



INDIAN INSTITUTE OF TECHNOLOGY BOMBAY

MATERIALS MANAGEMENT DIVISION

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Technical Specification

“Environmental Test Chamber with in-built Solar Simulator and Measurement System”

1. Chamber

- a) Internal Volume: 300-400 litres
- b) Temperature ranges: -30°C to $+100^{\circ}\text{C}$
- c) Temperature Change Rate (As per the International standard):
 - i. Heating Rate: $\geq 2-3^{\circ}\text{C}/\text{min}$.
 - ii. Cooling Rate: $\geq 2-3^{\circ}\text{C}/\text{min}$.
- d) Relative Humidity Range: from 10% to 90% within the temperature range ($+10^{\circ}\text{C}$ to $+90^{\circ}\text{C}$) (without solar radiation) [Calibration certificate for temperature and R.H. (using instruments calibrated with accredited calibration laboratory) should be provided.]
- e) Chamber should use refrigerant (compliant with Global Warming Potential protocols) in refrigeration system.
- f) The system should have in-built water supply tank for humidification with self-feeding system and water level alarm system.
- g) Air cooled condenser unit. Sound level not less than 60 dB measured as per the standard.

2. Controller

- a) The Equipment should have the facility for PLC based Controller for setup automated test sequence through computer and manually.
- b) On Chamber control with the built-in touch panel display. For additional computer-based control and data recording, necessary software and interface accessories should be provided with the equipment.
- c) Chamber embedded software to have perpetual license. Updates and reinstallation of the software should not require license renewal after expiry of warranty.
- d) Chamber should have in built power backup for the PLC to prevent loss of test results.
- e) In event of power failure, Chamber should have the capability to start the profile where it stopped automatically on power resumption.

- f) Remote Diagnostics by monitoring chamber parameters remotely to provide efficient service and maintenance activities.
- g) Remote control and monitoring of the test chambers through WIFI/Ethernet
- h) The control software should be able to perform (though not limited to) :
 - i. User defined measures and its' recording.
 - ii. Ability to upload, edit, export, (and delete) already existing cycles and recordings.
 - iii. Storage of alarms and events occurred during chamber operation.
 - iv. Visualization and graphical analysis of measures and recordings.
 - v. Synoptic graphs of the entire system.

3. Solar Simulator and Device Measurement System

- a) Solar spectra equivalent radiation source unit with LED or metal-halide light source. In case of metal-halide light source, additional lamp needs to be provided along with the equipment as a spare. The specification of the optical filter system should be provided.
- b) The system should provide a total irradiance of is 1100W/m^2 - with 1 SUN equivalent spectral distribution (IEC standard – Class B, at least) over the area of 0.2 m^2 (approximately).
- c) Irradiation intensity measurement – by calibrated.
- d) Pyrano meter / Photo diode should be provided to read the light intensity inside the chamber. Self-calibration of the lamp with the sensor feedback should be possible.

4. General

- a) Electromagnetic door closing System to ensure safety.
- b) 2 Entry port made of silicon for electrical connections and wires
- c) 1 No. Shelf should be made of stainless steel
- d) Electrical wiring must comply to standard to ensure safety.
- e) Interfaces Ethernet / USB
- f) Installation, commissioning and training by supplier deputed engineer and minimum 2/3 days training program for operation, programming and maintenance of the machine to the authorized person at site before final hand over to the equipment.
- g) Acceptance Test / Pre-Dispatch Inspection in the presence of the representative is mandatory requirement before dispatching the system.
- h) Along with chamber, Supplier has to provide latest configuration Laptop of reputed make with required software for remote operation and monitoring. The minimum configuration is with i7 or better processor, 16 GB RAM, 1TB SSD.
- i) 3 years on-site warranty.