

**A GLASS FILLED POLYAMIDE 12 MATERIAL USED WITH SELECTIVE LASER SINTERING**

**Background**

Polyamide 12 (PA12) is a well known plastic normally used for the injection moulding of parts intended for engineering applications. By adding glass beads, a glass filled composite is produced. This LS-PA12GF material produces stiffer and stronger components than natural LS-PA12 although these advantages are gained at the expense of a reduction in the elongation to break.

**Features**

The LS-PA12GF material produces parts with excellent strength and stiffness. Components made in these materials exhibit similar properties to those which are injection moulded in glass filled polyamide. The material also gives a smoother surface finish than the natural LS-PA12 material. The presence of the glass fill material enables components made in LS-PA12GF to be operated at a higher temperature than LS-PA12.

**Benefits**

Parts are accurate and strong, and can be machined, for example parts can be tapped or can be fitted with metal inserts, and can generally be treated in a similar way to injection moulded polyamide components. They can also be finished in a variety of ways, including being painted and plated. Components made in LS-PA12GF offer a quick route to completely functional plastic parts.

**Applications**

LS-PA12GF finds a great many applications in both prototyping and production applications. A wide range of industries, including aerospace, automotive, medical, environmental, defence and electrical goods are already wide users of this material. A list is given below of a few of the many applications to which LS-PA12GF parts can be put.

Prototyping	Production
Enclosures	Clips and stands
Frames, handles and mechanisms	Enclosures
Plugs and sockets	Parts likely to experience wear
Fans, impellers	Jigs and fixtures e.g. for drilling
Parts to be used at elevated temperatures	Assembly aids
Product chassis, cases and housings	
Load bearing components	

## LS-PA12GF Plastic ALM material

### Technical Data

Please be aware that these figures are **typical values**. At CRDM we are continually striving to improve the accuracy of our data and the repeatability of our machines

Many of the properties listed below will be dependant on the laser power used to sinter the parts and some values will depend on the X, Y and Z orientation of the part in the machine. If highly specified material properties are required for your application, please contact us.

#### General Properties of Sintered Parts

Density	1.3 – 1.6 g/cm <sup>3</sup> *
Moisture Absorption (24hrs)	0.1 – 0.25%
Colour	Light grey
Surface finish	Light grainy finish (post processing available)
Porosity	Typical pore size 35 microns *‡

#### Mechanical Properties

Tensile Modulus	3500 – 4000 N/mm <sup>2</sup> *†
Ultimate Tensile Strength	30 – 40 N/mm <sup>2</sup> *†
Elongation at break	1.5 – 4.0% *†
Flexural Modulus	2500 – 3000 N/ mm <sup>2</sup> *†
Hardness – Shore D	75 – 80

#### Thermal Properties

Melting Point	172 -180 °C
Recommended temp range	-50 – 120 °C

All properties listed assume standard building conditions. Certain parameters, e.g. porosity, can be varied significantly by varying applied laser power. This parameter variability can be used to tailor parts to particular applications.

\* *varies as a function of laser power*

† *will vary as a function of test direction (ie as a function of X, Y and Z build orientation)*

‡ *parts can be sealed as a post-processing operation*

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