1. 3D Printing Filament Extruder with Accessories			
Sl. No.	Specification	Range / Value	
1	Purpose	Compact parallel co-rotating twin screw extruder for lab scale to develop precise 3D print spools/filaments such as PLA, PET, ABS, PVDF, Nylon, PC, PP, fiber/filler reinforced composites, Elastomeric & Ceramic related samples, etc. Filament measuring and control unit with closed loop for precise adjustment of the 3D filament diameter.	
2	Barrel	<ul> <li>Barrel length: 11 mm or 12 mm</li> <li>L/D ratio: 36:1 or 40:1</li> <li>Co-rotating twin screw extruder for compounding small polymer and additive quantities. Incorporation of fillers, blending, and reinforcing with fibers suitable for powders, liquids, micro granules, and standard granules up to 3mm diameter production simulation and scale-up possibility on the mobile base frame.</li> </ul>	
3	Screw speed	Up to 700 rpm or higher	
4	Torque per shaft (Minimum)	6 Nm or better	
5	Pressure (Max)	100 - 150 bar	
6	Operating Temperature	400 °C or higher	
7	Feed zone	Permanently water cooled with refrigerated chiller to be included. The extruder should have an in-built water distribution system. Suitable water circulation cooling system should be provided.	
8	Heating zones	Minimum 4 heating / cooling zones with electrically heated water or air cooling	

9	Extruder Drive/ control/ software	<ul> <li>Controller shall have an integral coloured touch screen for monitoring of the following parameters:</li> <li>Extruder speed (rpm)</li> <li>Extruder torque (%)</li> <li>Barrel temperatures (Deg. C)</li> <li>Pressure (bar)</li> <li>Volumetric/Gravimetric feeder speed (%)</li> <li>Able to monitor the filament diameter</li> </ul>
10	Feeding systems	Minimum 3 nos. Feeding zone – One for polymer, and others for powders/fillers/additives/liquid/vacuum/venting purpose
11	The extruder should be supplied with a 3D strand die	Strand diameter can be easily altered using various sets of die inserts (0.5, 1, 1.5, 1.75, 2, 2.5, 3 mm). Should allow quick change of the die diameter. Should contain a set of threaded die nozzle (0.5, 1, 1.5, 1.75, 2, 2.5, 3 mm).
12	Throughput	Minimum 2.5 kg/hr.

13	Post Extrusion systems	<ul> <li>The extruder should be supplied with post-extrusion accessories like a water bath, spooler, and laser diameter measuring system to take up, measure, and wind up the strand for 3D printing.</li> <li>The spooler must be compatible with extruder die height and must have the following specifications: <ul> <li>Adjustable line speed with self-adjusting compensation for spool diameter.</li> <li>Filament distribution traverse with settable travel to compensate spool width.</li> <li>Filament diameter: 1 - 3 mm or Better</li> <li>Line Speed 0.5 - 15 m/min or better</li> </ul> </li> <li>Laser diameter measuring system: <ul> <li>Suitable high precision laser systems for online quality verification of filaments.</li> <li>Should be capable of identifying the variation in diameter while extruding to maintain the desired diameter</li> <li>Fully automatic closed-loop control technology for precise control of filament diameter.</li> <li>Device shall be software integrated for automated diameter control with downstream Equipment</li> <li>Highly accurate mean value, independent of the orientation of the product ovality</li> <li>Accurate value also for circumference and cross-section</li> </ul> </li> </ul>
14	Accessories	Toolbox- 1 set Purging kit-1 set Compressor as per the requirement-1 no. Spares should be available for the smooth running of the extruder for a minimum of 02 years.
15	Vacuum system	Compatible vacuum system to be provided with extruder
16	Chiller	Suitable refrigerated circulator chiller to cool and maintain the temperature of the extruder zone should be provided.

17	Sheet Die for Twin Screw Extruder	<ul> <li>Complete sheet die set-up with temperature controller, die heater, and flow channel for</li> <li>1. Horizontal wide sheet (minimum 50mm) with adjustable slit height (0.05 to 2 mm) compatible with the extruder.</li> <li>2. Temperature: 400 °C or better. Temperature is controlled via a separate controller.</li> <li>3. Modification of slit height for flexible sheet die</li> <li>4. Separate blower or compressed air.</li> <li>Sheet Take Off for Twin Screw Extruder</li> <li>1. To smooth and take off extruded sheet and ribbon samples in a defined manner. Easy handling due to cantilever-mounted rolls.</li> <li>2. Two driven chill rolls (oil/water cooled) to take the sheet from the die.</li> <li>3. Two rubber stretching rolls. The speed of the rubber rolls can be controlled separately within 0-10 %.</li> <li>4. Wind Off roll with interchangeable rolls with self-adjusting speed to compensate for the increasing roll diameter.</li> </ul>
18	Tubing Die	Tubing Die Assembly for extrusion of Tubes. Interchangeable Die inserts: ID Ø: 2 mm/ OD Ø: 4 mm to ID Ø: 8 mm/ OD Ø: 10 mm- any 02 Nos
19	Pelletizer for extruder	Strand Cutting Variable Length Pelletizer; with variable speed drive and adjustable pellet length. With an opening panel for easy-cleaning access, fully safety-interlocked and complete with electrical controls.
20	Vacuum Oven with dry vacuum pump	<ul> <li>Vacuum oven with a capacity of 100 L and a temperature of 200 °C or better, &amp; minimum of 2 shelves should be supplied.</li> <li>SS 316L Frame Structure.</li> <li>Double wall hinged door with Glass inspection window for process monitoring inside the chamber.</li> <li>Suitable sealing to achieve the required vacuum.</li> <li>Controller with digital display for monitoring pressure and temperature.</li> <li>Program-controlled drying and monitoring with automatic ventilation at the end of the process.</li> <li>Dry Vacuum Pump suitable to achieve the required vacuum.</li> <li>o Flexible hose to interconnect the pump and oven.</li> <li>o Moisture trap system shall be provided.</li> <li>o Inert gas connection should be included.</li> <li>Required mandatory accessories to be supplied with this including vacuum pump, gauges, flanges, etc.</li> </ul>

		Curing and drying in inert atmosphere furnaces up to 1800 °C.
		Capacity: 30 L or more
		Furnace construction:
		1. Dual shell housing with fan cooling for low shell temperatures
		2. Chain-guided parallel swivel door for defined opening and closing
		of the door.
		3. Heating from both sides via molybdenum disilicide or equivalent
		heating elements
		Heating element
		1. Molybdenum disilicide or equivalent
		2. Original manufacturer test certificate should be provided.
		3. Controlled by solid state and thyristor relays for very precise
		temperature control, wear-free and noiseless
		Standard Working Temperature: 1750 °C
		Maximum Working Temperature: 1800 °C
		Temperature Control: Programmable PID Temperature Controller
		Cum Indicator and Timer for Temperature direct indication
21	High-Temperature sintering Furnace	Heating Rate: The furnace should be of fast heating type with the
		maximum attainable temperature that should reach a ramp function
		in less than one hour.
		Temperature Accuracy: +/- 1 °C at the center of the zone. (Original
		manufacturer test certificate should be provided)
		Thermocouple: Type B thermocouple or better (Original
		manufacturer test certificate should be provided)
		Thyristor: Heating elements switched via thyristors (Original
		manufacturer test certificate should be provided)
		Type of Insulation:
		1. Refractory brick floor insulation for a higher floor load (Tmax -
		1700 °C)
		2. High-quality fiber insulation backed by special insulation
		3. Long-life roof insulation with special suspension
		Gas purging facility: N2 or Ar with solenoid valve and rotameter,
		controlled by the extra function of the controller.
		Required mandatory accessories to be supplied with this.

22	Microprocessor-controlled injection molding machine to produce test specimen (Please enclose complete specification)	<ul> <li>Micro injection molding machine to produce test specimen with a minimum amount of sample material. The manufacturing process is completely micro-processor controlled.</li> <li>Technical data: <ol> <li>Injection capacity Minimum (cc): 12.5</li> <li>Melt temperature: 400 °C or better</li> <li>Injection pressure: 1100 bar or better</li> <li>The requirement for compressed air supply should not be more than 10 bars</li> <li>Mold for Tensile bar ISO527-2-1BA</li> <li>Mold for disc diameter 20 mm, height 1.5 mm</li> <li>Mold for disc diameter 35 mm, height 1.5 mm</li> <li>Mold for disc diameter 50 mm, height 1.5 mm</li> <li>Mold for Tensile bar ISO527-2-5A</li> <li>Mold for flexural specimen as per ASTM D790</li> <li>Mold for bar 80 x 10 x 4 mm Izod ISO180, Charpy ISO179-1</li> <li>Mold for DMA test bar L = 60, w = 10, h = 1 mm</li> </ol> </li> </ul>
23	Software	<ul> <li>Compatible with Windows 10 or higher</li> <li>Required system controlled through using appropriate software and interphases for quick and reliable data acquisition and analysis.</li> <li>Upgradable software for complete data analysis/programming.</li> </ul>
24	Personal Computer (PC)	02-Nos-A Personal Computer having latest configuration: i7 processor 10th generation, 16GB RAM, DVD - RW, 500 GBSSD, Windows 11 with lifetime licence, Latest microsoft Office professional, 27"LCD display, Wifi enabled or with better specifications. The scope of supply also includes a good (reputed make, please give the details) colour Laserjet Printer having a resolution of 1200 × 1200 dpi or better.
25	Other Mandatory Items	<ul> <li>While supplying the Machines, the supplier should also provide the following items apart from above:</li> <li>Hard copies of Operational &amp; Service Manual - 01 Set.</li> <li>Machine should come with all other essential accessories &amp; spares required for installation, commissioning &amp; Operation.</li> <li>Onsite Training is to be provided to the CIPET officials at the commissioning site.</li> </ul>
26	UPS	• Suitable 02 Nos of UPS for 1 hour or higher power backup (2 years warranty on UPS and 2 years warranty on batteries) for extruder set- up and injection moulding set-up.

27	System Warranty	Minimum 2 years
28	Maintenance	The system should come with an initial annual maintenance cover (AMC) for a minimum of 02 years after the completion of the warranty period.

2. 10 KLD Packaged Effluent Treatment Plant (ETP)					
Sl. No.	Items Specification				
<b>Brief Des</b> Waste Ma plastic rec MLP etc. treated as	<b>Brief Description:</b> Effluent Treatment Plant with suitable treatment process is desired for proposed Plastic Waste Management Centre of CIPET being established at various location across country having a tentative plastic recycling capacity of approximately 1-1.5 Tons/day. The plastic waste expected to consist of PP / PE / MLP etc. from various sources. The effluent coming out from washing and cleaning of these waste need to be treated as per the norms / guidelines of respective State Pollution Control Boards before its reuse or discharge.				
Requiren	nents:				
	The ETP shall be compact in nature and may consist of following equipment / Packages with complete accessories required for their operation based on the treatment process being offered:				
	• Raw effluent collection pump				
	• Oil / Grease trap or separator				
· Screen Chamber					
	· Collection / Equalization tank				
	· Chemical Reaction tank				
1	· Settlers				
	• Disinfection tank				
	· Final treatment unit				

	· Drying and Sludge disposal unit			
	· Air blowers / diffusers			
	· Sand / carbon filter			
	· Air release valves, Pressure gauges, pH monitor, level controller etc.			
2	Shall be capable of treating various type of effluents generated by washing and cleaning of solid mixed plastic waste of municipal solid waste / industrial waste			
3	Construction should be robust and compact in design having rust proof Mild steel / FRP construction			
4	Shall be compliant with the statutory norms of State Pollution Control Boards			
5	Preferably Skid mounted			
6	All required civil work should be carried out by vendor for functional operation of plant as per SITC (Supply, Installation, Testing and commissioning) mode.			
7	Raw & Treated water quality			
SI.	Parameters Unit Raw Effluent			
1	рН	-	7-8	
2	Total Suspended Solids (TSS)	ppm	300 - 350	
3	BOD	ppm	1	
4	COD	ppm	30 - 40	
5	Odor and Smell		As per source	
6	Oil & Grease	ppm	May be small trace	

3. Radial Drilling Machine				
Sl. No.	Specification	Uni	it	Range / Value
	Make:		Bio	dder to specify
	Model:		Bio	dder to specify
1	Max. Drilling Capacity in Steel & CI	mm	1	50 & 60
2	Drilling Radius Max./ Min.	mr	1	(1200-1500) / (450– 600)
3	Vertical Traverse of Arm	mr	1	700-800
4	Horizontal Traverse of Arm	mn	1	700-800
5	Column Diameter	mn	1	350-400
6	Cross travel	mm		1000-1200
7	Morse Taper in Spindle -	Туре		MT-5
8	Number of Speeds	Nos.		12 or better
9	Range of Speed	RPM		40-1800 or better
10	Angle of Arm Rotation	Degree		360
11	Angle of Drill Head Rotation	Degree		360
12	Spindle Travel	mn	1	300-400

13	Motor	HP	2.25 HP or better
14	Feed	Mode	Manual & Auto feed Both type
15	Accessories to be quoted and supplied along with machine / equipments:		
15.1	Box Shape Worktable		
15.2	Machine Vise 8"		
15.3	Taper / Reduction sleeves		
15.4	Quick Change Drill Chuck		
15.5	Coolant Equipment	Set of accessories suitable to the machine.	
15.6	Machine Lamp		
15.7	Drifts		
15.8	One set of manuals		
15.9	One set of Service Tools, Keys		
16	Others	Bidder to specify and quote if any other accessories availab /required for smooth running of the machine.	
17	General features :		
17.1	The specification of feed drive motors with make, model no., max. & nominal torque		

17.2	Preferably the guide ways of all axes should have telescopic type protective covers with adequate sealing on joints to prevent seepage of dust & coolant oil inside. Guide ways should be of hardened steel with hardness HRC60 or more	Bidder to specify the features of the machine	
17.3	The machine must have rigid streamlined and vibration free construction. All gears must be case hardened and ground and all the slides should be rigid to withstand heavy stock removal. It should have independent main drive and feed drive motors.		
17.4	The axis travel of the machine should have applicable electrical limit switches (or) mechanical stopper interlocked with feed / rapid drive.		
18	Any Others Acessories	Bidder to specify and quote if any other accessories available /required for smooth running of the machine.	
		Manufacture/Supplier should have sizable installations of same or better model worldwide and at least Five in India which is education institutions centrally funded institution. A Satisfactory Performance certificate from two institutions to be provided for eligibility. Bidder should submit complete contact details.	
19	Terms & Conditions	The quoted machine should be recently manufactured with the latest tecnologies and should not be a absolute model in the market and has atleast minimum 7 years residual market life.	
		Authorization Letter from OEM	

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		List of clients in last five years to be provided.
20	Scope of supply	Bidder should submit complete scope of supply (Machine, standard acessories, Optional Acessories etc with make model) in the technical bid withour price.Bidder should supply complete start up package necessary to prove the machine and provide training.
20.1	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 electical requirement.Vendor should carry out installation and commissioning of the machine and its accessories on a turnkey basis.
20.2	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
		• Maintenance and trouble manual
		· Training
		· Installation and Commissioning
		· Handling of accessories
20.3	Warranty	The whole system and its accessories should be given two years warranty for the machine and three years for the spindle replacement and service against any design, manufacturing and workmanship defects from the date of installation and commissioning.

20.4	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 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.
20.5	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 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.