

Caverna™ ST Microporous Elastomeric Build Material for Additive Manufacturing

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Product Description

1.75mm and 2.85mm filament for printing porous elastomer parts on most Bowden and direct drive fused filament fabrication 3D printers. After a water soak, Caverna Soft Touch (ST) produces parts with a durometer of 50A, or even lower based on infill percent.

Part Design

Caverna ST requires a post-print water soak to achieve its final soft properties. It's important to keep this in mind during part design. Parts designed as either solely infill (no printed walls or top/bottom layers) or hollow shells with sparse infill will dissolve fastest and be the most compressible. If a part requires walls, we suggest walls no thicker than 2 linewidths thick. We recommend avoiding thick walls and highly dense infills as these features are less likely to reach full dissolution. Designing parts with an open top or bottom face greatly speeds up dissolution. If top and bottom surfaces must be solid, we recommend adding a hole with a diameter of at least 3 mm to either face to allow water to access the interior cavity.

Build Plate Adhesion

Caverna ST has been tested with heated glass build plates. Build plate temperatures of 65°C and greater do not require the use of an adhesive. If printing with a build plate between 50-65°C, we recommend applying an adhesive (Magigoo or similar) to the build plate. Without an adhesive, large parts may detach from the build plate.

If an adhesive is not available, a raft printed with support material, AquaSys GP will also help keep your print secured to the build plate.

Printing Conditions

SETTING	RECOMMENDED	POTENTIAL RANGE
Nozzle Temperature (°C)	245	220-250
Build Plate Temperature (°C)	65	50-70
Print Speed (mm/s)	25	10-50
Layer Height (mm)	0.2	> 0.2
Infill	Gyroid	Gyroid, Lines, Grid
Infill Percent	20	10-80

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Post-Processing

Dissolution of Printed Parts

A post-print water soak is required to obtain the soft, porous properties of Caverna ST. Dissolution of the soluble component occurs fastest in warm water (~70°C). While a commercial washing station (Oryx or similar) is recommended, alternative methods of heating water baths – such as an oven or a hot plate – work as well. Incorporating agitation or stirring will speed up dissolution.

Parts that follow the design suggestions typically take 6 hours to dissolve. It is normal for parts to expand (primarily in the z-direction) during the water soak. After drying, the parts will return to their as-printed dimensions.

Drying of Printed Parts

After dissolution is complete, some water will remain in the pores. We recommend drying your part at 60°C for 6 Hours.

When is the Part Dissolved?

The best way to determine if dissolution is complete is by comparing the mass of the parts pre- and post-dissolution. A mass loss greater than 50% signifies complete dissolution. Parts should be entirely dry before measuring the post-dissolution mass.

As dissolution occurs, the part will turn white as the soluble component is removed. The color change alone does not represent complete dissolution since the exterior surfaces will turn white before interior portions are fully dissolved.