

Micro Moulding Machine

High Precision all electric Injection Moulding Machine with Microprocessor Controlled and capable of compression injection moulding with the following specification for research and development purpose.

TECHNICAL SPECIFICATIONS:

Sl. No.	Description	Specification
1	Drive System	All electric
2	Clamping Unit	
2.1	Max. Clamping force (KN)	800 – 1000
2.2	Opening Stroke (mm)	350-450
2.3	Minium Mould Installation Height (mm)	200 mm or better
2.4	Mould mounting platen (mm)	600-650 x 600-650 or better
2.5	Max. Ejector Force(KN)/Stroke (mm)	25/100 or better
3	Injection Unit	
3.1	Screw Diameter (mm)	30 - 40
3.2	Screw Stroke (mm)	140 or better
3.3	Max. Short Weight (g)	100 or Higher
3.4	Max. Injection Pressure (bar)	2000 or better (Multi stage)
3.4	Max. holding Pressure (bar)	1800 or better
3.6	Max. Injection Flow (cm ³ /s)	200-350
3.7	Max. Screw speed (RPM)	400-450 (multistage)
3.8	Max. Screw Torque (Nm)	300-450
3.9	Barrel material	Bi-Metal (Nical based with tungstion reinforcement) or equvalent
3.10	Screw Material	Through hardened powder metallurgical steel
3.11	Heating capacity & Zones (kW)	9/4 or better
4	Max. Drive Power (kW)	14 or better
5	Injection -Compression	Complete capability for injection – compression molding (Coining)
6	Controller and software	Latest version of Microprocessor controller with software
7	Essential Accessories	<p>Bidder to specify and quote the suitable accessories essential for effective utilization of machine such as</p> <ul style="list-style-type: none"> · Chiller Unit (Cooling capacity 6 kW or more, teperature range + 5 to 20 degree) · Stabiliser · MTC unit for water (Max. Temp 140°C, Pressure 4 bar and flow 40 liter/ min) with high temperature hoses from controller to machine platernts · MTC unit for oil (Max. Temp 160°C , Pressure 4 bar and flow 60 liter/ min) with high temperature hoses from controller to machine platernts · NRV set · Thermocouples (for Nozzle & barrel) · Heaters · Nozzle for Nylon/LCP · Multipoint ejector rod · Limit switches
		Bidder to specify and quote the optional accessories available for effective and better utilization of machine and research purpose.

8	Optional accessories	<ul style="list-style-type: none"> · Water inlet / out let manifold for mould cooling (Standard) · Interface for gas assisted injection moulding and Gas Assisted Injection molding system with complete accessories · Hot Runner control (Minimum 8 Zone system with necessary accessories) · Hot pneumatic sequential gates (Minimum 4 Nos.) · Core Pulling system - Minimum 2 Nos · High execution to increase injection speed · Hopper drier with vacuum loader etc.
9	Any other accessories if available/required	Necessary/Optional accessories and spares, if required for running the machine with multiple capabilities, bidder to specify with details and quote.
10	Installation requirements	State space required and condition of floor and any other requirement for installation of the machine/ equipment.
11	Installation & Training	<p>Basic & Advanced level training and providing two sets of operating & maintenance manuals and other reference manuals for getting quality output and longer trouble free life of machine.</p> <p>Basic & Advanced level training schedule and plan to be submitted.</p>
12	Manufacturer's credential	Should have sizable installations of same model worldwide and at least two same or similar model in India.
13	References	Tenderer shall give complete contact details of existing customers having such supply in India.
14	Safety requirements	The machine or set of machines supplied to meet objective shall be able to operate without any risk or hazard without any additional protection, provision, training or guarding devices and meet current international standard.
15	Availability of spares and consumables	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.
16	Price list of spares and consumables	Price list of each material with minimum quantity, build plates, spares and consumables are to be quoted.
17	Technical support and service	Availability of technical support in the area of application and service both within the country. The tenderer shall have local service and application office and infrastructure to attend by visit within 48 hours of need.
18	Warranty and guarantee	The machine shall be guaranteed for at least two years for replacement and service against any design, manufacturing and workmanship defects.

19	Annual Comprehensive Maintenance Contract (ACMC)	Tenderer shall quote for Annual Comprehensive Maintenance Contract for the whole system after the completion of Performance Warranty period. Supplier has to provide service support within 48 Hours.
20	Scope of supply	Tenderer should supply complete start up package necessary to prove the machine and provide training. List for scope of supply to be submitted.

Multi Jet Fusion

Sl. No.	Description	Specification
1	Make	Bidder to specify
2	Model	Bidder to specify
3	Technology	An open architecture 3-D Polymer Additive Manufacturing System based on non-laser Material Fusion Technology having capability to transform part properties voxel by voxel.
4	Applications	The Machine will be used for Direct production of concept models, functional prototypes, strong mechanical parts for end use applications, patterns for sand casting etc.,
		The machine should be able to process varieties of engineering polymers to enable rigid and flexible parts to be produced.
		Printed part should be isotropic & watertight having density at least 99 % or better.
5	Processing Unit	
5.1	Building volume	Minimum built volume 350 mm x 280 mm x 350 mm (bigger build volume is preferred).
5.2	Layer thickness	0.08 – 0.1 mm or better
5.3	Build speed	5000 cm ³ /hr or better
5.4	Accuracy	0.2 mm/100mm or better
5.5	Min wall thickness / scanning line	0.4mm or Better
5.6	Resolution	1200 dpi or better
5.7	Machine Control	Advanced latest control system for effective control and printing
5.8	Thermal Control and Real time temperature Monitor & correction System.	To monitor the build temperatures throughout the build volume and calibrate automatically after each build layer. The mechanism employed to achieve this need to be explained in detail in the bid.
5.9	Effective Part Manufacturing Criteria	Supplied system should have fully Automated Mixing, Sieving, and Loading; with fast cooling option of Build Unit as a separate unit and the printing unit should be free from any material handling.
		Additional Material processing unit with fast cooling option & build unit for handling different material & enhanced productivity should be quoted separately.
5.10	Powder Recycling and Handling	Fully automatic system, Processing Station with Fast Cooling of Build unit to be provided.
5.11	Filter System	The system should have a filter which can remove both big and fine condensates. The life of each filter to be defined by the manufacture.

5.12	Parameter set module	Supplier should supply proven parameters for the above materials with clear documentation and statistics of the mechanical properties as build and under heat treatment conditions.
5.13	Parameter Editor Module	Complete package of process Parameter Editor to optimize parts results.
		Vendor to confirm that all parameters that are required to build a part is user controllable, and if not, to list what is not accessible.
		Also vendor should provide training on build Parameter Editing. The syllabus of this training should be clearly defined so that the user knows what is being offered.
6	Material	
6.1	Material options	Wide variety of material option and capable to use all type of materials such as Nylon 11, Nylon 12, glass filled Nylon, TPU and new materials.
		The material should be UL 94 certified for flammability & suitable for use in electrical/ electronic end use products
		Parts made of the material should be IP 67 certified, suitable to print enclosures for outdoor usage.
6.2	Powder material	Supply minimum 250kgs of each material with agents
7	Software	
7.1	Process Software	To control the building process and ergonomic operating interface of the touch screen.
		The process software should be able to work closely with the internal production and generate statistical QA reports which are preferred to subjective method of reporting.
7.2	Slicing and data editing software	Complete module for conversion of part data in the STL format and optimization of layer data.
7.3	Software feature	The machine should have feature of adding the parts in the running build job without interrupting the build.
7.4	Process control desktop software	To prepare build job independent from the machine processor.
7.5	Control and reporting software	Suitable software for controlling and reporting RP system.
		The system should also automatically generate the following for documentation
		General information of the build job
		Illustration of part placement on the build platform
		Process information of parameters and time
		Sensor data for temperature, pressure
8	Essential Accessories	
8.1	Workstation with accessories	Suitable OEM computer system handling large size stl data with complete accessories for slicing and control building process.
8.2	Vacuum Cleaner	Suitable Vacuum Cleaner - Bidder to specify and quote.
8.3	Micro shot peening	Suitable Micro shot peening smooth surface finish - Bidder to specify and quote.
8.4	Online UPS	Suitable UPS with minimum 60 minutes backup power for the machine. - Bidder to specify and quote.
8.5	De-humidifier	As per the requirement, Bidder to specify and quote.
8.6	Compressor with dryer (Silent operation)	As per the requirement, Bidder to specify with details and quote.

8.7	Electrical Lifting and handling truck	Suitable system if necessary for the machine - Bidder to specify and quote.
8.8	Break out Tool Kit	Standard tools/kits for startup, removal of parts and cleaning (list to be attached).
8.9	Maintenance Kit	Required spares like filters, rubber blade, lamps, gloves, Mask, Safety Goggles etc. should be supplied
8.10	Post-processing unit	Bidder to specify suitable dye finishing unit
9	Optional accessories	Bidder to specify and quote
10	Any other accessories if available/required	Necessary/Optional accessories and spares, if required for running the machine smoothly, bidder to specify with details and quote.
11	Other essential requirements	
11.1	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.
11.2	Other Conditions	The bidder must have supplied at least 3 such machines of similar capacities with in India including OEM Installations in the past 3-4 years. 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/ CE/FDA approved Bidder must submit Authorization letter form OEM of Printer, materials and software
11.3	Scope of supply	Bidder should submit complete scope of supply (Machine, standard accessories, Optional Accessories etc with make model) in the technical bid. Bidder should supply complete start up package including material necessary to prove the machine and provide training.
12	Installation, Commissioning and Training	
12.1	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.
12.2	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 · Software key (if any)

12.3	Warranty	Bidder to specify the warranty period. The whole system and its accessories should be in warranty for replacement and service against any design, manufacturing and workmanship defects from the date of installation and commissioning.
12.4	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 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.
12.5	Annual Comprehensive Maintenance Contract (ACMC) as optional	Vendor should quote for Annual Comprehensive Maintenance Contract for the whole system and accessories supplied after the completion of performance warranty period. Supplier has to provide service support within 24 hours. Calibration of the machine shall be a part of warranty and ACMC. It shall also be mandatory to perform calibration after every major repair or breakdown.

DYNAMIC MECHANICAL ANALYSER (DMA)

Sl.No.	Description	Specification
Make		Bidder to specify
Model		Bidder to specify
1	Temperature Range	from -150°C to 500 °C or better on both side
2	Temperature Resolution	0.1 °C
3	Heating Rate	0.1 to 20 °C/min or higher
4	Cooling Rate	0.1 to 20 °C/min or higher
5	Cooling system	Automated cooling system should be provided to achieve the specified low temperature
6	Force Range	18 N (Max) and 0.001N (Min)
7	Force Resolution	0.0005N or better
8	Tan δ Range	0.0001 to 10
9	Resolution	1.0 X 10 ⁻⁴
10	Sensitivity	1.0 X 10 ⁻³
11	Sample Deformation modes	Single and dual cantilevers

		bending modes: 3-point bending mode
		Tension and compression modes
		Shear Mode
		(Fixtures should be provided to all modes)
12	Sample Deformation Range	1 mm to 1 cm or better
13	Amplitude resolution	10 μ or better
14	Modulus Range	10 ³ to 10 ¹³ Pa
15	Modulus Resolution	0.01 Pa
16	Frequency Range	0.001 to 300 Hz with minimum of 0.01 Hz increment or better
17	Liquid Nitrogen Dewar	Dewar of capacity of 50 ltr or better should be provided in the system
18	Other	<ul style="list-style-type: none"> · Humidity Controller in the chamber · Provision for control flow of N₂ or Air · Calibration Standard Kits should be provided
19	Software	<p>compatible to Windows 10 OS and should have the capabilities to programme stress, strain, amplitude etc.</p> <p>capable of collecting data on storage, modulus, loss modulus, tan delta, complex modulus, complex / dynamic viscosity, creep compliance, etc.</p>
20	Workstation	Branded Desktop PC (i7, 8 Gb RAM, 1Tb HDD 21 " LCD display,) Inkject colour Printer & Branded UPS
21	Accessories	Bidder to specify and quote any ther accessories rerquired for the better utilisation of the equipment
22	Scope of supply	Bidder should submit complete scope of supply (Machine, standard acessories, Optional Acessories 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.
23	Installation and commissioning	The vendor should support necessary site preparation for installation. Vendor should carry out installation and commissioning of the machine and its accessories on a turnkey basis
24	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.
25	Annual Comprehensive Maintenance Contract (ACMC) as optional	Vendor should quote for Annual Comprehensive Maintenance Contract for the whole system and accessories supplied after the completion of performance warranty period. Supplier has to provide service support within 48 hours. Calibration of the machine shall be a part of warranty and ACMC. It shall also be mandatory to perform calibration after every major repair or breakdown.

RAMAN SPECTROSCOPY (FT-Raman Spectrometer)

S. No.	Applications	
1	Laser (Option)	YAG laser: 1,064 nm; 1, 2, or 3 W (air-cooled)
2	Rejection Filter	150 cm ⁻¹ or more (Raman shift value)
		50 cm ⁻¹ or more (Raman shift value) (Option)
3	Detectors	InGaAs: ~3,600 cm ⁻¹ or more (at R.T.)
		~3,000 cm ⁻¹ or more (77 K) (LN ₂ -cooled)
4	Interferometer	Beam splitter: Si/CaF ₂
5	Sample Stage	XYZ stage
6	Beam Collecting System	Lens method: F/0.63
7	Data Processing Functions	Smoothing, Baseline correction, Peak picking, Sensitivity correction, Arithmetic, Derivatives, Subtract, Raman shift, wavenumber conversion, Data truncate, Overlay, IF conversion, J-CAMP format conversion, Text format conversion
8	Other Standard Components	Laser plasma line rejection filter, Laser power monitor, Light source for Raman intensity correction (Halogen lamp), Interlock mechanism (Laser safety operation), Raman scattering collecting system (uses gold-coated mirrors)
9	Optional Accessories	Liquid sample cell / Liquid sample cell holder/ Powder holder, 90 degree scattering measurement system, TV monitor system for sample observation, Microscopic measurement system (Objective lens: X10, X50 including TV monitor system), Polarization measurement system (1/2 plate, Polarizer), Large XYZ stage, Thermal analysis system, Mapping system, Anti-vibration bench

S. No.	ELECTRO-SPINNING UNIT	
1	Applications	Preparation of fibers from polymers solution and metal and metal oxide fibres
2	X, Y and Z- axis stage	Programmed on the operation unit through PC
3	Spinning direction	Vertical, should be controlled individually
		Co-spinning (optional)
4	Safety system	Safety door lock system to avoid electrical shock and an exhausting system to evacuate evaporated solvents and flying nanofibers.
5	Power supply control unit	0 - 50kV with emission current less than 50 μA, 50Hz
		One movable syringe pump.
6	Traverse width	10- 300 mm with digital display of transverse speed.
7	Angle	0 to 45 degree.
8	Nozzles:	Metallic needles; Single nozzle & multi nozzles
9	Syringe unit	Four syringe (each for two syringe pump)
10	Syringe pump feed rate	0.1-60 ml/min
11	Syringe Traverse Speed	10-100 mm/min

12	High Voltage Power Supply Device	0-50 KV digital display & voltage control device with complete safety to operator
13	Inner Diameter of Nozzle	100-500 nm
14	Drum Rotation Speed	60-3000 rpm
15	Temperature	Room Temp. to 80 ° C inside stink cupboard
16	Temperature controlling system, precision	±0.1 °C
17	Collector system	i. Plate Collector, (Disc area: A5 size (< 370 cm ²) (approx.))
		ii. Disc Collector, (Disc circumference: 600 mm (approx.), Rotating speed : 500 – 3000 rpm (approx.))
		iii. Drum Collector (Fiber Deposition area: 870 cm ² (approx.) Rotating speed : 500 – 2500 rpm (approx.))
18	Safety measures	A door lock and static electricity removal device.

S. No.	CONE CALORIMETER	
1	The Cone Calorimeter should be capable of measuring:	
2	Ø Heat Release Rate	
3	Ø Mass Loss Rate	
4	Ø Time to Ignition	
5	Ø Effective Heat of Combustion	
6	The apparatus should meet the standards prescribed in ISO 5660 and ASTM E 1354.	
	FEATURES	DESCRIPTION
7	Conical Heater	<p>Ø The heater element should be rated at 5 kW (or better) at 240 V</p> <p>Ø The heater should be able to produce uniform irradiance over the range 0 to 100 kW/m² (or more)</p> <p>Ø The heater should be encased on the outside with a double-wall stainless steel cone, packed with a refractory fiber material of approximately 100 kg/m³ density</p> <p>Ø The heater should be capable of horizontal and vertical orientation arrangements</p> <p>Ø The heater should have three K-type stainless steel sheathed thermocouples, connected but not welded to heater element</p> <p>Ø The heater should have a shutter mechanism (automatic or manual) to protect the sample area before the test</p>
8	Temperature Controller	<p>Ø The temperature controller for heater should be capable of holding the element temperature steady to within ± 2°C or better, over the range of 0°C to 1000°C (or better) using a suitable 3-term PID controller and thyristor unit capable of switching currents up to 25 A at 240 V</p>
		<p>Ø External ignition should be by 10 kV discharge across a 3 mm spark gap</p>

9	Ignition Circuit:	<ul style="list-style-type: none"> Ø A power source should be a transformer designed for spark-ignition or a spark generator
10	Load Cell	<ul style="list-style-type: none"> Ø Load cell should be compensating for imbalance in the fuel
		<ul style="list-style-type: none"> Ø It should have a readout resolution of 0.1 g or better
		<ul style="list-style-type: none"> Ø Total weighing range of minimum 3.5 kg of which more than 500 g should be available for direct monitoring during single test
11	Specimen Mountings:	<ul style="list-style-type: none"> Ø The specimen holder should be manufactured from 2.5 mm thick stainless steel material
		<ul style="list-style-type: none"> Ø The inside dimensions of holder should be 100 mm×100 mm and 25 mm height
		<ul style="list-style-type: none"> Ø Retainer frame and wire grid arrangements for specimen holder should be provided
12	Heat Flux Meter	<ul style="list-style-type: none"> Ø Gardon or Schmidt-Boelter type heat flux meter to calibrate the heater temperature controller
		<ul style="list-style-type: none"> Ø The design range should be at least 0 to 100 kW/m² with an accuracy of ± 3 %
		<ul style="list-style-type: none"> Ø The sensing surface should be circular and flat
		<ul style="list-style-type: none"> Ø The flux meter should be water cooled
13	Calibration Burner:	<ul style="list-style-type: none"> Ø Calibration burner to be provided to calibrate the heat release rate of the apparatus using methane of at least 99.5% purity
		<ul style="list-style-type: none"> Ø Mass Flow Controller (MFC) to control the gas flow is preferred.
14	Exhaust System	<ul style="list-style-type: none"> Ø The exhaust system should consists of a variable speed exhaust blower capable of developing flow over a range 0.012 to 0.035 m³ /s
		<ul style="list-style-type: none"> Ø A restrictive orifice of 57 mm inside diameter should be placed between the hood and the duct for mixing and a sharp-edged orifice of 57 mm inside diameter should be located at least 350 mm downstream from the blower as per ASTM E 1354, ISO 5660
		<ul style="list-style-type: none"> Ø The duct should be 114 mm inside diameter and manufactured from 0.6 mm thick stainless steel plate
		<ul style="list-style-type: none"> Ø K-type stainless steel sheathed thermocouples to measure temperature of gas stream
		<ul style="list-style-type: none"> Ø Material of complete exhaust system should be stainless steel
15	Smoke Detection System	<ul style="list-style-type: none"> Ø Helium-Neon laser beam (0.5mW, 633nm) system, silicon photodiodes as a main beam and reference detectors.

		<ul style="list-style-type: none"> Ø 2 number of ND filters for calibration with optical density anywhere between 0.1 to 1
16	Gas sampling and analysis system	<ul style="list-style-type: none"> Ø Capable of measuring O₂, CO₂, CO Ø Should incorporate a ring sampler, soot filter, cold trap, pump, desiccant, bypass system and flow controller Ø The gas sample lines should be constructed noncorrosive material like nylon and plumbing should be using Swagelok fittings Ø The gas sampling & analysis rack should be modular for use with both cone calorimeter and well as large scale calorimetry.
17	O ₂ Analyser	<ul style="list-style-type: none"> Ø Paramagnetic type gas analyser with a range of 0 to 25 % oxygen Ø The analyser should exhibit a linear response Ø The drift of not more than ± 50 ppm of oxygen and noise of not more than 50 ppm of oxygen (root mean square value) over a period of 30 min. Ø The analyser should have 10 to 90% response time of less than 12 s Ø Intrinsic error (accuracy) should be less than 0.02% Oxygen Ø Absolute pressure transducer arrangement for analyser
18	CO ₂ Analyser	<ul style="list-style-type: none"> Ø Non-dispersive Infra-red (NDIR) type with a range of 0 to 10 % CO₂ (v/v) Ø The response time should be less than 20 s Ø Intrinsic error (accuracy) should be at least 1% of range
19	CO Analyser	<ul style="list-style-type: none"> Ø Non-dispersive Infra-red (NDIR) type with a range of 0 to 1 % CO (v/v) Ø The response time should be less than 20 s Ø Intrinsic error (accuracy) should be at least 1% of range
20	Digital Data Collection System	<ul style="list-style-type: none"> Ø The system must have facilities to record output from the analysers, the thermocouples, the orifice meter, the load cell and the smoke measuring system. Ø The system should be capable of recording test data at least 1 scan per 1 second or better. Ø Mention the hardware and software (OS) specification of computer system (personal computer/laptop) to be provided by the user.

21	Software	Ø Software for showing the status of the instrument, calibrating the instrument and storage of calibration results, collecting data generated during a test, calculating the required parameters, presenting the results in a manner approved by the standards should be provided on a media.
22	Optional	Kindly mention ability to provide the following optional. For each option please give the technical specifications (drawings if applicable) in the technical quote and extra cost of each individual option in the budgetary quote
		Ø Additional heated analytical line (3 meter) and filter to enable taking combustion gases for further analysis
		Ø Step temperature controller (for adjusting conical heater's heat flux in steps)
		Ø A larger cone, which can be used for larger samples (say 150 mm×150 mm) for low heat release materials
		Ø A quartz tube of 114 mm I.D. and length 100 mm should be incorporated before gas sampling ring
		Ø Personal computer i7 8GB 21" 1Tb branded workstation as per the requirement of software for equipment
		Ø CACC (Controlled Atmosphere Cone Calorimeter) attachment.
23	Warranty	Ø 12 months from the date of installation or 18 months from the date of invoice. Also, mention AMC (annual maintenance cost) after expiration of warranty

Dielectric Thermal Analyser (DETA)

Applications	Investigation of the curing behavior of thermosetting resin systems, composite materials, adhesives and paints.	
	➤ Suitable for films, liquid and powdered materials.	
	➤ To determine glass transition of delicate polymeric films and membranes.	
	➤ To study the dependence of temperature and frequency on dielectric properties.	
	➤ Provide information on capacitance and conductivity of materials.	
Technical Spec.		
1	Frequency range	12Hz to 200kHz Up to 50 frequencies in same experiment
2	Temperature range	-150°C to 350°C or better
3	Ramp Rate	±2C/minute
4	Heating/Cooling rate	Heating rate 0 to 20°C/min
		Cooling rate 0 to 40°C/min
5	Coolant	Automatic cryomode for measurement at sub ambient temperature using liquid nitrogen
6	Voltage range	0.005 to 20 V
7	Electrode type	➤ Parallel plates: 10mm, 33mm, 40mm
		➤ Cup: 40 mm

8	Data acquisition /operating system	➤ System should be capable of determining the dielectric constant, permittivity, loss factor, dissipation factor, glass transition, and other secondary transitions with the DETA.
		➤ Should have DETA data system which is based on Microsoft Windows10 operating system for instrument control, data acquisition, data analysis, quantization, automation & customization with online and offline sessions provided.
9	Voltage range	AC: 0 mV to 1.3V in 5mV step
		DC: 2V internal DC Bias and 30V external Bias 200mA max
	Capacitance range	10pF to 10 μF
11	Dynamic impedance	$10^{-5}\Omega$ to $10^5 k\Omega$
12	Tanδ resolution	> 0.0001
13	Humidity control chamber	20°C to 90 °C
		Dry purge gas
14	➤ Should be equipped with an efficient furnace for precise temperature control. Liquid nitrogen can be easily connected (automatic mode) to allow for sub-ambient measurements.	
	➤ Bidder should specify the sample thickness and dimension	
Accessories		
1	Branded latest suitable PC compatible with GC-MS system having HDD Graphics display, 20" LCD/LED Monitor along with a good quality printer (should specify the PC and printer model).	
2	UPS: 7 KVA UPS with at least 60 min back up is needed.	
3	Mechanical accessories (tool-kit etc.) and consumable spares for the operation and maintenance of the instrument should be provided to meet our needs for at least 1 year.	
Other terms and conditions		
1	The system must be factory tested and a certificate should be provided.	
2	A minimum of three years warranty from the date of installation should be given for the complete DETA system.	
3	The entire system should be installed by the company professionals at our site. A thorough technical training (minimum 2 days) in analyzing and troubleshooting should be given by the technical professionals.	
4	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.	
5	A minimum of three years warranty from the date of installation should be given for the complete DETA system.	
6	The entire system should be installed by the company professionals at our site. A thorough technical training (minimum 2 days) in analyzing and troubleshooting should be given by the technical professionals.	
7	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.	

3D printer - High Temperature Materials

Sl. No.	Description	Specification
1	MACHINE	
1.1	Make	Bidder to specify
1.2	Model	Bidder to specify
1.3	Technology	Solid based production additive manufacturing system based on Material Extrusion technology, capable of producing parts for high temperature and strength application.
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	Minimum Build Volume (X, Y, Z)	200 mm x 170 mm x 150 mm (maximum allowable deviation 10%)
1.6	Layer Thickness	Minimum horizontal build layer thickness 0.1 mm or better Greater/lesser than 0.1 mm can be quoted as additional features.
1.7	Part accuracy (in all three directions)	/- 0.1 mm or better
2	Material Handling	Material handling systems should be part of the Printer with automatic material loading, feeding and storage management system. 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.
3	Operation and Process	Controlled Chamber temperature Material extruding nozzles should have self-cleaning mechanism Auto calibration of build platform for coordinates. Auto and manual calibration of offset between model and support nozzle.
4	Display Feature	Printing status, Material in cartridge, Temperature of chamber and print head/nozzle etc..
5	Part building	Direct printing on base plate
6	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.
7	MATERIAL	
7.1	Model Material	Suitable Materials for medical, aerospace and other high performance engineering application.PEEK, Medical grade PEEK, CFR PEEK, PEI and metals. Medical grade material should be biocompatibility and sterilisation properties and Confirming ISO 10993 or equivalent standard.
8	SOFTWARE	
8.1	Slicing and control	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 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

		<p>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.</p> <p>Software allow the user to add various jobs to a queue for sequencing and job management</p> <p>Software should have ability to pre-program pauses on any layer of the generated slice file to add metal inserts, change color of filament.</p> <p>Software and its support/updates/upgrades should be from OEM/manufacturer of the offered machine.</p>
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 as per the requirement
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 each type 10 Canisters and support material 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 supply suitable compressor with dryer and filter units along with the machine, the compressor should have an air storage capacity that support the machine and its accessories for at least 1 hr at the time of power failure.
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 system for drying the filament
13.6	Sintering & De-binding station	Bidder to specify and quote suitable system for printing of metal parts
13.7	Online UPS	Vendor should supply suitable 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, i7 or higher processor, Hard disk 5TB, 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, 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.
15	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>Manufacture/Supplier should have sizable installations of same model worldwide and at least Fives in India.</p>
16	INSTALLATION, COMMISSIONING AND TRAINING	
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	<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 · 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.

Hyperworks Software		
Sl. No.	Description	Minimum No. of Licenses

1	Latest Academic version Hyperworks software (all modules) for training purpose.	5
GENERAL TERMS & CONDITIONS		
a) The above Software should be supplied with latest versions		
b) The quote shall be supplied with reference to the module		
c) The Software should be supplied in DVD / CD media for latest windows OS		
d) The license must be perpetual		
e) Warranty & AMC : Bidder should specify the warranty period from the date of acceptance of installation and training .Also submit quote for AMC as option separately.		
f) The Installation and training will be the responsibility of the supplier		
g) During the above period of maintenance, any upgrades released will be supplied free of cost		
h) Training : 7- Days Training shall be provided at the site after installation		

Plastic Process Simulation Software		
Sl. No.	Description	No. of Licenses
1	Latest Academic version Plastic process Simulation software with complete modules for training purpose.	20
GENERAL TERMS & CONDITIONS		
a) The above Software should be supplied with latest versions		
b) The quote shall be supplied with reference to the module		
c) The Software should be supplied in DVD / CD media for latest windows OS		
d) The license must be perpetual		
e) Warranty : Three years from the date of acceptance of installation		
f) The Installation and training will be the responsibility of the supplier		
g) During the above period of maintenance, any upgrades released will be supplied free of cost		
h) Training : 7- Days Training shall be provided at the site after installation		

MSC Software		
Sl. No.	Description	No. of Licenses
1	Latest Academic version MSC software with complete modules for training purpose.	5
GENERAL TERMS & CONDITIONS		
a) The above Software should be supplied with latest versions		
b) The quote shall be supplied with reference to the module		
c) The Software should be supplied in DVD / CD media for latest windows OS		
d) The license must be perpetual		
e) Warranty : Three years from the date of acceptance of installation		
f) The Installation and training will be the responsibility of the supplier		
g) During the above period of maintenance, any upgrades released will be supplied free of cost		
h) Training : 7- Days Training shall be provided at the site after installation		