

**Minutes of Pre-Bid Meeting for Procurement of Equipment & Related Services for Additive Manufacturing Facility at AMTZ Campus**

**(Tender Ref No: AMTZ/Proc./ATE/2021/002, Dated:07/10/2021)**

1. The Meeting was held on 12/10/2021 at 15:30 Hrs. through online video conferencing:

Name of the Attendees	Designation	Organization
Mr. A V J L Gupta	HOD – Procurement	AMTZ
Mr. Santosh B	COO – Additive Manufacturing	AMTZ
Mr. Shivam Anand	Scientist D (Procurement)	AMTZ
Mr. Sairam Murugan	Scientist A	AMTZ
Ms. U S Mithra	Intern	KIHT
Mr. Amit Saxena, Mr. Preran Prasad, Mr. Sheesha C V	Representative	M/s. Amace Solutions
Mr. Manoj Jain	Representative	M/s. 4D Simulation
Mr. Naresh Mettugari	Representative	M/s. SLM Solution
Mr. Rahul Despande & Mr. Prashanth S Kankanwadi	Representative	M/s. Vyapti Technica
Mr. Pradeep N S & Mr. Krishna Kashyap	Representative	M/s. Lodester 3D
Mr. Satish Anandharaman	President	I – Sat
Mr. Chandan Mishra	Representative	GE - Additive

2. Revised Due date & Time for submission of bid is 03:00PM, 15/11/2021 & Date & Time of Technical Bid opening will be 03:30PM, 15/11/2021.
3. Minor correction has been made in Evaluation Criteria as under:

*Avanish*  
28/10/21



**ANDHRA PRADESH MEDTECH ZONE LIMITED**

(An Enterprise of Government of Andhra Pradesh)

E-mail: [info@amtz.in](mailto:info@amtz.in), Contact: +91 88850 92122/33 CIN – U85190AP2016SGC103153

Tender Document Clause No. & Page No.	Existing clause	Amended as
Section III – Evaluation and Qualification Criteria, Clause 2.1.(a).(i).c (Page No: 29)	If bidder is an industry association group, then atleast two-member representative of this group must be the member of Industry association.	If bidder is an industry association group, then atleast two-member representative of the industry association must meet the financial & technical capacity individually.
Section III – Evaluation and Qualification Criteria, Clause 2.1.(b).(i).c (Page No: 30)	If bidder is an industry association group, then atleast two-member representative of this group must be the member of Industry association.	If bidder is an industry association group, then atleast two-member representative of the industry association must meet the financial & technical capacity individually.

4. Based on the amendment request asked by the bidder, following revised technical specification for below mentioned schedule is being issued (**Annexure I**). We are adding two more schedule (32 & 33), Details Specifications are attached as an **Annexure – II**. Below mentioned amendment shall be applicable to all the relevant section of tender document.

For, Andhra Pradesh Medtech Zone Ltd

 28/10/21  
(A V J L Gupta)

HOD - Procurement





**Annexure-I**

**Schedule No: 1. Pellet Additive Manufacturing System**

Direct Standard Granulate Printer with Hard and soft plastics, Composite and Combination pellets with wide range of materials and dyes.

Sl. No.	Technical Specifications	
1	Build Volume	Min (230 x 130 x 230) mm
2	Printer Type	Material Jetting- Plastic forming
3	Part Carrier	3 Axis
4	Discharge Units	1-3
5	Chamber	Heated
6	Position Accuracy	+/- 0.022
7	Max Temperature	Min 350 Degree Celsius
8	Output	2-14 Cu-cm /h
9	Wall thickness	Min 0.6 mm
10	Layer Thickness	Min 0.2 mm
11	All the standard operational accessories for Pellet additive system need to be provided as the scope of operation.	
12	Sample material quantity- 20 kgs of pellets (10kg each in hard and soft materials)	

**Schedule No: 2. Fused Deposition Modelling / Fused Filament Fabrication**

Printing of Engineering Thermoplastics and High-Performance Thermoplastics.

Sl. No.	Technical Specifications	
1	Build Volume	Min (300 x 300 x 300) mm or more
2	Extruders	2 or more
3	Material Capabilities	ULTEM, PEEK, PLA, ABS, PC, Nylon
4	Layer Resolution	50 – 100 microns
5	Bed	Heated Bed - min 120 deg C
6	Chamber	Heated Chamber - min 90 deg C
7	Extrusion Temperature	Min 450 Degree Celsius

M. Saini



8	All the standard operational accessories for FDM/FFF need to be provided as the scope of operation.
9	Sample material quantity - 5 kgs of each ( <i>ULTEM, PEEK, PLA, ABS, PC, Nylon</i> )
10	Filament Dehydrator (Dryer)
11	Post processing tools and systems for support removal, sanding, vapor smoothing e.g., cutters, grinding and micro grinding tools, sanding tools etc.,

### **Schedule No: 3. Digital Anatomy Printer – PolyJet**

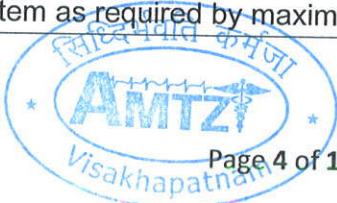
Handling Mimic Materials for Human Anatomical requirements with Wide Range in Material Portfolio with R&D Material Capabilities (custom materials and parameters).

Sl. No	Technical Specifications	
1	Build Size	Min 490 x 390 x 200 mm
2	Technology	PolyJet
3	Layer Thickness	14 Microns
4	Accuracy	Up to +/- 200 Microns
5	All the standard operational accessories for the printer, need to be provided as the scope of operation.	
6	Material quantity to run operation of Maximum Build size of the system are included in scope of supply 1- Biocompatible Material, 1- Flexible material, 1- High temperature material, 1- Dental application material.	

### **Schedule No: 4. Stereolithography- SLA / Digital Light Processing – DLP (Low Volume)**

Sl. No.	Technical Specifications	
1	Build Volume	Min (335 x 200 x 300) mm
2	Resolution	25 microns
3	Laser power	2- 250mW lasers or 500 mW / 405nm Wavelength
4	Laser spot size	85 – 120 microns
5	Layer thickness	25 – 300 microns
6	All the standard operational accessories for the SLA/DLP system, need to be provided as the scope of operation.	
7	Post processing equipment's includes Washing and Curing Chambers of the system as required by maximum build volume need to be provided.	

*M. Saurav*





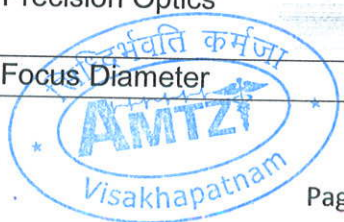
8	Sample material quantity of 1kg of all material in the portfolio that the SLA/DLP system supports.
9	Material quantity – 12 kgs (3 kg each of 4 different materials) includes Resins for medicals and molding applications.

**Schedule No: 5. Selective Laser Sintering – SLS**

Sl. No.	Technical Specifications	
1	Build Volume	Min (150 x 150 x 250) mm or more
2	Laser Type	Co2 Laser / Fiber laser / Diode Laser
3	Laser Power	Range between 10 – 200 watts
4	Layer thickness	Between 50 – 120 microns
5	All the standard operational accessories for the SLS system, need to be provided as the scope of operation e.g., Material Handling station, Powder recovery unit, mixing unit, Sieving unit.	
6	Additional Accessories e.g. Blasting station, Polishing station, Vacuum cleaner that makes system independent are mandatory as part of core supply.	
7	Material quantity of 20 kgs – 10 kg of Normal thermoplastics and 10 kg of engineering thermoplastics e.g., Nylon	

**Schedule No: 6. Laser Powder Bed Fusion**

Sl. No.	Technical Specifications	
1.	Build Volume	Min (400 x 400 x 400) mm or more
2.	Laser Type	Fiber Laser
3.	No of Lasers	Single /Dual or More
4.	Laser Power	Min 1000 W or more
5.	Precision Optics	4 F-theta lenses / varioscan
6.	Focus Diameter	80 -120 micrometer



*M. Saini*

7.	Materials	Titanium, Cobalt chrome and other materials.
8.	All the standard operational accessories for the LPBF system, need to be provided as the scope of operation e.g., Sieving module, Conveying module, Air and Gas Storage Accessories etc.,	
9.	Standard Post Processing equipment's need to be provided e.g., Depowering station and heat treatment furnace.	
10.	Material quantity of 20 kgs each ( <i>Titanium, Cobalt chrome, aluminum</i> )	

**Schedule No: 7. Metal Processing – Fused Filament Fabrication**

Sl. No.	Technical Specifications	
1.	Build Volume	Min (300 x 200 x 180) mm or more
2.	Print chamber	Heated
3.	Print Bed	Auto Levelling, Heated
4.	Nozzle	2
5.	Material	SS, TS, Copper, Titanium
6.	Material Load Type	Filament fed, bound powder or rod, Cartridge
7.	Layer height	50microns to 125 microns
8.	All the standard operational accessories for the Metal - FFF system, need to be provided in the scope of operation of the system	
9.	Standard post processing equipment e.g., Debinding and sintering furnace etc.,	
10.	Sample material quantity of 1kg of all material in the portfolio that the FFF system supports.	
11.	Operation Material quantity of 10 kgs each ( <i>SS, TS, Copper, Titanium</i> )	

**Schedule No: 8. Ceramics – Binder Jetting**

Sl. No.	Technical Specifications	
1.	Build Volume	Min (300 x 200 x 200) mm or more
2.	Material	Metals, reactive metals, high performance alloys and ceramics



3.	Layer Height	30 – 200 microns
4.	Build Rate	Build rate between range (1000-10000) cu-cm/hr.
5.	Technology	Binder based
6.	Binders	Phenolic, Water based, Solvent based.
7.	All the standard operational accessories for the binder jetting system, need to be provided as the scope of operation	
8.	Standard post processing and support accessories system e.g., furnace for both metals and ceramics, print head heating cap, Vacuum or Inert control unit, depowdering unit, dipping unit, Tool set for depowdering, IR heater, Print size reduction unit	
9.	Sample material quantity of 2kgs of all the Supporting material portfolio of the binder jetting system.	
10.	Operation material support of one material either ceramic or metal, to print maximum print volume supported by the system	

**Schedule No: 9. Ceramic – SLA / DLP**

Sl. No.	Technical Specifications	
1.	Build volume	Min (90 x 50 x 100) mm or more
2.	Laser / Light source	UV lasers / led light source
3.	Laser spot diameter / Projector	60 microns / 8K–4K projector
4.	Laser/ light Wavelength	Range between 315nm - 405nm
5.	Layer thickness	10 - 125 microns
6.	All the standard operational accessories for the SLA/DLP system, need to be provided as the scope of operation	
7.	Standard post processing systems e.g., Washing chambers, curing chambers, Heat treatment furnaces.	
8.	Sample material quantity of 1kg of all material in the portfolio that the SLA/DLP system supports.	
9.	Operation Material quantity – 12 kgs (3 kg each of 4 different materials)	

**Schedule No: 20 Thermogravimetric Analyzer – TGA**

Sl. No.	Technical Specifications
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1	Micro and Ultra Micro Balances with Sub microgram resolution over the whole Measurement Range
2	System - Buoyancy Compensation
3	Temperature Range RT – 1100 Degree Celsius
4	Baseline stability/ drift /repeatability <10 micro gram
5	Balancing Sensitivity 0.1/0.5 Microgram
6	Crucible Volume up to 150 Microliter
7	Heating Rate 0.01 to 100 C / min or more
8	Weighting Accuracy 0.005- 0.1%
9	Weighting Precision 0.0025- 0.4%
10	Mass flow controller Built-in
11	All standard operational accessories and calibration requirements to be provided
12	Software includes kinetics, modulated DSC, CRTA

**Schedule No: 21 Dynamic Scanning Calorimeter- DSC**

Sl. No.	Technical Specifications	
1	Temperature range	-150 to 700 Degree Celsius
2	Sensor	DSC sensor – Thermopile or Cu constant
3	Heating rate	0.01 to 100 C per min
4	Stability	< 30 uW
5	Sensitivity	0.1uW – 0.5 uW
6	Indium Response Ratio FRS Sensor	12mW/C or more
7	Standard Accessories both -85 intracooler / -150 LN2	
8	Nitrogen or Argon cylinder with regulator shall be provided with the system	
9	Software modular DSC, specific heat, kinetic energy provision should be available.	

**Schedule No: 22 Dynamic Mechanical Analyser - DMA**



*M. Saran*



Sl. No.	Technical Specifications	
1	Temperature Range	-150 to 600 Degree Celsius
2	Cooling	LN2
3	Peak Force	10 N
4	Minimal Force	0.001- 0.1 N
5	Dynamic Displacement	1 micron to 100 microns
6	Deformation modes	3-point bending, shear, compression, dual cantilever bending, tension
5	Frequency Range	0.001 to 200 or 300 HZ
6	Heating Range	0.01 to 20 deg C /min
7	All standard accessories and software's for the DMA system are in scope of supply with the system.	

## **Annexure - II**

### **Schedule: 32. Additive Powder Processing - EBM**

Sl. No.	Technical Specifications	
1.	Build volume	Min (200 x 200 x 180) mm or more
2.	Power Source	Electron Beam
3.	Minimum Beam Diameter	140 $\mu$ m
4.	Minimum Chamber Pressure	5 x 10 <sup>-4</sup> mBar
5.	Materials	Titanium, Cobalt Chrome, Copper (Medial Grade) and other materials.
6.	All the standard operational accessories for the EBM system, need to be provided as the scope of operation e.g., Sieving module, Conveying module, Air and Gas storage accessories, Cooling accessories etc.,	
7.	Standard Post Processing equipment's need to be provided e.g., Depowering (powder recovery) station, Vacuum cleaner and heat treatment furnace	
8.	Sample material quantity of 1kg each in all material that EBM System supports	

9.	Operational Material quantity of 20 kgs each ( <i>Titanium, Cobalt Chrome, copper</i> )
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**Schedule: 33. Stereolithography- SLA (High Volume)**

Sl. No.	Technical Specifications	
1	Build Volume	Min (400 x 400 x 400) mm
2	Resolution	10 - 25 microns
3	Beam Size	0.1 – 1.0 mm
4	Scanning Speed	5 – 15 m/s
5	Resin Slot	Changeable
6	Layer thickness	0.05 – 0.25 mm
7	All the standard operational accessories for the SLA system, need to be provided as the scope of operation.	
8	Post processing equipment's includes Washing and Curing Chambers of the system as required by maximum build volume need to be provided.	
9	Sample material quantity of 1kg of all material in the portfolio that the SLA system supports.	
10	Material quantity – 12 kgs (3 kg each of 4 different materials) includes Resins for medicals and molding applications.	

