through the pre-heater and will heat up the reactant
	gas. Same pre-treatment will be provided for liquid feed line where liquid
	preheated and vaporized. Vaporizer outlet will be connected to the inlet

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the preheater for uniform mixing of liquid vapours and gases. Outlet of the





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pre heater connected to the reactor inlet. The maximum temperature for heat traced line is 250°C

- All liquid lines are heat traced to avoid liquid condensation.
- Provision of Drain valve, Tee type filter, flow check valve in the line, check valves, pressure relief valve with return path to pump inlet.

C.1 PRE-HEATER with Static Mixer:

Following are the specifications for Pre-Heater:

Make : AdiChem

• Type : Ceramic Band Heater

2 MOC : SS316

Operating Temperature : 250 °C

Design Temperature : 300 °C
Max Pressure : 100 Barg

• Temperature control : Skin based

Mixture : STATIC

Qty:1Nos

C.2 Vaporizer

Make : AdiChem

MOC : SS 316

Pressure: 100 bar

Max Temperature : 250 °C

C.3 Thermocouples:

Following are the specifications for Thermocouple.

Make : Tempsense

Type : K

D)

D. REACTOR SECTION:

The reactor assembly will be designed for vapour phase as well as gasliquid reaction. Reactor temperature control with split tube furnace up to 500°C. Hand tighten reactor will be design for high pressure and high temperature. Isotherm across the reactor will be maintained. The rupture disc will be provided for safety of reactor

D.1 Reactor Tube 1:

Pre-mixed and pre-heated gases are entered at the top of the reactor tube. Following are the specifications of Reactor Tube:

Make : AdiChem

M.O.C.: SS 316

Type: Metal to Metal Seal (Seamless); Hand Tightened

• Design Temperature: 900_°C

Operating temperature: 700°C

• Design Pressure: 100 Barg

• Operating Pressure: 100 Barg

• Internal Diameter: 1"

• Length: 700 mm

Heating Media : Three zone furnaces

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- Temperature indicators : Single point variable thermocouples
- Reactor flow direction : Down flow
- Qtv:3

D.1.2 Furnace:

Following are the specifications of Heating Furnace:

- Furnace Make : ATS Make
- Type : Split Tube Type
- Construction : Three zone
- Design temperature: 1100 °C
- Design Pressure: 100 Barg
- Power supply: 230 V AC, 1 phase, 50/60 Hz.
- Thermocouples: 1 Nos

D.1.3 Thermocouples:

Following are the specifications for Thermocouples

- Make: Tempsense
- Type : K type with thermowell
- Design Temperature: 800 °C
- Design Pressure: 100 Barg

D. 2.1 Reactor Tube 2:

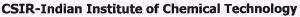
- Make : AdiChem
- M.O.C.: SS 316
- Type: Metal to Metal Seal (Seamless); Hand Tightened
- Design Temperature: 900°C
- Operating temperature : 700°C
- Design Pressure : 100 Barg
- Operating Pressure: 100 Barg
- Internal Diameter: 0.5"
- Total Reactor Length: 700 mm
- End Connection: 1/8" OD
- Heating Media: Three zone furnaces
- Temperature indicators : Single point variable thermocouples
- Reactor flow direction : Down flow
- Qty:3

D.2.2 Furnace:

Following are the specifications of Heating Furnace:

- Furnace Make : ATS Make
- Type : Split Tube Type
- Construction : Three zone
- Design temperature: 1100 °C
- Design Pressure: 100 Barg
- Power supply: 230 V AC, 1 phase, 50/60 Hz.
- Thermocouples: 1 Nos

D.2.3 Thermocouples:





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Following are the	e specifications for	r Thermocouples
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• Make : Tempsense

Type: K type with thermowell
Design Temperature: 800 °C

• Design Pressure: 100 Barg

E))

• E. SEPARATION SECTION:

E.1 Condenser:

Hot mixture of the gases passes through the condenser by providing cooling/chilling water outside.

Make : AdiChemMOC : SS 316

Type: Shell and tube And Serpent Coil type

Coil: ¼" Tube Coil
Coil Length: 250 mm
ID Of Jacket: 54mm

OD Of Jacket: 34mm
OD Of Jacket: 60.3 mm
Jacket Length: 250 mm
Design Pressure: 100 Barg
Design temperature: °C

Operating Temperature : -40 °C to 200 °C

Operating Pressure: 100 Barg

E.2. Gas Liquid Separator:

Make : AdiChemMOC : SS316

Capacity Of HPS: 375 ml
ID Of Shell: 40 mm

OD Of Shell: 48.26 mm
 Shell Length: 200 mm

Cooling Coil Outside The Vessel: 1/8" OD Copper Tube Coil

Operating Pressure : 100 Barg

Design temperature : °C

• Qty:1 Nos

E.3 BPR: Automatic Pressure Controlling Valve

Make : Jordan, USA

Type: Automatic with pneumatic

M.O.C.: SS316

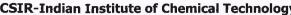
• End connection: 1/4" Suitable Connection

Pressure: 100 BargTemperature: 100 C

Qty: 1 Nos

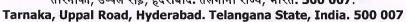
E.4 Chiller:

Make : Polyscience/ Eq.





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M.O.C.: Compatible Working Temperature: 0 C to 80 C Pressure: Barg Capacity: 2 to 4L Qty: 1 Nos F. PRODUCT SECTION: F.1 Product Collection Tank: Liquid from GLS will be collecting in the product collection tank. Make: AdiChem MOC: SS316 Capacity: 3 Lit Operating Condition: Atmospheric Qty: 1 Nos G. Accessories: G.1 Bulk Head Union: Type: Bulk Head M.O.C: SS 316 End Connection: 1/8 " OD Max Operating Pressure: 100 Barg @Amb Temp G.2 Filter: Type: In- Lined Filter For gas Line M.O.C: SS 316 End Connection: 1/8 " OD Max Operating Pressure: 100 Barg @Amb Temp G.3 Ball Valve: Type: 1 Piece Two Way Ball Valve M.O.C: SS 316 End Connection: 1/8 " OD Max Operating Pressure: 100 Barg @Amb Temp G.4 Needle Valve: Type: 1 Piece Two Way Ball Valve M.O.C: SS 316 End Connection: 1/8 " OD Max Operating Pressure: 100 Barg @Amb Temp G.4 Needle Valve: Type: 1 Piece Two Way Needle Valve M.O.C: SS 316 End Connection: 1/8 " OD Max Operating Pressure: 100 Barg @ 236 C Temp Seal: PTFE G.5 Pressure Gauge: Type: Bourdon Tube Pressure gauge		Type : Heating And Cooling Chiller	
Working Temperature: 0 C to 80 C Pressure: Barg Capacity: 2 to 4L Qty: 1 Nos F. PRODUCT SECTION: F.1 Product Collection Tank: Liquid from GLS will be collecting in the product collection tank. Make: AdiChem MOC: SS316 Capacity: 3 Lit Operating Condition: Atmospheric Qty: 1 Nos G. Accessories: G.1 Bulk Head Union: Type: Bulk Head M.O.C: SS 316 End Connection: 1/8 " OD Max Operating Pressure: 100 Barg @Amb Temp G.2 Filter: Type: In- Lined Filter For gas Line M.O.C: SS 316 End Connection: 1/8 " OD Max Operating Pressure: 100 Barg @Amb Temp G.3 Ball Valve: Type: 1 Piece Two Way Ball Valve M.O.C: SS 316 End Connection: 1/8 " OD Max Operating Pressure: 100 Barg @Amb Temp Pore Size: 07 Micron For Gas G.3 Ball Valve: Type: 1 Piece Two Way Ball Valve M.O.C: SS 316 End Connection: 1/8 " OD Max Operating Pressure: 100 Barg @Amb Temp G.4 Needle Valve: Type: 1 Piece Two Way Needle Valve M.O.C: SS 316 End Connection: 1/8 " OD Max Operating Pressure: 100 Barg @ 236 C Temp Seal: PTFE G.5 Pressure Gauge:			
Pressure: Barg Capacity: 2 to 4L Qty: 1 Nos F. PRODUCT SECTION: F.1 Product Collection Tank: Liquid from GLS will be collecting in the product collection tank. Make: Adichem MOC: \$5316 Capacity: 3 Lit Operating Condition: Atmospheric Qty: 1 Nos G. Accessories: G.1 Bulk Head Union: Type: Bulk Head M.O.C: \$S 316 End Connection: 1/8 " OD Max Operating Pressure: 100 Barg @Amb Temp G.2 Filter: Type: In-Lined Filter For gas Line M.O.C: \$S 316 End Connection: 1/8 " OD Max Operating Pressure: 100 Barg @Amb Temp G.3 Ball Valve: Type: 1 Piece Two Way Ball Valve M.O.C: \$S 316 End Connection: 1/8 " OD Max Operating Pressure: 100 Barg @Amb Temp G.4 Needle Valve: Type: 1 Piece Two Way Needle Valve M.O.C: \$S 316 End Connection: 1/8 " OD Max Operating Pressure: 100 Barg @Amb Temp			
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 Max Operating Pressure: 100 Barg @ 236 C Temp Seal: PTFE G.5 Pressure Gauge: 		• M.O.C: SS 316	
Seal : PTFE G.5 Pressure Gauge:		End Connection: 1/8 " OD	
G.5 Pressure Gauge:			
		Seal : PTFE	
Type : Bourdon Tube Pressure gauge		G.5 Pressure Gauge:	
		Type : Bourdon Tube Pressure gauge	
• DISLNIG : 63mm		Dial Size : 63mm	

दुरभाष/Tel: +91-40-27193461, 27193228; फैक्स/Fax: +91-40-27193147 ईमेल/ Email: cosp@iict.res.in; csiriicthyd@csiriict.in वेबसाईट/website:www.iictindia.org

Mounting: Back and Bottom End Connection: 1/8" MBSP



CSIR-Indian Institute of Chemical Technology

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Tarnaka, Uppal Road, Hyderabad. Telangana State, India. 500 007

Pressure Range: 0 to 100 Barg

G.6 Check Valve:

Type : Inline Check Valve

M.O.C: SS 316

End Connection: 1/8 " ODSeal: Fluorocarbon FKM

G.7 Filter:

• Type : In- Lined Filter For Liquid Line

M.O.C: SS 316

End Connection: 1/8"OD X 1/8"OD

• Max Operating Pressure: 100 Barg @Amb Temp

• Pore Size: 60 Micron For Liquid Line G.8 Three Way Valve:

• Type: 1 Piece Three way

M.O.C: SS 316 @ End Connection: 1/8 " OD

Max operating Pressure: 100 bar g at ambient temp

Seal : Fluorocarbon FKM

G.9 Micro Metering Valve:

Type : Flow Control Valve

M.O.C: SS 316

End Connection: 1/8 " OD

• Max Operating Pressure: 100 Barg @ 236 C Temp

Seal : PTFE

G.10 Rupture Disc:

Type : Rupture Disc

• Disc M.O.C : SS 316

• Disc Size : 0.5"

Burst Pressure: 100 Barg @200 F

G.11 Transducer:

Type: 2 Wire Pressure Transmitter

Contact Part: 316 L

End Connection: 1/8 " MBSP

Pressure Range: 0 to 100 Barg

Power Supply : 24 VDC

G.12 Pressure Control Valve:

• Type: Diaphragm Type Globe Valve

Operating Pressure: 100 Barg

End Connection: 1/8 " OD

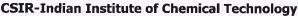
CV: 0.05

G.13 Pressure Safety Valve:

• Type: Pressure Relief Valve

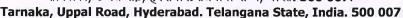
M.O.C: SS 316

W





आई. एस. ओ. 9001 संगठन (विश्लेषणात्मक परिसेवा हेतु) /ISO 9001 Organization (for Analytical Services)
(वैज्ञानिक तथा औद्योगिक अनुसंघान परिषद) / (Council of Scientific and Industrial Research)
तारनाका, उप्पल रोड़, हैदराबाद. तेलंगाना राज्य, भारत. 500 007.





End Connection: 1/8" OD

• Control Range: 50 to 100 Barg

G.14 Level Control Valve:

• Type : Ball Valve

M.O.C: SS 316

End Connection: 1/8 " OD

Max Operating Pressure: 100 Barg @ Amb Temp

Seal : PTFE

Operation : Automatic (Air Operated)

G.15 Level Switch:

• Type: Level Switch

Contact Part M.O.C: SS 316

End Connection: 1/8 " OD

• Max Operating Pressure: 100 Barg @ Amb Temp

G.16 Cylinders Regulators:

High Pressure H2, CO2, N2, CO CH4 Regulator:

Max Inlet pressure: 200 Bar g

Max Flow Rate: 4600 SCFH

Operating Temp: -26 Deg C to 74 Deg C

Gauges : Stainless Steel

Bonnet : Nickel Plated Brass

Piston: SS316

G17 Online UPS: 10 KVA

Battery backup: 1 Hrs.

Make: APC/Luminous / Vertiv-Emerson

G18 CO Sensor

For Carbon Monoxide -XCD Gas Detector,

ATEX/IECEx/Asian approvals,

2 X M20 entries

Output signal: 4 -20 mA

Painted LM25,

CO EC sensor cartridge: 0 to 300 ppm

• User selectable FSD between: 100 and 1000 ppm (100 ppm resolution),

Protection: includes nylon weather protection

H) H. CONTROL PANEL:

The process parameters will be controlled and monitored by this module; it is incorporated with PLC based control system.

Following are the specifications of Control Panel:

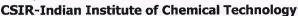
Type: PLC and HMI from Siemens

Operation: Both from HMI and SCADA.

• Classification: IP55

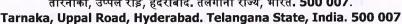
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दुरमाष/Tel: +91-40-27193461, 27193228; फैक्स/Fax: +91-40-27193147 ईमेल/ Email: cosp@iict.res.in; csiriicthyd@csiriict.in वेबसाईट/website:www.iictindia.org





आई. एस. ओ. 9001 संगठन (विश्लेषणात्मक परिसेवा हेतु) /ISO 9001 Organization (for Analytical Services) (वैज्ञानिक तथा औद्योगिक अनुसंघान परिषद) / (Council of Scientific and Industrial Research) तारनाका, उप्पल रोड़, हैदराबाद. तेलंगाना राज्य, भारत. 500 007.





Fully automatic application after readiness of soft start. Soft Start measures are noted with inline gas present at the inlet of the MFC. You can define operational philosophy with time basis. And integrated with the online analysis of feed and product.

Hi and Hi Hi limit alarming for the process parameters. Safety interlocks with three levels. Level 1 and 2 are settable. Level 3 is predefined for emergency stop. Control panel is designed.

Safety interlocks

- To control and monitor the temperature, pressure, and flow.
- Two station operation
- Safety limits to ensure power stop to resistive load.
- Safety for sensor breaks alarming.
- Safety limit to stop the flow for over pressure second level
- Safety limit to release the pressure for over pressure limit
- Safety limit to hazardous gas detection evacuation digit bit and emergency stop. UPS probes can be hooked up and monitoring of process parameters incorporated

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I. SCADA STATION: 2

Make: Siemens

SCADA station will be is design to control, monitor and logged the features of control panel. SCADA is featured with:

Data Logging	All process parameters i.e., temperature, Pressure, Level, Flow is logged in SCADA and saved the data in its server
On Line	Process parameters can be monitored in graphically for its
trending	current values of specified time frame
Historical	It is a feature to view the earlier process parameters in
Trending	graphical trends
Report	It is a tool to generate the process parameters in tabular format
Generation	either the current or past sessions
Recipe	It is a tool to operate the system in sequential manner for its
	given time frame

STATION TWO: A latest computer suitable for SCADA software.

Computer: Make-HP

Intel original motherboard and processor > 3GHz (i7, seven generation) with 16GB RAM, 1 TBSSD, 1TB HDD, optical mouse, multimedia keyboard, DVD +RDW, 4USB ports, 10/100 Ethernet card with WOL, 24" LED colour monitor and necessary Windows with license.

BATTERY LIMITS & UTILITY REQUIRMENTS:

All battery limit connections will be located at the process frame edge for connections by the client. It is assumed that the client secures all feeds on overpressure as stated below:

X

दुरमाष/Tel: +91-40-27193461, 27193228; फैक्स/Fax: +91-40-27193147 ईमेल/ Email: cosp@lict.res.in; csiriicthyd@csiriict.in वेबसाईट/website:www.iictindia.org





CSIR-Indian Institute of Chemical Technology

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Tarnaka,	, Uppal Road,	Hyderabad.	Telangana State	e, India. 500 007

	Utility Name	Operating range at battery limit
	Feed gas	Pressure controlled via cylinders
	Electric Power	230 VAC, 50 Hz, Current Amp- 25 Amps
	Space	For reactor system
	3	191 1945. In Proceedings of the Personal State 411
		s to arrange for the sufficient feed supply at rated pressure of 100 propriate connections
J)		propriate connections
J)	bars with app	propriate connections
J)	J. STRUCTUR Whole Fixed	propriate connections

The Supplied Equipment along with accessories should completely comply with all the technical specifications and related requirements indicated in Chapter 4 of Tender Documents on the subject and subsequent "corrigendum" issued in pursuance of the same.

Controller of Stores & Purchase

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