

Technical Specification for Tender No. 2022-23/08 Released Government E - Marketing (GeM Portal)

1. Multi Blades Scrap Grinder / Granulator

Sl. No.	Specification	Range / Value	
1	No. of moving/Rotary Blades& Size of blade	No	120 to 200 mm and 09 Nos. (Per row 03 Blades are to be arranged in an angular distance of 15 to 60 degree)
2	No of Fix Blades& Size of blade	No.	350 mm and above, 2 Nos
3	No of Blades	No.	2 Nos. of fixed and 09 Nos. moving
4	Motor Capacity& Make	KW	20 to 30 (Standard make only like Crompton, Siemens, Kirloskar, etc)
5	Screen Area	Sq. cm	4800 and above
6	Hopper Throat Size	mm	400 x 400 mm and above
7	Grinding Capacity	Kg/hr	300 Kg per hour and above
8	Grinded Particle Size	mm	5 to 8
9	Noise level	dB	Please specify
10	Material of main structure	-	Mild steel with standard corrosion free paint/ powder coated
11	Machine Dimensions (LXWXH)	-	Please Specify
12	Material to Grind		HDPE jar up to 20ltrs. & Pipe up to Dia. 160mm,PP,GPPS,ABS,Rigid,Solid Wall thick articles, lumps etc.
13	Material conveying system with Cyclone and bag filling station	-	Specify & Quote
14	Essential Spares		1. Mesh 5mm-1 No. and 08mm-1 No.
			2. One set of moving blade (9 Nos)
			3. One set of fixed blade (2 Nos)
			4. One set standard Tool Kit, Grease Gun, Belt, vibration pad, collection bin of SS Body with castor wheels

15	Safety	-	Specify the special safety provisions like motor overload relay, flywheel and V belt covered, PVC curtain for feeding hopper etc.
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2. 3D CT Scanner			
Sl. No.	Specification	Range / Value	
1	System Information		
1.1	Make	Bidder to specify	
1.2	Model	Bidder to specify	
1.3	Application	Dimensional and Defect analysis for Metal & Plastics	
1.4	Technology	X-ray based CT	
2	X Ray Tube		
2.1	Tube voltage	225 KV	
2.2	Maximum Tube current	up to 3000 μ A	
2.3	Focal spot size	5 μ m or better	
2.4	Power	300 W or Better	
3	Detector		
3.1	X ray Detector	Flat Panel Detector	
3.2	Pixel size	(100 - 200) μ m x (100 - 200) μ m	
4	Manipulator		
4.1	Manipulator	5 Axes or better	

4.2	Max Load	20 kg or better
4.4	Rotation Axes	0° - 360° x n (The position of the rotary table should be adjustable between x-ray tube and detector)
5	Measuring range	Dia: 150 - 200 mm x H :300 -350 mm or Better
6	Max Object Size	Dia: 150 - 200 mm x H :300 -350 mm or Better
7	Accuracy :	It must be ensured that measurements can be taken at any magnification position without additional calibration measures
7.1	Sphere center point error	4.0 +L/100 μm or better
7.2	Probing error	3-4μm or better
8	Radiation Protection Enclosure	
8.1	Material	Enclosure should be made of suitable material which absorbs X-Rays and prevents outside radiation
8.2	Dimensions	A minimum distance must be kept on all sides around the radiation protection enclosure as per the safety standard.
9	Software	

<p>9.1</p>	<p>Software package for Reconstruction/Data Acquisition / Data Evaluation / Analysis and Visualization : The software should be modular, yet fully integrated, complete system.</p>	<ol style="list-style-type: none"> 1. Suitable software for data reconstruction/ data acquisition and machine control : System for optimization of reconstruction parameters, 3D filters, different resolutions, different quality levels, automatically proposed reconstruction parameters. 2. The software shall facilitate the controls of all components of the CT system (such as the tube, detector, manipulation) and permits the control of all relevant steps during CT measurement, such as the creation of projection data sets, reconstruction of volumes, visualization of volumes and projections. 3. Suitable software with complete module for Volume analyses and Geometry Analyses modules. The volume analyses software should be the latest version of the evaluation software includes Basic evaluation, defect analysis and wall thickness analysis. The volume analyses software must be used for automated evaluation, After scan a prepared evaluation must be launched automatically. 4. Automatic Geometry Calibration - module for automatically determining the calibration value based on projections. 5. Beam Hardening Correction - Module for balancing unavoidable beam hardening artifacts in single material or multiple material samples. It should be fully automatic for single material samples. 6. Automatic ring artifact correction 7. Automatic selection of region of interest avoiding hull of air surrounding. <p>The software should be Perpetual/ permanent licensed copy of 3D visualization software for creating pseudo color rendering. The license should be perpetual/ permanent.</p> <p>At the end of the measurement, voxel data for the visualization and a control file, which contains all parameters required for the visualization, should be available.</p>
<p>9.2</p>	<p>Interfaces to other software Modules : all common software packages from different manufacturers should be usable.</p>	<p>Due to the modular software architecture, there should be a possibility to integrate additional modules at a later date. Thus, the system should be prepared to consider additional reconstruction tools or artefact corrections.</p>

10	Computer	
10.1	Reconstruction Computer & Evaluation Computer	<p>Two numbers high-performance multicore processors of the latest Xeon generation as per the specification given below or suitable for the CT system;</p> <p>Processor: Intel Xeon Silver 4214R 12c, 2.4GHz, 16.5MB DDR4 2400, Turbo, HT, 100W, 1TB</p> <p>Operating System: License Windows 11 Pro 64 for Workstations</p> <p>Memory: 64 GB RDIMM DDR4 2933MHz ECC (x2), 4DP</p> <p>Graphic memory: NVIDIA® RTX™ A4000 16GB GDDR6</p> <p>Hard Drive : 4 TB 7200rpm HDD 3.5" SATA (x2)</p> <p>Other : Provision for RAM memory Expandable up to 256 GB, Monitor : 27" (diagonal)LED , USB mouse, Key board - 02nos. each. 3/3/3 Warrenty - 3 years for part, labor and on-site service</p> <p>Software installation and licensing (For both operating software and Evaluation software) Suitable for data transfer to CAD/CAM, with multi-user and networking facility.</p>
11	Online UPS	Vendor should supply branded UPS with 60minutes power backup suitable for the machine and essential accessories. Should have built in safety to protect machine from voltage spikes and sudden surges
12	Calibration sets, Qualification Test piece and fixure plates	<p>A calibration set of artefacts is required to run the VDI/VDE workflow to bring the CT into the accuracy specification. Accessories requires are calibrated artefacts for the length measurement and probing error.</p> <p>Vendor should supply required calibration sets for Axis, Geometry, detector pixel, etc.and fixture plates for the scanner.</p> <p>One set of calibration certificates from the laboratory traceable for the CT system.</p>
13	Filter for X ray tube	Bidder should provide suitable filter for CT system

14	Essential accessories	Better should quote and supply suitable chiller, Compressor etc. as per the requiremnt of the CT system
15	Any other accessories to be quoted and supplied along with machine / equipment	<p>1. List all such material that will be used in part of CT system for commissioning should be included in the cost of the equipment.</p> <p>2. Tender shall include list of all essential spares and consumables to be provided with replacement time prescribed for each such item and its availability within reasonable time period. In case if any such item is likely to be out of availability within service period of machine, such item shall be included in initial supply.</p>
16	Scope of supply	<p>Bidder should submit complete scope of supply (Machine with make , model, computer hardware & suitable softwares, all accessories) in the technical bid without price.</p> <p>Bidder should supply as a complete package necessary to prove the machine and provide training.</p>
17	Safety Requirements	
17.1	General Compliance	<p>The machine and all the accessories supplied to meet objective should be able to operate without any risk or hazard, with additional protection,provision, training on guarding devices and meet current international standards.</p> <p>The machine should comply with standard, safety and protection. Vender should provide necessary details regarding standard, safety and protection</p> <p>The CT should be designed, manufactured and tested according to the standards and regulations prescribed. (including Radiation protection rules for the technical application of X-ray equipment (Indian X-ray regulation)).</p> <p>The Operation of the CT scan should be in closed chamber with necessary safety measures and must be radiation tight. Chamber door must auto lock during operation</p>

17.2	Environment Protection	The machine and all the accessories supplied should be safe to use without emission of any hazardous gases, noise level and radiation without any need for additional equipment, provision or training and meet current international standards and the product should carry the CE marking.
17.3	Other conditions	The Bidder must have supplied atleast 3 such machines with similar capacity within India including OEM installations in the past. A satisfactory performance from those users to be enclosed
18	Installation, Commissioning and Training	
18.1	Installation and commissioning	<p>1. The Bidder should state the space required and condition of floor and any other requirements like electrical, etc.. for installation of the machine and equipment and bidder should support necessary site preparation for installation. Bidder should carry out installation and commissioning of the machine and its accessories on a turnkey basis.</p> <p>2. After completion of installation and training, three measurements shall be carried out similar to those carried out during pre-dispatch inspection to check the full functionality and reproducibility of the system.</p>
18.2	Training and documentation	<p>1. Minimum of 5 days training for 5 persons which includes basic & advanced level training. The Training should cover</p> <ol style="list-style-type: none"> a. Operation and full maintenance of the main system b. Software usage c. Safety precautions needed during operation and maintenance <p>2. Training faculty must have adequate experience in this field.</p> <p>3. Submission of the detailed technical, maintenance and operating manuals for both, system and software in hard or soft copy formats before the installation of the CT.</p>

19	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 24 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> <p>a) The manufacturer shall confirm to support the maintenance and after-sales service of the complete system, after erection and commissioning, during and after the warranty period including supply of spares up to not less than 10 years, either directly or through their authorized service representative positioned in India.</p> <p>b) The service support should be available within 10 days of intimating an event of breakdown.</p> <p>c) After-sales service to be provided from factory trained and competent service engineers in case of any breakdown. Service during warranty should be free of charge. The supplier should be prepared to enter into a service contract after the warranty period</p>
20	Guarantees and technical assistance	<p>2 years from the date of successful installation & Training / Onsite support - Intervals and performance as specified by the manufacturer plus a minimum of 8 years spares & service support after the expiry of the warranty period.</p>
21	Annual Comprehensive Maintenance Contract (ACMC)	<p>Annual Maintenance Contract for the three years after warranty period shall be quoted separately and the same will not be considered for evaluation. Supplier has to provide service support within 24hrs. The calibration of the machine shall be the part of the warranty & ACMC. It shall also be mandatory to perform calibration after every major repair or breakdown.</p>

22	Condition of the equipments	All items of equipment must be new. The parts and pieces that relate to the structure and fairings must present quality finish without scratches, stains, dents and broken, within the standard announced by the supplier and validated by the technician who will accept on the part of CIPET.
23	Other conditions	The Bidder must have supplied atleast 3 such machines with similar capacity within India including OEM installations in the past. A satisfactory performance from those users to be enclosed

3. Fused Filament Fabrication		
Sl. No.	Specification	Range / Value
1	MACHINE	
1.1	Make	Bidder to specify
1.2	Model	Bidder to specify
1.3	Technology	Fused Filament Fabrication. Should be suitable for printing high temperature materials such as PEEK, PEI, etc and Medical Grade Materials like PLA, ABS etc
1.4	Machine Capability	Should be able to build high strength, high performance and high temperature and medical grade materials. Provision for inclusion of new materials developed by R & D.
1.5	Build Volume (X, Y, Z) range	(300- 350) mm x (300-350) mm x (300-350) mm (maximum allowable deviation 10%)
1.6	Layer Thickness (height)	0.05 to 0.8 mm (Variable)
1.7	Part accuracy (in all three directions)	150 µm or better
1.8	Material Handling	Material handling systems should be part of the Printer with automatic material loading, feeding, storage management system and other accessories like Filament Dryer etc... At any instance of the machine operation during idle or run time, the machine shall indicate the quantity of material available in the spool / cartridge for optimizing the material consumption.

2	Operation and Process	Adaptive Heating System
		Material extruding nozzles should have self-cleaning mechanism
		Auto calibration of build platform for coordinates.
3	Display Feature	Printing status, Material in cartridge, Tip reading to indicate its life, Temperature of chamber and print head/nozzle etc..
4	Part building	Direct printing on build sheet
5	Facility Requirements	Machine compatible of working in office/lab environments setup.
		Noise level of the machine at the lowest level preferably 70 decibels. Relevant documentation/test results to be provided.
6	Monitored printing process	By integrating a camera system, temperature recording and the use of servo motors, the printing process is continuously monitored by camera. Or monitored through any app by installing in computer / phone
7	MATERIAL	
7.1	Model Material	Suitable Materials for medical, aerospace and other high performance engineering application. PP,PLA , ABS,PEEK, PEI and metal-polymer composite material. Medical grade material should be biocompatible and have sterilisation properties and Confirming ISO 10993 or equivalent standard.
7.2	Support Material	Should be soluable and Break away
8	SOFTWARE	
		Software should capable to edit the internal structure of each layer and/or group of layers of the CAD model.
		Software should generate customizable build styles & Auto Orientation
		Software should provide real time part build status, time etc.
		Software should have capability to section large parts which does not fit into the build volume

8.1	Slicing and control	Software should be able to create stabilizing structures to support build of thin and tall geometries. And ability to put supporting structures to prevent warpage in case of large flat and bulky parts.
		Software should allow the user to add various jobs to a queue for sequencing and job management
		Software should have ability to pre-program pauses on any layer of the generated slice file to add metal inserts, change color of filament.
		Software and its support/updates/upgrades should be from OEM/manufacture of the offered machine and must be included in warranty period
8.2	License	License must be perpetual
9	Networks Connectivity	10/100 base T connection. Ethernet protocol
10	Workstation Compatibility	Compatible with latest Windows OS
11	Regulatory Compliance	Machine should be Regulatory Compliance - CE / FCC Relevant documentation to be attached.
12	Safety	The machine and all the accessories supplied to meet objective should be able to operate without any risk or hazard, without any additional protection, provision, training or guarding devices and meet current international standards. Operations of machine should be in closed chamber with necessary safety measures. Chamber door must auto lock during part building.
13	Essential Accessories	
13.1	Support removing system	Bidder should specify and quote for removal of soluble supports and Break away supports.
13.2	Consumables	Bidder should supply minimum quantities of consumables like build platforms, wiper blade, brush etc., required for 6 months. Also bidder should supply minimum quantity of model material (PP, PLA, PEEK, PEI and metal-polymer composite material and Medical Grade materials like PP, ABS, PLA) each type 05 Canisters. Minimum two sets of Nozzles for different layer thickness minimum to maximum for all types of materials.
13.3	Compressor	Bidder should specify and quote suitable compressor if required for the machine

13.4	De-humidifier	Vendor should supply suitable de-humidifier to maintain room humidity level within suitable range for machine operation.
13.5	Filament Dryer	Bidder to specify and quote suitable equipment for drying the filament
13.7	Online UPS	Vendor should supply suitable Branded UPS with minimum 60 minutes power backup for the machine and essential accessories. Should have built in safety to protect machine from voltage spikes and sudden surges.
13.8	Workstation with accessories	Bidder should supply suitable latest model OEM workstation with complete accessories and UPS for handling large size stl data (128 GB RAM, 11th generation i9 processor, 5TB HDD, 4GB dedicated Graphics card)
13.9	Tool kit	Bidder should supply standard tool kit for startup, removal of parts and cleaning (list to be attached).
13.10	Any other accessories required	Bidder should quote and supply any other accessories for high speed printing, material transport trolleys / carts and spares required for effective and better utilization of machine.
14	Scope of supply	Bidder should submit complete scope of supply (Machine, all accessories, 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.
15	Terms & Conditions	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.
		Manufacturer of the supplied equipment must be ISO Certified
		Authorization Letter from OEM
		List of clients in last three years to be provided.
16	INSTALLATION, COMMISSIONING AND	

16.1	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.
16.2	Training and documentation	Minimum of 2 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
		· Software key (if any)
· Software CDs		
16.3	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. 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.

4. Free Hand Scanner

Sl. No.	Specification	Range / Value
1	Make	Bidder to specify
2	Model	Bidder to specify

3	Camera & pixel size	Dual camera with at least 12 Mega Pixel resolution having optical blue light projector
4	Scanner & Light Source	Optical Blue LED light based 3D Scanning system. System should be stand alone and mounted on a studio stand. Should not be handheld type, arm type or connected to any optical/laser tracker system.
5	Measuring Volume	Minimum 2 measuring volume to cover small part to lmedium size
6	Acquisition Time	Should be 2 seconds or less
7	System Accuracy	To be reported as per VDI 2634 - Part 3 with following accuracy for different Scanning volumes as below:
		Small FOV
		a. Probing Error Form 0.010 mm
		b. Probing Error Size 0.010 mm
		c. Spacing Error 0.020 mm
		Medlum FoV
		a. Probing Error Form 0.015 mm
		b. Probing Error Size 0.015 mm
c. Spacing Error 0.030 mm		
8	Data Transmission	Between sensor and data acquisition system should be through Ethernet or Thunderbolt
9	LED Bulb Life	Minimum 10,000 hours or better
10	Calibration	Certified caibration plates covering all measurement volumes to be supplied
11	Transport Box & Casing	Transport box and casing to be supplied
		Supplied Mounting and Handling system of the Sensor could be handled by a single person.
		High quality height adjustable tripod stand with manual tilt axis for quick and easy manual sensor positioning. The tripod should be equipped with high-quality and smooth-running wheels for maximum maneuverability.

12	Mounting and Handling System	Scanner should have 10 meter sensor cable
13	Automatic Rotary Table	Rotation of rotary table should be auto- synchronised with scanning software.
		Automatic Rotary table of diameter 300 mm (minimum) and load capacity 20 kg (Minimum) to be supplied. Resolution: 1° (or better), RPM- 7
14	Guided Pointers	The system should be equipped with guided pointers for setting of optimum standoff distance
15	Stand-off Distance	Stand off Distance should be same for all Fov's , 500 ~ 1000 MM
16	Fields of View and Component Size to Cover	System should be upgradable with the ability to change only the lenses - if necessary, for adapting for different fields of views (FOV).
		No manual setting of focus is needed, either at projector or at camera.
17	Operating Conditions	The instrument should be capable of operating at 10 to 40 deg C temperature and Relative humidity 55% or less with no condensation.
18	Merging Scanned Data	Should have the ability to merge scanned data using different methods like automatic , Manual points Mode, , contour without points , Hybrid switching with in same Project
		Merging of back or front side should be with or without use of reference marker
19	Onsite Calibration	VDI 2634 - Part 3 Calibration & accuracy certification should be done at on site.
20	Curve Bases Analysis	Should be able to do character curve and curvature analysis
21	GD&T Form Deviation	Color plot presentation of form error feature of GD&T (flatness.roundness etc) on points and mesh data
22	User Reference	The supplier should have supplied similar systems to at least 5 premier government organizations like ISRO, HAL,DRDO, CIPET,CTTCs, NITs& Central Universities.
		Software should be parametric. Software should be capable of 3D data acquisition, processing and 3D color comparison as well as 2D comparison

23	Features of the Parametric Design and Inspection Software	System should be capable to do large size part
		Import /Export of scan data in ST ,ASCII,POL etc
		Complete geometric measurement such as point, line, circle, slot, rectangle, vector, plane, cylinder, sphere, cone etc.
		Fitting elements feature (maximum inscribed and minimum circumscribed elements, Gaussian and Chebyshev methods) should be possible
		Tracing and evaluation of curvatures and character lines
		Silhouette section facility for 2D inspection
		Multisections (axis parallel, radial, along curves and in viewina direction)
		Distance measurement using virtual caliper shall be possible.
		The measuring software shall provide complete set of indirect measurement for intersection
		Curve base analysis like flush and gap,curvature etc
		Evaluation of GD&T according to International Certified Specification should be possible in software,
		The software shall provide polygonization of random point clouds into polygon meshes.
		Multiple alignment with hierarchical order in same project should be possible
24	Computer	Latest configuration LAPTO w, XEON processor minimum 64GB RAM, 12 GB Graphics CARD , 4TB with Additonal 27inch monitor /Key board Mouse , WEBcam , Wifi ,Speaker , Microsoft XL Word , PDF editor , Remote Assitance Ready - Large display
25	Technical updates	Availability of information on technical update such as updated software, case studies, feedback from other customers etc. for effective utilization of the system on a regular basis.
		Operational Manual (User Manual)

26	Documentation	Software Instruction Manual for Parametric Design and Inspection Software
		Maintenance and troubleshooting Manual
		Training Manual
		Installation and Commissioning
		Handling of accessories
		Software perpetual License key
		Software CDs/ USB drive
27	Calibration Plates	Calibration Plate with International STD VDI Certification for all FoV
		Periodic calibration process of the artefact during and subsequent to expiry of warranty
28	Software capability	Software should be capable of Reverse Engineering, Parametric Design and multi part Inspection
29	Accessories to be quoted and supplied along with machine / equipment	Antivirus, Webcam, Consumable Spray, UPS 3 KVA etc should be quoted. Any other Accessories, if available for better utilization , Bidder to specify and quote
30	System	The System shall be catalogued items from a company. All the relevant catalogues shall be enclosed in the technical bid.
31	Scope of supply	Attach list for scope of supply
32	Installation requirements	Bidder to specify , pre-installation requirement
33	Installation & Training	Basic and Advanced training should be provided for 6 days
34	Technical support and service	Availability of technical support in the area of application and service both within the country.
35	Manufacturer's credential	Should have installations of same model worldwide and at least Three similar model sold in Private and Government sectors, Attached OLD PO's for Rerefernce

36	Warranty and guarantee	The machine shall be guaranteed for at least Three years for replacement and service against any design, manufacturing and workmanship defects , PARTS AVAILABILITY/ SUPPLY 07 Years Assurance under AMC Post warrenty
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5. Drop Weight Impact Tester			
Sl. No.	Specification	Range / Value	
1.1	Make	Bidder to specify	
1.2	Model	Bidder to specify	
2	Energy Range		
2.1	Min. Impact Energy	J	5 or lower
2.2	Max. Impact Energy	J	1800 - 2000
3	Impact velocity	m/s	Upto 20 m/s or more (Suitable masses and control system for controlling the velocity to be provided)
4	Drop height	m	2 or higher (Adjustable with an accuracy of 1 cm or better) Appropriate scaling to be provided
5	Drop Weight	kg	Suitable weights to achieve the desired velocity and energy to be provided
5.1	Weight level increment	Kg	500 g or better
5.2	Striker Tup holders	Standrad and reinforced tup holders with standard weights & additioal / supplementary weights to be provided	
5.3	Sensors	-	Tups with Straing guage type (FRP and high stiff materials) and piezoelectric type (for ductile materials) sensors should be provided
5.4	Strain Measuring range	%	Sensors should capable of measuring strain upto 500% or better during tensile impact test
5.5	Tup inserts	-	Hemispherical, conical, and flat based for performing puncture resistance and high speed puncture resistance test for rigid plastics and plastics films / sheets, impact resistance of thermoplastics pipes and fittings as per relevant ASTM / ISO / EN standards

5.6	Supports / Fixtures	-	<p><u>Compression after impact (CAI):</u> Support fixture as per ASTM D 7136</p> <p><u>Tensile Impact:</u> Clamps and grips suitable for holding Type 1,2,3, 4 & 5 specimens.</p> <p><u>Izod and Charpy</u> as per ASTM D 256 and ASTM D 6110</p> <p><u>Puncture resistance:</u> Clamping plates for rigid plastics and films / sheets as per V-Grooved and flat plate supports for pipe testing upto the diameter of 200 mm or above.</p> <p>Suitable support to be provided for testing the finished product (component)</p> <p>Fixtures / supports should be compatible for operation in Low temperature, ambient and high temperature.</p>
5.7	Cross head movements	-	Motorized cross head movement for positioning / lifting the strikers, Clamping of test specimen: Pnematic and Manual
6	Force Signal resolution	Bit	16-24
7	Test area dimensions (w x d x h)	mm	(600-800) x (700-900) x (500-800)
8	Max potential energy	J	Bidder should specify
9	Scope of supply		
9.1	Supply and installation of Drop Weight Impact Tester (with High Strain Tensile Testing & Compression Testing after Impact including all accessories)		<p>Bidder should submit complete scope of supply (Machine with make, model, computer hardware & suitable softwares, standard accessories, Optional Accessories etc) in the technical bid without price.</p> <p>Bidder should supply as a complete package necessary to prove the machine and provide training.</p>
9.2	Computer with Operating Software		<p>Bidder should specify & supply suitable latest model processor with 27"LED Monitor with Keyboard, Mouse with minimum 3/3/3 Warrenty - 3 years for part, labor and on-site service.</p> <p>User interface software for test management with supporting hardware (computer for smooth running of the machine.</p> <p>The application software should provide quantitative measurement options and display for parameters such as Peak force, speed, deceleration, deformation, absorbed energy & impact curves.</p>

9.3	Application areas	<p>1. ASTM D7136M & ISO 18352 - Predamaging of FRC (CAI std)</p> <p>2. ISO 8256 Method A - Tensile & Impact testing</p> <p>3. ISO 6603-2 & ASTM D3763 - Puncture Test on Plastics</p> <p>4. ISO 7765-2 - Puncture test on Films</p> <p>5. ISO 11343 - Adhesive Peel Impact Test</p> <p>6. ASTM D 2444 - Drop impact test for pipes</p>	
9.4	Accessories for components testing as per above std	<p>Bidder to specify the set of accessories (specimen loader, Vice, Strikers, Fixture, lubrication system, necessary compressed air supply system, etc...) required for performing the above test standards.</p> <p>Also includes:</p> <p>Optical sensors to detect impact speed.</p> <p>Motorized crosshead for striker lifting.</p> <p>Sensor to position crosshead.</p> <p>Hydraulic shock absorber to slow down striker after impact</p> <p>Should have Pneumatic rebound to avoid damage of the impacted specimen.</p> <p>Data Acquisition Rate and Points: Minimum 40'000 points acquired up to 4 MHz, simultaneous on Strain Gauge, Piezoelectric, and Analog channels. Display system along with interface cables and complete software for measurements & calculations</p> <p>Suitable for Easy-to-use operator control panel and precision control, <u>protective doors and panels for operator safety.</u></p>	
9.5	Thermostatic Chamber	° C	-70° C or better to + 150° C or better
9.6	Cooling system	-	Liquid Nitrogen cooling (Suitable system to be provided including Dewar Flask of appropriate capacity)
9.7	Compressor	-	Suitable compressor to achieve the desired pressure for pneumatic operation to be provided
9.7	Calibration sets, Qualification Test Piece	To be provided according to the test standards	
9.8	Calibration Certificate	One set of calibration certificates from the laboratory traceable.	
10	Safety Requirements		

10.1	General Compliance	<p>The machine and all the accessories supplied to meet objective should be able to operate without any risk or hazard, with additional protection,provision, training on guarding devices and meet current international standards.</p> <p>The machine should comply with standard, safety and protection. Vender should provide necessary details regarding standard, safety and protection.</p> <p>The Equipment should be designed, manufactured and tested according to the standards and regulations prescribed.</p> <p>The Operation of the Equipment should be in closed chamber with necessary safety measures.</p>
10.2	Environment Protection	<p>The machine and all the accessories supplied should be safe to use without emission of any hazardous gases, noise level and radiation without any need for additional equipment, provision or training and meet current international standards and the product should carry the CE marking.</p>
10.3	Other conditions	<p>The Bidder must have supplied atleast 3 such machines with similar capacity within India including OEM installations in the past. A satisfactory performance from those users to be enclosed</p>
11	Installation, Commissioning and Training	
11.1	Installation and commissioning	<ol style="list-style-type: none"> 1. The Bidder should state the space required and condition of floor and any other requirements like electrical, etc.. for installation of the machine and equipment and bidder should support necessary site preparation for installation. Bidder should carry out installation and commissioning of the machine and its accessories on a turnkey basis. 2. After completion of installation and training, three measurements shall be carried out similar to those carried out during pre-dispatch inspection) to check the full functionality and reproducibility of the system.

11.2	Training and documentation	<p>1. Minimum of 5 days training for five persons which includes basic & advanced level training. The Training should cover</p> <p>a. Operation and full maintenance of the main system</p> <p>b. Software usage</p> <p>c. Safety precautions needed during operation and maintenance</p> <p>2. Training faculty must have adequate experience in this field.</p> <p>3. Submission of the detailed technical, maintenance and operating manuals for both, system and software in hard or soft copy formats before the installation of the equipment.</p>
12	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 24 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> <p>a) The manufacturer shall confirm to support the maintenance and after-</p>
13	Guarantees and technical assistance	<p>2 years from the date of successful installation & Training plus a minimum of 8 years spares & service support after the expiry of the warranty period.</p>
14	Annual Comprehensive Maintenance Contract (ACMC)	<p>Annual Maintenance Contract for the three years after warranty period shall be quoted separately and the same will not be considered for evaluation. Supplier has to provide service support within 24hrs. The calibration of the machine shall be the part of the warranty & ACMC. It shall also be mandatory to perform calibration after every major repair or breakdown.</p>
15	Condition of the equipments	<p>All items of equipment must be new;</p> <p>The parts and pieces that relate to the structure and fairings must present quality finish without scratches, stains, dents and broken, within the standard announced by the supplier and validated by the technician who will accept on the part of CIPET.</p>

6. Multi - Product Calibrator / Multi - Function Calibrator With 8.5 Digit Multimeter

Sl. No.	Specification	Range / Value
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APPLICATION		It is used to Calibrate a wide variety of electrical test such as frequency, Temperature simulation-Thermocouple, RTD, Resistance, DC /AC voltage, AC/DC Current, Capacitance, Power factor, Phase angle, Oscilloscope, AC/DC Power
1	Functional Requirement:	<ul style="list-style-type: none"> • The offered MFC shall be able to source AC/DC voltage, AC/DC current, AC/DC Power, frequency, resistance, capacitance. • It should also have capability to simulate thermocouple and RTDs. Additionally; there should be provision for calibration of oscilloscope. • The offered MFC should have capabilities to calibrate digital and analogue multi meters, frequency meters, ohm meters, AC/DC milli voltmeters, thermocouple and RTDs indicators, tachometers, clamp meters, and timer counters. • The 8.5 Digit Multimeter should be high performance and high accuracy with simple operation. It shall be used for laboratory calibration and verification purpose.
2	DC Voltage	<ul style="list-style-type: none"> • Range: 250 mV to 1000 V or better <u>Resolution:</u> • 10 nV or better @ minimum Voltage • 100 μV or better @ Maximum Voltage <u>Stability @ $\pm 1^{\circ}$C for 24 hrs:</u> • ± 0.3 ppm + 0.3 μV or better @ minimum • ± 0.5 ppm + 200 μV or better @ maximum <u>Linearity $\pm 1^{\circ}$C</u> • ± 1 ppm + 0.2 μV or better @ minimum • ± 1 ppm + 200 μV or better @ maximum
3	AC Voltage	<ul style="list-style-type: none"> • Range: 100 mV to 1000 V or better <u>Resolution:</u> • 1 nV or better @ minimum • 1 mV or better @ Maximum <u>Stability @ $\pm 1^{\circ}$C for 24 hrs:</u> • ± 10 μV or better @ minimum • $\pm (150$ ppm + 1 μV) or better @ maximum
4	DC Current	<ul style="list-style-type: none"> • Range: 0.25 mA to ± 10 A or better <u>Resolution:</u> • 0.1 nA or better @ minimum • 10 nA or better @ Maximum <u>Stability @ $\pm 1^{\circ}$C for 24 hrs:</u> • $\pm (5$ ppm + 1 nA) or better @ minimum • $\pm (25$ ppm + 100 nA) or better @ maximum

5	AC Current	<ul style="list-style-type: none"> • Range: 250 μA to 10 A or better <u>Resolution:</u> • 1 nA or better @ minimum • 10 nA or better @ Maximum <u>Stability @ $\pm 1^{\circ}$C for 24 hrs:</u> • $\pm (150 \text{ ppm} + 5 \text{ nA})$ or better @ minimum • $\pm(75 \text{ ppm} + 100 \text{ nA})$ or better @ maximum
6	Capacitance	<ul style="list-style-type: none"> • 1 μF to 100 μF or better • Best Accuracy: 0.2 % or better
7	Variable Resistance	<ul style="list-style-type: none"> • Range: 1Ω to 100MΩ or better <u>Resolution:</u> • 0.1 m Ω or better @ minimum • 1 m Ω or better @ Maximum <u>Stability @ $\pm 1^{\circ}$C for 24 hrs:</u> • $\pm 50 \text{ ppm}$ or better @ minimum • $\pm 100 \text{ ppm}$ or better @ maximum
8	Temperature calibration (Thermocouple)	<ul style="list-style-type: none"> • Range & type: -210 to 2315$^{\circ}$C (type J, K, R, T, S, B, E, N,C,L,U) or better • Best Accuracy: $\pm 0.10^{\circ}$C or better
9	RTD simulation	<ul style="list-style-type: none"> • Range: -100 to 500$^{\circ}$C or better • Best Resolution: 0.01$^{\circ}$C or better
10	Oscilloscope calibration	<ul style="list-style-type: none"> • Amplitude • Range: 2 mV to 200 V (1 M Ω) and 1 mV to 2 V 50 Ω (Square-wave or DC) • Best Accuracy: $\pm 0.05\%$ • Frequency / period • Range: 0.1Hz to 100MHz / 10ns to 10s (fixed values 1, 2, 5 sequence) • Accuracy: $\pm 0.1\text{ppm}$ (0.1Hz to 10MHz / 100ns to 10s) • $\pm 20\text{ppm}$ (20, 50, 100MHz / 50, 20, & 10ns) • Duty Cycle • 3 frequency: 100Hz, 1kHz, 10kHz, settable from 0 to 100% • Fast-Rise • < 400ps. Bandwidth checking up to 400MHz • 600 MHz to 1GHz leveled sine-wave (0.5, 1, 1.5V pk-pk)

11	Power AC/DC	<ul style="list-style-type: none"> • Current: upto 20 A, Voltage: upto 1000 V, Power: upto 20 kW or better • Frequency: 40 to 500 Hz, Phase: $\pm 90^\circ$, Power Factor: 0.00 to 1.00 PF or better
12	Clamp Meter Adaptor	<ul style="list-style-type: none"> • Coil Turn : 50 • Range: AC/DC Current up to 1000A (DC, 45 to 90Hz) or higher • Best Accuracy: $\pm 0.5\%$
13	Interfaces	IEEE-488 (GPIB), RS-232
14	Environment	Operating temperature range: 10°C to 40°C
15	Mains power supply	Single Phase 230V, 50Hz
16	Accessories to be quoted and supplied along with machine / equipment	Test lead set, Control Software, PC interface cable, Calibration certificate (NABL/UKAS) & User manual.

Technical Specification for 8.5 Digit Multimeter

1	Functional Requirement:	<ul style="list-style-type: none"> • The 8.5 Digit Multimeter should be high performance and high accuracy with simple operation. It shall be used for laboratory calibration and verification purpose.
2	Resolution	8.5 digit or better
3	Measurement confidence	10 ppm or better
4	Measurement Speed	100,000 readings/s or better

5	DC Voltage	<ul style="list-style-type: none"> • Range: upto 1000 V or more Maximum Resolution: <ul style="list-style-type: none"> • 10 nV or better at minimum • 100 μV or better at maximum
6	AC Voltage	<ul style="list-style-type: none"> • Range: 0 – 30mV to 3kV or more Maximum Resolution: <ul style="list-style-type: none"> • 10 nV or better at minimum • 100 μV or better at maximum
7	DC Current	<ul style="list-style-type: none"> • Range: upto 1 A or more Maximum Resolution: <ul style="list-style-type: none"> • 1 pA or better at minimum • 100 nA or better at maximum
8	AC Current	<ul style="list-style-type: none"> • Range: Upto 1 A or more Maximum Resolution: <ul style="list-style-type: none"> • 100 pA or better at minimum • 100 μA or better at maximum
9	Resistance	<ul style="list-style-type: none"> • Range: up to 1GΩ or more Maximum Resolution: <ul style="list-style-type: none"> • 10 $\mu\Omega$ or better at minimum • 100 Ω or better at maximum
10	PRT (PT100) Temperature	<ul style="list-style-type: none"> • Support thermocouple, PT sensor
11	Frequency	<ul style="list-style-type: none"> • Range: 10 – 100kHz or higher • Best Resolution: 1Hz or better • Best Accuracy: 0.05% of reading or better
12	Interfaces	IEEE-488 (GPIB), RS-232
13	Environment	Operating temperature range:10°C to 40°C
14	Mains power supply	Single Phase 230V, 50Hz

15	Accessories to be quoted and supplied along with machine / equipment	• Test lead set, Control Software, PC interface cable, Calibration certificate (NABL/UKAS) & User manual.
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7. Lateral Spread of Flame

Sl. No.	Specification	Range / Value
TYPES OF TESTS TO BE PERFORMED		The lateral flame spread test can be used as a measure of the ability of a product to inhibit the ignition of the substrate to which it is applied. The substrate, in a vertical orientation, is exposed to a known radiant heat source and the time to ignition measured.
APPLICABLE STANDARD		ISO 5658-2 Specified as per EN-45545-2
1	Tubular steel frame	This frame should consist of 40 mm X 40 mmsquare section steel tube and shall support theradiant panel with its centre 1200 mm abovefloor level.
2	Radiant Panel	It should made up of Porous refractory materialhaving dimension280 mm × 480 mm
3	Specimen Holder	<ul style="list-style-type: none"> • It should constructed from heat resistant steel. • Observation mark shall be field in an interval of 50 mm • The framework shall have two solids of stainless steel pipe with grove
4	Pilot Burner	The pilot burner Should be made of up a stainless-steel tubing approximately length of 200 mm long
5	Mirror	750 mm length and 120 mm width
6	Flux meter	Heat flux meter for measuringthe flux profile along the specimen should be supplied.
7	Calibration System	<p>The calibration system should consists of a calibration board and a heat fluxmeter.</p> <p>The calibration board shouldmanufacturedfrom a calciumsilicate-based board material andis provided with a series of holes which, whenthe calibration boards inserted into the testapparatus, positions the heat flux meter atprescribed calibration locations.</p>

8	Other Features	<ul style="list-style-type: none"> • High accuracy Mass flow controller is used for controlling the gas mixing. • Radiant panel gas control. • Safety gas controls and cut off circuitry. • Ignition system • Equipment should have all facility to comply the test procedure as per the standard ISO 5658-2.
9	Other Mandatory Items	<p>While supplying the Machines, the supplier should also provide the following items apart from above:</p> <ul style="list-style-type: none"> • Hard copies of Operational & Service Manual- 01 Set . • Calibration Certificate for required parameters with Traceability. • Machine should come with all other essential accessories, demo material for trial & spares required for installation, commissioning & Operation.

8. Limiting (Critical) Oxygen Index Tester

Sl. No.	Specification	Range / Value
TYPES OF TESTS TO BE PERFORMED		Oxygen index of various Organic materials according to various Indian and International standards.
APPLICABLE STANDARD		ASTM D2863, ISO 4589-1, ISO 4589-2, ISO 4589-3, ASTM E-2931, IS-13501 and as per UL specifications.
1	Digital Read out for oxygen concentration	±0.1%
2	Test temperature	400°C or equivalent
3	Dimensions(mm)	Length: 200-400 Width : 200-500 Height: 200-300

4	Features	<p>Paramagnetic Oxygen Cell for assessing accurate oxygen (< 0.1%) levels.</p> <ul style="list-style-type: none"> • Compact unit for efficient use inside a laboratory hood, with ventilation. • Automatic flow control for oxygen level adjustment by turning one single valve. • Quick loading of test specimen into test chimney measuring 450 mm × 75 mm or equivalent as per Standard. • Digital display of oxygen percentage in atmosphere during test (no calculations needed). • Digital display of temperature of gas mixture entering the test chimney. • Sample holders for both rigid and flexible samples to be supplied. • Shortened gas path for rapid response • Test apparatus includes glass beaded mixing chamber, specimen support, and heat resistant glass column. • Uniform combustion atmosphere. • Dual inlet gas pressure gauges. 0-100 psi • Ignition wand with variable gas control valve. • Smoke density measurement system with chart recorder.
5	Additional Requirements	<ul style="list-style-type: none"> • Ventilation hood compatible with the instrument to be supplied • Transparent radiant heated test column. • Air pump to conserve oxygen and nitrogen supply during standby period
6	Should be Suitable For Composites.	Testing of Polymers, Rubbers, Fibres, Films, FRP products
7	Other Mandatory Items	<p>While supplying the Machines, the supplier should also provide the following items apart from above:</p> <ul style="list-style-type: none"> • Hard copies of Operational & Service Manual- 01 Set . • Required filled gas Cylinders with best quality Regulator. • Calibration Certificate of supplied gas and flow meters. • Machine should come with all other essential accessories & spares required for installation, commissioning& Operation.

9. Radiant Panel

Sl. No.	Specification	Range / Value
TYPES OF TESTS TO BE PERFORMED		<p>This test method is used to measure the critical radiant flux of horizontally-mounted floor covering systems exposed to a flaming ignition source in a graded radiant heat environment, within a test chamber. It can also be used to measure this same critical radiant flux for exposed attic floor cellulose insulation.</p>

APPLICABLE STANDARD		ISO 9239-1 as per EN 45545
1	Test Chamber	Chamber should made up of fire-resistant (calcium silicate) body with fire resistance window glass.
2	Heat flux	10kW/m ² to 50 kW/m ²
	Specimenholder:-	
3	Size	A specimen holder should heat-resistant L-profile stainless steel of (2.0 ± 0.1) mm thickness & size (1140 ± 10) mm by (325 ± 10) mm x (22 ± 2) mm
4	Gas-Fired Radiant Panel	A panel of porous refractory material radiant heat source area should be (300 ± 10) mm x (450 ± 10) mm
5	Maximum working temperature	up to 900 °C
6	Pilot Burner	ID 6 mm and OD 10 mm
7	Exhaust system Capacity	Should have capacity to Exhaust 39 m ³ /min at (25 °C , 1 bar) to 85 m ³ /min.
8	Smoke extraction rate	(2.5 ± 0.2)m/s
9	Radiation Pyrometer	Temperature range should 480 °C to 530 °C (black body temperature) & accuracy of ± 5 °C.
10	Heat Flux Meter	Having a range of 0 to 15 kW/m ² ± 0.2 kW/m ² (accuracy of ± 3 %).
11	Ignition system	high voltage electronic ignition
12	Other Features	Equipment should have all facility to comply the test procedure as per the standard ISO 9239-1
13	Other Mandatory Items	<p>While supplying the Machines, the supplier should also provide the following items apart from above:</p> <ul style="list-style-type: none"> • Hard copies of Operational & Service Manual- 01 Set . • Calibration Certificate for required parameters with Traceability. • Machine should come with all other essential accessories, demo material for trial & spares required for installation, commissioning & Operation.

10. Smoke Density Chamber With Single Flame Source & Smoke Toxicity

Sl. No.	Specification	Range / Value
TYPES OF TESTS TO BE PERFORMED		The Smoke Density Chamber should be capable of determining the specific optical density of smoke generated by solid materials, when an essentially flat specimen up to 25 mm thick, is exposed vertically to a radiant heat source of 25kW/m ² , in a closed chamber, with or without the use of a pilot flame. In addition to that, it measures the toxicity of the produced smoke.
APPLICABLE STANDARD		ISO 5659-2 – Smoke Density; ISO-17084- Smoke Toxicity ISO 11925-2 - Single Flame Source Specified as per EN 45545-2 standard
1	Radiator:-	
1.1	Rated Power	2600W
1.2	Heat flux	10kW/m ² to 50 kW/m ²
1.3	Measuring position	25mm under specimen.
1.4	Measurement area of the radiator	Φ10mm
1.5	Distance from the furnace	25mm
2	Burner:-	
2.1	Flame Height	30±5mm
2.2	Distance to the Specimen	10mm
3	Specimen:-	
3.1	Size	59mm x 59mm
3.2	Thickness	Less than 25mm
3.3	Orientation	Horizontal

4	Smoke Toxicity Tester:	
4.1	Smoke Toxicity attachment	Gaseous/volatile test products drawn from the chamber at any time for analysis through three ports on the top of the chamber. One of these ports is used to connect to the vacuum box.
5	Single Flame Tester:	
5.1	Power	AC220V±10%,50Hz
6	Burning Chamber :-	
6.1	Burner Dimension	0.17mm with four \varnothing 4mm suction inlet
6.2	Gas pressure	Should have capacity to control gas pressure up to 10kpa~50kpa
6.3	Flue air velocity	0.7m/s
6.4	Burner angle	45°
7	Control Device:-	
7.1	Timer for flame	0~ 99min99sec
7.2	Timer accuracy	≤1s/h
7.3	Anemometer accuracy	±0.1m/s
7.4	Orientation	Horizontal
8	Testprocedure:-	
8.1	Specimen process	23±2°C, 50% to constant weight
8.2	Modes	25 kW/m ² without fire 25 kW/m ² with fire 50 kW/m ² without fire 50 kW/m ² with fire
8.3	Time	10min or minimum light transmittance value

8.4	Other Features	<ul style="list-style-type: none"> • Test chamber should have with full width opening door, allowing easy access for sample loading and chamber cleaning. • Controls should be mounted beside chamber for convenient operation. • Smoke density and temperature are on digital displays. • Chamber walls are pre-heated for easier start-up and convenient equipment operation • Safety blow-out panel, easily replaceable, allows for safe operation of test method • Cabinet should have designed with a standard 19" rack. • Furnance have to designed for allowing potential of the Smoke at variable heat fluxes (up to 50 kW/m²). • Equipment should have the facility for the horizontal rotation of the specimen with mass loss rate of the specimen. • Equipment should have all facility to comply the test procedure as per the standard ISO 5659-2. • Test chamber should have made up of stainless steel material. • Two number of windows on the front and right side to observe the process. • Equipment should also have all facility to comply the test procedure as per the standard ISO 11925-2.
8.5	Other Mandatory Items	<p>While supplying the Machines, the supplier should also provide the following items apart from above:</p> <ul style="list-style-type: none"> • Hard copies of Operational & Service Manual- 01 Set . • Calibration Certificate for required parameters with Traceability. • Machine should come with all other essential accessories, demo material for trial & spares required for installation, commissioning & Operation. • Toxicity test attachment should be provided.