

File Ref. No. PUR/IICT/DMS/0681/24-25
CPPP Tender ID : 2024_CSIR_204898_1

Dt: 22-08-2024

Minutes of Pre-Bid Conference (PBC) held on 22-08-2024 for proposed procurement of "Supply, installation and commissioning of "Customized High Pressure Tubular Reactor System - 1 No."

Chairpersons / Members of the Technical Sub Committee (TSC) present during PBC including domain experts present during PBC:-

1. Dr. N.Lingaiah, Chairman
2. Dr.PratyayBasak, Member
3. Dr.G.Jithender Reddy, Member
4. Sri. D. Venkateswara Rao, Member
5. Dr.SreepriyaVedantam, Member
6. IO Dr. A. Venu Gopal

Representatives of the following firm attended the PBC:

Following one bidder has attended the PBC meeting physically.
M/s. Qualitas Techno Solutions.

Another bidder, M/s. Amar Equipment Pvt Ltd has raised queries through email.

The following points were discussed during the PBC with the technical committee on the points raised by one bidder physically and by one bidder over e-mail and the responses are as follows:

Queries by M/s Qualitas Technosolutions and responses:

Query-1:

Temperature specification for Furnace and Pre-heater are given as the same.

Response: Yes, these are required because if needed in certain cases, pre-heater could be used for reactor in itself.

Queries raised over e-mail by M/s Amar Equipment Pvt Ltd and responses:

Query-1:

SS316 MOC is not compatible for such high temperature and pressure conditions. Hence, we suggest INC 625 as reactor MOC with below design parameters:

J. Acharya

Design pressure (Bar)	Design Temperature (°C)
100	800
50	900
10	1000

Response: The MoC required will be SS316, the maximum operating temperature is now amended as 500 °C with 100 bar maximum operating pressure Instead of 700-900 °C with 100 bar. Further, furnace design temperature and pre-heater design temperature is now modified as 900 °C

Query-2: We presume that the reactor of each size required is 3 nos, out of which 1 will be in use, and the other 2 will be kept as spares. Please reconfirm.

Response: All the three reactors (of each diameter) will be connected in series (One as pre-heater and other two as main reactors).

Query-3: CO leak detector – For sensing and alarming shall be of portable type. Please reconfirm.

Response: Yes

Query-4: Request you to please elaborate Thermal MFC - CO- with iron penta carbonyl trap

Response: It is a conventional way to connect a trap for removal of iron penta carbonyl impurity.

Query-5: MFCs standard maximum operating temperature is 65Deg C, however 70 Deg C is mentioned in the tender specifications. Please comment.

Response: It will be amended to 65 °C

Query-6: Please let us know the type of condenser to be used: Shell & tube / serpent coil type; as both types are mentioned in the tender specs, however, quantity of condenser mentioned is only 1.

Response: It will be amended to Shell-and-tube type

Query-7: Point no 7 mentions BPR and point no 25 mentions Pressure Control Valve, the function of both is ideally same to control the pressure of the entire system. We presume that there is requirement of only 1 instrument for controlling this pressure. Please reconfirm..

Response: Yes

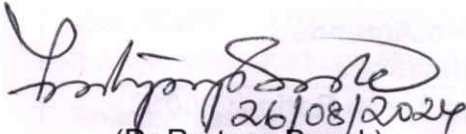
Query-8: Please confirm the delivery period of the system, as it mentions 120 days at one place ,and 12 weeks supply +3 weeks installation at other place.

Response: The delivery period including complete installation will be 120 days.

J. Ashok.

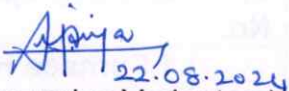
Points clarified by CSIR-IICT Team during PBC:


One bidder has physically attended the meeting (M/s Qualitas Techno Solutions). One more bidder, M/s Amar Equipment Pvt Ltd has raised queries over e-mail. All points were discussed by the technical committee and point wise responses are drafted. Responses and modifications made, will be uploaded in **CPPP** as part of **revised/amended tendered specifications** along with CSIR-IICT website www.iict.res.in or before _____. All bidders are requested kindly to take a note of the changes, in tendered specifications subsequent to **PBC** held today, i.e. 23-07-2024 before they start submitting their online bids through CPPP.

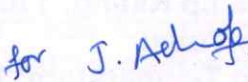

(Dr. Pratyay Basak)
Member

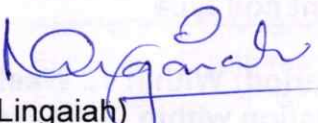
Ag. Chairperson


(Dr. Jithender Reddy)
Member


(Dr. Sreepriya Vedantam)
Member


(Sri. D. Venkateswara Rao)
Member

for 
(Dr. A. Venu Gopal)
IO/PL


(Dr. N. Lingaiah)
Chairperson member

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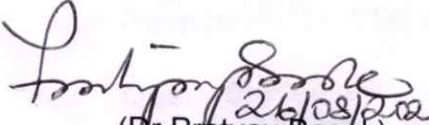
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The following changes has been made in tendered specification subsequent to PBC held on 22.08.2024

S. No.	Existing Specifications	Revised/Amended Specifications
1	1.Furnace Heater: Design Temp Rating: 1100 °C	Design Temp Rating: 900°C
2	2.Pre-heater (for gases & liquid) Design Temp Rating: 1100 °C	Design Temp Rating: 900°C
3	3.Reactor Tube: Operating Temperature: 700 °C	Maximum Operating Temperature: 500 °C
4	10.Product handling section I Condenser: Type: Shell and tube and Serpent coil type	Condenser Type: Shell and Tube
5	Delivery period: Within 12 Weeks and Installation within 3 Weeks.	The delivery period including complete installation will be 120 days.

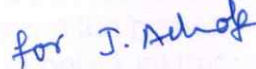
All the other tender terms remains unchanged. Bidders may please submit their bids accordingly.



(Dr. Pratyay Basak)
Member
Ag. Chairperson


(Dr Jithender Reddy)
Member


(Dr. Sreepriya Vedantam)
Member


(Sri. D. Venkateswara Rao)
Member


(Dr. A. Venu Gopal)
IO/PL


(Dr N Lingaiah)
Chairperson
Member

REVISED SPECIFICATIONS OF
CUSTOMIZED HIGH PRESSURE TUBULAR REACTOR SYSTEM

A customized high pressure tubular reactor system with multiple furnaces, hand-fitted tubular reactors and NRTL approved control system, with an operating pressure of 100 bar and a maximum operating temperature of 500°C, which is skid-mounted to carry out high pressure gas phase reactions is required. The reactor system requires to be facilitated for connecting to an in-process sample analysing system for detailed analysis at every stage of the process. The system needs automated SCADA controlled arrangement for robust operation. Detailed specifications of the major equipment parts and the required accessories that are required as a single integrated unit are as appended beneath:

Reactor manifold:

S. No	Item	Qty	Specification
1.	Furnace Heater	2	<ul style="list-style-type: none"> • Type : Split construction with stainless steel shell and hinge assembly • Power : 230 VAC, Single-phase • Total length : 50 cm • Bore at end disk : To accommodate reactors of 0.5" and 1" ID. • End Disc : 1" with reactor bore • End Cap : 1" with reactor bore • End disc and cap to accommodate reactor with dimensions of 0.5" ID • Temperature control : Ramp soak profile heating controller • K-factor to be < 1 • Operating Temperature : Ambient to 700 °C • Design Temp Rating : 900°C • Construction : 03 zone furnace for temperature measurement at 3 zones along the reactor length • Heating element must comprise of Kanthal A1, embedded windings • Thermocouple Ports : 1/4" dia, located mid-length of each zone on opposing halves of the furnace, for skin temperature. • Support brackets compatible for vertical mount of the furnace to be provided • Hinge to be provided on the left
2	Pre-heater (for gases & liquid)	1	<ul style="list-style-type: none"> • Type : Split construction with stainless steel shell and hinge assembly • Heating element must comprise of Kanthal A1, embedded windings • End Disc : 1" with reactor bore • End Cap : 1" with reactor bore

J. Acharya.

			<ul style="list-style-type: none"> • End disc and cap to accommodate reactor with dimensions of 0.5" ID • Operating Temperature : Ambient to 700°C • Design Temp Rating : 900°C • Construction : 03 zone furnace for temperature measurement at 3 zones along the reactor length • Thermocouple Ports : 1/4" dia, located mid-length of each zone on opposing halves of the furnace, for skin temperature. • Support brackets compatible for vertical mount of the furnace to be provided • Hinge to be provided on the left • Temperature control : Ramp soak profile heating controller • K-factor to be < 1 • Power : 230 VAC, Single-phase • Total length : 50 cm • Bore at end disk : To accommodate reactors of 0.5" and 1" ID.
3.	Reactor Tube	3	<ul style="list-style-type: none"> • ID: 1" • Type: Metal to metal seal (Seamless) • Fitting: Hand fitted only • Flow Mode : Down Flow Reactor • MOC: SS 316 • Operating Pressure : 100 bar • Maximum Operating Temperature : 500 °C • Thermowell Dimensions: 1/4" OD inside of reactor tube • Catalyst bed temperature measurement: Three zones at a distance of 2 cm each from the start of the bed. • Mesh Roll with different length: 20cm, 16cm, 12cm, 8cm and 4cm • Catalyst Capacity : 2-20 cc / gm • Heating Media : Electric Furnace heater as specified in item no. 1 • Temperature control : Skin Based • End Connections : 1/8"OD with HEX coupling • Reactor Volume : 140 ml (without thermowell) • Reactor Volume : 125 ml (with thermowell) • Internal Diameter : 19 mm • Outer Diameter : 25 mm • Process Inlet & Outlet distance: 50 cm • Total reactor length: 70 cm • End Connections : 1/8" OD
4.	Reactor Tube	3	<ul style="list-style-type: none"> • ID: 0.5" • Type: Metal to metal seal (Seamless)

J. Ashraf

			<ul style="list-style-type: none"> • Fitting: Hand fitted only • Flow Mode : Down Flow Reactor • MOC: SS 316 • Operating Pressure : 100 bar • Operating Temperature : 700 °C (Max: 900 °C) • Process Inlet & Outlet distance: 50 cm • Total reactor length: 70 cm • End Connections : 1/8" OD • Catalyst Capacity : 2-20 cc / gm • Heating Media : Electric Furnace heater as specified in item no. 1 • Temperature control : Skin Based • End Connections : 1/8"OD with HEX coupling • Reactor Volume : 35 ml (without thermowell) • Catalyst bed temperature measurement: Three zones at a distance of 2 cm each from the start of the bed. • Mesh Roll with different length: 20cm, 16cm, 12cm, 8cm and 4cm • Reactor Volume : 31 ml (with thermowell) • Internal Diameter : 8 mm • Outer Diameter : 13 mm • Thermowell Dimensions:1/4" OD inside of reactor tube
5	Control Panel	1	<ul style="list-style-type: none"> • Operation : Manual as well as SCADA • Protection rating must be minimum of IP55 • CO leak sensing and alarming for the necessary action. • Emergency stop • SCADA to be run 24X7 with business PC configuration with i7 processor, 16GBRAM, SSD hard drive, 24" screen. It should have logged data continuously for 1-2 Sec, Data monitoring, historical as well present graph screen, continuous report generation & recipe tool to be incorporated. • Control and monitor the temperature, pressure, and flow. • Safety limits to ensure reactor should run in safety mode. • Safety for sensor breaks alarming. • Safety limit to stop the flow for over pressure second level.
6.	High pressure HPLC pump	1	<ul style="list-style-type: none"> • Feed Tank : 02 to 03 liter & SS 316 MOC • Process Fluid : Water • Accuracy : within 2% of set flow rate & pressure • Flow Rate : 0.01-10 ml/min • Head MOC : SS 316

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			<ul style="list-style-type: none"> • Communication : RS232 • Operating Temperature : 60 °C(Max) • Flow Accuracy : within 2% of set flowrate • Operating Pressure : 100 Bar (Max) • End Connection : 1/8" OD
7.	Back pressure regulator (BPR)	1	<ul style="list-style-type: none"> • To be placed in-line with a maximum pressure of 100 bar • Should sustain line temperature (<100 °C) • Diaphragm : SS316
8	Air compressor		<ul style="list-style-type: none"> • Auto mode • Air compressor suitable for Back pressure regulator as specified in item 7
9	Thermal MFC I. CO- with iron penta carbonyl trap	1	<ul style="list-style-type: none"> • Maximum Inlet Pressure : 100 Barg • Maximum Operating Conditions : 97 Barg • Contact Part M.O.C. : SS 316 • Gas Flow Range : 5 to 200 ml/min • End Connections : 1/8" OD • Accuracy : ±0.5% Rd plus ±0.1% FS (At calibration conditions) • Calibration certificate : 3 to 5-point calibration
	II. MFC for CO ₂ GAS	1	<ul style="list-style-type: none"> • Maximum Inlet Pressure : 45 Barg • Maximum Operating Conditions : 42 Barg • Contact Part M.O.C. : SS 316 • Gas Flow Range : 5 to 200 ml/min • End Connections : 1/8" OD • Normal heating @ 70 Deg.C for the CO₂ line should be provided
	III. Coriolis MFC for CO ₂ GAS+badger controller RC 200	1	<ul style="list-style-type: none"> • Maximum Inlet Pressure : 100 Barg • Maximum Operating Conditions : 97 Barg • Contact Part M.O.C. : SS 316 • Gas Flow Range : 5 to 200 ml/min • End Connections : 1/8" OD • Normal heating @ 70 Deg.C for the CO₂ line should be provided
	IV. Thermal MFC for H ₂ gas	2	<ul style="list-style-type: none"> • Maximum Inlet Pressure : 100 Barg • Maximum Operating Conditions : 97 Barg • Contact Part M.O.C. : SS 316 • Gas Flow Range : 15 to 800 ml/min • End Connections : 1/8" OD • Accuracy : ±0.5% Rd plus ±0.1% FS (At calibration conditions) • Calibration certificate : 3 to 5-point calibration
		1	<ul style="list-style-type: none"> • Maximum Inlet Pressure : 100 Barg

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	<p>V. Thermal MFC for N₂ gas</p>		<ul style="list-style-type: none"> • Maximum Operating Conditions : 97 Barg • Contact Part M.O.C. : SS 316 • Gas Flow Range : 5 to 200 ml/min • End Connections : 1/8" OD • Accuracy : ±0.5% Rd plus ±0.1% FS (At calibration conditions) • Calibration certificate : 3 to 5-point calibration
10.	<p>VI. Thermal MFC for CH₄ gas</p>	1	<ul style="list-style-type: none"> • Maximum Inlet Pressure : 100 Barg • Maximum Operating Conditions : 97 Barg • Contact Part M.O.C. : SS 316 • Gas Flow Range : 5 to 200 ml/min • End Connections : 1/8" OD • Accuracy : ±0.5% Rd plus ±0.1% FS (At calibration conditions) • Calibration certificate : 3 to 5-point calibration
	<p>Product handling section</p> <p>I. Condenser</p>	1	<ul style="list-style-type: none"> • TYPE : Shell and tube type • Operating Temperature Range : -40 °C to 200 °C • Operating Pressure: 100 Barg • MOC : SS 316 • Coil : 1/4" tube coil • Coil Length : 250 mm • Internal Dia of Jacket : 54mm • Outer Dia of Jacket: 60.3mm • Jacket Length : 250 mm • M.O.C. : SS 316
	<p>II. Gas liquid separator</p>	1	<ul style="list-style-type: none"> • Operating Pressure : 100 Barg • Level Sensor : Analog with standard accuracy of 0.5% of full scale • Internal Dia of Shell : 40 mm • Outer Dia of Shell : 48.26 mm • Shell Length : 200 mm • Capacity of HPS : 375 ml (Appx) • Cooling coil outside vessel: 1/8" OD copper tube coil
	<p>III. Product collection vessel</p>	1	<ul style="list-style-type: none"> • M.O.C. : SS 316 • Capacity : 03 L • Operating conditions: Atmospheric

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11	Chiller	1	<ul style="list-style-type: none"> Type: heating and cooling chiller Working temperature range : 0°C to 80 °C Temperature stability: - 0.2 °C Heating capacity: 1.2kW Filling volume: 2 to 4L Barbed fitting diameters: 8/12 mm Pump capacity flow pressure: 5L/min Circulation capacity pressure: 0.5bar Bath tank: Stainless steel Cooling of compressor: 1 stage water Cooling water pressure maximum: 6bar Temperature controller: PID1
12.	Cylinder Regulators		
	i. High pressure H ₂ regulator	1	
	ii. High pressure CO ₂ regulator	1	<ul style="list-style-type: none"> Maximum Inlet Pressure: 200 Barg Maximum Flow Rate (100Barg, N₂): Model 3030S: 4600 SCFH (2170 SLPM) Flow Capacity (Cv): 0.06 Operating Temperature : -26°C to 74°C Gauges: Stainless Steel Body: Stainless Steel Bonnet: Nickel plated brass Piston: 316 stainless steel
	iii. High pressure N ₂ regulator	1	
	iv. High pressure CO regulator	1	
	v. High pressure CH ₄ gas regulator	1	
13	UPS	1	<ul style="list-style-type: none"> 10 kVA
14.	Level switch		<ul style="list-style-type: none"> Type : Level Switch Contact Part MOC : SS 316 End Connections : 1/8"OD Max Operating Pres: 100 barg @ Amb Temp
15.	Filter		<ul style="list-style-type: none"> In-line Filter for liquid line M.O.C: SS 316 End Connections : 1/8"OD X 1/8"OD Element Pore Size : 60 microns for liquid line Max Operating Pres : 100 barg @ Amb Temp
16.	Ball Valve		<ul style="list-style-type: none"> Type : 1-Piece two-way ball valve M.O.C : SS 316 End Connections : 1/8"OD Operation : Manual Max Operating Pres : 100 barg @ Amb Temp
17.	Bulk Head Union		<ul style="list-style-type: none"> Type : Bulk Head M.O.C : SS 316

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			<ul style="list-style-type: none"> • End Connections : 1/8" OD • Max Operating Pres: 100 barg @ Amb Temp
18.	Level Control Valve		<ul style="list-style-type: none"> • Type : ball valve • M.O.C : SS 316 • End Connections : 1/8"OD • Operation : Automatic (Air Operated) • Seal : PTFE • Max Operating Pres: 100 barg @ Amb Temp
19.	Pressure Gauge		<ul style="list-style-type: none"> • Type : Bourdon tube Pressure Gauge • M.O.C : SS 316 • Dial Size : 63 mm • Mounting : Back & Bottom • Pressure Range : 0 - 100 Barg • End Connections : 1/8"MBSP
20.	Check valve		<ul style="list-style-type: none"> • Type : Inline Check Valve • M.O.C : SS 316 • Seal : Fluorocarbon FKM • End Connections : 1/8"OD
21.	Needle Valve		<ul style="list-style-type: none"> • Type : 1-Piece two-way ball valve • M.O.C : SS 316 • End Connections : 1/8" OD • Operation : Manual • Seal : PTFE • Max Operating Pres: 100 barg @ 236 °C
22.	Micro Metering Valve		<ul style="list-style-type: none"> • Type : Flow control valve • M.O.C : SS 316 • End Connections : 1/8" OD • Operation : Manual • Seal : PTFE • Max Operating Pres: 100 barg @ 236 °C
23.	Rupture Disk		<ul style="list-style-type: none"> • Type : Rupture Disc • Disc M.O.C : INC • Disc Size : 0.5" • Burst Pressure: 100 Barg @ 200°F
24.	Transducer		<ul style="list-style-type: none"> • Type : 2 Wire Pressure Transmitter • Contact Parts : 316L • Pressure range : 0 to 100 Barg • Power supply : 24 VDC • End Connections : 1/8"MBSP
25.	Pressure Control Valve		<ul style="list-style-type: none"> • Type : Diaphragm Type Globe Valve • Operating Pressure : 100 Barg • End Connections : 1/8" OD • CV :0.05
26.	Pressure Safety Valve		<ul style="list-style-type: none"> • Type : Pressure Relief Valve • Control Range : 50 – 100 Barg

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		<ul style="list-style-type: none"> • M.O.C : SS 316 • End Connections : 1/8"OD
27.	Mounting	Skid Mounted
28.	Filter	<ul style="list-style-type: none"> • Type : In-line Filter for gas line • M.O.C : SS 316 • End Connections : 1/8"OD X 1/8"OD Element Pore Size : 07 micron for gas lines • Max Operating Pres: 100 barg @ Amb temp
29	Three Way Valve	<ul style="list-style-type: none"> • Type : 1-Piece three-way ball valve • M.O.C : SS 316 • End Connections : 1/8"OD • Actuator Type : Manual • Seal : Modified PTFE • Max Operating Pressure : 100 barg @ Amb Temp

J. Aulof.

Ajaya
22.08.2024.