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

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Technical Specifications

4-Port Stainless Steel Glove Box System with Integrated Thermal evaporation-based metal Coater capable of maintaining **oxygen and moisture levels below 1 ppm**, fully PLC-controlled, energy-efficient, and suitable for advanced thin-film deposition and inert-atmosphere materials

Sr. No	Item Description	Detailed Technical Specification	Technical Compliance (Yes / No)	Additional Information (if any)
1.1	**Glove Box Workstation:**	Stainless steel inert gas four-port glove box system integrated with metal coater, suitable for supply, installation, and commissioning.		
1.2	**Box Material:**	SS316 stainless steel, minimum thickness 2.5 mm, brushed finish (Ra ≤ 1.2 µm), external white coating.		
1.3	**Internal Dimensions:**	Minimum L 2400 mm × D 750 mm × H 900 mm.		
1.4	**Ports:**	Four (4) glove ports with O-ring sealing.		
1.5	**Glove Port Size & Material:**	Minimum 9-inch diameter, outer diameter 220 mm, anodized aluminum..		
1.6	**Front Window:**	Safety glass.		
1.7	**Gloves:**	Butyl rubber gloves, minimum thickness 0.4 mm.		
1.8	**Dust Filters:**	Two (2) HEPA filters (0.3 µm) for gas inlet and outlet.		
1.9	**Lighting:**	LED illumination		
1.10	**Leak Rate:**	< 0.05 vol % per hour..		

1.11	**Shelves:**	Minimum six (6) height-adjustable shelves.		
1.12	**Mini-Antechamber:**	Right-side, bidirectional sliding tray, minimum 400 mm × 220 mm, brushed finish.		
1.13	**Antechamber:**	Stainless steel cylindrical right-side chamber with bidirectional sliding tray; dimensions ≥ 600 mm × 400 mm; one-hand door mechanism; internal Ra ≤ 1.2 μm, external white finish.		
1.14	**Gas Purification System:**	5.5 kg Cu catalyst and 6.5 kg molecular sieve column. Removal capacity: minimum of 44 L oxygen & at least 1650 g moisture. Specification sheets or data sheets attesting to this must be provided. he purifier should be fully regenerable with an automatic/programmed control using forming gas (10% H2 or lower) or Ar or N2. Auto purge with time sequence or ppm of O2 and H2O		
1.15	**Control Unit:**	Glove box should be controllable with independent and fully integrated programmatic logic control (PLC), with a touch panel interface. All glove box functions should be accessible via the touch panel. Graphical display of the box pressure, O2 and moisture levels should be available in the touch panel interface. PLC should trigger an automatic box purge either due to high O2 or moisture or both in the glove box or an automatic timer option to trigger box purge at a pre-set time for a pre-set duration		
1.16	**Blower:**	Frequency-controlled blower, capacity ≥ 90 m^3/hour.		
1.17	**Automatic Pressure Control Range:**	Box pressure should be controllable automatically (via programmatic logic) within a pressure range of - 15 to +15 mbar.		
1.18	**Vacuum Pump:**	double stage rotary vane pump with oil-mist filter.		

1.19	**Sensor Set:**	A solid-state/Electrochemical oxygen sensor capable of measuring oxygen levels from 0.1 ppm to 1000 ppm should be provided with box. A solid-state moisture sensor capable of measuring moisture levels from 0.1ppm to 3000 ppm should be provided with box.		
1.20	**Purge Control:**	Fully automatic.		
1.21	**Regeneration:**	Automatic regeneration through programmed operation.		
1.22	**Solvent Trap:**	Minimum 6 kg activated charcoal; cartridge exchange without stopping purifier circulation.		
1.23	**Feedthroughs**	Four (4) DN-40 KF flanges.		
1.24	**Glove Port Cover:**	One (1) glove replacement cover.		
1.25	**Heat Exchanger:**	Integrated heat-exchanger system with chiller needs to be supplied.		
1.26	**Smart Energy Mode:**	Automatic vacuum pump shutdown, positive pressure control without pump, automatic light shutoff, reduced energy consumption and noise.		
1.27	**Gas Cylinders & Regulators:**	Nitrogen and regeneration gas cylinders with regulators; initial gases for installation under vendor scope.		
1.28	**Additional Feedthroughs with Glove Box:**	1 × BNC, 1 × banana connector, 1 × gas/vacuum dual pipe, 1 × electrical feedthrough, 1 × blank port.		
1.29	**Thermal evaporation based Metal Coater (2 Sources):**	Thermal evaporator chamber (300mm x 300mm x 400mm SS304 or SS316) Substrate shutter and source shutter (manual shutters), these can be upgraded for electro pneumatically operated. Provision for substrate heater. Substrate rotation with holder with RPM 0- 20RPM for uniform deposition. No of thermal sources 2- Thermal Source metal evaporator source. Provision for 1 more additional sources- can used for redox source or metal source. Power source: 300		

		Feasible for materials for deposition: Al, Cr, Au, Ag using appropriate coil or boats 300LPM turbomolecular pump-Pfeiffer make; 250LPM rotary pump - Pirani and penning gauges Thickness monitor (6MHz oscillator)-resolution of 1A, tooling factor 0.25 - 8.0, water cooled, film density of 0.8-99gm/cm2		
1.30	**Extras to be Supplied:**	2 pairs of gloves; molecular sieve 6 kg; copper catalyst 5 kg; activated carbon 6 kg.		
1.31	**Warranty**	Comprehensive warranty for minimum of three (3) years		
1.32	**Service support**	The vendor should have a service Center/facility and complete infrastructure within India to handle complete repair of the system. Critical spares should be available off the shelf.		