

**Summary Sheet for Testing Equipment**

S. No.	Name of the Equipment	Qty (No's)
1	Compression Moulding Press for Specimen Preparation for Thermoplastics (30 T)	1
2	Melting Point Apparatus (Digital Display)	1
3	Melt Flow Index (MFI)	1
4	Muffle Furnance (Up to 1000 C)	1
5	HDT/VST Apparatus	1
6	Long/Short Term Hydrostatic Pressure Test Apparatus for Pipes	1
7	Weighing Balance (Precision Electronic Balance)	1
8	Reversion Oil Bath	1
9	Deep Freezer	1
10	Impact Tester-Falling Weight Impact Tester for Pipe with all Stikers	1
11	Opacity Tester	1
12	Carbon Black Content Apparatus	1
13	Haze & Clarity Meter	1
14	Environment Stress Cracking Resistance (ESCR) Test Apparatus	1
15	Contour Cutter with Templates	1
16	Izod & Charpy Impact Tester	1
17	Tear Tester for Films	1
18	Projector & Hot Plate for Carbon Black Dispersion (CBD) for HDPE Pipes Testing	1
19	Press Cutting 30 Tonnes with Dies	1
20	Universal Testing Machine 2.5 T (For Training)	1
21	Melting Point Apparatus (Hot Stages)	1
22	Hight Temperature Water Bath (Upto 100 <sup>0</sup> C)	1
23	Brust Tester for Films	1
24	Hot Air Oven (Upto 300 °C)	1
25	Drop Tester for PET Container/ Bottle	1
26	Viscosity Thermostatic Bath	1
27	Climatic Chamber	1
28	Co-efficient of Friction	1
29	Density Gradient Column	1
30	Falling Weight Dart Impact Tester for Film	1
31	End Fittings for Pressure Test of Pipe for UPVC,HDPE and CPVC	Each 1 Set



## TECHNICAL SPECIFICATION FOR TESTING EQUIPMENTS/MACHINERIES

### 1. Compression Molding Press for specimen preparation for thermoplastics (30T)

S.L. No.	Parameter	:	Specification/Range
01	Capacity	:	30 T
02	Temperature	:	Upto 300°C (Individual microprocessor based calibrated digital temperature controller for both plates)
03	Platen Size	:	300 mm X 300 mm
04	Power	:	440 Volts, 3 Phase A.C. supply
05	Platen Movement	:	Hydraulic systems (Up Strokes)
06	Accessories/Spares	:	Two number of digital timers for curing & cooling cycle, heating & cooling system in platens.
07	Press	:	Press without molding die.
10	Working area (LXW)	:	250 X250 (mm)
11	Plate dimension (LXW)	:	300X300 (mm)
12	Daylight opening	:	195 mm
13	Press force	:	Up to 150 bar
14	Hydraulic pressure	:	Up to 150 bar
15	Heating power	:	1.5 kW
16	Micro processor	:	Comprehensive user friendly easy to operate and handling microprocessor for complete cycle
17	Power Cabinet	:	3 – Phase + neutral + earth – 440 v AC
18	Water Supply	:	½ inch external hose connection for cooling
19	Dimensions	:	Please specify
20	Test Standard	:	IS 7328, & other relevant standards
21	Mould for making Thermoplastics Sheets	:	a) Mould Material: M S Steel  b) Size of moulded Plastics sheet should be as per following specification: i) Length X Width-25cm X 25cm (min) ii) Thickness of Sheet -2.00mm, 3.00mm & 4.00mm

## 2. Melting Point Apparatus (Digital Display)

S.L. No.	Parameter		Specification/Range
01	Temperature Range	:	Ambient Temperature to 400°C
02	Temperature Accuracy	:	$\pm 0.5^{\circ}\text{C}$ at 20°C; $\pm 2.5^{\circ}\text{C}$ at 400°C
03	Temperature Rate to Fast Temp Set	:	0.1° C to 20 ° C per minute
04	Digital Display/Resolution	:	4 digit LED/0.1 ° C
05	Sample Carrier	:	Glass slides

### 3. Melt Flow Index

S.L. No.	Parameter	:	Specification/Range
1	Scope	:	Determination of flow properties of polymer powders & pellets using ISO 1133 (1991) and ASTM D1238, Method A, B & C and other equivalent International standards.
<b>TECHNICAL SPECIFICATION</b>			
2	Performance Characteristics Compliant Standards	:	System should meet ASTM 1238 and ISO 1133-1-2, DIN 53735, BS 2782, IS 2530
3	Temperature range	:	50 °C to 400 °C
4	Temperature display resolution	:	+/- 0.1 °C
5	Thermal stability	:	+/- 0.2 °C from 50 to 400 °C
6	Thermal fuse protection	:	MVR with up to 40 data points acquisition for a single test (with encoder)
7	Barrel Cylinder	:	Hardened Nitride Steel
8	Display	:	On-board LCD Display with alphanumeric keypad for methods setting and visualization of results
9	Digital Encoder Accuracy & Lifting Device	:	Should be equipped with high accuracy encoder and motorized lifting device to allow precise and exact positioning of the lifting device for the masses.
10	Knife	:	Automatic Cutting device
11	Masses	:	1.2, 2.16, 5, 10, 21.6 kg
12	Nozzle	:	Standard Nozzle as per ISO 1133/ASTM D1238 Diameter 2.095 mm, Length 8 mm,, tungsten carbide; should be supplied with dimensional conformity certificate
13	Accessories	:	Cleaning Tools & Cleaning cream, Go-No-Go Gauges for dies and piston & Die Plug
14	CRM Materials	:	CRM with NIST traceable certificate
15	Software	:	Windows based
16	Die	:	Die According to ASTM D1238 Method C (Half Die), for high flow rate polyolefins, Dia 1.048 mm, Length 4.00 mm, - Made of tungsten carbide; should be supplied with dimensional conformity certificate
17	Recommended Spares	:	* Spare Standard Die/Nozzle and Piston * Fuses and Thermal Probe
<b>The equipment should be supplied with all the essential accessories to meet the standard methods mentioned above</b>			

#### 4. Muffle Furnace (up to 1000°C)

S.L. No.	Parameter		Specification/Range
01	Maximum temperature	:	1000°C
02	Working Temperature Temperature accuracy Least count	:	1000°C ± 10°C ± 1°C
03	Thermocouple Type	:	J or K Type
04	Heating Elements	:	Kanthal Wire/ Silicon carbide
05	Inner Chamber	:	Ceramic tile
06	Insulation	:	Ceramic Fiber
07	Power Supply		220 volts 50Hz
08	Standard Size (inch)	:	Min. 18" x 24" x 12" (W x H x D)
09	Accessories		Stainless steel tong, one pair of furnace gloves & spare parts.

## 5. HDT/VST Apparatus

S.L. No.	Parameter	Specification/Range
01	Number of testing stations	: 3 Station
02	Movement of the stations	: Manual Machine controlled
03	Application of test weights	: Manual Machine controlled
04	Heat transfer medium	: Silicone oil
05	Temperature range	: 20 °C – 300 °C
06	Temperature resolution	: 1 °C
07	Temperature present accuracy	: ± 2°C
08	Temperature rate between	: 50 & 120°C per hr.
09	Instrument processing with PID	: Digital PID Control
10	Thermal stability °C	: 300°C
11	Thermal Distribution	: (100 to 250) °C
12	Test confirms to	: ASTMD- 648 (HDT) ASTMD -1525 (VST)
13	Power supply	: 230 V ±10%, 50Hz
14	Data connections	: Ethernet (for PC) USB (for printer) Ethernet (for PC) USB (for printer) Ethernet (for PC) USB (for printer)
15	Other	: 1) HDT Test: HDT capability to test sample in flat wise or edgewise position with 64 or 100 mm free span according to international standards.  2) VICAT test: VICAT masses (one set of each station) for a total of 10N and 50N. For VICAT tests only. These masses are ready included in the binary mass system, which allows to perform HDT and VICAT tests 3) Different wt. for getting fibre stresses of 4.6 Kg/cm sq and 5 kg/cm sq. 4) Calibration material and each station calibrated.

## 6. Long/ short term Hydrostatic Pressure test apparatus for Pipes

S.L. No.	Parameter	:	Specification/Range
01	Test Standard	:	HDPE, PVC, PPR, Lateral pipes as per IS 4985, IS 4984, IS 12786, IS 14333, IS 14151, IS 15328, IS 15801, EN 921:1994, ASTM D 1785 & other relevant standards
02	No. of Stations No of outlet from each station	:	08 (Min) 03
03	Unit of pressure	:	kg/cm <sup>2</sup> , MPa, BAR
04	Pressure Range	:	0.00 to 99.99 kg/cm <sup>2</sup>
05	Pressure Resolution	:	0.01 kg/cm <sup>2</sup>
06	Resolution of Timer	:	999.9 hrs.
07	Time Range	:	0.1 hour/6 minute
08	Hydraulic Circuit	:	Made from corrosion-less S.S. 304 tubing and fittings
09	Compressed air requirement	:	Min. 3.0 kg/cm <sup>2</sup> form compressor unit
10	Pressure Developing System	:	Through hydro-pneumatic type reciprocating pump
11	No. of Pumps	:	02 pumps
12	Pressure control system	:	Hydro-pneumatic pressure regulating device with individual control of station.
13	Power Supply	:	230V AC, Single phase, 50Hz

## 7. Precision Electronic Balance

S.L. No.	Parameter		Specification/Range
01	Capacity	:	0- 220 gm (Min.)
02	Accuracy	:	0.001 g
03	Display	:	Digital display
04	Density kit	:	1.Density kit supply with equipment and direct result of Density (gm/cm <sup>3</sup> ) 2. Cover glass cabinet to avoid outside effect during the weighing.
05	Pan size	:	100mm
06	Power supply	:	220 volts ,single phase,50 Hz at your end
07	Other	:	With Print report

## 8. Reversion Oil Bath

S.L. No.	Parameter	:	Specification/Range
01	Size (LxWxD)	:	1000mm X 750mm X 750mm
02	Digital Temperature control panel	:	0 to 200 °C Least Count: 0.1 °C
03	Stirrer Motor for Uniform Temperature	:	1/8 HP
04	12 KW Heating Power	:	6 KW X 2 Nos.
05	Power Coated body with heat insulation	:	Cotton fibre wool insulation
06	Timer	:	0 to 999 min
07	Timer Accuracy	:	1 Sec

Should comply with IS 12235

## 09. Deep Freezer



S.L. No.	Parameter		Specification/Range
01	Type	:	Digital Zero Degree Chamber
02	Size of working Chamber (Inner Dimension)	:	1m(L) x 0.5m(W) x 0.6m (D)-Minimum Horizontal Top Open
03	Material of Construction	:	Inner bath: S. S., outer body M.S. (The gap between the inner and outer wall is filled high grade PUFF insulated to avoid thermal loss.
04	Temp. Range	:	Ambient to - 15°C
05	Compressor	:	CFC Free
06	Paint	:	Powder Coated
07	Power	:	230 volts, 50 Hz, Single Phase.
08	Display	:	Digital Display by P/D controller
09	Accuracy	:	0.1°C
10	Other	:	Moving wheel to be provided, Air circulating fan & lighting.

#### 10. Impact Tester-Falling weight impact tester for pipe with all strikers

S.L. No.	Parameter		Specification/Range
01	Falling Height	:	2000mm
02	Height Adjustment	:	Manually
03	Height Adjustment Resolution	:	± 2mm
04	Striker (Dart / Dead Weight)	:	Made from mild steel
05	Striker (Dart / Dead Weight) Weight	:	0.250kgf, 0.500kgf ,0.800 kgf & 1.000kgf – one set of each weight
06	Striker (Dart) Release Device	:	Through D.C. magnet / Pull release free falling mechanism
07	Max. Dia. Of Test Sample	:	Test up to uPVC pipe Ø315mm
08	Sample Clamping	:	on 120°V' block
09	Paint	:	Powder coated

### 11. Opacity Tester

S.L. No.	Parameter		Specification/Range
01	Range	:	0 to 100% Transparency
02	Display	:	4 ½ Digit 7 segment LED
03	Resolution	:	0.01
04	Scale linearity	:	>0.2% of FSD (0.2 class)
05	Accuracy	:	0.01%
06	Lamp	:	12 V 21 W with 15mm screw Cap
07	Power	:	230+ 10% V AC 50 HZ single phase, approx. 35W
08	Accessories	:	One calibrated opacity ref. plate & instruction manual.
09	Optical filter Wavelength	:	540 Nm
10	Test Standard	:	as per IS 4985 & other relevant standards

### 12. Carbon Black Content Apparatus

S.L. No.	Parameter		Specification/Range
01	Test Method	:	ASTM D1603, IS 4984, IS 2508 & IS 2530 or equivalent Standard
02	Furnace Size	:	10 X 8 X 8 inch
03	Temperature Range	:	Ambient to 850 °C
04	Temperature Control Systems	:	Microcontroller based PID Controller
05	Resolution	:	1°C Accuracy $\pm$ 2°C
06	Accessories	:	Desiccator, Glass U Tube, Combustion Tube, Combust Rotameter, Rubber Tube (1 No. each), Glass end Caps- 2 Nos and Glass Traps- 3 Nos
07	Supply	:	230 V ACS/ 50 Hz
08	Power	:	1.5 KW
09	Special Feature	:	Compact with safe assembly for glassware's

### 13. Haze & Clarity

<b>S.L. No.</b>	<b>Parameter</b>	<b>:</b>	<b>Specification/Range</b>
01	Measurement Area	:	18.0 mm (0.65 in)
02	Sample Port	:	25.4 mm (0.85 in)
03	Measurement Range i) Transmittance ii) Haze iii) Clarity	:	0 to 100% 0 to 100% 0 to 100%
04	Repeatability	:	± 0.1 units (standard deviation)
05	Reproducibility	:	± 0.4 units (standard deviation)
06	Geometry	:	0° / diffuse
07	Spectral Response	:	CIE luminosity function y
08	Illuminant	:	ASTM D 1003, ISO 13468 & CIE – D65
09	Memory	:	5000 Reading
10	Interface serial	:	LAN, USB 2.0, Addition front USB port for drive
11	Power Supply	:	230 V / 50 Hz, 115 V / 60 Hz, 200 VA max.
12	Operating Temperature	:	+10 – 40 °C (+50 – 104 °F)
13	Storage Temperature	:	0 – 50 °C (+32 – 122 °F)
14	Dimensions	:	62 x 33 x 22 cm (24 x 13 x 9 in)
15	Weight	:	18 kg (40 lbs)

#### 14. Environment Stress Cracking Resistance Test Chamber (ESCR)

S.L. No.	Parameter		Specification/Range
01	Construction	:	Double walled with Poly Urethane (PUF)insulation
02	Exterior	:	MS powder coated
03	Chamber size	:	18"X18"X20"(inch.)
04	Capacity	:	3 CFT (90ltr)
05	Inner Chamber	:	304 grades stainless steel
06	Door	:	Insulated door with lock and key arrangement
07	Chamber must condition the samples with combination like	:	Temperature – 24+20C RH – 65+5% & Temp- 23±2°C, RH 50+5%
08	Temperature Controller	:	Microprocessor based PID controller
09	Temperature Sensor	:	PT 100 (Imported, Germany Make)
10	Temperature range	:	5°C to 50°C
11	Steam Injection	:	Stainless steel water reservoir with heater and insulator and water level monitor
12	Cooling	:	CFC free ISI marked heretically sealed compressor
13	Heating	:	"U" Shaped Nichrome Wire heater
14	Air Circulation	:	Flange motor with impeller/Blower
15	Chamber	:	Vacume glass inspection window with door switch
15	Shelves (Trays)	:	Stainless steel wire mesh
16	Safety	:	High temperature cut-off Low water level alarm

### 15. Contour Cutter with Templates

S.L. No.	Parameter		Specification/Range
01	Template as per	:	IS (Type A, B & C) & ASTM Standard
02	Speed	:	Based on AC Variable speed AC Drive, High cutting speed.
03	Operation	:	Milling performance and easy operation
04	Use	:	Used for making Dumbbell/Other shape specimen
05	Power Requirement	:	220 / 230 V AC 50-60 Hz, Single Phase.
06	Test Standard	:	HDPE, , IS 4984, IS 12786, IS 14333, IS 14151, ASTM D 638 & other relevant standards

### 16. Izod & Charpy Impact Tester

S.L. No.	Parameter	:	Specification/Range
1	Set Up	:	For Izod & Charpy as per ASTM and ISO standards
2	Basic pendulum capacity	:	2.82J
3	Additional weights	:	Weight sets upto 25J capacity or more
4	Impact velocity	:	Aerodynamic compound pendulum with facility to increase/decrease pendulum capacity with addition/ removal of weights enabling user to change to desired capacity quickly & easily
5	Drop Height	:	0.61m
6	Strikers	:	Izod striker, charpy striker and its anvil, setting gauges. Should include charpy striker, anvils, setting gauges
7	Notch cutter	:	Motorised Notch cutter
8	Optional Accessories	:	Facility for Zero and Sub Zero testing upto 50°C
9	Additional	:	Transparent Safety Enclosure Is Fitted Around The Pendulum

#### 17. Tear Tester for Films

S.L. No.	Parameter	:	Specification/Range
01	Capacity	:	0-6400gm.
02	Pendulum Range	:	400,800,1600,3200,6400gm.
03	Accuracy	:	1.0% of Pendulum Range
04	Calibration Weights	:	20%, 50% and 90%
05	Measuring Principle	:	Hi-resolution digital encoder
06	Test Standard	:	IS 2508, ASTM D1922

#### Features:

1. Automatic specimen notching
2. Mechanical-pneumatic clamping avoids sample slippage to ensure repeatable results
3. Automatic pendulum reset with lifting device
4. Tearing force displayed digitally.
5. Safety Hood protects operator from injury while pendulum is in motion.

#### 18. Projector & Hot Plate for Carbon Black Dispersion (CBD) for HDPE Pipe Testing

<b>S.L. No.</b>	<b>Parameter</b>	<b>:</b>	<b>Specification/Range</b>
01	Display	:	Digital Controller
02	Temperature Range	:	Ambient to 200.C
03	Size of Hot plate	:	8 inch diameter
04	Microscope Magnification Power	:	10x & 20x
05	Size of Microscope Screen	:	6 inch
06	Power Supply	:	Single Phase 220-240V AC, 50Hz
07	Control Method	:	Digital Control & Hot Plate
08	Test Standard	:	IS 2508, & other relevant standards

### **19. Press (Cutting) - 30Tonnes with Dies**

<b>S.L. No.</b>	<b>Parameter</b>	<b>:</b>	<b>Specification/Range</b>
01	Specimen Cutting Press	:	Hydraulic
02	Dumbell Cutting Die	:	IS:4984, 4985, 14151(Part-I), 12786, 13592

## 20. Universal Testing Machine (2.5 T for Training)

SL. No.	Parameter	:	Specification/Range
01	Max. load capacity	:	25 kN
02	Load cell	:	25 kN, 5.0 kN, 1.0 kN, 100 N
03	Load cell accuracy	:	≤ 0.5 %
04	Test speed	:	1 mm/min to 500 mm/min.
05	Speed accuracy	:	± 0.2%
06	Cross head travel	:	Min 800 mm
07	Horizontal daylight	:	Min 400 mm
08	Strain measurement accuracy	:	0.5% or better
09	Load measured	:	Tension and Compression
10	Tensile Grips	:	<ul style="list-style-type: none"> <li>- Wedge grips Suitable for above loads Grips suitable for testing of Plastic films (rubber faceted Pneumatic type)</li> <li>- Grips for Rigid Plastics (opening up to min.12mm)</li> <li>- Grips for woven Sacks (up to 70 mm width-As per IS :14887 Latest version)</li> </ul>
11	Fixtures	:	<ul style="list-style-type: none"> <li>- Flexural fixture complies to ASTM D 790</li> <li>- Compressive Fixture complies to ASTM D 695</li> <li>- Shear fixture complies to ASTM D 732</li> <li>- Fixture complies to IS 4984-2016 (Plastics Butt Fusion Joints Test)</li> </ul>
12	Extensometer	:	Contact type Strain gauge
13	Applicable standards and Conforming to	:	ISO/R-527, ASTM D 638, 695, 790, 882, 412, 3039 and Equivalent standards
14	Power	:	230 Volts, 50 HZ, single phase.
15	Other Information	:	The machine is supposed to carryout testing on various type of plastic specimens and product samples as per IS and ASTM Standards as mention above. The sample involves FRP sheets, Plastic Pipe cut Pieces, Moulded Specimens of commodity, Engineering Plastics as per different standards.
16	Operating system &Software	:	Suitable for all functions such as maximum Load, strain, modulus etc. Necessary software Computer & Printer should be provided.

## 21. Melting Point Apparatus (Hot Stage)

<b>S.L. No.</b>	<b>Parameter</b>	<b>:</b>	<b>Specification/Range</b>
01	Temp Range (Deg. Centigrade)	:	Ambient to 350° C
02	Operation Grade	:	Automatic
03	Control System	:	PLC control
Other required accessories should be provided			

## 22. High Temperature Water Bath (up to 100°C)

<b>S.L. No.</b>	<b>Parameter</b>	<b>:</b>	<b>Specification/Range</b>
01	Size (L X W X H) mm (Inner Dimension of bath)	:	1000X1000X1000 mm
02	Temperature Range	:	Ambient to 100°C
03	Least Count	:	0.1°C
04	Accuracy	:	1°C (Throughout the Bath)
05	Material of inner Body	:	S.S. 304 grade
06	Material of out Body	:	S.S. 304 grade
07	Temperature controller	:	Digital temp. Controller
08	Water Circulation pump	:	In built water circulation pump of reputed make
09	Top Opening Cover	:	Top opening cover with heavy hinges



### 23. Burst Tester for Films

S.L. No.	Parameter	:	Specification/Range	
Mullen type of hydro-static digital burst strength tester For film, Aluminum foil, Fabric Specifications: Machine designed and working principal as per ASTM D-3786				
1	Pressure range	:	60 Kg/cm <sup>2</sup>	
2	Least Count	:	0.05 kg/cm <sup>2</sup>	
3	Display	:	Digital	
4	Rate of Fluid Dispalcement	:	100 cc/minute	
5	Test fluid	:	Water	
6	Motor	:	1/2 HP single Phase	
7	Peak Hold Facility	:	Yes	
8	Safety Switch	:	Yes	
9	<b>Features</b>	:	Digital Indication of readings	
		:	Equipment should be completely Microprocessor based	
		:	Tare facility should be incorporated	
		:	Peak hold facility for keeping the maximum value in the memory	
		:	Bright LED display	
		:	Features touch control	
		:	Single push button control	
		:	Memory to hold upto 10 tests	
			:	Strong griping clamp
Grooved structure for test specimen holder to avoid seepage and intact holding of specimen				
No seepage in case of specimen tightened uniformly using operating wheel				

#### 24. Hot Air Oven (up to 300°C)

S.L. No.	Parameter	:	Specification/Range
01	Temperature Range	:	Ambient Temperature to 300°C
02	Temperature Accuracy Least count	:	1.0°C ± 0.1°C
03	Digital Display/Resolution	:	4 digit LED/0.1 ° C
04	Construction	:	Inside & outer SS body with Cotton fiber wool heat insulation.
05	Standard Size (mm) (W x H x D)	:	450 x 450 x 450mm(min)
06	Area Requirement	:	1.00 X 1.00 X 1.00 (Meter)
07	Power Supply	:	220 to 240 volts 50Hz

#### 25. Drop Tester for PET Bottle

S.L. No.	Parameter	:	Specification/Range
01	Drop Height	:	Adjustable b/w 0.5 mtr. to 2.0 mtr.
02	Drop Weight	:	Up to 25 kg (min)
03	Operating Systems	:	Manual flap opening with liver operation/ Automatic
04	Platform Size	:	Please Specify
05	Lifting	:	Manual with supportive pulley & wire rope winch systems
06	Operations	:	Manual Flaps Opening with liver
07	Dropping edges and corners	:	By Fixing Support from upper side & from sides of flaps
08	Constructed of Drop Tester	:	The drop tester is constructed sturdy MS with Powder coated/painted & plated. Its single column design with operating from different heights
Device to be used for Drop Test for Containers, Filled Pouches and should full fill the requirement of IS 2798-1998 and IS 7394-1984.			

## 26. Viscosity Thermostatic Bath

S.L. No.	Parameter	:	Specification/Range
01	Material of inner body	:	Stainless Steel - 304
02	Material of outer body	:	Stainless Steel - 304
03	Insulation	:	<ul style="list-style-type: none"> <li>• Thermo insulation bath</li> <li>• Inspection glass on the front side</li> <li>• PID temp. controller</li> </ul>
04	Range	:	0 - 99.99 °C
05	Least count	:	0.01 °C
06	Power supply	:	230 V, AV. 3/13 amps, with 3 pin socket
07	Heater	:	100 watts and cooling facilities required
08	Other	:	Stirrer for uniform temperature
09	Size of Bath	:	L-300mm x W-300mm x H-350 mm (Minimum)

## 27. Climatic Chamber

S.L. No.	Parameter	:	Specification/Range
<b>Interior dimensions</b>			
1	Width (mm)	:	402
2	Height (mm)	:	402
3	Depth (mm)	:	330
4	Interior volume (l)	:	53 or specify
5	Load per shelf (kg)	:	15
6	Permitted total load (kg)	:	60
<b>Temperature data</b>			
7	Temperature range (°C)	:	- 40 to 180
8	Temperature fluctuation (± K)	:	0,1 - 0,5
9	Recovery time after door was open	:	30 sec
10	at -10 °C (min.)	:	5
11	at 70 °C (min.)	:	1
12	at 150 °C (min.)	:	5
13	Mean warm-up rate acc. to fa	:	4,6
14	Mean cooling rate acc. factory standard (°C/min.) 180 °C to -40 °C	:	4,1
15	Heat compensation, max. (W)	:	500
<b>Humidity data</b>			
16	Humidity range (%)	:	0-99
<b>Electrical data</b>			
17	IP protection class acc. to EN 50529	:	IP 20
<b>Temperature and Humidity should be microprocessor based Programmable</b>			

### 28. Coefficient Of Friction

S.L. No.	Parameter		Specification/Range
01	Capacity	:	Up to 9.999 kg.
02	Direct display	:	Static and kinetic friction values
03	Speed	:	150mm/minute.
04	Weight of sledge	:	200 grams.
05	Accessories	:	Three nos. of S.S templates
06	Paint	:	Powder coated.
07	Power	:	230 Volts, 50Hz, single phase
08	Force Measurement- Through Load Cell	:	Through Load Cell
09	Force Range	:	1000gram
10	As per	:	ASTM D – 1894

### 29. Density Gradient Column

S.L. No.	Parameter	:	Specification/Range
1	Calculation of Data	:	Automatic density
2	Calibration system	:	Automatic
3	Display	:	LCD
4	Resolution	:	0.0001 g/ml
5	Accuracy	:	0.0001 g/ml , Backlight
6	System of Pumped	:	Variable speed pumped filling
7	Flasks	:	Twin conical filling Flasks
8	Stirrer	:	Automatic magnetic
9	Mechanism	:	Automatic sweep
10	Baskets	:	Stainless steel sweep
11	Microscope	:	7x optical
12	Temperature Control	:	Digital temperature control to 0.1°C
13	Output	:	RS232
14	Coil	:	Cooling coil
15	Power Supply	:	110v 60hz and 240v 50Hz
16	Product	:	User manual
17	Conforms Of IS Method	:	ISO1183 & ASTM D1505
<b>OPTIONAL ACCESSORIES</b>			
18	Printer	:	Thermal Printer
19	Unit	:	Water chiller unit
20	Glass marker floats	:	0.7g/ml up to 2.2g/ml

### 30. Falling weight Dart Impact tester for film

S.L. No.	Parameter		Specification/Range
01	Drop Height	:	600mm to 1500mm
02	Weights	:	5g. to 300g.
03	Stainless Steel Dart Head	:	50mm(280g)
04	Aluminum Dart Head	:	38mm(50g)
05	Sample holding & Drop release mechanism		Pneumatic
06	Test Standard	:	,IS 2508, & other relevant standards

### 31. End Fittings For Pressure Test Of Pipe for UPVC, HDPE & CPVC-Each 1 Set

S.L. No.	Description of items	
01	M.S. cast iron and coated with non-rusting material.	
02	Adequate no. of accessories, bolt , nuts Allen key screw ,connection nipple must be stainless steel ,copper/ brass,	
03	Complying standard – IS: 4984-2016 (Cone type)	Size of pipe Dia (mm): 16,20,25,32,40,50,63,75,90,110,125,140,160, 180,200,225,250,
04	IS: 4985-2000 (Type –A)	Size of pipe Dia (mm): 16,20,25,32,40,50,63,75,90,110,125,140,160, 180,200,225,250,
05	IS: 15778-2007	Size of pipe Dia : (15 to 150)

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