

Somos[®] 9920

Robust, Accurate, Functional Epoxy Resin for Stereolithography For Solid State (355nm) Laser Systems

Description

DSM Somos[®] 9920 is a liquid photopolymer that produces robust, functional and accurate parts using stereolithography machines. The material offers superior chemical resistance, a wide processing latitude and excellent tolerance to a broad temperature and humidity range during and after build. Parts created from Somos[®] 9920 exhibit superior fatigue properties, strong memory retention and high quality up-facing and down-facing surfaces. Somos[®] 9920 also offers a good balance of properties between rigidity and functionality.

Applications

- Parts that mimic polypropylene
- Ideal for master patterns in rubber molding applications
- Durable and robust applications
 - Automobile components
 - Electrical housings
 - Medical Products
 - Large panels
 - Snap fit parts



Physical Properties – Liquid

Appearance	Transparent Amber
Viscosity	~450 cps at 30°C
Density	~1.13 g/cm ³ at 25°C

Optical Properties at 355 nm

E _c	~10.9 mJ/cm ² <small>[critical exposure]</small>
D _p	0.14 mm (~.00545 inch) <small>[slope of cure-depth vs. ln(E) curve]</small>
E ₁₀	65 mJ/cm ² <small>[exposure that gives 0.254 mm (.010 inch) thickness]</small>

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Mechanical Properties (Metric)

ASTM Method	Description	Somos® 9920	Somos® 9120	Polypropylene*
D638M	Tensile Strength	31 - 39 MPa	30 - 32 MPa	31 - 37 MPa
	Elongation at Break	13 - 29 %		
	Elongation at Yield	20 %	15 - 25 %	7 - 13 %
	Modulus of Elasticity	1,345 - 1,810 MPa	1,227 - 1,462 MPa	1,138 - 1,551 MPa
D790M	Flexural Strength	40 - 45 MPa	41 - 46 MPa	41 - 55 MPa
	Flexural Modulus	1,190 - 1,383 MPa	1,310 - 1,455 MPa	1,172 - 1,724 MPa
D256A	Izod Impact-Notched	0.27 - 0.50 J/cm	0.48 - 0.53 J/cm	0.21 - 0.75 J/cm
D542	Index of Refraction	N/A		
D2240	Hardness (Shore D)	81	80 - 82	N/A
D1004	Graves Tear	154,287 N/m		
D570-98	Water Absorption	0.84 %		

* Unfilled Polypropylene (Reference: Modern Plastics Encyclopedia, 1997)

N/A: Not Available

Thermal & Electrical Properties (Metric)

ASTM Method	Description	Somos® 9920	Somos® 9120	Polypropylene*
E831-00	C.T.E. -40°C – 0°C	65 - 67 $\mu\text{m}/\text{m}\cdot^\circ\text{C}$		
	C.T.E. 0°C – 50°C	90 - 96 $\mu\text{m}/\text{m}\cdot^\circ\text{C}$		
	C.T.E. 50°C – 100°C	170 - 189 $\mu\text{m}/\text{m}\cdot^\circ\text{C}$		
	C.T.E. 100°C – 150°C	192 - 201 $\mu\text{m}/\text{m}\cdot^\circ\text{C}$		
D150-98	Dielectric Constant 60Hz	4.6		
	Dielectric Constant 1KHz	4.3		
	Dielectric Constant 1MHz	3.8		
D149-97a	Dielectric Strength	14.6 - 15.2 kV/mm		
E1545-00	T _g	37 - 52 °C		
D648-98c	HDT @ 0.46 MPa	54.5 - 61.6 °C		
	HDT @ 1.81 MPa	45.4 - 48.0 °C		

* Unfilled Polypropylene (Reference: Modern Plastics Encyclopedia, 1997)

N/A: Not Available

Mechanical Properties (Imperial)

ASTM Method	Description	Somos® 9920	Somos® 9120	Polypropylene*
D638M	Tensile Strength	4,496 - 5,627 psi	4,400 - 4,700 psi	4,500 - 5,400 psi
	Elongation at Break	13 - 29 %		
	Elongation at Yield	20 %	15 - 25 %	7 - 13 %
	Modulus of Elasticity	195,076 - 262,519 psi	178,000 - 212,000 psi	165,000 - 225,000 psi
D790M	Flexural Strength	5,802 - 6,527 psi	6,000 - 6,700 psi	6,000 - 8,000 psi
	Flexural Modulus	172,595 - 197,252 psi	190,000 - 211,000 psi	170,000 - 250,000 psi
D256A	Izod Impact-Notched	0.5 - 1.0 ft lb/in	0.9 - 1.0 ft lb/in	0.4 - 1.4 ft lb/in
D542	Index of Refraction	N/A		
D2240	Hardness (Shore D)	81	80 - 82	N/A
D1004	Graves Tear	796 - 904 lbf/in		
D570-98	Water Absorption	0.84 %		

* Unfilled Polypropylene (Reference: Modern Plastics Encyclopedia, 1997)

N/A: Not Available

Thermal & Electrical Properties (Imperial)

ASTM Method	Description	Somos® 9920	Somos® 9120	Polypropylene*
E831-00	C.T.E. -40°F – 32°F	36 - 37 $\mu\text{in}/\text{in}\text{-}^\circ\text{F}$		
	C.T.E. 32°F – 122°F	50 - 53 $\mu\text{in}/\text{in}\text{-}^\circ\text{F}$		
	C.T.E. 122°F – 212°F	94 - 105 $\mu\text{in}/\text{in}\text{-}^\circ\text{F}$		
	C.T.E. 212°F – 302°F	107 - 112 $\mu\text{in}/\text{in}\text{-}^\circ\text{F}$		
D150-98	Dielectric Constant 60Hz	4.6		
	Dielectric Constant 1KHz	4.3		
	Dielectric Constant 1MHz	3.8		
D149-97a	Dielectric Strength	370 - 387 V/mil		
E1545-00	Tg	99 - 104 °F		
D648-98c	HDT @ 0.46 MPa	130 - 143 °F		
	HDT @ 1.81 MPa	114 - 118 °F		

* Unfilled Polypropylene (Reference: Modern Plastics Encyclopedia, 1997)

N/A: Not Available