

**TENDER DOCUMENT  
&  
SPECIFICATIONS BOOKLET**

**FOR LABORATORY EQUIPMENTS  
(FOR THE YEAR 2017 – 18)**

**Tender Notice No. IIP/LAB/2017/04    Dated: 03/05/2017**

**Last Date & Time of Receipt of Tender: 24<sup>th</sup> May, 2017 at 05:00 pm**



**INDIAN INSTITUTE OF PACKAGING**

Plot E-2, Road No. 8, MIDC Area,  
Andheri (East), Mumbai 400 093, Maharashtra, INDIA  
Tel.: +91-22-2821-9803 / 6751 / 9469  
Fax: +91-22-2832-8178 / 2837-5302

## INDIAN INSTITUTE OF PACKAGING, MUMBAI

**Tender Notice No. IIP/LAB/2017/04**

**Dated: 03/05/2017**

**Last Date & Time of Receipt of Tender: 24<sup>th</sup> May, 2017 at 05:00 pm**

Sealed tenders under **two bid system** are invited from reputed manufacturers/suppliers of various scientific/ testing equipments. Tender details and the terms & conditions can be downloaded from [www.iip-in.com](http://www.iip-in.com). Two separate lists namely Part I – Imported Equipments and Part II – Indigenous Equipments is given in the tender document. Manufacturers/Suppliers can supply quote for supply of each equipment separately or group wise, ie for Part I AND/OR Part II.

Two separate sealed envelopes for technical and commercial bids are to be submitted clearly mentioning on each envelop that “**Technical bid for supply of scientific/ testing equipments**” and “**Commercial bid for supply of scientific/ testing equipments**”. Sealed Envelope for technical bid should contain detailed company profile with supporting documents and DD of Rs.1,000/- towards tender cost in favour of “**Indian Institute of Packaging**”, payable at Mumbai. The Commercial bid containing the price offers shall be placed in another sealed envelope. Commercial bid will be considered only if the contractor is shortlisted based on the evaluation of Technical bid.

Tender documents containing two envelopes (both Technical and Commercial bids) shall be submitted within the closing date to the Dy. Director (Accounts & Administration), Indian Institute of Packaging, E-2, MIDC Area, Andheri (East), Mumbai 400 093.

Dy. Director (Admin. & Accounts)

1) Name & Address of the Proprietors / Directors: \_\_\_\_\_  
\_\_\_\_\_

2) Name & Address of the Tenderer & Tel. No.: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

3) Permanent Account No. (PAN): \_\_\_\_\_

Item No.	Description*	Rate/Unit	Terms & Conditions

*\*Please Refer the Specifications Attached*

Note: The tenderers are requested to submit their offer in original.

4) Discount if offered Yes / No, if Yes \_\_\_\_\_

5) Is VAT / Service tax / Octroi extra? If so indicate the rate  
(ORIGINAL RECEIPT WOULD BE REQUIRED)

6) Is Excise Duty extra? If so, indicate rate, quantum of assessable value

7) Admissibility, if any other taxes

8) Service Tax Registration No. \_\_\_\_\_

9) VAT Registration No. \_\_\_\_\_

Signature of the Tenderer: \_\_\_\_\_

Name (IN BLOCK LETTERS): \_\_\_\_\_

Capacity in which Tender is signed: \_\_\_\_\_

Address in full: \_\_\_\_\_  
\_\_\_\_\_

### **Special Terms & Conditions**

1. Please mention freight and insurance charges separately
2. Manufacturers/suppliers are required to furnish compliance of specifications and bringing out clearly deviations from specifications, if any.
3. Manufacturers/suppliers are advised to submit the compliance statement in the following format along with tender, failing which their offer will be treated as incomplete and liable to be disqualified.

### **Format of Compliance Statement**

Para of Tender Enquiry Specification	Specification of Equipment offered	Compliance to specification whether Yes/No	In case of Non-compliance or deviation from specification (To be indicated clearly)
1	2	3	4

4. The tenderers should furnish the following documents with their tender:
  - a. A valid Income Tax Clearance Certificate or PAN No/Service Tax VAT /WCT no. or a certified photocopy thereof.
  - b. Performance statement duly signed by the tenderers regarding supplies made by them for the identical/similar items during last three years.

#### 5. Terms of Delivery:

Delivery is required at IIP Ahmedabad. The Tenderers are required to quote price on delivery at site basis considering delivery at Ahmedabad. **In case of imported items, the prices should be quoted on the CIF, delivery at Ahmedabad clearly indicating the element of freight and insurance charges separately.** The tenderers quoting for supply of imported equipment are required to furnish in their bid, the estimated dimensions, shipping weight and approximate CIF value of each package.

#### 6. Warranty:

The Bidder must confirm that the equipment supplied by them will remain under warranty for a period of THIRTY SIX calendar months from the date of commissioning, including supply of spare parts during the warranty period.

- a. Performance Guarantee clause: Successful bidder shall furnish an unconditional performance Bank guarantee @ 15% (or higher if decided) of the order value valid for thirty six months within 15 days after placement of the order.

- b. It shall be clearly mentioned that if the vendor has supplied identical or similar equipment to the Institute, the details of such supplies for the proceeding three years shall be given together with the prices eventually or finally paid.
- c. Purchase of equipment from abroad shall be made directly from manufacturer or its authorized agents in India. It shall not be bought from sub-agents in India.
- d. Documentary proof of registration for all taxes charged like Service Tax, VAT, Work Contract Tax, etc along with proof of PAN shall be submitted.
- e. The supplier shall be responsible for safe delivery of equipment to IIP Ahmedabad. Similarly, IIP shall not bear any demurrage charges due to non-intimation which shall be recovered from the Earnest Money Deposit.

7. Guarantee against defects :

Notwithstanding any inspection carried out by the inspector at any time and /or approval, the supplier shall be responsible for a period of 36 calendar months after the equipment has been taken over, the supplier shall be responsible to the extent in this clause expressed for any defects that may develop under the conditions provided for by the contract and under proper use, arising from faulty materials, design and workmanship in the equipment, or from faulty erection of the equipment by the supplier, but not otherwise and shall remedy such defects at his own cost when called upon to do so by the purchaser, who shall state in writing in what respect the portion is faulty.

If it becomes necessary for the supplier to replace or renew any defective portions of the equipment under this clause, then provision of this clause shall apply to the portion of the equipment to replace or renewed until the expiration of six months from the date of such replacement or renewal or until the end of above mentioned period of 36 months, whichever may be later.

8. The guarantee/warranty clause will be applicable and binding on successful bidders.

**General Terms & Conditions:**

1. The tenderers quoting as an Indian agent for imported stores should furnish copy of agency agreement stating the quantum of agency commission and collaborating responsibilities of foreign supplier's services to be rendered by the Indian agent in justification thereof.

2. Excise Duty/VAT etc:

If it is desired to claim for Excise duty/VAT or any other additional charges, the same must be specifically stated. In the absence of any such stipulation, it will be presumed that the prices include all such charges and no claim for the same will be entertained.

3. Octroi Duty / Entry Tax:

Octroi duty / Entry Tax will be reimbursed against submission of original receipt issued by BMC/Local Govt. Authority

4. PAYMENT:

**For Indigenous Supplies:**

Payment for the equipment or for each delivery will be made to the Supplier on submission of bills in accordance with the laid down procedure, as detailed below:-

a. 85% payment will be released on delivery and satisfactory installation, commissioning and performance of the equipment.

b. The supplier furnishes the following certificate:

I / We have personally examined and verified and do hereby certify that the goods in Respect of which the payment is being claimed have been actually dispatched by me us. Under RR No. / B/L No. / Air Consignment Note No. Postal Receipt ..... dated ..... Drawn in favor of the Purchaser which is genuine and mentioned in the Bills and that I/We hold myself / ourselves personally responsible for the correctness of this statement.

I/We further certify that the above mentioned RR No. / Air Consignment Note No. dated ..... has been forwarded to the consignee mentioned in the contract under registered post acknowledgement due on.

The above certificate is to be signed by a duly authorized person of the firm and he should be the same as signing the bill. His designation and name of the firm on whose behalf he has signed the bill is required to be indicated below his dated signature.

c. Fifteen percent (15%) of the balance payment will be released within one month against Bank Guarantee for warranty period of 36 months.

**For Imported Items:**

Payment through LC up to 85% of CIF Value. Balance 15% on satisfactory installation and commissioning of the equipment and submission of bank guarantee for warranty period of 36 months

5. The successful bidder shall provide literature, specifications, operation and maintenance manual, etc. They should provide training to employees for operation of equipments to the satisfaction of Purchaser.

6. Any effort by a bidder to influence, bid evaluation, bid comparison or contract award may result in rejection of the bidder's bid.

7. The successful bidder shall be notified in writing letter that the bid has been accepted. The bidder shall acknowledge in writing receipt of the same.

Dy. Director (Admin & Accounts)

## Part . I

### Imported Equipments

#### Technical Specifications

Sr. No.	Equipment / Item Name	Specifications
1.	Brookfield Viscometer	<ul style="list-style-type: none"> <li>• Programme based Viscometer associated with software, PC with LCD monitor, Laser printer (Black ink) and UPS to support the whole system</li> <li>• Digital display with continuous sensing and display the information like viscosity (cP or MPa.s), Temperature (degree C or degree F), % Torque, Speed, Spindle used, Shear rate, Shear stress.</li> <li>• Determination of viscosity in very less amount of sample (0.5-2.0 ml)</li> <li>• Choice of various rotational speeds (minimum 50)</li> <li>• Available with Temperature probe</li> <li>• Timed stop feature to measure viscosity at precise user specified time intervals</li> <li>• Easy to use key pad</li> <li>• Temperature Sensing Range: -100°C to 300°C (-148°F to 572°F)</li> <li>• Analog Torque Output: 0 - 1 Volt DC (0 - 100% Torque)</li> <li>• Analog Temperature Output: 0 - 3.75 Volts DC (-100°C to +275°C)</li> <li>• Viscosity Accuracy: <math>\pm 1.0\%</math> of full scale range</li> <li>• Viscosity Repeatability: <math>\pm 0.2\%</math></li> <li>• Temperature Accuracy: <math>\pm 1^\circ\text{C}</math> /-100°C to +149°C and <math>\pm 2^\circ\text{C}</math> /+150°C to +300°C</li> <li>• Torque measurement accuracy: 1% on full scale</li> <li>• Software CD</li> </ul> <p><b>Computer Specifications:</b></p> <ul style="list-style-type: none"> <li>• Brand &amp; Model: Specify</li> <li>• Processor: Intel core i5</li> <li>• Chipset: Intel H81</li> <li>• Motherboard: Intel Original or OEM motherboard</li> <li>• Memory: 4 GB DDR3</li> <li>• HDD: 500 GB or higher SATA 7200 RPM</li> <li>• HDD Controller: Integrated on board HDD controller</li> <li>• Graphics: Integrated on Board</li> <li>• Network Card: Integrated on Board 10/100/1000 Gigabit</li> <li>• Slots: Minimum 2 PCI/PCI-e slots</li> <li>• Ports: 6 USB Ports (preferably 2 in front panel), 1 Serial Port, RJ45, audio in/out, headphone and microphone, VGA Port</li> <li>• Cabinet: Micro Tower ATX / Convertible SFF/or equivalent</li> <li>• Power Supply: Power supply SMPS with Surge protection and 90% energy efficiency</li> <li>• Monitor: 18.5" LED TFT Digital Color Monitor from same OEM, TECO- 05 certified</li> <li>• Keyboard: 104 keys, windows compatible</li> <li>• Mouse: 2 button optical with scroller</li> <li>• Operating System: Microsoft Windows 8/8.1/10 (64Bit)</li> <li>• OS Certification: Windows 8, 8.1, 10 and Linux Compatible</li> <li>• Warranty: 3 years onsite</li> <li>• Optical Drive: DVD, DVDR, DVDRW, 16x or better</li> </ul>

Sr. No.	Equipment / Item Name	Specifications
		<ul style="list-style-type: none"> <li>Accessories: Mouse Pad</li> </ul>
2.	Gloss & Haze Tester	<ul style="list-style-type: none"> <li>Angles: 20/60/85 degree, 45 degree, 75 degree</li> </ul> <p><b>Instrument should contain:</b></p> <ul style="list-style-type: none"> <li>Holder with integrated calibration tile</li> <li>Conforming to Standards IS 1060 and/or ASTM D 2457</li> <li>Traceable calibration certificate</li> <li>Software</li> <li>Three years warranty plus five years AMC after the warranty period</li> </ul>
3.	Hot Tack Tester	<p><b>Touch Screen Panel:</b></p> <ul style="list-style-type: none"> <li>LCD, 256 colour QVGA, 320 x 240 pixels, 14.48 cm diagonal viewing.</li> <li>Touch screen, analogue resistive (gonze) with serial controller.</li> <li>Processor geode SC2200.</li> <li>266 MHz MMX compatible.</li> <li>64 MB Dram main memory.</li> </ul> <p><b>Heat Sealing Process:</b></p> <ul style="list-style-type: none"> <li>Temperature range – ambient to 250 deg. C +/- 1 deg C reading to 1 deg C, RTD input (deg F may be selected via the screen).</li> <li>Pressure range – 0 to 100 psi +/- 5 psi (other units may be selected via screen).</li> <li>Dwell Time range – 0 to 99.999 sec +/- 0.1 sec.</li> <li>Heat sealing head pneumatically operated to extend for heat sealing cycle and then return to rest position.</li> <li>Ensures heat is not influencing seal whilst waiting for pull cycle or when cold peel test option selected.</li> </ul> <p><b>Sealing Jaws:</b></p> <ul style="list-style-type: none"> <li>Heated upper and lower ground flat aluminium jaws 25 x 50mm, supplied as standard.</li> <li>Jaws should have interchangeable features which enable crimp jaws or customised jaws to be fitted.</li> <li>Alignment of jaws made through spring mounted lower bolster.</li> <li>Teflon coating of jaws should be there.</li> </ul> <p><b>Hot Tack Measuring:</b></p> <ul style="list-style-type: none"> <li>Load cell 'Z' bend strain gauge range – 5000 g (50N) +/- 0.25%.</li> <li>Pull speed range – 1 mm/sec to 1000 mm/sec.</li> <li>Manual or automatic return of cross arm to start position.</li> <li>Maximum cross arm travel – 100 mm.</li> <li>Travel indication should be shown on main display panel in mm.</li> <li>Delay on pull range – 0 to 99 min 99 sec.</li> </ul> <p><b>Film clamps:</b></p> <ul style="list-style-type: none"> <li>Left and right pneumatic clamps synchronised with pulling operation.</li> </ul> <p><b>Cold Peel:</b></p> <ul style="list-style-type: none"> <li>Should allow seal to completely cool and cure before pulling operation takes place producing cold seal strength measurement.</li> <li>Cooling Range – 0 to 99 hrs 99 mins 99 sec.</li> </ul> <p><b>Safety Guard:</b></p> <ul style="list-style-type: none"> <li>Micro-switch controlled guard in position.</li> </ul> <p><b>Environment:</b></p> <ul style="list-style-type: none"> <li>5-50 °C ambient operating temperature, RH 75% max (non-condensing)</li> </ul> <p><b>Power:</b></p>



Sr. No.	Equipment / Item Name	Specifications
		<ul style="list-style-type: none"> <li>220/230V AC; 50/60 Hz; 1000 W</li> </ul> <p><b>Weight Drop Test:</b></p> <ul style="list-style-type: none"> <li>The machine should be able to be used in comparison work using drop weights attached to the free end of the sample seal.</li> </ul> <p><b>Accessories required:</b></p> <ul style="list-style-type: none"> <li>1000 g calibration weight.</li> <li>25 mm x 350 mm sample seal template</li> <li>Crimp jaws 25 x 50mm, 120 deg x 1.8 mm pitch.</li> <li>Drop weight set</li> </ul>
4.	Melt Flow Index (MFI) Tester	<ul style="list-style-type: none"> <li>Temperature Range: Ambient to 400°C</li> <li>Accuracy: <math>\pm 1^{\circ}\text{C}</math></li> <li>Resolution: <math>0.01^{\circ}\text{C}</math></li> <li>Least Count: 0.01 gms.</li> <li>Weights: 1.2 kg; 2.16 kg; 3.8 kg &amp; 5 kg</li> <li>Temperature Controller: PID</li> <li>Warm Up Time: 10 mins (<math>23^{\circ}\text{C}</math> to <math>190^{\circ}\text{C}</math>)</li> <li>Corrosion Resistant Barrel, Pistons, and Die</li> <li>Sample Cutting: Automatic</li> <li>Conforming to Standard ASTM D 1238</li> <li>Calibration certificate from NABL accredited laboratory</li> <li>Three years warranty plus five years AMC after the warranty period</li> </ul>
5.	Optical Density (OD) Meter	<ul style="list-style-type: none"> <li>Density Measuring range: 0.00 --- 6.00 OD</li> <li>Dot Area Measuring range: 0 --- 100%</li> <li>Resolution: 0.0005% Transmission / 0.01 OD</li> <li>Density Accuracy: <math>\pm 0.02</math> (0 -2.00 OD); <math>\pm 2\%</math> (2.00-6.00 OD)</li> <li>Transmittance Accuracy: <math>\pm 1\%</math> (0-50%); <math>\pm 2\%</math> (50- 100%)</li> <li>Aperture: 2 mm</li> <li>Light source: ANSI/ISO Visual</li> <li>Power supply: 4*AAA alkaline battery</li> <li>Should be able to perform completely self-contained operation.</li> <li>No independent power supply or light source should be required.</li> <li>Should be able to directly measures density, density difference and dot area.</li> <li>Should be simple to operate and easy to use</li> <li>Should be able to measure densities up to 6.0 OD</li> </ul>
6.	Oxygen Transmission Rate (OTR) Tester	<ul style="list-style-type: none"> <li>Test Range: 10-10,000 <math>\text{s/in}^2 \cdot 100 \text{ ml}</math></li> <li>Pressure Range: 0-20 kPa</li> <li>Resolution: 0.1 Pa</li> <li>Specimen Size: <math>\Phi 12 \text{ mm}</math></li> <li>Test Area: 0.025 sq.in. (<math>0.16 \text{ cm}^2</math>)</li> <li>Number of Specimens: 3, 2 or 1</li> <li>Test Gas: Test gas could be air, <math>\text{O}_2</math>, <math>\text{N}_2</math>, <math>\text{CO}_2</math> and 99.9% dry gas</li> <li>Gas Supply pressure: 0.4 MPa - 0.6 MPa</li> <li>Port Size: <math>\Phi 4 \text{ mm}</math> PU Tubing</li> <li>Power: AC 220V 50Hz</li> <li>High end and suitable PC &amp; Printer</li> <li>Warranty: Three years with performance guarantee certificate.</li> <li>Manuals: Hardware and Software manuals</li> </ul>

Sr. No.	Equipment / Item Name	Specifications
		<ul style="list-style-type: none"> <li>The equipment should including Mainframe, Professional Software, Rapid Quantitative Filter Paper, Sampling Plate and Vacuum Grease</li> </ul>
7.	Water Vapour Transmission Rate (WVTR)	<p>Water Vapour Transmission Rate (WVTR) analyzer should be capable of detecting water vapour 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 plastic bottles, retort pouches and other food packages.</p> <p><u>Features and Specifications</u></p> <p>Water Vapour Transmission Rate (WVTR) analyzer should have,</p> <ul style="list-style-type: none"> <li>Minimum WVTR measuring range – 0.005 g/ m<sup>2</sup>/ 24 h</li> <li>Maximum WVTR measuring range – 5000 g/ m<sup>2</sup>/ 24 h</li> <li>Resolution - 0.001 g/ m<sup>2</sup>/ 24 h</li> <li>Reproducibility - Better than 1% for low permeable samples.</li> <li>Measuring temperature range - 5 °C to 50 °C (with automatic control)</li> <li>Measuring humidity range (electronically) - 35% to 90% RH (In measuring chamber)</li> <li>Measuring area - 50 cm<sup>2</sup></li> <li>Built-in Standard Reference Cell and automatic flow compensation</li> <li>Rapid calibration with reference film</li> <li>Infra red / electrolytic type sensor for accurate measurement of WVTR through high barrier films.</li> <li>Software controlled for performing pre programmed tests, storing and re analyzing test data, plotting graphs etc.</li> <li>Branded computer like HP/DELL/IBM, monitor and laser printer.</li> <li>The WVTR test should conform to ASTM standards.</li> <li>The firm should also provide software up-gradation for a period of ten years free of cost.</li> <li>Warranty: Three years with performance guarantee certificate.</li> <li>Manuals: Hardware and Software manuals</li> <li>High end and suitable PC &amp; Printer</li> </ul>
8.	Weighing Balance Semi-Micro (220 gm)	<ul style="list-style-type: none"> <li>Weighing Capacity: Up to 220 grams</li> <li>Accuracy: 0.00001 g (0.01 mg)</li> <li>Range of External Weights for Calibration: 10-220 g</li> <li>Repeatability: ≤ 0.00001 g</li> <li>Linearity: ± 0.00002 g</li> <li>Response Time: 3 seconds</li> <li>Ambient Temperature: 5-50 °C</li> <li>Pan Size (approx.): Φ100</li> <li>Main body dimensions (approx.): 200(W)x290(D)x240(H)</li> <li>Display: LED with backlight, excellent, high-contrast, easy-to-read display, with large digits</li> <li>All-glass draft shield, with smooth-action doors that open extremely wide.</li> <li>Built-in, motorized calibration weight</li> <li>Shall comply with the standard IS 9281 (Part 3)</li> <li>Calibration certificate from NABL accredited laboratory</li> <li>Three years warranty plus five years AMC after the warranty period</li> <li>Should be provided with arrangements for density measurement (desirable/preferable).</li> </ul>
9.	Weighing Balance (5000)	<ul style="list-style-type: none"> <li>Weighing Capacity: Up to 5000 grams</li> </ul>

Sr. No.	Equipment / Item Name	Specifications
	gm)	<ul style="list-style-type: none"> <li>• Accuracy: 5 g</li> <li>• Repeatability: <math>\leq 0.01</math> g</li> <li>• Linearity: <math>\pm 0.02</math> g</li> <li>• Response Time: 3 seconds</li> <li>• Ambient Temperature: 5-50 °C</li> <li>• Main body dimensions (approx.) (L x B): 30 x 30 inches</li> <li>• Display: LED with backlight, excellent, high-contrast, easy-to-read display, with large digits</li> <li>• All-glass draft shield, with smooth-action doors that open extremely wide.</li> <li>• Built-in, motorized calibration weight</li> <li>• Shall comply with the standard IS 9281 (Part 3)</li> <li>• Calibration certificate from NABL accredited laboratory</li> <li>• Three years warranty plus five years AMC after the warranty period</li> <li>• Should be provided with arrangements for density measurement (desirable/preferable).</li> </ul>
10.	Xenon Weatherometer	<ul style="list-style-type: none"> <li>• 6500 W water cooled xenon arc lamp system</li> <li>• Total exposure area: 6500 cm<sup>2</sup></li> <li>• 3-tier inclined specimen rack</li> <li>• TFT full color 12" touch screen control panel display of all test parameters</li> <li>• Direct setting and control of irradiance: 340nm, 420nm, 300-400nm or Lux</li> <li>• Direct setting and control of Black Panel Temperature; uninsulated (BPT) or insulated (BST)</li> <li>• Direct setting and control of relative humidity</li> <li>• Direct setting and control of specimen chamber air temperature</li> <li>• Display of diagnostics messages</li> <li>• Pre-programmed test methods: 15 (approx.)</li> <li>• Space for 12 custom programs; sub-cycle capability</li> <li>• Multi-language capability (English, French, German, Spanish, Japanese, Chinese, Korean, Turkish)</li> <li>• Streaming data output via ethernet or USB port. USB thumb drive should be included</li> <li>• Smart Damper to reduce test variability in chamber temperature and humidity and compensates for changes in ambient lab conditions</li> <li>• Smart Light Monitor to verify that correct light capsule is installed</li> <li>• Specimen and rack spray</li> <li>• Filter combinations should be available to meet all common test methods</li> <li>• Air intake dust filter</li> <li>• CS-7 xenon lamp cooling system</li> <li>• Water purity indicator with alarm</li> <li>• Calibrated xenon reference lamp</li> <li>• Chamber viewing window in door</li> <li>• Universal electrical configurations to meet local frequency, voltage, and electrical requirements</li> <li>• Must meet CE, UL, ISO EN and CSA safety requirements</li> <li>• Automatic test countdown based on time or radiant exposure</li> <li>• Specimen Holders should be available to accommodate many sample types</li> <li>• Humidification System</li> <li>• Dual Black Panel Temperature (BPT) and Black Standard Temperature (BST)</li> </ul>

Sr. No.	Equipment / Item Name	Specifications
		<p>Measurement / Control including uninsulated BPT and BST sensors</p> <ul style="list-style-type: none"> <li>• Monitoring of second wavelength: 300-400 nm, 340 nm, 420 nm or Lux</li> <li>• Refrigeration coils should be installed in air duct</li> <li>• S3T Specific Specimen Surface Temperature system</li> <li>• Data Acquisition System</li> <li>• Self contained xenon lamp cooling system (top and/or wall mounted)</li> <li>• Chamber air and DI water refrigeration</li> <li>• Should fulfill the requirements of ASTM D4303, ASTM D4355, ASTM D4637, ASTM, ASTM G151, ASTM G155, IEC 61345, ISO 105-B02-10, ISO 11341, ISO 12040, ISO 16474-1, ISO 16474-2, ISO 18909, ISO 18930, ISO 8937, ISO 29664, ISO 3917, ISO 4892-1 &amp; 2</li> </ul> <p>Accessories Required:</p> <ul style="list-style-type: none"> <li>• Auxiliary filter lantern for meeting special test requirements</li> <li>• Casters (4 legs) including adapters and installation instructions</li> <li>• Full Spectrum Monitoring Device</li> </ul>

## Part . II

### Indigenous Equipments

#### Technical Specifications

Sr. No.	Equipment / Item Name	Specifications
1.	Air Pressure Leakage Tester	<p>Purpose: The test is carried out by maintaining the specified pressure in the container and detecting any leakage with water or soap solution.</p> <p>Equipment should consist of:</p> <ul style="list-style-type: none"> <li>• Air supply equipment: A pressure line from an air compressor is used for this test. A rubber plug is fixed to the end of the air line. The testing pressure may be regulated by an air pressure valve and read on the pressure gauge connected to the end of the air line. The testing pressure may be regulated by an air pressure valve at 35 kPa to an accuracy of <math>\pm 2</math> percent and read on the pressure gauge connected to the equipment.</li> <li>• Reservoir: Holding enough water so that the container can be fully or partly immersed in it as required.</li> <li>• Should meet the criteria mentioned in Standard IS 2798</li> <li>• Three years warranty plus five years AMC after the warranty period</li> </ul>
2.	Bursting Strength Tester (for Paper & Paperboard)	<ul style="list-style-type: none"> <li>• Range : Upto <math>60 \text{ kg/cm}^2</math></li> <li>• Least Count : <math>0.01 \text{ kg/cm}^2</math></li> <li>• Clamp: Pneumatic</li> <li>• 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 <math>0.07 \text{ kg/cm}^2</math></li> <li>• Conforming to Standard IS 1060 (Part 1)</li> <li>• Calibration certificate from NABL accredited laboratory</li> <li>• Three years warranty plus five years AMC after the warranty period</li> </ul>
3.	COBB Tester	<p>Purpose: To determine the water absorption property of paper, paper board and corrugated fibreboard (60 / 120 Seconds COBB Test for Paper; 30 Minute COBB Test for Board)</p> <p>Technical Specifications :</p> <ul style="list-style-type: none"> <li>• Test Area : <math>100 \text{ cm}^2</math></li> <li>• Diameter: 112.8 mm</li> <li>• Water Depth: 10 mm</li> <li>• With measuring cylinder for pouring 100 ml water.</li> <li>• Special design (no water spillage).</li> <li>• User friendly tilting device.</li> <li>• With Non-Corrosive couch roll of <math>10 \pm 0.5 \text{ kg}</math> and <math>90 \pm 10 \text{ mm}</math> diameter</li> <li>• Shall meet the criteria as per IS 1060, TAPPI T441 &amp; T2045, ISO 535</li> </ul> <p>Material of Construction :</p> <ul style="list-style-type: none"> <li>• Machine body : Stainless Steel</li> <li>• Body Finish : Stainless Steel</li> <li>• Couch Roll (<math>10 \pm 0.5 \text{ kg}</math>) : Stainless Steel</li> <li>• Water retention chamber : Plastic</li> </ul>

Sr. No.	Equipment / Item Name	Specifications
		<ul style="list-style-type: none"> <li>Water measuring cylinder : Plastic</li> <li>Water dispensing dish : Stainless Steel</li> </ul>
4.	Compression Strength Tester	<ul style="list-style-type: none"> <li>Computerized Box Compression Testing machine with Attachment for Stack load Test &amp; Tear Test</li> <li>With 24 hrs holding period facility.</li> <li>Capacity - Minimum: 2 Kgf &amp; Maximum: 20000 kgf.</li> <li>Platen Size : 1500 x 1500 mm</li> <li>Conforming to Standard IS 7028 (Part 6)</li> <li>Calibration certificate from NABL accredited laboratory</li> <li>Three years warranty plus five years AMC after the warranty period</li> </ul>
5.	Dart Impact Tester	<p>Purpose: To determine impact strength of packaging material such as plastic films, laminates and paper.</p> <ul style="list-style-type: none"> <li>The tester comprises a horizontal base-plate on which a vertical column of steel has been erected and which on its top carries a release mechanism in which the falling dart can be inserted. The dart consists of a hemispherical part of aluminum with polished surface and a diameter of 38.1 mm (1.5 in.), having a vertical shaft in the center of the flat top surface. Around the shaft additional weights can be fitted.</li> <li>On the base-plate in the vertical center line of the inserted dart, a circular clamping device has been fitted. This clamping device consists of a firm and a movable cylinder, both having an inner diameter of 127 mm (5 in.).</li> <li>By means of a handle operated excenter, a sample can be clamped slippage free between both cylinders. The bottom of the firm cylinder has been provided with a 2-3 mm thick disc of soft rubber in order to eliminate damage of the falling dart.</li> </ul> <p>Specifications:</p> <ul style="list-style-type: none"> <li>Falling height: <ul style="list-style-type: none"> <li>43-26: 660 mm (26 in.) with movable release mechanism</li> <li>43-27: 1500 mm (59 in.) with movable release mechanism</li> </ul> </li> <li>Dart weight without additional weights: 50 g <math>\pm</math> 0.5%</li> <li>Additional weights: <ul style="list-style-type: none"> <li>43-26: <ul style="list-style-type: none"> <li>10 pcs. of 5 <math>\pm</math>0.1 g</li> <li>8 pcs. of 15 <math>\pm</math>0.1 g</li> <li>8 pcs. of 30 <math>\pm</math>0.2 g</li> <li>8 pcs. of 60 <math>\pm</math>0.2 g</li> </ul> </li> <li>43-27: <ul style="list-style-type: none"> <li>8 pcs. of 15 <math>\pm</math>0.1 g</li> <li>8 pcs. of 45 <math>\pm</math>0.2 g</li> <li>8 pcs. of 90 <math>\pm</math>0.2 g</li> </ul> </li> </ul> </li> </ul>
6.	Elmendorf Tearing Tester (Automatic)	<ul style="list-style-type: none"> <li>Purpose: To measure the force required to propagate an existing slit a fixed distance to the edge of the test sample.</li> <li>Should comply with Standards IS 1060; ISO 1974,6383-2, 9290; ASTM D295, D752, D1424, D1922, D5734 ASTM D1922; TAPPI T414, T496</li> <li>7" full-color digital touch screen display</li> <li>Standard Impact Head:</li> </ul>

Sr. No.	Equipment / Item Name	Specifications
		<ul style="list-style-type: none"> <li>Radius: 0.5 inches (12.7 mm)</li> <li>Diameter: 0.75 inches (19.0 mm)</li> <li>O-Ring Clamp: <ul style="list-style-type: none"> <li>Inside Diameter: 89 mm</li> </ul> </li> <li>Sample Size: <ul style="list-style-type: none"> <li>5 x 5 in (127 x 127 mm) square</li> <li>5.25 in (133.35 mm) diameter circle</li> </ul> </li> <li>Air Clamp Assembly: Min. 60 PSI</li> <li>Pendulum: Universal with interchangeable weights (200, 400, 800, 1600, 3200 and 6400 gram)</li> <li>Pneumatic clamps and pendulum release</li> <li>Automatic calibration of pendulum</li> <li>Units: Selectable [Percentage (%), Millinewtons (mN), Grams-force (gf), Pounds-force (lbf)]</li> <li>Sample statistics: Average, High/low results, Standard deviation</li> <li>Output: USB flash drive, USB ESC/POS printer, RS232</li> <li>Power: Single phase; 220/240 V; 50/60 Hz</li> <li>Storage and editing of up to 200 readings</li> <li>Report printout with optional printer</li> </ul>
7.	Folding Endurance Tester	<ul style="list-style-type: none"> <li>Upto 10,000 double folds</li> <li>Conforming to Standard IS 1060</li> <li>Calibration certificate</li> <li>Three years warranty plus five years AMC after the warranty period</li> </ul>
8.	Friction Tester (Coefficient of Friction) Static and Kinetic	<ul style="list-style-type: none"> <li>As per ASTM D1894 to determine the coefficients of friction of plastic film and sheeting.</li> </ul> <p><b>Specification :</b></p> <ul style="list-style-type: none"> <li>Capacity: Up to 9.999 kg.</li> <li>Direct display: Static and kinetic friction values.</li> <li>Speed: 150 mm/minute.</li> <li>Weight of sled: 200 grams.</li> <li>Accessories: Three nos. of S.S templates.</li> <li>Paint: Powder coated.</li> <li>Power: 230 Volts, 50Hz, single phase.</li> </ul>
9.	Fume Hood	<p><b>Purpose</b></p> <ul style="list-style-type: none"> <li>Fume Exhaust hood is required to exhaust toxic, obnoxious or otherwise harmful gases, vapors, mist etc. and to protect personnel &amp; equipment.</li> </ul> <p><b>Required Features:</b></p> <ul style="list-style-type: none"> <li>Inbuilt Centrifugal Blower unit (2 HP)</li> <li>Fluorescent tubes with safety electrical arrangements</li> <li>Internally located Electric Plugs</li> <li>Gas Vacuum &amp; Air Connections</li> <li>Counter balanced sliding up &amp; down front sash (door)</li> <li>Dimensions: 5' x 2'5" x 6'5"</li> </ul>
10.	Gelbo Flex Tester	<p>Application: To test the flex crack resistance of plastic films</p> <p><b>Required Specifications:</b></p>

Sr. No.	Equipment / Item Name	Specifications
		<ul style="list-style-type: none"> <li>• Flex Frequency: 45 cpm</li> <li>• Tensile &amp; Pressing Force: 300 N</li> <li>• Stroke : 80 / 155 mm</li> <li>• Torque : 2 Nm</li> <li>• Twist : 400° Short stroke</li> <li>• Twist : 440° Long stroke</li> <li>• Counter for oscillations</li> <li>• Totaliser</li> <li>• Home Switch</li> <li>• Stainless Steel Cutting Template: 280 mm x 200 mm</li> <li>• Conforming to ASTM F 392 Standard</li> </ul>
11.	Hot Air Oven	<ul style="list-style-type: none"> <li>• Volume: 350 liters</li> <li>• Inner Chamber Size (W x D x H): 600 x 600 x 900 mm with 4 nos. 304 grade stainless steel trays with holes.</li> <li>• Temperature Range: 30 to 300 °C.</li> <li>• Should comply with the Standards ASTM F2894 and IS 6365.</li> <li>• Inner chamber should be made of highly polished 304 grade stainless steel and outer chamber should be made of mild steel sheet duly pre-treated in seven tanks process for surface treatment and finished with durable powder coated paint.</li> <li>• Inner chamber should be fabricated with ribs to adjust shelves to any convenient height.</li> <li>• Insulated door should be fitted with heavy hinges and with a special design spring-loaded door closing device.</li> <li>• Door gasket(s) should be made of silicon rubber.</li> <li>• Minimum 100 mm gap between the walls should be filled with special grade glass wool for proper insulation and to avoid heat losses.</li> <li>• Heating elements should be made of high grade imported Nichrome wire which should be insulated inside the porcelain beads and should be placed on three sides of the chamber for uniform temperature on all shelves.</li> <li>• Should be provided with air circulating fan.</li> <li>• Should provide with a variable micro processor based digital temperature controller with digital display and alarm.</li> <li>• Should be provided with air ventilations.</li> <li>• Constant-temperature, equipped with means of ensuring adequate temperature control and free access of air.</li> <li>• Should have provision for monitoring the temperature with a thermometer and electronic digital control cum indicator.</li> <li>• Should have protection/safety feature for preventing overheating.</li> <li>• Should be operated on 230V, 50 Hz single phase AC supply.</li> <li>• Should be supplied with high quality cord and plug.</li> <li>• Calibration certificates of all the equipped instruments from NABL accredited laboratory</li> <li>• Three years warranty plus five years AMC after the warranty period.</li> </ul>
12.	Hot Plate	<ul style="list-style-type: none"> <li>• Type: Rectangular</li> <li>• Size (Dimension): 45 x 60 cm</li> <li>• Temperature: Upto 250°C</li> <li>• Heating Plate MOC: Mild Steel</li> <li>• Controller: Temperature Regulator</li> </ul>



Sr. No.	Equipment / Item Name	Specifications
		<ul style="list-style-type: none"> <li>Power Supply: 220 / 230 Volts, 50 Hz</li> <li>Rating: 3 kW</li> <li>PID Controller</li> <li>Digital temperature display (optional)</li> </ul>
13.	Micrometers	<p><b>1. Micrometer (Dead weight type) with digital gauge</b></p> <ul style="list-style-type: none"> <li>Range : 0 - 12 mm</li> <li>Least Count / Resolution : 0.01 microns</li> <li>Gauge Make: MITUTOYO, Japan or SYLVAC, Switzerland</li> <li>Dial Type : Digital</li> <li>Conforming to Standard IS 1060</li> <li>Calibration certificate</li> <li>Three years warranty plus five years AMC after the warranty period</li> </ul> <p><b>2. Micrometer (Tube type) with digital gauge</b></p> <ul style="list-style-type: none"> <li>Range: 0-25 mm</li> <li>Resolution: 0.001 mm</li> <li>Accuracy: <math>\pm 0.002</math> mm</li> <li>Gauge Make: MITUTOYO, Japan or SYLVAC, Switzerland</li> <li>Dial Type : Digital</li> <li>Conforming to Standard IS 1060</li> <li>Calibration certificate</li> <li>Three years warranty plus five years AMC after the warranty period</li> </ul> <p><b>3. Micrometer with digital gauge</b></p> <ul style="list-style-type: none"> <li>Range: 0-1" / 0-25 mm</li> <li>Resolution: 0.00005" / 0.001 mm</li> <li>Accuracy: <math>\pm 0.0001</math>"</li> <li>Gauge Make: MITUTOYO, Japan or SYLVAC, Switzerland</li> <li>Dial Type : Digital</li> <li>Conforming to Standard IS 1060</li> <li>Calibration certificate</li> <li>Three years warranty plus five years AMC after the warranty period</li> </ul>
14.	Muffle Furnace	<ul style="list-style-type: none"> <li>Internal Dimensions: 300 × 150 × 150 (Min.)</li> <li>Working Temperature : 1200 °C or better</li> <li>Heating Element : Silicon Carbide (SiC)</li> <li>Temperature Accuracy : <math>\pm 2</math> °C or better</li> <li>Temperature Control : Through microprocessor based PID controller</li> <li>Furnace Insulation : Ceramic wool</li> <li>Temperature settings &amp; Display : Digital and double display</li> <li>Outer body: Stainless Steel / Powder Coated MS</li> <li>Inner body: Stainless Steel</li> <li>Conforming to Standard ASTM D 5630</li> <li>Calibration certificate of all the equipped instruments from NABL accredited laboratory</li> <li>Three years warranty plus five years AMC after the warranty period</li> </ul>
15.	pH Measuring Instrument	<p>1. Functions: Lab-Grade pH, mV and Temperature Measuring</p> <p>2. pH:</p> <ul style="list-style-type: none"> <li>Range: -2.00 to 16.00 units</li> <li>Resolution: 0.01 unit</li> </ul>

Sr. No.	Equipment / Item Name	Specifications
		<ul style="list-style-type: none"> <li>Accuracy: <math>\pm 0.01</math> units</li> </ul> <p>3. Temperature:</p> <ul style="list-style-type: none"> <li>Range: 0.0 to 100°C (32 to 212°F)</li> <li>Resolution 0.1°C</li> <li>Accuracy <math>\pm 0.2^\circ\text{C}</math></li> </ul> <p>4. mV:</p> <ul style="list-style-type: none"> <li>Range -1999 to +1999 mV</li> <li>Resolution: 0.1 mV</li> <li>Accuracy: <math>\pm 0.05\%</math> <math>\pm 1</math> digit</li> </ul> <p>5. Operating range: Temperature: 0 to 50°C &amp; RH up to 90%</p> <p>6. Adapter: 115/230V AC</p> <p>7. Accessories:</p> <ul style="list-style-type: none"> <li>pH/mV electrode, lab-grade with 1-m cable</li> <li>pH/mV/Temperature combination electrode (120 mm length/12 mm diameter, Glass sensor, 1 m cable, 0 to 80°C operating temperature)</li> <li>Temperature probe, stainless steel with 10K thermistor</li> <li>pH piercing tipped double-junction electrode; 1 m cable</li> <li>pH flat glass double-junction electrode; 1 m cable</li> <li>Electrode stand</li> <li>Assorted case of pH buffers; 2 pints each of pH 4, 7, and 10 buffers</li> </ul> <p>8. 3 Years Warranty</p>
16.	Puncture Resistance Tester	<ul style="list-style-type: none"> <li>Units (display): kgf-cm, Joule</li> <li>Dimensions : L 60 cm x W 24 cm x H 40 cm</li> <li>Conforming to Standard IS 4006 (Part-2)</li> <li>Calibration certificate from NABL accredited laboratory</li> <li>Three years warranty plus five years AMC after the warranty period</li> </ul>
17.	Sample Cutters (Semi-Automatic)	<ul style="list-style-type: none"> <li>For Paper: <ul style="list-style-type: none"> <li>43 mm x 63 mm; Suitable for Tear Strength Testing</li> <li>15 mm x 100 mm; Suitable for Folding Endurance Testing</li> </ul> </li> <li>For Plastic Films: <ul style="list-style-type: none"> <li>1 inch x 7 inch; Suitable for Seal Strength &amp; Peel Strength Testing</li> </ul> </li> <li>For Paper and Plastic Films both: <ul style="list-style-type: none"> <li>15 mm x 300 mm; Suitable for Tensile Strength Testing</li> </ul> </li> </ul>
18.	Scuff Proofness Tester	<ul style="list-style-type: none"> <li>Specimen Size: 2 inch and 4.5 inches diameter.</li> <li>Weight on Sample: 1 psi + 1 psi</li> <li>Controls: Digital Preset Cycle counter</li> <li>No. of Cycles: 0 – 9999, 9999.</li> <li>Conforming to Standard IS 4006</li> <li>Paint: Powder coated &amp; Chromate finished</li> <li>Input Power: 230 Volts, 50/60Hz, single phase supply.</li> <li>Calibration certificate from NABL accredited laboratory</li> <li>Three years warranty plus five years AMC after the warranty period</li> </ul>
19.	Smoothness and Porosity Tester	<ul style="list-style-type: none"> <li>Measuring range: 5-3000 ml/min</li> <li>Measuring accuracy: <math>\pm 0.5\%</math> of the final value</li> </ul>

Sr. No.	Equipment / Item Name	Specifications
	(Bendtsen)	<ul style="list-style-type: none"> <li>• Accuracy of test duration: <math>\pm 0.5</math> s</li> <li>• Able to Calculate mean and Standard deviation automatically</li> <li>• Conforming to Standards IS 9894, TAPPI T-251, ASTM D-737 and ISO 5636/1</li> <li>• 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.</li> <li>• Calibration certificate from NABL accredited laboratory</li> <li>• Three years warranty plus five years AMC after the warranty period</li> </ul>
20.	Soxhlet Extraction Apparatus	<ol style="list-style-type: none"> <li>1. Nominal Capacity: 500 ml</li> <li>2. Size of joint: Socket 34/35</li> <li>3. Size of joint: Cone 34/35</li> <li>4. Body: <ul style="list-style-type: none"> <li>• External diameter: 80 mm</li> <li>• Wall thickness: 2.5 mm</li> <li>• Length from bottom of the body (excluding socket): <math>240 \pm 10</math> mm</li> </ul> </li> <li>5. Siphon tube: <ul style="list-style-type: none"> <li>• External diameter: 6 mm</li> <li>• Wall thickness: 1 mm</li> <li>• Length from bottom of the body: <math>125 \pm 2</math> mm</li> </ul> </li> <li>6. Vapour tube: <ul style="list-style-type: none"> <li>• External diameter: 15 mm</li> <li>• Wall thickness: 1.2 mm</li> <li>• Length from bottom of the body: <math>165 \pm 10</math> mm</li> </ul> </li> <li>7. Lower appendage: <ul style="list-style-type: none"> <li>• Length from bottom of body, excluding cone: <math>110 \pm 5</math> mm</li> </ul> </li> <li>8. Minimum thickness of flange: 5 mm</li> <li>9. Nominal internal diameter: 75 mm</li> <li>10. External diameter of flange: 100 mm</li> </ol>
21.	Stiffness Tester (Taber type)	<ul style="list-style-type: none"> <li>• Range: Upto 10,000 Taber</li> <li>• Calibrated to accuracy of <math>\pm 1\%</math> full scale</li> <li>• Compensator Range Weight</li> <li>• Range Weight (500, 1000 and 2000 Taber units)</li> <li>• Calibration Specimen</li> <li>• Conforming to Standard TAPPI 489</li> <li>• Calibration certificate</li> <li>• Three years warranty plus five years AMC after the warranty period</li> </ul>
22.	Vacuum Desiccators	<ul style="list-style-type: none"> <li>• Top: Polycarbonate (Clear / Transparent)</li> <li>• Bottom: Polypropylene</li> <li>• The desiccators should have extra heavy walls to eliminate the danger of implosion.</li> <li>• Should be able to hold a vacuum of 740 mm Hg (0.09 MPa) for a period of 24 hrs and temperature upto <math>130^{\circ}\text{C}</math></li> <li>• Should have in-built stopcock (of polypropylene) with PTFE plug; it should turn easily allowing a slow, gentle entrance of air to prevent unnecessary turbulence and specimen damage. Stopcock Port should accept 1/4" (6.4 mm) I.D. tubing.</li> <li>• Neoprene O-Ring seal: In general, the O-ring should not require grease, but must not be harmed if grease is used. Seal should be unaffected by low temperatures down to <math>0^{\circ}\text{C}</math>.</li> <li>• The Perforated Plate should be made of Polypropylene having 1/8"</li> </ul>

Sr. No.	Equipment / Item Name	Specifications
		(3.2mm) thickness and 1/8" diameter perforations for air transfer.
23.	Vacuum Oven	<ul style="list-style-type: none"> <li>Capacity: 20 Liters</li> <li>Cabinet Material: Powder-coated heavy-gauge steel</li> <li>Chamber Material: Stainless steel</li> <li>Display: LED with 1°C increments</li> <li>Dimensions (D x W x H) Interior: 12 x 10 x 10 in.</li> <li>Height (Exterior): 40 cm</li> <li>Shelves: 2, Aluminum</li> <li>Temperature Range: Ambient +10° to 220°C</li> <li>Temperature Resolution: ±1.0°C</li> <li>Temperature Uniformity: ±6.0°C at 100°C</li> <li>Vacuum Range: 0 to 760 mm Hg</li> <li>Wattage: 600 W</li> <li>Electrical Requirements: 220/230 V 50/60 Hz</li> </ul>
24.	Vernier Calipers	<p><b>1. Digimatic Caliper</b></p> <ul style="list-style-type: none"> <li>Range: 0-6" / 0-150 mm</li> <li>Resolution: 0.0005" / 0.01 mm</li> <li>Accuracy: ±0.001"</li> </ul> <p><b>2. ABSOLUTE Coolant Proof Caliper</b></p> <ul style="list-style-type: none"> <li>Range: 0-12" / 300 mm</li> <li>Resolution: 0.0005" / 0.01 mm</li> <li>Accuracy: ±0.03 mm</li> </ul> <p><b>3. Fine Adjustment Vernier Caliper</b></p> <ul style="list-style-type: none"> <li>Range: 0-280mm / 0-11"</li> <li>Resolution: 0.001" / 0.02 mm</li> <li>Accuracy: ±0.04 mm</li> </ul>
25.	Water Bath	<ul style="list-style-type: none"> <li>Chamber Capacity: 5.5 liters</li> <li>Temperature Range: Ambient to 99.9 °C</li> <li>Dimensions (L x W x H) of Work Area: 11.5 x 6 x 6 in. (29.2 x 15.2 x 15.2 cm)</li> <li>Electrical Requirements: 220/230V; 300 Watts; 1.3 Amps</li> </ul> <p><b>Special Requirements:</b></p> <ul style="list-style-type: none"> <li>Stainless-steel diffuser shelf</li> <li>Stainless-steel gable cover</li> <li>Polypropylene gable cover</li> <li>Temperature Uniformity: +/- 0.2 °C</li> <li>Sensitivity: +/- 0.1 °C at 37 °C with stainless steel gable cover</li> </ul>
26.	Water Distillation Unit	<p>1. DESCRIPTION: Double Distillation Apparatus (Quartz), Horizontal Type</p> <p>2. CONSTRUCTION: i) Made of high quality heat resistant quartz glass (Cylinders and Tubes). ii) Resistant to minor damages. iii) Parts should be replaceable.</p> <p>A) Condenser: Made of quartz glass.</p> <p>B) Boiler: i) Demountable upper and lower boiler along with water level indicator. ii) Provision for easy cleaning and general maintenance.</p>

Sr. No.	Equipment / Item Name	Specifications
		<p>C) Heater i) High purity electronic grade transparent quartz type. ii) Capacity - 3 KW, Single phase. iii) Heater outlet should be capped with Silicon Boots iv) Should avoid contact of embedded boiler with water.</p> <p>D) Cooling Water Consumption Should not be more than 100 L/hr</p> <p>E) Stand Stand for the apparatus should be of high quality, rust free, powder coated metal with embedded clamps for perfect holding.</p> <p>3. CAPACITY: 1.5 L/hr</p> <p>4. DISTILLATE: i) The resultant distillate obtained should be of high purity water with following specification, accompanied by compliance certificate:</p> <p>a) Specific resistivity : should be minimum 18MΩ.cm at 25°C</p> <p>b) Specific conductivity : should be less than <math>1 \times 10^{-6}</math> S/cm at 25°C</p> <p>c) pH : Should be 6.9 – 7.0</p> <p>d) Distillate should be free from organic, inorganic and colloidal solids, constituents, metallic ions including heavy metals and also pyrogen free.</p> <p>5. POWER SUPPLY: Single phase electrical supply with 230 volts.</p> <p>6. SAFETY FEATURES: Provided with safety cut-off device to ensure automatic Switch Off of electrical power in the event water level falls below the heating coil.</p> <p>7. ACCESSORIES:</p> <p>i) Provided with electric cord of sufficient length and plug.</p> <p>ii) Provided with suitable size tubes to connect the assembly to water inlet and outlet.</p> <p>iii) Provided with any other accessories required for the smooth operation of the assembly/unit and should be mentioned in detail in the bid document.</p> <p>8. SERVICE:</p> <p>i) The instrument supplier has to demonstrate the performance of the instrument at the site for the operation and general routine maintenance after installation.</p> <p>ii) Service of the test system shall be available in/around Ahmedabad.</p>
27.	Wax Applicator	<ul style="list-style-type: none"> <li>• Temperature Range: 30 °C to 150 °C</li> <li>• Voltage: 110 V</li> </ul>