POLYJET BEST PRACTICE

High-Temperature RGD525 Model Material

SOFTWARE / PRODUCT / FINISHING / **MATERIAL**

Overview

High-temperature RGD525 model material has exceptional dimensional stability and great temperature resistance. These properties make RGD525 parts suitable for static applications that require high temperature resistance.

This Best Practice describes recommendations for obtaining good results when designing parts printed with RGD525.

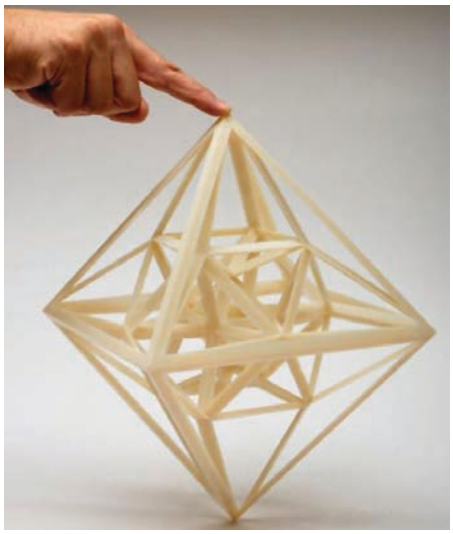

Figure 1: Model made with RGD525.

1. Printing Recommendations

1.1. Designing Parts with Holes and Cavities

Design parts with any required holes and cavities in your CAD program instead of drilling holes in printed parts.

High-temperature parts are fabricated from a combination of two materials, RGD525 and SUP705 (the support material). This unique combination enhances dimensional stability. However, drilling of printed parts is not recommended.

1.2. Head Cleaning

RGD525 may leave more residue on the print heads than Vero materials. For best results and to maintain print heads in optimum condition, clean them daily using the Head Cleaning Wizard.

Refer to the printer user guide, “Cleaning the Printing Heads.”

1.3. Preparing Trays for Printing

The arrangement of the parts on the build tray affects the quality of the printed parts and the duration of printing.

Quality considerations:

- Position the section requiring the highest planar accuracy along the Y-axis (Figure 2). This is because internal stresses may cause the part to curve upwards, and this is less pronounced along the Y-axis (Figure 3).
- If surface matching is required, place all matching surfaces face up (Figure 4).

Time considerations (Eden/Connex printers only):

To relieve internal stresses, a buffer (time delay) is introduced after each layer is printed. However, when many parts are placed on the tray, the additional time is insignificant.

- When printing trays that are partially full, position the parts so that they require at least three printing passes (Figure 5). In this way, printing time is long enough to allow material relaxation, eliminating unnecessary printing delays between layers.
- If the print job requires less than three printing passes (Figure 6), Objet Studio™ automatically adds the required delay. This may significantly increase printing time in order to maintain the quality of printed parts.

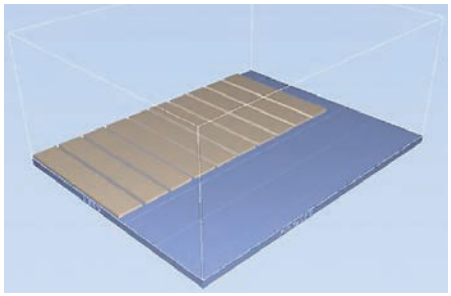

Figure 2: The section requiring the highest planar accuracy (long edge) is positioned along the Y axis.

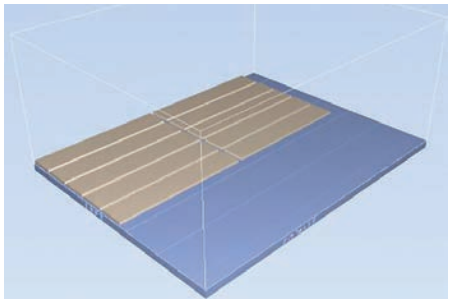

Figure 3: Long parts positioned along the X axis may curve upward.

1.4. Printing Preferences

To reduce internal stresses that cause the part to curve upwards, print in High Quality mode, if applicable.

1.5. Polishing Parts

Parts printed with RGD525 are more brittle than parts printed with other PolyJet printing materials. For this reason, extensive polishing is not recommended, especially when parts have thin walls.

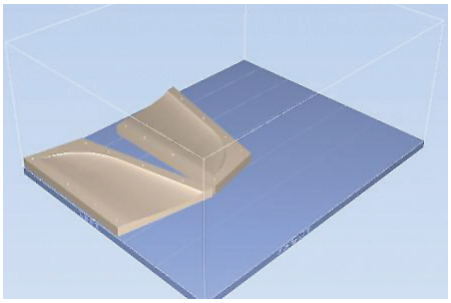

Figure 4: Matching surfaces face up.

1.6. Thermal Treatment

Upon removal from the printer, RGD525 parts have an initial heat-deflection temperature (HDT) of 65 °C (149 °F). A higher HDT—80 °C (176 °F)—can be achieved after thermal treatment in a programmable oven (see specifications on page 4).

To achieve a higher HDT, follow the procedure in Section 2 below. This procedure is suitable for all part geometries and for mixed parts.

2. Process

2.1. Thermal Treatment

NOTE

Time in oven is approximately seven hours (including cooling).

STEP 1: Clean the part and remove the support material.

STEP 2: Place the part in a programmable oven at room temperature.

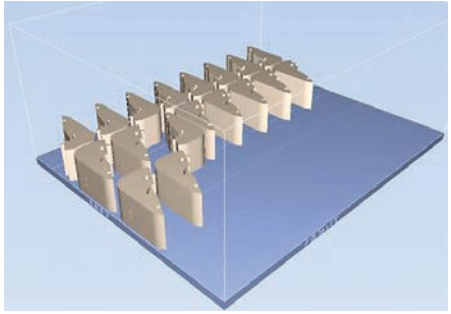

Figure 5: Three printing passes – no time delay.

STEP 3: Set the ramp-up rate to 1 °C (1.8 °F) per minute.

STEP 4: Set the temperature to 50 °C (122 °F).

STEP 5: Turn on the oven.

NOTE
Time in oven is approximately seven hours (including cooling).

STEP 6: Maintain the temperature at 50 °C (122 °F) for two hours.

STEP 7: Increase the temperature to 60 °C (140 °F).

NOTE
The oven temperature reaches 60 °C (140 °F) after approximately 10 minutes.

STEP 8: Maintain the temperature at 60 °C (140 °F) for two hours.

STEP 9: Increase the temperature to 70 °C (158 °F).

NOTE
The oven reaches 70 °C (158 °F) after approximately 10 minutes.

STEP 10: Maintain the temperature at 70 °C (158 °F) for one hour.

STEP 11: Cool the parts in the oven.

STEP 12: When the oven temperature is lower than 35 °C (95 °F), remove the part.

CAUTION
Always wear oven gloves when handling hot parts.

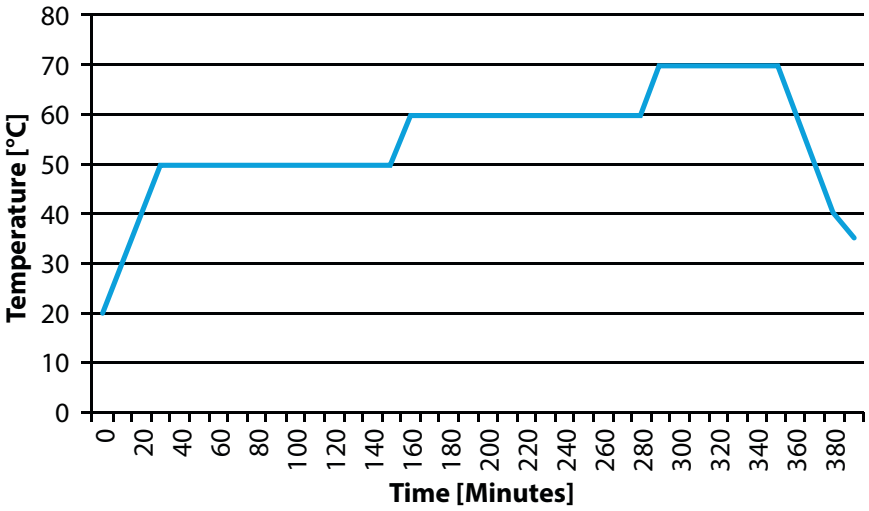

Figure 5 – Oven temperature over time

Feature	Specification
Maximum operating temperature	250-300 °C (480-570 °F)
Temperature stability (PID controller On/Off)	±0.1 / ±0.2 degrees
Temperature uniformity	at 300 °C ±5° (at 570 °F ±10°)
Heat-up time to maximum temperature	25 minutes
Recovery time to maximum temperature	4 minutes
Dimensions	as required
Volume (liters)	as required
Air changes per hour	10-50 (depends on oven size)
Maximum power	depends on oven size: • 750 W for 28-liter oven • 9000 W for 900-liter oven
Holding power	depends on oven size: • 300 W for 28-liter oven • 3500 W for 900-liter oven
Controller	stores 4 programs and up to 16 segments (Eurotherm programmer, or similar)

Table 1 – Programmable Oven Recommended Specifications

3. Safety

Observe manufacturer's recommendations for safety, material handling and storage. This information can be found in the Safety Data Sheet (SDS).

4. Tools & Supplies

4.1. Equipment:

- Programmable oven

The following oven manufacturers and models are recommended and available worldwide. Other manufacturers and oven models may be suitable. Make sure they meet the specifications listed in Table 1.

Manufacturer	Oven model	Chamber size	Comments
Despatch Industries www.despatch.com	LBB oven series	as required	May require an additional controller
Nabertherm www.nabertherm.com	TR oven series		

CONTACT

For questions about the information contained in this document, contact Stratasys at www.stratasys.com/contact-us/contact-stratasys.

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