LOCTITE®

LOCTITE 3D 3843™

HDT60 High Toughness Photoplastic
Matte Black, White, Clear, Gray

LOCTITE®
Henkel Corporation
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3843™
HDT60 HIGH TOUGHNESS PHOTOPLASTIC

LOCTITE 3D 3843™

Semi-flexible resin with moderate temperature resistance HDT60, high impact strength, and versality for a broad range of applications.

LOCTITE 3D 3843 is a high-strength engineering plastic with good impact resistance and excellent surface finish. It is ideal for a wide variety of tooling applications on the production floor.

LOCTITE 3D 3843 displays high green strength and HDT enabling it to print accurately and function at room temperature. It is compatible with a broad range of DLP machines.

Benefits:

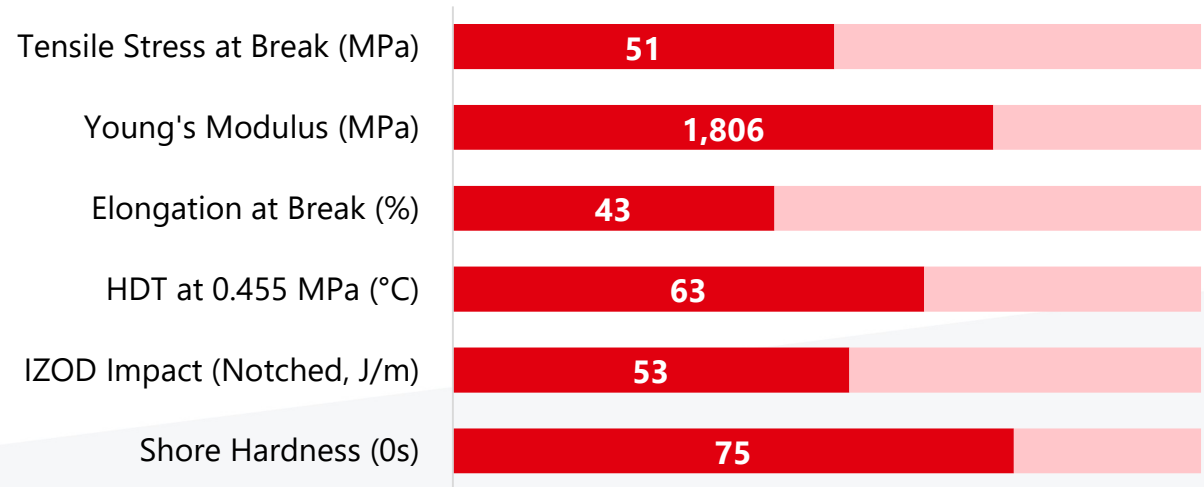
- Moderate heat resistance, HDT 60º C
- Tough with outstanding surface finish
- Superior strength and impact resistant

Ideal for:

- Manufacturing aids
- Jigs and fixtures
- Housings and covers
- Insoles

Markets:

Industry | Automotive | Consumer Goods



**Values shown are linked to LOCTITE 3843 Matte Black as reference, please refer to the specific mechanical properties for each of the colors shown in this document*

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MATTE BLACK

MECHANICAL PROPERTIES

Mechanical Properties	Measure	Method	Green	Post Processed
Tensile Stress at Yield	MPa	ASTM D638	43.8 ± 0.7 [5]	52.9 ± 1.5 [1]
Tensile Stress at Break	MPa	ASTM D638	37.8 ± 1 [5]	50.9 ± 2.4 [1]
Young's Modulus	MPa	ASTM D638	1,572 ± 31 [5]	1,806 ± 47 [1]
Elongation at Break	%	ASTM D638	51.5 ± 10.3 [5]	43.4 ± 9.7 [1]
Flexural Stress at Yield	MPa	ASTM D790	49.4 ± 0.8 [6]	73.8 ± 1.0 [2]
Flexural Modulus	MPa	ASTM D790	1,113 ± 23 [6]	1,783 ± 45 [2]
Flexural Strain at Break	%	ASTM D790	>10 [6]	>10 [2]
Other Properties				
HDT at 0.455 MPa	°C	ASTM D648	-	63°C [3]
IZOD Impact (Notched)	J/m	ASTM D256	-	52.6 ± 3.8 [4]
Water Absorption (24hr)	%	ASTM D570	-	1.94 [7]
Water Absorption (72hr)	%	ASTM D570	-	3.21 [7]
Shore Hardness (0s, 3s)	D	ASTM D2240	68, 63 [11]	74, 67 [9]
Solid Density	g/cm^3	ASTM D1475	1.18 [10]	1.18 [10]

Liquid Properties	Measure	Method	Value
Viscosity at 25°C (77°F)	cP	ASTM D7867	759 ± 1 [8]
Liquid Density	g/cm^3	ASTM D1475	1.07 [10]

"All specimen are printed unless otherwise noted. All specimen were conditioned in ambient lab conditions at 19-23°C / 40-60% RH for at least 24 hours." ASTM Methods: D638 Type IV, 5 mm/min, D790-B, 2 mm/min, D648, D256 Notched IZOD (Machine Notched), 6 mm x 12 mm, D570 0.125" x 2" Disc 24hr@ 25°C, D2240, Type "D" (0, 3 seconds), D7867, D1475

Internal Data Sources:
[1]FOR16424, [2]FOR16426, FOR17678, [3]FOR19725, [4]FOR16427, [5]FOR16425, [6]FOR19115, [7]FOR19118, [8]FOR16420, [9]FOR19117, [10]FOR19114, [11]FOR19119

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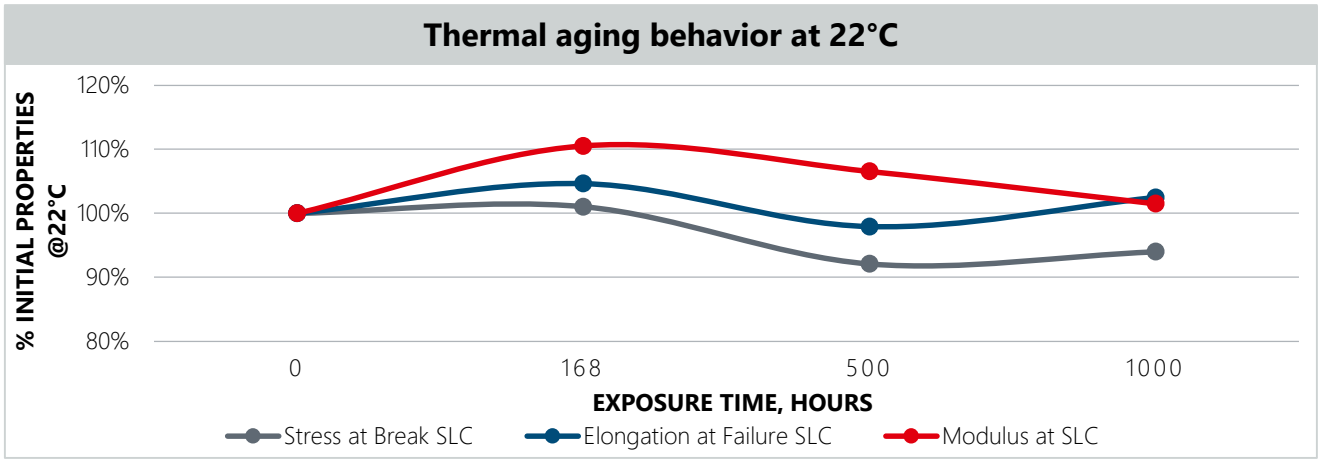
MATTE BLACK

AGING AND ENVIRONMENTAL EFFECTS (I/III)

LOCTITE 3D 3843 has been tested in QUV exterior weathering conditions (ASTM G-154) for 800 hours with less than a 15% change in Tensile and IZOD Impact properties.

CONTROL AGING AT 22°C (Tested at 22°C)

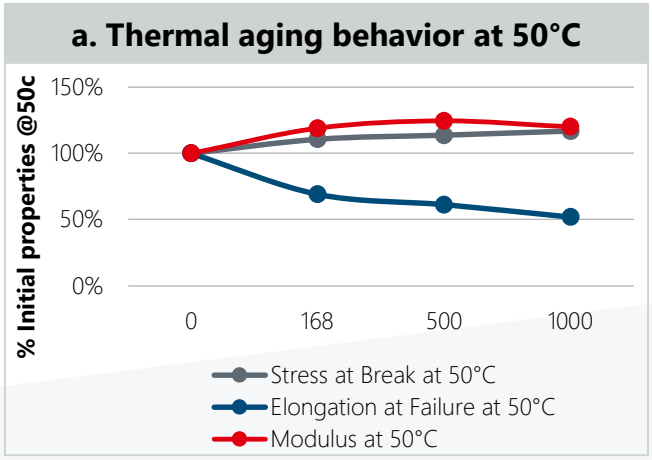
Samples were kept at standard laboratory conditions and were not exposed to elevated temperatures.

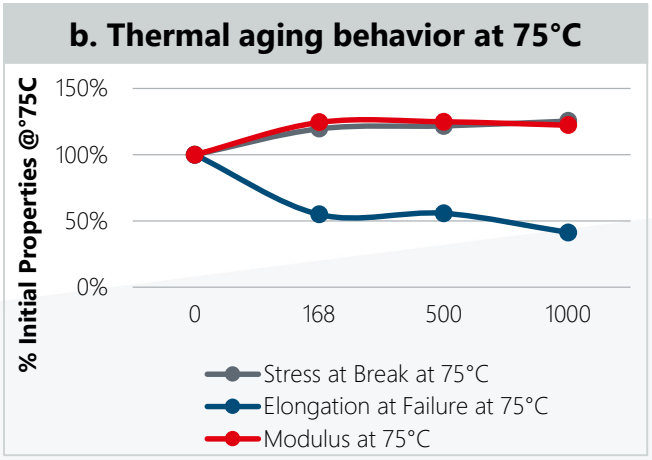


SLC: Standard Lab Conditions

HEAT AGING (Tested at 22°C)

Samples were aged at (a) 50°C and (b) 75°C.





**All values tested at room temperature*

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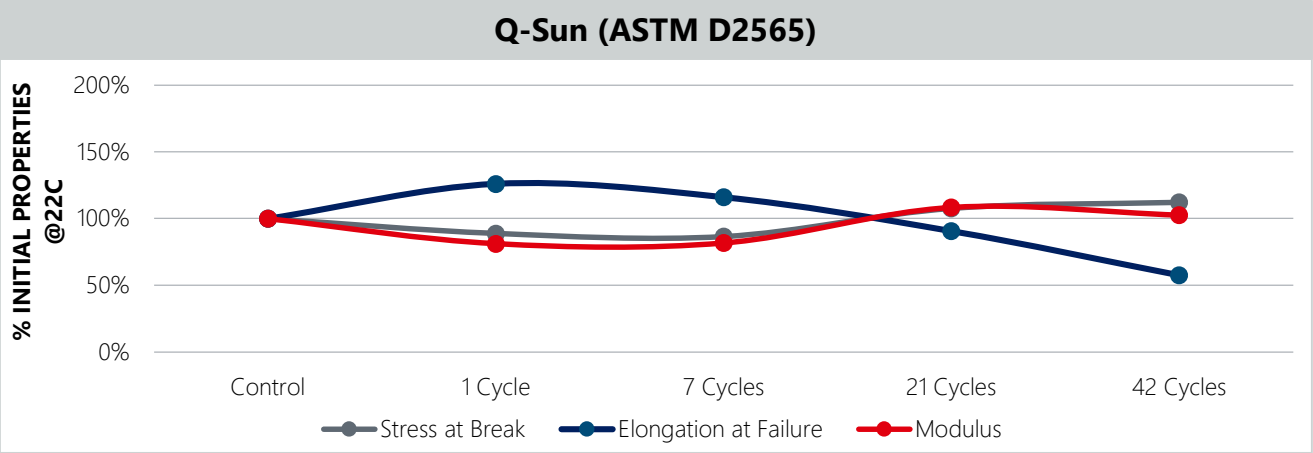
Q-Sun (ASTM D2565)



Chemical Resistance

Amount of Exposure Time 100 hours

		% of initial strength		
Chemical	**Measure**	**Elongation at Break**	**Stress at Break**	**Modulus**
Water (22C°)	%	152	52	44
IPA	%	117	40	38
NaOCl	%	120	57	58
Salt Fog (22C°)	%	169	43	30
Motor Oil (87C°)	%	93	104	100
Hydrogen Peroxide	%	158	47	38

Chemical Resistance

Amount of Exposure Time 500 hours

		% of initial strength		
Chemical	**Measure**	**Elongation at Break**	**Stress at Break**	**Modulus**
Water (22C°)	%	175	27	12
IPA	%	0	0	0
NaOCl 5	%	83	28	31
Salt Fog (22C°)	%	192	33	17
Motor Oil (87C°)	%	78	106	105
Hydrogen Peroxide	%	180	22	7

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MATTE BLACK

MACHINE SETTINGS

LOCTITE 3D 3843 Matte Black is formulated to print optimally on any DLP machine. It is recommended to print with 385 nm wavelength projectors with irradiance between 3-7 mW/cm^2. Layer time is given below at 5 mW/cm^2:

Layer Thickness (µm):	25	50	100
First layer time (s)	45	45	50
Burn in region (s):	4	5	7.5

Ec (mJ/cm^2)	11.16
Dp (mm):	0.21

Recommended printing Temperature range: 20°C to 45°C

POST PROCESSING

LOCTITE 3D 3843 requires post processing to achieve specified properties. Prior to post curing, support structures should be removed from the printed part, and the part should be washed in a compatible cleaner. LOCTITE recommends either IPA or Cleaner C in 2-minute interval wash cycles. Use compressed air to remove residual solvent from the surface of the material between intervals. Exact times and methods can be found by contacting us at www.loctiteAM.com.

ADDITIONAL DEVELOPMENT OPTIONS

Colors: LOCTITE 3D 3843 formula is made with additional pigment colors.

POST CURING

LOCTITE 3D 3843 requires post curing to achieve specified properties. A wide array of post cure equipment can be used to cure appropriately. See Validation chart for examples of type and time. Exact devices with detailed information can be found by contacting us at www.loctiteAM.com.

LIMITATIONS

Vat Printer: LOCTITE 3D 3843 is not compatible with SLA printing process

LCD printers: LOCTITE 3D 3843 formula shows limited path forward for LCD projector printers at this time.

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HDT60 HIGH TOUGHNESS
PHOTOPLASTIC
WHITE

MECHANICAL PROPERTIES

Mechanical Properties	Measure	Method	Green	Post Processed
Tensile Stress at Yield	MPa	ASTM D638	36.2 ± 1.0 [1]	52.6 ± 1.1 [2]
Tensile Stress at Break	MPa	ASTM D638	33.1 ± 2.6 [1]	49.0 ± 1.5 [2]
Young's Modulus	MPa	ASTM D638	1318 ± 31 [1]	1720 ± 72 [2]
Elongation at Break	%	ASTM D638	74.4 ± 9.9 [1]	47.6 ± 7.8 [2]
Flexural Stress at Yield	MPa	ASTM D790	38.3 ± 1.7 [3]	71.9 ± 1.0 [4]
Flexural Modulus	MPa	ASTM D790	721 ± 36 [3]	1673 ± 44 [4]
Flexural Strain at Break	%	ASTM D790	>10 [3]	>10 [4]
Other Properties				
HDT at 0.455 MPa	°C	ASTM D648	50 [5]	60 [6]
IZOD Impact (Notched)	J/m	ASTM D256	-	58.3 ± 4.17 [7]
IZOD Impact (Unnotched)	J/m	ASTM D256	-	175.3 ± 12.8 [8]
Water Absorption (24hr)	%	ASTM D570	-	2.3 [9]
Water Absorption (72hr)	%	ASTM D570	-	3.5 [9]
Shore Hardness (0s, 3s)	D	ASTM D2240	68, 64 [10]	70, 76 [11]
Solid Density	g/cm	ASTM D1475	1.18 [13]	1.18 [11]

Liquid Properties	Measure	Method	Value
Viscosity at 25°C (77°F)	cP	ASTM D7867	400 – 600 [14]
Liquid Density	g/cm³	ASTM D1475	1.07 [12]

"All specimen are printed unless otherwise noted. All specimen were conditioned in ambient lab conditions at 19-23°C / 40-60% RH for at least 24 hours." ASTM Methods: D638 Type IV, 5 mm/min, D790-B, 2 mm/min, D648, D256 Notched IZOD (Machine Notched), 6 mm x 12 mm, D570 0.125" x 2" Disc 24hr@ 25°C, D2240, Type "D" (0, 3 seconds), D7867, D1475

Internal Data Sources:
[1]FOR17796, [2]FOR17795, [3]FOR17799, [4]FOR17797, [5]FOR17801, [6]FOR17800, [7]FOR17792, [8]FOR17793, [9]FOR17794, [10]FOR17790, [11]FOR17789, [12]FOR17791, [13]FOR17809, [14]FOR17804

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HDT60 HIGH TOUGHNESS
PHOTOPLASTIC
WHITE

MACHINE SETTINGS

LOCTITE 3D 3843 White is formulated to print optimally on any DLP machine. It is recommended to print with 385 nm wavelength projectors with irradiance between 3-7 mW/cm^2. Layer time is given below at 5 mW/cm^2:

Layer Thickness (µm):	25	50	100
First layer time (s)	45	45	45
Burn in region (s):	2	3.5	6

Ec (mJ/cm^2)	7.194
Dp (mm):	0.170

Recommended printing Temperature range: 20°C to 45°C

POST PROCESSING

LOCTITE 3D 3843 requires post processing to achieve specified properties. Prior to post curing, support structures should be removed from the printed part, and the part should be washed in a compatible cleaner. LOCTITE recommends either IPA or Cleaner C in 2-minute interval wash cycles. Use compressed air to remove residual solvent from the surface of the material between intervals. Exact times and methods can be found by contacting us at www.loctiteAM.com.

ADDITIONAL DEVELOPMENT OPTIONS

Colors: LOCTITEn 3D 3843 formula is made with additional pigment colors.

POST CURING

LOCTITE 3D 3843 requires post curing to achieve specified properties. A wide array of post cure equipment can be used to cure appropriately. See Validation chart for examples of type and time. Exact devices with detailed information can be found by contacting us at www.loctiteAM.com.

LIMITATIONS

Vat Printer: LOCTITE 3D 3843 is not compatible with SLA printing process

LCD printers: LOCTITE 3D 3843 formula shows limited path forward for LCD projector printers at this time.

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HDT60 HIGH TOUGHNESS
PHOTOPLASTIC
CLEAR

MECHANICAL PROPERTIES

Mechanical Properties	Measure	Method	Green	Post Processed
Tensile Stress at Yield	MPa	ASTM D638	43.8 ± 0.7 [6]	45.0 ± 1.5 [1]
Tensile Stress at Break	MPa	ASTM D638	38.0 ± 1.7 [6]	44.0 ± 2.7 [1]
Young's Modulus	MPa	ASTM D638	1,562 ± 36 [6]	1,752 ± 42 [1]
Elongation at Break	%	ASTM D638	58.0 ± 24 [6]	41.0 ± 6.7 [1]
Flexural Stress at Yield	MPa	ASTM D790	-	79.0 ± 2.6 [2]
Flexural Modulus	MPa	ASTM D790	-	1,878 ± 81 [2]
Flexural Strain at Break	%	ASTM D790	-	>10 [2]
Other Properties				
HDT at 0.455 MPa	°C	ASTM D648	-	63 [9]
IZOD Impact (Notched)	J/m	ASTM D256	-	65.0 ± 2.9 [3]
Water Absorption (24hr)	%	ASTM D570	-	2.13 [7]
Shore Hardness (0s, 3s)	D	ASTM D2240	-	68, 63 [8]
Solid Density	g/cm^3	ASTM D1475	1.17 [4]	1.18 [4]

Liquid Properties	Measure	Method	Value
Viscosity at 25°C (77°F)	cP	ASTM D7867	530 ± 2 [5]
Liquid Density	g/cm^3	ASTM D1475	1.07 [4]

"All specimen are printed unless otherwise noted. All specimen were conditioned in ambient lab conditions at 19-23C / 40-60% RH for at least 24 hours." ASTM Methods: D638 Type IV, 5mm/min, D790-B, 2mm/min, D648, D256 Notched IZOD (Machine Notched), 6 mm x 12 mm, D570 0.125" x 2" Disc 24hr@ 25°C, D2240, Type "D" (0, 3 seconds), D7867, D1475

Internal Data Sources:
[1]FOR17386, [2]FOR17382, [3]FOR17385, [4]FOR17383, [5]FOR17381, [6]FOR17201, [7]FOR17380, [8]FOR19616, [9]FOR20038, [10]FOR20009, [11]FOR20010

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HDT60 HIGH TOUGHNESS
PHOTOPLASTIC
CLEAR

CLEAR COLOR PROPERTIES

In order to assess clear properties, color variation is measured as Delta-E (dE) to define parts transmittance.

dE measures changes from L*a*b*C*h. The table below shows the color variation for two different workflows:

Method: ASTM E308, Total Transmission

Part State	L*	a*	b*	C*	h	dE
Green / no post-processing [10]	93.11	-1.06	2.28	2.52	114.9	-
Dymax 5000EC 5 min/side [10]	93.20	-0.46	1.14	1.22	111.89	1.29
Loctite CL36 60 min/side [11]	92.89	-0.36	1.28	1.33	105.85	1.24

The table below shows color variation after ageing for 650 hours
A dE of 1.0 - 2.0 change is the smallest color difference, in average, that the human eye can perceive

QUV exterior weathering conditions (ASTM G-154—Cycle 1): Clear color

Method: ASTM G-154—Cycle 1 & ASTM E308, Total Transmission

QUV Exposure Time (Hrs)	L*	a*	b*	C*	h	dE
0	93.82	-0.49	1.35	1.44	109.91	-
325	93.10	-0.61	1.68	1.79	109.96	0.80
650	93.40	-0.86	2.47	2.61	109.22	1.25

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HDT60 HIGH TOUGHNESS
PHOTOPLASTIC
CLEAR

MACHINE SETTINGS

LOCTITE 3D 3843 Clear is formulated to print optimally on any DLP machine. It is recommended to print with 385 nm wavelength projectors with irradiance between 3-7 mW/cm^2. Layer time is given below at 5 mW/cm^2:

Layer Thickness (µm):	25	50	100
First layer time (s)	45	45	45
Burn in region (s):	2	3.5	6

Ec (mJ/cm^2)	7.67
Dp (mm):	0.18

Recommended printing Temperature range: 20°C to 45°C

POST PROCESSING

LOCTITE 3D 3843 requires post processing to achieve specified properties. Prior to post curing, support structures should be removed from the printed part, and the part should be washed in a compatible cleaner. LOCTITE recommends either IPA or Cleaner C in two-minute interval wash cycles. Use compressed air to remove residual solvent from the surface of the material between intervals. Exact times and methods can be found by contacting us at www.loctiteAM.com

ADDITIONAL DEVELOPMENT OPTIONS

Colors: LOCTITE 3D 3843 formula is made with additional pigment colors.

POST CURING

LOCTITE 3D 3843 requires post curing to achieve specified properties. A wide array of post cure equipment can be used to cure appropriately. See Validation chart for examples of type and time. Exact devices with detailed information can be found by contacting us at www.loctiteAM.com

LIMITATIONS

Vat Printer: LOCTITE 3D 3843 is not compatible with SLA printing process

LCD printers: LOCTITE 3D 3843 formula shows limited path forward for LCD projector printers at this time.

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HDT60 HIGH TOUGHNESS
PHOTOPLASTIC
GRAY

MECHANICAL PROPERTIES

Mechanical Properties	Measure	Method	Green	Post Processed
Tensile Stress at Yield	MPa	ASTM D638	43.8 ± 1 [1]	55 ± 2 [2]
Tensile Stress at Break	MPa	ASTM D638	38 ± 1.5 [1]	52 ± 2 [2]
Young's Modulus	MPa	ASTM D638	1375 ± 19 [1]	1844 ± 48 [2]
Elongation at Break	%	ASTM D638	76 ± 8 [1]	46 ± 8 [2]
Flexural Stress at Yield	MPa	ASTM D790	-	82 ± 1 [3]
Flexural Modulus	MPa	ASTM D790	-	1807 ± 56 [3]
Flexural Strain at Break	%	ASTM D790	-	>10 [3]
Other Properties				
HDT at 0.455 MPa	°C	ASTM D648	-	64 [9]
IZOD Impact Strength (Notched)	J/m	ASTM D256	-	67 ± 9 [4]
Water Absorption (24hr)	%	ASTM D570	-	2.37 [5]
Shore Hardness (0s, 3s)	D	ASTM D2240	-	70,65 [8]
Solid Density	g/cm³	ASTM D1475	-	1.182 [6]

Liquid Properties	Measure	Method	Value
Viscosity at 25°C (77°F)	cP	ASTM D7867	594 ± 2 [7]
Liquid Density	g/cm³	ASTM D1475	1.0713 [6]

"All specimen are printed unless otherwise noted. All specimen were conditioned in ambient lab conditions at 19-23C / 40-60% RH for at least 24 hours." ASTM Methods: D638 Type IV, 5mm/min, D790-B, 2mm/min, D648, D256 Notched IZOD (Machine Notched), 6 mm x 12 mm, D570 0.125" x 2" Disc 24hr@ 25°C, D2240, Type "D" (0, 3 seconds), D7867, D1475

Internal Data Sources:
[1]FOR19718, [2]FOR16101, [3]FOR16102, [4]FOR16331, [5]FOR16137, [6]FOR17364, [7]FOR10661, [8]FOR16332, [9]FOR18826

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NOTE

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Version 2021/06/04