



## INDIAN INSTITUTE OF TECHNOLOGY BOMBAY

### MATERIALS MANAGEMENT DIVISION

Powai, Mumbai - 400076

### Up-gradation of Geo-chemistry Lab for Clean Chemistry with Laminar Airflow Flow Benches :

- I. **Scope of Work:** Design, fabrication, supply and installation of Non-Metallic clean chemistry lab of Class 10000 as per attached design along with laminar flow benches of Class 100 as per US FED standard for ICP-MS sample preparation, and fume hood for acid distillation. Installation and commissioning at Earth Sciences department IIT Bombay.
- II. **Clean Chemistry Lab Dimensions:** Carpet area of 180 sq. ft. for clean room and of 40 sq. ft. for change room and air shower entry. Clean room inner height from the finished floor till the false ceiling should be 8 feet.
- III. **Machinery Load:** Three Vertical Laminar Airflow Work Benches of Class 100. One chemical storage cabinet. Two seatings. No metallic parts inside clean room.
- IV. **Air Flow and Ambient Conditions:** Class 10000 with airflow velocity of 90 feet per minute at downstream side. Particle retention 0.3 micron and above at discharge. Noise level 50 decibels +/-5%, inside the clean room. Magnehelic gauge 0 to 100 Pascal pressure indicators. Probable 70 air changes per hour. Ambient temperature  $22^{\circ}\text{C} \pm 2^{\circ}\text{C}$ . Ambient humidity 55%.
- V. **Air Filters:** Approximately seven numbers of 2 x 2 feet Mini pleat HEPA filters, H14 grade with 99.99% efficiency. Primary/Fresh air filters of 10 micron rating with 90% efficiency and of 5 micron rating with 95% efficiency made of HDPE mesh with reinforcement and casing made of non-metallic material. An additional set of spare pre-filters must be quoted.
- VI. **Condensing and Air Handling Units:** Condensing DX Units of 1 x 8 TR of a reputed brand. Air handling unit of double skin construction, 3000 CFM displacement, 125 mm static, with forward curve fans, driven by a three-phase 1440 RPM motor driven through belt system.
- VII. **Ducting:** Ducting inside the clean room should be of non-metallic material. For external part of the clean room, GI ducting made from 22 gauge sheet, with 13 mm thick nitrile rubber insulation for supply air and with 9 mm insulation for return air.
- VIII. **Wall Panel:** 80 mm thick, PUF insulated, high pressure laminated wall panels of off-white colour with integrated return riser wherever required. All the floor tracks and corner angels to be made of PP.
- IX. **False Ceiling:** 80 mm thick, PUF injected, high pressure laminated panels of off-white colour, duly supported from wall panels and ceiling through proper support systems as per standard clean room practice.

- X. **Coving:** Coving for all vertical and horizontal joints to be made of PVC.
- XI. **Flooring:** Vinyl flooring 2 mm thick.
- XII. **Glass for Windows:** Double glazed glass to cover 4 existing windows (3 ft x 4 ft each).
- XIII. **Return Air Riser:** Six numbers return air riser to collect the contaminated air back into AHU for continuous recirculation.
- XIV. **Door:** One clean room door, PUF injected, with non-metallic handles, lock, ball bearing type hinges and door closure.
- XV. **Air Shower Entry System:** Inner size: W 900 mm x D 900 mm x H 1950 mm, and Overall Size: W 1500 mm x D 1000 mm x H 2200 mm. Made of non-metallic material suitable for 2 persons per cycle.
- XVI. **Gowning Cabinet:** Non-metallic, static type, W 600 mm x D 600 mm x H 1500 mm; with swing door. 10 set of washable lab coats made from lint-free cleanroom compatible fabric. 10 pairs of clean room shoes. 50 pairs of disposable head cover and shoe cover.
- XVII. **Chemical Storage Cabinet:** One number with dimension H 6 ft x B 3 ft x D 1.5 ft and ducting made of PP.
- XVIII. **Modular Vertical Laminar Airflow Benches:** CLASS 100 as per US FED STD 209 E / CLASS 5 of ISO 14644-1. Three numbers, each with inner size of 4 ft x 2 ft x 2 ft. Entirely made of 6–8 mm propylene sheets and rods. Vertical, downflow. Unidirectional. Velocity  $90 \pm 20$  feet/minute. Work table made of 12 mm thick PP sheet. Sliding type front door made of 5 mm thick, clear, polycarbonate. One of the laminar flow benches should have a PP drip cup width acid-resistant drain pipe. Another laminar flow bench should have a suitable base for drying sample solution inside the chamber using an IR lamp. The base should preferably be of PP with teflon lining to withstand IR heating. Touch pad for each bench to control light and air circulation.
- XIX. **Blower Assembly for Airflow Benches:** DIDW type blower, 800 CFM driven by 220V, 1440 RPM motor. Separate exhaust system for each of the three laminar flow benches.
- XX. **HEPA Filter for Airflow Benches:** H14 grade, Mini-pleat HEPA filter in separator less construction in anodized aluminum extruded frame with protective mesh on both sides and tubular rubber gasket on downstream side. Initial pressure drop 12 mm, final pressure drop 30 mm. Particle retention 0.3 micron, efficiency 99.97% at rated velocity. Filter size 1220 mm x 610 mm x 65 mm.
- XXI. **Pre-Filter for Airflow Benches:** Synthetic, non-woven polyester fibers with protective mesh and deep comb formed into PU coated GI casing. IPD 6 mm. Particle retention 10 Micron. Efficiency 95%. Filter size: 600 mm x 300 mm x 30 mm.
- XXII. **Electrical and Lighting for Clean Room:** Clean room compatible electrical fittings. Complete internal wiring, cable from AHU equipment to control panel. Eight nos. of 1' x 1' 18W LED lights on the ceiling with separate switches for each. One 6" x 6" LED for change room/air lock. Plug points – 6 nos. of 5 Amps, and 2 nos. of 15 Amps.
- I.PP Fume Hood with Base Cabinet:** To be used for sub-boiling acid distillation systems for purifying HNO<sub>3</sub>, HCl and HF and for wet chemistry. One number with overall dimension W 1800 mm x D 750 mm x H 2400 mm. Inside liner, side panels and back panels to be made of chemical resistant, smooth finish, easily cleanable PP material of 6–8 mm thickness. Chemical resistant PP worktop of at least 17 mm thickness with

skirting from all sides to prevent chemical spillage. One oval-shaped water sink of 200 mm x 100 mm size made of PP material sealed with silicon sealant and water tap at right back corner of the worktop. Sink must have a trap for waste collection. Vertical rising polycarbonate glass sash of 5 mm thickness counter-balanced with pulley and counter-weight system. Fluorescent light (40 watt, 2 nos.) with vapour-proof fittings. Six nos. electrical sockets (230 V, 6/16 A, 50 Hz) (3 on left side and 3 on right side). MCBs with blower switch with built-in starter and light switch on front panel.

### **Other Terms & Conditions:-**

- Visit and Drawings: It is Mandatory for vendor to attend the pre bid meeting on 27th September 2019 at 11.00 am in the conference room of Joint Registrar (MM), MMD, Ground floor, Main building, IIT Bombay – 400 076.
- It's a **Turnkey** project.
- Period of Completion: The work must be completed within 60 days of receiving Purchase order.
- Warranty and Maintenance: One year of warranty on equipments. One year of comprehensive maintenance by the vendor.
- Experience and Certification: Preference will be given to vendors who have at least 10 years of experience in non-metallic clean room industry and constructed several major non-metallic clean rooms in India for chemical, geochemical or semiconductor applications as evidenced by user certificates. The company should preferably be ISO certified supplying CE certified equipments.
- Contact person for technical clarification: Prof. S. C. Patel, Department of Earth Sciences, IIT Bombay, Mumbai 400076. Ph. 022-2576-7270, 2576-4285, Email: scpatel@iitb.ac.in.
- Contact person for financial/legal clarification: Deputy Registrar of Material Management (DRMM), IIT Bombay, Mumbai 400076. Ph. 022-2576-8800; Email: drmm@iitb.ac.in.