# TECHNOLOGIES AND MATERIALS - PLASTICS

| TECHNOLOGY | SELECTIVE LASER SINTERING | | | | | |
|---|---|---|---|---|---|---|
| ACRONYM | **SLS®** | | | | | |
| MATERIAL | **Polyamid powder – pure or filled** | | | | | |
| MATERIAL REFERENCE | **PA2200** | **PA3200** | **ALUMIDE** | **PA2210 FR** | **PA2241 FR** | **PA2200 HD** |
| PROPERTIES | Colour: white<br>PA12<br>Flexible, ideal for hinges/clips<br>Resistant to temperature<br>< 130°C | Colour: white-grey<br>Glass-filled<br>More rigid and resistant<br>to abrasion.<br>Imitation PA6.6 GF30 | Colour: Aluminium grey<br>Aluminium-filled<br>Metallic appearance<br>Easy to machine, very rigid<br>(less distortion risk for big flat parts) | Beige colour<br>Flame-retardant | Colour: white<br>Flame-retardant | Colour: white<br>Flexible, ideal for clips<br>extreme precision |
| ADVANTAGES | Functional, mechanical, thermical properties can be tested | | | Parts appropriate for aircraft industry<br>certificates UL 94 / V-0 / FAR 25 | Parts appropriate for aircraft industry<br>certificates: FAR 25 / CS 25 / JAR25 | Very fine and detailed parts<br>Need for precision |
| LIMITATIONS | Porous | Porous | Porous | Porous | Porous | Small parts |
| PRECISION | Layer: 0.15mm<br>Minimum Wall thickness: 0.8mm | | | Layer: 0.15 mm.<br>Certified for a min.<br>Wall thickness of 2mm | Layer: 0.15 mm.<br>Certified for a min. Wall thickness<br>of 2mm | Minimum Wall thickness: 0.4 mm<br>Recommended Wall thickness: 0.7mm<br>Layer thickness: 60µ / 100µ |
| EQUIPMENT | **4 EOS® P380 -**<br>**1 EOS® P390 - 1 EOS® P396** capacity:<br>350 x 350 x 600 mm<br>**2 EOS® P730 - 1 EOS® P770**<br>capacity: 700 x 380 x 580 mm | **2 EOS® P380**<br>capacity: 350 x 350 x 600 mm | **2 EOS® P380**<br>capacity: 350 x 350 x 600 mm | **1 EOS® P390**<br>capacity: 350 x 350 x 600 mm | **1 EOS® P396**<br>capacity: 350 x 350 x 600 mm | **2 machines EOSINT® P110 Formiga**<br>capacity: 200 x 250 x 330 mm |
| NOTICE | Between 3 and 5 days | Between 3 and 5 days | Between 3 and 5 days | Between 6 and 8 days | Between 6 and 8 days | Between 3 and 5 days |
| PRICE | € | € | €€ | €€€ | €€€ | € |

| TECHNOLOGY | SELECTIVE LASER SINTERING | | | MULTIJET FUSION | |
|---|---|---|---|---|---|
| ACRONYM | SLS® | | | MJF | |
| MATERIAL | **Polyurethane blend**<br>**Elastomeric type material** | **Polypropylene** | **Polyamid 11** | **Polyamid powder – pure or filled** | |
| MATERIAL REFERENCE | **TPU-70A** | **PP 1200** | **PA11-SX 1450** | **HP PA12** | **HP PA12 GB** |
| PROPERTIES | Flexible<br>80 - 85 shA | Color: White, slightly translucent.<br>Flexible. Close to injected material. | Color: Creamy white,<br>USP Class VI certified material. | Color : Dark grey. USP Class I and Class VI.<br>FDA food contact. Flexible, ideal for clips.<br>Temperature resistance : 130°C. | Color: Light grey.<br>Glass-filled. Rigid.<br>Good dimensional stability.<br>Temperature resistance : 130°C. |
| ADVANTAGES | Elastomer close to the injected material | Very good resistance to shocks.<br>Good elongation. | Biosourced material with good impact resistance.<br>Good mechanical strength compared to PA 12 in terms of bending and tensile strength. | Good isotropic mechanical and dimensional properties.<br>Functional tests.<br>Good sealing properties according to geometry. | |
| LIMITATIONS | Surface condition slightly rough | Surface finish. Accuracy. | Porous. | Visible print lines on horizontally produced surfaces. | |
| PRECISION | Layer: 0,1<br>Minimum Wall thickness: 1,5 mm | Layer: 0,1 mm<br>Minimum Wall thickness: 1 mm | Layer: 0,1mm<br>Minimum Wall thickness: 0,8mm | Layer : 0,08 mm<br>Minimum Wall thickness > 1 mm | |
| EQUIPMENT | **3 Prodways machine**<br>**ProMaker P1000**<br>Capacity: 300 x 300 x 300 mm | | | **2 HP MULTIJET FUSION 4210 machines**<br>capacity: 380 x 284 x 380 mm | |
| NOTICE | Between 4 and 6 days | | Between 5 and 7 days | Between 4 and 6 days | |
| PRICE | € | | € € | € | |

# TECHNOLOGIES AND MATERIALS - PLASTICS

| TECHNOLOGY | STEREOLITHOGRAPHY | | | | | |
|---|---|---|---|---|---|---|
| ACRONYM | SLA® / STL | | | | | |
| MATERIAL | **Epoxy resins (light sensitive)** | | | | | |
| MATERIAL REFERENCE | **Accura® 25** | **Accura® ClearVue™** | **Accura® Xtreme™** | **ULTRACUR 3280** | **18420 ProtoGen™** | **Watershed Black** |
| PROPERTIES | White cream | Transparent, waterproof<br>Biocompatibility > specific cleaning procedure. USP Class VI. | Color: grey.<br>Rigid material. | Ceramic-filled composite resin<br>Rigid, opaque<br>white, ceramic-like color | Opaque white<br>Very high resolution<br>Biocompatibility > specific cleaning procedure. USP Class VI. | Color: Black<br>Good mechanical characteristics and thermal. |
| ADVANTAGES | High flexibility with excellent shape retention.<br>High precision | Polish+ clear coat for better transparency.<br>Ideal for big parts | Functional assemblies,<br>good impact resistance. | Highly resistant on temperature (250°C after post-cure)<br>ideal for wind tunnels testing<br>Easily polished<br>=> model for metal plating | high precision, smooth surface<br>ideal for presentation modells<br>Can also be used as a model for vaccuum casting.Ideal for small parts.<br>Highly resistant on temperature : 90°C post-cure. | Black mass-colored part<br>Good resistance to humidity. |
| LIMITATIONS | Thin pieces.<br>Max. temperature : 58°C. | Temperature resistance: 46°C | Reduced precision.<br>Max. temperature : 62°C | Low shock resistance | Small pieces with details. | Max. temperature : 50°C. |
| PRECISION | Layer= 0,10 mm<br>Minimum Wall thickness recommended= 1mm | Layer= 0.10 mm<br>Minimum Wall thickness recommended= 1 mm | Layer= 0.10 mm<br>Minimum Wall thickness recommended= 1 mm | Layer= 0,075mm - 0,10mm<br>Minimum Wall thickness recommended= 2 mm | Layer: 0.15 mm<br>Minimum Wall thickness: 1 mm | Layer: 0.10mm |
| EQUIPMENT | **2 3D Systems® Machines**<br>ProX™ 800<br>Capacity: 650 x 750 x 550 mm | **1 3D Systems® Machine**<br>ProX™ 800<br>Capacity: 650 x 750 x 550 mm | **1 3D Systems® Machine SLA5000**<br>capacité : 500 x 500 x 600 mm | **1 Prodways Machines ProMaker L5000**<br>capacity: 400 x 330 x 400 mm | **1 EOS 400SX Machine**<br>capacity: 400 x 400 x 300 mm | **1 3D Systems® Machine SLA5000**<br>capacité : 500 x 500 x 600 mm |
| NOTICE | Between 3 and 5 days | Between 3 and 5 days | Between 3 and 5 days | Between 3 and 5 days | Between 3 and 5 days | Between 5 and 7 days |
| PRICE | €€ | €€ | €€ | €€ | €€ | €€€ |

| TECHNOLOGY | POLYJET® | FUSED DEPOSITION MODELING | | VACUUM CASTING |
|---|---|---|---|---|
| ACRONYM | MULTI-MATERIALS | FDM® | | |
| MATERIAL | **Acrylate based** | **ULTEM® 9085**<br>**Polycarbonate PC W**<br>**ABS M30 - ABS ESD 7** | **NYLON 12CF** | **Polyurethane - Resin: Transparent, rigid, Similar to thermoplastic, rubber-like, silicone**<br>**Epoxy Resin: Medical** |
| MATERIAL REFERENCE | **Verowhite®, Tango Black Plus®, Gray** | | | Contact us for advise |
| PROPERTIES | Rigid or flexible (27 to 95 Sh A)<br>multi-component | **ULTEM®**: Golden or Black<br>**Polycarbonate PC W**: White<br>**ABS**: Ivory, Black or Red. | Color: Black<br>The material is a blend of Nylon 12 resin and carbon fiber filaments, which make up 35% of its weight. | PP-like, ABS-like, Filled..<br>Hardness 40 to100 Sh. A. |
| ADVANTAGES | Simulation moulded parts<br>Validation tests<br>with several hardnesses | **ULTEM®**: certificates UL 94 / V-0<br>Fire protection of railway vehicles EN-45545-2<br>Highly resistant on temperature<br>**Polycarbonate PC W**: certificates UL 94 / -HB<br>Solidity<br>**ABS**: certificates UL 94 / -HB<br>Good dimensional stability | Flexural strength and strength-to-weight ratio superior to any other FDM material.Thermoplastic suitable for tooling production combining strength and lightness.Functional prototypes. | Small series (with 1 Mould= approx. 20 replicas )<br>Similar to injected material<br>(rigid, flexible, mixed)<br>Possibility of thread and overmoulded parts<br>(e.g.: inserts),<br>coloured, transparent, temperature<br>or shock resistant parts. |
| LIMITATIONS | Limited mechanical resistance | Smooth surface | Smooth surface | Tolerances on large pieces |
| PRECISION | Layer: 16µ or 32µ<br>Minimum Wall thickness: 1 mm | Layer: 0,178 to 0,33 mm<br>Minimum Wall thickness: 1,2 mm | Layer: 250 µ<br>Minimum Wall thickness: 1,5 mm | Minimum Wall thicknes: 0.5mm |
| EQUIPMENT | **1 Connex® 350 Machine**<br>Capacity: 350 x 350 x 200 mm | **1 Stratasys® Fortus 900MC Machine**<br>Capacity: 914 x 610 x 914 mm | **1 machine Stratasys® Fortus 450MC**<br>Capacity: 406 x 355 x 406 mm | **1 UGM 700 Machine** – cap. 800 x 700 x 700<br>**3 UGM 400 Machines** – cap. 400 x 400 x 400<br>Parts of 1mm to 630mm (inside vacuum chamber).<br>Please contact us for parts beyond these dimensions. |
| NOTICE | Between 2 and 4 days | Between 2 and 8 days | Between 2 and 8 days | Between 3 and 5 weeks |
| PRICE | € for a few parts<br>€€€ for many similar parts | € ABS - €€ PC W<br>€€€ ULTEM® | €€€ | €€€ for a few parts<br>€ order small serie<br>(approx. 20 replicas / mould) |