

Absorv™ Products

Bioabsorbable Extrusions

Overview-

Absorv™ bioabsorbable products are particularly well-suited for medical applications seeking an alternative to metal and long-term implantable components. Absorv™ products are produced from synthetic polyesters, primarily homopolymers and copolymers of poly(L-lactide) (PLLA), poly(glycolide) (PGA), poly(ε-caprolactone) (PCL), and polydioxanone (PDO). These polymers offer a baseline for the design of copolymers, terpolymers, and blends with mechanical properties and absorption profiles tailored to meet the demands of specific medical applications.

Various products are available within the Absorv™ product family, including, but not limited to, drawn fiber, monofilament, tubing, ribbon, and custom profiles. Some product types are oriented after extrusion, allowing tailored performance and up to 5x the strength compared to similar non-oriented products*.

Absorv™ products are utilized in a variety of proven applications globally, from drug-eluting sinus stents formed with drawn fiber, to non-oriented tubing that helps deliver radioactive seeds for treatment of prostate cancer, to oriented ribbon that is cut and formed into devices that correct nasal septal deviation. Contact us for samples and more information on how Absorv™ products can be tailored for your specific application.



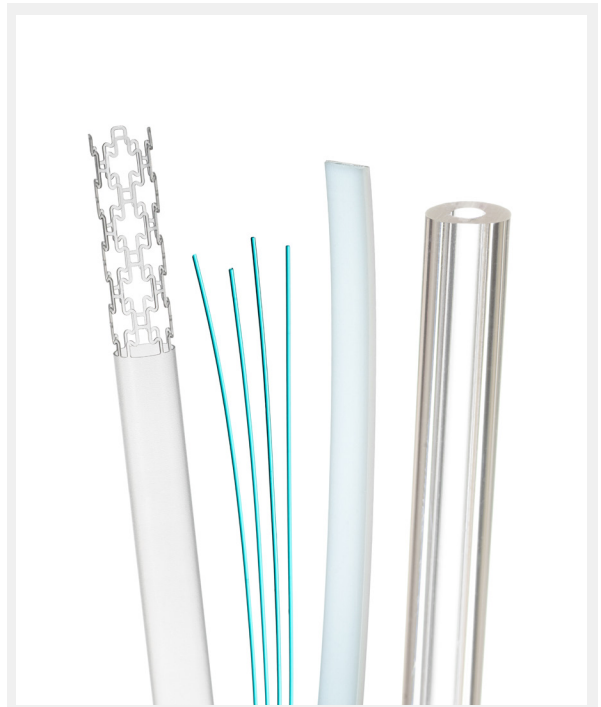
BIOCOMPATIBLE



MECHANICAL STRENGTH



TENSILE STRENGTH



We provide drawn fiber that can be oriented for up to 5x the strength compared to the same monofilament.*

APPLICATIONS

- Stents/scaffolds
- Non-load bearing carrier tubes
- Controlled drug delivery
- Cosmetic lifting with drawn fiber

AVAILABLE PRODUCTS

- Absorv™ Tubing (non-oriented)
- Absorv™ XSE Tubing (oriented)
- Absorv™ Drawn Fiber (oriented)
- Absorv™ Monofilament (non-oriented)
- Absorv™ Ribbon (oriented and non-oriented)
- Absorv™ Profiles (oriented and non-oriented)

KEY PROPERTIES

- Up to 5x strength with orientation*
- Ability to customize sizes and tolerances
- Ability to customize rates of absorption
- Ability to tailor strengths and stiffness
- Color options
- No explantation surgery
- Controlled load transfer
- Used in FDA-approved medical devices



Absorv™ Products

Below are approximate values for a small selection of absorbable materials processed by Zeus.

Absorv™ Tubing & XSE Oriented Tubing		
	Absorv™ Tubing	Absorv™ XSE Tubing
Oriented/Non-Oriented	Non-Oriented	Oriented
Strength Classification	Standard	Stronger
Outside Diameter	0.31 mm – 6.35 mm 0.012" – 0.250"	2.5 mm – 7.5 mm 0.098" – 0.295"
Wall Thickness	25 µm – 2010 µm 0.025 mm – 2.010 mm 0.001" – 0.079"	50 µm – 250 µm (± 15% to 25%) 0.050 mm – 0.250 mm (± 15% to 25%) 0.002" – 0.010" (± 15% to 25%)
Length	up to 673 mm (± 6.4 mm) up to 26.5" (± 0.25")	up to 210 mm (± 6.4 mm) up to 8.25" (± 0.25")

Absorv™ Ribbon		
	Absorv™ Extruded Special Ribbon (Aspect Ratio > 3)	Absorv™ Drawn Ribbon (Aspect Ratio > 3)
Oriented/Non-Oriented	Non-Oriented	Oriented
Strength Classification	Standard	Stronger
Width	0.250" – 1.25" (± 20% to 25%) 6.35 mm – 31.75 mm (± 20% to 25%)	0.050" – 0.250" (± 20% to 25%) 1.27 mm – 6.35 mm (± 20% to 25%)
Thickness	0.004" – 0.010" (± 20% to 25%) 0.102 mm – 0.254 mm (± 20% to 25%)	0.004" – 0.030" (± 20% to 25%) 0.102 mm – 0.762 mm (± 20% to 25%)
Length	Up to 673 mm (± 6.4 mm) Up to 26.5" (± 0.25")	Up to 673 mm (± 6.4 mm) Up to 26.5" (± 0.25") Spooled Put Up Available

Custom sizes outside the listed capabilities may be possible upon request.

Non-Oriented vs. Oriented Absorv™ Tubing (PLLA)

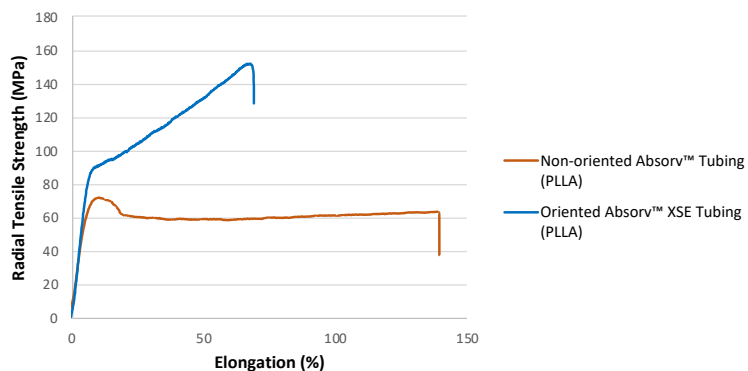


Figure 1: Absorv™ XSE oriented tubing provides more than 2x greater tensile strength over non-oriented Absorv™ tubing.

*Based on testing of a nominal size, oriented vs. non-oriented that are not sterilized, not intended to be a specification, actual testing and economic value is subject to change with material(s), sizes, or product types.

Disclaimer: Absorv™ tubing utilizes manufacturing aids made from Class VI PTFE monofilament. As a result, embedded PTFE particulates may be present in the product. Zeus does not warrant that Absorv™ tubing is free of PTFE particulates. Customers must assess the suitability and safety of using Absorv™ tubing products for medical devices.



Absorv™ Products

Below are approximate values for a small selection of absorbable materials processed by Zeus.

Absorv™ Monofilament & Drawn Fiber				
	Absorv™ Monofilament (Round)	Absorv™ Profile Extruded	Absorv™ Drawn Fiber (Round)	Absorv™ Drawn Profile (Rectangular Profile with Aspect Ratio < 3)
Availability	Customizable	Customizable	Customizable	Customizable
Process	Extruded	Extruded	Extruded + Drawn	Extruded + Drawn
Oriented/ Non-Oriented	Non-Oriented	Non-Oriented	Oriented	Oriented
Strength Classification	Standard	Standard	Stronger	Stronger
Outside Diameter (OD)	0.004" - 0.080" 0.102 mm - 2.032 mm	Customer supplied drawing	0.0025" - 0.025" 0.064 mm - 0.635 mm	Height/Thickness: 0.004" - 0.030" 0.102 mm - 0.762 mm Width: 0.050" - 0.250" 1.27 mm - 6.35 mm
Outside Diameter (OD) Tolerance	± 0.0005" - 0.002" ± 0.013 mm - 0.051 mm	Customer supplied drawing	± 0.0005" - 0.002" ± 0.013 mm - 0.051 mm	Height: ± 0.001" - 0.0015" ± 0.025 mm - 0.038 mm Width: ± 0.001" - 0.003" ± 0.025 mm - 0.076 mm
Permenanat/ Absorbable	Absorbable	Absorbable	Absorbable	Absorbable

Custom sizes outside the listed capabilities may be possible upon request.

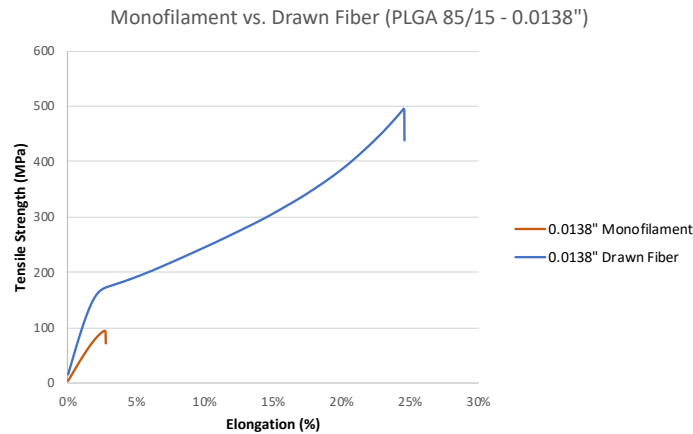


Figure 2: Absorv™ Drawn fiber, in some sizes and materials, can provide up to 5x greater tensile strength when compared to Absorv™ Monofilament*. Absorv™ drawn fiber also allows for heat-setting into custom shapes.

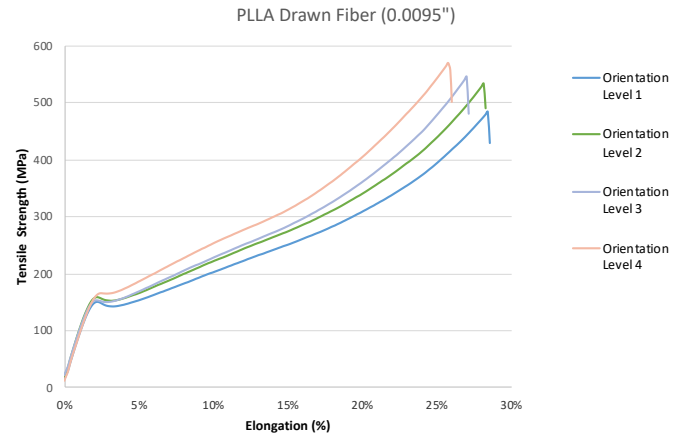


Figure 3: Controlled orientation and processing provides customizable mechanical properties such as strength, stiffness, and elongation. The fiber strength when knotted can be maximized by varying the level of orientation.

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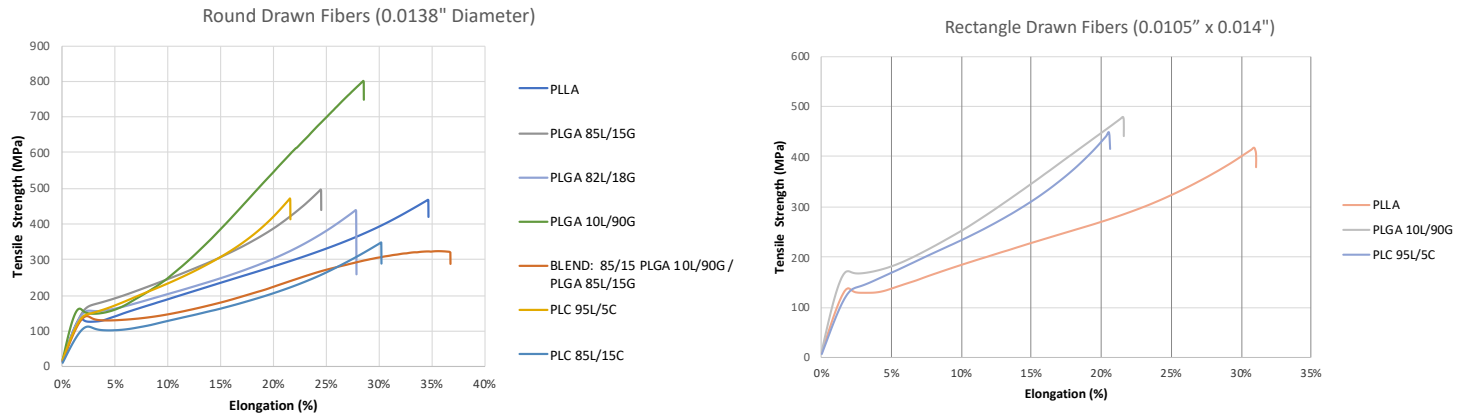


Figure 4a & 4b: Absorv™ Drawn Fibers are highly customizable and available in multiple resin options (i.e. homopolymers, copolymers, blends), as well as various shapes and sizes, allowing for tailored performance.

