



FilaOne™ Advanced Engineering Composite Filament System for FDM Printers

User Guide

version 1.6

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Printer Setup:

Clean and dry your printer's print bed to remove all fingerprints and any debris.

Apply a **FilaOne™ Printing Adhesion Sheet** to the printer's glass print bed as described below. The sheet will also work on PCB print beds, however removing the adhesive from the PCB may require the use of Acetone to loosen.

To apply:

1. Peel off the paper masking ("3M label" side) from the bottom of the sheet and carefully place on your print bed.
2. Press firmly with your hand or a window wiper to remove any air bubbles.
3. Let cure for 60 minutes at room temperature before printing.

Calibrate your printer as accurately as possible. Level your print bed, or use a surface probe to insure accurate first layer height.

Print settings:

Layer Height: $\leq .25$

First layer height: $\leq .25$

Avoid layer heights $> .20$ in order to increase the extrusion pressure, to form a better bond between the print and the print surface, and between layers of the print.

Vertical shells: 2

Note: printing more than 2 vertical shells increases warp stresses. Additional vertical shells may create sufficient tension to cause the print to lift from the print surface during printing.

Solid layers -Top: 4
Solid layers - Bottom: 2

Print Speed:

Perimeters: 80mm/s
Small perimeters: 100%
External Perimeters: 50%

Infill Settings:

Infill: 80mm/s
Solid infill: 100%
Top of solid infill: 70%

Support Material Settings:

Support material: 50mm/s
Support material interface: 100%
Bridges: 30mm/s
Gap fill: 30mm/s

Note: Print quality can be improved by reducing print speed. Surface quality in particular can be improved by reducing the speed of external perimeters below the 40mm/s which is specified above.

Brim width: 1mm

Note: for larger prints, a small brim improves the distribution of warp stresses and helps keep the print adhered to the print surface. Too large of a brim may add its own warp stresses.

Filament settings:

Diameter: 1.75mm 2.88mm
Extrusion multiplier: 0.95 0.95

You'll want to adjust this so that prints don't end up overstuffed. Note: different nozzle diameters may require adjustments to this setting.

Extruder Temperature:

First Layer: 205° C FilaOne™ Green, Yellow
210° C FilaOne™ Gray

Printed Object Removal:

To remove a print from the print surface, pry up an edge with a plastic coated razor blade or narrow paint scraper. The print should peel away from the print surface without a lot of pressure and without leaving significant marks on the print surface.

Note: If the print takes a lot of effort (and scraping) to remove, or leaves significant white marks, then you've welded it to the print surface. Adjust your settings before attempting another print. Try reducing the hot end temperature a few degrees in the next print job. If welding persists, reduce the print bed temperature a few degrees

Printing Adhesion Sheet Removal:

To remove the print adhesion sheet from a glass print bed:

1. heat the print bed to 100° C and let it cool a bit (down to 80c or so).
2. Peel the sheet off the print surface. Most of the adhesive will come away from the glass.
3. Remove any adhesive which remains on the glass by picking it up with the adhesive that stayed stuck to the bottom of the print sheet.
4. If nothing else works, soften the remaining adhesive with acetone and scrape away with a putty knife.

Note: The useful life of a printing adhesion sheet will vary based on a number of factors. To extend its useful life, try to vary the location of each print job so the same surface area is not used every time. Printing the same object repeatedly at exactly the same spot on the printing adhesion sheet will accelerate wear. If necessary, orient the next print so there is an overlap between a frequently used area and an unused area.

Printing Tips:

Like all true engineering grade plastics, this filament behaves differently from ABS or PLA. During printing, significant internal stresses are built up in the printed object. It is important to get strong adhesion for the first print layer to keep the print sticking to the printing adhesion sheet during the printing process. It is best to print slowly.

For objects longer than 3 inches long or wide, we recommend printing a "brim" along the perimeter of the object. A good starting point is printing the brim at a single layer, and approximately 2 mm wide.

For larger objects, we recommend printing “mouse ears” on each corner of the printed object. A good starting point for mouse ears is printing 4 layers thick and approximately 1/2 inch in radius from the corner of the printed object.

For very long printed objects that have long straight sides, we recommend using small “crenulations” at 90° perpendicular to the long axis of the print. These tiny indentations to the surface act like tiny springs to release internal stress. We suggest starting at 1 print layer deep and 1 print layer wide. If the side surfaces must be smooth for aesthetic reasons, you can try adding these to the bottom layer.

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