

1. Xenon Weather - o - Meter		
Sl. No.	Specification	Range / Value
1	Purpose	Accelerated weathering test is a type of weathering testing which is used to measure future possibilities of materials' durability under certain environmental conditions. This testing technique is applied to measure future degradation or corrosion of materials.
2	Principle/ Definition	Xenon arc testing promotes property changes of materials, including the effects of sunlight, moisture and heat, by simulating ultraviolet and visible solar radiations by means of a weatherometer.
3	Reference Standard	ISO 105, ISO 11341, SAE-J1885, SAE-J2527, SEAJ 2412, ASTM G155, ASTM G 151 ISO 4892-2, ASTM D 4459, ASTM D 5071, ASTM D 4355, ASTM D 2565 , ASTM D 6622, IS 2454 , IS 15827
4	Light source	Air cooled Xenon Arc Lamps
5	Sample compartment	Approx. 3000 Sq. cm or more
6	Filter	Optical Filter system to simulate outdoor / indoor testing
		Filters should be of non-ageing type to avoid frequent change
7	Panel	Black Panel Temperature (BPT) Control
		Black Standard Temperature (BST) Control
		White Panel Temperature Sensor
8	Control	Chamber Air Temperature Control
		Simultaneous control of BST & CAT required
		Relative Humidity Control required

9	Other built –in features	Microprocessor control required
		Touch screen/key pad
		Irradiance control required
		Irradiance Sensors at 340nm, 420 nm & TUV range
		Irradiance Calibration device for quick, easy, error free and automatic calibration
		Provision of water spray front & back required
		Data logging interface along with software
		Capability of mounting and testing fabric specimens
		Back spray and dual spray in xenon test chamber
10	Standard compliance	Compliance to various international standards (ISO, ASTM and other standards)
		Suitable Radiometer with NIST Traceable calibration certificate for optional filters for Xenon test chamber
		Black Panel Calibration Thermometer for Xenon test chamber
11	Accessories	Specimen holder set for Xenon test chamber.
		One Set of Xenon Arc Lamps for Xenon test chamber
		Other types of Filters (Window glass, UV/Extended UV) for Xenon test chamber
		Suitable water filtration system with required accessories to achieve the desired micron level and ionic conductivity

		Suitable UPS to withstand backup power for 01 hour
12	Additional features	· Easy programming of cycles, temperature checking and status performance with proper safety controls.
		· Self-diagnostic system for complete error checking and performance status should be displayed.
13	Other Mandatory Items	While supplying the Machines, the supplier should also provide the following items apart from above:
		· 02 years of warranty.
14	Training	Required training should be provided on operation and maintainance
		Complete set of manuals for the operation of equipment should be given.
15	Scope of supply	Complete list of items quoted are to be provided
16	Intallation & Commissioning	The Machine should come with all other essential accessories & spares required for installation, commissioning & operation.

2. Ingress Protection Tester		
Sl. No.	Specification	Range / Value
IP Tester As per IS/ IEC – 60529, IEC- 61032, EN 60529, IS : 12063		Shall meet the requirements of following standards. IS/ IEC – 60529, IEC- 61032, EN 60529, IS : 12063
1	IP 1X Probe	(Sphere Dia = 50 mm , Handle = Ø10 X 100 mm length,Guard = Ø45 X 4 mm thickness) as per relevant standard
2	IP 2X Probe (Test Probe)	Sphere Dia = 12.5 mm , Handle = Ø10 X 100 mm length

3	IP 2X Probe (Jointed Test Finger) (Test Probe B)	Knurled Finger Diameter = 12mm , Knurled Finger Length = 80mm, Baffle Plate Diameter = 50mm, Baffle Plate Thickness = 20 mm
4	IP 3X Probe	Length of test Rod = 100 mm, Test Rod Dia = 2.5 mm, Diameter of Sphere = Ø35 mm, Length of Handle = 100 mm, Handle Dia = 10 mm As per Standard: IS/ IEC – 60529, IEC- 61032, EN 60529
5	IP 4X Probe	Length of test Rod = 100 mm, Test Rod Dia = 1 mm, Diameter of Sphere = Ø35 mm, Length of Handle = 100 mm, Handle Dia = 10 mm
6	Low Voltage Panel	Voltage = 0 to 50 V, Digital Voltage Indicator, ON OFF switch, Two cable with banana connector
7	Push pull Gauge	Range : 20KG, Digital Display
8	IP X1 & IP X2 (Rain Test Apparatus)	Main drip box 600 x 600 x 75 mm and hole of 0.4 mm id at pitch of 20 x 20 mm Sample mounting stand with 1 RPM Up down adjustable movement 800 mm. and 15 degree angle, Turn table capacity 100 kg Flow Rota meter Acrylic and pressure gauge of S.S. All detail suitable for as per standard with water flow indicator Up to unit pipe line and connection provide by you Power Supply: 220-240 VAC 50-60Hz, Single Phase Size: 700 x 800 x 2400 mm(LXBXH) (approx.)

9	IP X3 & X4 (Oscillating Tube Test / Oblique RainTest)	<p>Material S.S.304 Tube for Spray Apparatus, R 600, and $\pm 60, \pm 90^\circ$ as per IEC 60529 and as per IS: 12063 Fig: 4 (cl. No 14.2.3 a) device to verify protection again spraying water.</p> <p>Second characteristic numerals 3 and 4 (oscillating tube) Unit complete S.S. oscillating tube of 15 mm ID with hole at pitch of 50 mm 0.4 Dia with oscillating motorize movement at rare of $60^\circ/s$ approximately $\pm 60^\circ, \pm 90^\circ$ by selection of switch unit PLC operated, sample mounting stand with 1 RPM and up down adjustable movement. Flow Rota meter Acrylic and pressure gauge of S.S. All detail suitable for IP x3x4 as per standard Up to unit. Size: 2200 x 1400 x 2200 (L X B X H) (Approx.) Oscillating tube provided of R 600</p>
10	IP X3 & IP X4 (Hand Held Shower)	<p>Pressure gauge and control valve Pressure Gauge: 0 – 2 kg Number of Holes: 121 Diameter of Nozzle Holes: 0.5mm Water Flow: 10L/min, Flow meter is adjustable Material: Spray nozzle make of brass Size: 370X330X160 (LXBXH) (Approx.)</p>
11	IP X5 & IP X6 (Water Jet)	<p>IP X5 6.3 mm & IP X6 12.5 mm Jet With control valve Size: 370 x 330 x 160 (LXBXH) (Approx.)</p>
12	IP X7 immerse tank	<p>Technical Specification: Tank material M.S. with Powder coated and internal FRP coated. Tank size : 1 X 1 X 1.5 Meter (LXBXH) With drainage valve With water level visible window. Accessories: Ladder, measuring scale & a stop Size: 1200 x 1200 x 1700 (LXBXH) (Approx.)</p>

13	Water supply control unit	<p>On S.S. stand water Flow Rota meter Acrylic. 2 to 20, 12 to 120 LPM, 2 Nos. Non rusting type pressure gauge of rating 2 Kg/cm². All detail suitable for as per standard with water pressure and flow indicator with control valve manually, pump flow and pressure suitable with standard this unit you can use in for IP X1X2X3X4X5 and X6 tester, Up to unit pipe line with water supply and Power connection provide by you Power Supply: 440 VAC 50-60Hz, Suitable for four wire Three Phase Supply</p>
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3. Computerised Universal Testing Machine Model 100 kN

Sl. No.	Specification	Range / Value
1	Application	To be designed for testing of Materials/Products under Tension, flexural and compression bending (Microprocessor Controlled)
2	Maximum Capacity	100 kN
3	Crosshead Travel	Min. 1000 mm
4	Clearance between columns (horizontal Daylight)	600 mm (Minimum)
5	Provision for Measuring Range	200N-100kN
6	Load cell Accuracy	<p>Accuracy: +/- 0.5% or better of applied force, and (+/-) 0.5% or better of reading down to 0.5% or better of full scale Range :0.5% to 100% for all the load cells (together from 200 N or better to 100kN maintaining +/-0.5% accuracy) Internal sampling rate: 1000 sample/sec or better with ASTM E83 & ISO 5893 and to an accuracy within 1 %.</p>
7	Cross Head Speed	Min. 0.001 mm/min
8	Straining / Testing speed (at no Load/Full load)	Should be 500 mm/min or better (Straining at variable speed)
9	Through Precision Load cells & coupling	100kN with LC - 0.0125N or better & adapter for load cell attachment & grip
10	Standard Accessories	

10.1	1) <u>TENSILE TEST FOR METAL PIPES - SPECIMEN :-</u>	up to 25 mm
	Grip head arrangements for the tensile Specimen of metal pipes with throat area available with Shank length of different diameters :- (Tensile Test Method IS 1608 / ISO 6892)	
10.2	2) <u>TENSILE TEST FOR ROUND SPECIMEN :-</u>	Up to & including 20mm for round specimen and up to & including 12 mm thickness for flat sample with <u>50</u> mm width.
	Clamping Jaw for Round Specimen of Diameter & flat specimen	
10.3	4) <u>COMPRESSION TEST:</u>	150 mm with Max. 100kN capacity.
	Pair of compression plates of diameters	
11	Flexural Test/Bend Test	3 point Bend fixture with span continuously variable from 30mm to 300mm or more and roller diameter 4mm/10 mm and length of loading bars 50mm or more & complies with ASTM D 790.
12	Grips & Fixtures for Plastic/Rubber&Rope sample testing	The machine should have versatile removable grips and fixtures so that it can be changed quickly to meet variable requirements in tension, compression, shear, flexure etc. and should be Pneumatic and/or Self-tightening wedge grip as per ASTM D 638, IS 4984:2016, IS 12235 part 13:2004 and ISO :4427:2019 etc. Shear Test fixture (Sandwich specimen) as per IS 14182/ ASTM C 273.
		Provision of special gripping for polymeric, film and rubbery materials, Rope Samples, Wide variety of grips and fixtures
		Provision for Pneumatic grip 25 x 50 mm up to 5 kN or higher capacity.

		<p>Heavy Duty Vice Grip for 20kN for woven sack as per IS 14968, 14887:2014 and HDPE Geo-membrane as per ASTM D 6392 including Rubber Faced Flat Jaws 50x100mm (Set) ; Aluminium Corrugated Jaws 50x100mm (Set).</p> <p>Provision for LVDTcompressometer and Deflectometer compatible for use with above compression platen and bend fixtures as per ASTM D 695. Provision for creep testing of DWC pipes with suitable LVDT device integrate with main testing software.</p>
13		Printer & PC graphs
		Motor driven threaded columns for quick effortless adjustment of lower cross-head-to facilitate rapid fixing of test specimen.
		Digital display on hand held interface and through PC
		USB or any suitable port to transfer data to computer for analysis/storage evaluation etc.
14	Strain Unit	· Suitable encoder of minimum resolution 0.001 mm. Strain
		· Tension, Compression, bending, transverse and shear test to be conducted between lower cross head and table
		· Provision for rapid change the position of lower cross head by operating screwed column for easy fixing of specimen.
15	Extensometer (Mechanical - Contact Type)	
15.1	Measuring range	Long travel Extensometers up to 700mm or more to measure strain by means of knife edges which contact the sample till break. Gauge length of 10 mm, 15mm, 20mm, 25mm, 50mm should be provided. Supplied unit must meet ASTM E83 & ISO 5893 and to an accuracy within 1 %.
15.2	Least count	0.01 mm or better

15.3	Arm travel	Requirements:Should be left on specimen through failure, Lightweight to minimize any influence on the test, Low operating tracking force, Rugged construction to withstand rigors of operation, The strain should be used to control the machine in a closed loop feedback controlled mode,
15.5	Calibration	Extensometers shall be calibrated & certified as per relevent ASTM standards.
15.6	Data Acquisition & Software	<p>Material testing Software with Metal & Plastic Module with methoded data base</p> <ul style="list-style-type: none"> · Real-time image, stress-strain curve, load deformation, load-time curve, load/strain, Young Modulus etc. shall be displayed by the software. · The upper and lower yield, maximum breaking and strain, breaking/elongation ratio of selecting point etc. required be supplied from graphic. · Software shall record and generate test report. The software shall have wide range of process. Test results can be displayed in Metric and System International (SI) system. · Automatic zeroing at the beginning of the test and auto return facility after specimen failure is required · All test results to be displayed on the screen. System should have option for automatic break detection · Software should compatible with extensometer · Data analysis, statistics, point tracing, superimposing graph for comparison should be available. <p>User programmable method in software for cyclic loading and creep test should be provided.</p>
17	Installation, Commissioning & Performance guarantee	<ul style="list-style-type: none"> · The Supplier shall be responsible for carrying out the Installation and Commissioning at customer site. · Shall provide guarantee for the satisfactory performance of the system for a period of two year after satisfactory installation and commissioning at Purchaser's site.

		Complete training should be provided at the site.
18	Technical support and service	Manufacturer should have established after sales & service network in India. The vendor shall have local service and application office and infrastructure to attend by visit within 48 hours of need.
19	Eligibility Criteria	<p>The tenderer shall have to meet the following eligibility criteria for being considered against this Invitation to tender:</p> <p>A. The tenderer should be Original Equipment Manufacturer (OEM) of Universal Testing Machine (UTM) or their authorized representative.(A)The tenderer, if OEM, shall submit ISO certificate/certificate from any Govt./Govt. authorized agency to show that the tenderer is a manufacturer of UTM.</p> <p>B. In case of authorized representative, supporting documents like valid agreement between tenderer and OEM or valid certification of dealership from OEM or valid letter of authorization from OEM must also be submitted along with the ISO certificate/certificate from any Govt./Govt. authorized agency. OEM and Exclusive representative should have worked together for at least 5 years as on bid submission deadline.</p> <p>2. The OEM should have an established / authorized service centre / service representative in India to provide technical support / after sales service of the equipment. Copy of valid agreement between OEM and authorized service centre /service representatives or authorization / certification by OEM shall be submitted.</p> <p>3. The tenderer should have carried out Supply, Erection / Installation / Supervision of Erection or Installation / Commissioning / Supervision of Commissioning of at least three (3) Nos. of Universal Testing Machines of same as offered make and same capacity or higher (of same OEM in case of authorized representative) to any of the following in India during past 5 (five) years from the date of Request for Quote (RFQ).</p> <p>♦ The tenderer should be supplied the said equipment to Govt. organization; PSU; Public Ltd. company or Joint venture company in which at least one partner is Govt. organization or PSU</p> <p>The jobs should have been completed in the last seven (7) years prior to the date of RFQ. In case of merger or acquisition of the</p>

		<p>OEM after the first supply of such equipment during past five (5) years from the date of Request for Quote (RFQ) and the equipment make has changed subsequently, in that case supply with old make shall be considered for evaluation provided documents related to merger or acquisition is submitted along with the offer. OEM should specify the year of launch of the offered model and undertake spares availability of minimum 10 years after the model is discontinued.</p> <p>Copies of the following documents shall be submitted in support of above and information to be furnished as given below:</p> <p>a) Un-priced Purchase order / Work order / Award letter / contract document from client</p> <p>b) Completion / installation & commissioning / performance certificate from client (should have reference to point 3(a) above) Complete address, contact person, company's e-mail address and telephone numbers of the above clients should also be furnished.</p>
20	Machine Working Video Link	Machine Working Video Link must be provided.

4. UV - Vis - NIR Spectrophotometer		
Sl. No.	Specification	Range / Value
1	Photometric system	Double beam optics
2	Monochromator	Double beam monochromator
3	Light Source	Deuterium lamp, WI lamp with automatic optical axis adjustment
4	Detectors	PMT, InGaAs and Cooled PbS: All three detectors
5	Wavelength Range	200 or lower to 3300 nm
		± 0.2 nm or lower for UV/Vis

6	Wavelength Accuracy	NIR: ± 0.8 nm or lower
		0.1 nm or better.
7	Resolution	± 0.05 nm or better
8	Wavelength scanning speed	Instrument should have variable wavelength scan rate from 4000 to 0.5 nm/min (UV-Vis) and 9000 nm/min (NIR) with automatic selection
9	Spectral band width	UV/VIS: 0.1 -8 nm or higher
		NIR: 0.2 - 32 nm or higher
10	Stray light	0.00008 %T or less (220 nm; NaI)
		0.00007 % T or less (340 nm, NaNO ₂)
		0.0005 %T or less (1420 nm, H ₂ O)
		0.0005 %T or less (2365 nm, CHCl ₃)
11	Photometric range	Absorbance = -6 to 6 Abs or better.
		Transmittance & reflectance 0 to 80000% or better.
12	Photometric Accuracy	Instrument should have photometric accuracy of ± 0.003 Abs (at 1 Abs), ± 0.002 Abs (at 0.5 Abs) or better/ ± 0.007 Abs (at 2 Abs) or better
13	Photometric repeatability	0.0008 Abs (0 - 0.5A)
		0.0016 Abs (0.5 - 1A) or better.
14	Baseline Flatness	± 0.001 Abs (200 - 3000 nm)
		± 0.005 Abs (3000 - 3300 nm)
15	Baseline stability:	Within 0.0002 Abs/h
		(500 nm, 1-second integration)
16	Noise Level	UV-Vis: 0.00005 Abs or less (500 nm)
		NIR: 0.00008 Abs or less (900 nm)

		0.00003 Abs or less (1500 nm)
17	Data Acquisition	The equipment should interface with computer and controlled by software. Data points in .csv format to be obtained.
18	Accessories to be quoted and supplied along with machine / equipment	
	1 10 mm rectangular quartz cell - 02 pair	
	2. 100 mm cylindrical quartz cell - 02 pair	
	3. Film Holder - 01 no.	
	<p>A. Solid sample transmission holder: 1 Nos. solid sample transmission holder for thin film/solid samples.</p> <p>B. Solid powder sample holder: - 1 Nos.</p> <p>C. Quartz Cuvette: pair of quartz cell of 3 mL capacity and 10mm path length for liquid sample</p> <p>D. Beam Adjustable holder – Beam size (height and width) fully software Controllable for small sample measurement</p> <p>E. Attenuator: must offer with system, Inbuilt /external attenuators for analysis of high absorbing samples and software controllable</p> <p>F. Desktop: suitable branded PC with i5 processor with 8 GB RAM, Hard Disk 1 TB, 17 inch monitor and color printer (Ink Tank) with Scanner, Anti –virus software or better configuration</p> <p>G. UPS: 5KVA or suitable capacity UPS with minimum 30 minutes backup or above</p>	
	6. The total instrument must have warranty of 2 years from the date of installation	
	<p>7. Integrating sphere accessory with facility to measure</p> <p>Diffuse Reflectance Accessories : minimum 150 mm integrating sphere (PMT and PbS detector) to measure 200-2500 nm or better with powder sample holder, transmission holder for thin film and cuvette holder.</p>	
	8. CRM - NIST Traceable Pressed Barium Sulphate	

5. Modulated Differential Scanning Calorimetry (MDSC)		
Sl. No.	Specification	Range / Value
		· Measures heat absorbed or released by a sample as a function of time, temperature, and environment
		· Measurement of the following properties of polymers, rubbers, elastomers, etc.
		1. Glass transition temperature (T_g)

1.	Purpose	<p>2. Melting temperature (T_m)</p> <p>3. Crystallization temperature (T_c)</p> <p>4. % of crystallinity</p> <p>5. Curing temperature</p> <p>6. Degree of cure</p> <p>7. Purity</p> <p>8. Activation energy</p> <p>9. Heat of enthalpy</p> <p>10. Heat of fusion</p> <p>11. Kinetic studies (isothermal/non-isothermal)</p> <p>12. Thermal stability</p> <p>13. Oxidation/decomposition</p> <p>14. Oxidative-Induction Time (OIT)</p> <p>15. Specific Heat</p>
2.	Principle/Definition	MDSC is a thermo-analytical technique to investigate the response of polymers to heating cycle.
3.	Reference Standard	ASTM D 3417-99, ASTM D 3418-15, ASTM E 1356-08(2014), ISO 11357-1:2016, ASTM-D 3895-14, IS-4984, ASTM E-1269
4.	System	System shall be capable of running in conventional DSC mode as well as Sine wave modulated DSC mode

5.	Temperature Range	-120 °C to 700 °C or better
6.	Temperature Accuracy	± 0.1 °C or better
7.	Temperature Precision	± 0.05 °C or better
8.	Heating Rate	0.1 °C/min to 200°C/ min or higher
9.	Cooling Rate	0.1 °C/min to 100°C/ min or higher
10.	Oscillating (modulated) heating rate	± 1.0 °C/min. Or better
11.	Furnace	To be constructed of corrosion-resistant material suitable for rapid heating/cooling and should have a long lifetime.
12.	Calorimeter Sensor	Thermopile or constantan or platinum Thermocouple
13.	Calorimeter Baseline Repeatability / Stability/ Flatness	<30 μW or better
14.	Maximum Calorimetric Sensitivity	0.2 μW or better
15.	Calorimetric Precision (based on metal standard)	± 0.10% or better
16.	Dynamic Range	± 200 mw to 500 μW
17.	Temperature Calibration	5 points calibration over the full temperature range
18.	Baseline Noise (max. peak to peak)	0.1 μW or better
		Operating software and analysis software shall be user friendly and shall be running on windows 10 or higher version

19.	Software	Analysis software shall have the provision to smoothen to evaluate peak temperature, onset temperature, glass transition temperature, melting temperature, crystallization temperature, % of crystallinity, purity, curing temperature, activation energy, heat of enthalpy, heat of fusion, kinetic studies, Oxidative-Induction Time (OIT), X-scaling w.r.t time, temperature, etc.
		The software shall have the provision to view total heat flow, modulated heat flow, total heat capacity signals in real time during experiment.
		Software for kinetic studies (to be supplied with one license as the same can be used with TGA) for single and multiple steps through non-linear regression.
		The data analysis software should be unkeyed or multi-user licensed to allow installation at a minimum of 3 PCs Calibrations shall include baseline, cell constant, and temperature. Scheduling capabilities must be present, such that these calibrations and/or verifications can be programmed to perform during normal quiescent periods, such as overnight or on weekends.
		The data file format should easily allow sharing/transfer of data files as individual electronic documents, which are readable by the same data analysis package.
		The operating software should also be capable of periodically and automatically checking for updates via an Internet connection, and downloading/installing those updates if desired.
		Library
		Compatible to Windows 10 or higher OS (32 and 64 bit) and should have the capabilities to heating rate, temperature setting, etc. and capable of collecting data on heat flow, heat capacity enthalpy change, C_p , T_g , T_m , T_c , peak area, peak onset, etc
20.	Measurement Atmosphere	N_2 or O_2 or air
21	Provision for cooling	Fully automatic Inbuilt liquid nitrogen cooling system & accessories with variable cooling rates as specified above.

22.	Control system	Built-in Gas mass flow control system with auto-gas switching option within the test run.
23.	Accessories	<p>MDSC must include:</p> <p>02 no. of the Platinum pan with lid,</p> <p>02 no. of Graphite pan with lid</p> <p>100 nos. of Copper pans for the OIT test</p> <p>800 nos. of Aluminium pans with lid.</p> <p>Standard samples such as Indium, Cobalt, Tin, Adamantane, Sapphire with Traceable calibration Certificate for calibration purpose.</p> <p>Reference standard for sub-ambient temperature.</p> <p>Crimper and die set to be supplied along with the Instrument for sample preparation of both dry powder and liquid samples.</p> <p>Suitable controlled cooling system for maintaining -120 to 700 °C range</p> <p>Gas Tubing & fittings-01Set</p> <p>Moisture dryer-01Set</p> <p>PC of required configuration with the original software</p> <p>01 No. of filled N₂ gas cylinder with two-stage SS Gas regulator of the best quality with tubing fittings</p> <p>01 No. of filled O₂ gas cylinder with a two-stage SS Gas regulator of the best quality with tubing fittings.</p> <p>01 No. Five Digit High Precision Digital Weighing Balance (1 μg readability).</p>

		UPS (5 KVA) for 1 hour or higher power backup
		Basic tool Kit-01 set
		Hard copies of Operational & Service Manual- 01 set
		Necessary Hoses & Nipples required -01 set
24.	Calibration Certificate	Calibration certificates for supplied reference material traceable to NIST and internal calibration report to be provided.
25.	Personal Computer (PC)	A Personal Computer having latest configuration: i7 processor 10th generation, 16GB RAM, DVD - RW, 500 GBSSD, Windows 11 with lifetime licence, Latest microsoft Office professional, 27"LCD display, Wifi enabled or with better specifications along with a suitable laser color printer
		All software shall be loaded into the hard disk with appropriate partitions. All original CDs/DVDs must be provided.
26.	Others	Modulated DSC shall have the ability to apply sinusoidal temperature wave to sample by amplitude and frequency.
		Modulated DSC shall include the ability to perform quasi-isothermal experiments i.e. holding isothermal with a small temperature modulation.
		Modulated DSC should be able to show the following signals in real-time during the experiment: Total Heat Flow, Total Heat Capacity, Reversing Heat Capacity, Reversing Heat Flow, Non-Reversing (Kinetic) Heat Flow, Modulated Temperature, Modulated Heat Flow, Heat Flow Phase, Reference Sine Angle, Temperature Amplitude, and Heat Flow Amplitude.
		DSC shall allow for the direct measurement of specific heat CP i.e. in one single scan.
27	Scope of supply	Complete list of items quoted are to be provided

28	Training	Training on operation & maintenance of the equipment should be provided onsite
29	Intallation & Commissioning	The Machine should come with all other essential accessories & spares (as per ASTM & ISO standards) required for installation, commissioning & operation.

6. Automatic Servo Hydraulic Injection Moulding Machine (75 T - 80 T)

Sl. No.	Items	Unit	Specification
	Injection Unit		
1	Shot Capacity (In GPPS)	g	Min.75 and above
2	Screw Diameter	mm	25-36
3	Screw L/D Ratio	-	Pls Specify
4	Injection Pressure	bar	Min. 1800 and above
5	Injection Speed	mm/sec	Min. 150 and above
6	Injection Rate	cc/sec	80 and above
7	Plasticizing Rate (GPPS)	Gm\Sec	Min. 10 and above
8	Max. Screw Speed	rpm	Pls specify
9	Total Heating Capacity	KW	Pls Specify (suitable to achive 380 deg. C temp)
10	Bi-Metallic Screw Barrel - Mandatory	-	Specify & Quote for Bi metallic screw bareel (suitable for engineering with fillers & speciality plastics) & Certificate to be furnished.
	Clamping Unit		
11	Clamp Force	ton	75 T - 80 T
12	Mould Opening Stroke	mm	Min. 300 and above
13	Maximum Daylight	mm	Min. 700 and above
14	Mould Height Min./Max.	mm	Specify

15	Platen Size	mm	Min 500 x 500 and above
16	Distance Between Tie Rod	mm	Min. 350 x 350 and above
17	Ejector Stroke	mm	Specify
18	Ejector Force	ton	Min. 2 and above
18	Hydraulic Multiple Core Pulling Unit		specify and quote (Minimum 2 core pulling)
19	Clamping Mechanism		Toggle
General			
22	T Slot Platen		Specify and Quote (T Slot is Preferred)
23	Water inlet & outlet manifold for Mould cooling		Min.8/8 Channel
24	Essential/Standard spares		Specify and Quote (Standard Tool Kit, NRV, Thermocouple, Band Heater, Short/Extended Nozzle, SSR, Proximity Switch, Limit Switch, Mould Clamps, T-Nut and Studs, Etc.,)
25	Hopper Loader cum Drier System	Kg	Min.25 Kg Capacity
26	Safety		The machine or set of machines supplied to meet objective shall be able to operate without any risk or hazard without any additional protection, provision, training or guarding devices and meet current international standard.
27	Motor / Pump Type		Servo motor operated hyd pump
28	Motor load		Specify
29	Machine Dimensions (LxWxH)		Specify
30	Total connected load	KW	Specify (lower Connected Load will be preferred)
31	Max. Power consumption @ full load machine capacity		Specify (lower power consumption will be preferred)
32	Warranty		Two Years from the date of installation.