



INDIAN INSTITUTE OF TECHNOLOGY BOMBAY  
MATERIALS MANAGEMENT DIVISION  
Powai, Mumbai - 400076

**Specifications for “Closed Cycle Cryostat” to be established as a central facility at IITB**

**RFx No. 6100000682 (Reference No. 1000016799)**

**Note 1:** All components are necessary. Some suggestions for the suitable option are provided based on previous experience.

**Note 2:** In the technical bid, point by point list should be furnished to demonstrate requirements have been met.

**Other important terms:**

1. The closed-cycle cryostat should come with a three-year warranty. During warranty, all spare parts should be included free of cost, and at least three maintenance/breakdown service per year should be provided.
2. The authorization letter should be furnished along with the quotation.
3. **It is mandatory to quote price on DDP basis in the bidding engine. Bidders have to select FCA/ FOB as the system won't allow bidders to select DDP in online bidding engine.**
4. The compliance statement should be enclosed with the quotation.
5. The vendor should furnish a letter of authorization from the manufacturer along with the quotation. Also, the manufacturer should have ISO9001 or similar certifications.
6. The vendor should have trained service personnel to provide efficient after-sales service support. Names of three personnel, along with their training certificates, should be furnished along with the quotation.
7. The vendor must have done installation of at least five closed-cycle cryostat during the 5 years in the government academic institutions and R&D labs in India to be supported with installation reports obtained from the Institutions. The names and contact details of the Institutions where the instruments are supplied and installed should be given so that the technical committee can ascertain the veracity of the information provided.
8. The installation should be done free of cost for all equipment. Training to operate the instrument must be given to our research scholars free of charge.
9. Trained Service engineers in India or directly from OEM must be available to resolve technical problems within a week.
10. The vendor should take total responsibility to install the closed-cycle cryostat with the Raman spectrometer and demonstrate the performance.
11. All power supplies should be Indian type 230+/-10% Volts, 50 Hz, with Indian standard plugs. If Indian plugs are not available, suitable converters must be provided.

12. In the technical bid, technical specifications described below should be substantiated with data measurement, in particular for sample temperature and vibration level. The inability to do so will lead to disqualification from the tender process.

### **Closed cycle cryostat for Raman spectrometer**

The cryostat with the below specifications must be compatible with the Raman spectrometer. The vendor must take responsibility for their integration. A separate tender is being floated for the Raman spectrometer.

1. The temperature at the sample mount (not the second stage) should be controllable at least from 10 to 325 K.
2. Temperature stability should be better than 50 mK.
3. If required for operation, the unit should come with a chiller unit with minimum of 10m piping length and water reservoir tank.
4. Temperature controller unit (preferably Lakeshore 335)
  - Two independent diode / resistor input channels;
  - Two independent heater output loops (1st loop 25 W max banana plug output, 2nd loop 2 W max detachable terminal block)
  - Autotuning PID, audible and visual alarms, and relays;
  - GPIB (IEEE-488) parallel computer interfaces;
  - Cable to connect to cryostat.
5. Dry turbo pumping station with dry diaphragm backing pump from reputed suppliers only
  - a. Suitable vacuum gauge, vent valve, SS bellows, all necessary connections to be supplied.
  - b. Turbo Pumping speed for N<sub>2</sub> with NW40 should be at least 40 liter/sec.
6. Maintenance interval: minimum of 30,000 hours for compressor and 12,000 hours of the cold head.
7. Exchange-gas low vibration design with flexible rubber bellows.
8. Cryostat should have 10-pin feed through with 10 PhBr wires running to sample holder for user experimentation (exclude all other standard cryostat wires)
9. The system should come with a microscopy extension to be used under a microscope.
  - a. The length of microscopy extension from center of vacuum shroud should be  $\geq 200$  mm, and length of microscopy extension rod should be  $\geq 80$  mm.
  - b. Microscopy extension top & bottom flange diameter should be less than 120 mm.
  - c. Microscopy extension height should be less than 40 mm.
  - d. Microscopy extension top flange height should be less than 75mm when measured from base of cryostat.
10. Window material should be made from UV-grade fused silica windows. Windows should be epoxy sealed. Windows should be both on the top and bottom flanges and at least 1-

inch diameter. Optical windows must have more than 90% transmission for 300nm to 1700nm.

11. Working distance: the sample position to outer quartz window distance must be less than 7 mm.
12. Vibrations at the sample position in the laboratory working condition must be less than 120 nm when measured from 0 to 100 Hz. Vibration data to be provided in the same range with the technical bid measured using the same parts that are going to be supplied. Vibration test reports to be submitted as part of technical specifications.
13. Cooling power of bare cryocooler should be more than 7.5 W @ 20 K (second stage), 1.5 Watts @ 10 K (second stage), and 15 W @ 40 K (first stage). Initial cool down time should be less than 2.5 hrs @ 50 Hz to reach 10 K from ambient.
14. The water-cooled compressor with a full charge of high-purity helium gas
15. Cryostat vacuum shroud base should not occupy more than 130mm diameter space on optical table.
16. Cryostat drawing & product brochure with detail specifications to be submitted along with technical bid
17. The system should come with all necessary flex lines (minimum 10 feet long) and cold head control cable (minimum 10 feet long), exchange gas valve manifold with pressure relief valve, hose adaptor, flanges, evacuation valve, safety pressure relief valve, calibrated temperature sensor.
18. The system should come with a gold plated OFHC copper optical sample holder. Sample holder should have space to accommodate samples of 10mm diameter or more.
19. Appropriate mounting stand arrangement with castors & lock for mounting cold head to be included.

The following line items for the above specification in their respective currencies (INR or foreign) must be quoted separately:

1. Closed-cycle cryostat
2. Temperature controller
3. Water chiller
4. Mounting stand for cryostat
5. Vacuum gauge
6. Turbo pump