

Technical Data Sheet

Siraya Tech Flex TPU Air

Black



Product Introduction

Flex TPU Air Filament

Key Features

- **Tunable Results:** Controlled foaming via nozzle temperature.
- **Half the Weight:** Up to 50% lighter than standard TPUs.
- **Tunable Hardness:** Print between 63A and 78A Shore hardness.
- **Matte Finish:** Unique, fabric-like texture.
- **Easier Printing:** Stiffer pre-extrusion filament improves compatibility.
- **Strong Bonds:** Excellent layer adhesion for durable & flexible parts.

Application

Siraya Tech TPU Air is a unique foaming flexible material ideal for:

- **Lightweighting:** Significantly reducing weight for drone parts, robotics, and more.
- **Shock Absorption & Cushioning:** Creating insoles, seals, and various dampening components.
- **Customization:** Printing unique matte-textured wearables and accessories.
- **Functional Prototyping:** Rapidly validating prototypes requiring variable flexibility.



Property Data

Specifications	Data
Name	Flex TPU Air
Color	Black, White
SKU	ST3020, ST3021
Net weight (KG)	1
Gross weight (KG)	1.5
Package Dimensions	21*21*7.5 cm
Diameter (mm)	1.75±0.03
Material Type	Actively Foaming Thermoplastic Polyurethane (TPU)

Material Properties	Measure	Method
Filament Density (g/cm3)	1.15	ISO 1183
Melt Index (MFI)	8g/10min	190°C, 2.16kg

Property Data

Mechanical Properties	Print @ 240C	Print @ 250C	Method
Printed Part Density (g/cm ³)	0.88	0.7	ISO 845
Vicat Softening Temp (°C)	83	74	ISO 306
Hardness (Shore A)	78	71	ISO 7619
Tensile Yield Strength (MPa)	6.3	4.4	X-Y, ISO 527
Tensile Breaking Strength (MPa)	10.3	7.2	X-Y, ISO 527
Elongation at Break (%)	629	605	X-Y, ISO 527

Mechanical Properties	Print @ 260C	Print @ 270C	Method
Printed Part Density (g/cm ³)	0.59	0.51	ISO 845
Vicat Softening Temp (°C)	65	53	ISO 306
Hardness (Shore A)	68	63	ISO 7619
Tensile Yield Strength (MPa)	3.4	2.8	X-Y, ISO 527
Tensile Breaking Strength (MPa)	5.0	3.8	X-Y, ISO 527
Elongation at Break (%)	547	475	X-Y, ISO 527

Work Flow

Drying and Storage	
Note: TPU Air is hygroscopic (absorbs moisture), which severely impacts foaming and print quality, causing bubbles, stringing, and poor layer adhesion.	
Upon Opening	• Immediately place the spool in a filament dryer or a sealed container with plenty of active desiccant. • Aim for <15% humidity. • Print directly from the dry box if possible.
Storage	• Always store the spool back in the provided resealable bag with the desiccant pack. Ensuring it's tightly sealed.
Dry Steps	• Put the filament in a dedicated dryer or convection oven. • Dry 4-6 hours at 70°C - 80°C before printing.

Printing Profile

Printer	Download Link
BambuLab	Setting Profile
Creality	
Qidi	
Flashforge	

Work Flow

Recommended Printing Conditions

Parameter	Recommendation	Notes
Nozzle Temperature	230–270°C	Higher temps = more foaming (lighter/softer). 260°C recommended starting point.
Recommended Nozzle Diameter	0.4mm–0.8mm	0.4mm standard nozzle works well.
Build Plate Temperature	30–45°C	Avoid excessive heat to prevent over-adhesion.
Recommended Build Surface	• Glass (w/ PVP glue) • PEI (w/ release agent) • Steel Plate (w/ PVP glue) • PC Film	Use release agent (PVP glue, Magigoo) on PEI or highly adhesive surfaces.
Cooling Fan Speed	100	Helps solidify the foamed structure quickly.
Print Speed	30–60mm/s	Slower speeds generally improve quality. Up to 150 mm/s possible with careful tuning.
Retraction	Off Recommended	Set Distance & Speed to 0. Material expansion causes oozing; retraction is generally ineffective.
Flow Rate / Extrusion Mult.	See Below	MUST be reduced significantly at higher temps (e.g., ~55-60% @ 260°C). Calibration required.

Work Flow

Temperature vs. Hardness & Flow (Approximate Guide)

Print Temp (°C)	Approx. Shore Hardness	Resulting Properties	Starting Flow Rate (%)
230°C - 240°C	~85A	Denser, Stiffer, Less Foaming, Less Texture	~85% - 90%
250°C	~75A	Balanced Foaming, Noticeably Lighter/Softer	~65% - 70%
260°C	~70A	Optimal Balance, Good Foaming & Softness	~55% - 60%
270°C	~65A	Max Foaming, Lightest, Softest, Max Texture	~50% - 55%

Note:

Exact hardness and optimal flow rate depend on your specific printer, nozzle size, and other settings. Use this table as a starting point for calibration. It is important to dial in flow rate as it is related to the temperature and how much the tpu air expanded as well as the flow rate of the extruder.

Tips:

Taming the Ooze (Retraction)	• Active foaming materials naturally expand in the hotend, causing oozing during travel moves. Standard retraction settings are often ineffective. • Best Practice: Turn Retraction OFF in your slicer (set Retraction Distance and Speed to 0).
Minimize Travel	• Print one model at a time whenever possible. • Using your slicer's "sequential printing" feature can also help (if available and suitable for the model).

Work Flow

Tips:

Minimize Travel	Models designed with continuous extrusion paths (minimal jumping between features) will yield the cleanest results due to reduced oozing.
Perfect Plate Adhesion	Too Sticky? If prints bond too strongly (especially on PEI), use a release agent like PVP glue stick, Magigoo, or even a light mist of Windex before printing. Let the bed cool completely before attempting removal. Not Sticking? Ensure your bed is clean (wash with soap and water, then wipe with IPA) and perfectly leveled. A slightly slower, wider first layer (e.g., 20mm/s speed, 120% line width) can improve adhesion.