

Testing Equipments Technical Specification 2021-22/02

2021-22/02/01 CHNSO Analyser

S. no.	Item	Specification
1	Operating Principle:	
2	Basic Principle	Based on classical technique of Pregi & Dumas. The system includes Pressurised Oxygen Injection System (TurboFlash Technology) for perfecting combustion in widest variety of samples matrices
3	Operating Mode	simultaneous (CHNS); (CNS); (S); (O); (CHN); (CN); (N). Full field up gradability from one operating mode to another through full modularity
4	Detection Principle	Separation of combustion product on GC Column followed by detection using Supersensitive Thermal Conductivity detector
5	Instrument Features:	
6	Oven temperature range	From 40°C to 190°C
7	Furnace Temperature	Up to 1100°C for all operating mode
8	Combustion temperature	Up to 1800 °C
9	Oxygen injection (volume)	Volume set via S/W
10	Oxygen injection (pressure)	Set Independently from Carrier velocity via S/W Zero flow in Gas Save
11	Gas leak test	Automatic by keypad push button or via S/W
12	Gas flow rate in stand-by	Zero flow in Gas Save
13	Gas save in stand-by	Automatically selectable by keypad or S/W
14	Catalyst & TCD protection	Automatic isolation with gas save routine
15	Exhausted reactor change	Bayonet-lock action from outside of the instrument
16	Sample introduction	80 sample via electrically driven AutoSampler
17	Sample Type	Solid, Viscous and liquid
18	SW Instrument Control	Fully automatic control of all parameters and results reporting by user selected format. Set up guide for Windows XP/ME
19	SW	Real time chromatogram display. Storing of an unlimited methods. Ability to reprocess individual runs and batches of samples. AutoRun & AutoCal.

20		AutoReady & Wake up routine. Automatic Leak test. Export on Excel
21	Calibration	Traditional K-factor or linear regression
22	Safety	Full fail-safe operation. Sensors for high temperature compartment and transformer. Dual redundant control valving for Oxygen delivery circuit Shut-off safety interlock for users accessing the hot compartment
Instruments Performances:		
23	Practical Working Range	0,01% up to 100%
24	Precision	Using Cystine as Reference Std Material and Sartorius Mod CP2P MicroBalance, weighing 5-6 standard within 0,5 mg up to 1,5 for linear regression calibration the typical results obtained are From 0,20% or up to 0,30% depending on Element % content
25	Speed of Analysis	From 0,20% or up to 0,30% depending on Element % content CHNS/CNS = 5 min; CHN = 3 minutes; for Oxygen = 2 min
26	Accessories	Micro balance with Calibration Certificate to be supplied
WARRANTY		
27	Minimum 3 years warranty must be provided with additional 3 year's maintenance contract (Optional) in order to keep the equipment in continuous working condition. Part numbers of all parts for which warranty will not be applicable should be specified in the quotation.	
28	AMC charges for additional 3 years should be quoted additionally.	
TRAINING		
29	Onsite training for system operation and maintenance as well as application support should be provided by the vendor at its own cost.	

2021-22/02/02 Colour Spectrophotometer

S. no.	Item	Specification
1	PURPOSE	To measure Colour ,Yellowness Index as per various Indian and International standards.
2	APPLICABLE STANDARD	ASTM D1925, ASTM E313,ASTM D2244, ASTM E308,ASTM E1164, DIN 5033, JIS Z 8722, ISO 7724/1, CIE 15: 2004
3	MEASUREMENT PRINCIPLE	Dual beam spectrophotometer.
TECHNICAL SPECIFICATION		
4	Light Source	Pulsed Xenon lamp filtered to approximate D65

5	Viewing Aperture	Large area view : 1.75 in. illuminated, 50 mm measured
		Small area view : 1.75in, 1.00in, 0.50in, 0.25in & 0.13 in illuminated
		2in., 1.20in, 0.70in, 0.40in, 0.20in, measured
6	Lens switching for LAV/SAV	Automatic
7	Spectral Range	400-700 nm
8	Resolution	<3nm
9	Effective Band width	10 nm equivalent triangular
10	Photometric range	0 - 150%
11	Photometric Resolution	0.003%
12	Light Source	Pulsed Xenon lamp, Filtered to approximate D65 daylight
13	Lamp life	1 billion flashes or better
14	Automatic UV Control	420nm cutoff filter for UV Control & UV Exclusion
15	Measurement Time	< 3 seconds; (except 3mm area<10sec.)
	Calorimetric repeatability	For white tile: $\Delta E^* < 0.09$ for 44mm (1.75 inch)
16		For Blue denim tile: $\Delta E^* < 0.07$ for 44mm (1.75 inch)
17	Inter instrument agreement	$\Delta E^* < 0.15$ (Avg) for 44mm (1.75 in.)
		$\Delta E^* < 0.36$ (Max.) for 44 mm(1.75 in.) CIE Lab (max.)
18	Equipment to be supplied with all essential Accessories such as:	Calibrated white UV Fluorescent Standard with NIST Traceable certificate of calibration -01no
		Sample Cup Opaque Cover-01 no
		Glass Sample Cup(2.5in)-04 nos
		Port insert,2.5in Glass sample cup holder-01no
		Sample Clamp Assembly-01 no
		Other parts like cable, adopter, power cord etc
		Black Calibration light Trap
		Green Check Tile
19	Color matching software to measure: L, a, b, Δxyz	Suitable advanced software inbuilt with instrument
20	Other Mandatory Accessories:	While supplying the Machine, the supplier should also provide the following items apart from above:
		<ul style="list-style-type: none"> · Branded PC (if required for operation)of best configuration with necessary software including software for colour matching & colour printer suitable for the instrument operation. · Basic tool Kit-01 set

	<ul style="list-style-type: none"> Hard copies of Operational & Service Manual- 01 set
	<ul style="list-style-type: none"> The Machines shall be supplied with all other essential accessories & spares (as per ASTM & ISO standards) required for installation, commissioning & operation.
	Onsite free operational Training

2021-22/02/03 Computerised Brinell Hardness Testing Machine

S. no.	Item	Specification
1	Total Load kgf	500 to 3000 in stages of 250 kgf
2	Magnification of objectives	2x
3	Max. Test Height	380mm
4	Scale least count	0.01mm
5	Throat Depth	200mm
6	Power Supply (V/Cy/Ph)	415/50/3
7	Measurement Range	1-6 mm
8	Standard Accessories	Testing table 200mm dia ,Testing table 70mm dia with "V" groove for round jobs 10 to 80mm dia, Ball holder 5mm & 10mm , Test Block HB-5/750, Test Block HB-10/3000, Allen Spanner, Telescopic Cover for elevating screw protection, Electric Cord, Software CD, Instruction Manual.
9	Features	<ul style="list-style-type: none"> Fully Computerized (PC Based) Brinell Hardness Tester.
10		<ul style="list-style-type: none"> Direct and accurate measurement of Brinell Hardness Number using "State of Art" image
11		processing technology.
		<ul style="list-style-type: none"> 'Wide Testing Range' : from soft metals to medium hardness steels.
		<ul style="list-style-type: none"> High accuracy and repetability of measurement at all loads.
		<ul style="list-style-type: none"> Faster measurement yielding to higher productivity.
		<ul style="list-style-type: none"> Hydraulic loading and unloading cycle.
		<ul style="list-style-type: none"> Advanced Window based software.
		<ul style="list-style-type: none"> User friendly software with all help file and Windows Features.
		<ul style="list-style-type: none"> Online indentation setting and focusing on PC monitor.

12	Latest GUI Features	• Advance image processing : Algorithms implemented for precise calculation of hardness
		Numbers with various options to cover all ranges of specimen
		Any other essential spares, standards and consumables should be provided for operation of equipment

2021-22/02/04 Double Beam UV Spectrophotometer

S. no.	Item	Specification
1	Wavelength range	190-1100 nm
2	Wavelength Accuracy	± 0.5 nm or better
3	Wavelength reproducibility:	± 0.1nm or better
4	Optics	Monochromator with grating and step motor / reference beam
5	Baseline Flatness	± 0.001 Abs or better throughout UV-Vis range
6	Lamp	Tungsten-halogen
7	Display	Backlit 7" colour display for extensive graphical evaluation
8	Bandwidth	4 nm
9	Measurement	Concentration, absorbance, % transmission, kinetics and spectra in Abs or % transmission, multi-wavelengths and multi-step readings
10	Scan speed	700-2000 nm/min, Scans in 1, 2, 5, 10 nm steps of wavelength range
11	Photometric accuracy/ reproducibility	- 0.003 E for E < 0.600; 0.5 % of values for 0.600 < E < 2.000
12	Cuvette	16 mm round, 10 mm, 20 mm, 50 mm rectangular with automatic detection w/o adapter
13	Bar code	Automatic method recognition including measurement range for all cuvettes
14	Data storage	5000 measurement values, spectra and kinetics approx. 40 MB => 500 spectra (300-900 nm) and 400 kinetics with 150 measurement values
15	Methods and profiles	> 200 pre-programmed methods, 1000 user-defined methods, 20 profiles for kinetics and spectra, comprehensive programming options
16	Interface/update	1 USB-A, 1 USB-B, 1 Ethernet / Update via Internet and USB stick

17	IP Class	IP 30 including drainage in optical compartment
18	Power Supply	Universal power supply, optional supply via standard adaptor cable for car batteries
19	Temperature Range	Operation: +10 °C to +35 °C, Storage: -25 °C to +65 °C
20	Accessories	Branded PC, Display Screen, Printer and UPS with 2 sets of glass and 2 sets of quartz cuvette to be offered
21	Calibration certificate should be provided from NABL accredited lab	

2021-22/02/05 Field Emission Scanning Electron Microscope (FE-SEM) with EDS

S. no.	Item	Specification
1	Applications	To study morphological features of polymers, ceramics, metals, composites, biomaterials and multiphase polymer systems.
2	Electron Gun	II. Schottky Field Emitter with High brightness.
		III. Filament or its replacement must be provided for at least 3 years from the date of installation
3	Accelerating Voltage	Upto 30 kV or better (continuously adjustable)
4	Resolution	I. Resolution with in-beam/in-lens SE Detector
		II. 0.8 nm or better @ 15 kV
		III. 1.0 nm or better @ 1 kV
		IV. The definition of resolution and the method used to determine the resolution should be clearly specified and resolution should be determined at the site of installation on standard gold on carbon sample at supplied accelerating voltage
5	Magnification	20x (or lower) to 10,00,000x or better
6	Probe current	Suitable for all applications. Upto 100 nA
7	Imaging Modes	(I) SE, (II) BSE
8	Detectors	SE detector, BSE detector and In-column or In-lens detector with beam deceleration (BD)

9	Vacuum System	I. Suitable vacuum systems having Ion getter Pump/sputter ion Pump, Turbo molecular Pump and Rotary Pump/Oil free/Dry Scroll Pump must be provided.
		II. All necessary gauges and valves must be included. Pump down time should be 5 minutes or less.
10	Chamber	I. Chamber should accommodate a sample size of 1.5 cm x 1.5cm or more.
		II. Minimum number sample Ports: 8 or more; and capable for future expansion
		III. Details of chamber dimensions to accommodate the above sample size for characterization should be clearly indicated
11	Sample stage	I. PC controlled 5 axis motorized stage. (X ~100 mm, Y ~80mm, Z=25 mm Tilt=0-60° R=360° Ease for specimen exchange.
		II. Ease for specimen exchange.
		III. Stage movement should be controllable through both computer and manually with joystick.
12	Sample holder	For adding 8 or more 1 cm ² samples
13	Camera	CCD camera with IR illumination for in chamber viewing
14	EDS system	I. System should be compatible with EDS.
		II. Detector size/Chip size: 30 mm ² or more
		III. Resolution: 129 eV or better@ Mn K α
		IV. Detection from B(5) to U(92).
		V. LN ₂ Free, Peltier cooled detector
		VI. Supplied EDS server and analysis software should be capable of performing data acquisition storing and transfer in common windows based application formats, qualitative & quantitative analysis, line scanning, elemental or dot mapping including spectrum imaging and phase mapping with specimen drift correction.
		VII. Standard samples for calibration should be provided.

		VIII. Interactive ZAF/PB and Phi ρ z based quantification software with tilt correction and manual background correction and peak deconvolution as an integral part of the the software.
15	Data storage, analysis softwares and PC	I. Suitable hardware and software for equipment control, data acquisition and analysis.
		II. 2 no. of branded PC with i7 10th generation or better with 2 TB SSD, 8 GB graphic card, minimum 6 USB ports; DVD drive; minimum 8 GB RAM; OS: Wondow 10 professional or advanced version
		III. 24-inch HD LCD or LED Screen: 02 no.
		IV. Image size: 5120 X3840 pixel or better.
		V. Image depth: up to 16 bits or better
		VI. Image format: BMP, TIFF, JPEG, JPEG2000, GIF, PNG, etc.
		VII. Software should be capable of automatic generation of report in MS-Office. MS-office be provided.
		VIII. Image acquisition system should be compatible with Windows 10 or recent operating system version of windows.
		IX. No public domain software is acceptable. Manufacturer must offer their licensed software developed by them. Updates to the instrument control/data collection and automated structure solution and refinement software will be provided as available free of charge and in perpetuity.
16	Sputter Coater system	I. Sputter coater system: Metal Sputtering and Carbon coating system to be provided.
		II. Metal Target: Au, Pt, Au-Pd to be provided,
		III. Vacuum pump and other necessary items to be provided.
		IV. 01 set of additional/spare targets to be required.
17	Sample holders and consumable	I. Sample holders for 6- inch wafers – 2 Nos.
		II. Cross section and tilted sample holders – 5 Nos. each of 45° and 90°
		III. Pin/regular stubs 1 inch – 50 numbers

		IV. Conductive carbon adhesive tapes – 5 Nos.; (Length: 20 m; Width: 8mm – 1 No.; 10mm – 2 No.s; 20 mm – 1 Nos.; 50 mm – 1 No.)
18	Essential Accessories	I. A filament replacement warranty card.
		II. Track ball for imaging operations/ Joystick/ Control panel
		III. Touch alarm safety detector for specimen stage and detectors.
		IV. Remote control hardware & network software for on line fault diagnosis using internet TCP / IP open protocols.
		V. All essential commissioning and operating accessories like Air compressor, Chillers etc., to be provided
		VI. Essential tool kit to be provided
		VII. A suitable 10 KVA or more UPS for 1 Hour or more backup on full load to be provided
		VIII. Suitable printer
19	Standard/ calibration samples	I. Standard samples such as Co, Mn, Gold magnification standard Faraday cup, a brass duplex standard for BSD calibration, etc. should be provided for calibration.
		II. Should provide other optional standard samples (no. should be mentioned with details)
20	Installation and training	I). After installation one week of through training must be provided on site. Details should be indicated.
		II) Installation must include:
		Resolution check.
		EDS resolution check; 129 eV or better; Mn K α and also detecting B(5) to U(92).
		Operation using standard samples on all modes of imaging
		Elemental mapping, line scan, etc. in case of EDS
		Standard samples requires a certificate from standard certifying bodies
Complete set of manuals on operation, maintenance of the system in hard copy as well as soft copy should be provided in English exactly for quoted model only.		

21	General	<p>I. FESEM quoted must be compete in all respect with state-of-the-art technology. It should have capability to image thin films, polymers, ceramics, semiconductors and magnetic specimen at high mag. FESEM should have suitable technology for optimum performance of all the detectors particularly In-Lens SEI.</p>
		<p>II. The quote should include all accessories required to image. Thin films, polymer, ceramics, semiconductor and magnetic samples etc.</p>
		<p>III. FESEM should include safety devices for protection against Failures in vacuum, water, power etc.</p>
22		<p>IV. Should provide all others accessories and consumables required for installation of instrument (also mention detils of other accessories)</p>
23		<p>V. Site visit, site preparation etc. should be included for successful instllation and operation of instrument</p>
24	ACMC	<p>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. Technical support personnel must have adequate experience in this field. Technical support personnel details should be submitted. Name and address of the authorized service centre/ partner in India along with the certificate of authorization should be attached. ACMC should be quoted for 3 years after warranty period</p>
		<p>I. System should be compatible with EDS.</p> <p>II. Speed of 800 points/sec in 8X8 binning mode. Speed of 620 points/sec in 4X4 binning mode. Angular resolution of 0.5 degrees at 300-400 pts / sec speed</p>

25	EBSD system	III. Software should include (i) camera optimization for data collection (binning, brightness and gain), (ii) background collection and subtraction, (iii) point analysis (for collection of patterns from multiple spots in a given area and Off-line analysis).
		IV. The EBSD software should be able to index all seven crystal systems (metallic, ceramic, semiconductor, minerals and rock samples).
		V. The EBSD software should also have capabilities for dynamic mapping (for producing orientation and phase maps with SEM image with pie charts showing phase and structural information) to ensure data collected matches data needed.
26	Imaging	Software for 3D tomography and imaging
27	Attachment for in-situ electrical measurements while viewing using SEM	This system is to be installed in SEM stage and measures 4 point local electrical conduction. The probes for I-V measurement should have following specifications
		I. No of Probes: 4
		II. Degrees of freedom: 3 independently driven (X,Y,Z) perprobe
		III. X-Y scan range: Max 10mm × 10 mm in step of 200nm each
		IV. Z scan range: Max 5mm in step of 200nm
		V. Movement resolution: Better than 50nm
VI. BNC on feed through for electrical measurements		
28	Extended warranty	Extended warranty for another two years - Optional
Note: Any other accessories apart from above mentioned accessories and systems must be		

2021-22/02/06 FT-IR Spectrometer

S. no.	Item	Specification
1	Wave number	4000-350 cm ⁻¹
2	Spectral resolution	0.5 cm ⁻¹ or better
3	Signal to Noise ratio	40000 : 1 or better (peak to peak)
4	Detector	High performance DTGS
5	Beam splitter	Ge coated KBr with moisture resistant coating on surface

6	Light source	Solid state Mid – infrared / Infra red emitter
7	Sample Interference	ATR – Attenuated Total Reflection (Monolithisc diamond) to meet the range
8	Internal Validation	Performance validation through inbuilt calibration with NIST traceability standards
9	Library	Library of Polymeric materials, blends, chemical compounds shall be provided
10	Standard	Shall meet ASTM E 1252
11	Warranty	3 years
12	ACCESSORIES	
13		· Hydraulic Press for pellet/sample preparation (15 ton)
		· Mortar and pestle
		· Dies
		· KBr set for Pellets
		· KBr Powder
		· Pellet holder
		· Diamond ATR
		· ATR Crystal- Diamond
		· liquid cell holder
		· Replacement dessicant
		· Liquid Cell Window
		· Liquid Cell Window material

2021-22/02/07 Gas Permeability Analyzer

S. no.	Item	Specification
1	Testing standard	ASTM D1434, ISO 15105
2	Testing range	0.02~50000 cm3/ (m2 · 24h · 0.1MPa)
3	Temperature range	15~60
4	Temperature accuracy	±0.1
5	Vacuum degree	<20Pa
6	Vacuum resolution	0.01Pa
7	Gas supply pressure	0.2~0.8MPa
8	Test pressure	-0.1~+0.1MPa
9	Gas port	1/8 inch rubber tube
10	Test gas	O2, Co2, N2, etc
11	Test area	50.24 cm2

12	Sample	size Φ 110 mm
13	Sample thickness	\leq 2mm
14	Power supply	AC 220V, 50Hz
15	Other	Professional software with simple interface, easy to use and convenient to set test process.
		Fully-auto operation, judge and stop automatically.
		Vacuum-pumping process, air intake, testing, pressure maintain, constant temperature program automatic control, experimental status are displayed in real time.
		Curves display of transmission, water vapor concentration, temperature and humidity in real time. The curves with conceal function, support query function for background data.
		Display to observe temperature, humidity and transmission without external computer.
16	Calibration	instrument support to two methods of reference materials and standard gas to certificate and calibrate;
17	Scope of Supply	Machine, standard accessories, work station with softwares and other items if any for smooth conduct of test as per requisite standard. Bidder should supply complete start up package including material necessary to prove the machine and provide training.
18	NIST traceable/NABL accredited calibration certificates to be supplied	

2021-22/02/08 GC-MS with Pyrolyzer and Headspace

S. no.	Item	Specification
1	Applications	Separation and identification of solids/liquids/gaseous and their mixtures that includes unknown samples, polymers, pesticides, organic compounds, pharmaceutical ingredient etc.
	General Technical	

2	Gas Chromatograph system	Instrument detection limit should be ≤ 4 fg OFN for Statistically derived at 99 % confidence level from the area precision of 8 sequential splitless injections of 10 fg OFN standard. MS/MS transition of m/z 272 & 222 using 30m long column
3	Ionization mode	Electron Impact (EI)
4	Detector	Flame Ionization Detector (FID) should be provided which can be coupled with the Gas chromatographic system.
5	Data acquisition /operating system	System should be capable of supporting three inlets and three detector ports simultaneously; should have electronic pneumatic/pressure controls for all the gases and should have Chromatography Data system which is based on Microsoft Windows operating system for instrument control, data acquisition, data analysis, quantization, automation & customization with online and offline sessions provided.
6	Provision	The system should have post-column backflush capabilities using Advanced flow technology to eliminate long bake-out times for highly retained (or high-boiling) contaminants.
7	Column Oven	
	Columns	Provision to install at least two columns
8	Operating temperature	450°C or more
9	Temperature set point resolution	0.1°C or better
10	Maximum temp ramp rate	120 °C /min or more
11	Cooling rate	From 450 °C to 50 °C: within 4 minutes or better
12	Temperature programming	Should have minimum 15 ramps & 16 Plateaus
13	Head Space Analyzer	
	Injection system	Loop based or syringe based system
14	Sample	Should be able to handle all types of VOC
15	Incubation Temperature	35°C to 200°C or more
16	Head space vial	Vial capacity 20 or more and upgradable to 70 or more vial capacity
17	Pyrolyzer	
18	Make and model	Bidder to specify
19	Type	Multi-shot pyrolyzer compatible with GC-MS
20	Temperature range	Up to 1000 deg.C or better
21	Furnace cooling rate	Temperature to go down from 800 deg.C to 50 deg.C within 10 min.

22	Sample to be analyzed	Solid and viscous liquid
23	Control	Should be provide with controll software
24	Injection port	
	Injection port	1. Split/Splitles sinjection port with electronic pressure control (EPC)/programmable pneumatic control(PPC) /advanced flow control (AFC) with fast GC capability
		<ul style="list-style-type: none"> • Programmable vaporizer injector and programmable up to 8 ramps (or better); Heating rate 500 deg.C/min. or better • PTV inlet configured with liquid N2/ PELTIER cooling & Air should have maximum temperature of 400deg.C and support sub-ambient temperature setting upto -3deg.C using Cryo gas.
		Possible to use capillary columns of 100µm to 530µm columns
		Digital display of gas flow, temperature etc.
	Manufacture's software controlled (AFC/EFC/APC/EPC controlled).	
25	Pressure range	100 psi or better
26	Maximum temperature	400 °C or more
27	Heating zones	Should have independently heated zones
28	Auto Injector-liquid	An automatic injector device having a capacity to hold at least 15 vials capacity and should be field upgradabale to 150 vial capacity
29	GC Detector Specifications (FID)	
	FID detector	Having an MDL:<1.5pgc/s or better
	Linear dynamic range	107 or better
	Carrier gas head pressure setting	Should be more than 950kPa
	Mass range	m/z up to 1000 unit or better
	Mass Analyzer	Should have inert/metallic quadrapole massfilter with pre-filter or equivalent technology
	Mass axis stability	Should be ±0.10 amu over 48 hrs
	Scan speed	up to 10,000 u/sec or more
	Ion source temp	upto 350 °C or better and it should be programmable. It should be cable less source for easy cleaning and maintenance. Additional a pair of filament should be provided.
30	Ionization mode	EI
31	Filament	Dual and automatic switching

32	The sensitivity of system should be a followed and demonstrated at site	EI MRM S/N: 1 μ L of 100 fg/ μ L of OFN produces > 15,000:1 RMS for the transition of m/z 272 & 222 using 30m x 0.25mm x 0.25 μ m
33	Turbo Molecular Pump (TMP)	300L/sec or better capacity
34	Resolution	Selectable, 0.7 to 2.5 Daltons,
35	WorkStation Instrument Control Software	GC and MS system should be combined with the same workstation for simultaneous settings and programming.
		Should have Auto tune (to optimize MS parameters automatically) feature
		A user friendly automatic data collection and analysis system compatible with Microsoft Windows OS and Microsoft Office suite applications
		Library search through Retention Index function should be provided as standard in the software
36	Sample preparation	Qucheers Kit: 2 No.
37	Spectral Library	Latest mass spectral library (NIST) to be supplied in CD (licensed) for polymers including rubbers, additives, pesticide, insecticide, etc.
38	Accessories	Branded latest suitable PC compatible with GC-MS system having HDD Graphics display, 20"LCD/LED Monitor alongwith a good quality printer (should specify the PC and printer model).
		UPS: 10 KVA UPS with at least 60 min back up is needed.
		High quality He, H ₂ , N ₂ , Argon & Zero Air gas cylinders alongwith compatible regulators, gas purification panel for the above mentioned four gases,and required tubings should be provided.
		Syringes for manual and autosampler injection (minimum pack of 10 each), Filaments (minimum 2 no.), capillary column (minimum 1 no., desired 2 no.).
		Mechanical accessories (tool-kit etc) and consumable spares (Vials, Septa, Ferrules etc.) for the operation and maintenance of the instrument should be provided to meet our needs for at least 1 year.

39	Other terms and conditions	Installation Qualification (IQ) and Operational Qualification (OQ) should be performed at the time of installation and commissioning.
		The system must be factory tested and a certificate should be provided
		The entire system should be installed by the company professionals at oursite. A thorough technical training (minimum 3 days) in analyzing and troubleshooting should be given by the technical professionals
		A list of references in India,where similar systems have been installed,must be provided and this will be taken very seriously while making the decision.Your post sales service feedback will certainly be a deciding factor
		Complete set of manuals on operation, maintenance of the system in hardcopy as well as soft copy should be provided in English.
40	warranty	2 years

2021-22/02/09 High performance Liquid chromatography

S. no.	Item	Specification
1	column	120,C18,5µm,4.6x150mm
2	Eluent	Water/Acetonitrile, 85/18 v/v
3	Flow rate	1.2 ml/min
4	Injection volume	3µL
5	Temperature	35 °C
6	Detection	UV 272nm
7	pump	HPG(2 channel)
8	sampler	Inline split –loop(SL) flow through needle
9	Detector	Unique charge aerosol & PH & conductivity monitor
10	wavelength	190-700 nm
11	Band width	< 5nm
12	Wavelength accuracy	± 1 nm
13	Wavelength Repeatability	0.1 nm
14	Baseline noise dual wavelength	35.0X10 ⁻⁶ AU at 230nm,280nm or better.
15	Delivery system	High Pressure binary gradient Two pump Integrated System.

16		The machine should be operable both in isocratic and gradient mode.
17		The flow rate should be within a range from 0.001 to 20 ml/min with the possibility of increment of 0.01 ml/min for carrying out semi-preparative applications.
18		Flow Precision: $\leq 0.1\%$ RSD or better.
19		Max. Operating pressure: 6000 psi or more.
20		Gradient Composition Accuracy : $\pm 0.5\%$ of setting 1ml.
21		Gradient Composition Precision : $\pm 0.5\%$ of RSD of setting 1ml.
22	Software	Should have option for data integrity along with advanced security measures Embedded Oracle data base software must be quoted.
23		Single point control/Single software must be quoted to control and acquire data from all the modules.
24	Column Oven	Should have provision for housing at least four or more columns of 30 cm length.
25		Temperature setting rage: Ambient- 60oC or better
26		Operating temperature: ambient to 60oC or better
27	UV Detector	Flow Cell Path length: 10mm, Cell volume: 16.3 μ l or less.
28		Light Source: Deuterium or tungsten lamp with minimum life of 2000 hrs or more
29		Should have provision of low noise performance within the operable wavelength range without lamp change
General terms and conditions		
<ul style="list-style-type: none"> · Guarantee/ Warranty · Three Years or more onsite Warranty from the date of installation. Part numbers of all parts for which warranty will not be applicable should be specified in the quotation. 		
<ul style="list-style-type: none"> · The vendor should furnish details of customers in India. 		
<ul style="list-style-type: none"> · The vendor should have agents in India to provide after sales service, support and maintenance 		
<ul style="list-style-type: none"> · Hard copy of all the operational manuals related to the system has to be provided while supplying the system. 		
<ul style="list-style-type: none"> · Training should be provided for the system operation and maintenance 		
<ul style="list-style-type: none"> · Spares Price of essential spares and consumables should be provided 		

2021-22/02/10 Induction Coupled Plasma - Optical Emission Spectroscor

S. no.	Item	Specification
1	Introduction	A compact high performance Dual View ICP system is required for the routine measurement of major and minor elements in a variety of general samples and research samples.
2		The ICP should be true simultaneous using polychromator , in all aspects of measurements including simultaneous measurements of all analyte wavelengths, internal standard and background.
3	Optical System	The instrument shall be equipped with a high energy Echelle Cross Dispersion Spectrometer with focal length of less than 400mm & a "side by side" arrangement of prism and grating.
		Emission spectra shall be dispersed in both wavelength and order in a 2 dimensional array
4		The optical purge shall be with either argon or nitrogen to allow measurement of signals in the low UV part of the spectrum. The instrument shall operate with a reduced purge flow of 2 lpm and include a standby flow of 1 lpm to minimize gas consumption.
5	RF Generator	The Solid state water cooled RF generator must run at a frequency of 40 / 27.12 MHz .
6		The generator shall have a high coupling efficiency of >75% and be directly coupled with a swing frequency impedance control and power regulation to better than 0.1%.
7	Plasma / Auxiliary / Nebulizer Gases	Argon Gas consumption should be as low as possible.
		Preferably 14 to 17 lit/min or minimum, including optics purge
8		Shear gas should be avoided for better resolution & sensitivity.

9	Standard Sample Introduction Kit / Peristaltic Pump	Sample introduction shall be via an integral, close coupled and variable speed, peristaltic pump with a minimum of 12 rollers. The pump shall have a minimum of 3-channels to accommodate sample and drain
10		An high efficiency cyclone spray chamber fitted with a high performance glass concentric nebulizer shall be provided for optimum stability and best detection limits with fast washout and minimum cross contamination.
11		A semi demountable quartz ICP torch with separate injector shall be provided for maximum flexibility.
12	Plasma Viewing	The torch orientation should be horizontal and plasma shall be viewed axially as well as radially. Auxiliary optics shall be available to provide a radial plasma view.
13		The viewing height of the plasma must be adjustable under computer control to enable optimisation whilst the plasma is lit, in complete safety to the operator.
14		The instrument shall have the possibility to automatically switch between axial and radial view (dual view) during an analysis.
15	Resolution	The instrument shall have the capability to perform measurements in routine operation with a Minimum optical resolution of 0.007/ 0.008 or better.
16	Wavelength Range	The instrument shall be able to operate over the minimum range of 166 to 840 nm.
17	Detector	The instrument shall be equipped with a single chip based solid state CCD/CID Detector,
18		The Detector shall be cooled by a triple stage pettier cooling device to -45oC to reduce dark current and background noise resulting in enhanced detection limits.
19	Detector Operating Modes.	The detector must be capable of measuring all the analytes (including background) and internal standard in simultaneous mode.

20	Software	The instrument system software shall be based on the Windows operating system. The software shall provide full control of all instrument functions including plasma ignition, gas flows, viewing position, and monitoring of safety interlocks.
21		<ul style="list-style-type: none"> - It must include as a minimum the following features and capabilities: - - Full instrument control with the ability to display parameters and instrument response in real time. - Fully automated system start up and shutdown via the instrument control window. - Real time graphics for instrument setup and monitoring. - All set up parameters including plasma position to be stored on disk. - Internal diagnostics including error checking and complete fault log. - Automatic identification of possible spectral interferences when selecting wavelengths for analysis. Search mode for identification of unknown wavelengths should be available - Automatic identification of possible spectral interferences when selecting wavelengths for analysis. Search mode for identification of unknown wavelengths etc should be available
22	Chiller	Suitable Chiller/re-circulator to be provided
23	Hydride Vapor Generator	System should be offered with Hydride/vapor generation kit
24	Warranty	Minimum Three year from date of installation
25	Application Note	Published application note for detection limits data should be attached.

26	Local Accessories	Vendor should quote fume hood, Argon gas cylinders (02 no`s) with double stage regulator, Nitrogen gas cylinders (02 no`s) with double stage regulator (if needed) , Gas Purification System, Manifold for 2 cylinders spares and consumables for 2 year operation as required by system with Latest PC – i7 (Dell/HP//Compaq) and Printer & Suitable online 15 KVA UPS with 60 minutes power backup to run the complete ICP system including chiller.
27	Calibration standards	1000 ppm of Each As, Hg, & Au Single Element Standard 100ml quantity
28	AMC (Optional)	To be quoted separately for a period of 3 years after warranty

2021-22/02/11 Melt Flow Rate Tester

S. no.	Item	Specification
1	Scope : Determination of flow properties of polymer powders & granules	
2	ISO 1133 (1991) and ASTM D1238, Method A, B & C and other equivalent International standards.	
3	TECHNICAL SPECIFICATION:	
4	Ø System should meet ASTM 1238 and ISO 1133-1-2,DIN 53735, BS 2782, IS 2530	
5	Ø Temperature range 50 to 400 Degree C	
6	Ø Temperature display resolution: +/- 0.1 C	
7	Ø Thermal stability: +/- 0.2 C from 50to 400 Degree C	
8	Ø Thermal fuse protection.	
9	Ø MVR with up to 20 data points acquisition for a single test (with encoder)	
10	Ø Barrel Cylinder: Hardened Nitride Steel	
11	Ø On-board LCD Display with alphanumeric keypad for methods setting and visualization of results.	

12	∅ Should be equipped with high accuracy encoder and motorized lifting device to allow precise and exact positioning of the lifting device for the masses.	
13	∅ Automatic Cutting device	
14	ACCESSORIES:	
15	- Masses : 1.2, 2.16, 5, 10, 21.6 kg	
16	- Standard Nozzle as per ISO 1133/ASTM D1238 Diameter 2.095 mm, Length 8 mm,, tungsten carbide; should be supplied with dimensional conformity certificate	
17	- Cleaning Tools & Cleaning cream	
18	- Go-No-Go Gauges for dies and piston	
19	- CRM with NIST traceable certificate	
20	Accessories:	
21	- Die Plug	
22	- Windows based software	
23	- 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	
24	Recommended Spares:	
25	- Spare Standard Die/Nozzle and Piston	
26	- Fuses and Thermal Probe	
27	The equipment should be supplied with all the essential accessories to meet the standard methods mentioned above. The Basic start up kit including material for calibration shall be provided by the supplier. NIST traceable Calibration certificates to be provided with equipment	

2021-22/02/12 Modulated Differential Scanning Calorimeter (MDSC)

S. no.	Item	Specification
1	Purpose	Measurement of the following properties of polymers, rubbers, elastomers etc
		· Measures heat absorbed or released by a sample as a function of time, temperature and environment
		· Glass transition temperature (T_g)
		· Melting temperature (T_m),
		· Crystallization temperature (T_c)
		· % of crystallinity,
		· Curing temperature
		· Degree of cure
		· Purity
		· Activation energy
		· Heat of enthalpy
		· Heat of fusion
		· Kinetic studies (isothermal/non-isothermal)
		· Thermal stability
· Oxidation/decomposition		
· Oxidative-Induction Time (OIT)		
· Specific Heat		
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
4	System	System shall be capable of running in conventional DSC mode as well as modulated DSC mode
5	Temperature Range	-150 °C to 700°C
6	Temperature Accuracy	± 0.1C or better
7	Temperature Precision	± 0.05°C or better
8	Heating/Cooling Rate	0.01 °C/min to 100°C/ min or higher
9	Oscillating (modulated) heating rate	± 1.0 °C/min. Or better
10	Furnace	To be constructed of corrosion resistant material suitable for rapid heating/cooling and should have long lifetime.
11	Calorimeter Sensor	Cromel/ constantan TZero Thermocouple
12	Maximum Calorimetric Sensitivity	0.2 µW or better
13	Calorimetric Precision (based on metal standard)	±0.08%
14	Dynamic Range	± 500 µW

15	Temperature Calibration	5 points calibration over the full temperature range
16	Baseline Noise (max. peak to peak)	0.2 μ W or better
17	Software	<ul style="list-style-type: none"> Operating software and analysis software shall be user friendly and shall be running on windows 7/10 version
		<ul style="list-style-type: none"> 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.
		<ul style="list-style-type: none"> The software shall have the provision to view total heat flow, modulated heat flow, total heat capacity signals in real time during experiment.
		<ul style="list-style-type: none"> Software for kinetic studies (to be supplied with one licence as the same can be used with TGA) for single and multiple steps through non-linear regression
		<ul style="list-style-type: none"> The data analysis software should be unkeyed or multi-user licensed to allow installation at minimum 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.
		<ul style="list-style-type: none"> 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.
		<ul style="list-style-type: none"> 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 7 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, Cp, Tg, Tm, Tc, peak area, peak onset, etc.
18	Measurement Atmosphere	N ₂ or O ₂ or air or helium
19	Provision for cooling	Inbuilt cooling system & accessories with variable cooling rates as specified above.
20	Control system	Built in Gas mass flow control system with auto gas switching option within the test run.
21	Accessories	DSC shall include:
		· 01 no. of Platinum pan with lid,
		· 01 no. of Graphite pan with lid
		· 100 nos. of Copper pans for OIT test
		· 800 nos. of TZero Aluminium pans with lid.
		· Standard samples such as Indium, Adamantane with Traceable calibration Certificate for calibration purpose.
		· Crimper and die set to be supplied along with the Instrument for sample preparation of both dry powder and liquid samples.
		· Cooler System for -150 to 700 C range
		· Dewar Flask of Min. 50Ltr capacity for Liquid Nitrogen handling-01No
		· Gas Tubing & fittings-01Set
		· Moisture dryer-01Set
· PC of required configuration with original software		
· 01 no of filled N2 gas cylinder with two stage SS Gas		
· regulator of best quality with tubing fittings		
· 01 no of filled O2 gas cylinder with two stage SS Gas regulator of best quality with tubing fittings.		
22	Calibration Certificate	Calibration certificates for supplied reference material traceable to NIST and internal calibration report to be provided.
		A Personal Computer having latest configuration.

23	Personal Computer (PC)	All softwares shall be loaded in the hard disk with appropriate partitions. All original CDs/DVDs must be provided
24	Power Requirement	100-240 Volt, 50/60 Hz
25	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.
26	Other Mandatory Accessories	While supplying the Machines, the supplier should also provide the following items apart from above:
		· Basic tool Kit-01 set
		· Hard copies of Operational & Service Manual- 01 set
		· Necessary Hoses & Nipples required -01 set
		· The Machines should come with all other essential accessories & spares (as per ASTM & ISO standards) required for installation, commissioning & operation.


2021-22/02/13 Rotary Evaporator

S. no.	Item	Specification
1	Motor Type	Brushless DC Motor
2	Speed range	20-200 ppm
3	Display	LED(speed,temperature,time)
4	Direction	Clockwise and anticlockwise
5	Heating temperature Range	Room temp. to 180°C

6	Control Accuracy	Water \pm 1 $^{\circ}$ C ,oil \pm 3 $^{\circ}$ C
7	Heating power	1010w
8	Stroke Displacement	Manual 110 mm + auxiliary 100mm
9	Interval time setting Range	1-999s
10	Dimension(DxWxH)	Heating Bath : 300x300x240mm
11	Permissible ambient temp.	5-40 $^{\circ}$ C
12	Permissible relative humidity	80%RH
13	Protection class	IP20
14	USB interface	Required
15	Accessories	1.Compatible chiller and vacuum pump with this unit
		2.Nitrogen Evaporator
		Capacity- 25 sample
		Temp.- Ambient to 99 $^{\circ}$ C
		Gas regulator range- 0-100psi
		Pressure gauge range-0-100psi
16	Safety Preacutions	Shall be manufactured with good manufacturing practises with suitable safety features like Alarm, buzzer, Temperature Cut-Off System etc.,
17	The bidder shall specify & provide all accessories required for installation and operation of equipment	

2021-22/02/14 Universal Testing Machine 10 kN (Fully computerised)

S. no.	Item	Specification
1	Control System	Microprocessor controlled
2	Maximum Load Capacity	10 kN
2	Cross head Travel distance	Min 1000 mm
3	Horizontal daylight	Min. 400mm
4	Cross Head Speed	
4.1	Minimum	0.5 mm / min
4.2	Maximum	1000 mm/min
4.3	Accuracy for Cross head speed	\pm 0.1 mm/min
5	Load cells	100 N, 1 kN, 5 kN 10 kN
6	Load cell Accuracy	\leq 0.5 %
7	Grips & Fixtures	Neumatic and Manual
		Tensile (suitable for plastics, rubber, film and fibre) compression, flexural, and shear fixtures.
		All fixtures should be suitable for low temperature testing and can be accommodated in to environmental chamber

		Rigid plastics (self lock winch grip, opening up to 12mm), plastic/composite rod (upto 12 mm dia) woven sacks (50mm width), rubber, fibre/filament.
8	Test Conform to	Tensile: ASTM D 638, ASTM D 882, and ISO 527 Flexural: ASTM D 790 and ISO - 178 Compression: ASTM D 695 Shear: ASTM D 732
9	Extensometer	Extensometer -Non Contact Strain guage
10	Data Acquisition Rate:	24-bit resolution card with data acquisition rate of minimum 500 Hz simultaneously on load, extension, and strain channels.
11	Data Sampling Rate:	400kHz or better
12	Safety lock provisions	Limiting switch for cross head travel should be provided
13	Software	(a) Software attached & data storage for sample test methods (b) Software should automates data acquisition, machine control, analysis, and reporting for a wide range of test requirements.  (c) In addition, data compilation and provision for stress relaxation and creep shall be provided as per relevant ASTM Standards (d) Window's based graphical user interface.
14	Essential Accessories	
14.1	Computer System	Computer with suitable configuration to support the software and colour bottled inkjet printers should be provided
14.2	Environmental Chamber	Environmental Conditioning Chamber temp. range : - 100° C to 300° C
14.3	Any other accessories required	Bidder should quote and supply any other accessories effective and better utilization of machine.
15	Calibration certificate	Calibration certificate for load cells and extensometer traceable to National / International Standards should be provided

16	Scope of supply	Bidder should submit complete scope of supply (Machine, standard accessories, Optional Accessories etc with make model) in the technical bid without price. Bidder should supply complete start up package including material necessary to prove the machine and provide training.
17	Terms & Conditions	<p>The bidder must have supplied machines at other Institutes in the past (a satisfactory performance certificate from those users may be solicited if needed). Bidder should submit complete contact details.</p> <p>Manufacturer of the supplied equipment must be ISO Certified</p> <p>Authorization Letter from OEM</p> <p>List of clients in last five years to be provided.</p> <p>Manufacturer/Supplier should have sizable installations of same model worldwide and at least Fives in India.</p>
18	INSTALLATION, COMMISSIONING AND TRAINING	
18.1	Installation and commissioning requirements	Bidder should state the space required and condition of floor and any other requirements for installation of the machine and equipments. State clearly the specifications of electrical requirement. Vendor should carry out installation and commissioning of the machine and its accessories on a turnkey basis.
18.2	Training and documentation	<p>Minimum of 5 days training for five persons which includes basic & advanced level training. Training content and plan to be submitted. Training faculty must have adequate experience in this field.</p> <p>The vendor should supply the necessary manuals such as</p> <ul style="list-style-type: none"> · Software instruction · Maintenance and trouble manual · Training · Installation and Commissioning

		<ul style="list-style-type: none"> · Handling of accessories · Software key (if any) · Software CDs
18.4	Technical support and service	<p>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. Technical support personnel must have adequate experience in this field. Technical support personnel details should be submitted. Name and address of the authorized service centre/ partner in India along with the certificate of authorization should be attached.</p>

2021-22/02/15 Universal Testing Machine 10 tonnes (Fully computerised)

S. no.	Item	Specification
1	Control System	Microprocessor controlled
2	Maximum Load Capacity	100 kN
3	Cross head Travel distance	Min 1000 mm
4	Horizontal daylight	Min. 400mm
5	Cross Head Speed	
6	Minimum	0.01 mm / min
7	Maximum	500 mm/min
8	Accuracy for Cross head speed	± 0.1 mm/min
9	Load cells	100 N, 1 kN, 10 kN & 100 kN
10	Load cell Accuracy	≤ 0.5 %
11	Grips & Fixtures	Pneumatic and Manual
		Tensile (suitable for plastics, rubber, film and fibre) compression, flexural fixtures.
		Rigid plastics (self lock wedge grip, opening up to 12mm), plastic/composite rod (upto 12 mm dia) woven sacks (50mm width), rubber, fibre/filament.
		3 point Bend Fixture, Adjustable Span – 40 to 200 mm ,10 mm dia Loading nose and support ,Width 50 mm, Capacity: 1000 Kg
12	<u>Operating Console</u>	
		Backlit LCD Display
		Keypad for easy setup and functions. Facility to Calibrate Loadcell

		Useful for Performing Standard Test without PC.
13	Test Conform to	Tensile: ASTM D 638, ASTM D 882, and ISO 527 Flexural: ASTM D 790 and ISO - 178 Compression: ASTM D 695
14	Extensometer	Ready to connect LONGTRAVEL .
15		Range 800 mm
16		Resolution : 0.1 mm
17	Data Acquisition Rate:	24-bit resolution card with data acquisition rate of minimum 500 Hz simultaneously on load, extension, and strain channels.
18	Data Sampling Rate:	more than 1KHz internal conversion
19	Safety lock provisions	Limiting switch for cross head travel should be provided
20	Software	(a) Software for data storage for sample test methods (b) Software should automates data acquisition, machine control, analysis, and reporting for a wide range of test requirements. ☐ (c) In addition, data compilation and provision for stress relaxation and creep shall be provided as per relevant ASTM Standards (d) Window's based graphical user interface.
21	Essential Accessories	
22	Computer System	Computer with suitable configuration to support the software and printer
23	Calibration certificate	Calibration certificate for load cells and extensometer traceable to National / International Standards should be provided
24	Scope of supply	Bidder should submit complete scope of supply (Machine, standard accessories, Optional Accessories etc with make model) in the technical bid without price. Bidder should supply complete start up package including material necessary to prove the machine and provide training.
25	INSTALLATION, COMMISSIONING AND TRAINING	

26	Installation and commissioning requirements	Bidder should submit the preinstallation requirements such as space etc., . State clearly the specifications of electrical requirement. Vendor should carry out installation and commissioning of the machine and its accessories on a turnkey basis.
27	Training and documentation	Minimum of 5 days training for five persons which includes basic & advanced level training. Training content and plan to be submitted. Training faculty must have adequate experience in this field.
		The vendor should supply the necessary manuals such as
		· Software instruction
		· Maintenance and trouble manual
		· Training
		· Installation and Commissioning
		· Handling of accessories
28		· Software key (if any)
		· Software CDs
		NIST traceable/NABL accredited calibration certificates to be supplied

2021-22/02/16 UV Weathero Meter

S. no.	Item	Specification
1	Applications	To simulate, accelerate and correlate the artificial sunlight / weathering atmosphere for polymers, coatings, etc.
2	Effective radiation area	4000 cm ²
3	Components surface temperature	45°C to 80°C for UV Cycle
4		45°C -60°C for Condensation
5	Temperature accuracy	± 0.1°C or better
6	Temperature resolution	1°C or better
7	Temperature controller	Black Panel Temperature
8	Centre distance of lamp	5 cm
9	Humidity	100%
10	Light source	UV-B Fluorescent Lamp, UVA (Optional)
11	Wavelength	UVB (313 nm)
12	Minimum sample holder plates	Aluminum Plates 24 sample holders
13	Conditioning cycle	Light cycle and Condensation cycle

14	Irradiation Control	Irradiation control (solar eye automatically maintain light intensity through feedback loop this controller monitor UV intensity and compensate lamp aging or any other variability by adjusting power to the lamp) with NIST traceability
15	Conforms to standards	ASTM G151, ASTM G 154, ISO 4892 (1 – 3), SAE J2020
16	Warranty	Minimum 3 years of warranty to be provided
17	Scope of supply	Complete list of items quoted are to be provided + 12 UVB lamps+ 1 No. of Calibration sensor/Device+ Radiometer for calibration
18	Installation requirements	Bidder to specify the preinstallation requirements
19	Training	Onsite training for system operation and maintenance as well as application support should be provided by the vendor at its own cost.
20	Service	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.
		The vendor should have technical support in the area of application and service available within the country

2021-22/02/17 WVTR

S. no.	Item	Specification
1	Test range	0.002-100 g/m ² · 24h (film and sheet) (Unmasked).
2		0.04-2000 g·m ⁻² ·24h ⁻¹ (masked)
3	Test precision	0.002 g/m ² · 24h (film and sheet) or better
4	Measurement Accuracy	±0.01 g·m-224 h-1 or 3% of the measured value(which is greater)
5	Temperature range	10- 50
6	Temperature	±0.1
7	accuracy	
8	Humidity range	30~90%RH, or better
9	Humidity accuracy	±1.5 %RH
10	Test area	50.00 cm ²
11	Sample size m	Φ100 m
12	Sample thickness	Max 2.5 mm
13	Number of test sample	1 piece
14	Carrier gas	99.999% N ₂
15	Carrier gas pressure	≥0.1MPa
16	Carrier gas flow	10 - 75 mL/min
17	Gas supply port	1/8 inch metal pipe
18	Power supply	AC 220V, 50Hz
19	Other	WINDOWS based Industrial standard Software for complete control and data Acquisition.
		Ø Create and save setups
		Ø Automatic Test Sequence from Sensor conditioning to Flushing of system.
		Ø Graphical indication of TEMPERATURE, RH, OTR or WVTR for Conditioning as well as Testing.
		Ø Indication for important parameters like, Sensor temperature, flow, Barometric Pressure etc...
		Ø Display of current ppm values for WVTR .
		Ø Report generation & printing
Ø Review of old tests saved		
20		PC & Printer suitable for the Permeation Tester must be offered as part of package.
21		OS : XP or above
22		Monitor : Minimum 17" LCD
23		Preloaded Software with license (backup of software must be provided on CD or PENDRIVE)

24		WINDOWS licensed Software pre-loaded
25		Color Inkjet Printer
26		Power Supply :
27		230V, 50 Hz
28	Calibration	instrument supports two methods of reference materials and standard
		gas to calibrate and certificate; certified reference materials for normal testing,
29	Instrument must be suitable for testing WVTR as per Standards: ASTM F1249, TAPPI T557, JIS K-1729 and ISO 15106-2	