



DEPARTMENT OF CHEMICAL ENGINEERING  
INDIAN INSTITUTE OF TECHNOLOGY MADRAS  
CHENNAI – 600036, INDIA

Ref. No. RB/14-15/CHE/003/SHEI/RVIN

Date: 7 Nov. 2014

Due date: 28 Nov. 2014

**Item: High Pressure Interchangeable Stainless Steel and Glass Reactor**

1. Quotations are invited in duplicate for the items shown overleaf (in Annexure I). The quotations duly sealed and superscribed on the envelope with reference no. and due date, should be addressed to the undersigned so as to reach on or before the due date mentioned above.
2. The quotations should be valid for sixty days from the due date and the period of delivery required should also be clearly indicated.
3. The total cost of the equipment in terms of CIP Chennai should be clearly mentioned.
4. Terms of warranty and guarantee should be explicitly mentioned.
5. Packing and delivery charges, customs and clearance duty should be clearly stated.
6. Goods shall not be supplied without an official supply order.
7. Local firms : Quotations should be for free delivery to this institute. If quotations for ex-godown delivery charges should be indicated separately.
8. Firms outside Chennai: Quotations should be for F.O.R. Chennai. If F.O.R. consignor station, freight charges by passenger train / lorry transport must be indicated. If ex-godown, packing, forwarding and freight charges must be indicated.
9. The rate of sales / general taxes and the percentage of such other taxes legally leviable and intended to be claimed should be distinctly shown along with the price quoted. Where this is not done, no claim for sales / general taxes will be admitted at any stage and on any ground whatsoever. The taxes leviable should take into consideration that we are entitled to have Concessional Sales Tax (CST) applicable to non-government educational institutions run with no profit motive for which a concession sales tax certificate will be issued at the time of final settlement of the bill.
10. Payment : Specify the mode of payment and if advanced payment has to be made. Every attempt will be made to make payment within 30 days from the date of receipt of bill / acceptance of goods, whichever is later.
11. IIT Madras is exempt from payment of excise duty and is eligible for concessional rate of customs duty. Necessary certificate will be issued on demand.
12. IIT Madras has the right to accept the whole or any part of the tender or portion of the quantity offered or reject it in full without assigning any reason.
13. In case of any queries/clarifications, please contact Dr. R. Vinu, Chemical Engineering, IIT Madras, Chennai, E-mail: vinu@iitm.ac.in.
14. The sealed quotation may be sent to

**Dr. R. Vinu**

**Dept. of Chemical Engineering, IIT Madras**

**Chennai – 600036**

**(P) +91-44-22574187**



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**Annexure I**

Ref. No. RB/14-15/CHE/003/SHEI/RVIN

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**Technical Specifications for Lab-scale High Pressure Interchangeable Stainless Steel and Glass Reactor**

Scope/Application: Conduct high pressure and high temperature reactions in stainless steel and glass reactor/autoclave with acute temperature, pressure and O<sub>2</sub> concentration control.

**Stainless steel reactor**: Material: SS 316 (solid bar stock, non-welded), volume: 400-500 mL, design pressure: 100 bar, design temperature: 250 °C

**Glass reactor**: Interchangeable borosilicate glass reactor with SS metal head, fittings and base. Volume same as SS reactor. External electrical heater. Max. pressure = 6 bar. Max. temperature = 150 °C with safety shield and pressure safety valve.

External/Safety fittings: pressure gauge, vent valve, safety rupture disc, gas inlet and liquid sampling valve

Internal fittings: cooling coil, thermowell with RTD Pt-100 sensor, dip tube

Body and head sealing: teflon gasket with split clamp quick opening system

Motor and drive: 1/4 HP AC motor and variable frequency drive with 100-450 rpm. Digital rpm indication

Magnetic drive coupling for shaft sealing. Maintenance free magnetic drive coupling

Stirrer: 6 bladed turbine stirrer clamp and bush for the shaft

Heater: Electrical ceramic band heater with insulation and provision to connect temperature sensor. Insulated heater plate to avoid thermal shock

Control system: Microprocessor based PID temperature controller with high temperature alarm system. Motor speed controller.

Mounting: SS Movable trolley

Back pressure regulator (with PEEK seat and SS 316)

Pressure relief valve (SS 316) with max. working temperature of 250 °C

Flush bottom valve (SS 316)

Oxygen concentration sensor and controlling of system pressure based on preset O<sub>2</sub> concentration (necessary feature)



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Digital pressure indicator and high pressure alarm (quote separately)

Automatic control of cooling water in cooling coil based on pressure set point (quote separately)

Instruction manual, warranty and calibration certificates, tool kit and spare parts kit with all basic consumables should be provided

Installation and training should be provided by an expert service engineer

Power supply: 220 V, 50 Hz, Indian socket