

# forwardam.

## Ultracur3D<sup>®</sup> FL 60

Flexible | 60 A | Clear

### Extended TDS

Complete Technical Documentation  
and Testing Summary

Version 1.1

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Are you looking for an updated TDS version? [Check out the latest online version here.](#)

# Technical Data Sheet

**Flexible resin with optimum haptics and low hardness (Shore 60 A).**

The data contained in this publication is based on our current knowledge and experience. In view of the many factors that may affect processing and application of our product, this data does not relieve processors from carrying out their own investigations and tests; neither does this data imply any guarantee of certain properties, nor the suitability of the product for a specific purpose.

Any descriptions, drawings, photographs, data, proportions, weights etc. given herein may change without prior information and do not constitute the agreed contractual quality of the product. It is the responsibility of the recipient of our products to ensure that any proprietary rights and existing laws and legislation are observed.

The safety data given in this publication is for informational purposes only and does not constitute a legally binding MSDS. The relevant MSDS can be obtained upon request from your supplier or you may contact Forward AM Technologies GmbH directly at [sales@forward-am.com](mailto:sales@forward-am.com).

General Properties	Method	Typical Values
Appearance	-	Clear
Viscosity, 25°C	Cone/Plate Rheometer <sup>1)</sup>	500 mPas
Viscosity, 30°C	Cone/Plate Rheometer <sup>1)</sup>	400 mPas
Density (Printed Part)	ASTM D792	1.16 g/cm <sup>3</sup>
Density (Liquid Resin)	ASTM D4052-18a	1.08 g/cm <sup>3</sup>

Tensile Properties <sup>2)</sup>	Method	Typical Values
Ultimate Tensile Strength	ASTM D412 C	4 MPa
Elongation at Break	ASTM D412 C	90%

Mechanical Properties	Norm	Typical Values
Tear Strength (Graves)	ASTM D624 type C	9 N/mm
Tear Strength (Trouser)	ASTM D624 type T	2 kN/m
Rebound Resilience	ASTM D7121	11%
Relative Abrasion Loss	ISO 4649	695 mm <sup>3</sup>
Compression set at 23°C, 72h (constant force)	ASTM D395-A	0.5%
Compression set at 23°C, 72h (constant deflection)	ASTM D395-B	0%

Thermal Properties	Method	Typical Values
Glass transition temperature (DMA, tan(d))	ASTM D4065	25°C
Vicat temperature <sup>3)</sup>	ASTM D1525	59°C

Other	Method	Typical Values
Hardness Shore A	ASTM D2240	60
Water Absorption, Short-Term (24 hours)	ASTM D570	1.26%

*Mechanical properties overview*

- 1) Determined with TA-Instrument DHR rheometer, cone/plate, diameter 60 mm, shear rate 100 s<sup>-1</sup>
- 2) Pulling speed 500 mm/min
- 3) 120 K/h, 10N
- 4) If not noted otherwise, all specimens are 3D printed. Samples were tested at room temperature, 23°C.

**Printing Performance**

The combination of 3D printer and material has a huge impact on the quality of the parts produced. The measured lattice design characteristics can be found in the [Design Guidelines for Lattice Structures of Ultracur3D® Resins](#).

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# Long-Term UV

Durability is a key feature for the components utilized within many industries, as they expect the materials used to withstand years of exposure to the elements. Through the effects of UV radiation, photopolymers can degrade over time. The aging can be caused by the influence of UV light, heat and water. The degree of ageing depends on duration and intensity.

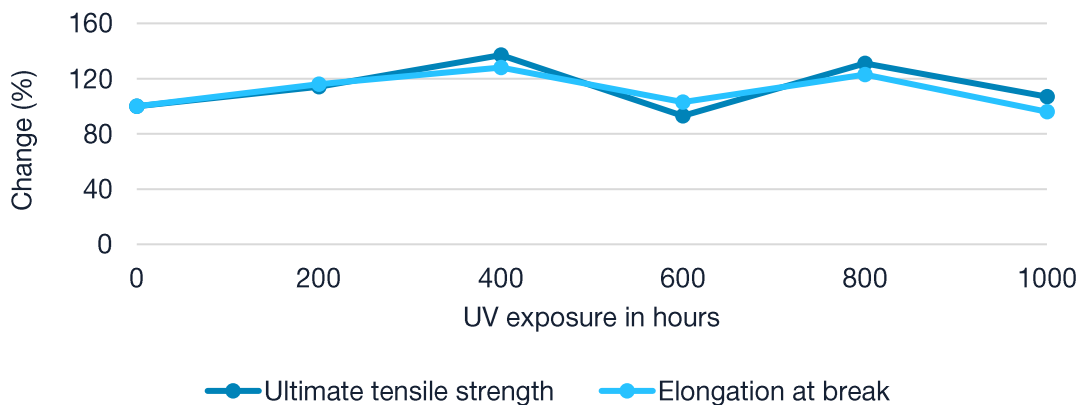
## Test Method and Specimens

The ageing tests were performed with ASTM D412 C tensile bars and color cones as per ISO 4892-2:2013 method A, cycle 1.

Cycle No.	Exposure period	Irradiance		Black standard temperature in °C	Chamber temperature in °C	Relative humidity in %
		Broadband (300 nm to 400 nm) in W/m <sup>2</sup>	Narrowband (340 nm) in W/(m <sup>2</sup> nm)			
1	102 min dry	60 ± 2	0.51 ± 0.02	65 ± 3	38 ± 3	50 ± 10
	18 min water spray	60 ± 2	0.51 ± 0.02	-	-	-

Testing conditions for ISO 4892-2 method A, cycle 1

## Mechanical Testing



Change in mechanical properties after accelerated weathering

The final values after 1000 hours of long-term UV exposure can be found below.

Property	Before long-term UV exposure	After 1000 hours of UV exposure
Ultimate tensile strength	3 MPa	3.2 MPa
Elongation at break	78%	75%

*Mechanical properties before and after 1000 hours of UV exposure as per ISO 4892:2 method A*

**Coloration**

After being exposed up to 1000 hours, there was a slightly yellowing change in color.



*Effect of UV exposure on color of the specimens*

# Sterilization

Sterilization is an essential requirement in many applications especially when used in the medical field. Testing not only ensures the material quality but also determines how effectively the chosen sterilization process is eliminating potential microorganisms.

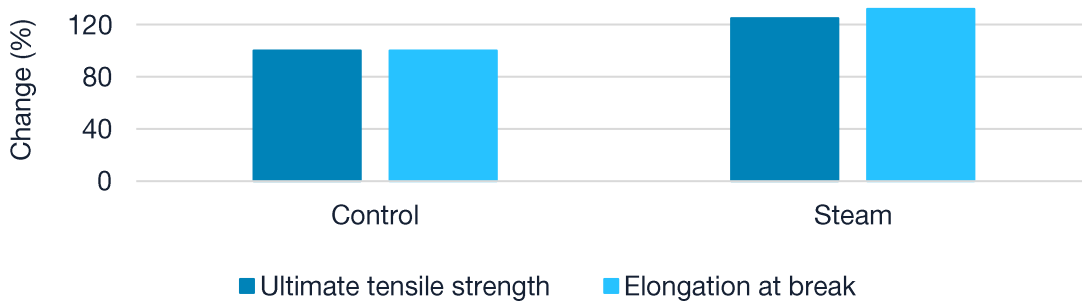
## Test Method and Specimens

### Steam Sterilization

Steam sterilization parameters	Settings
Vacuum pulses	4
Temperature	134°C
Pressure	210 kPa
Holding time	4 minutes
Drying time	20 minutes

*Testing conditions steam sterilization*

### Mechanical Testing



*Change in mechanical properties after sterilization*

### Coloration



*Color samples before and after sterilization*