

**Technical Specification for Testing Equipments (S. No.21 to 39)**

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**IMPACT TESTING MACHINE WITH NOTCH CUTTER ALONG WITH  
LOW TEMPERATURE CRYOGENIC CHAMBER**

<b><u>Technical Specification</u></b>		
<b>Make</b>		
<b>Model</b>		
<b>S. No</b>	<b>Items</b>	<b>Specification</b>
The impact tester should confirm to the Standards: ASTM D 256 & ASTM D 6110, ISO 180 & ISO 179		
1	Pendulum Impact Energy Range	0-25 Joules
2	Least Count of Indication	0.01 Joules
3	Release Angle of Pendulum	150°
4	Striking velocity range of Pendulum	2.5 – 3.8 m/s.
5	Hammers	Hammers for Izod Impact Tests –2.75 J, 5.5 J, 11.0 J (According to ASTM D 256, ISO 180)  Hammers for Charpy Impact Tests – 1.0 J, 2.7 J, 5.4 J (ASTM D 6110)
6	Vice	Hard chrome plated vice for Izod & Charpy test.
7	Notch cutting device	<ul style="list-style-type: none"> <li>• Digital Notch depth measuring device (0 to 12 mm)</li> <li>• Suitable for notching plastics specimens for Izod &amp; Charpy impact testes as per ASTM &amp; ISO specification. The machine shall have gradual feed control mechanism with micrometer &amp; standard notching tool.</li> <li>• Motor driven, attached with constant profile tungsten carbide knife, "V" notch (45°), Type A, Type B and Type C Comply to ASTM D 256</li> <li>• Knife Speed Regulator</li> <li>• Digital tool with zeroing having accuracy of 0.01mm division for measurement of notch depth.</li> </ul>

8	Special Features	Microprocessor Controlled equipment with possibility to modify and create test parameters according to standard and store templates, Possibility to save data and export selected data with customized format, Real time display of impact energy, resilience, pendulum angle, impact speed and statistical analysis
9	Cryogenic Chamber	Cryogenic chamber (-30 oC) to accommodate Charpy / Izod impact test specimen (5 specimens at one time)
10	Standard Accessories	Manual Izod vice for ISO 180,ASTM D 256 and ASTM D 4812 Jig for aligning of un notched specimen according to ASTM D 256,ISO 180
		Standard detachable weights corresponding to 2J, 4J, 7J, 15J,and 25J should be provided. Standard fixtures for fitting Izod / Charpy test specimen. Any other standard accessories for smooth conduct of test should be provided
		Device for Inspection & verification of Notch as per ASTMD 256 including optical device with minimum magnification of 60X,Filar Glass Scale and camera attachment
11	Auto Notch Cutter & Sample Mounting accessories	Suitable for notching plastics specimens for Izod & Charpy impact tests. As per ASTM D 256, ASTM D 6110 and ISO 180, ISO 179
12	Power	230V, 50Hz, Single phase
	Other Mandatory Items	While supplying the Machines, the supplier should also provide the following items apart from above: • PC with Printer

13	<ul style="list-style-type: none"> <li>• Hard copies of Operational &amp; Service Manual- 01 Set .</li> <li>• NIST/NPL Traceable Calibration certificate for for cutting knife, cryogenic chamber and hammer</li> <li>• Adaptor for ASTM D 256/ISO 180 Machine should come with all other essential accessories &amp; spares required for installation, commissioning&amp; Operation.</li> </ul>
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**LIMITING OXYGEN INDEX TESTER (LOI)**

Technical Specification		
Make		
Model		
S. No	Items	Specification
	<b>APPLICABLE STANDARD</b>	ASTM D2863, ISO 4589-1, ASTM E-2931, IS-13501 and as per UL specifications.
	Digital Read out for oxygen concentration	±0.1%
	Test temperature	Room Temperature
	Dimensions(mm)	Length: 200-400
		Width : 200-500
		Height: 200-300
	Features	Paramagnetic Oxygen Cell for assessing accurate oxygen (< 0.1%) levels.
		Compact unit for efficient use inside a laboratory hood, with ventilation.
		Automatic flow control for oxygen level adjustment by turning one single valve.
		Quick loading of test specimen into test chimney measuring 450 mm x 75 mm or equivalent as per Standard.
		Digital display of oxygen percentage in atmosphere during test (no calculations needed).
		Digital display of temperature of gas mixture entering the test chimney.
		Sample holders for both rigid and flexible samples to be supplied.

		Shortened gas path for rapid response
		<ul style="list-style-type: none"> <li>• Test apparatus includes glass beaded mixing chamber, specimen support, and heat resistant glass column.</li> </ul>
		<ul style="list-style-type: none"> <li>• Uniform combustion atmosphere.</li> </ul>
		<ul style="list-style-type: none"> <li>• Dual inlet gas pressure gauges. 0-100 psi</li> </ul>
		<ul style="list-style-type: none"> <li>• Ignition wand with variable gas control valve.</li> </ul>
		<ul style="list-style-type: none"> <li>• Smoke density measurement system with chart recorder.</li> </ul>
	Additional	Ventilation hood compatible with the instrument to be supplied
	Requirements	Transparent radiant heated test column.
		Air pump to conserve oxygen and nitrogen supply during standby period
	Should be Suitable For	Testing of Polymers, Rubbers, Fibres, Films, FRP products and allied products
	Other Mandatory Items	While supplying the Machines, the supplier should also provide the following items apart from above:
		<ul style="list-style-type: none"> <li>• Hard copies of Operational &amp; Service Manual- 01 Set .</li> </ul>
		<ul style="list-style-type: none"> <li>• Required filled gas Cylinders(Nitrogen and Oxygen) with best qualitySS Regulator.</li> </ul>
		<ul style="list-style-type: none"> <li>• Calibration Certificate of supplied gas and flow meters.</li> </ul>
		<ul style="list-style-type: none"> <li>• Machine should come with all other essential accessories &amp; spares required for installation, commissioning&amp; Operation.</li> </ul>

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### Microprocessor based HDT / VSP Apparatus

<b>Technical Specification</b>		
<b>Make</b>		
<b>Model</b>		
<b>S. No</b>	<b>Items</b>	<b>Specification</b>
1	<b>Make</b>	Bidder to specify

2	<b>Model</b>	Bidder to specify (Please attach the supporting documents like product & accessories catalogue )
3	<b>Test Standards</b>	HDT test as per ISO 75 & ASTM D648 and equivalents VSP test as per ISO 306 & ASTM D1525 and equivalents
4	<b>Temperature range :</b>	From ambient to 300 °C or more.
5	<b>Resolution:</b>	0.1°C
6	<b>Accuracy:</b>	± 0.1°C
7	<b>No of stations :</b>	Min 05-06 Stations.
8	<b>Special Features</b>	The equipment should be automatic microprocessor-based .
		To be supplied with dedicated Software for test parameters management, data storage and analysis.
		Automatic station lift at the beginning and end of tests
		Automatic application and removal of the weights on the test stations
		Automatic cooling cycle at end of test.
		All operations, test cycle and alarms are electronically controlled by a microprocessor via a keyboard with an LED graphic display
9	<b>Material of construction :</b>	Inner bath: S.S Outer-M.S with good finish.
10	<b>Cooling System</b>	Compact Chiller of suitable capacity to coll the oil temp for running next operation.
11	<b>Displacement Range:</b>	0- 10mm with resolution of 0.01mm measured via LVDT transducers
12	<b>Power :</b>	230 Volts, 50Hz, single phase.
13	<b>Weights :</b>	For Vicat: 1 kg and 5 kg. For HDT: Set of modular binary test weights ranging from 5grams to 2000grams

14	Other Mandatory Items	<p>While supplying the Machines, the supplier should also provide the following items apart from above:</p> <ul style="list-style-type: none"> <li>• Hard copies of Operational &amp; Service Manual- 01 Set .</li> <li>• Traceable Calibration certificate for the applicable parts of equipment like Weights ,Indentors, Temperature controllers .</li> <li>• Machine should come with all other essential accessories &amp; spares required for installation, commissioning &amp; Operation.</li> </ul>
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**OPACITY METER**

<u>Technical Specification</u>		
<b>Make</b>		
<b>Model</b>		
<b>S. No</b>	<b>Items</b>	<b>Specification</b>
<b>TYPES OF TESTS TO BE PERFORMED</b>		To check the opaqueness of plastic samples as per
<b>APPLICABLE STANDARD</b>		IS 4985 and IS 12235 (Part 3).
<b>Technical Specification</b>		
1	Range	0 - 100 % opaque
2	Least count	0.01% or better
3	Display	Digital
4	Features	Test specimen clamps up to 15 mm thickness. Indicating Result in percentage reading of light passing through specimen zero & span calibration Powder Coated Body
	Accessories	Standard grey Glass Filter
5	Power Requirement	230V,50Hz

6	Other Mandatory Items	<p>While supplying the Machines, the supplier should also provide the following items apart from above:</p> <ul style="list-style-type: none"> <li>• Hard copies of Operational &amp; Service Manual- 01 Set .</li> <li>• NABL Traceable Calibration certificate for equipment including for Standard grey Glass Filter</li> <li>• Machine should come with all other essential accessories &amp; spares required for installation, commissioning &amp; Operation.</li> </ul>
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**PROGRAMMABLE MUFFLE FURNACE**

Technical Specification		
<b>Make</b>		
<b>Model</b>		
S. No	Items	Specification
1	Controls	PID Based Digital Temperature Controller with Digital Timer (Timer range : 0.001 to 999Secs)
2	Working Range	1200°C
3	Least Count & Accuracy	1°C & ± 5 °C
4	Heating element	Silicon carbide (SiC) / Molybdenum Silicide (MoSi <sub>2</sub> )
5	Heating rate	Fast heating rate and the maximum temperature should be attained as a ramp function within 1 hour Assured uniform heating inside the chamber
6	Furnace	Fire Bricks Insulated Muffle Furnace. Door opening on front side. / Powder coated outer body
7	Features	Safety switch on door, Temperature Chart Recorder, Extra port for gas,
8	Inside Chamber size (Minimum)	12 in X8 In x 5 In or higher size
9	Power Requirement	230V, 50Hz

10	Accessories	Silica crucible-05Nos, Platinum crucible-02 No, Extra heating element & rod with clips, Extra thermocouple, Tongs, & Gloves to be provided Any other accessories suitable for smooth running of furnace should be quoted.
11	Other Mandatory Items	While supplying the Machines, the supplier should also provide the following items apart from above: <ul style="list-style-type: none"> <li>• Hard copies of Operational &amp; Service Manual- 01 Set .</li> <li>• NABL Traceable Calibration certificate for the applicable parts of equipment like Temp.for whole ranges .</li> <li>• Machine should come with all other essential accessories &amp; spares required for installation, commissioning&amp; Operation.</li> </ul>

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**REFRACTOMETER**

<u>Technical Specification</u>		
Make		
Model		
S. No	Items	Specification
1	Measurement	Capable to Measure Refractive Index and Abbe number for Solid and Liquid Samples at different wavelengths. The refractive index curve as a function of wavelength to be obtained.
2	Refractive index range	1.3 to 1.7
3	Wavelength Range	450 nm to 1100 nm with suitable filters
4	Light Source	LED
5	Display	LCD
6	Interface	RS 232 with PC.
7	Accessories	Suitable attachments for solid, liquid and film samples, Spare lamp, Standard reference material with known refractive index for calibration



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## REVERSION OIL BATH

<u>Technical Specification</u>		
<b>Make</b>		
<b>Model</b>		
<b>S. No</b>	<b>Items</b>	<b>Specification</b>
<b>QUANTITY</b>		1
<b>TYPES OF TESTS TO BE PERFORMED</b>		For reversion test of pipes and finished goods
<b>APPLICABLE STANDARD</b>		IS 4985 & IS 12235
<b>Technical Specification</b>		
1	Temperature range	Max. up to 200°C.
2	Least count	1°C or better
3	Inner Chamber Size W*H*D(cm)	suitable upto 400 mm pipe testing with required oil filling capacity. Size to be specified by bidder accordingly while quoting.
5	Features	Digital PID based temperature controller
		faster heating with low energy cost and maintain the temperature for longer time
		Proper insulation
		Suitable stirring attachment for uniform temperature.
		ISI or CE mark electrical panel and components.
6	Power Requirement	230V,50Hz or suitable
7	Other Mandatory Items	While supplying the Machines, the supplier should also provide the following items apart from above: <ul style="list-style-type: none"> <li>• Hard copies of Operational &amp; Service Manual- 01 Set .</li> <li>• NABL Traceable Calibration certificate for equipment</li> <li>• Machine should come with all other essential accessories &amp; spares required for installation, commissioning &amp; Operation.</li> </ul>

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## SHEAR FATIGUE TESTER

<u>Technical Specification</u>	
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<b>Make</b>		
<b>Model</b>		
<b>S. No</b>	<b>Items</b>	<b>Specification</b>
<b>QUANTITY</b>		1
<b>TYPES OF TESTS TO BE PERFORMED</b>		For testing burst resistance for fabric, Sheet , laminations & corrugated box
<b>APPLICABLE STANDARD</b>		IS 7888 & ASTM D 3574
<b>Technical Specification</b>		
1	Flexing Frequency	28cpm
2	Dimension of Test Specimen	380mm x380 mm
3	Main Features	<p>The apparatus consists of the following:</p> <p>a) A perforated moving platform (perforated base platen) with 6 mm diameter holes at 19 mm centre distance;</p> <p>b) Provision for movement of the above platform at the rate of 28 cycles per minute and stroke length of 330 mm;</p> <p>c) A stationary roller 460 mm long and 75 mm in diameter mounted in an off-set position (15") with suitable mesas for adjustment for:</p> <p>1) loading the test piece so that a specified deflection is maintained: and</p> <p>2) deflecting the test specimen so that a specified load is maintained.</p>
4	Accessories	<p>Sample cutting template-01</p> <p>Load deflection Test attachment as per CI No.6 -01 Set</p>
5	Power Requirement	230V,50Hz
6	Other Mandatory Items	<p>While supplying the Machines, the supplier should also provide the following items apart from above:</p> <ul style="list-style-type: none"> <li>• Hard copies of Operational &amp; Service Manual- 01 Set .</li> <li>• NABL Traceable Calibration certificate for equipment</li> <li>• Machine should come with all other essential accessories &amp; spares required for installation, commissioning &amp; Operation.</li> </ul>

<b>Technical Specification</b>		
<b>Make</b>		
<b>Model</b>		
<b>S. No</b>	<b>Items</b>	<b>Specification</b>
<b>QUANTITY</b>		1
<b>TYPES OF TESTS TO BE PERFORMED</b>		For determining deterioration of visibility due to smoke released on combustion of Polymeric materials
<b>APPLICABLE STANDARD</b>		UIC 564-2 OR appendix 15
<b>Technical Specification</b>		
1	Inner size of the chamber	: 750±5 mm (L) X 750±5 mm (W) X 1000±5 mm (H)
2	LUX meter	More than 100 LUX
3	Pressure gauge	2 Kg/cm <sup>2</sup> (2 bars)
4	Rotameter	60 LPM)
5	Features	Digital Display
		MS powder coated exterior
		Ventilation for smoke
		Precise and even heat distribution
5	Accessories	ISI or CE mark electrical panel and components.
		Rotameter of 30LPM-01 no
6	Power Requirement	All sample holders/attachment as per standard 230V,50Hz
7	Other Mandatory Items	While supplying the Machines, the supplier should also provide the following items apart from above: <ul style="list-style-type: none"> <li>• Hard copies of Operational &amp; Service Manual- 01 Set .</li> <li>• NABL Traceable Calibration certificate for equipment</li> <li>• Machine should come with all other essential accessories &amp; spares required for installation, commissioning &amp; Operation.</li> </ul>

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**Spread of Flame Tester**

<b>Technical Specification</b>		
<b>Make</b>		
<b>Model</b>		
<b>S. No</b>	<b>Items</b>	<b>Specification</b>
<b>QUANTITY</b>		1
<b>TYPES OF TESTS TO BE PERFORMED</b>		For fire test of Plastic & allied materials as per RDSO specification

<b>APPLICABLE STANDARD</b>		UIC 564-2 Appendix 4, 5 &11
<b>Technical Specification</b>		
1	Operating Temp	Room Temperature
2	Size of test chamber	1200 mm x 1200 mmx 1400mm (Appox)
3	Angle of test specimen	45°C to horizontal
4	Features	Digital Display
		MS powder coated exterior
		Ventilation for smoke
		Precise and even heat distribution
5	Accessories	ISI or CE mark electrical panel and components.
		Butane Gas cartridge-02 Set
		SS Regulators of Good quality-02 Nos
		Gas Valve
6	Power Requirement	230V,50Hz
7	Other Mandatory Items	While supplying the Machines, the supplier should also provide the following items apart from above: <ul style="list-style-type: none"> <li>• Hard copies of Operational &amp; Service Manual- 01 Set .</li> <li>• NABL Tracebale Calibration certificate for equipment</li> <li>• Machine should come with all other essential accessories &amp; spares required for installation, commissioning&amp; Operation.</li> </ul>

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**Thermostatic Bath**

<b>Technical Specification</b>		
<b>Make</b>		
<b>Model</b>		
<b>S. No</b>	<b>Items</b>	<b>Specification</b>
<b>QUANTITY</b>		1
<b>TYPES OF TESTS TO BE PERFORMED</b>		To determine the K-value of PVC in a diluted solution at a temperature of 27 °C Or 25 °C. The K-Value provides information for characterising the polymerisation of VC polymers.
<b>APPLICABLE STANDARD</b>		IS 4985 ,IS-4669 & ISO 1628-2
<b>Technical Specification</b>		

1	Operating Range	(-10) to (+)100 °C
2	Temperature constancy	0.05°C or better
3	Inner Chamber Size W*H*D(cm)	40 X40 X25 or better
4	Heating Power	As per requirement & to be specified by the bidder
5	Features	Holding device for Ubbelohde Viscometer as per IS 4669
		Indicating reading in digital display
		Powder Coated Body with good finish
	ISI or CE mark electrical components.	
6	Power Requirement	230V,50Hz
7	Other Mandatory Items	While supplying the Machines, the supplier should also provide the following items apart from above: <ul style="list-style-type: none"> <li>• Hard copies of Operational &amp; Service Manual- 01 Set .</li> <li>• NABL Traceable Calibration certificate for equipment</li> <li>• Machine should come with all other essential accessories &amp; spares required for installation, commissioning&amp; Operation.</li> </ul>

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**Thermostatic Bath - 2**

<b>Technical Specification</b>		
<b>Make</b>		
<b>Model</b>		
<b>S. No</b>	<b>Items</b>	<b>Specification</b>
<b>QUANTITY</b>		1
<b>TYPES OF TESTS TO BE PERFORMED</b>		To determine the Resistance of PVC pipes to Dichloromethane
<b>APPLICABLE STANDARD</b>		IS-12235(part-11)
<b>Technical Specification</b>		
1	Operating Range	(-5) to (+) 100 °C
2	Temperature constancy	0.5°C or better
3	Inner Chamber Size W*H*D(cm)	40 X40 X25 or better
4	Heating Power	As per requirement & to be specified by the bidder
5	Features	Auto Stirrer facility
		Indicating reading in digital display
		Powder Coated Body with good finish

		ISI or CE mark electrical components.
6	Power Requirement	230V,50Hz
7	Other Mandatory Items	While supplying the Machines, the supplier should also provide the following items apart from above: <ul style="list-style-type: none"> <li>• Hard copies of Operational &amp; Service Manual- 01 Set .</li> <li>• NABL Traceable Calibration certificate for equipment</li> <li>• Machine should come with all other essential accessories &amp; spares required for installation, commissioning &amp; Operation.</li> </ul>

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**TOP LOADING WEIGHING BALANCE (5kg)**

<b>Technical Specification</b>		
<b>Make</b>		
<b>Model</b>		
<b>S. No</b>	<b>Items</b>	<b>Specification</b>
	<b>QUANTITY</b>	1
	<b>TYPES OF TESTS TO BE PERFORMED</b>	To measure the weight of the Plastics including bulky plastic items like Sack bundles.
	<b>APPLICABLE STANDARD</b>	NA
<b>TECHNICAL SPECIFICATION</b>		
	<b>Parameters</b>	<b>Details</b>
	Capacity	5Kg
	Readability	1 g or better
	Repeatability	1 g or better
	Linearity	4g or better
	Stabilization time	10 s or better
	Display Type	LED /VFD Digital Display
	Pan/Platform Material Type	Stainless Steel SS304 or equivalent
	Platform Size	300mmX225mm or equivalent
	Features	• Auto Zero Tracking facility.
		• Auto Power Saver.
		• Powder Coated Metal Body.
		• Over load Protection.
		• Weather & Water proof tactile Keyboard.
		• High Accuracy Sensor
		• RS 232c Interface.
	Accessories	Power Adaptor

	Function	Power On, Power Off, Tare, Unit
	Other Mandatory Items	While supplying the Machines, the supplier should also provide the following items apart from above:
		<ul style="list-style-type: none"> <li>• Hard copies of Operational &amp; Service Manual- 01 Set .</li> </ul>
		<ul style="list-style-type: none"> <li>• NABLCalibration certificate for the equipment.</li> </ul>
		<ul style="list-style-type: none"> <li>• Machine should come with all other essential accessories &amp; spares required for installation, commissioning &amp; Operation.</li> </ul>

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**TOXICITY TESTER**

<b><u>Technical Specification</u></b>		
<b>Make</b>		
<b>Model</b>		
<b>S. No</b>	<b>Items</b>	<b>Specification</b>
<b>QUANTITY</b>		1
<b>TYPES OF TESTS TO BE PERFORMED</b>		For determination of toxicity index of plastic products while burnt
<b>APPLICABLE STANDARD</b>		NCD 1409
<b>Technical Specification</b>		
1	Inner Chamber Size W*H*D(cm)	To be specified by bidder
2	Chamber Volume	1 m3
	Main Features	Digital display for temperature & timer
		Toxicity Chamber should consist of an airtight enclosure lined with opaque plastic sheeting having a hinged, fitted with a transparent plastic panel.
		The inner wall should have the suitable lining and with polycarbonate,
		Transparency window of good quality should be provided
		The chambershould be fitted with a vacuum pump forced air extraction system, which can be closed at the exit from the chamber when required.

3		<p>The chamber should contain a mixing axial fan inside the chamber at horizontally and centrally inside the chamber at roof level to ensure rapid mixing of combustion products capable of being switched on and off externally.</p> <p>The burner should be capable of achieving a flame approximately 100 mm in height and it should fitted at the center of the chamber.</p> <p>There should be a provision for igniting and extinguishing the burner from outside the chamber.</p> <p>A digital temperature indicator should be mounted for the measurement of the temperature of the flame of the burner.</p> <p>sample holder assembly should have the provision of sliding of the sample without the leakage of the chamber.</p> <p>Two flow meters should be fitted to the instrument to fine control of the supply of natural gas and air. Gas detection tubes and its pumps are optional which will be supplied at the separate order as per customer requirement.</p> <p>All the parts are either polished or painted to give the corrosion resistance long life.</p>
4	Accessories	<p>Gas detection tubes of Good quality as per standard requirement-Qty 10 Pkts</p> <p>Suitable Pumps for Gas-01 no</p> <p>Flow meter of 15 LPM for natural gas and 20 LPM for air</p>
5	Power Requirement	230V,50Hz



6	Other Mandatory Items	While supplying the Machines, the supplier should also provide the following items apart from above: <ul style="list-style-type: none"> <li>• Hard copies of Operational &amp; Service Manual- 01 Set .</li> <li>• NABL Traceable Calibration certificate applicable parts of equipment</li> <li>• Machine should come with all other essential accessories &amp; spares required for installation, commissioning &amp; Operation.</li> </ul>
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**Vaccum Rotary Pump**

<u>Technical Specification</u>		
<b>Make</b>		
<b>Model</b>		
<b>S. No</b>	<b>Items</b>	<b>Specification</b>
1	Pressure Range	Max. 01 bar
2	Least Count	0.01 bar or better
3	Acessories	Negative pressure gauge -01 no Positive pressure Gauge-01 no
4	Power Requirement	230V,50Hz
5	Other Mandatory Items	While supplying the Machines, the supplier should also provide the following items apart from above: <ul style="list-style-type: none"> <li>• Hard copies of Operational &amp; Service Manual- 01 Set .</li> <li>• NABL Traceable Calibration certificate for pressure gauges</li> <li>• Machine should come with all other essential accessories &amp; spares required for installation, commissioning &amp; Operation.</li> </ul>

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**VIBRATION LEAKAGE TESTER**

<u>Technical Specification</u>		
<b>Make</b>		
<b>Model</b>		
<b>S. No</b>	<b>Items</b>	<b>Specification</b>
1	Shall conform to	Standard IS 2798 Clause 6.2
	Capacity	For testing of containers upto 20 litres

2		Vibration table size of 300mm x 300 mm or suitable with fencing arrangement as per Cl. No. 6.2.1 of IS 2798 for sinusoidal rotary movement.
3	Frequency	variable upto 8 Hz
4	Digital Accelerometer	0.5 to 1.1 g ( with calibration certificate )
5	Other Features	Spring loaded motorized vibration arrangement
		Digital display of Set frequency & Acceleration and Timer
		Variable frequency drive should be provided for variable speed
		Shall be suitable for replacing the frame on the vibration table for testing various products as desirable
6	Other Mandatory Items	<p>While supplying the Machines, the supplier should also provide the following items apart from above:</p> <ul style="list-style-type: none"> <li>• Hard copies of Operational &amp; Service Manual- 01 Set .</li> <li>• NABL/NIST Traceable Calibration certificate for the applicable parts for frequency and acceleration .</li> <li>• Different Frame attachments required for testing of different capacity containers upto 20Ltr capacity.</li> </ul> <p>Machine should come with all other essential accessories &amp; spares required for installation, commissioning &amp; Operation.</p>

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**VOLUME & SURFACE RESISTIVITY TESTER**

<u>Technical Specification</u>		
<b>Make</b>		
<b>Model</b>		
<b>S. No</b>	<b>Items</b>	<b>Specification</b>
	<b>APPLICABLE STANDARD</b>	ASTM D 257
	Resistance Measurement Range	10 <sup>3</sup> to 1 x 10 <sup>14</sup> Ω Type of Measurement: Direct-reading from the instrument Ohms Shunted by Insulation Resistance from main electrode to Guarded Electrode
	Resistance Measurement accuracy	±0.5% of setting value

	Test Voltage Range	Programmable test voltage up to 1000V
	Voltage Accuracy	$\pm(1\%$ of setting +2V ) with resolution 250 mV
	Display type	High-visibility blue LCD Graphical Display, High-Voltage Indicator & Pass/Fail indicator
	Standard features	Fully programmable via on-screen, Safety interlock, keypad lockout, measurement averaging (1-140 readings), programmable test times, automatic zeroing of test Load.
	Operating temp. range	0° C to 50 °C
	Operating humidity range	45% RH to 90% RH
	Electrode	1) Standard electrodes with guard ring .The electrodes for insulating materials should be of a material that is readily applied, allows intimate contact with the specimen surface, and introduces no appreciable error because of electrode resistance or contamination of the specimen.The electrode material should be corrosion-resistant under the conditions of test. For tests of fabricated specimens such as feed-through bushings, cables, etc.
		2) Broad combination of electrodes support for measuring a wide variety of objects having different size and shape (Circular,Rectangular, Square, Tube,Cable etc.)
	Calibration Kit	Required calibration kit should be provided along with instrument.
	Interface	RS-232 interface , I/O port with safety interlock, USB Host Port for Data/Program storage
	Additional Special Features Need	Vendors must have sufficient experience in supplying equipment to reputed organizations of Plastic/polymer Industries . Sheets and molded products should be measured just as they are without the need to cut samples.

	Testing	Should be Suitable For Electrical testing of Plastics, Rubbers, Films, FRP Composites.
	Power Supply (Mains)	220 V AC in single
	Other Mandatory Items	While supplying the Machines, the supplier should also provide the following items apart from above: <ul style="list-style-type: none"> <li>• Hard copies of Operational &amp; Service Manual- 01 Set .</li> <li>• NIST/NPL Traceable Calibration certificate of equipment .</li> <li>• Machine should come with all other essential accessories &amp; spares required for installation, commissioning&amp; Operation.</li> </ul>

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**WEIGHING SCALE (100 kg)**

<b>Technical Specification</b>		
<b>Make</b>		
<b>Model</b>		
<b>S. No</b>	<b>Items</b>	<b>Specification</b>
	<b>QUANTITY</b>	1
	<b>TYPES OF TESTS TO BE PERFORMED</b>	To measure the weight of the Plastics Tanks and other high volume materials.
	<b>APPLICABLE STANDARD</b>	NA

**TECHNICAL SPECIFICATION**

<b>Parameters</b>	<b>Details</b>
Maximum Capacity	100kg
Readability	10 g or better
Repeatability	10 g or better
Stabilization time	10 s to 15s or better
Display Type	LED /VFD Digital Display
Pan/Platform Material Type	Rectangular & Stainless Steel SS 304 or better
Platform Size	500mm X550mm or better
	<ul style="list-style-type: none"> <li>• Auto Power Saver.</li> <li>• High Bright LED/VFD Display.</li> <li>• Removable 304 stainless steel weighing pans for quick cleaning</li> <li>• Over load Protection.</li> <li>• level bubble,</li> </ul>
Accessories	Power Adaptor
Function	Power On, Power Off, Tare, Unit

	Other Mandatory Items	While supplying the Machines, the supplier should also provide the following items apart from above:
		<ul style="list-style-type: none"> <li>• Hard copies of Operational &amp; Service Manual- 01 Set .</li> </ul>
		NABL Calibration certificate for the equipment.
		<ul style="list-style-type: none"> <li>• Machine should come with all other essential accessories &amp; spares required for installation, commissioning &amp; Operation.</li> </ul>

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WVTR

<u>Technical Specification</u>		
Make		
Model		
S. No	Items	Specification
1	Make	Bidder to specify
2	Model	Bidder to specify (Please attach the supporting documents like product & accessories catalogue )
3	<b>Applications</b>	<b>Measurement of WVTR of polymer film, composite, sheet, membrane, packaging films etc as per ASTM F 1249 .</b>
4	Measuring range	0.002 to 1000g/ g/m <sup>2</sup> /day
5	Measuring accuracy	0.002 g/m <sup>2</sup> /day or better
6	Sample Test surface area	Max 50cm <sup>2</sup>
7	Minimum sample size	100 x 100 mm
8	Thickness of sample	0.005 – 1 mm
9	Operating Temperature Range	15-45°C
10	Temperature control accuracy	± 0.5°C
11	Communication interface	RS 232 – Interface
12	Humidity measuring range	20% -90%
13	Humidity accuracy	± 1% RH
14	Reproducibility	High permeability samples : better than 1%
		Low permeability samples better than 5%
15	Accessories	<ul style="list-style-type: none"> <li>• Standard Reference calibration Films/Sheets of low range and high range-02 nos , Foil Mask for smaller samples , Tubing fittings.Moisture tap and filters, Sampling Plate and Vacuum Grease</li> </ul>
		<ul style="list-style-type: none"> <li>• Professional Software &amp; Operating Manual</li> </ul>

16	Other Features	<ul style="list-style-type: none"> <li>• Program controlled testing - Featured with leakage, over range protection, error warning</li> </ul>
		<ul style="list-style-type: none"> <li>• Auto stop at power cut-off with automatic saving of test data and results</li> </ul>
		<ul style="list-style-type: none"> <li>• Monitors interaction between testing parameters with real time display of transmission rate, water vapor density, humidity, temperature and related curves</li> </ul>
17	Calibration	Calibration of necessary parts traceable to NIST where required to be provided
18	Warranty	Minimum 3 years of warranty to be provided.
19	Scope of supply	Complete list of items quoted are to be provided
20	Installation requirements	Bidder to specify the preinstallation requirements
22	Other Mandatory Items	Onsite training for system operation and maintenance as well as application support should be provided by the vendor at its own cost.
		Appropriate tool box/kit for routine maintenance should be provided with the equipment
		All documents (i.e. operating & service manuals, drawings etc.) and original softwares relevant to the instrument and its accessories must be supplied.
		In case of any up gradation of software within the period of warranty then the same should be provided free of cost by the supplier/manufacturer.
		Power and receptacle/socket as per Indian Standards should be provided.
		The vendor shall have local service and application office and infrastructure to attend by visit within 48 hours of need.
		PC with Printer
		NIST/NPL Traceable Calibration certificate for Standard reference calibration Films.
		The vendor should have technical support in the area of application and service available readily within 24 hrs of call.
23	The vendor should furnish details of customers in India alongwith the image of instrument and literature.	