

Collaborative Engineering

Rapid Prototyping Systems



- RP Systems
- Comparison / Benchmarking
- Rapid Manufacturing

OrthoCAD Lab, I.I.T. Bombay

SLA:PP(UV):S

Stereo Lithography
SLA 5000 (3D Systems Inc.)

Build volume 508x508x584 mm
Layer Thickness 0.10 mm

Material
Part Liquid Photo-Polymers (UV curable Resins)
Support Part material itself

Characteristics
Tolerance +/- 0.36 mm
Roughness 6 µm
Time 4 hrs
Cost Rs. 8548



SLA:PP(UV):H

Stereo Lithography
SLA 5000 (3D Systems Inc.)

Build volume 508x508x584 mm
Layer Thickness 0.10 mm

Material
Part Liquid Photo-Polymers (UV curable Resins)
Support Part material itself

Characteristics
Tolerance +/- 0.36 mm
Roughness 6 µm
Time 2.5 hrs
Cost Rs. 6628



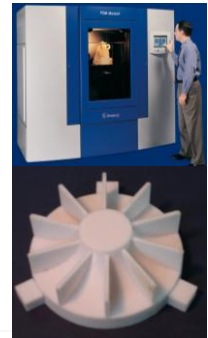
FDM:ABS/PC/PPS:S/H

Fused Deposition Modelling
FDM Maxum (Stratasys, Inc.)

Build volume 600x500x600 mm
Layer Thickness 0.254 mm

Material
Part ABS, Polycarbonate, Polyphenylsulfone
Support Water soluble

Characteristics:
Tolerance +/- 0.127 mm
Roughness 20 µm
Time 7 hrs
Cost Rs. 7230



LOM:LP:S

Laminated Object Manufacturing LOM 2030 H
(Cubic Technologies)

Build volume 813x559x508 mm
Layer Thickness 0.20 mm

Material
Part Special laminated paper, Sheet of Nylon, Polyester
Support Part material itself

Characteristics
Tolerance +/- 0.89 mm
Roughness 5 µm
Time 6 hrs
Cost Rs. 4503



SD:PVC:S

SolidDimension – 3D Printer
SD 300 (Solidimension Ltd.)

Build volume 230x185x150 mm
Layer Thickness 0.165 mm

Material
Part Engineered Plastic (Polyvinylchloride)
Support Part material itself

Characteristics
Tolerance +/- 0.25 mm
Roughness 4 µm
Time 7.4 hrs
Cost Rs. 1654



OBJ:PP:S

Objet (PolyJet Modeling)

Eden 500V (Objet geometries Ltd.)

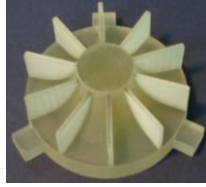
Build volume 500x400x200 mm
Layer Thickness 0.016 mm
Resolution 600 Dpi

Material

Part Photo polymer resins
Support Gel like proprietary material

Characteristics

Tolerance +/- 0.46 mm
Roughness 15 µm
Time 7.16 hrs
Cost Rs. 5700



TJP:WAX:S

ThermoJet Printer

ThermoJet[®] (3D Systems Inc.)

Build volume 250x190x200 mm
Layer Thickness 0.042 mm
Resolution 300 x 400 x 600 Dpi

Material

Part Wax, Thermoplastics
Support Part material itself

Characteristics

Tolerance +/- 0.36 mm
Roughness 3 µm
Time 6 hrs
Cost Rs. 3897



Rapid Manufacturing – Plastic Parts

1. Stereo Lithography

2. Vacuum casting

MCP 4/04 (MCP Group)

Build volume 750x900x750 mm

Max. Part weight 6.5 Kg

Material Silicone (RTV Series)

Characteristics:

Tolerance +/- 0.005 mm
Roughness same as RP Part
Time 24 hrs (typical)
Cost Rs. 1900



SLA:PP(UV):S/H-VC:RTV:S-MC:EP:S

2. Vacuum casting

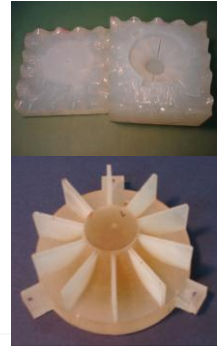
Material Silicone (RTV Series)

3. Mass casting

Material Epoxies, Wax

Characteristics:

Tolerance +/- 0.23 mm
Roughness same as RP Part
Time
Cost



Rapid Manufacturing – Metal Parts

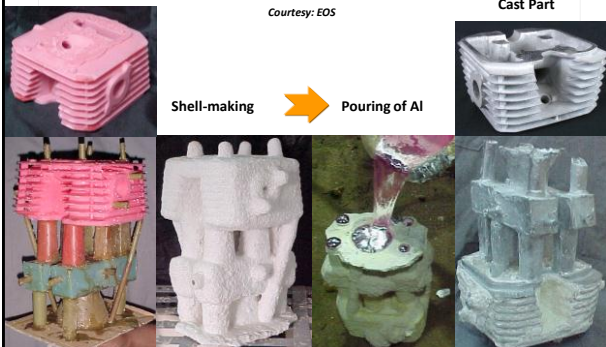
PU RP Pattern

Courtesy: EOS

Cast Part

Shell-making

Pouring of Al



SUMMARY

- Rapid prototypes for form, fit, function evaluation
- By additive (layer) manufacture / free form fabrication
- Directly from CAD to part without part-specific tooling
- Different methods, materials, quality outcomes
- Suitable for both plastic and metal parts.



SLA QC FDM Thermojet LOM Rubber mold