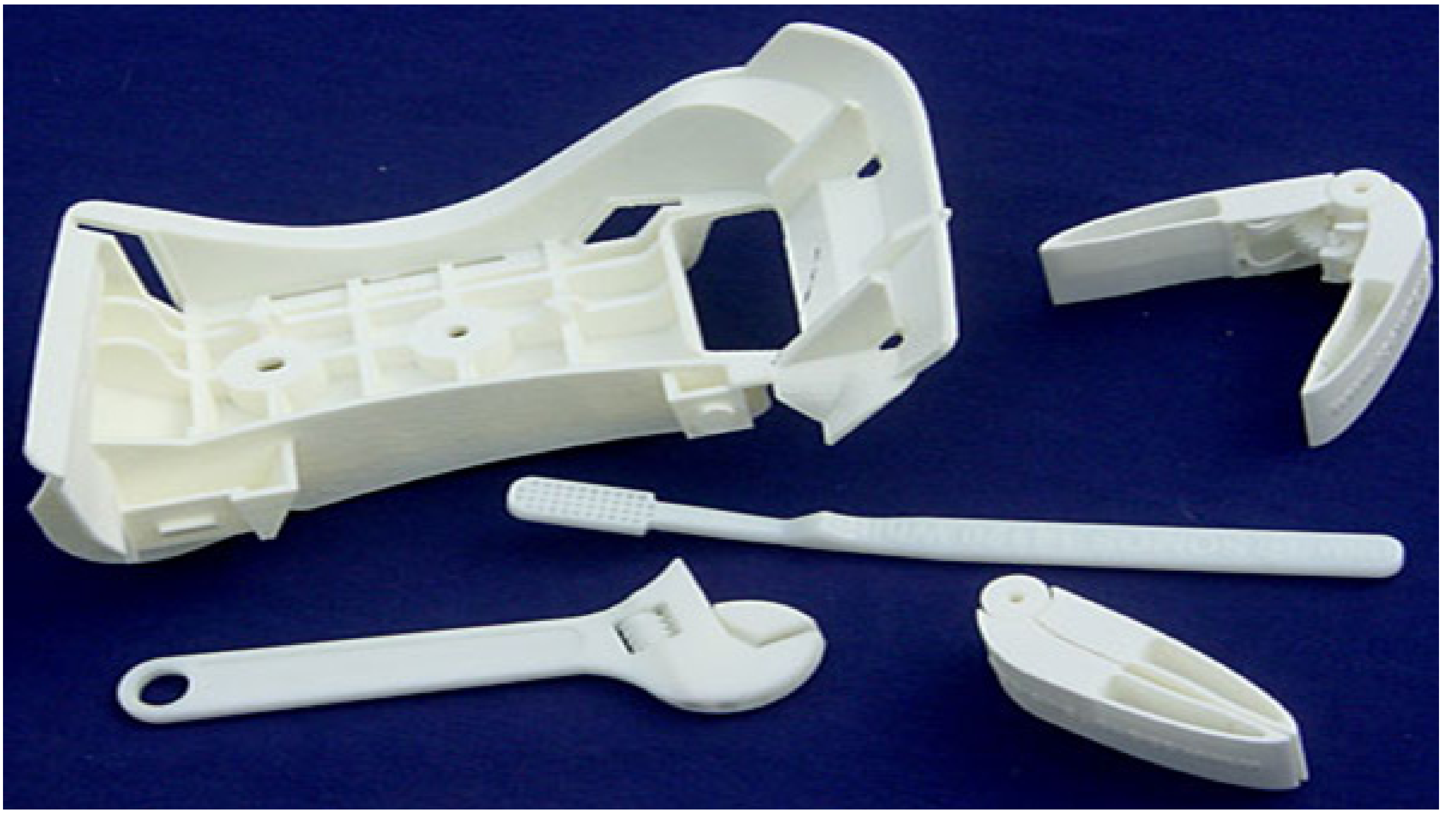
RAPID PROTOTYPE

TECHNICAL DATA	
Plastic laser-sintering system	**EOSINT P 385**
Effective building volume	340mm x 340mm x 620mm
Building speed	10 - 25 mm
Layer thickness	0.1 - 0.15 mm
Support structure	not necessary
Power consumption	2 kW
DATA PREPARATION	
PC	Windows operating system
Software	EOS RP Tools; Magics RP
CAD interface	STL

RAPID PROTOTYPING (SELECTIVE LASER SINTERING)

Rapid prototyping, also known as solid freeform fabrication, is an additive layering process. A three-dimensional computer model of a part is sliced into layers by the SLS rapid prototyping system's computer program. Each slice is then fed to a processor which in turn directs a laser in X and Y axis directions, as well as controlling the beam output power, to sinter through CO2 laser (SLS) the cross section (slice) of the part. After the slice is completed the system's build mechanism vertically repositions incrementally (Z vector), usually between .07mm and .15mm per layer. This process is repeated until the vertical height of the part is completed. Build time can range from one hour to many depending upon the part volume, mass and Z height.



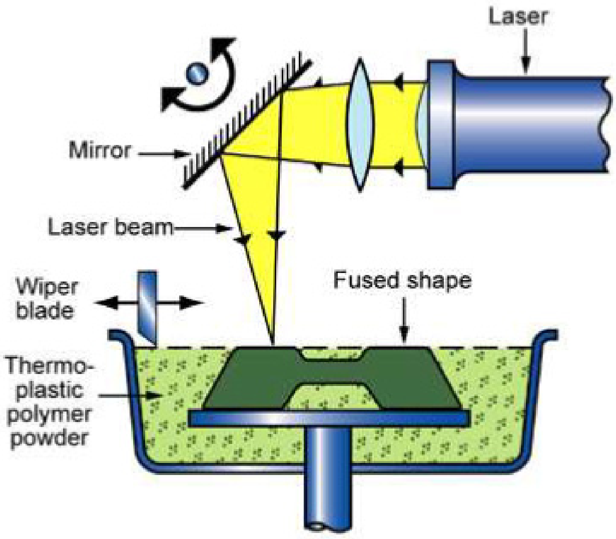
A. WHY SLS - SELECTIVE LASER SINTERING

SLS materials (thermo-set plastic) are suited for direct functional applications where performance demands robust resistance to chemical, heat, wear, abrasion, flexibility, and internal/external surface pressures.

B. SLS PROCESS

Selective Laser Sintering (SLS) is a free form fabrication process applying additive manufacturing technology. The laser sintering technology was developed at the University of Texas, originally licensed to DTM Corporation. University of Louisville and Kodak were the first beta sites in 1991. In 2001 3D Systems acquired DTM. Today there are two manufacturers of laser sintering systems: 3D Systems, Inc. and EOS GmbH. Dok-ing d.o.o. purchased its first laser sintering system in 2007.

Laser sintering uses high power CO2 lasers (carbon dioxide laser) to fuse plastic, metal or ceramic particles. Powder particle-size ranges from 20m to 70m. As an additive rapid manufacturing technology, laser sintering builds one layer cross-section at a time from a 3D CAD digital solid model. This is accomplished by tracing a beam of laser energy in the X and Y axis on the surface of the powder. With each successive layer scan the bed is incrementally lowered 0.05mm to 0.2mm (Z vector). This process is repeated one slice at a time until the part build height is completed. Z vector is set by the SLS machine technician based on material processing parameters and/or desired increase or decrease in part accuracy and surface resolution.



Part support is accomplished by the un-sintered powder that surrounds the parts during processing. Complete mechanical assemblies can be made mechanically functional simply by removing the un-sintered powder. Trapped volumes are possible as a result of this phenomenon. Powder can be removed by creating small windows or drain holes. This unique attribute is only possible with laser sintering and is enabling design freedoms never before realized in traditional manufacturing paradigms. An example is a lightweight airfoil (wing) requiring no fabrication to assemble discrete components (benefit: no manufacturing fabrication costs) or having no molding witness lines to interrupt aero dynamics (benefit: no loss in design performance and efficiency).

C. APPLICATIONS:

- Direct Digital Manufacturing (DDM) / Rapid Manufacturing

○ Aerospace Hardware

○ Medical and Healthcare

○ Electronics; Packaging, Connectors

- Rapid Prototypes:

○ Appearance Models

○ Proof of Concept Prototypes

○ Design Evaluation Models (Form, Fit & Function)

○ Engineering Proving Models (Design Verification)

○ Product Performance & Testing

○ Wind-Tunnel Test Models

- Tooling and Patterns:

○ Rapid Tooling (concept development & bridge tools)

○ Injection Mold Inserts

○ Tooling and Manufacturing Estimating Visual Aid

○ Investment Casting Patterns

○ Jigs and Fixtures

○ Foundry Patterns - Sand Casting