CARE
PA 11

FABULOUS MATERIALS

CARE is a fine powder based on polyamide 11 (thermoplastic) especially formulated to function on rapid prototyping systems by laser sintering (SLS, LS) or radiation (IRS, MJF). It enables to obtain productions of models and functional parts in "plastic engineering" with long cycle of life and excellent chemical resistance.

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Typical features :

Bio-sourcing
(Castor oil)
Better elasticity
than PA12 with 75 shore A
High performances : ductility, elongation shock resistance
Recyclability network

Applications examples :

- ➔ Medical
- ➔ Dental (USP Class VI)
- ➔ Mechanical parts
- ➔ Industry requesting ductility and shock resistance : engine, fuel or oil tanks

Refresh rate :

Medical:50% limited to 6 cycles

Other:40% limited to 8-10 cycles

The process ability of the powder on your systems is optimized ; thus **all the powder** of a building can be re-used after sifting.

Key Points :

Medical grade USP Class VI

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General Properties :

Chemical Nature of the Preparation :	POLYAMIDE 11, Presence of additives Natural grade = CARE	
Physical State (20°C) and Color :	**Solid (powder) Natural Grade : white cream**	
Average Particle Size :	**Diffraction laser :**	**45 < _ < 60 µm**
Grain Size :	D10	35 µm
Grain Size :	D50	45 µm
Grain Size :	D90	70 µm
Powder packed Density 23 ° C :	**Method FABULOUS :**	**0,55 +/- 0,05 g/cm³**
Part Density :	**Method FABULOUS :**	**1 +/- 0,05 g/cm³**
23°C Moisture absorption 24 hrs :	ASTDM D570	1,12 +/- 0,05 %

Mechanical Properties :

Young Modulus*	**ISO 527**	**> 1500 MPa**
Flexural Modulus*	ISO 178	> 1300 MPa
Tensile strength (Average XY)*	**ISO 527**	**45 +/- 3 MPa**
Tensile strength (Average Z)*	ISO 527	40 +/- 3 MPa
Elongation at break (Average XY)*	**ISO 527**	**40 +/- 5 %**
Elongation at break (Average Z)*	ISO 527	20 +/- 3 %
Charpy – Impact strength*	**ISO 179 (20°C)**	**NO BREAK** dry/Cond.24 hrs KJ/m²
**statistics after several cycles.*		*50 cond. 24 hrs*

The mechanical properties can vary according to the positioning of the tensile bars, operating conditions and exposure parameters of the systems used. These data rest on the current state of our knowledge. They do not give the exact characteristics of material and does not represent a guarantee.

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Thermal Properties :

T°f Melting Point : T° Process : According to machine Reading :	**DSC** Glazing Method	**196 < _ < 204 °C** - 12 +/- 2 °C (ex : 186 °C +/-2)
Flammability – Fire Classification UL-94 following ASTM D618(ISO 921) with a barrel 125 x 13 x 13 mm	**UL94** vertical & Horizontal test	**Natural grade: HC** Out Classification

Electrical Properties :

According to the value reach in CEI 93 the material is considered as : **ISOLANT**

Volume resistivity	**CEI 93**	**1.3 E+13** Ohms/m
Horizontal surface Voluminal resistivity	**CEI 93**	**1.2 E+15** Ohms
Vertical surface Voluminal resistivity	**CEI 93**	**1.5 E+15** Ohms

Surface Finish :

Natural Coloration :	**Visual**	**White cream**
Shore D Hardness :	**ISO 868 (20°C)**	**80 +/- 2 Shore D**
Surface Ra/ Upper Facing processed & blasting :	ISO 4287	10 +/- 2 µm
Surface Ra/ Upper Facing after Finishing :	ISO 4287	6 +/- 1 µm

Chemical Properties :

Matrix in Polyamide 11 with a good chemical resistance to alkaline, hydrocarbons, oils, gasoline's, gas oil and solvents.
Attack by the acids. Sealing of wall starting **from 1.6 mm thickness.**

SOLUBILITY : WATER :	 Insoluble in Water on the basis of its structure at 20 °C < 1 mg/m3 (estimated) Soluble in :Mineral acids, Phenols
Solvents :	Insoluble in most organic solvents Insoluble in : Chlorinated solvents, Alkaline conditions
Odor : pH:	None NA
Melting Point / Range : Decomposition Temperature : Explosive Properties :	> 180 °C Polymer: > 350 ° C Dust may form explosive mixture in air (**30 - 60 g/m3)** Test of dust behavior in explosions : Kst = 200 - 250 m.bar/s CARE / 301 m.bar/s Explosibility class : St2 CARE. Standard : ISO 6184/1 - ASTM E 1226
Explosive Limits :	Lower : in air **30 - 60 g/m3** Higher : In air Approximately 200 g/m3 (estimated)

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