Department of Biochemical Engineering and Biotechnology

September 27, 2012

Specifications for Multi Tier Incubator Shaker

- Should have maximum of four Shaking Platforms in the same Incubator. The distance between two platform should be enough to accommodate 1 liter flasks in each platform
- Machine should be designed for extremely low energy consumption. The Power Consumption for the operation of machine < 2500 Watts at full load.
- Should have Single HMI (Human Machine Interface) Display with PLC for easy handling for all shaker parameters (Temperature and RPM).
- Should have gradual acceleration circuit in order to prevent sudden ON/OFF of shaker
- Set points (Temperature and RPM) and display should be retained by non-volatile memory. Machine should have an automatic restart after power is resumed.
- Visual & Audible alarms for set point deviations (temperature & rpm)
- Machine should be operable at amplitudes (diameter of orbital motion) at 13,25, 50 & 70 mm to facilitate process optimisation. There should be a provision to operate different platforms of the shaker at different RPMs and user defined amplitudes
- Pull out tray for easy handing & removal of flasks.
- Machine should have provision for illumination and measurement and control of Co_2 gas (OPTIONAL Accessory)
- Large viewing glass to facilitate observation of shake flasks under running condition.
- Belt less direct drive system for accurate speed control with the step size of 1 RPM and should be operable at an accuracy of 1%
- The machine should be designed to operate in the range of 30 – 350 RPM for 13 and 25 mm amplitude (orbital dia). It should be operable in the range of 30-300 RPM for amplitude (orbital dia) 50 mm and for amplitude (orbital dia) 70 mm the shaker should be operable at 30 -250 RPM

- The machine should have tray size of 800 x 420 mm for all the sliding platforms Each platform should be able to support a load of at least 25 Kg
- Machine should have PLC control for RPM, Temperature, CO_2 The system should be equipped with timer for RPM control.
- Machine should be operable in the temperature range 5°C - 80°C with a step size of 0.1 units Desired accuracy absolute : +/- 0.3 (at 37°C) using PT 100 as temperature sensor & 1000W heater
- The machine should occupy minimum floor space and therefore the shaker should have the chamber of outside Dimension (W x D X H) : 1760 x 685 x 2050 mm ($1.2M^2$) & inside dimension (W x D x H) : 760 x 560 x 1845 mm and total weight of the shaker should not be greater than 900 Kg. The machine should be equipped with anti vibration mounts.
- The outer body of the shaker should be made up of MS powder coated material whereas the inside should be made up of stainless steel SS 304 sheet
- The company submitting the quote should be ISO certificated
- The machine should have 15 numbers of clamps for 1 liter flask 52 clamps for 500 ml flasks and 38 clamps for 250 ml flasks
- The Company submitting the quote should be ISO certificated and the product should be CE certified"

Terms and Conditions –

1. Please submit the TECHNICAL and FINANCIAL bids in separate sealed envelopes. Mark the two envelopes clearly as "Technical Bid" and "Financial Bid". Both the sealed envelopes should be sent in a single sealed envelope, clearly marked as "**Quotations for Purchase of Multitier Incubator Shaker due on 19-10-12**". The quote should reach the following address on or before 19-10-12, up to 5 PM.

   Prof. A. K. Srivastava
   Department of Biochemical Engineering and Biotechnology
   Indian Institute of Technology Delhi
   Hauz Khas, New Delhi-110016

2. Please quote F.O.B. & CIF New Delhi prices separately.
3. Technical bid should contain **compliance chart** based on specifications as per NIQ, but must not contain any commercial information
4. The quotations should be in the currency of the country of origin and should be valid for at least three months.

5. Please attach all the technical literature and a list of similar installations done in India.
6. The warranty on the equipment should be clearly specified.
7. Payment should be through irrevocable letter of credit.
8. If the quote is being submitted by the representative of the Principals/manufacturer themselves, a valid Agency ship/Dealership Certificate authorizing the agent to quote to IIT Delhi on behalf of the Principals should be enclosed.
9. Complete set of manuals for the operation of equipment should be given.
10. Clearly specify the installation requirements—such as space, power, frequency, environment (Temperature and humidity) etc.
11. The institute reserves the right to accept or reject any / all the quotations without assigning any reasons thereof.