



ELASTIC TOUGHRUBBER™

A Tough Printable Elastomer For All Seasons

CHALLENGE

In the past, it has been nearly impossible to additively manufacture elastomeric materials with rubber and polyurethane-like performance. FFF and SLS printing of elastomeric thermoplastics result in poor properties and parts that are only good for prototyping. DLP and SLA printing requires viscous materials with low tear elasticity, poor tear strength and little strain. Until now!

SOLUTION

Elastic ToughRubber™ (ETR) unlocks the benefits of additive manufacturing to those in the rubber, polyurethane and foam industries. Elastic ToughRubber™ is simply the toughest AM elastomer on the market. With a tear strength of 38 kN/m, 190% elongation and ultimate tensile strength of 14 MPa, ETR mimics leading injection molded thermoplastic polyurethanes like PEBAX® and Elastollan®. If you make parts from technical foams, rubbers or polyurethanes, ETR is your solution to additive manufacturing end parts and products.

USES AND APPLICATIONS

Elastic ToughRubber™ can already be found in parts and products that are sold on store shelves. It is perfect for shoe midsoles and heel cups, seals, door boots, bellows, foam-like lattice structures and impact parts.

MANUFACTURING, PROCESSING AND QUALITY

Unlike similar materials in DLP printing, Elastic ToughRubber™ is a one part one pot polymer system. This means there is no mixing of two materials in the proper ratios, which can lead to poor quality if not done correctly. ETR is also pot stable so there is no wasted resin at the end of the print. You simply use the left over resin to print your next part!

Key Features & Benefits

- Flexibility and simplicity in design
- New design geometries and wow factor
- Modulus and performance comparable to foamed TPU
- Stable performance in all weather
- Durable and long lasting for end use

Applications & Use Cases

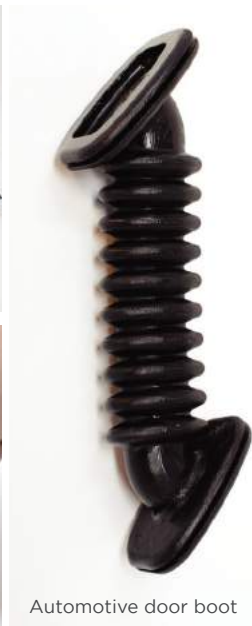
- Midsoles
- Heel cups
- Foam-like lattice structuring
- Lifestyle running shoe
- High performance hiking boot
- Casual sneaker



ETR PROPERTIES

PARAMETER	ETR70	ETR90
Hardness	Shore A 70	SHORE A 90
Bayshore Resilience	40%	49%
Tear Strength	31 kN/m	38 kN/m
Elongation	400%	190%
Toughness	17.4 MJ/m ³	17.9 MJ/m ³
Ultimate Tensile Strength	7.6MPa	14MPa
Glass Transition Temperature	-60°C to +63°C	-62°C to +86°C

Test	Test Result	Grade	Test Site
ETR90 - Cytotoxicity	ISO - 10993-5	Pass	NAMSA
ETR90 - Irritation	ISO - 10993-10	Pass	NAMSA
ETR90 - Sensitization	ISO - 10993-10	Pass	NAMSA



PRODUCT DATA SHEET

Elastic ToughRubber™ 70

ETR70-TD-385-B

TYPE	STANDARD	PARAMETER	UNIT	VALUE
Liquid	ASTM D2196	Viscosity	cP	4350
Liquid	ASTM D792	Liquid Density	g/mL	1.056
Print	ASTM D2240	Hardness - 0 s	Shore A	75
Print	ASTM D2240	Hardness - 10 s	Shore A	64
Print	ASTM D4065	Glass Transition (DMA) - Low	°C	-60
Print	ASTM D4065	Glass Transition (DMA) - High	°C	63
Print	ASTM D4065	Storage Modulus @ 25 C	MPa	14
Print	ASTM D638 Type V	Fracture Toughness	MJ/m ³	17.4
Print	ASTM D638 Type V	Elongation at Break	%	400
Print	ASTM D638 Type V	Ultimate Tensile Strength	MPa	76
Print	ASTM D624 Die C	Tear Strength	kN/m	31
Print	ASTM D395 Method B Type 1	Compression Set - 25 C/25%/22hrs	%	34
Print	ASTM D395 Method B Type 1	Compression Set - 70 C/25%/22hrs	%	50
Print	ASTM D2632	Bayshore Resilience	%	40

The data provided are typical values when following the described testing parameters and recommended processing and post processing steps on standard prints. 3D Printing materials properties can change based on any changes to the above.

PRODUCT DATA SHEET

Elastic ToughRubber™ 90

ETR90-TD-385-B

TYPE	STANDARD	PARAMETER	UNIT	VALUE
Liquid	ASTM D2196	Viscosity	cP	7900
Liquid	ASTM D792	Liquid Density	g/mL	1.038
Print	ASTM D2240	Hardness - 0s	Shore A	92
Print	ASTM D2240	Hardness - 10s	Shore A	89
Print	ASTM D2240	Hardness - 0s	Shore D	28
Print	ASTM D2240	Hardness - 10s	Shore D	28
Print	ASTM D4065	Glass Transition (DMA) - Low	°C	-62
Print	ASTM D4065	Glass Transition (DMA) - High	°C	86
Print	ASTM D4065	Storage Modulus @ 25 C	MPa	59
Print	ASTM D638 Type V	Fracture Toughness	MJ/m ³	17.9
Print	ASTM D638 Type V	Elongation at Break	%	190
Print	ASTM D638 Type V	Ultimate Tensile Strength	MPa	14
Print	ASTM D624 Die C	Tear Strength	kN/m	38
Print	ASTM D395 Method B Type 1	Compression Set - 25 C/25%/22hrs	%	25
Print	ASTM D395 Method B Type 1	Compression Set - 70 C/25%/22hrs	%	53
Print	ASTM D2632	Bayshore Resilience	%	49

Passed Bio-Compatibility Testing

Test Conducted at NAMSA Testing Labs (namsa.com) and test procedure was followed as per ISO 10993 standards

	ISO 10993-5	ISO 10993-10	ISO 10993-10
Material	Cytotoxicity	Irritation	Sensitization
ETR 90	Pass	Pass	Pass

The data provided are typical values when following the described testing parameters and recommended processing and post processing steps on standard prints. 3D Printing materials properties can change based on any changes to the above.



SOFT TOUGH RUBBER™

The World's Softest
Tough Additive
Manufacturing Photopolymer

What if you could rapidly print soft, flexible parts? What if you could rapidly print soft, flexible parts with functional end performance, complex geometry, and fine feature sizes?

Designed for functional prototypes of audio ear buds, wearable electronics, and anatomical medical models Soft ToughRubber (STR) delivers silicone feel and mechanical properties with the resolution and surface finish that DLP® printing provides.

Soft ToughRubber is the newest product in the ToughRubber family, a class of one-part, one-pot, rapid curing photopolymer resins with high-throughput print speeds. With Adaptive3D Technologies materials, you can create stronger, tougher, and more-strainable parts that have high accuracy, isotropic properties, and great printability.

ToughRubber™ opens up advantages for 3D printing that have not been available before the launch of this product family, which makes ToughRubber™ materials the premium flexible AM materials on the market.

Key Features & Benefits

- Soft AM photopolymer (Shore A 28.6)
- Silicone/TPE feel
- High strain, tensile strength, and toughness
- Large part size, high resolution, smooth surface, and black color
- One-part polymer resin system

Applications & Use Cases

- Functional Prototypes
- Audio ear pieces
- Wearable electronics
- High-quality 3D prints out of soft, flexible materials
- Printing tough and flexible parts that are usable and functional

TENSILE PROPERTIES

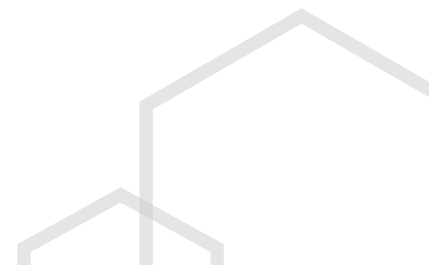
Ultimate Tensile Strength	Compression Set@25°C	Elongation at Break
1.4 MPa	5%	255%

GENERAL PROPERTIES

Hardness	Viscosity @ 25°C
Shore A 28.6	560 cP

BIOCOMPATIBILITY

Test	Test Result	Grade	Test Site
STR - Cytotoxicity (Printed)	ISO - 10993-5	Pass	NAMSA
STR - Skin Irritation (Printed)	ISO - 10993-10	Pass	NAMSA



PRODUCT DATA SHEET

Soft ToughRubber™

STR-TD-385-B

TYPE	STANDARD	PARAMETER	UNIT	VALUE
Liquid	ASTM D2196	Viscosity	cP	560
Liquid	ASTM D792	Liquid Density	g/mL	1.019
Print	ASTM D2240	Hardness - 0 s	Shore A	36
Print	ASTM D2240	Hardness - 10 s	Shore A	24
Print	ASTM D4065	Glass Transition (DMA)	°C	-4
Print	ASTM D4065	Storage Modulus @ 25 C	MPa	0.8
Print	ASTM D638 Type V	Fracture Toughness	MJ/m ³	1.6
Print	ASTM D638 Type V	Elongation at Break	%	245
Print	ASTM D638 Type V	Ultimate Tensile Strength	MPa	1.5
Print	ASTM D412 Method A Die C	Fracture Toughness	MJ/m ³	1.7
Print	ASTM D412 Method A Die C	Elongation at Break	%	255
Print	ASTM D412 Method A Die C	Ultimate Tensile Strength	MPa	1.4
Print	ASTM D624 Die C	Tear Strength	kN/m	5
Print	ASTM D395 Method B Type 1	Compression Set - 25 C/25%/22hrs	%	5
Print	ASTM D395 Method B Type 1	Compression Set - 70 C/25%/22hrs	%	10
Print	ASTM D2632	Bayshore Resilience	%	4

Passed Bio-Compatibility Testing

Test Conducted at NAMSA Testing Labs (namsa.com) and test procedure was followed as per ISO 10993 standards

	ISO 10993-5	ISO 10993-10
Material	Cytotoxicity	Irritation
STR	Pass	Pass

The data provided are typical values when following the described testing parameters and recommended processing and post processing steps on standard prints. 3D Printing materials properties can change based on any changes to the above.