



Digital ABS Plus for J5 and J3 Series

Overview

Digital ABS™ Plus simulates standard ABS plastics in combining high temperature resistance and high toughness.

Parts printed with Digital ABS Plus offer:

- An impact resistance of 90-110J/m (1.69-2.06 ft lb/in.)
- An initial heat deflection temperature (HDT) of 58–68°C (136–154°F) upon removal from the printer. A higher HDT of 82–90°C (179–194°F) can be achieved after thermal treatment in a programmable oven (see section E).

These properties make Digital ABS Plus suitable for printing parts that require high impact resistance, strength and dimensional stability.

Digital ABS Plus is fabricated using RGD515™Plus together with RGD531™ and yield ivory printed parts.

This document describes recommendations and tips for achieving optimum quality and enhanced mechanical properties when printing Digital ABS Plus parts.

- Supported Printers
- Preparing for Printing
- Drying parts
- Photobleaching
- Thermal Treatment

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Recommendations and Tips

Supported Printers

System	Support Material
J55™	
J55™ Prime	SUP710™
J5 DentaJet™	
J35™ Pro	



Figure 1: Functional prototype 3D printed with Digital ABS Plus on the J55 printer

To assign Digital ABS Plus to your part:

1. Load the RGD515Plus and RGD531 cartridges.
2. Insert your part into GrabCAD Print.
3. Display the *Model Settings* dialog box.
4. From the *Model Materials* drop-down list select **Digital Materials**.
5. Select the RGD515 and RGD531 materials to see the digital material options.

Drying Parts

Printed parts may require longer time to dry than parts printed with Vero materials.

To dry parts thoroughly:

- Place them on a dry surface or on a drying rack.
- To avoid deformation, orientate the parts so that there is minimal strain on thin walls.
- Allow the parts to dry overnight.

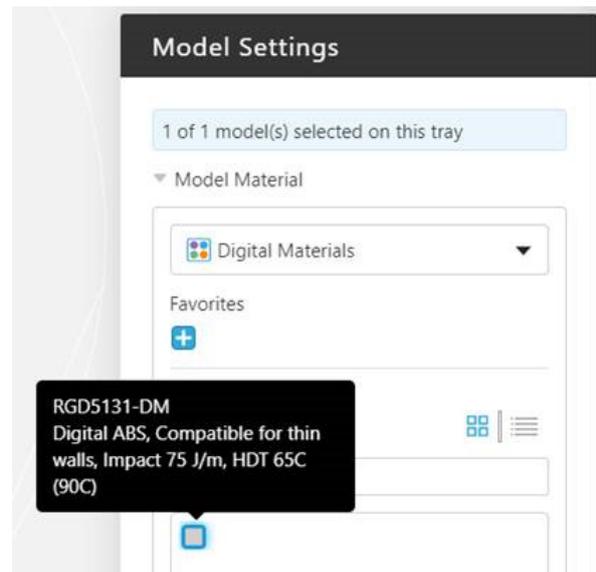


Figure 2: Digital ABS material selection for J55 printers

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Photobleaching

Parts printed with Digital ABS Plus have a slightly yellow tint when removed from the printer. This is especially true for parts printed with a glossy finish. The yellow tint fades naturally over time, but you can greatly accelerate this process by using photobleaching treatment. This involves exposing parts to intense LED flood light. After 24 hours, there is tint reduction of 90%.

Recommended photobleaching methods include:

Method A: Using a Stratasys ProBleacher™

- Sold and supported by Stratasys
- Temperature, light intensity, and duration control
- Office-friendly
- Fast and consistent results

Method B: Using LED Flood Light

- Self-assembly from readily available components, including a cabinet lined with mirrors and a 100W LED flood light, 6500K daylight.
- Low cost solution
- Varying results, due to the lack of precise control over temperature and light intensity

Method C: Using an Illumination Chamber

- Off-the-shelf chamber.
- Enables controlling temperature and light intensity
- Varying results, due to the lack of precise control over temperature and light intensity
- Assures predictable results



Figure 3: Stratasys ProBleacher



Figure 4: Sample do-it-yourself photobleaching cabinet with LED lamp and mirrors.

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General Photobleaching Instructions:

1. For best results, polish the parts before performing photobleaching.
2. As soon as possible after printing, place the parts in the cabinet/chamber.
3. Arrange the printed parts with enough distance between them to allow light to reach all sides of each part.
4. Turn on the lights. Verify that the ambient temperature around the models is approximately 40°C (104°F). Higher temperatures may cause model distortion; lower temperatures may not produce satisfactory results. When using desk lamps, you can achieve the required temperature by positioning the lamps approximately 10 cm (4 in.) above the models.
5. Inspect the model tint after 24 hours of treatment. If necessary, continue the photobleaching treatment.



Figure 5: Oven chamber

Thermal Treatment

Thermal treatment of Digital ABS Plus parts in a programmable oven improves their heat resistance.

Special Instructions:

To avoid distortion during the thermal post process procedure:

- Parts with thin walls and overhangs must be properly supported before placing them in the oven.

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- Consider the best placement for the printed part inside the programmable oven.
- Place the part on a flat surface in the oven and not directly on the oven rack. The rack may exert forces on model.

Procedures A and B, below, are suitable for all part geometries. They differ in the duration and expected HDT.

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

Procedure A

- Desired HDT: 90°C (194°F)
 - Time in oven: approximately seven hours (including cooling time)
1. Clean the part and remove the support material.
 2. Place the part in a programmable oven (see specification below) at room temperature.
 3. Set the ramp-up rate to 1°C (1.8°F) per minute.
 4. Increase the temperature to 60°C (140°F).
 5. Turn on the oven.
The oven temperature reaches 60°C (140°F) after approximately 35 minutes.
 6. Maintain the temperature at 60°C (140°F) for two hours. Increase the temperature to 70°C (158°F).
The oven temperature reaches 70°C (158°F) after approximately 10 minutes.
 7. Increase temperature to 80°C (176°F) and maintain for one hour.
 8. Cool in oven.
 9. When the oven temperature is below 35°C (95°F), you can remove the part from the oven.

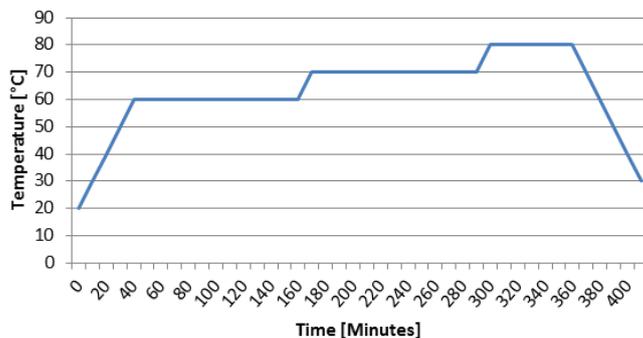
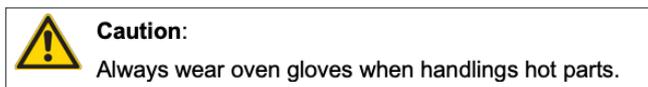


Figure 6: Oven temperature over time (Procedure A)

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Procedure B

- Desired HDT: 100°C (212°F)
- Time in oven: approximately nine hours (including cooling time)

If this is a concern, use procedure A.

1. Clean the part and remove the support material.
2. Place the part in a programmable oven (see specifications below) at room temperature.
3. Set the ramp-up rate to 1°C (1.8°F) per minute.
4. Increase the temperature to 60°C (140°F).
5. Turn on the oven.

The oven temperature reaches 60°C (140°F) after approximately 35 minutes.

6. Maintain the temperature at 60°C (140°F) for two hours.
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8. Increase temperature to 80°C (176°F) and maintain for one hour.
9. Increase temperature to 100°C (212°F) and maintain for one hour.
10. Cool in oven.
11. When the oven temperature is below 35°C (95°F), you can remove the part from the oven.

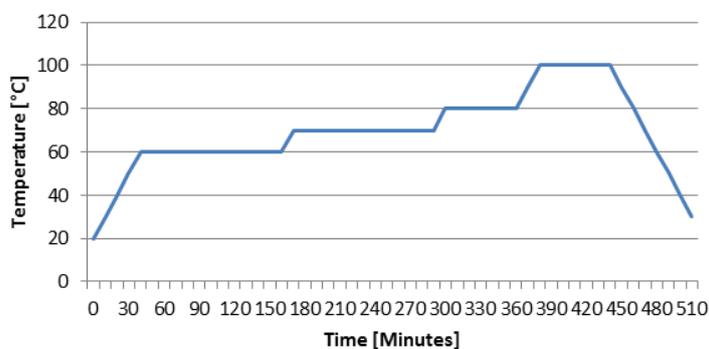
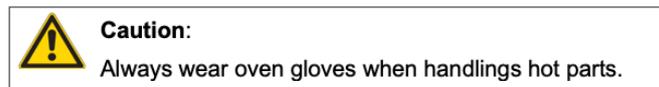


Figure 7: Oven temperature over time (Procedure B)

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Programmable Oven

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)

Recommended Oven Manufacturers and Models

The following oven manufacturers and models are recommended by StratasyS and are available worldwide.

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

DOC-09276 Rev. B

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