
A guide by



A brand of BASF - We create chemistry

MATERIAL SELECTION GUIDE

Choose the ideal material for your 3D printing project

Additive Manufacturing
at your scale.



Welcome to Sculpteo's material selection guide !

Additive manufacturing empowers you to manufacture prototypes and end-use parts, and allows you to optimize your products and processes. In order to do so, choosing the right material is an essential step to get the most out of your project. It has to suit the final use of your parts as well as its environment and constraints to ensure its performance and durability.

At Sculpteo, we know there is an adapted 3D printing material for each project and for each stage of your manufacturing process. In this guide you will find materials indexed by properties, helping you to find a material with mechanical properties and functional characteristics suiting your most demanding projects. For each of these properties, you will find technical specifications for each material suggested, examples of applications and a special material recommendation made by Sculpteo's online 3D printing.



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Flexibility

Flexibility is an interesting material property which could benefit your healthcare projects, to manufacture adaptable flexible shoe soles or orthosis. But flexible materials also offer new possibilities for industrial and robotics projects, with innovative grippers and joints. Advanced 3D printing materials are now combining strength, great rebound resilience as well as an interesting elongation at break.



Grippers



Shoe soles



Sport equipment



Joints and snaps fits

**Ultrasint®
TPU01**
Polymer powder
MJF

**Ultrasint®
TPU88A**
Polymer powder
SLS

**Elastomeric
Polyurethane**
Photopolymer Resin
DLS

**Ultracur3D®
FL 300**
Reactive Urethane Photopolymer
DLP

Elongation at break

220 %

270 %

190 ± 10 %

245 %

Hardness Shore A

88

88 - 90

40

40

Rebound Resilience

63 %

63 %

29 %

16 %

Fatigue behavior

(Rossiflex, 100k cycles, 23°C)

No cut growth

No cut growth

#

#

Fatigue behavior

(Rossiflex, 100k cycles, -10°C)

No cut growth

No cut growth

#

#



Available for
online order



Available for
online order



Available for
online order

This information and values are presented as guidance only and based on Sculpteo's knowledge and experience. It is believed to be accurate, however all guarantees are explicitly denied. Consult with our 3d printing specialists for your project. Document updated Nov 2021

Heat resistance

From flame retardant plastics to heat resistant metals, there are several material choices to create parts that will be exposed to high temperatures. The use of 3D printing materials is becoming quite common for automotive or mechanical applications, which are requiring an adapted Heat Deflection Temperature.



Automotive



Aerospace



Robotics



Engine components



Electronics

Ultrasint®
PA6 MF
Polymer powder
SLS



Ultrasint®
PA11 ESD
Polymer powder
SLS



Nylon
PA12
Polymer powder
SLS



Ultrasint®
PA11
Polymer powder
SLS



Melting temperature

220 °C

204 °C

180 °C

203 °C

HDT B

207 °C

186 °C

Vicat softening temperature A/50

181 °C

176 °C

Vicat (10 N)

217 °C

192 °C

Vicat softening temperature B/50

163 °C

191 °C

Vicat (50 N)

210 °C

183 °C

177 °C



Available for
online order



Available for
online order



Available for
online order



Available for
online order

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Mechanical performance

Robust parts can be created thanks to high-performance materials, offering advanced mechanical properties. These materials will be suited for most technical applications in tough environments, or submitted to stress, in demanding industries.



Automotive



Aerospace



Industrial parts



Mechanics

Elongation at break

Charpy Impact unnotched

Tensile Strength

Tensile Modulus

Ultrasint®
PA11 CF (Dry)
Polymer powder
SLS



(X) 7 %
(Z) 11 %

(X) 54 kJ/m²
(Z) 33 kJ/m²

(X) 82 MPa
(Z) 55 MPa

(X) 5900 MPa
(Z) 2500 MPa



Available for
online order

Ultrasint®
PA6 MF
Polymer powder
SLS



7 %

28 kJ/m²

62 MPa

3300 MPa



Available for
online order

Ultrasint
PA11 (Dry)
Polymer powder
SLS



(X) 28 %
(Z) 24 %

(X) 184 kJ/m²
(Z) 85 kJ/m²

(X) 52 MPa
(Z) 54 MPa

(X) 1750 MPa
(Z) 1800 MPa



Available for
online order

Ultrasint®
PA11 ESD (Dry)
Polymer powder
SLS



(X) 20 %
(Z) 23 %

(X) 6.6 kJ/m²
(Z) 4.7 kJ/m²

(X) 65 MPa
(Z) 55 MPa

(X) 3150 MPa
(Z) 2150 MPa



Available for
online order

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Chemical resistance

Some additive manufacturing materials are resistant to solvents, bases, acids or other harsh environments. Chemical resistance makes it possible to use these materials to create reservoirs for nearly all kinds of media and chemicals resistant packagings.



Packaging



Reservoirs

Resistant to

Permissible temperature for neutral fluids long-term °C

Permissible temperature for aggressive fluids long-term °C

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SCULPTEO'S CHOICE

**Nylon
PA12**
Polymer powder
SLS



- fats
- oils
- waxes
- fuels
- weak bases
- aliphatic
- aromatic
- hydrocarbons

0 to +100 °C

0 to 60 °C



Available for online order

PP HP
Polymer powder
MJF



- organic solvents as well as aqueous solutions of acids
- bases
- salts.
- Unsuitable for concentrated oxidising acids

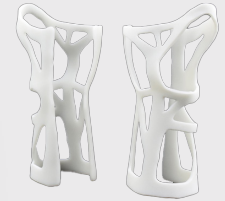
0 to +100 °C

0 to 60 °C



Available for online order

**Ultrasint®
PA11**
Polymer powder
SLS



- fats
- oils
- waxes
- fuels
- weak bases
- aliphatic
- aromatic
- hydrocarbons

0 to +100 °C

0 to 60 °C



Available for online order

Water resistance

Materials well-suited to media flow and storage parts could suit your most advanced projects. Some waterproof, or water resistant materials are now developed for additive manufacturing.



Media flow



Packaging



Reservoirs



Piping & media



Engine components



External environments

Elongation at break

HDT B

Tensile Strength

E Modulus

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SCULPTEO'S CHOICE

**Nylon
PA12**
Polymer powder
SLS



20 ± 5 %

175 °C

45 ± 3 MPa

1700 ± 150 MPa



Available for
online order

PP HP
Polymer powder
MJF



20 % (XY)
18 % (Z)

100 °C

30 MPa

1600 MPa



Available for
online order

**Ultracur3D®
RG 35**
Photopolymer resin
DLP



6 %

83 °C

80 MPa

2600 MPa



Available for
online order

Food safe

Some materials contain toxic chemicals and shouldn't be use in contact with food. It is important to be careful and choose adapted food-safe materials for these specific applications.



Packaging



Mold



Cooking tools

Elongation at break

Shore D

Tensile Strength

Tensile Modulus

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**Nylon
PA12**
Polymer powder
SLS



20 ± 5 %

75 ± 2

45 ± 3 MPa

1700 ± 150 MPa



Available for
online order

PLA
(without additives)
Filament
FDM



4.2 %

60

60 MPa

3800 MPa



Available for
online order

Skin contact

Materials with a safe composition can be approved for skin contact. These can be really useful for medical applications as well as jewelry, where prolonged contact with the skin can occur.



Orthosis



Prosthesis



Jewelry

Elongation at break

Shore

Tensile Strength

Tensile Modulus

**Nylon
PA12**
Polymer powder
SLS



20 ± 5

75 ± 2 (Shore D)

45 ± 3 MPa

1700 ± 150 MPa



Available for
online order

SCULPTEO'S CHOICE

**Ultrasint
TPU88A**
Polymer powder
SLS



270 %

88 - 90 (Shore A)

8 MPa

75 MPa



Available for
online order

PP HP
Polymer powder
MJF



20 % (XY)
14 % (Z)

100 °C
HDT B

30 MPa

1600 MPa



Available for
online order

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Think additive & Gain an adaptive advantage for your business.

Access to a one-stop-shop of resources to discover your Additive Advantage and develop a strategy that will **put game-changing technology into your hands**.

Use it to unlock the full potential of 3D printing, and:

- Create room for innovation,
- Scale your production,
- Make adaptability one of your greatest strengths.

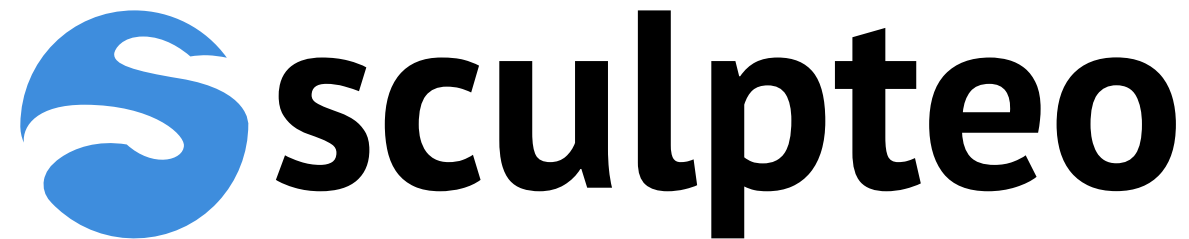
We've compiled our best ebooks, playbooks, guides, and customers' stories, made for professionals who want new additive manufacturing opportunities

...all in one place.

MAKE YOUR BUSINESS THRIVE WITH 3D PRINTING

Access our **MasterClass resources** and develop your AM strategy





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