

भारत सरकार / Government of India
भाभा परमाणु अनुसंधान केंद्र / Bhabha Atomic Research Centre
रसायनिकी प्रभाग / Chemistry Division

सन्दर्भ संख्या : CHD/SB/44431
Ref. No.:

दि :
Date: 20/06/2022

विषय : लघु संविचरन/कोटेशन का आसूत्रण
Sub: Minor fabrication/ Invitation of quotations

महोदय Dear Sirs,

- संलग्न विनिर्देशों और आरेखों के अनुसार लघु संविचरन/अनुरक्षण कार्य के लिये कोटेशन आमंत्रित किये जाते हैं।
Quotations are invited for the minor fabrication job, as per the enclosed specification (Annexure-1)
 - बोलीकर्ता इन घटकों के संविचरन/अनुरक्षण हेतु सामग्री एवं सामग्री के बिना कोट करेंगे।
Bidder shall quote for fabrication/repair/maintenance of these components with material
 - करों एवं सीमा शुल्कों को अलग से कोट करना होगा। आवश्यकता होने पर प्रपत्र ए एफ उपलब्ध कराया जायेगा।
Goods and Service Tax shall be quoted separately.
 - कोटेशन अध्यक्ष, रसायनिकी प्रभाग को दिनांक 26/07/2022 तक पहुंचना चाहिये एवं लिफाफे में उपर्युक्त सन्दर्भ संख्या तथा नियत तिथि उपरिलिखित करके सीलबन्द करके भेजना होगा।
The quotations must reach Head, Chemistry Division by 26/07/2022 and must be sent in a sealed envelope superscribed with the above reference number and due date given above.
 - लिफाफे पर पता निम्नलिखित होगा:
अध्यक्ष, रसायनिकी प्रभाग,
भाभा परमाणु अनुसंधान केंद्र,
ट्रोम्बे, मुंबई-400085
The address on the envelope should read as
Head, Chemistry Division,
Bhabha Atomic Research Centre, Trombay,
Mumbai - 400085
- कृपया, ध्यान दें/ डॉ.: सीमिता बेनर्जी
Kind Attention: Dr. Seemita Banerjee
- संविचरित कार्य का निरीक्षण हमारे अभियांत्रिकी द्वारा किया जायेगा। पूर्ण रूप से तैयार घटकों को हमारे अभियांत्रिकी द्वारा बोलीकर्ता के स्थान पर अनुमोदित करने से पहले नहीं भेजा जाएगा। बोलीकर्ता के परिसर संविचरन के दौरान में आवश्यक निरीक्षण सुविधा उपलब्ध करावी जागी चाहिये।
The fabricated work shall be subject to inspection by our engineer. The finished components shall not be dispatched prior to approval by our engineer, at bidder's works. Necessary inspection facilities should be provided to our engineers during fabrication at bidder's premises.
 - बोलीकर्ता पूर्ण रूप से तैयार घटकों को हमारे अभियांत्रिकी के अनुमोदन के पश्चात बोलीकर्ता को क्रय आदेश के जारी होने की तारीख से 90 दिनों के भीतर पूर्ण रूप से तैयार घटकों को सुपुर्द करन होगा एवं निशुल्क जारी पदार्थों/ सामग्री से प्राप्त स्क्रैप को बोलीकर्ता द्वारा 2-78-H Mod Labs पर सुपुर्द करना होगा।
The bidder shall deliver the finished components after approval by our engineer/s within 90 days from the date the firm purchase order is issued to the bidder. The finished components and the scrap from the free issue material shall be delivered by the bidder at 2-78-H Mod. Labs.

8
24/6/2022

अध्यक्ष, रसायनिकी प्रभाग बिना कोई कारण बताये किसी एक या सभी प्रस्तावों को स्वीकार/ अस्वीकार करने का अधिकार सुरक्षित रखते हैं।
Head, Chemistry Division reserves the right to accept/ reject any or all the questions without assigning any reason.

संलग्न: आरेख सं :

Encl : Technical specification (Annexure-1)

24/06/2022

अध्यक्ष, रसायनिकी प्रभाग

Head, Chemistry Division

डॉ. ए. के. त्यागी / Dr. A. K. Tyagi

अध्यक्ष, रसायनिकी प्रभाग

Head Chemistry Division

डॉ. ए. आर. सी. / B.A.R.C.

ट्रॉम्बे, मुंबई 400065 / Trombay, Mumbai-400065

Annexure-I

Fabrication of High Pressure Setup for Hydrogen Estimation

SPECIFICATIONS

1. FURNACE STRUCTURE

Outer Shell size	:	≈150mm (D) x 200 mm (Height) Circular cross section
Useful volume (hot zone)	:	40mm dia x 55 mm height
Isotherm temperature)	:	70 mm dia x 125 mm height with accuracy (uniform of ±1°C
Shell Construction	:	SS 316Body and SS Angle's double wall structure with proper stiffeners
Tube Inner diameter	:	30 mm
Furnace Maximum Temperature	:	(700 ± 1) degree Celsius
Furnace Minimum Temperature	:	(RT ± 1) degree Celsius
Furnace arrangement	:	One end closed (Bottom Closed. Top open)

2. REACTOR CHAMBER

Reactor Vessel body	:	Made with High grade corrosion resistant stainless steel (SS316) Retort size 40mm Dia X 350mm length Retort 40mm Dia X 30mm ID Sample volume - 30mm X 20mm Height Remaining Chamber will be covered by SS316 rod
Maximum/Minimum Temperature In the vessel	:	(700 ± 1) °C –upto RT °C
Maximum pressure In the vessel	:	80 bar
O ring	:	Flat Copper O ring
Sample holder	:	Made with solid copper and stainless Steel

3. PIPE LINES AND VALVES

Pipe lines	:	High Pressure stainless steel pipe lines from Swagelok 1/4" OD / HP
Needle Valves	:	2 way straight Swagelok SS Needle valve 1/4" OD High pressure end connection.
Fittings	:	High-grade corrosion resistant stainless steel with High pressure Swagelok End connection.
Pressure Locking system	:	Swagelok ferrule

4. PRESSURE SEALING

Vacuum sealing	:	Copper o-ring based vacuum sealing at the base plate
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Fittings : Swagelok SS316 fittings are used throughout.

5. HEATING SYSTEM

Heating elements : Ceramic Band Heaters
Operation : 240 / 1 phase / AC / 50 Hz
Calculated power required : 1.6 Kw
Maximum temperature : 700 °C
Continuous operating temp : 650°C
Rate of heating : 1 to 25 deg per min

6. PRESSURE SYSTEM

- a. Pressure Sensor cum Indicator : 1200mbar (positive pressure) to 10mbar (Vacuum)**
1. Accuracy : ±0.05% FS positive pressure,
 2. Temperature Compensation : 0 to 50°C (32 to 122°F) to rated accuracy
 3. Standard Engineering Units : psi, bar, kg/cm², inH₂O (4°C, 20°C or
 4. Media Compatibility : Liquids and gases compatible with 316 SS
 5. Operating Temperature : -10 to 55°C (14 to 131°F)
 6. Dimensions : 111.1 H x 127 W x 38.1 mm D (4.375 x 5 x 1.50")
 7. Input Port : 1/4 MNPT lower mount
 8. Display : 5 digits, 16.5 mm (0.65") high
 9. Window : Rugged Polycarbonate
 10. Bar Graph : 0 to 100% in 20 segments
 11. Power : 24 Vdc power optional
- b. Pressure transducer : 0-69 bar**
- (a) Make and Model : Omega & DPG7025-1K
 - (b) Combined Accuracy : 0.25% Accuracy
 - (c) Temperature range : +10 °C to +50 °C

7. VACUUM SYSTEM

- a) Oil Free Edwards Make : XDD1 Diaphragm Pump 230V 50Hz
- b) Edwards nEXT85H turbomolecular pump with pressure of maximum 10⁻⁶ torr, with needle valve and connecting accessories and pressure gauges
- c) Cleaning of Chamber (Purge Line) Pump should enable N₂ or Ar purging for cleaning Process tube (Reaction chamber) after deposition shall be flushed with Ar/N₂ for which separate line will be provided.
- d) Accessories Two Anti-corrosive, gas independent pressure gauge (~10⁻³ Torr, and 1-1000 torr measurement range), digital display, high accuracy, and reproducibility at atmosphere, easy to exchange plug & play sensor element.
- e) The ATV1000 Exhaust Throttle Valve is one of three components in a closed loop, downstream pressure control system.
- f) Water Cooled End Flanges with Silicon O ring

8. CONTROL SYSTEM

1. Control Panel : Pipe line bottom stand converted to control panel with all necessary electric and electronics

2. Temperature control : on par with international standards.
Eurotherm make microprocessor based PID (2416) Digital Temperature programmable Controller cum indicator with RS 485 communication Port
3. Safety Controller :Eurotherm make microprocessor based relay output With RS 485 communication port
4. Temperature sensor : 'K' type thermocouple along with Recrystallized alumina beads and sheath

9. Pressure Release Chamber

1. Pressure Release chamber : Made with High grade corrosion resistant stainless steel (SS316)
2. Volume of the vessel : 10 liters
3. Maximum pressure In the vessel : 10 bar

10. Hand Held Hydrogen Leak detector

Uni MP100, Single Gas Detector for Detection of H₂ (Diffusion Version), Range: H₂: 0-2000 ppm with 1ppm Resolution.

Features: Durable Housing, Large Display, 50 Event Data

logging, 95dB@30 cm, Built-in vibrator, Replaceable Lithium Battery,

11. Mass flow Controllers

- 1 No of MFC – 2 nos
- 2 MFCs will be calibrated for, Ar, H₂
- 3 Control Range : 1-1000 sccm
- 4 Accuracy: $\leq \pm 0.02\%$ of Full Scale
- 5 Material: Stainless Steel (316L)
- 6 Control Stability: $\leq \pm 0.1\%$ of Full Scale
- 7 Control Valve: Closed Solenoid
- 8 Mass flow controller maximum pressure 10 bar
- 9 Make :Alicat –USA
- 10

12. Hydrogen Safety

a. Filters

- 1 ultra fine filtering out of mechanical impurities through stainless steel filter inserts.
- 2 Filtering fineness -10 μm
- 3 Material – Brass elastomer
- 4 make : WITT

b. flashback arrestor

- MOC : Brass
- With Flame Arresting Element , NRV and
- Temperature sensitive cut-off valve.
- Connection : 1/4" NPTF,
- Max. Working pressure : H₂ = 60 bar.

c. High Pressure Relief valve

- Safety Valve _ pressure Relief valve
- MOC – BRASS
- Pressure setting range = 45- 0.5 bar
- spring- loaded, direct-acting safety relief valve
- Connections Available = NPT 1/2".

13. LabVIEW based data logging system for Pressure and temperature

14. Accessories: Additional Flat Copper O rings 200 nos

15. Installation and Commissioning by the vendor

16. Two years warranty

17. Pre delivery inspection