Agilus30
Rubber-Like Materials

Overview

Stratasys® Agilus30™ materials have properties that simulate rubber.

- Agilus30 Clear — Shore A 30
- Agilus30 Black — Shore A 30
- Agilus30 White — Shore A 30

Agilus30 printing materials offer improved mechanical properties, tactile quality and ease of use, compared to Tango™ family materials.

The following results were obtained from parts printed on PolyJet™ Connex3™ 3D printers:

Manufacturer	Agilus30	TangoBlackPlus™
Printing Mode	High Speed, Digital Material	
Hardness (Shore A)	30 – 35	26 – 28
Elongation at Break (%)	220 – 240	170 – 220
Tensile Strength (MPa)	2.4 – 3.1	0.8 – 1.5
Tensile Tear Resistance (Kg/cm)	5 – 7	2 – 4
Polymerized Density (g/cm3)	1.14 – 1.15	1.12 – 1.13
Water Absorption (%)	2.7 – 3	3.1 – 3.3

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Rubber-like Digital Materials with varying Shore values and colors are fabricated by combining Agilus30 materials with rigid materials. The following table shows the Shore A values of Digital Materials fabricated from Agilus30 and Vero™ materials.

Hardness Selection	Shore A in Printed Part*
FLXA-xx40	40 – 45
FLXA-xx50	50 – 55
FLXA-xx60	60 – 65
FLXA-xx70	70 – 75
FLXA-xx85	80 – 85
FLXA-xx95	90 – 95

*Values obtained using the ASTM D-2240-03 standard, at Time 0.

For more information, see specification sheets for Digital Materials on stratasys.com.

Practical applications for Agilus30 materials include:

- Realistic simulation of rubber parts — knobs, grips, seals, gaskets, hoses, footwear, handles, etc.

- Soft-touch parts and non-slip surfaces

- Rubber-like surrounds and overmolding.

The following section describes recommendations and tips for achieving optimum quality and mechanical properties with Agilus30 materials.

- Supported printers

- Printer settings

- Preparing the printer

- Preparing for printing

- Removing support materials

- The effect of temperature on elasticity

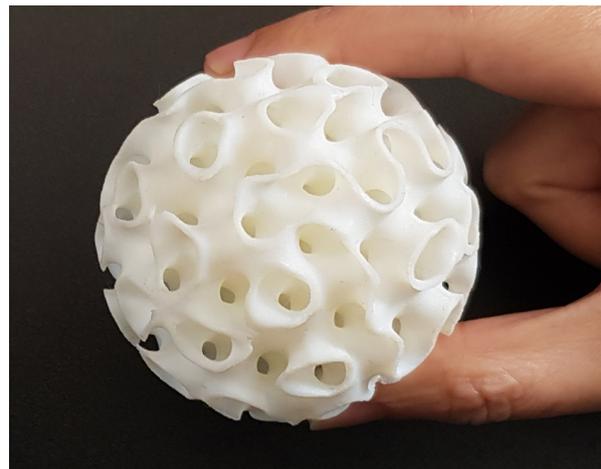- Painting parts

Figure 1: Gasket for car window.

Figure 2: Rubber-like hollow model.

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Recommendations and Tips

Supported Printers, Materials and Modes

Agilus30 materials can be used as follows:

Printer	Material Type	Printing Mode	Objet Studio™/ GrabCAD Print™	Support Material
Objet260/350/500 Connex1™ Objet260/350/500 Connex2™ Objet260/350/500 Connex3™	Agilus30 Clear Agilus30 Black	HS DM HQ is not supported.	Objet Studio version 9.2.11.6785 and above GrabCAD Print version 1.18 and above	SUP705™/ SUP705B™ SUP706B™
Stratasys J750™/J735™ Stratasys J850™/J835™/ J826™	Agilus30 Clear Agilus30 Black Agilus30 White	HS HM HQ is not supported.	GrabCAD Print version 1.18 and above	SUP705/ SUP705B SUP706B
J4100™	Agilus30 Clear Agilus30 Black Agilus30 White	HS HM HQ is not supported.	Current version of GrabCAD Print and above	SUP705/ SUP705B SUP706B

Printer Settings

When printing with Agilus30 (including Digital Materials fabricated with it), the following printer settings are automatically adjusted in Objet Studio to ensure optimum part quality:

• Roller velocity

• Activation of only one UV lamp in Digital Material and High Mix printing modes

Preparing the Printer

• Stopping and resuming the print job may adversely affect model quality and color uniformity (Figure 3). Therefore, before printing with Agilus30, ensure that the print job is not interrupted. Check that the waste container is not full and that there is sufficient printing material loaded.
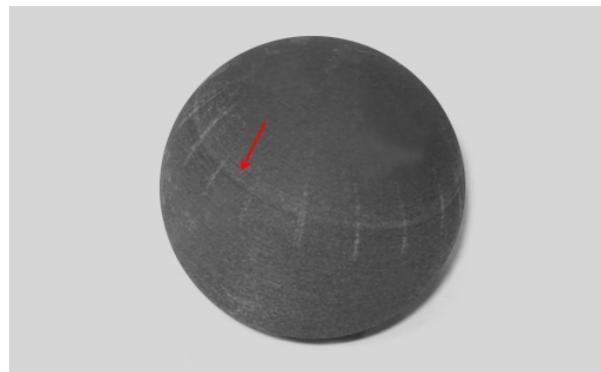

Figure 3: This model has a "seam" where the print job was interrupted.

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Preparing for Printing

The arrangement of parts on the build tray and other factors affect the duration of printing and the quality of the printed part.

- Printing full trays may cause leakage from the roller waste collector. To avoid this, only partially fill the build tray.

- Internal stress may cause parts to curve downwards and detach from the tray.

  To reduce this occurrence:

  - For parts that have a high aspect ratio (X:Y), position the longer edge along the X-axis (Figure 4).

  - Prepare relatively short print jobs (by partially filling the build tray).

- When printing in High Speed mode, arrange the parts on the tray so that they do not exceed three printing passes (Figure 6). This ensures that the ambient temperature in the printing chamber, required for maintaining part quality, remains stable.

- Position thin and delicate parts so that recesses in the surface (hollows, drill holes, etc.) face upwards. This improves their resistance to tear.

- Print with a glossy surface finish, especially for delicate and thin parts.

- If possible, position vertical walls parallel to the X-axis (Figure 5). This reduces the impact of the roller on the walls.

- The default and recommended grid style is *Heavy*. However, when printing hollow and delicate models, and models with thin walls, select the *Lite* grid style. This enables easier removal of support material from printed models.

  Note: For assigning colors when using Digital Materials that include Agilus30, the color of printed parts might vary from the selected color.
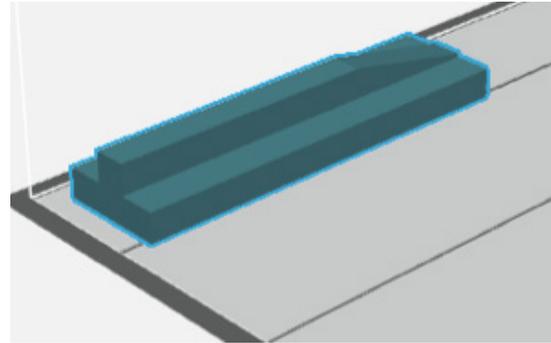

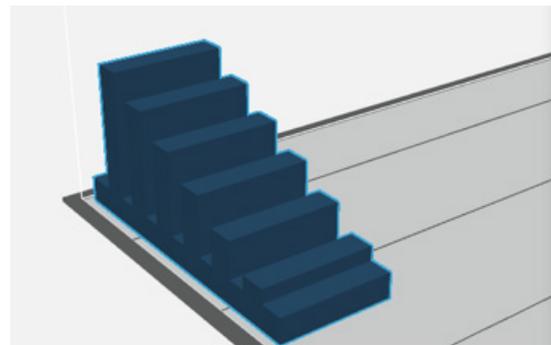Figure 4: Long edge along the X-axis.
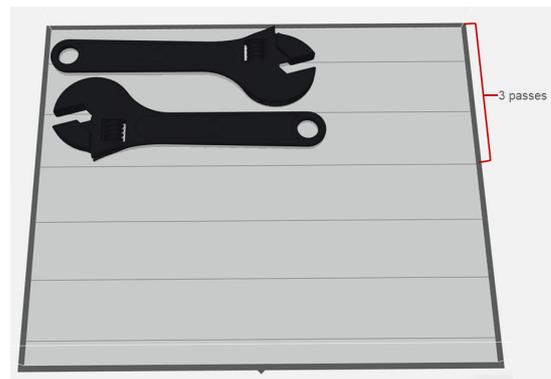

Figure 5: Walls parallel to the X-axis.

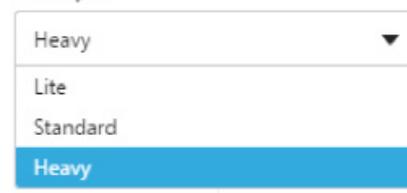Figure 6: Tray arranged for three printing passes.

Figure 7: Heavy grid style.

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- For VRML files (with Agilus30 White), since you cannot determine the Shore value, the use of Agilus30 materials may result in a printed part with unintended ranges of hardness.

- J7, J8, and J4100 printers only: In solid or bulky parts, the recommended height (Z-axis) depends on the part's dimensions along the X- and Y-axis. To ensure optimum quality, make sure that the part height along the Z-axis does not exceed the following dimensions in High Speed (HS) and High Mix (HM) modes:

J7, J8, and J4100 Printers (HS and HM modes)			
	X = 250 mm	X = 375 mm/X = 350 mm	X = 490 mm
Y = 45 mm (1 pass)	100 mm Z axis	80 mm Z axis	40 mm Z axis
Y = 110 mm (2 passes)	50 mm Z axis	40 mm Z axis	30mm Z axis
Y = 110 mm (3 passes)	30 mm Z axis	25 mm Z axis	20 mm Z axis
Y = 220 mm (4 passes)	30 mm Z axis	20 mm Z axis	20 mm Z axis

Removing Support Material

For best results, clean parts printed with Agilus30 (including Digital Materials fabricated with it) as follows:

- Remove as much support material as possible by hand to prevent scratches and the tearing of delicate parts

- Use the water jet cleaning station to remove the remaining support material

- Adjust the water pressure in the water jet to the minimum required

    Note: Parts printed with Agilus30 and rinsed in water may have a milky-colored surface, which disappears while drying. You can accelerate the drying process using an air blower. Using the DT3 or CSIIP cleaning station to dissolve SUP706B support material may cause model deformation due to water absorption.
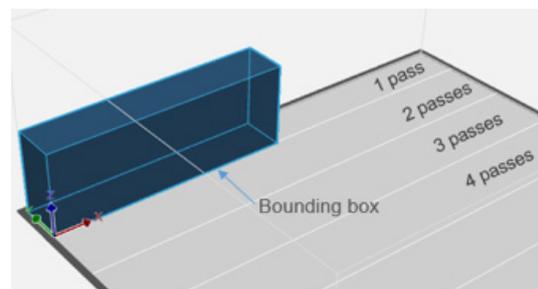

Figure 8: Walls parallel to the X-axis.

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The Effect of Temperature on Elasticity

At room temperature, parts printed with Agilus30 have optimum elasticity. At very low temperatures, parts might become stiff and brittle. Therefore, care and adequate precautions should be taken when packaging parts and models for shipping. Parts regain their original elasticity when warmed above 5°C.

Painting Parts

Painting parts enhances their look, feel and functionality. Apply flexible lacquer (acrylic or water-based) to give parts a realistic look, protect them from cracks, and reduce surface stickiness.

To achieve best results with painted parts:

- Print parts with a glossy finish

- Sand areas that have a matte surface finish

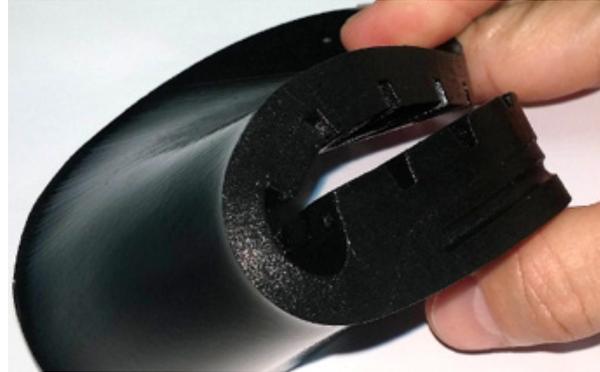For detailed painting recommendations, refer to "Guide to Basic Post-Printing Processes for PolyJet 3D Models."

Figure 9: Painted prototype of a shoe sole.

Figure 10: Rubber-like toy duck.

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Best Practice