

DUPONT™ ZYTEL® 3D1000FL NC010

HANDLING AND PRINTING GUIDE

DuPont™ Zytel® 3D1000FL NC010 is a high performance material for 3D printing. It is a polyamide material in filament form for fused filament fabrication. It is capable of being printed on a variety of printers in a variety of configurations.

Recommended Printing and Drying Conditions

Variable	Recommendation
Nozzle Temperature	245-295°C: Start at 275°C and increase or decrease the temperature by 5°C until the desired adhesion and mechanical strength are established.
Bed Treatment and Temperature	85-110°C: Treating the bed with a PEI adhesive layer enables the use of a room temperature bed for a number of printers and builds. In general, start at 85°C and increase by 5°C until the desired adhesion is established. Treatment of the bed with glue stick aids adhesion and release. To facilitate release from the build surface, re-heat the bed to 70-85 °C before removing the printed part.
Percent Flow	75-100%: A lower percent flow is recommended for fine details and/or dimensional accuracy.
Printing Speed and # Shells	15-90 mm/sec: Start at 30 mm/sec and adjust according to desired print quality, time, etc. For enhanced dimensional accuracy and/or parts with challenging overhangs, recommend using 1 shell or perimeter. For improved strength, use 2 or more shells/perimeters.
Cooling Fan	None: A cooling fan is not recommended due to the potential for increased delamination and warpage.
Extruder	Compatible with direct- and indirect-drive extruders.
Drying Conditions	Dry the filament before use. Use of a dry-feeding system is recommended. Dry at 80-90°C under vacuum for 12 h or at 80°C in a hot air oven for at least 4 h. Store in a sealed container with active desiccant.
Retraction Distance and Speed	1-1.5 mm at 10-30 mm/sec for direct-drive extruders 2.5 mm at 30-35 mm/sec for indirect-drive extruders If stringing or oozing occurs, increase the retraction distance and/or speed in order to optimize the printing quality.
Bridging	Slow printing speed to 30 mm/sec. Zytel® 3D1000FL has successfully been used as a support material for itself. For easy removal of the support, select 15% infill, an x/y distance of 0.7 mm or greater and a z distance of 0.15 mm or greater.

Recommendations are based on testing DuPont Zytel® 3D1000FL on direct- and indirect-drive Cartesian 3D printers with nozzle sizes varying from 0.25 mm to 0.5 mm.

Material Handling: Zytel® 3D1000FL is vacuum-packaged together with desiccant using moisture-resistant packaging. The supplied packaging should be kept sealed prior to using the filament in order to prevent moisture and dust pick-up. Immediately after printing, place the unused filament back in the original packaging together with the desiccant, resealing with tape (e.g., duct tape). If the filament becomes wet, dry it according to the recommendations given in the table. To prevent moisture pick-up by the filament during long prints, commercial or home-made drying and feeding systems are useful.

Safety: Consult the SDS for the safety properties of the material. Molten material and hot surfaces can cause thermal burns. Therefore, wear personal protective equipment for the hands, eyes, and body.

Printing Guidelines:

- Zytel® 3D1000FL is capable of being printed on a variety of printers in a variety of configurations. Different printers, slicing and/or printing configurations, test conditions, ambient environments, etc. may give different results. Always consult your printer's manual and follow the recommendations of your filament provider.
- Clean the nozzle surface prior to printing to prevent pick-up of dirt from the nozzle.
- Extrude some material through the nozzle prior to initial printing and following production breaks.
- Remove the filament from the machine prior to shutting down the printer.

Troubleshooting:

- If the printed part has a rough surface and/or if a popping or hissing noise occurs while printing, dry the filament and consider using a dry feeding system for longer prints and if the environment is humid.
- During material purging, if the strand does not exit the nozzle at a steady speed or if the diameter of the strand is too thin, try increasing the hot-end temperature and/or reducing the printing speed.
- If filament grinding or jamming occurs, retract and remove the filament, cut off the part that is deformed and restart. Reduce the printing speed, raise the hot-end temperature, decrease the retraction speed, and/or lessen the retraction distance.
- If stringing/oozing of the filament occurs, decrease the temperature of the hot-end, lengthen the retraction distance and/or raise the retraction speed.
- If black specks occur on the printed part, make sure that the nozzle surface is clean prior to initializing the print. Consider lowering the hot-end temperature.
- If warping occurs, add at least a 20-line brim around the printed part or use a raft.

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