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Thermal Treatment for Objet RGD525

High-Temperature Material

1. Purpose

This document describes thermal treatment for parts printed with Objet RGD525 on Objet 3-D printers. Parts made of Objet RGD525 have an initial heat deflection temperature (HDT) of 65°C (149°F). With thermal treatment in a programmable oven, you can achieve greater temperature resistance.

HDT test method: ASTM D 648-06, HDT at 0.45 MPa

Note: The actual degree of temperature resistance depends on the part geometry.

2. Special Instructions

To avoid distortion during thermal treatment:

1. Consider the best orientation for printed parts in the oven.
2. Parts with thin walls and overhangs must be properly supported before placing them in the oven.
3. Place the part on a flat surface in the oven and not directly on the oven rack.

Figure 1 Oven chamber

3. Thermal Treatment Procedure

To achieve higher temperature resistance, follow the procedure described below. This procedure is suitable for all part geometries.

- Desired HDT: 80°C (176°F)
- Time in oven: approximately seven hours (including cooling)

1. Clean the part and remove the support material.
2. Place the part in a programmable oven (see specifications on page 3) at room temperature.
3. Set the ramp-up rate to 1°C (1.8°F) per minute.
4. Set the temperature to 50°C (122°F).
5. Turn on the oven.
   The oven temperature reaches 50°C (122°F) after approximately 35 minutes.
6. Maintain the temperature at 50°C (122°F) for two hours.
7. Increase the temperature to 60°C (140°F).
   The oven temperature reaches 60°C (140°F) after approximately 10 minutes.
8. Maintain the temperature at 60°C (140°F) for two hours.
9. Increase temperature to 70°C (158°F).
   The oven temperature reaches 70°C (158°F) after approximately 10 minutes.
10. Maintain the temperature at 70°C (158°F) for one hour.
11. Cool in oven.
12. When the oven temperature is lower than 35°C (95°F), remove the part.

Caution: Always wear oven gloves when handlings hot parts.

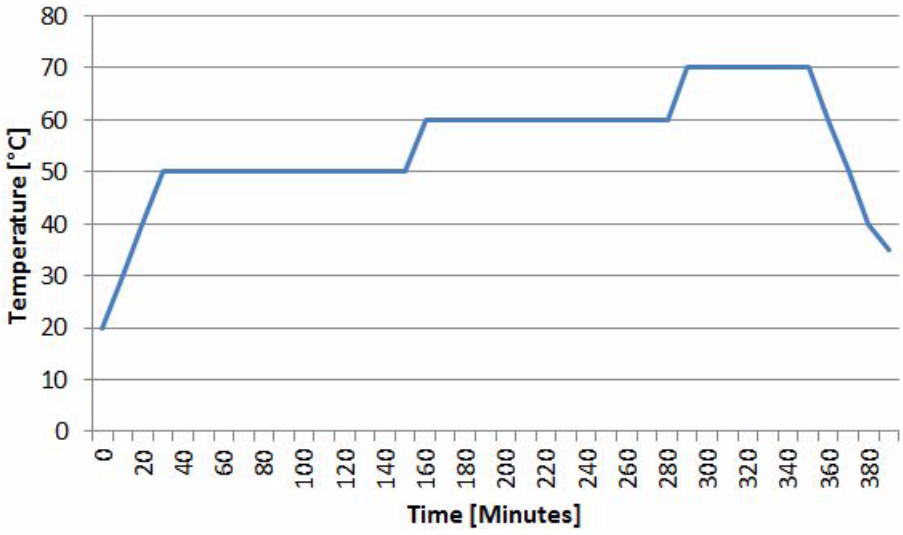

Figure 2 Oven temperature over time

4. Programmable Oven

4.1 Recommended Specifications

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)

4.2. Recommended Oven Manufacturers and Models

The following oven manufacturers and models are recommend by Objet and are available worldwide.

Note: Other manufacturers and oven models may be suitable. Make sure they meet the specifications listed in section 4.1.

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		

If you have any questions about the procedure in this document, contact your local Objet specialist.