ANNEXURE-I

Indian Institute of Packaging

Tender Invitation Notice (Phase-I)

List of Laboratory Equipment

S.No	Name of the Equipment	Qty	Technical Specification	Location
1	Inclined Impact Tester	1	• Max. Payload 200 KG • Max.Impact Velocity 2.8 m/s • Max.Shock Distance 5M • Max.Size of Specimen 1200*1200*1600mm • Sliding Trolley 600*550*2500mm • Impact Base Size 1800*2000mm • Power Voltage 3φ 380V 50/60Hz • Test Standards JB/T6868-93 ISO2248-1972(E) • The equipment should have: Flexible positioning electric pulley, easy to fix the position, to achieve the required speed change value. Hydraulically operated for inclined angle of 10° Reinforced impact resistant plate to ensure firm structure. Conforming to Standard IS 7028 Part 3 and ASTM D 880	Ahmedabad

2	Vibration Tester	2	Technical Specifications: • Varying frequency of vibration using the panel box from 2Hz to 6 Hz • Pay load capacity 1500 kg • Table top 1500 mm x 1500 mm • Fixed amplitude of 25mm, which is generated using cam assembly • 0-99 hours programmable timer is provided for test duration • PC based Monitoring and control available with data logging facility Applications: For simulating the Road condition and handling of packages: • testing of IBC containers • testing of drums • testing of packages • testing of defence equipments/components • Conforming to Standards IS 7028, and ASTM D999, ISO 2247 • Calibration certificate from NABL accredited laboratory • Three years warranty plus five years AMC after the warranty period	Delhi Ahmedabad
3	Salt Spray Tester	3	Internal Size: 1600 x 700 x 800 mm Temperature Range: Ambient to 45 °C Temperature Accuracy: ±1 °C Temperature Control: Solid State Digital Programmable Temperature Controller cum indicator with special Zero Corrosion sensor Air Regulator: A moisture cum oil filter and air regulator ranging from 0 to 30 psi Construction: FRP- Fibre Reinforced Plastic; Double Walled (with glasswool insulation) Should be equipped with Air purging, Time totaliser, Cyclic timer, Regulators, Gauges and Specimen racks Conforming to Standards: ASTM B 117 -11; IS 5528; IS 6910	Mumbai Hyderabad Ahmedabad

4	Smoothness & Porosity Tester	3	• Measuring range: 5-3000 ml/min • Measuring accuracy: ± 0.5 % of the final value • Accuracy of test duration: ± 0.5 s • Able to Calculate mean and Standard deviation automatically • Conforming to Standards IS 9894, TAPPI T-251, ASTM D-737 and ISO 5636/1 • Should be able to measure the porosity (or air-permeability) of materials like non-woven or woven textiles, filter and cloth felts, some types of blotting, saturating and absorbent bag papers, meshes, etc. • Calibration certificate from NABL accredited laboratory Three years warranty plus five years AMC after the warranty period	Mumbai Chennai Ahmedabad
5	Gloss Meter for Paper and Paper Board at 75 deg & 20 Deg (Specular gloss of paper and paperboard at 75 degrees) - Imported	4	Measurement Range: 0-2000 GU (Gloss Units) Repeatability: 0.2 GU (Gloss Units) Reproducibility: 0.5 GU (Gloss Units) Angles: 200 , 600, 850 Conforming to Standards ASTM D 523, ASTM D 2457,ASTM E 430, ISO 2813, ISO 13803, DIN 67530	Delhi Hyderabad Kolkata Ahmedabad
6	Semi-cicro Weighing Balance with least count 0.01 mg	2	• Weighing Capacity: Up to 220 grams • Accuracy: 0.00001 g (0.01 mg) • Range of External Weights for Calibration: 10-220 g • Repeatability: ≤ 0.00001 g • Linearity: ± 0.00002 g • Response Time: 3 seconds • Ambient Temperature: 5-50 °C • Pan Size (approx.): F100 • Main body dimensions (approx.): 200(W)x290(D)x240(H) • Display: LED with backlight, excellent, high-contrast, easy-to-read display, with large digits • All-glass draft shield, with smooth-action doors that open extremely wide. • Built-in, motorized calibration weight • Shall comply with the standard IS 9281 (Part 3) • Calibration certificate from NABL accredited laboratory Three years warranty plus five years AMC after the warranty period	Ahmedabad Mumbai

7	UTM Machine	1	Load cell capacity 50kN Total Cross-head Movement (mm) 1000 0r 1100 Precision reducers, ball screws which significantly reduce the noise and transmission losses while increasing the transmission efficiency. The seal plate mining anode hardening protects the ball screw and increase service life and precision of the instrument. Load cell memory lock function which memorizes various parameters. Plug and play load cell. When using the external I/O signal contact various functions can be expanded. Jog control and very easy for operation of machine Many relevant tests can be performed with optional grips and extensometer of fixtures.	Mumbai
8	Water Activity Meter	1	**Water activity:** Range: 0.030 –1.000 aw; Resolution: 0.0001 aw; Accuracy: ±0.003 (4TE dew point) ±0.015 (4TEV capacitance); Repeatability: 0.001 aw **Temperature**: Range: 15-50 °C; Resolution: 0.01 °C; Accuracy: ±0.1 °C **Read Time**: ~5 min **Dimensions**: Length: 26.7 cm (10.5 in) Width: 17.8 cm (7.0 in) Height: 12.7 cm (5.0 in) **Operating temperature**: Minimum: 4 °C Maximum: 50 °C **Power** : 110–220 VAC 50/60 Hz **COMPLIANCE**: Complies with ISO 18787:2017 Manufactured under ISO 9001:2015 EM ISO/IEC 17050:2010 (CE Mark)	Mumbai

9	Environmental / Humidity Chamber (Walk - in - Type)	3	Capacity -15000 Liter Inner chamber MOC - Stainless steel 304 Outer chamber MOC - Stainless steel 304 Tray Size, Qty and MOC - 48 No's of Stainless steel; Size: 725 x 800 mm Door with lock and key arrangement - Required Observation window - Size 300 x 300 mm PUF Insulated Pre-fabricated panel which Can be easily assembled at site with 80 mm PUF thickness Illumination-Fluorescent tube light Inside chamber - Required **Process Requirement** Temperature range - 20 to 60 ºC Temperature Accuracy - ± 0.2 ºC Temperature Uniformity - ± 1 ºC Humidity Range - 40% to 95% RH Humidity Accuracy - ± 2% RH Humidity Uniformity - ± 3% RH Automatic Control of temperature and humidity :Required Auto start after recovery of power as per set parameters :Required Fully integrated PLC control system. Total system controlled by PLC with data storage of up to 1000 readings (i.e. if date-logging interval is of 30 mins then date upt 20 days is to be stored on the PLC itself) : PLC make allan bradly (Prefered) Data storage to be inbuilt in the PLC itself without additional external hardware Facility to send emails from PLC in case of deviation from set values : Required HMI: 4" Colour Touch Screen Display : Required Alarms for deviation required for : Required Temperature all sensors (High & Low) Humidity all sensors (High & Low) Other required alarms for Door opening Chamber mains supply failure Chamber water supply failure Emergency alarm (man inside) Componenet failure, circuit failure Forced air circulation to maintain uniformity Required	Hyderabad Chennai (2)

10	WVTR Tester (Imported)	1	Water Vapour Transmission Rate Tester, capable of detecting WVTR transmission through plastic films, laminated films, sheets as well as various materials used in food packaging applications. The instrument should also be capable of detecting water vapour transmission rate through PET bottles, retort pouches and other food packages. • Compliance Standards: New ASTM F3299, ASTM F1249, ISO 15106-3, DIN 53122-2. • Two test chambers. • Precise temperature control on each chamber: 10 Deg. C to 40 Deg. C. • Automatic gas flow control and precise humidity control on the wet side, 20% - 90%. • Measurement range: 0.005 to 1000 g/m2/day. • Sample Size: 50 cm2 & 100 cm2 • Carrier Gas Requirement: 100% Dry N2. • Windows software. • Grease or Film Sealant. • Nitrogen Purifier. • Calibration Film for low range and high range. • Analytical systems manufactured traceable to NIST. •System validation with certified gas or film for speed and convenience. •Flow, temperature and humidity control for ultimate responsiveness and repeatability. •Minimum two NIST calibration films to be supplied along with the equipment. •HP, Dell, IBM branded PC with Licensed Windows Software and Laser Printer. Intuitive Windows based software. Operating Manual.	Chennai

11	FT-IR with Microscope and Accessories	4	Ø The instrument must be sealed and desiccated optical unit. Vibration isolated base plate. Ø Offered system must be capable to use without any purging gas for sample compartment/optics/detector Ø Wavelength range : Must be minimum 7500 cm-1 to 400 cm-1 Ø Spectral resolution : Must be minimum 0.5 cm-1 or better Ø Wavelength precision : 0.01 cm-1 at 3,000 cm-1 Ø Wavelength accuracy : 0.1 cm-1 at 3,000 cm-1 Ø Signal to Noise Ratio : 48,000:1 or above peak-peak, 1 minute Ø Interferometer : Rotary Michelson interferometer for fast scanning, self-compensating for dynamic alignment changes due to a tilt and shear, incorporating high-reflectivity.. Ø Source : Long-life source with hot-spot stabilization. Must be user replaceable. Ø Beam splitter: Multilayer KBr for the study of metal oxides and metal Halides Ø Instrument must have Optics Guard system for extended desiccant life and additional optical component protection. Ø Instrument must have Atmospheric Compensation to minimize effect of atmospheric water and CO2 on the sample spectra without the need for reference or calibration spectra. Ø The instrument must have provision to attach the third party PIKE, SPECAC, etc. accessories ATR, HATR, etc. Ø Software : A single software platform incorporates all of the functions required for infrared analyses, Such as spectral comparison algorithm and Euclidean searching instrument control, data manipulation and analysis, and flexible report utilities, Ø Imported Portable De humidifier to be supplied. Ø Instrument should be capable to interface with TGA for Evolved Gas Analysis and IR microscope. Ø Installation & demonstration: Free of Cost. Ø Operative and service manuals to be	Mumbai Delhi Hyderabad Kolkata

			supplied. Ø IR spectral library to be provided. Ø Instrument must be quoted with ATR with diamond Crystal Ø Germanium Crystal for ATR accessory to be quoted for Black Samples.	

12	TGA - Analyser	1	• The instrument must operate to temperatures upto 1200 °C or more with scan rates of 500 °C/min or better. • The TGA should have Ultra Microbalance with 0.1 µg sensitivity and weighing precision better than 0.001%. and must be environmentally controlled (temperature and inert gas). • The Weighing range should be upto 1300 mg or better including pan weight. • The system should have Low Thermal Mass Furnace with built-in Platinum or similar heating element which is resistant to inert and oxidative gas over the full temperature range. The furnace should have facility of auto-calibration, auto-clean furnace etc. • The system must have the ability to operate in a vacuum to 10-5 Torr and should have capability to use various types of inert and active gases. The provision of ion spray to avoid static change should be available. • The Furnace should cool down to room temperature from 1100 °C in 15 minutes or better. • It must have a clear tube surrounding the furnace for visual observation of the sample area. • The Gas control should be mass flow control (balance purge and sample purge) and must be able to changeover from one gas to another in less than 3 minutes. • The Balance assembly should have thermostatting capability to minimize isothermal drift. • It should be supplied with platinum as well as ceramic pans (5 qty. each). • The movement of furnace should be software controlled. Furnace should be protected with chamber sleeve to avoid convection effects.	Mumbai

			• In future, TGA should have the capability to upgrade with FT-IR or GC-MS combination for EGA (Gas Evolved Analysis). CONTROL AND SOFTWARE • The system should be supplied with licensed software and Branded PC (i5 or better) and Colour Laser-Jet Printer. • The Software should be Multitasking, Multiuser with capability of handling multiple analyser simultaneously. • The Software should be using MS-Windows Environment and should have all the parameters for Instrument Control, Method storage, Multi Ramp capabilities etc. • The Software must have a real time reference curve capability • The Software must have real time calculation capability • The Software must be able to save several different data files into one file • The software package must include 28 curve types, 5 mathematical operations and 16 calculation options for Thermal Analysis, Autostepwise TGA, Variable Rate TGA, Decomposition Kinetics etc.	
13	Modular DSC	1	Heat Flow Measurement Method - Heat flux Temperature Range -150 to 725°C DSC Measurement Range ±100 mW RMS noise / Sensitivity 0.05 µW / 0.1 µW Scanning Rate 0.01 ～100°C/min	Delhi

14	Gloss Meter for Plastic and Coating Materials	1	Resolution 0.1GU • Repeatability ±0.2GU • Reproducibility ±0.5GU Resolution 0.1GU • Repeatability ±0.2% • Reproducibility ±0.5% Measurement range: 20°: 0-2000GU 60°: 0-1000GU 85°: 0-199GU Standards: ISO 2813, ISO 7668 ASTM D523, ASTM D2457	Delhi
15	Overal Migration Testing system (Automatic)	1	Test Range: 0.3 ~ 80000 mg Resolution: 0.1 mg Repeatability, mg: 0.3 Test Temperature: Room Temperature ~ 130 °C Temperature Accuracy: ±0.5 °C Additional Functions: Fast Evaporation Mode, Reagent Recycling Function, Acid, Alcohol & Alkane Test, Extended Working Station with independent weighing system Test Cup Capacity: 200 ml (approx.)	Hyderabad
16	Bursting Strength Tester (digital)	2	Range: Upto 60 kg/cm2 Least Count: 0.01 kg/cm2 Clamp: Pneumatic The diaphragm used in the equipment should be 0.35-0.45 mm thick and the pressure required to bulge the diaphragm 5 mm above the top plane of the lower clamping surface of the test instrument should not be more than 0-07 kg/cm2 Conforming to standards ASTM D 3786 and IS 1060 Part 1	Mumbai Hyderabad
17	Puncture Resistance Tester (digital)	2	To measure Puncture Resistance of various packaging materials like paper & corrugated boards/boxes etc. Micro Processor-based control panel; digital display Conforming to Standards IS 4006 (Part-II), IS 2771 (Part II), TAPPI T 803 om-99	Mumbai Hyderabad

18	Folding Endurance Tester (Schopper Type)	3	Specimen Size: 15 x 150 mm Counter: 0-999,999 Load Precision: ±0.5 Folding Angle: 135±0.5°, 90±0.5° Speed: Variable - From 20 cpm to 175±10 cpm Width of folding head: 19±1 mm Arc radius of folding surface: 0.25±0.02 mm, 0.38±0.02 mm, 3.5±0.02 mm Clamping thickness of folding head: 0.25, 0.5, 0.75, 1.0, 1.25mm Applicable Standards: TAPPI Method T 511 and ASTM D2176	Mumbai (2) Hyderabad
19	Falling Dart Impact Tester	2	Test Method Method A or Method B is optional Test Range Method A: 50 ~ 2000 g and Method B: 300 ~ 2000 g Accuracy 0.1g (0.1J) Specimen Clamp Pneumatic Clamp Pressure of Gas Supply 0.6 MPa (outside of supply scope) Port of Gas Supply Φ8 mm PU Tubing Specimen Size > 150 mm x 150 mm Power Supply 220VAC 50Hz / 120VAC 60Hz	Mumbai (2)
20	Carbon Black Content Tester	2	Material of construction: Compact tubular furnace to get temperature up to 800 °C Temperature Controller: Microprocessor based Digital PID controller with range up to 800 °C resolution of 0.1 °C & accuracy of +/- 0.1 °C Heating Load: 2 kw heating element wound on a tubular "Quartz" tube. Accessories: Glassware & gas flow regulator meter, Quartz boat, Pulling rod, Rubber tube, Gas bottle stand. Paint: Powder Coated.	Mumbai Hyderabad
21	Dead Weight Micrometer	1	Thickness of paper, plastic film samples to be measured between two circular optically flat surfaces under the pressure of 1 kg/cm2 (98 kPa) Programmable thickness micrometer - motorized, automatic; "Push Button" operation; Digital display (LVDT) Differential transformer as measuring transducer with high accuracy; Measurement Units: Microns, mm, cm, inch, mils Measuring Range: 0-15 mm Accuracy: 0-500 ± 1 micron, Conforming to Standards: TAPPI T411, ISO 534, ISO 3034, DIN 53105, BS 3983, BS 4817	Hyderabad

22	Grammage Sample Cutter (Hydraulic/automatic)	1	Grammage Sample Cutter is used to quickly and precisely cut samples of standard area. It is the special sample taker of grammage measurement for paper and cardboards. Sample Area: 100cm² Accuracy: ±0.35cm² Sample Thickness: (0.1~1.0) mm Conforming to Standards ISO 3801, ASTM D3776 / 2646, BS 3424 / 2471	Hyderabad
23	Hot Plate	1	Temperature: Upto 250 °C Heating Plate: Stainless Steel Controller: PID Power Supply: 220 / 230 Volts, 50 Hz Display: Digital Should come with overhead stirrer and support stand	Hyderabad
24	Torque Tester (digital)	1	Temperature: Upto 250 °C Heating Plate: Stainless Steel Controller: PID Power Supply: 220 / 230 Volts, 50 Hz Display: Digital Should come with overhead stirrer and support stand Calibration: Dead weight, NIST certifiable NIST Resolution: 0.1 unit (optionally 0.01 or 1) Maximum overload: 150% Rotation: infinite Torque tests: tightening, removal (CR, CT, etc.) Torque units: dNm, Nm, kg-cm, kg-m, oz-in, lb-in	Hyderabad
25	Dennison Wax Pick-up Tester	2	Apparatus should be comprised of: 1. Heating device, such as: Bunsen burner, alcohol lamp, propane torch, or electric heat element. 2. Wooden block, about 90 × 40 × 10 mm having a 30 mm diameter hole with an edge about 3 mm from one end. 3. Work surface that is smooth, hard, and a poor conductor of heat, such as wood. Conforming to Standards IS 1060 (Part 3), TAPPI T 459	Mumbai Hyderabad

26	Hardness Tester (Shore - A and Shore D)	2	Fitted with Digital durometer for shore hardness testing Measuring Range: 0 to 100 HA (HD) Accuracy: +/-0.5 Div Least Count: 0.1 HA. Conforming to ASTM D 2240, ASTM D 1415, ASTM D	Hyderabad & Kolkata
27	Automatic Titrator	2	No need for sample preparation (automatic acid addition by pump, no color indicator needed) Automatic measurement by pressing one button Accurate and repeatable measurement (electrochemical measurement) Not operator dependent Good safety with minimal reagent contact No need to use color indicator Automatic acid addition before titration Complete traceability with easy export features (USB or PC software)	Mumbai Hyderabad
28	Hot Plate with Magnetic Stirrer	1	Large 12" x 12" (30.5 x 30.5 cm) top plate surfaces Heating Range = Up to 200°C Stainless-steel top Stainless-steel case Conforming to ASTM D 36 and EN 1427	Hyderabad
29	Carbon Dioxide Free Air Genetor	1	Moisture < 0.5 ppm Total Hydro Carbon < 0.2 ppm CO & CO2 < 0.2 ppm Purity TOC/XL Grade Micro Particulates < 0.01µ Capacity of ZAG 1 LPM at 5kg/cm2 Room Temperature 5ºC – 25ºC Size of ZAG without compressor (in mm) 600H x 400W x 700D	Hyderabad

30	Melt Flow Index (MFI) Tester	3	Temperature Range: Ambient to 400°C Accuracy: ± 1°C Resolution: 0.01°C Least Count: 0.01 gms. Weights: 1.2 kg; 2.16 kg; 3.8 kg, 5 kg & 10 kg Temperature Controller: PID Warm Up Time: 10 mins (23°C to 190°C) Corrosion Resistant Barrel, Pistons, and Die Sample Cutting: Automatic Conforming to Standard ASTM D 1238 Calibration certificate from NABL accredited laboratory Three years warranty plus five years AMC after the warranty period	Mumbai Hyderabad Kolkata
31	Ply Bond Strength Tester	1	Capacity: 0 – 2100 J/m² Impact Angle: 90° Selectable units (J/m², ft.lb/in², and kg•cm) Magnetic hammer release Automatic calibration Conforming to Standard TAPPI T 569 Automatic specimen hold-down during test sequence Settable limits, statistics-average, standard deviation, high/low results Calibration certificate Three years warranty plus five years AMC after the warranty period	Hyderabad
32	Die Punch for Sample Preparation (Tensile Strength, Folding Endurance etc.) /Automatic Sample Cutter as per ISO/ASTM	2	To obtain specimen by punching, using hollow dies of different sizes and contours. Interchangeable socket punches with different profiles and size according to the customer needs. Should be made of steel with hand finished cutting edges and provided with ejector for easy removal of the specimen after punching. Conforming to IS 1060, IS 2508, ASTM D 638, ASTM D 882	Mumbai Hyderabad
33	Pouch Burst Tester (Automatic and Digital Model)	1	Digital model with load cell based system; Very Low Noise Level; Embedded Push Buttons on control panel; Peak hold facility for registration of maximum reading; Capacity - 300kgf; Least Count - 0.1kgf; Large LCD Display (38 X 103 mm); Accuracy (0.2% of full scale) - 0.6 kgf	Kolkata

34	Air Permability Tester- Gurley Method (Gurley Porosity Tester) - Imported	1	The Densometer test measures the time required for a given volume of air (25cc to 300cc) to flow through a standard area of material tested, under light uniform pressure. The air pressure is supplied by an inner cylinder of specific diameter and standardized weight, floating freely within an outer cylinder partly filled with oil to act as an air-seal. The sample material is held between clamping plates having a circular orifice area of 1.0 (standard), 0.25 or 0.1 square inch (optional). Densometer readings may be evaluated on both a direct or indirect basis dependent upon the material and test purpose. They are a direct test of materials which are intended to either resist or permit the passage of air. Indirectly, they are used to measure other physical properties which affect the flow of air through a porous sheet.	Kolkata
35	Tear Tester - Digital Model	1	• Purpose: To measure the force required to propagate an existing slit a fixed distance to the edge of the test sample. • Should comply with Standards IS 1060; ISO 1974,6383-2, 9290; ASTM D295, D752, D1424, D1922, D5734 ASTM D1922; TAPPI T414, T496 • 7" full-color digital touch screen display • Standard Impact Head: • Radius: 0.5 inches (12.7 mm) • Diameter: 0.75 inches (19.0 mm) • O-Ring Clamp: • Inside Diameter: 89 mm • Sample Size: • 5 x 5 in (127 x 127 mm) square • 5.25 in (133.35 mm) diameter circle • Air Clamp Assembly: Min. 60 PSI • Pendulum: Universal with interchangeable weights (200, 400, 800, 1600, 3200 and 6400 gram) • Pneumatic clamps and pendulum release • Automatic calibration of pendulum • Units: Selectable [Percentage (%), Millinewtons (mN), Grams-force (gf), Pounds-force (lbf)] • Sample statistics: Average, High/low results, Standard deviation • Output: USB flash drive, USB ESC/POS printer, RS232 • Power: Single phase; 220/240 V; 50/60 Hz • Storage and editing of up to 200 readings • Report printout with optional printer	Kolkata

36	Vacuum Leakage Tester	1	Automation Grade: Automatic Display Unit: Bar, Kpa Accuracy: 0.035 Pa	Mumbai
37	Air circulated oven	2	Temperature range up to +300 °C Capacity from 30 liters up to 1060 liters SingleDISPLAY and TwinDISPLAY Forced air circulation via chamber fan (adjustable speed in 10% increments)	Mumbai
38	Column Density Meter	2	Automatic density calculation Automatic calibration system LCD display Resolution 0.0001 g/ml Accuracy 0.0001 g/ml Backlight Variable speed pumped filling system Twin conical filling flasks Automatic magnetic stirrer Automatic sweep mechanism Stainless steel sweep baskets 7x optical microscope Digital temperature control to 0.1°C RS232 output Cooling coil 110v 60hz and 240v 50Hz Product user manual Traceable calibration certificate Conforms to ISO1183 & ASTM D1505	Mumbai & Kolkata

39	Texture Analyzer	1	Tester load capacity : 5 kN Load method : High-precision constant-speed strain measurement using backlash-free ball screw drive Test Force Measurement High-Precision Type : ±0.5 % of indicated value (within 1/500 to 1/1 of load cell rated capacity) Conforms to JIS B 7721 class 0.5, ISO 7500-1 class 0.5, EN 10002-2 grade 0.5, and ASTM E4. Standard-Precision Type ±1 % of indicated value (within 1/500 to 1/1 of load cell rated capacity) Conforms to JIS B 7721 class 1, ISO 7500-1 class 1, EN 10002-2 grade 1, and ASTM E4.. Range : 1 range (rangeless) Test force calibration : Automatic calibration using calibration cable Crosshead Speed Range :0.001 to 1000 mm/min Maximum Return Speed :1500 mm/min Crosshead Speed Accuracy :Within ±0.1% of test speed Dimensions and Weight :W400 × D530 × H1315 mm, Approx. 55 kg	Mumbai
40	Haze, Clarity & Transparency meter	4	Measurement Range: 10-2500 HU (Haze Units) Repeatability: 1 Hu (Haze Unit) Reproducibility: 7 HU (Haze Units) Measurement Range - Ø Light transmittance: 0 ~ 100%; Ø Haze: 0-30% (absolute measurement); Ø Haze: 30.1% ~ 99% (relative measurement) Resolution: 0.1 Accuracy - light transmittance: ≤1; Haze: ≤0.5%: ≤±0.3% Repeatability - Light transmittance: 0.5%; Haze: ≤0.5%: 0.1% Conforming to Standards ASTM D 1003, ASTM D 1044	Delhi Hyderabad Kolkata Ahmedabad
41	Multimeter (Ph, Temperature and Humidity)	1	Standard	Hyderabad
42	UTM-Spares	1	Load cell - 10kN; 50kN, Self Aligning Compression Platen; Compression Platens; Horizon Software; Blet Kit for H50KS and Bellows for H50KS	Chennai

Note: In case the quoted quipment/item is not available in the market as per specifications, the bidder may submit Higher Version/Latest Version.