



3DLPrinter
3DLPrinter-HD
3DLPrinter-HD 2.0
3DLPrinter-HD 2.0+



Our Resins

January 20, 2016

Introduction:

Robot Factory production turned to 3D printing from this year it has **three new resins**, specially manufactured for use with **3DLPrinter** Series (printers DLP® technology). The new range of photosensitive resins is aimed at meet the different requirements for professional use of 3D printing, ensuring high performance and definition, while still maintaining a price to the public always very competitive.

The **three new resins**, usable with **3DLPrinter** Series made by **Robot Factory**, allow to print models usable for:

- direct casting (**RF Resin - CS Red**), for use mainly addressed the jewelery sector
- mechanical or outline marker testing (**RF Resin – HT Green**), for use mainly directed to the sector of Industrial Design
- functional / artistic models (**RF Resin – GU Blue**).

RF Resin - CS Red allows the construction of models with high detail, the high surface quality and the precision obtained with this resin require no additional hand-finishing of the piece before use. It is mainly used for the process of casting (called "lost wax casting").

RF Resin – HT Green it allows to obtain models perfectly stable and accurate, but with a higher mechanical resistance, compared to the castable resin. This resin can also be used in the process of 'vulcanization', because it keeps its structural integrity even when subjected to extreme temperatures (withstands temperatures from -30 °C to +200 °C).

RF Resin – GU Blue being more elastic, is suitable to be more easily manipulated. Is generally a resin 'multi-purpose', for print tests without any particular specific uses.

One of the most attractive features of the new resins is the **rate of reaction**, with a solidification time which ensures an even more high 'speed' of the printing process of **3DLPrinter** Series.

The new resins have a very **wide range** of **reactivity**, from 300nm to 420nm and a very low **shrinkage**: 0.5%.

The new resins have a natural resistance to water and chemicals. In addition, the new resins have a **very low odor**.

Precautions for Use:

- Store the resin in a cool dry place, in tightly closed container and away from heat sources.
- Ensure good ventilation / exhaustion in the workplace, while using the resin.
- Before use, mix at long to eliminate any inhomogeneity of the product that can be created owing to a long period of storage. Mix gently with a spatula, avoiding the formation of air bubbles.

Recommended times:

The exposure times of the resin (**Base Exp. Time** and **Object Exp. Time**), to be used for printing an object, can vary depending on **many factors**, we examine the main to be taken into account before printing:

- The **overall size of the object** - the greater the volume, less time is required for the printing of a layer. For objects with very thin details, the time required will be much longer.
- The **environmental temperature** - in general, higher the temperature, more liquid is the resin, and consequently has to be increased the exposure time to allow the resin to catalyze better.
- The **preservation of resin** – the time and manner of storage affect the time. In general a older and / or deteriorated resin may take an higher time printing, for the same object, compared to a resin most 'fresh'.
- The **homogeneity** of resin - it is very important to mix thoroughly the resin before use, to allow the chemical components to blend well among themselves and with the pigment used to color the resin itself.
- The **thickness** of the layers– depending on the thickness plus / minus high of layers adopted in the printing, the timing may increase / decrease. Remember that with **3DLPrinter** Series the thickness of the layer can range from **10µm to 100µm** (parameter set by the user).

However, a distinction must be made between the exposure time used to print the **layers** that form the basis of the object (**Base Exp. Time**) and the exposure time used to print successive layers of the object (**Object Exp. Time**), is important to set the first according to the extent of the base (which will depend on the total volume of the object) and the second according to the '**thickness**' of the various pieces that constitute the object. If the object is constituted by very minute details, so that these are built you must raise the exposure times, rather than when the object is constituted by more coarser details.

On the other hand, if the base of the object is very large and you set a time too high (**Base Exp. Time**), while printing, you can have a **suction effect** between the construction base and the bottom of the vat of the resin, causing a deterioration of **Siligel** and, in some cases, even the blocking of the vat. Conversely, if the time set for the construction of the base of the object is too low, this does not stick well to the construction base and consequently the object is not built, in this case the resin solidified precipitates in the vat and attaches to Siligel causing, also in this case, the deterioration of the Siligel.

As regards the layers of the object, by setting a too high time (**Object Exp. Time**), during the construction of the piece, layers already solidified could be 'snatched' and to detach the object from the construction base. Instead, by setting a too low time, it might cause, during the construction of the piece, the layers attack on **Siligel**, instead of solidify and build the object, ruining the Siligel.

Warning: It is recommended initially to use an intermediate time, print the first 30-50 layers, stop printing and check the result, if necessary, increase / decrease the time.

In the next paragraphs, we give some synthetic indications for the three resin types available, including also a more or less exact indication of the times '**Recommended**' both for layers of the bases, both for the layers of the object.

Warning: The times indicated are to be just a reference, since, as mentioned earlier, they may vary in function of several parameters. Moreover, the times given are for a print by setting the **brightness** and **contrast** of the projector as the **default** (brightness 65, contrast 55), obviously **increasing** these values, you have to **decrease exposure time**, both for layers of the bases, both for the layers of the object.

Caution: Before using resins, read the Material Safety Data Sheets (MSDS) present in the DVD supplied with 3DLPrinter series and Technical Note 05/14 (also present in DVD supplied), to be aware of the necessary precautions for use.

Product identifier:

Name: **RF resin**

Code: **CS – Red**

Type: **Castable**

Relevant identified uses of the mixture and uses advised against:

- Photosensitive resin for stereolithography 3D printer.
- Directly castable.

Information on basic physical and chemical properties:

Appearance	Viscous liquid.
Solubility	Insoluble in water.
Relative density	1.13
Vapour pressure at 20°C	< 0.1 mbar (97.0 hPa)
Flash point	> 93 C > 200 F P/M Pensky-Martens
Odor	Low odour.
Melting point/ Melting range	Undetermined.
Boiling point/ boiling range	Undetermined.
Solvent content	None.
Hardness	73 Shore D
Viscosity	27 DIN Cup 4
Dynamic viscosity	85 Centipoise /Mpas

Properties like Hardness and Viscosity are dependent on several factors. The Viscosity is determined at a temperature of 25 °C. Hardness is measured at a thickness of the material of 10mm and at a size of 20x20mm.

Bases Time:

Base Exp. Time:

from 6 seconds to 9 seconds (in special cases, you can go further).

Layers:

Object Exp. Time:

from 0.6 seconds to 1.3 seconds (in special cases, you can go further).

Product identifier:

Name: **RF resin**

Code: **HT - Green**

Type: **Mechanical**

Relevant identified uses of the mixture and uses advised against:

- Photosensitive resin for stereolithography 3D printer.
- For mechanical details - vulcanization.

Information on basic physical and chemical properties:

Appearance	Viscous liquid.
Solubility	Insoluble in water.
Relative density	1.13
Vapour pressure at 20°C	< 0.1 mbar (97.0 hPa)
Flash point	> 93 C > 200 F P/M Pensky-Martens
Odor	Low odour.
Melting point/ Melting range	180 - 200 °C.
Boiling point/ boiling range	Undetermined.
Solvent content	None.
Hardness	75 Shore D
Viscosity	29 DIN Cup 4
Dynamic viscosity	95 Centipoise /Mpas

Properties like Hardness and Viscosity are dependent on several factors. The Viscosity is determined at a temperature of 25 °C. Hardness is measured at a thickness of the material of 10mm and at a size of 20x20mm.

Bases Time:

Base Exp. Time:

from 6 seconds to 9 seconds (in special cases, you can go further).

Layers:

Object Exp. Time:

from 0.6 seconds to 1.3 seconds (in special cases, you can go further).

Product identifier:

Name: **RF resin**

Code: **GU - Blue**

Type: **Generic - Artistic (Elastic)**

Relevant identified uses of the mixture and uses advised against:

- Photosensitive resin for stereolithography 3D printer.
- For general use and functional / artistic models.

Information on basic physical and chemical properties:

Appearance	Viscous liquid.
Solubility	Insoluble in water.
Relative density	1.13
Vapour pressure at 20°C	< 0.1 mbar (97.0 hPa)
Flash point	> 93 C > 200 F P/M Pensky-Martens
Odor	Low odour.
Melting point/ Melting range	Undetermined.
Boiling point/ boiling range	Undetermined.
Solvent content	None.
Hardness	35 Shore D
Viscosity	30 DIN Cup 4
Dynamic viscosity	100 Centipoise /Mpas

Properties like Hardness and Viscosity are dependent on several factors. The Viscosity is determined at a temperature of 25 °C. Hardness is measured at a thickness of the material of 10mm and at a size of 20x20mm.

Bases Time:

Base Exp. Time:

from 6 seconds to 9 seconds (in special cases, you can go further).

Layers:

Object Exp. Time:

from 0.6 seconds to 1.3 seconds (in special cases, you can go further).

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Robot Factory S.r.l. - Via Caltana, 59 - 30035 Mirano (Venezia) - P.IVA: 03654900277
Tel./Fax: +39 (0)41 5770270 Mobile: +39 338 7159853
Site: www.robotfactory.it - E-mail: robot@robotfactory.it

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