

Elastic Material for Accelerated Design Verification and Prototyping

With 3D Systems' affordable industrial FabPro® 1000 3D printer and our FabPro Elastic BLK elastomeric material

Ideal for engineers for prototyping and verifying designs across a range of industrial and consumer goods applications, the FabPro Elastic BLK material offers excellent compressive characteristics and shape recovery with a realistic opaque black rubber look and feel.

Quick printing and quick curing, FabPro Elastic BLK material saves times and money versus outsourcing to a third party for manufacturing. Suggested applications include:

- Overmolds, seals, grommets, grips and vibration dampening components
- Functional parts including dust covers, push buttons and cable stress reliefs

FabPro Elastic BLK material expands the range of functional materials for 3D Systems' most affordable industrial 3D printer, the FabPro 1000. Rugged and durable, the FabPro 1000 is designed for engineers and designers who want to save time and money by managing their design and prototyping processes in-house. Design iteration is quick and easy with results within hours, not days that can occur with costly outsourcing to a third-party.



FabPro Elastic BLK is a material suited for the prototyping and design of a wide variety of elastomeric parts.



High Quality and Accuracy Elastomeric Parts

Using FabPro technology and the FabPro Elastic BLK material, the FabPro 1000's projector images 0.100 mm (0.004 in) thick layers for high quality parts and smooth surface finish. This document summarizes the main tips to ensure part quality. Users should note that a Software Update will be required to run this new material. Details on how to download and install can be found in the [Customer Information Bulletin](#).

1. Before each build, make sure there is no debris stuck to the film, nor floating around in the tray.
2. For best results, use the Resin Mixer to gently stir between prints and after the resin has been sitting overnight. Visit 3D Systems Infocenter for [complete material stirring information](#).
3. Remove parts from print platform soon after printing—large parts within six hours of the end of a print, and all smaller parts within 24 hours from the end of a print. Due to the elastic nature of the material, and gravity, failure to do this risks the part detaching from the print platform and falling into the print tray. This will cause a resin spill and partially cured resin to be left in the tray. It can also damage your build.
4. Verify proper cleaning method (see Post-Processing overview from page 3). Ensure cleaning solvents are not saturated and parts are allowed to dry before post-curing.
5. To get best surfaces, cut supports off of part before post-curing.
6. Verify print tray is full of material before printing.

BENEFITS

- + Excellent compressive characteristics
- + Excellent shape recovery
- + Medium softness/stiffness
- + Realistic rubber look and feel

USE IT FOR

- > Especially well-suited for compressive applications*
- > Limited testing under tension
- > Limited testing with repeated flexing or bending
- > Limited testing of bellows and hoses

** Ideal for buttons, handles, grips, gaskets, grommets, seals, spacers, vibration dampening components, overmolds and other compressive applications.*



FabPro Elastic BLK material is ideal for compressive applications and is suitable for limited testing under tension, repeated flexing, bending and stretching, after which parts may show signs of cracking or tearing after intensive use.



CONTROL BOX:

- Bottom Case | FabPro Tough BLK
- Top Case | FabPro Proto GRY
- Cable Stress Relief | FabPro Elastic BLK
- Dust Proof Gasket Buttons | FabPro Elastic BLK

PART ORIENTATION:

Part orientation is the first critical setup function before slicing a part in 3D Sprint® software. The part orientation must consider several features before adding supports to the part. The optimal orientation may not be intuitive at first, but the orientation is based on the premise of printing on a 3D printer one layer at a time. Here is an overview to allow customers to build that orientation skill and intuition. Complete part orientation best practices are available [here](#).

Tip 1 - Identify No Support Surfaces

The first thing to consider for a part is to determine what surfaces or features should be pristine and should be oriented to have no supports.

Tip 2 - Large Cross Sectional Area

To get the best surface quality and accurate part, minimizing the cross sectional area is very important. Use the Transform function in 3D Sprint to rotate the part such that it satisfies Tip 1 and Tip 2.

Tip 3 - Critical Feature Orientation

A critical feature is a feature for which you would prefer minimal or no supports, such as text, fine details or other critical geometry. For these features, it is optimal to rotate the part so they are facing away from the print platform.

Tip 4 - Minimizing Supports using Self Supporting Orientation

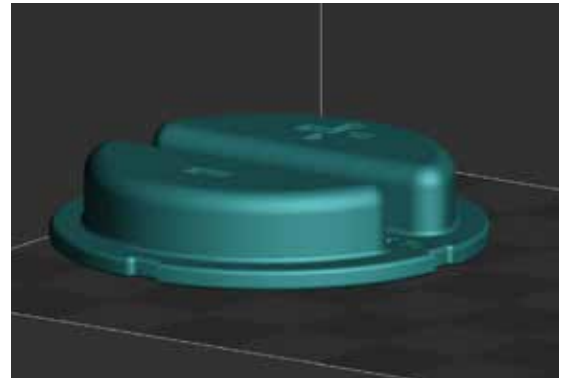
Before adding supports, it is important to orient the parts to be self-supporting. This includes orienting the part such that larger sections of the part are at approximately 45° relative to the print platform.

ADDING SUPPORTS:

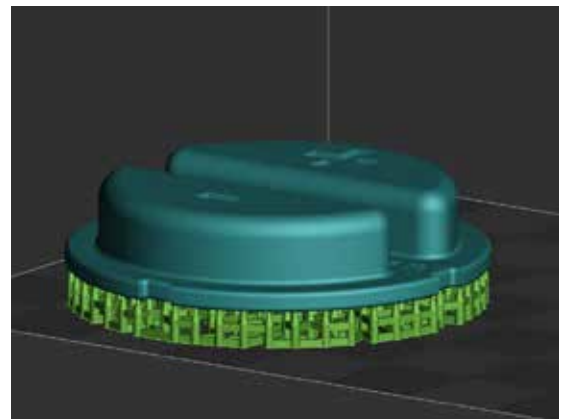
Supporting the part is another critical function for getting successful accurate parts. Once the part has been optimized for orientation, then the supports can be added. Default support styles are Flat and Tilted. The Flat and Tilted refer to the part orientation. Sometimes a part will need to be printed in a flat orientation and, thus, the supports are optimized for that; it is likewise for a tilted part. Please see the [Add Supports section](#) for tips.

Advanced users who would like to try to print flat-bottom parts, such as gaskets, directly on the print platform without supports may do so by taking the following steps in 3D Sprint:

1. Go to Build Style > Advanced.
2. Scroll down and set the Min. Support Height field to 0. Then click Apply.
3. Use the Transform tool to move parts to sit flush on the bottom of the grid (print platform).



Final part orientation after following Tips 1-4.



Part with default supports.

Post-Processing

Once your 3D build has completed, the part on the print platform is considered "green" until it has been through post-processing. **A green part must be handled with nitrile gloves at all times.** This section briefly describes how to post-process the part. Please review the [Complete Post-Processing Guide](#) for detailed instructions.

REMOVE PRINT PLATFORM:

1. Place a paper towel under the part. Lift up the locking handle to allow the print platform to be removed.
2. Remove print platform from printer with printed part attached. Support the paper towel underneath with your hand so that it does not dip into the material in the print tray.

CAUTION: Do not remove the printed part from the print platform while platform is still in the machine. Doing so risks getting partially cured print material in the print tray, which will damage future builds if not cleaned out.

3. Continue holding the paper towel under the print platform when transporting it to the first stage of post-processing.

REMOVE PRINTED PARTS FROM PLATFORM:

1. Using included platform scraper or similar tool, carefully scrape the part off the print platform.
2. Using your hands, pliers, or other tools, remove the base and other supporting architecture from the part.

CLEAN PRINTED PARTS:

The following equipment is needed to clean parts produced on the printer:

- Plastic containers with lids, which are included with the printer
- Digital timer
- Solvent, as prescribed in the below Cleaning Chart
- Optionally, you could have an ultrasonic cleaner, which agitates the cleaning solvent using ultrasonic sound waves

CAUTION: ALWAYS WEAR NITRILE GLOVES WHEN CLEANING PRINTED PARTS.

Please review the [Complete Parts Cleaning Instructions](#).

ULTRASONIC CLEANING	MANUAL CLEANING	MAX NB OF BUILDS*
1 st bath - 4 min dirty IPA	1 st bath - 4 min dirty IPA	6-8
2 nd bath - 4 min in clean IPA	2 nd bath - 4 min in clean IPA	
Fresh IPA rinse	Fresh IPA rinse	

Use the above Cleaning Chart for the recommended cleaning method of your printed parts in FabPro Elastic BLK material.

* Max Number of Builds That Can Be Cleaned Before Solvent is Saturated

NOTE: The recommendation for max number of builds in the chart above is assuming builds of a medium width and height volume. If you have very dense builds with tall parts, the solvent baths may become saturated with a fewer number of builds. Always pay attention to build-surface tackiness and shininess, as this is an indication that uncured liquid material is still on the build.

For the first bath, it is okay to use solvent that has already been used to clean other parts. You may do this until the solvent becomes saturated. Then you must discard the dirty solvent according to all local, state, and federal regulations.

For FabPro branded materials: for the first bath, 3D Systems' EZ Rinse C solvent is also suitably effective.

TIP: The clean IPA that becomes saturated according to the number of builds in the chart above should then be used for the first ("dirty") IPA bath until the max number of builds has been reached again.

DRY THE BUILD PARTS:

After cleaning the part(s), it is necessary to dry them of any solvent used in the cleaning step. This may be done in several ways, but a few recommended methods follow:

- Shop air – if you have shop air in your facility, this would be the most ideal way to air-dry the parts
- Air Compressor – If you do not have shop air, an air compressor would be the next best solution. However, be aware that air compressors are fairly loud
- Air Drying – Simply leave the part sitting on a paper towel for 60 minutes

NOTE: For all parts, be sure there is an absorbent cloth/paper towels or container underneath the part to catch the solvent being dried off.

For any drying method, please use the following [Part Drying Guidelines](#).

The optional LC-3DPrint Box post-curing unit is available for UV-curing parts and is the recommended UV-curing unit for all FabPro print materials.



UV-CURE THE PART:

1. After the part is completely dry, insert the part into your UV oven in the same orientation it was printed in, as if the bottom of the curing oven is the print platform.
2. Follow instructions in your UV oven instruction manual to begin the post-curing process. If you have the LC-3DPrint Box, the instruction manual can be found both in the packaging or by downloading the [LC-3DPrint Box Instructions for Use](#).
3. Curing time for the FabPro Elastic BLK material in the LC-3DPrintBox is 45 minutes. Do not open the curing chamber door until the curing process has been completed. The LC-3DPrint Box has a sensor that will turn the machine off during curing if the lid is open.
4. Once the printed part has been fully cured, remove the part from the UV oven, using nitrile gloves when opening and closing the oven.
5. Inspect the part for surface tackiness and/or areas of discernable liquid material. If either condition exists, clean the part with recommended solvent once more and put it back in the UV oven until there is no more uncured material on it. The printed part is now safe to touch without nitrile gloves.

CAUTION: Be careful not to over-cure the part. Over-curing can cause discoloration and part warping.

6. You may now wish to further refine the part's shape with fine-grit sandpaper or other tools, removing any remnants of supporting architecture that remain on the part.

Learn more about the FabPro 1000 printer and materials at

<http://www.3dsystems.com/fabpro-1000>

Find the complete technical documentation, including Best Practices and Post-processing Guide, at

<http://infocenter.3dsystems.com/fabpro1000/>