TECHNICAL DATA SHEET

FILAFLEX FOAMY

Description

Filaflex Foamy is a flexible TPU filament with dynamic foaming technology that reduces weight and density, delivering up to 30–40% more prints per spool. It allows adjustable hardness (82A down to 60A), customizable density, texture, and even color tone, all through printing parameters. Lightweight, versatile, and durable, ideal for efficient high-volume production, specially developed for 3D printing applications.

Key Features

- **Up to 40% Weight Reduction:** Print lightweight parts with tunable density
- **Dynamic Foaming:** Low temps give tough parts, high temps activate foaming
- **Flexible Hardness (82A-60A):** Adjustable hardness from Shore 82A down to 60A depending on foaming level
- **Enhanced Efficiency:** Achieve up to 40% more prints per spool
- **Color Control:** Fine-tune tones through temperature settings
- **Versatile Properties:** Customize expansion, texture, and performance
- **Soft, Skin-Friendly Texture:** Smooth, comfortable finish suitable

Professional Applications

- **Footwear Innovation:** Complete shoes, insoles, and soles
- **Cycling Components:** Lightweight grips and seats
- **Automotive Parts:** Cushioning elements and gaskets
- **Protection Equipment:** Impact-absorbing pads and gear
- **Sound Management:** Acoustic damping components

Certifications - ISO 10993 Tested & Regulatory Compliance

- **ISO 10993-5: 2009** - Cytotoxicity Test with Filaflex Foamy
- **ISO 10993-23: 2021** - Acute Skin Irritation Test with Filaflex Foamy

Resources

- Video: Discover how dynamic foaming technology works
- Video: Filaflex Foamy in Action
- Print Settings

Unique Characteristics of Filaflex Foamy

Filaflex Foamy contains a foaming agent that activates when heated, causing the material to expand during extrusion. At 100 % flow, the line width expands by approximately 37.5 % relative to the nozzle diameter. Adjust the flow rate accordingly to maintain the desired line width.

Color & Foaming Effect
As foaming increases, the material becomes lighter in color. Higher printing temperatures and lower flow rates enhance foaming and result in a lighter shade. This color variation is normal and confirms proper activation of the foaming agent.

Advanced Weight Reduction & Foaming Control

Further Weight Optimization:

· Flow rate can be reduced to 60% to achieve maximum weight reduction
· Lower volumetric speed allows more time for the foaming agent to activate during extrusion

Fine-tuning Guidelines:

- The optimal balance between flow rate and volumetric speed depends on:

  · Your specific printer's characteristics
  · Part geometry and requirements
  · Desired level of foaming effect

- Start with our recommended settings (75% flow) and gradually adjust:

  · Reduce flow rate in 5% increments (down to 60%)
  · Decrease volumetric speed by 10-15% to allow more foaming time
  · Monitor line width consistency and material color change

Important Consideration: Lighter material color indicates increased foaming activation. Aim for consistent color throughout your print to ensure uniform material properties.

Speed Settings
All speeds are calculated considering the expanded line width and optimized flow rate (75%) to ensure proper material behavior.

Retraction Settings
Due to the foaming nature of this material, stringing will be more pronounced than with standard TPU. Set travel speed to maximum (200-500mm/s) and ensure proper retraction settings to minimize stringing.

Physical Property*	Value	Unit	Test method according to
Material density	1120	kg/m³	ISO 1183

* Values refer to the characterization of the non-foamed filament, which may vary depending on the printing parameters.

Mechanical Property*	Value	Unit	Test method according to
Hardness (Shore A, 3 s). Measured in non-foamed state (85A)	85	—	ISO 7619-1
Tensile strength	45	MPa	DIN 53504-S2
Elongation at break	650	%	DIN 53504-S2

* Values refer to the characterization of the non-foamed filament, which may vary depending on the printing parameters.

Thermal Property*	Value	Unit	Test method according to
VST Vicat softening temperature (Method A, 10 N, 120 °C/h)	113	°C	ISO 306

* Values refer to the characterization of the non-foamed filament, which may vary depending on the printing parameters.

Printing Properties	Recommended
1. Material Preparation	
Drying Temperature	55 °C
Minimum Time	1 hour
Note	Drying is crucial for optimal results
2. Basic Parameters, Speed Settings and Retraction Settings	
Nozzle 0.4 mm	
Layer Height	0.2 mm
Line Width at 100% Flow	0.55 mm
Optimized Flow for 0.4 mm Line Width	75%
Volumetric Speed (mm³/s)	3.5 mm³/s
Temperature	248 °C
External Perimeter	50% - 15.91 mm/s
Internal Perimeters	75% - 23.86 mm/s
Infill	100% - 31.82 mm/s
Top/Bottom	60% - 19.09 mm/s
First Layer	30% - 9.55 mm/s
Retraction distance	2.5–5.0 mm
Retraction speed	65 mm/s
Retraction Z-Hop	0.2 mm
Nozzle 0.6 mm	

Layer Height	0.3 mm
Line Width	0.825 mm
Optimized Flow for 0.4 mm Line Width	75%
Volumetric Speed (mm^3/s)	7.9 mm^3/s
Temperature	248 °C
External Perimeter	50% - 15.96 mm/s
Internal Perimeters	75% - 23.94 mm/s
Infill	100% - 31.92 mm/s
Top/Bottom	60% - 19.15 mm/s
First Layer	30% - 9.58 mm/s
Retraction distance	2.5–5.0 mm
Retraction speed	65 mm/s
Retraction Z-Hop	0.2 mm
Nozzle 0.8 mm	
Layer Height	0.4 mm
Line Width	1.1 mm
Optimized Flow for 0.4 mm Line Width	75%
Volumetric Speed (mm^3/s)	14.0 mm^3/s
Temperature	250 °C
External Perimeter	50% - 15.91 mm/s
Internal Perimeters	75% - 23.86 mm/s
Infill	100% - 31.82 mm/s
Top/Bottom	60% - 19.09 mm/s
First Layer	30% - 9.55 mm/s
Retraction distance	2.5–5.0 mm
Retraction speed	65 mm/s
Retraction Z-Hop	0.2 mm
Nozzle 1.0 mm	
Layer Height	0.5 mm
Line Width	1.375 mm
Optimized Flow for 0.4 mm Line Width	75%
Volumetric Speed (mm^3/s)	21.9 mm^3/s
Temperature	252 °C
External Perimeter	50% - 15.93 mm/s
Internal Perimeters	75% - 23.89 mm/s
Infill	100% - 31.85 mm/s
Top/Bottom	60% - 19.11 mm/s
First Layer	30% - 9.56 mm/s
Retraction distance	2.5–5.0 mm
Retraction speed	65 mm/s
Retraction Z-Hop	0.2 mm

3. Bed Temperature

Small parts	Room temperature (no heating)

Large parts	50–55 °C

4. Cooling

General Fan	0% (keep fan always off)
Force fan on overhangs/bridges	OFF
Layers < 10 seconds	40% fan
First layer	0% (always)

5. Troubleshooting

Excessive expansion	1. Reduce temperature 2. Increase flow rate 3. Check actual line width
Insufficient foaming	1. Increase temperature 2. Decrease flow rate 3. Ensure proper drying
Excessive stringing	1. Increase travel speed 2. Optimize retraction 3. Reduce temperature if possible

6. Best Practices

- Keep filament dry – store and dry before use.
- Preferably use a direct drive extruder system.
- Print multiple small parts simultaneously for better results.
- Use maximum travel speed to minimize stringing.

Disclaimer

PLEASE NOTE: These printing parameters are initial recommendations based on our experience. They may need adjustment depending on your specific 3D printer, environmental conditions, and the geometry of the part you are printing. Use these settings as a starting point and fine-tune them according to your specific needs.

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