



Ultrafuse® PLA Tough

Tough, Biocompatible, Speed and Consistency

Launch Package
04-06-2024



Product overview

Key features

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Product overview

Key features

■ Engineering filament, Ultrafuse® PLA Tough

- ▶ The Ultimate Choice for an easy, sustainable, cost- and time-saving production of large components. It's user friendliness, making it a top choice for beginners and seasoned 3D printing enthusiasts alike.



Impact resistant
up to 34 kJ/m² and
annealed 54 kJ/m²



High Speed



Biocompatibility



Aesthetic / Visual



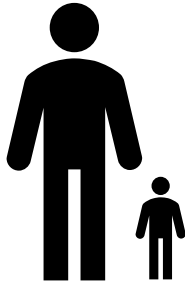
Heat resistance
up to 157 °C
when annealed



Post processable



Biobased



**Large scale
to fine detailed
Prints**

Product overview

Key features

■ **Ultrafuse® PLA Tough**

- ▶ The Ultimate Choice for an easy, sustainable, cost- and time-saving production of large components. It's user friendliness, making it a top choice for beginners and seasoned 3D printing enthusiasts alike.

Description:

Ultrafuse® PLA Tough is a highly versatile **biocompatible** and **biobased** material specially developed for the needs of professional users. It effortlessly accommodates validated **high printing speeds** up to 300mm/s*, without the need for any hardware adjustment while offering an exceptional surface finish and an impressive impact strength. Moreover, it boasts a notably high success rate for large print jobs, ensuring a straightforward and cost-effective printing process.

Ultrafuse® PLA Tough can be an alternative for ABS as it is more sustainable, strong and easy to print. As it is compatible with water-soluble BVOH support material, this biocompatible material which exhibits an impressive **impact strength - 720% higher than standard PLA** - is the perfect solution for printing **complex geometries** for demanding high volume applications.

Furthermore, Ultrafuse® PLA Tough parts can be **enhanced by annealing** the part in a separate process step, which can **increase the toughness** up to 230% and its **heat resistance** by 257%.

With Ultrafuse® PLA Tough, you can achieve sustainable, cost- and time-saving production of large components at rapid speeds while maintaining **impeccable surface quality**. Elevate your designs and projects to PRO levels with a filament that guarantees outstanding performance, **reliability, and consistency**.

*The stated printing speed of 300 mm/s is based on current validations. As equipment and technology continue to evolve, it is possible that even higher printing speeds may be attainable in the future.

Product overview

Key features

■ **Ultrafuse® PLA Tough**

- ▶ **Enhanced toughness:** 720% tougher than standard PLA
- ▶ **High speed printing:** 750% faster printing speeds than standard PLA print profiles with excellent surface finish
- ▶ **Biocompatible:** suitable for skin contact application
- ▶ **Ease of printing for high detail and large-scale prints:** High success rate for large prints and complex geometries and compatible with water soluble support Ultrafuse® BVOH
- ▶ **Stronger:** 133% stronger than printed ABS
- ▶ **Biobased**
- ▶ **Heat resistance:** up to 157°C Vicat A 10N and 94°C HDT B at 0.45MPa when annealed
- ▶ **Annealable:** can enhance printed parts for impact resistance (toughness) and heat resistance.
When annealed the heat resistance is increased by 257%, **157°C Vicat A 10N, 94°C HDT B** at 0.45MPa; as the impact strength increased by 230% for **Charpy notched 19,8 kJ/m², and 54,1 kJ/m².**

Product overview

Product configuration offer

- **Engineering filaments**

- **Ultrafuse® PLA Tough**

- ▶ **Weights:** 750g, 1000g, 2000g, 4000g, 8000g
- ▶ **Diameters:** 1.75 and 2.85mm
- ▶ **Colors:** Black and Natural



Impact resistant



High Speed



Biocompatibility



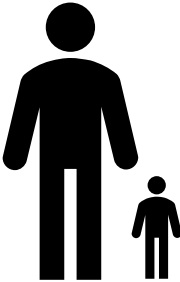
Aesthetic / Visual



Post processable



Biobased



Large scale
to fine detailed
Prints




Ultrafuse® PLA Tough

Target audience

- **Hobbyists and Makers:** Enthusiasts seeking durable prints with intricate details for various projects.
- **Professionals:** Engineers, designers, and architects requiring functional prototypes and models with enhanced toughness and speed, from detailed to large scale printed parts..
- **Industries:** Healthcare, automotive, aerospace, consumer electronics, and more, where rapid prototyping and production of durable and sustainable parts are crucial.
- **Applications:** Jigs & fixtures, orthotics and prostheses, functional prototyping, tooling and manufacturing aids.
- **Challenges the largest filament market, the filament ABS business:** Ultrafuse® PLA Tough outperforms PLAs in many ways and provides higher strength (+133%) when compared to ABS filament but it is as easy to print like regular PLA. With the current global market development in the search of sustainable alternatives the fossil-based ABS, this ABS market can be challenged if it would have similar properties and being bio based. The PLA Tough can outperform ABS on mechanical properties and when annealed it has a similar heat resistance for HDT B. Further, PLA Tough has no styrene emissions during printing.

Ultrafuse® PLA Tough

Product portfolio positioning and comparison

	Ultrafuse® PLA Tough 	PLA 	Ultrafuse® PRO1 	ABS
Toughness	● ● ● ● ●	● ○ ○ ○ ○	● ● ● ○ ○	● ● ● ● ●
Strength upright ZX	● ● ● ● ●	● ● ● ○ ○	● ● ● ○ ○	● ● ● ○ ○
Strength flatwise XY	● ● ● ● ○	● ● ● ○ ○	● ● ● ● ●	● ● ● ○ ○
Elongation at break	● ● ● ● ○	● ● ○ ○ ○	● ● ○ ○ ○	● ● ● ● ○
Print speed vs surface aesthetics	● ● ● ● ○	● ● ○ ○ ○	● ● ● ● ●	● ● ● ● ○
Surface finish	● ● ● ● ○	● ● ● ○ ○	● ● ● ● ●	● ● ● ● ○
Pricing MSRP	● ● ● ○ ○	● ○ ○ ○ ○	● ● ● ● ○	● ● ○ ○ ○
Pricing MSRP per kg	€32,95/kg	€21,12/kg	€44,67/kg	€33/kg

Lowest rating: ● ○ ○ ○ ○

Highest rating: ● ● ● ● ●

The displayed MSRP pricing displayed is for reference only and may vary depending on the region and currency and is subjected to change without prior notice. The latest and most accurate pricing for the Ultrafuse PLA Tough and other products are available on request by contacting sales@basf-3dps.com.

Ultrafuse® PLA Tough

Product portfolio positioning and comparison

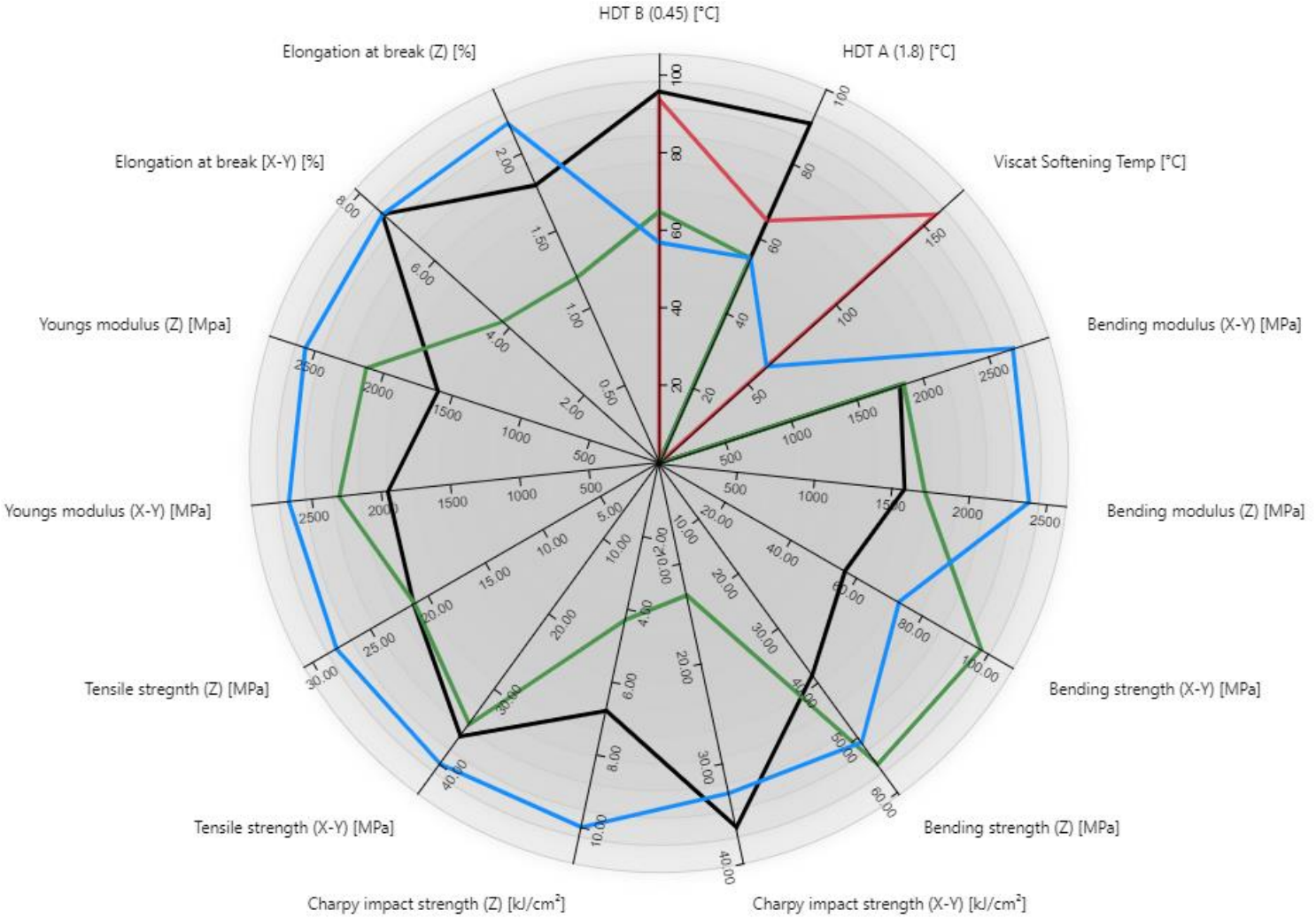
How to choose the right type of PLA, “simplified”?

- **Ultrafuse® PLA:** Offer PLA for affordable, easy, and colorful 3D prints with no warping, ideal for basic projects and beginners.
- **Ultrafuse® PLA Tough:** Recommend PLA Tough for the toughest and durable biocompatible 3D prints, stronger than regular PLA or ABS, without sacrificing surface quality when printing faster. The material for cost-effective and durable functional parts without fear for delamination and warping.
- **Ultrafuse® PRO1:** Suggest PLA PRO1 for top-tier 3D prints that demand the best aesthetics, slightly tougher than PLA but the fastest to print with no warping issues, ideal for premium projects. A biocompatible material for quality-conscious customers.

Ultrafuse® PLA Tough

Ultrafuse® PLA Tough a stronger and a sustainable alternative for ABS without styrene emissions during 3D printing.

- Materials
- Ultrafuse ABS
 - Ultrafuse PLA Tough Annealed
 - Ultrafuse PLA
 - Ultrafuse PLA Tough



Battlecard Ultrafuse® PLA Tough

Material Overview

Ultrafuse® PLA Tough is the ultimate choice for an easy, sustainable, cost- and time-saving production of large components. It's user friendliness, making it a top choice for beginners and seasoned 3D printing enthusiasts alike.

Why? PLA Tough was developed as a tough and high-speed engineering thermoplastic. This material prints as easy as standard PLA at higher speed and excellent mechanical properties and surface quality.

When? If a customer wants to print focused on toughness, speed and/or skin contact applications.

Target Customers/Industries

- Skin contact applications
- Jigs & fixtures, functional prototyping
- Orthotics and prostheses
- Large scale prints
- Non electronic housings
- Alternative for ABS

Customer Pain

- Biocompatible tough PLA for **skin contact applications**.
- Low volume and low investment solution for functional tough prototypes and needs a time oriented solution.
- Need for an easy to finish tough solution, easy post-processing like milling, sanding and painting.
- For repeatable and reliable prints, high volume printing.
- A biobased alternative for fossil-based ABS, it is 1.33x stronger than ABS, is easy and repeatable to print, and has no styrene emissions during printing.

Key Features

- **720% tougher** than standard PLA
- Stronger and biobased alternative for ABS
- **750% faster** printing speeds than standard PLA with excellent surface finish.
- **133% stronger** than ABS
- Very easy to print
- Biocompatible
- Annealable, increasing toughness and heat resistance
- High success rate for large prints and complex geometries

Validated Printers

- Ultimaker
- Raise3D
- Bambulabs
- Prusa
- BCN3D
- BigRep

Differentiators

- Biocompatibility
- Traceability of the products, QR code to access CoA
- Repeatability and reliability
- Availability on different spool sizes: 750g till 8000g
- Comprehensive TDS and full MSDS available
- Global support of local legislation
- Compatible with water soluble support Ultrafuse BVOH
- Material delivered by an ISO 9001:2015 certified provider

FAQ

Is this material biocompatible?

We have performed skin contact tests especially for this material. The product information sheet is available in our data exchange cloud.

What makes this material different from normal PLA?

Ultrafuse® PLA Tough is fast and reliable to print compared to other PLAs making it the perfect candidate for engineering applications. Further, the printed part is annealable by which the **heat resistance** can be increased by 257%, 157°C Vicat A 10N, 94°C HDT B at 0.45MPa; as the **impact strength** increased by 230%, for charpy (notched) 19,8 kJ/m² and 54,1 kJ/m² unnotched.

Use Cases

Pneumatic regulator housing, high speed printing reducing manufacturing downtimes where part durability is needed.

Documentation Partner Resource Center

- Multi language TDS based on printed parts:
 - Mechanical data in three printing orientations
 - Annealing guideline
 - Stress strain and Flexural strength graph
- Biocompatibility statement
- BPA free statement
- BSE free statement
- MSDS, REACH, RoHS, WEE
- High speed and standard print profile availability

Evidence of Value

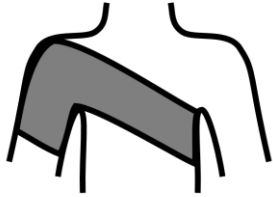
Ultrafuse® PLA Tough



Ultrafuse® PLA Tough for skin contact applications

■ Ultrafuse® PLA Tough successfully passed the following biocompatibility tests, the material is evaluated on 3D printed specimens according to the standards:

- ▶ Cytotoxicity XTT Test - Neutral red (ISO 10993-5:2009)
- ▶ Skin Irritation Test (ISO10993-10:2013)
- ▶ Skin Sensitisation Test - Local Lymph Node Assay KretinoSens (ISO10993-10:2020)



Biocompatibility



Contact:
BASF 3D Printing Solutions B.V.
Eerste Bokslottweg 17
7821 AT Emmen, The Netherlands
sales@basf-3dps.com
www.forward-am.com

Ultrafuse® PLA Tough material is 3D printed as test specimens and successfully passed the requirements of the stated tests below:

- **Cytotoxicity XTT Test - Neutral red (ISO 10993-5:2009)**
The extract of the product Ultrafuse® PLA Tough resulted in a cell vitality of more than 70% in comparison to the negative control and can therefore be considered to be not cytotoxic.
- **Skin Irritation Test (ISO 10993-23:2021)**
All 10 volunteers exhibited no dermal changes in the test zone at 24h, 48h and 72h when exposed to Ultrafuse® PLA Tough.
- **Skin Sensitisation Test - Local Lymph Node Assay KretinoSens (OECD 442D and ISO 10993-10:2021)**
The extracts of the product Ultrafuse® PLA Tough resulted in an induction of the luciferase activity of less than 1.5 times compared to the DMSO control and is therefore to be assessed as non-sensitizing.

The performed biocompatibility tests were recorded on test specimen of the above referenced product to show compatibility of the material in general. The biocompatibility tests listed are not part of any continuous production protocol. The test assessments reflect only the test specimen and have to be retested on the final product. It remains the responsibility of the device manufacturers and/or end-users to determine the suitability of all printed parts for their respective application.

Disclaimer:
We give no warranties, expressed or implied, concerning the suitability of above-mentioned product for use in any medical device and pharmaceutical applications.

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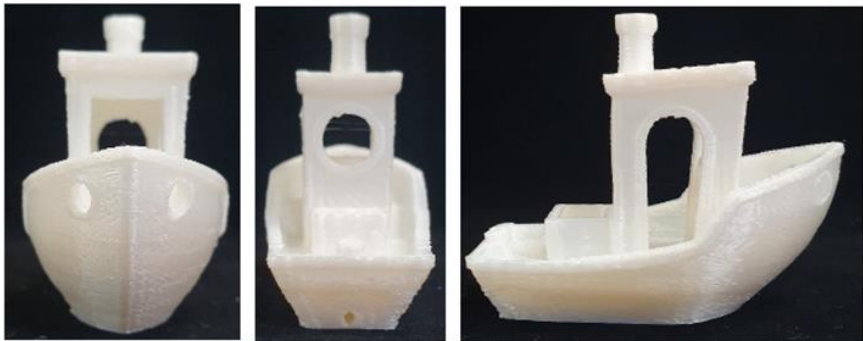
Biocompatibility Statement_Ultrafuse® PLA Tough_EN_V1.0

Ultrafuse® PLA Tough

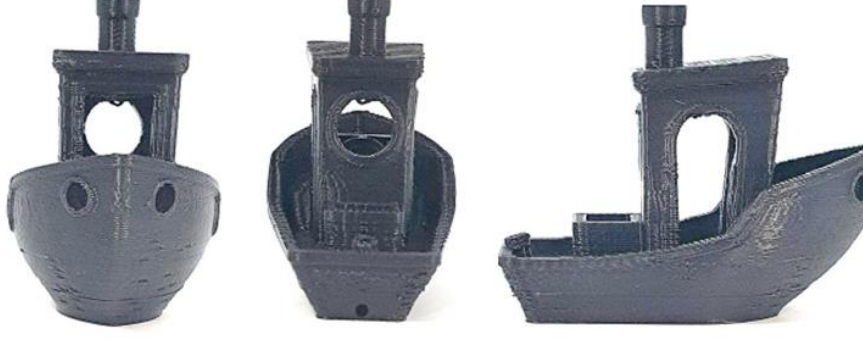
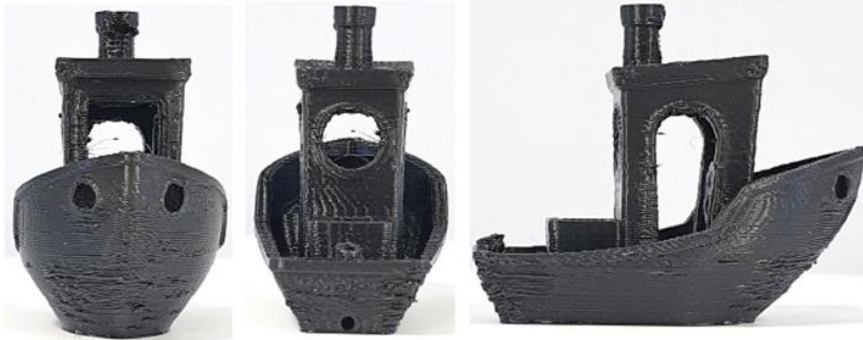
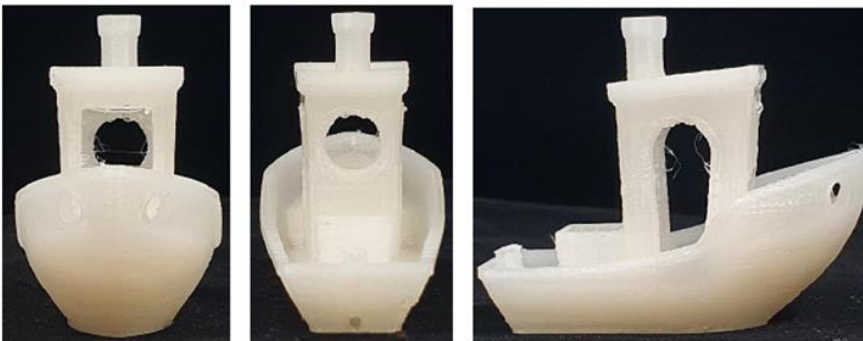
Benchy printed on Ultimaker S5 high speed (100mm/s), **better surface aesthetics**



PLA



Ultrafuse® PLA Tough



Ultrafuse® PLA Tough

Up to 300mm/s validated, with excellent surface quality



High Speed



Aesthetic / Visual



Validated on Raise3D PRO3 HS and a Bambu Lab, 300mm/s, high speed printing profile available.

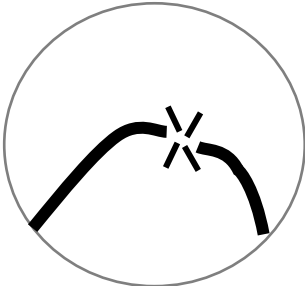
¹Fast printing might require an additional increase of the nozzle temperature; the stated printing speed of 300 mm/s is based on current validations. As equipment and technology continues to evolve, it is possible that even higher printing speeds may be attainable in the future.

Ultrafuse® PLA Tough

Large scale prints

When you need toughness in large parts, PLA Tough is an easy-to-print and reliable material, ideal for printers with a larger build volumes. This part is printed completely without issues, overall aesthetics and print performance look excellent at the first trial.

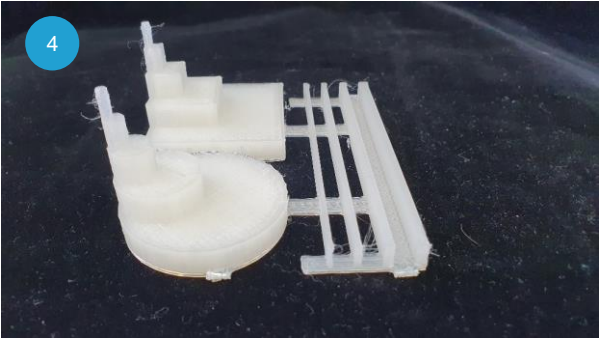
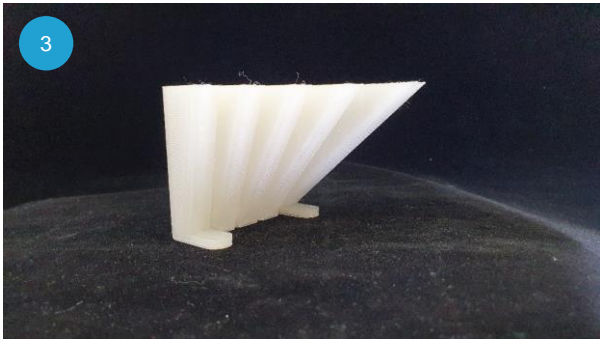
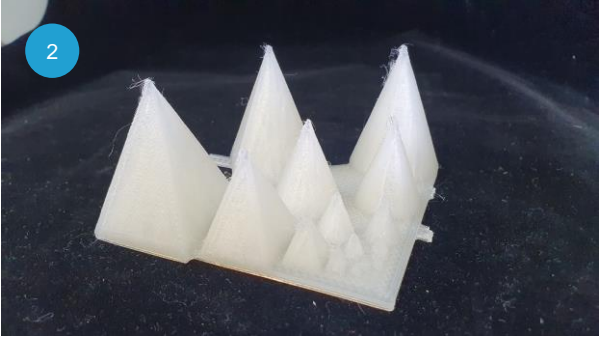
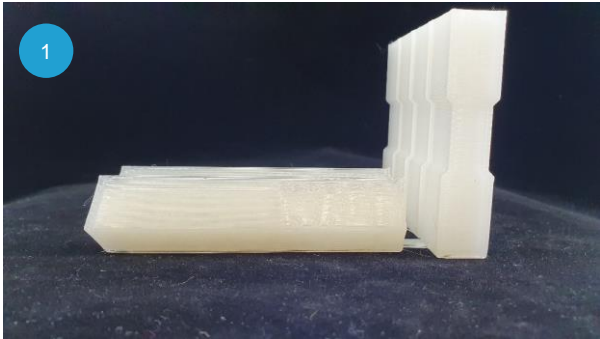
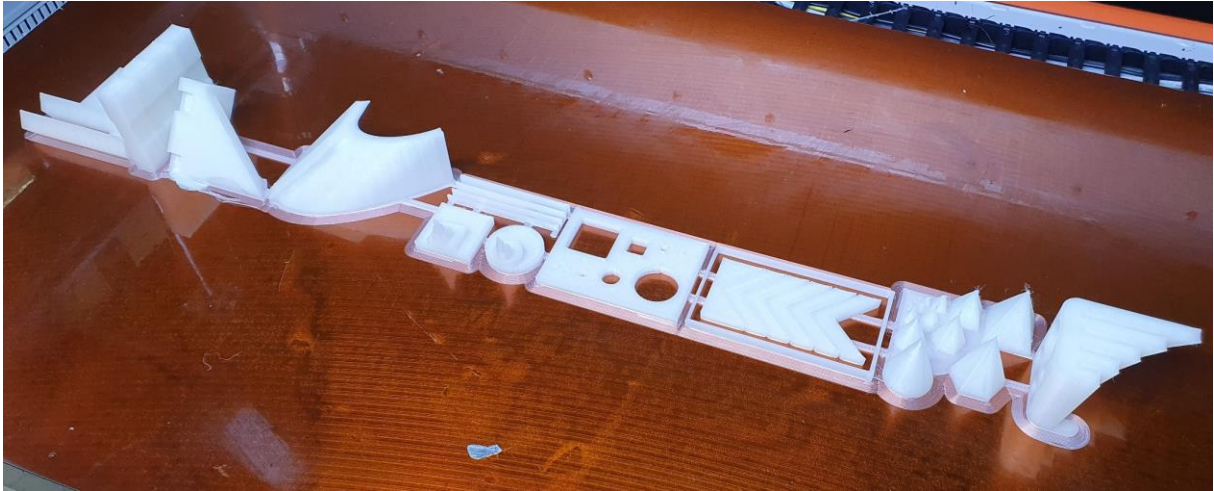
- 1. Build plate adhesion is good, no visible warp, no deformation at corners.
- 2. Retraction pyramids look clean, only thin oozing (hairs) visible. (can potentially be improved when using new nozzle)
- 3. Overhang performance is excellent, all overhangs printed correctly,
- 4. Dimensional accuracy is excellent, max deviation of only 0.1mm.



Tough to break



Large scale Prints



Large scales parts printed on a Big Rep Studio G2

Annealing your Ultrafuse® PLA Tough parts for better performance

- Annealing of polymer materials is a heat treatment process that involves subjecting a polymer to a controlled heating and cooling cycle to modify its properties. This process is commonly used to enhance the mechanical, wear and thermal properties of polymers.

Annealing Recommendations for Performance Enhancement

Equipment	Use an oven which can heat up to ~120°C.	
Part preparation	Place the parts inside the oven. Fix larger parts to avoid potential deformation during the annealing process.	
Annealing Process	Heating	From room temperature to 120°C / 248 °F in ~15 min (ramp up time).
	Holding the temperature	120°C / 248 °F for 30 min (thicker parts might require a longer time).
	Cooling	From 120°C / 248 °F to room temperature in ~15 min (ramp down time).



Annealing your Ultrafuse® PLA Tough parts for better performance

- When annealed printed parts showed a heat resistance increased by **257%**, 157°C Vicat A 10N; and the impact strength increased by **230%** for charpy (notched).
- Dimensional changes after annealing 120 °C, 60 minutes remained below +2% in the Z orientation (height) and a shrinkage below -1% in the XY orientation (width). The dimensional accuracies are measured on a DIN EN ISO 527 Type 1A tensile bars, nominal thickness of 4 mm and a nominal width of 10 mm.

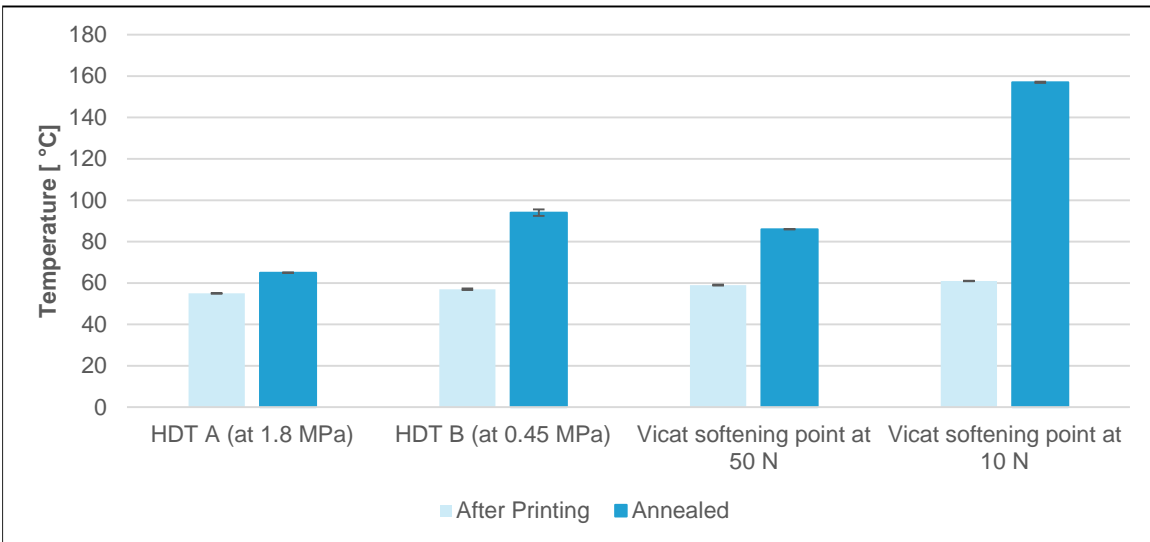


Figure 1: Heat resistance of the material after printing and annealed

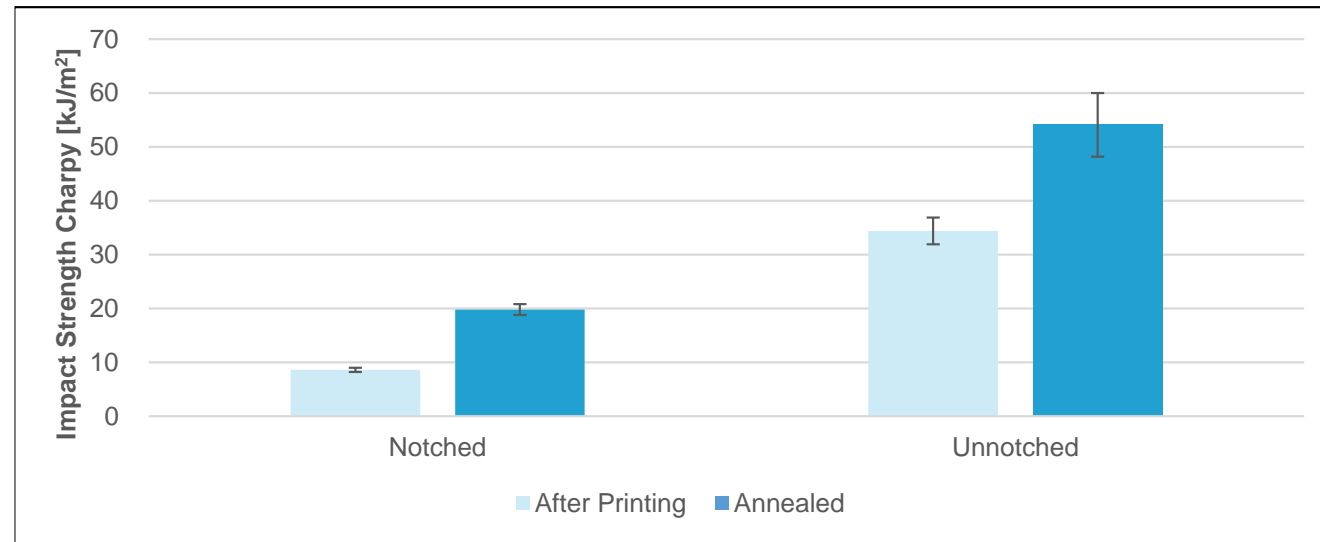


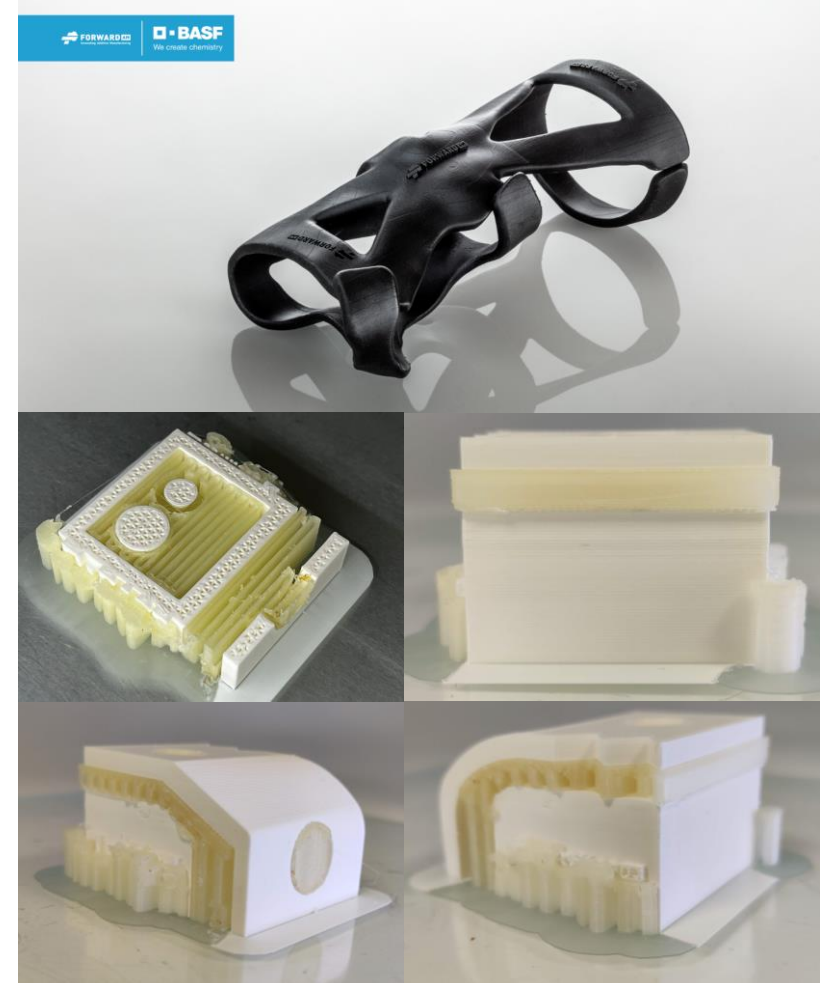
Figure 1: Impact Strength Charpy after printing vs. annealed (Printed in XZ-orientation)

Ultrafuse® PLA Tough

Achieve complex geometries

PLA Tough for designs with intricate curves, fine details, and large overhangs with sharp corners can be easily printed with PLA Tough, especially when combined with breakaway or water-soluble Ultrafuse® BVOH support.

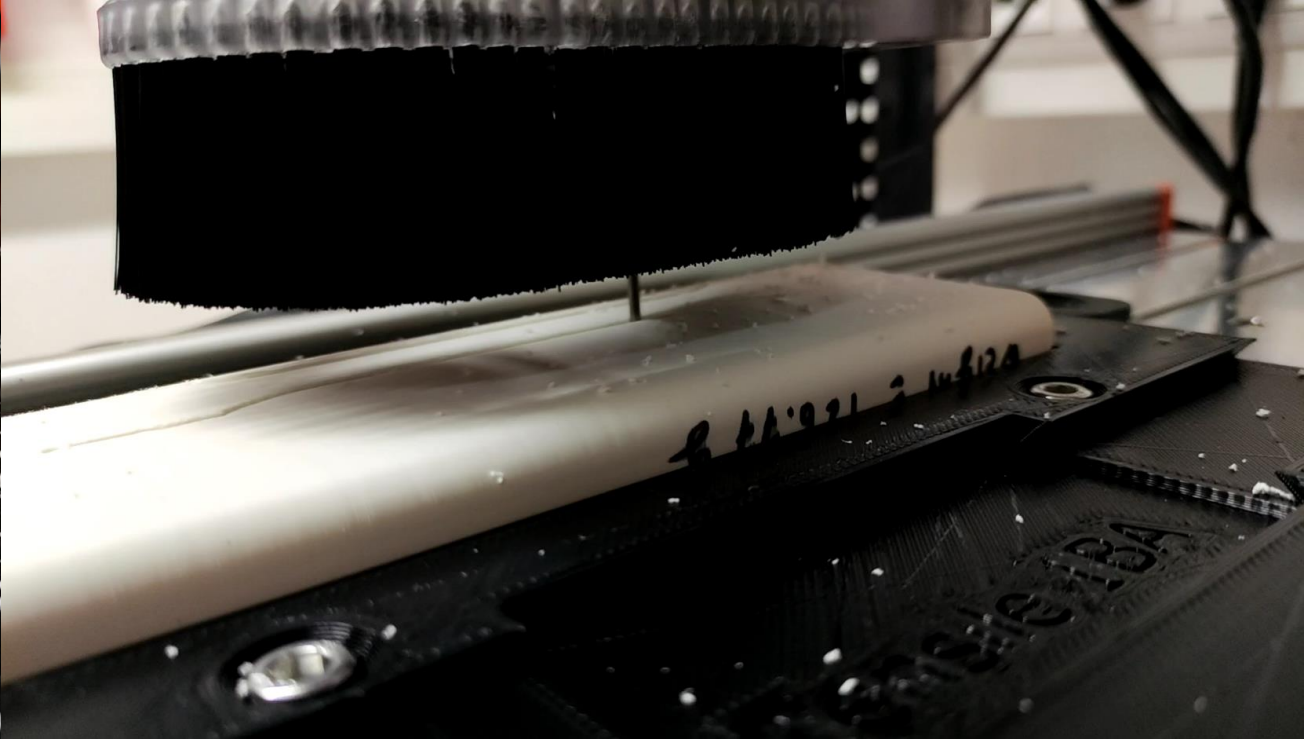
- Ultrafuse® BVOH water soluble support compatible with Ultrafuse® PLA Tough



Ultrafuse® PLA Tough

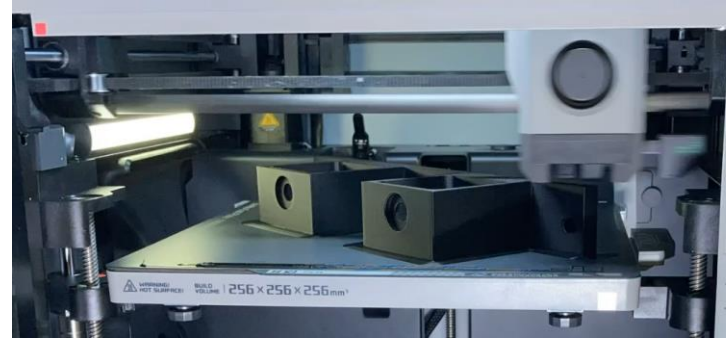
Post processing example – CNC milling

■ Showing PLA Tough during a CNC milling operation:



Use case

High-Speed 3D printing reduces operational downtime



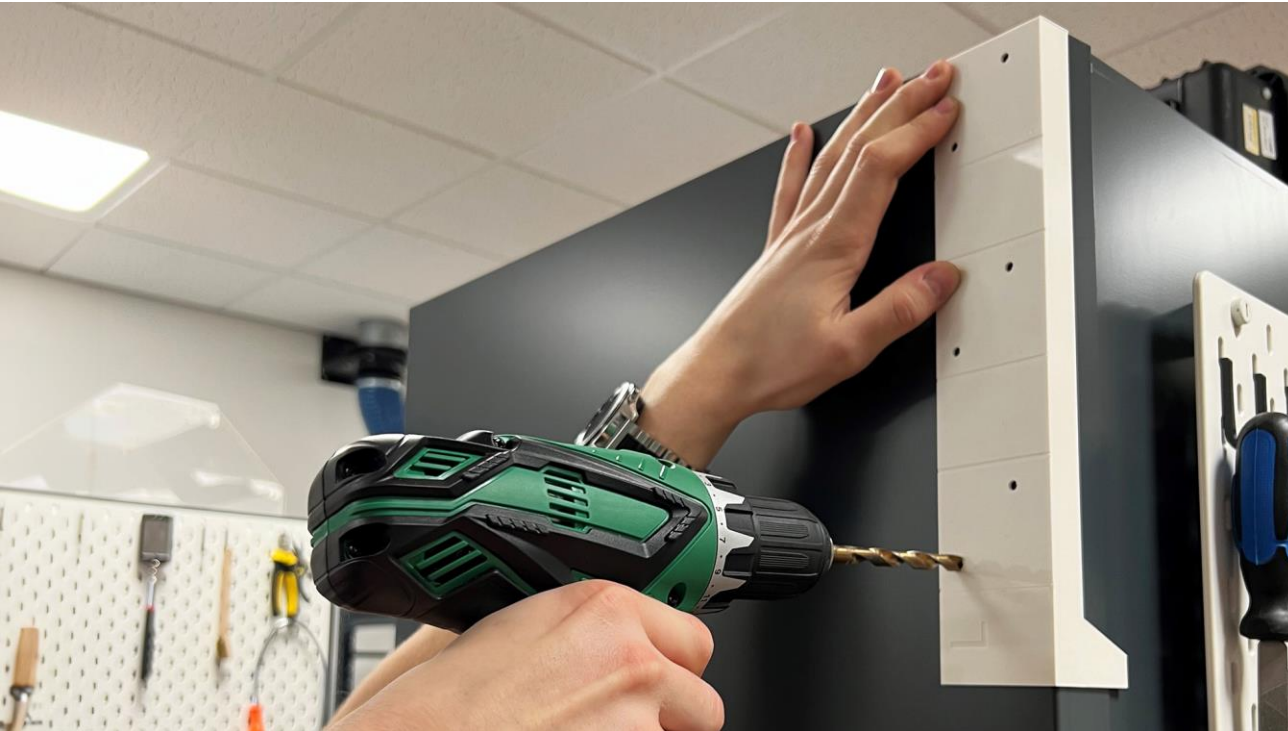
Pneumatic regulator mounting bracket, please [read the use case](#).

- In a continuous manufacturing setting, a unique challenge arose: the need to install pneumatic regulators on new machines within one production shift of 8 hrs.
- Traditional methods proved insufficient, so the team turned to 3D printing with Ultrafuse® PLA Tough for **durability** and design freedom. They designed a custom fixture, leveraging 3D printing's precision.
- The use of PLA Tough's high-speed compatibility and high-speed printing profile reduced the printing time **by 250%** (13 hours 31 minutes standard PLA, 3hours 50 minutes for Ultrafuse® PLA Tough).
- This efficiency allowed them to complete the entire process, from design to assembly, within a single working day, minimizing downtime and maximizing manufacturing efficiency.
- This case exemplifies 3D printing's ability to solve specific challenges and enhance productivity in industrial settings, without long lead-times, and excessive costs for customized parts.



Use case

Alignment Jig 3D Printed with Ultrafuse® PLA Tough



Reusable alignment jig that allows to precisely drill holes:

- **Accurate Printing:** PLA Tough has minimal shrinkage compared to other filaments like standard ABS, allowing for precise dimensional control during printing. This ensures the holes in the jig align with the holes on the work piece.
- **Repeated Accuracy:** Consistent printing properties of PLA Tough lead to repeatable results. You can print multiple jigs with the confidence that the hole placements can be identical.
- **Why Ultrafuse® PLA Tough?** Standard PLA, while offering good print quality, it's too brittle for this application. It could crack or break under the pressure of drilling, or when dropped on the floor, this is compromising the jig's functionality and potentially damaging the work piece.

By combining accurate printing with **720% higher** impact resistance than regular PLA, PLA Tough makes a perfect material for a reusable drilling jig.

Processing conditions Ultrafuse® PLA Tough



Ultrafuse® PLA Tough

Processing parameters

Recommended 3D-Print processing parameters		Used for test specimens
Printer	FFF printer	Ultimaker S5
Nozzle Temperature ¹	200 – 220 °C / 392 – 428 °F	220 °C / 428 °F
Build Chamber Temperature	-	Indirect heating (cover)
Bed Temperature	50 – 70 °C / 122 – 158 °F	60 °C / 140 °F
Bed Material	Glass	Glass
Nozzle Diameter	≥ 0.4 mm	0.4 mm
Print Speed	40 – 300 mm/s ¹	40 mm/s

- Please check your standard and/or high speed print profile availability for an easy start at www.forward-am.com.
- ¹Fast printing might require an additional increase of the nozzle temperature; the stated printing speed of 300 mm/s is based on current validations. As equipment and technology continues to evolve, it is possible that even higher printing speeds may be attainable in the future.

Print profiles, standard and high-speed profiles:



Prusa



Product QR code

Ultrafuse® PLA Tough



Ultrafuse® PLA Tough

Product QR Code, located on the spool label

Easy to use feature too access up-to-date product information seamlessly:

- Technical data sheet
- Product quality assurance report (CoA)
- Material landing page, print profiles, ...
- Survey, to collect end-user feedback
- Product sustainability statement (Showing our product sustainability journey)



Ultrafuse® PLA Tough

Access our **Technical Data Sheet** for 3D printer settings and material properties.

[Technical Data Sheet](#)

Access your **product quality assurance report** through our Certificate of Analysis (CoA) database and enter the unique five-digit batch number, which is located on the spool label.

[CoA Database](#)

Access our **material landing page** for: Print Profiles, Product Leaflet, Technical Data Sheet, Safety Data Sheet, Use Cases and more (Specific content available in multiple languages).

[Material Landing Page](#)

Your feedback matters, take our **2 minute survey** now and help us to drive innovation and advance our next product.

[Give your Feedback!](#)

Content overview

Ultrafuse® PLA Tough



Technical Data Sheet - Extended

Ultrafuse® PLA Tough

- It mentions the available spool sizes and it dimensions

Technical Data Sheet for Ultrafuse® PLA Tough

Version No. 2.1

Filament Properties		
Filament Diameter	1.75 mm	2.85 mm
Diameter Tolerance	±0.050 mm	±0.1 mm
Roundness	0 - 0.050 mm	
Available Spool size	750 g, 1.0 kg, 2.0 kg, 4.0 kg, 8.0 kg	
Available colors	Natural, black	

Spool Properties					
Available Spool size	750 g	1.0 kg	2.0 kg	4.0 kg	8.0 kg
Outer diameter	200 mm	200 mm	300 mm	350 mm	355 mm
Inner diameter	50.5 mm	52 mm	51.5 mm	51.7 mm	36 mm
Width	55 mm	67 mm	103 mm	103 mm	167 mm

Technical Data Sheet - Extended Ultrafuse® PLA Tough



- It extended with annealing settings and the material enhancements an increase heat resistance and impact

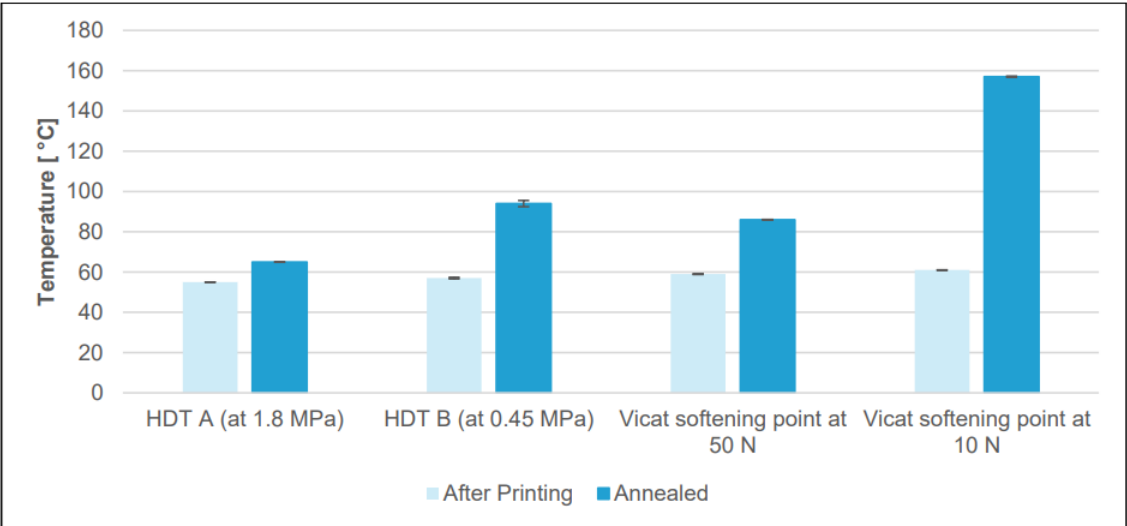


Figure 1: Heat resistance of the material after printing and annealed

XZ
On its edge (annealed)
-
-
-
75 MPa / 10.9 ksi
2410 MPa / 349.5 ksi
No break
8.6 kJ/m ² (19.8 kJ/m ²)
34 kJ/m ² (54.1 kJ/m ²)
7,1 kJ/m ²
27 kJ/m ²

Technical Data Sheet - Extended Ultrafuse® PLA Tough

- It is extended with stress strain and flexural stress strain curves

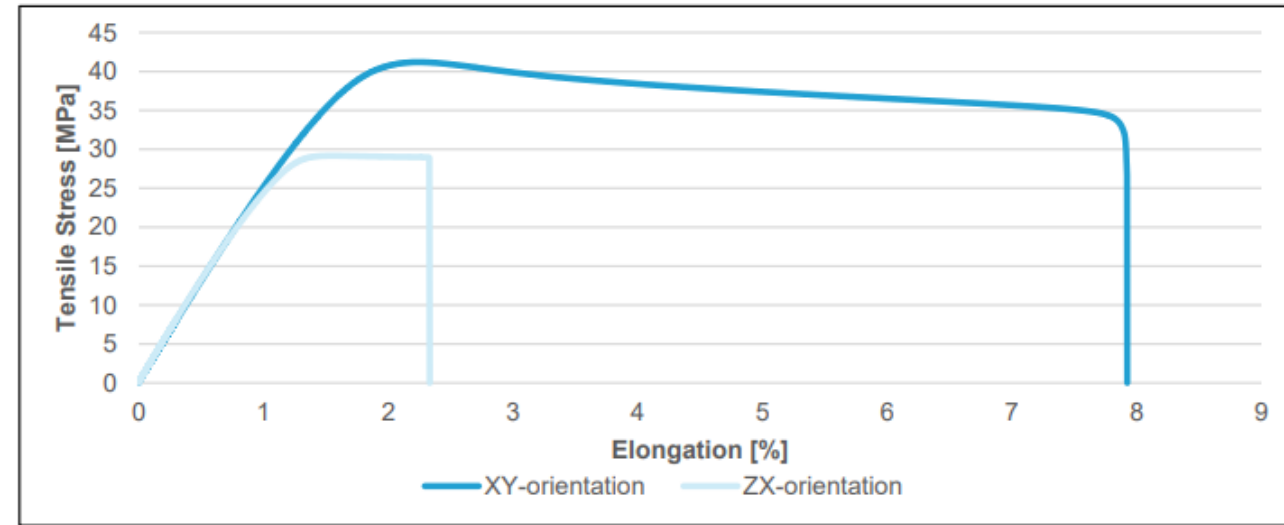


Figure 3: Typical Tensile Stress-Strain curves for the XY and ZX print orientation.

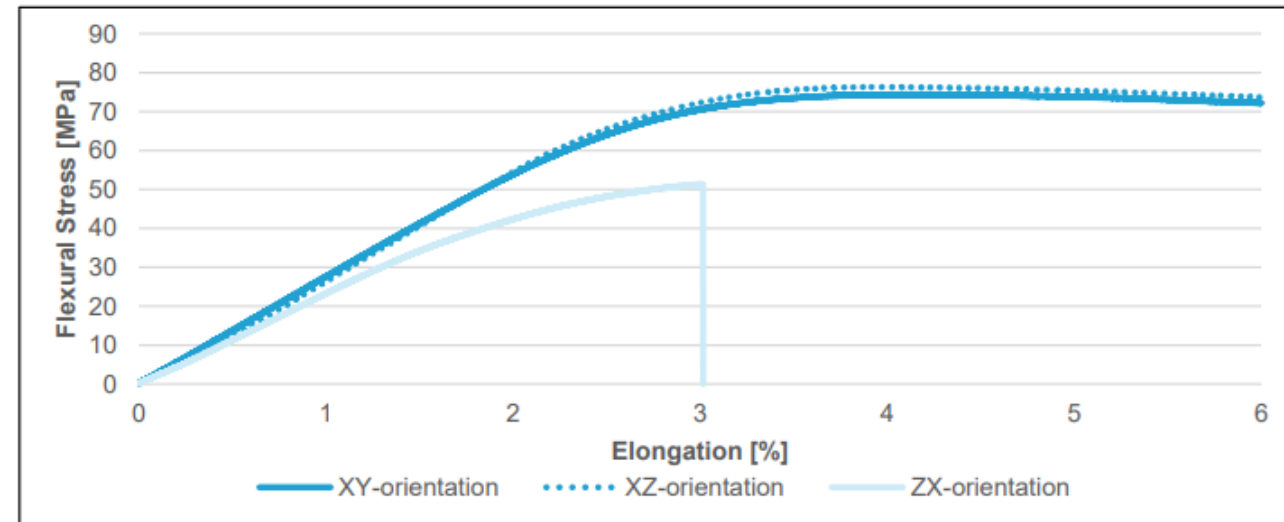


Figure 4: Typical Flexural Stress-Strain curves for the XY and ZX print orientation.

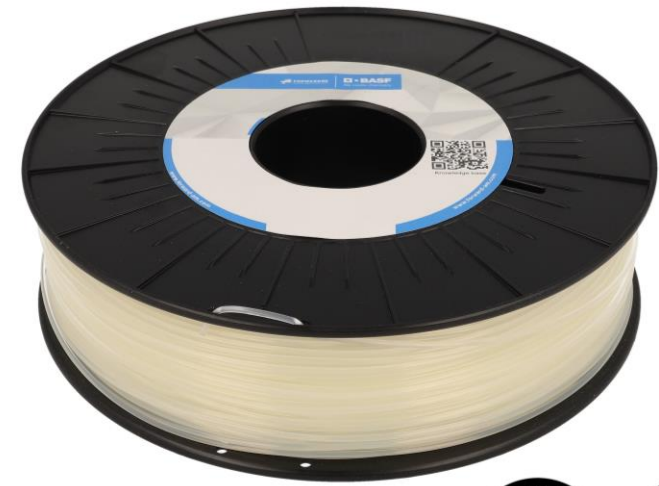
Content overview

For the latest updates, please access the [Partner Resource Center](#)

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■ **Ultrafuse® PLA Tough**

- ▶ Technical Data Sheets (TDS), available in multiple languages:
English, German, Spanish, France, Chinese (Simplified)
 - [EN](#), [DE](#), [ES](#), [FR](#), [ZH](#)
- ▶ Material Safety Data Sheets (MSDS), available in multiple languages and countries:
 - [Ultrafuse® PLA Tough Black](#), [Ultrafuse® PLA Tough Natural](#)
Australia, Canada, Austria, China, Germany, Spain, France, Great Britain, Italy, The Netherlands, Norway, New Zealand, Philippines, Singapore, Thailand, Turkey, Taiwan, USA, Brazil, Malaysia, Indonesia, and Japan.
- ▶ Print profiles, standard and high-speed profiles:
 - [Ultimaker](#), [Bambu Lab](#), [Prusa](#), [Raise 3D](#), [BCN3D](#), overview document [Printer Profiles Availability](#)
- ▶ [Biocompatibility statement](#)
- ▶ [Initial Product Launch Package](#)
- ▶ [Images](#), spool pictures, icons, printed parts and applications.
- ▶ [Use case](#), pneumatic regulator housing
- ▶ [Launch video](#)
- ▶ [REACH and SVHC](#), [RoHS](#), [WEE](#)
- ▶ [Product Sustainability Information for products produced within the EU](#)
- ▶ [BPA-Bisphenol A Statement](#)
- ▶ [BSE Bovine Spongiform Encephalopathy Statement](#)



Content overview

BI number	ART no. Cobalt	ART no. SAP B1	BI name/mat. description	Portfolio	Category
1106972	50827870	PLAT-0501a075	Ultrafuse® PLA Tough Natural 1,75mm 750G	AES	Engineering Filaments
1106972	50827901	PLAT-0501b075	Ultrafuse® PLA Tough Natural 2,85mm 750G	AES	Engineering Filaments
1106972	50838018	PLAT-0501a100	Ultrafuse® PLA Tough Natural 1,75mm 1KG	AES	Engineering Filaments
1106972	50838019	PLAT-0501b100	Ultrafuse® PLA Tough Natural 2,85mm 1KG	AES	Engineering Filaments
1106972	50827971	PLAT-0501a200	Ultrafuse® PLA Tough Natural 1,75mm 2KG	AES	Engineering Filaments
1106972	50827972	PLAT-0501b200	Ultrafuse® PLA Tough Natural 2,85mm 2KG	AES	Engineering Filaments
1106972	50827959	PLAT-0501a400	Ultrafuse® PLA Tough Natural 1,75mm 4KG	AES	Engineering Filaments
1106972	50827960	PLAT-0501b400	Ultrafuse® PLA Tough Natural 2,85mm 4KG	AES	Engineering Filaments
1106972	50828001	PLAT-0501a800	Ultrafuse® PLA Tough Natural 1,75mm 8KG	AES	Engineering Filaments
1106972	50828002	PLAT-0501b800	Ultrafuse® PLA Tough Natural 2,85mm 8KG	AES	Engineering Filaments
1107025	50828010	PLAT-0502a075	Ultrafuse® PLA Tough Black 1,75mm 750G	AES	Engineering Filaments
1107025	50828021	PLAT-0502b075	Ultrafuse® PLA Tough Black 2,85mm 750G	AES	Engineering Filaments
1106972	50838020	PLAT-0502a100	Ultrafuse® PLA Tough Black 1,75mm 1KG	AES	Engineering Filaments
1106972	50838031	PLAT-0502b100	Ultrafuse® PLA Tough Black 2,85mm 1KG	AES	Engineering Filaments
1107025	50828022	PLAT-0502a200	Ultrafuse® PLA Tough Black 1,75mm 2KG	AES	Engineering Filaments
1107025	50828023	PLAT-0502b200	Ultrafuse® PLA Tough Black 2,85mm 2KG	AES	Engineering Filaments
1107025	50828024	PLAT-0502a400	Ultrafuse® PLA Tough Black 1,75mm 4KG	AES	Engineering Filaments
1107025	50828025	PLAT-0502b400	Ultrafuse® PLA Tough Black 2,85mm 4KG	AES	Engineering Filaments
1107025	50828026	PLAT-0502a800	Ultrafuse® PLA Tough Black 1,75mm 8KG	AES	Engineering Filaments
1107025	50828027	PLAT-0502b800	Ultrafuse® PLA Tough Black 2,85mm 8KG	AES	Engineering Filaments

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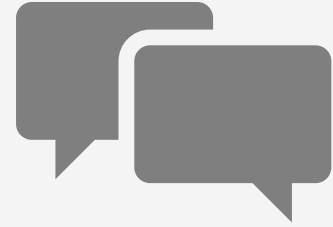
Ultrafuse® PLA Tough

Contact Details

At Forward AM we strive to provide you with the best service possible.

If you have **questions about our materials, technologies or services**, or would like to **request an expert consultation**, we will be delighted to hear from you!

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