



INDIAN INSTITUTE OF TECHNOLOGY BOMBAY

MATERIALS MANAGEMENT DIVISION

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**Technical Specifications of Cryo-Preparation Unit for FEG-SEM**  
**RFx No. 610001325 (Reference No. 1000029983)**

**Add on parts such as Cryoprep, Cryotransfer and Cryostage for existing equipment  
High-Resolution FEG SEM (Joel JSM 7600F)**

**Detailed Technical Specifications:**

State of the art High-Resolution Cryo stage, cryo-prep and cryo-transfer facility for our existing FEG-SEM (Jeol JSM 7600F) to include the following:

1. Compatible with our FEG SEM (Jeol JSM 7600F) equipped with SEI, BEI and LAGE detectors
2. SEM Cryo Stage should include:
  - a) Nitrogen Gas-cooled SEM stage module with thermal isolation (ambient to -190 °C)
  - b) Max stage temperature of 100°C is stipulated for our Cryo stages (Note: only the ones fitted with heaters elements).
  - c) Nitrogen Gas-cooled SEM anti-contaminator device (ACD) module with Thermal isolation (ambient to -190 °C)
  - d) Stage module and Anti-contaminator device (ACD) module independent of each other.
  - e) Gas controlled by electronic flow control valves with flow sensors.
  - f) Temperature sensor for measurement, display and control facility, independently for stage and anti-contamination device, for the specified temperature range.
  - g) LED lamp and CCD camera in SEM chamber with facility to view image with optional binocular viewing during sample preparation.
  - h) Interlock gate valve with airlock.
  - i) Off column cooling dewar for the SEM stage and ACD with a run time between fills of up to 24 hours or more.
3. Cryo Preparation Chamber should include:
  - a) Compact design with minimum mass on the SEM
  - b) Integral specimen exchange and manipulation controls
  - c) Two Integral Airlock gate valves with interface for vacuum transfer device into the device for loading and out of the device (into the SEM) forUnloading

- d) Integral 30 litres liquid nitrogen cooling Dewar(for cryoheat exchanger CHE) and optional 60 litre pressurised dewerwith long hold time for uninterrupted operation.
- e) Large anti-contaminator plates above and below the cold stage in preparation chamber
- f) Cold knife fracturing device with active braid cooling
- g) Connection for high purity argon gas supply
- h) Large front viewing window plus top (and side viewing through transfer device)
- i) Connection leads for temperature sensor, heater, and sputter coating head
- j) Additional vacuum interlock capabilities with some combinations
- k) Multiple LED chamber illumination
- l) Externally mounted CCD camera for observation of specimen stage wherethe imageis displayed on the system control screen.
- m) Fully automatic high-resolution sputter coating unit with Pt standard target (Au, Au/PdIr on request).
- n)Slushed nitrogen freezing and specimen handling system, ideal for handling pre-frozen specimens
- o) Pressurized dewar for dry N2 gas

4. Rapid freezing station for nitrogen slush freezing of specimens

5. Specimen transfer devicefor vacuum transfer with pumped storage

6. Floor mounted turbo pumpingwith stainless steel vacuum connection to preparation chamber with base vacuum  $8 \times 10^{-5}$  mbar (ambient),  $8 \times 10^{-7}$  mbar (-190 °C). With single  $5\text{m}^3/\text{hr}$  equivalent vacuum pump.

7. Remotely mounted turbo molecular pump (TMP) system to include:

8. System is controlled by a large touch screen, mounted on the preparation trolley. To Include:

- a) Control of nitrogen gas flow
- b) Automatic control of sublimation and sputtering
- c) Vacuum status
- d) CCD images of cold stages
- e)On-screen help
- f) Ability to store process recipes

9. Specimen holders for stubs, rivets (for liquids), Bal-Tec top-hats, planchettes, open rivets and rivets with lockable clamp

11. Instrument workstation with large work surface

12. Electronics located under the work surface in a ventilated, sealed unit

13. Specimen stubs

14. Specimen shuttles

15. Mounting media

16. Comprehensive start-up kit

17. **Warranty:** Minimum 3 year to be offered from date of successful installation.