सीएसआईआर- भारतीय रासायनिक प्रौद्योगिकी संस्थान
CSIR-Indian Institute of Chemical Technology
आई. एस. ओ. 9001 संगठन (विश्लेषणात्मक परिसेवा हेतु) /ISO 9001 Organization (for Analytical Services)
(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद) / (Council of Scientific and Industrial Research)
तारनाका, उप्पल रोड़, हैदराबाद. तेलंगाना राज्य, भारत. 500 007.
Tarnaka, Uppal Road, Hyderabad. Telangana State, India. 500 007

PURCHASE ORDER

No: PUR/IICT/0480/24-25/EQPT/1874 **Date: 08-11-2024**

To
M/s. Amar Equipments Pvt Ltd
Valson Compound ,LbS Road
Bhandup(w),Mumbai 400078
Ph:+91-22-62255000/ M: +91-7506073792
Email:info@amarequip.com | E: tender@amarequip.com

Sub;- Supply Installation and Commissioning of "Pressure Tubular Reactor for Catalytic Vapour Phase Reactions with 1" diameter and ¾" dia"- reg.

Ref: - 1. Our Tender Enquiry No. PUR/IICT/0480/24-25/EQPT DT.16.07.2024 and CPPP tender enquiry No.2024_CSIR_200858_2 Dt.16.07.2024.

2. Your bid reference No: QAM-T/020/AEPL/24-25 dt.25.07.2024

Dear Sirs,

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

Sl. No	DESCRIPTION OF MATERIAL	Quantity	Price in (₹)	Total Amount in (₹)
1.	**Pressure Tubular Reactor for Catalytic Vapour Phase Reactions** *(Detailed Specifications and other items and accessories as per Annexure enclosed)*	2Nos.	-	82,20,339.00
				82.20,339.00
			Add GST @18%	**14,79,661.00**
			FOR CSIR-IICT, Hyderabad	**97,00,000.00**

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

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 12-16 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 ICT user.**
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 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 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.

9. **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 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 thesupplier 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)

13. **Jurisdiction** - All disputes related to this tender shall be subject to the local court of competent jurisdiction at **HYDERABAD,**

Telangana, India only.

14. **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).

Budget Head: **FCP512403 for Rs.97,00,000/-** (Rupees Ninety Seven lakhs only)

1. **Indentor's copy: B.VIJAYA THOMAS (FAC)** 2. Accounts copy; 3. Office copy; 4. Guard File copy 5. Spare copy;

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

PLATINUM JUBILEE 1944-2018 CSIR - IICT Touching Lives

NO.PUR/IICT/0480/24-25/EQPT/1874 **DT.08.11.2024**

ANNEXURE

Sr. No.	Item	Quantity	Description	Make
1	Reactor with Furnace Assembly	1	Reactor-1: Type: Tubular reactor Dimensions: 26.7 mm OD x 18.88 mm ID x 1200 mm L Operating Pressure: 1-70 Bar Design Pressure: 80 Bar Operating Temperature: 600 Deg C Design Temperature: 700 Deg C MOC: Inconel 600 * Material of construction for Reactor's inlet and outlet connection, Thermowell is alloy Inconel 600 *Catalyst bed temperature at four different point is measured by temperature sensor/ thermocouple. *Reactor is provided with Pressure Gauge, Pressure Transmitter, Pressure safety Valves, Rupture Disc *Reactor tube is designed for frequent and easy to dismantle and reinstallation for catalyst loading/discharge and screening studies Reactor is provided with pressure monitoring & safety system with alarm	Amar
		1	Electrical Furnace Heater-1: Type: Split type Electrical furnace Operating Temperature: 700°C No of zone: 3 Dimensions: Suitable for reactor tube of heating length 1000 mm *Three zone furnace with controllable temperature for individual zone to ensure isothermal operating condition across the catalyst bed inside the reactor tube. *All zones with temperature safety limit alarm (TSS)	ATS USA / Carbolite / Watlow
2	Gas Feed Assembly	2	Mass Flow Controller: (MFC-1 & MFC-2) MFC-1: Fluorocarbon Gases: 152a / Trifluropropene MFC-2: Corrosive Gases: Chlorine / Fluorine Type: Thermal Flow Rate: 10-500 ml/min Operating Pressure: 1-80 Bar (variable pressure) Operating Temperature: Ambient Temperature Turndown Ratio: 50:1 Accuracy: ±1% of setpoint (Within 20-100% of full scale) End Connections: ¼" OD MOC (wetted parts): SS 316 *MFC is provided with bypass loop line, with filter and NRV for direct flow to reactor. *Gas flowrate is monitored and controlled by PLC *We have considered Thermal MFCs based on the comment mentioned in corrigendum released post Prebid Conference.	Bronkhorst / Brooks / Alicat
		1	Preheater:	Amar

			Type: Tubular Operating Pressure: 1-70 Bar Design Pressure: 80 Bar Operating Temperature: 200 Deg C Design Temperature: 300 Deg C	
			MOC: Inconel 600 *Dimensions: ½" Tube or higher will be decided during detailed engir *Effective heating length: 12" or more (will be decided during detail engineering) *Preheater temperature is monitored and controlled by PLC	
		1	Furnace-3 Type: Split type Electrical furnace Operating Temperature: 300°C No of zone: 1 Suitable for preheater dimensions	Amar
		1	Line Heater: (LH-1 from Preheater outlet to reactor inlet) Operating Temperature: 350°C MOC: Std.	HTS Amptek
3	**Liquid Feed Assembly**	1	Pump: (P-1) Type: HPLC Liquid: Chloroform / Tetrachloroethane / Tetrachloropropane Flow rate: 0.01 - 10 ml/min Flow rate increment 0.01 ml/min Operating pressure: 1-80 Bar Operating Temperature: 0-60°C MOC (wetted part): SS 316 *Pump with high precision and flowrate is monitored and controlled by PLC *With Self flushing pump heads with continuous wash without auxiliary pump-piston wash	Teledyne
		1	Vaporizer: Type: Tubular Operating Pressure: 1-70 Bar Design Pressure: 80 Bar Operating Temperature: 200 Deg C Design Temperature: 300 Deg C MOC: Inconel 600 *Dimensions: ½" Tube or higher will be decided during detailed engir	Amar
		1	Furnace -2 Type: Split type Electrical furnace Operating Temperature: 300°C No of zone: 1 Suitable for vaporizer dimensions	Amar
4	**Outlet Section**	1	Condenser-1: Type: Double pipe Operating Pressure: 1- 70 Bar Design Pressure: 80 Bar Design Temperature: (-20) to 100 Deg C	Amar

			MOC: SS 316 with Teflon coating inside flowpath	
		2 set	Fins over tube for cooling: Tube MOC: Alloy 600 Fins MOC: SS 304 As per requirement	Amar
		1	Gas Liquid Separator (GLS-1): Type: Jacketed, Clamped end at the top and torispherical dish end at the bottom. Capacity: 2 Litre Operating Pressure: 1-70 Bar Design Pressure: 80 Bar Design Temperature: (-20) to 100 Deg C Shell MOC: SS 316 with Teflon coating inside the vessel Jacket MOC: SS 304 *GLS is designed for collection of reaction product fractions (Liquids/ Gases) during the reaction. *Gas Liquid Separator is designed with inlet and outlet line for liquids and gas outlet line.	Amar
5	**Instruments**	6	Pressure Gauge: (PG-1 & PG-6) Type: Bourdon Pressure Range: 0-80 Bar MOC (wetted parts): SS316	Wika
		1	Pressure Transmitter: (PT-1) Pressure Range: 0-80 Bar MOC (wetted parts): SS 316	Wika
		11	Temperature Element: (TE-1 to TE-5; TE-10 to TE-12; TSS-1 to TSS-3) Type: K-type Temperature Range: 0 - 700 Deg C MOC: Alloy 600	Exotherm/ Equivalent
		1	Multipoint Temperature Element. (MPT-1) (TE-6 to TE-9) Type: K-type No of Sensing Points: 4 Temperature Range. 0 - 700 Deg C MOC: Alloy 600	Exotherm/ Equivalent
		1	Rupture Disc: (RD-1) Burst Pressure: 80 Bar MOC: SS 316	BS&B / Varem
		1	Back Pressure Regulator: (MBPR-1) Type: Manual Operating Pressure: 1-80 Bar Operating Temperature: 100-250°C End Connections: ¼" OD MOC (wetted part): If Tescom make, MOC: SS 316; or If Amar make, MOC: Alloy 600 *With perpetual support. *As per the comments mentioned in corrigendum released post Prebid conference, we have considered Manual Back pressure	Tescom / Amar

			regulator with operating temperature of 100-250°C immediately after the reactor. *BPR vendors have regretted to quote for Alloy 600 MOC, and as the chemical compatibility with SS 316 is excellent, we have offered you both the options - with Tescom make & Amar make BPR.	
		1	Level Gauge: (LG-1) End Connections: ¼" OD MOC: Glass with SS 316 as base frame.	Amar
6	Valves	4	Filter: (F-1 to F-4) Type: In-line Size: 7 microns (Gas line) & 60 microns (Liquid line) End Connection: ¼" OD MOC: SS 316	Swagelok / Parker
		3	Isolation Valve: (BV-1 to BV-3) Type: 2-way End Connection: ¼" OD MOC: SS 316	Swagelok / Parker
		1	Isolation Valve: (TBV-1) Type: 3-way End Connection: ¼" OD MOC: SS 316	Swagelok / Parker
		6	Needle Valve: (NV-1 to NV-6) Type: Regulating End Connection: ¼" OD MOC: SS 316	Swagelok / Parker
		5	Non-Return valve: (NRV-1 to NRV-5) End Connection: ¼" OD MOC: SS 316 *With kalrez O-ring	Swagelok / Parker
		1	Pressure Relief Valve: (PSV-1) Set Pressure: 80 Bar End Connection: ¼" OD MOC: SS 316 *With kalrez O-ring	Swagelok / Parker
7	Fittings, Tubing & Insulation	1	As per requirement End Connections: ¼" OD MOC: SS316	Swagelok / Sandvik / Parker
8	PLC based Control Panel with HMI, SCADA & PC	1	PLC Based Control Panel: For Preheater, Vaporizer & Reactor's temperature Indicator & Controller, with suitable high temperature Alarms and interlocking. with compact design All safety interlocks, SMPS, Panel, SSR, SPR, MCB, Buzzer, Indications, HRC fuse etc Other necessary accessories, Line Filters, Wiring, cables etc All other accessories as per the system requirement Provision to develop and modify HMI/ SCADA screens as per requirement of the customer	Siemens / Allen Bardley / Honeywell

			Data logging and backup, trends, historical data for both HMI and SCADA Back up of PLC logic, SCADA software and its developed application, HMI logic and screens to be provided is provided by Amar. Provision to operate the unit from HMI and SCADA independently	
			All the temperature control settings in the PLC should have ramp and soak with at least eight steps	
		1	SCADA: Online control and data acquisition system for Gas flow, liquid flow, reactor furnace temperature, reactor pressure, catalyst bed temperature indication & control by SCADA software.	
		1	HMI Screen: 10" HMI colour with touch screen Resolution 1024X600 or better, HMI panel with provision of connectivity keyboard and mouse for data entry	
		1	PC/ Laptop: Suitable Laptop/PC for the above-mentioned SCADA software a) 24" Screen b) Intel Core i7 Processor 12 gen or latest one with MS Office, OS Windows 11Professional 64 bit (English) c) 1TB SSD, RAM: 16 GB d) Wireless Mouse, Keyboard, Wi-Fi connectivity, DVD-RW and USB ports.	DELL / HP
9	**Structure**	1	Aluminum Skid MOC: Std *External ladders / platforms are not considered in present scope of supply.	Amar
10	**Spares**	6	Needle Valve: Type: Regulating End Connection: ¼" OD MOC: SS 316	Swagelok / Parker
		2	Isolation Valve: Type: 2-way End Connection: ¼" OD MOC: SS 316	Swagelok / Parker
		2	Isolation Valve: Type: 3-way End Connection: ¼" OD MOC: SS 316	Swagelok / Parker
		2	Non-Return valve: End Connection: ¼" OD MOC: SS 316 *With kalrez O-ring	Swagelok / Parker
		1	Seamless tube Length: 5 meter End Connections: ¼"OD	Swagelok / Parker

Table 3- Technical specification for Pressure tubular reactor system to carry out catalytic vapour phase reactions (Unit-2)

Sr. No.	Item	Quantity	Description	Make
1	**Reactor with Furnace Assembly**	1	Reactor-1; Type: Tubular reactor Dimensions: 33.4 mm OD x 24.3 mm ID x 1200 mm L Operating Pressure: 1-70 Bar Design Pressure: 80 Bar Operating Temperature: 600 Deg C Design Temperature: 700 Deg C MOC: Inconel 600 * Material of construction for Reactor's inlet and outlet connection, Thermowell is alloy inconel 600 *Catalyst bed temperature at four different point is measured by temperature sensor/ thermocouple. *Reactor is provided with Pressure Gauge, Pressure Transmitter, Pressure safety Valves, Rupture Disc * Reactor tube is designed for frequent and easy to dismantle and reinstallation for catalyst loading/discharge and screening studies Reactor is provided with pressure monitoring & safety system with alarm	Amar
		1	Electrical Furnace Heater-1: Type: Split type Electrical furnace Operating Temperature: 700°C No of zone: 3 Dimensions: Suitable for reactor tube of heating length 1000 mm *Three zone furnace with controllable temperature for individual zone to ensure isothermal operating condition across the catalyst bed inside the reactor tube. *All zones with temperature safety limit alarm (TSS)	ATS USA / Carbolite / Watlow
2	**Gas Feed Assembly**	2	Mass Flow Controller: (MFC-1 & MFC-2) MFC-1; Fluorocarbon Gases: 152a / Trifluropropene MFC-2; Corrosive Gases: Chlorine / Fluorine Type: Thermal Flow Rate: 10-500 ml/min Operating Pressure: 1-80 Bar (variable pressure) Operating Temperature: Ambient Temperature Turndown Ratio: 50:1 Accuracy: ±1% of setpoint (Within 20-100% of full scale) End Connections: ¼" OD MOC (wetted parts): SS 316	Bronkhorst / Brooks / Alicat

			*MFC is provided with bypass loop line, with filter and NRV for direct flow to reactor. *Gas flowrate is monitored and controlled by PLC *We have considered Thermal MFCs based on the comments mentioned in corrigendum released post Prebid conference.	—
		1	Preheater: Type: Tubular Operating Pressure: 1-70 Bar Design Pressure: 80 Bar Operating Temperature: 200 Deg C Design Temperature: 300 Deg C MOC: Inconel 600 *Dimensions: ½" Tube or higher will be decided during detailed engineering *Effective heating length: 12" or more (will be decided during detail engineering) *Preheater temperature is monitored and controlled by PLC	Amar
		1	Furnace-3 Type: Split type Electrical furnace Operating Temperature: 300°C No of zone: 1 Suitable for preheater dimensions	Amar
		1	Line Heater: (LH-1 from Preheater outlet to reactor inlet) Operating Temperature: 350°C MOC: Std.	HTS Amptek
3	Liquid Feed Assembly	1	Pump: (P-1) Type: HPLC Liquid: Chloroform / Tetrachloroethane / Tetrachloropropane Flow rate: 0.01 - 10 ml/min Flow rate increment 0.01 ml/min Operating pressure: 1-80 Bar Operating Temperature: 0-60°C MOC (wetted part): SS 316 *Pump with high precision and flowrate is monitored and controlled by PLC *With Self flushing pump heads with continuous wash without auxiliary pump-piston wash	Teledyne
		1	Vaporizer: Type: Tubular Operating Pressure: 1-70 Bar Design Pressure: 80 Bar Operating Temperature: 200 Deg C Design Temperature: 300 Deg C MOC: Inconel 600 *Dimensions: ½" Tube or higher will be decided during detailed engineering	Amar
		1	Furnace-2 Type: Split type Electrical furnace	Amar

			Operating Temperature: 300°C No of zone: 1 Suitable for vaporizer dimensions	
4	Outlet Section	1	Condenser-1: Type: Double Pipe Operating Pressure: 1- 70 Bar Design Pressure: 80 Bar Design Temperature: (-20) to 100 Deg C MOC: SS 316 with Teflon coating inside flowpath	Amar
		2 set	Fins over tube for cooling: Tube MOC: Alloy 600 Fins MOC: SS304 As per requirement	Amar
		1	Gas Liquid Separator (GLS-1): Type: Jacketed, Clamped end at the top and torispherical dish end at the bottom. Capacity: 2 Litre Operating Pressure: 1-70 Bar Design Pressure: 80 Bar Design Temperature: (-20) to 100 Deg C Shell MOC: SS 316 with Teflon coating inside the vessel Jacket MOC: SS 304 *GLS is designed for collection of reaction product fractions (Liquids/ Gases) during the reaction. *Gas Liquid Separator is designed with inlet and outlet line for liquids and gas outlet line.	Amar
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		1	Pressure Transmitter: (PT-1) Pressure Range: 0-80 Bar MOC (wetted parts): SS 316	Wika
		11	Temperature Element: (TE-1 to TE-5; TE-10 to TE-12; TSS-1 to TSS-3) Type: K-type Temperature Range: 0 - 700 Deg C MOC: Alloy 600	Exotherm/ Equivalent
		1	Multipoint Temperature Element: (MPT-1) (TE-6 to TE-9) Type: K-type No of Sensing Points: 4 Temperature Range: 0 - 700 Deg C MOC: Alloy 600	Exotherm/ Equivalent
		1	Rupture Disc: (RD-1) Burst Pressure: 80 Bar MOC: SS 316	BS&B / Varem
		1	Back Pressure Regulator: (MBPR-1) Type: Manual Operating Pressure: 1-80 Bar	Tescom / Amar

			Operating Temperature: 100-250°C End Connections: ¼" OD MOC (wetted part): If Tescom make, MOC: SS 316; or If Amar make, MOC: Alloy 600 *With perpetual support. *As per the comments mentioned in corrigendum released post Prebid conference, we have considered Manual Back pressure regulator with operating temperature of 100-250°C immediately after the reactor. *BPR vendors have regretted to quote for Alloy 600 MOC, and as the chemical compatibility with SS 316 is excellent, we have offered you both the options - with Tescom make & Amar make BPR.	
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		3	Isolation Valve: (BV-1 to BV-3) Type: 2-way End Connection: ¼" OD MOC: SS 316	Swagelok / Parker
		1	Isolation Valve: (TBV-1) Type: 3-way End Connection: ¼" OD MOC: SS 316	Swagelok / Parker
		6	Needle Valve: (NV-1 to NV-6) Type: Regulating End Connection: ¼" OD MOC: SS 316	Swagelok / Parker
		5	Non-Return valve: (NRV-1 to NRV-5) End Connection: ¼" OD MOC: SS 316 *With kalrez O-ring	Swagelok / Parker
		1	Pressure Relief Valve: (PSV-1) Set Pressure: 80 Bar End Connection: ¼" OD MOC: SS 316 *With kalrez O-ring	Swagelok / Parker
7	Fittings, Tubing & Insulation	1	As per requirement End Connections: ¼" OD MOC: SS316	Swagelok & Sandvik / Parker
8	PLC based Control Panel with	1	PLC Based Control Panel: For Preheater, Vaporizer & Reactor's temperature Indicator & Controller, with suitable high temperature Alarms and interlocking. with compact design	Siemens / Allen Bardley / Honeywell

	HMI, SCADA & PC		All safety interlocks, SMPS, Panel, SSR, SPR, MCB, Buzzer, Indications, HRC fuse etc Other necessary accessories, Line Filters, Wiring, cables etc All other accessories as per the system requirement Provision to develop and modify HMI/ SCADA screens as per requirement of the customer Data logging and backup, trends, historical data for both HMI and SCADA Back up of PLC logic, SCADA software and its developed application, HMI logic and screens to be provided is provided by Amar. Provision to operate the unit from HMI and SCADA independently All the temperature control settings in the PLC should have ramp and soak with at least eight steps	—
		1	SCADA: Online control and data acquisition system for Gas flow, liquid flow, reactor furnace temperature, reactor pressure, catalyst bed temperature indication & control by SCADA software.	
		1	HMI Screen: 10" HMI colour with touch screen Resolution 1024X600 or better, HMI panel with provision of connectivity keyboard and mouse for data entry	
		1	PC/ Laptop: Suitable Laptop/PC for the above-mentioned SCADA software a) 24" Screen b) Intel Core i7 Processor 12 gen or latest one with MS Office, OS Windows 11Professional 64 bit (English) c) 1TB SSD, RAM: 16 GB d) Wireless Mouse, Keyboard, Wi-Fi connectivity, DVD-RW and USB ports.	DELL / HP
9	Structure	1	Aluminum Skid *External ladders / platforms are not considered in present scope of supply.	Amar
10	Spares	6	Needle Valve: Type: Regulating End Connection: ¼" OD MOC: SS 316	Swagelok / Parker
		2	Isolation Valve: Type: 2-way End Connection: ¼" OD MOC: SS 316	Swagelok / Parker
		2	Isolation Valve: Type: 3-way End Connection. ¼" OD MOC: SS 316	Swagelok / Parker
		2	Non-Return valve: End Connection: ¼" OD	Swagelok / Parker

AMAR EQUIPMENTS

		MOC: SS 316 *With kalrez O-ring	
	1	Seamless tube Length: 5 meter End Connections: ¼"OD MOC: SS 316	Swagelok / Parker

COSP