EPU 41

EPU 41 is a production-grade elastomeric material that is especially well-suited for elastomeric lattices where high resiliency is needed.

EPU 41 Green

Tensile Properties ASTM D412, Die C, 500 mm/min	**Metric**	**US**
Tensile Modulus	6 MPa	870 psi
Elongation at Break	250%	250%
Stress at 50% Elongation	3 MPa	440 psi
Stress at 100% Elongation	5 MPa	730 psi
Stress at 200% Elongation	9 MPa	1300 psi
Ultimate Tensile Strength	15 MPa	2200 psi

Other Mechanical Properties	**Metric**	**US**
Tear Strength, Die C (die cut), ASTM D624	20 kN/m	110 lbf/in
Compression Set, 23 °C, 72 h, ASTM D395-B	30%	
Bayshore Rebound Resilience, ASTM D2632	30%	
Ross Flexing Fatigue (Notched), ASTM D1052 23 °C, 60° bending, 100 cycles/minute	> 50,000 cycles (no crack propagation)	
Ross Flexing Fatigue (Notched), ASTM D1052 -10 °C, 60° bending, 100 cycles/minute	> 40,000 cycles (no crack propagation)	

Thermal Properties	**Metric**	**US**
T_g (DMA, tan(d)), ASTM D4065	-10 °C	14 °F

Dielectric/Electric Properties	
Dielectric Constant, ASTM D150	5
Dissipation Factor, ASTM D150	0.03

General Properties	
Hardness, ASTM D2240	72 (Instant), 71 (5 sec), Shore A
Density, ASTM D792	1.03 g/cm^3
Density (liquid resin)	1.01 g/cm^3
Relative Abrasion Volume Loss, ISO-4649 A	70 mm^3

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Parts were processed using an M series printer and a Smart Part Washer with VF 1 as the solvent.

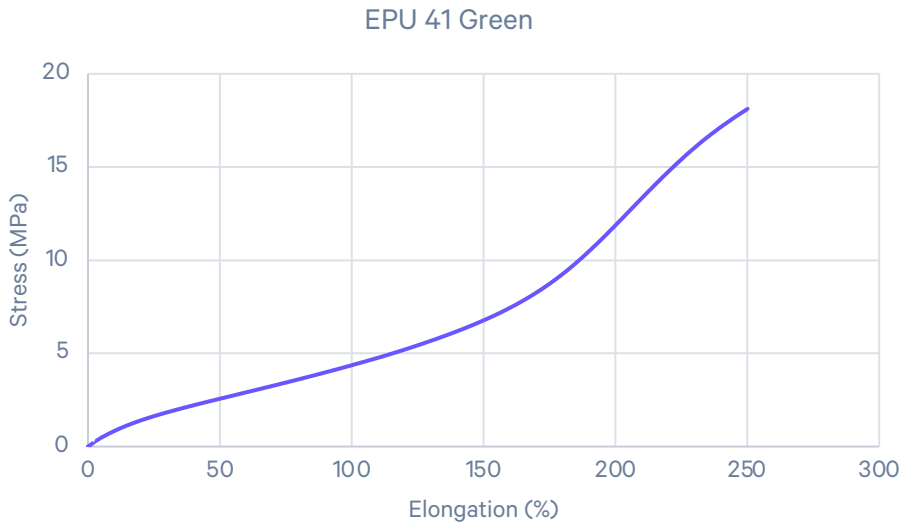
EPU 41

Extended TDS

EPU 41 Green Mechanical Properties

Representative Tensile Curve

ASTM D412, Die C, 500 mm/min



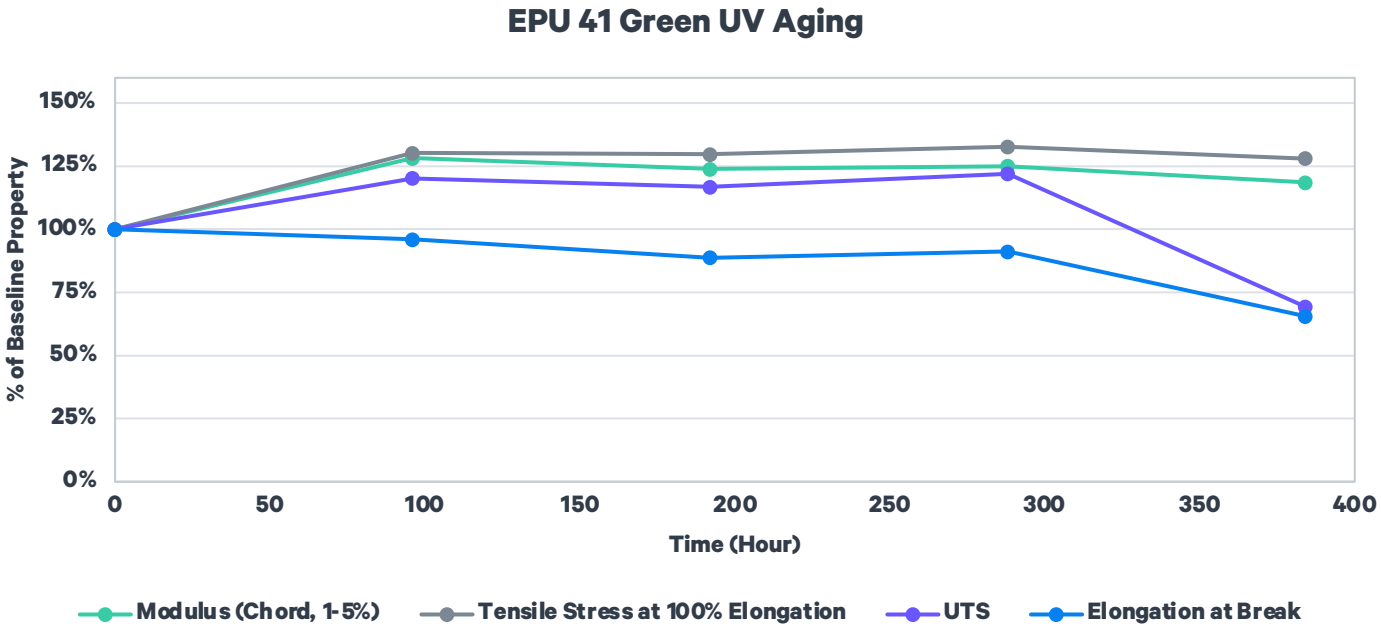
EPU 41 Green Chemical Compatibility

	Mass Gain* (%)
Household Chemicals	
Bleach (NaClO, 5%)	< 5%
Sanitizer (NH_4Cl, 10%)	< 5%
Distilled Water	< 5%
Sunscreen (Banana Boat, SPF 50)	> 30%
Detergent (Tide, Original)	5 - 15%
Windex Powerized Formula	5 - 15%
Hydrogen Peroxide (30%)	15 - 30%
Ethanol (95%)	> 30%
Industrial Fluids	
Engine Oil (Havoline SAE 5W-30)	< 5%
Brake Fluid (Castrol DOT-4)	15 - 30%
Airplane Deicing Fluid (Type I Ethylene Glycol)	-
Airplane Deicing Fluid (Type I Propylene Glycol)	-
Airplane Deicing Fluid (Type IV Ethylene Glycol)	-
Airplane Deicing Fluid (Type IV Propylene Glycol)	-
Transmission Fluid (Havoline Synthetic ATF)	5 - 15%
Engine Coolant (Havoline XLC, 50%/50% premixed)	< 5%
Diesel (Chevron #2)	> 30%
Gasoline (Chevron #91)	-
Skydrol 500B-4	> 30%
Strong Acid/Base	
Sulfuric Acid (30%)	15 - 30%
Sodium Hydroxide (10%)	< 5%

Percent weight gained after one week submersion following ASTM D543. Values do not represent changes in dimension or mechanical properties.

EPU 41 Green UV Aging

Natural polymer aging can occur in the presence of light, sun, and heat. Carbon evaluated the UV aging performance of EPU 41 using ASTM D4459, which is intended to simulate indoor exposure of solar radiation through glass.



ASTM D4459: Q-Sun XE-1, 0.8 W/m^2/nm at 420 nm, 55 °C
ASTM D412: Die C, 500 mm/min, average values represented

Color Fastness

After UV Aging

EPU 41 Green has excellent color fastness after UV aging. Color change is calculated from L*a*b* values measured by colorimeter.

Color change after UV aging, dE = 0.7

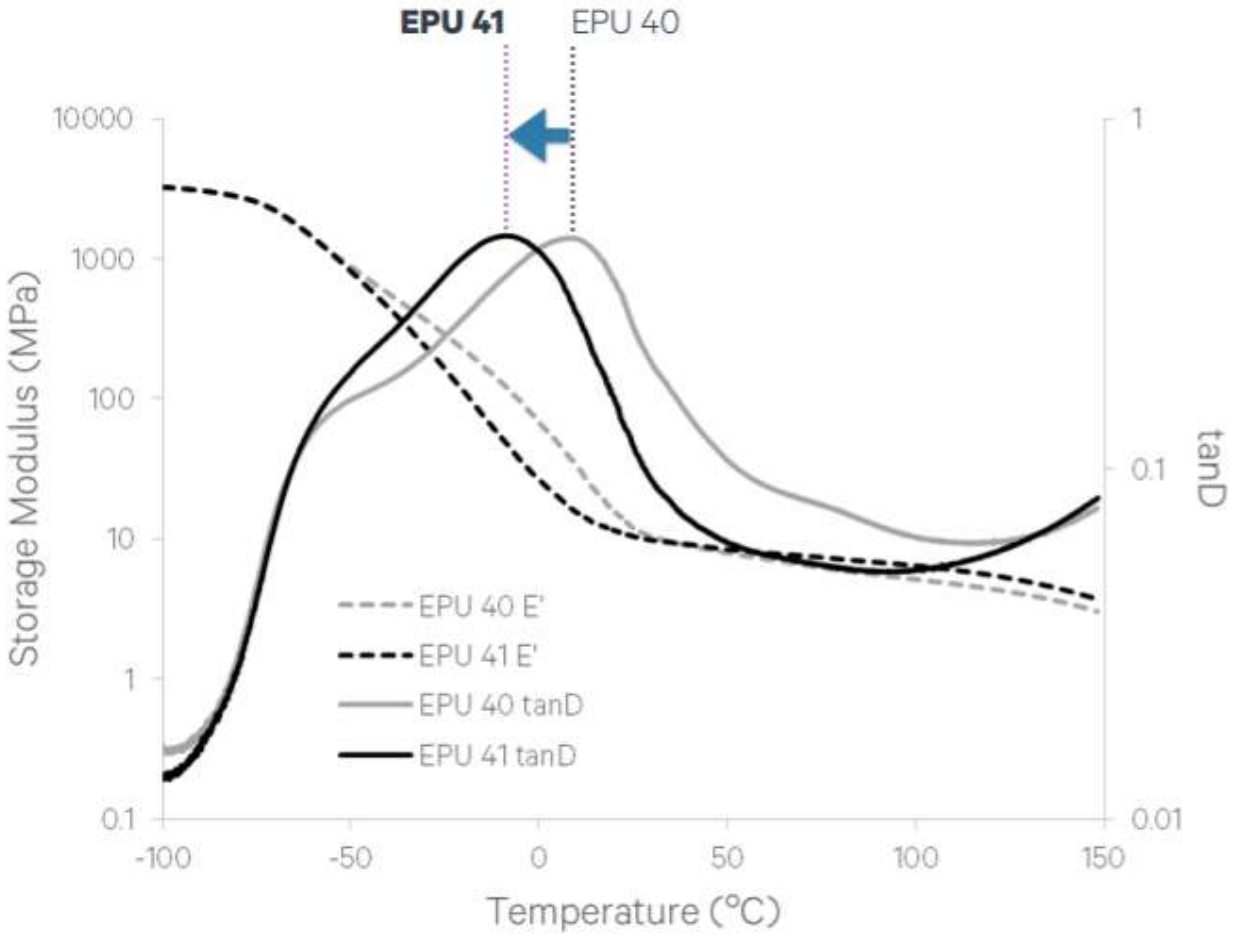
ISO 4892-1/4892-2: Xenon-arc lamp, UV-Quartz filter, 1.2 W/m^2/nm, at 420 nm, 70 °C, 6 hours

Dynamic Mechanical Analysis (DMA)

EPU 41 Green versus EPU 40

EPU 41 Green has improved cold temperature performance compared to EPU 40. EPU 41 Green has lower T_g (tanD peak), indicating retention of elastomeric properties down to colder temperatures.

EPU 41 Green T_g(tanD) = -10 °C
EPU 40 T_g(tanD) = 10 °C



EPU 41 Black

Tensile Properties ASTM D412, Die C, 500 mm/min	**Metric**	**US**
Tensile Modulus	8 MPa	1160 psi
Elongation at Break	250%	250%
Stress at 50% Elongation	2 MPa	290 psi
Stress at 100% Elongation	4 MPa	580 psi
Stress at 200% Elongation	9 MPa	1300 psi
Ultimate Tensile Strength	15 MPa	2200 psi

Other Mechanical Properties	**Metric**	**US**
Tear Strength, Die C (die cut), ASTM D624	20 kN/m	110 lbf/in
Compression Set, 23 °C, 72 h, ASTM D395-B	30%	

Thermal Properties	**Metric**	**US**
T_g (DMA, tan(d)), ASTM D4065	-10 °C	14 °F

General Properties	
Hardness, ASTM D2240	71 (Instant), 70 (5 sec) Shore A
Density, ASTM D792	1.03 g/cm^3
Density (liquid resin)	1.01 g/cm^3

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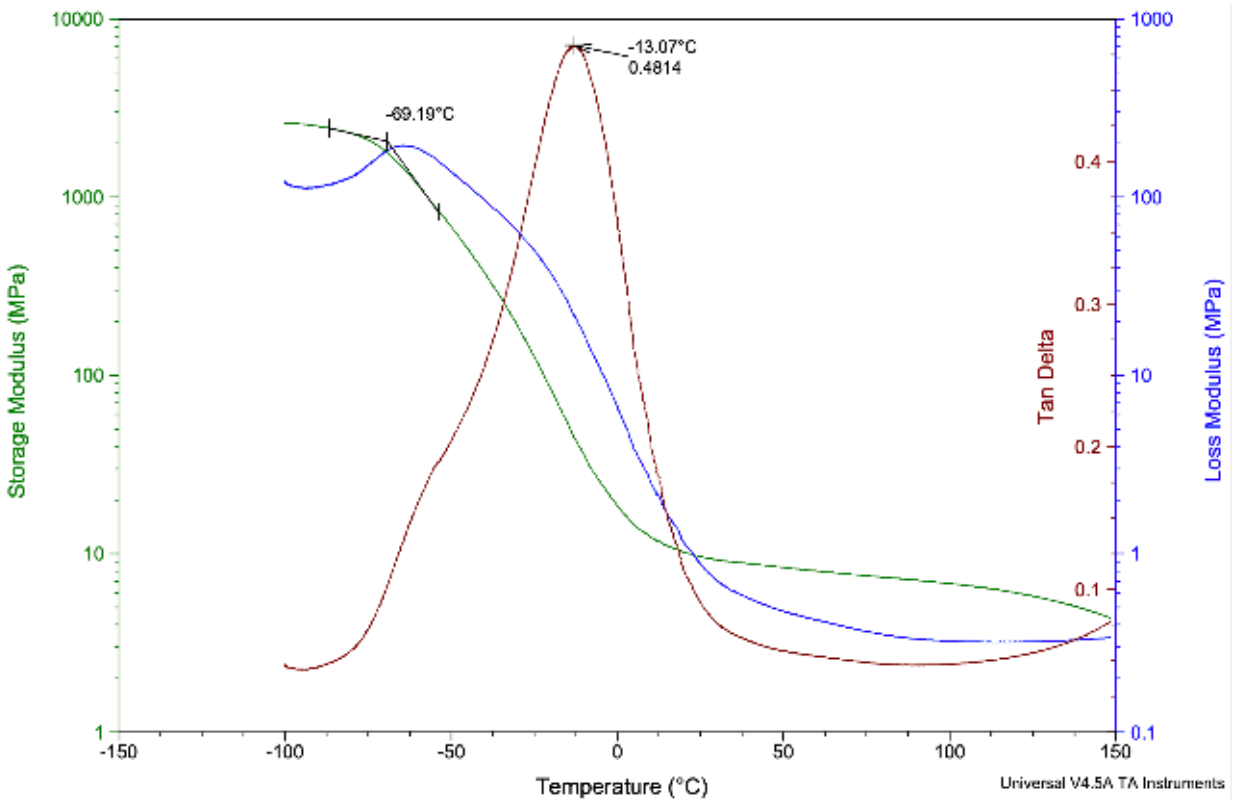
Parts were processed using an M series printer and a Smart Part Washer with VF 1 as the solvent.

Dynamic Mechanical Analysis (DMA)

EPU 41 Black

EPU 41 Black has a similar dynamic mechanical response as EPU 41 Green.

EPU 41 Black T_g(tanD) = -13 °C



EPU 41 Green Biocompatibility

Biocompatibility Testing

Printed parts were provided to NAMSA for evaluation in accordance with ISO 10993-5, *Biological evaluation of medical devices - Part 5: Tests for in vitro cytotoxicity*, and ISO 10993-10, *Biological evaluation of medical devices - Part 10: Tests for irritation and skin sensitization* (specifically the Closed Patch Sensitization Study). Parts were processed using an M series printer and a Smart Part Washer with VF 1 as the solvent. The results for all tests indicated that EPU 41 passed the requirements for biocompatibility according to the above tests. **Carbon makes no representation and is not responsible for the results of any biocompatibility tests other than those specified above.**

Disclaimer

Biocompatibility results may vary based on printing and/or post-processing procedures.

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