



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

For RfX No.6100000397 (PR No.1000014836)
Technical Specifications of Optical cryostat system:
(Quantity: 1)

1. Base temperature required: ≤ 10 K to ≥ 325 K.
2. Initial cooldown time (room temp to base temp) ~100 minutes.
3. Cooling power at 2nd stage ~2.0 watts at 20 K
4. Orientation free (Should be able to operate in any orientation without significant cooling capacity loss)
5. Recommended maintenance intervals:
 - a) Cold Head: $\geq 13,000$ hours
 - b) Compressor: $\geq 30,000$ hours

A) The system should include:

1. Two-stage pneumatically driven cold head
2. Helium compressor with full charge of high-purity helium gas
3. At least 10' long helium flexlines & cold head control cable
4. Cold finger with copper sample mount of ≥ 1.50 " diameter.
5. Sample holder size should be ≥ 1.5 " diameter.
6. 50 ohm control heater (cartridge type), and silicon diode temperature sensor.
7. Optical radiation shield made of highly polished aluminum with optical access holes of ≥ 0.75 " diameter.
8. Radiation shield should have bolted connection for repeatable & reliable optical alignment
9. Optical Vacuum shroud made of high quality & durable non-magnetic stainless steel, with quick disconnect clamp for ease of operation
10. Four O-ring sealed, fused quartz Optical windows with clear view of ≥ 1.6 " for large sample viewing angle (for sample illumination & data collection) allowing more flexibility in experimental set up
11. Instrumentation skirt should have below ports/feedthroughs for our experimentation:
 - a) One 10-pin electrical feedthrough for heater and temperature sensor wires
 - b) One 8-pin feedthrough with mating connector wired to the 4-probe holder, with (4) Ph-Br wires



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- c) One 10-pin feedthrough with mating connector, having (6) Ph-Br wires running to the sample area
- d) One blank port
- 12. Gold-plated (over Ni) OFHC 4-probe sample holder with the following details:- four (4) tungsten probes with point radius of 5 μ m on electrically isolated probe holders, a 0.5" diameter sapphire isolation disk for electrical isolation of the sample, transmission hole through the OFHC sample holder (not the sapphire disk),
- 13. 4 probe holder to enable variable movement to vary working distance, minimum possible working distance from outer surface of window to sample surface to be ≤ 30 mm.
- 14. One-piece base plate to mount the cryostat window block onto optical table
- 15. Temperature stability should be ± 50 mK or better at various temp setpoints.
- 16. Vibration levels at all frequencies up to 100Hz must be < 25 microns.
Vibration Test reports on the similar cryostat tested at frequencies up to 100Hz to be submitted with technical bid.
- 17. Cryostat drawing to be submitted along with technical bid.

B) Temperature controller (preferably Lakeshore) with below specification should be included:

- 1. At least two independent diode / resistor input channels
- 2. At least two independent heater output loops (1st loop 25 W max banana plug output, 2nd loop 2 W max detachable terminal block)
- 3. Autotuning PID, audible and visual alarms, and relays
- 4. GPIB (IEEE-488) parallel computer interfaces
- 5. Cable to connect to cryostat