

INDIAN INSTITUTE OF TECHNOLOGY KANPUR

Central Glass Blowing Section

Enquiry No.: CGBS/02/2013-2014

Opening Date: 30/08/2013

Closing Date: 20/09/2013

Sub.: Purchase of **Tube Sealing Unit System**

We are interested in purchasing **Tube Sealing Unit System** for Glass Blowing Section.

Our organization is an educational institute of the repute and liable to get education discount from manufacturer, please specify it, separately. Please send sealed

quotation, to undersigned, for the same.

Tube Sealing Unit Specifications

We are interested in procuring a glass/quartz tube sealing unit, which should be custom-designed and fabricated as per the specifications mentioned below. The required functions to be conducted by the proposed tube sealing unit are (i.e. the design should provide for):

- (i) Evacuating 4 glass/quartz tubes of (two each) 8mm and 10mm diameter (OD) simultaneously. Provision for evacuating 1, 2, 3 or all 4 tubes at a time should be possible. One set of vacuum gauges (both Pirani and Penning) for measuring low and high vacuum near the manifold (as described later).
- (ii) Back-filling with gas from cylinder (such as Ar, CO₂, N₂ etc.) to a required pressure in glass/quartz tube should be possible. Facility for each tube to be filled by a different gas or even for leaving some of the tubes in vacuum should be provided. (e.g. tube #1 may be filled with Ar to a pressure of 0.5 atm, while tube #2 is filled with O₂ to a pressure of 0.01 atm; while tubes #3 & #4 are kept in vacuum). This implies that mechanism (valves) must exist for isolation of each tube connection and 4 separate good quality needle valves should be provided.
- (iii) Pressure measurement should be possible via separate gauges for each tube.
- (iv) Re-evacuating and back-filling of selected tubes multiple times if required.
- (v) Sequential sealing of glass/quartz tubes must be possible with a ground based high temperature flame (i.e. the flame need not be lifted) in the evacuated or back-filled condition using the LPG facility along with gas-burner already available in the Central Glass Blowing Facility (CGBS) of IIT Kanpur. This requires that the glass/quartz tubes are attached to a flexible high quality high vacuum grade tube/pipe. The positions of the vacuum connections to the quartz/glass tubes should be such that there is no interference from other tubes when one is being sealed.
- (vi) The proposed tube sealing unit should be compatible with the CGBS facility for vacuum glass sealing, which means that the quartz tubes evacuated and back-filled with gas using the proposed unit should be easily be able to be sealed using the burners in the CGBS. The tube-sealing unit should comply with or be better than each of the specifications mentioned below.

Please note that the technical bid should clearly specify against each of the specification, the value offered by the proposed unit as well as clearly mention whether the unit complies or does not comply

with each of the specifications. If any specification is left unaddressed or unspecified, the bid would be considered as unresponsive and would not be considered for further processing.

Method of Submitting Quote:

Submit technical and commercial bid in two separate sealed envelopes. The name “technical bid” or “commercial bid” should be clearly mentioned on each envelope. The technical bid should not mention prices. If the technical bid is found to mention prices, the bid will be disqualified. The two sealed bids (technical and commercial) should then be sealed together in another bigger envelop. All the envelopes i.e. the technical bid envelop, price bid envelop and the main envelop should clearly mention the Tender Number at the top.

SYSTEM SPECIFICATIONS:

VACUUM PUMPING SYSTEM:

ROTARY VACUUM PUMP

Direct drive Rotary vacuum pump having a displacement capacity of at least 250 lit/min giving a vacuum of at least 1×10^{-3} milli-bar. This rotary pump is used as roughing pump as well as back-up pump for creating higher vacuum. Pump should be branded only (Hindhivac/Oerlikon Leybold/Edwards/Pfeiffer /).

OIL DIFFUSION PUMP Branded only .

The ultimate vacuum required is 1×10^{-6} milli-bar. For this purpose, an oil Diffusion pump having minimum 150 mm nominal diameter with a minimum effective pumping speed of 750 lit/sec should be provided . A cryo-trap should also be provided.

HIGH VACUUM VALVE (high quality)

A high vacuum butterfly valve of around 6" dia should be provided above the diffusion pump. This should facilitate the isolation of the diffusion pump, even when the tube is exposed to atmosphere.

CRYO TRAP :

To avoid the back-streaming of diffusion pump oil, liquid nitrogen cryo cooled trap should be provided in the system.

VACUUM COLLAR:

A vacuum collar should be mounted above the high vacuum valve and should be versatile for multiple needs of the user. The top port would be blanked off and can be connected after removing the top plate when maximum pumping speed is required. In case of a connection to a smaller opening, side port should be provided.

PLUMBING LINES & VALVES:

Plumbing lines made of 316 stainless steel incorporate combination valve for backing and roughing operations. An air admittance valve to release vacuum into the collar and a fine control needle valve for controlled admittance of inert gas should be provided.

MANIFOLD WITH FITTINGS:

The Proposed tube-sealing unit should cater to multiple tubes at a time. 1 to 4 tubes should be able to be evacuated simultaneously and backfilled with gas and then either sealed in backfilled condition or re-

evacuated and then sealed. It should be possible to backfill each tube with different gas through separate needle valves (for each tube). Each tube port should be compatible or easily adjustable with tubes of outer diameters 10mm or 8mm.

Stainless steel manifold should be mounted on the top of flanges. The other side mounted 4 nos. of small ball valve. There should be 4 no's of different diameter pipe e. g, 10mm/8mm (two each) with 60mm length and fitted with rubber tubes. After the each valve there should be one needle valve mounted to introduce gases.

VACUUM MEASURING GAUGES:

PIRANI GAUGE:

Branded (Hindhivac/Oerlikon Leybold/Vac Tech Engineers) Digital pirani gauge with two pirani gauge heads should be provided to independently monitor the roughing and backing pressure in the range of 1000 to 0.001 mbar through independent displays.

PENNING GAUGE:

Branded (Hindhivac/Oerlikon Leybold/Vac Tech Engineers) analog penning gauge, with 1 no. metal gauge head is provided to monitor high vacuum from is 1×10^{-3} to 1×10^{-6} milli-bar.

ELECTRICAL CONTROLS:

Unit should operate on 220V A.C 50 Hz Single phase power supply.

MOUNTING FRAME:

All the above components should be housed in an aesthetic metal frame with a front panel for mounting gauges and controls. The valve control knobs should be towards the front of the frame. The unit should be mounted on four castor wheels for mobility and easy maneuverability.

ULTIMATE VACUUM:

The unit should be specified to achieve an ultimate vacuum of 1×10^{-6} milli-bar in clean, cool, empty degassed condition with dry nitrogen back filling.

FREE SUPPLY:

The following material should be supplied free along with the unit:

- a) First charge of molecular distilled oil for vacuum pump.
- b) First charge of silicone oil for diffusion pump.
- c) One set of Instruction Manual.

(FACILITY TO BACKFILL WITH GAS).

(NOTE): At a time one, two, three or four Vacuum sealing should be done simultaneously.

Design or diagram of the system should be given along with the technical bids.

Reputation and Experience of the Supplier:

The prospective supplier should have a good experience of manufacturing and installing similar units in recognized laboratories, universities and companies. The supplier should include in the technical bid, a list of various personnel to whom the similar unit has been supplied along with the personnel's affiliation, address and contact numbers. In addition, at least one letter of "satisfactory performance" of the similar unit should

be obtained from one of the clients from either a national laboratory or a government institution (e.g. to list a few are IISc, IIT, NCL, NML or any Central Government institute.). This letter from the client should clearly mention that the unit has been installed since when and whether it has been performing satisfactorily .The name, address, mobile number, Fax number (all currently valid details) should be clearly mentioned in letter from the client.

Warranty: ONE year onsite warranty required (from date of installation, against all manufacturing defects and faulty workmanship).

Installation: The price should be inclusive of installation on site with full functionality.

Delivery time: 10 weeks maximum from the date of purchase order.

Payment: 100% on Satisfactory installation.

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