ProtoTherm™ 12110

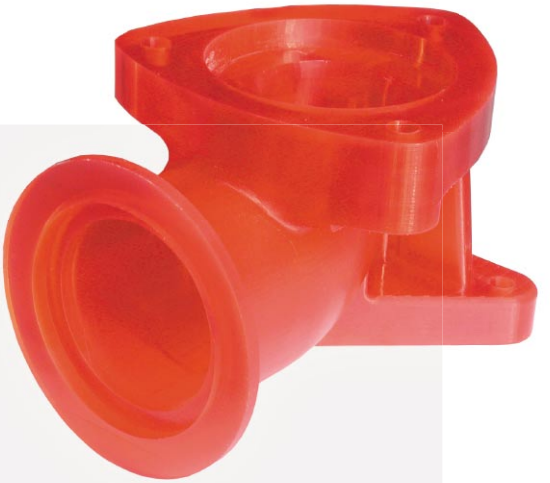
Strong, high-temperature, water-resistant resin for stereolithography
For Helium Cadmium (325 nm) Laser Systems

Description

DSM Somos® 12110 is a liquid photopolymer that produces strong, high temperature tolerant, water-resistant parts. Parts created with Somos® 12110 have a cherry-red appearance which turns to an orange-red color after thermal treatment.

Application

Somos® 12110 differentiates itself from other high temperature stereolithography materials by increasing in tensile strength and maintaining decent elongation at break after thermal treatment. This makes the material ideal for many applications in the automotive and aerospace markets where strong parts that can resist high temperatures are needed.



Physical Properties – Liquid

Viscosity	~410 cps at 30°C
Density	~1.15 g/cm^3 at 25°C

Optical Properties at 325 nm

E_c	12.2 mJ/cm^2	*[critical exposure]*
D_p	0.14 mm (~.0055 inch)	*[slope of cure-depth vs. ln(E) curve]*
E_{10}	75.4 mJ/cm^2	*[exposure that gives 0.254 mm (.010 inch) thickness]*

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Mechanical Properties (Metric)

ASTM Method	Description	12110 UV Postcure	12110 Thermal Postcure
D638M	Tensile Strength	57.6 MPa	65.5 MPa
	Elongation at Break	5.00 %	3.8 %
	Elongation at Yield	N/A	N/A
	Modulus of Elasticity	3,430 MPa	2,950 MPa
D790M	Flexural Strength	108 MPa	98 MPa
	Flexural Modulus	3,350 MPa	2,730 MPa
D256A	Izod Impact-Notched	0.115 J/cm	0.207 J/cm
D2240	Hardness (Shore D)	84.5	86.4
D570-98	Water Absorption	0.28 %	0.25 %

N/A: Not Available

Thermal & Electrical Properties (Metric)

ASTM Method	Description	12110 UV Postcure	12110 Thermal Postcure
E831-00	C.T.E. -40°C – 0°C	58.0 µm/m-°C	56.2 µm/m-°C
	C.T.E. 0°C – 50°C	85.5 µm/m-°C	64.9 µm/m-°C
	C.T.E. 50°C – 100°C	124.4 µm/m-°C	81.2 µm/m-°C
	C.T.E. 100°C – 150°C	139.1 µm/m-°C	116.3 µm/m-°C
D150-98	Dielectric Constant 60Hz	3.54	3.41
	Dielectric Constant 1KHz	3.52	3.37
	Dielectric Constant 1MHz	3.39	3.12
D149-97a	Dielectric Strength	16.6 kV/mm	17.8 kV/mm
E1545-00	Tg	59.3 °C	135.1 °C
D648-98c	HDT @ 0.46 MPa	52.9 °C	154.9 °C
	HDT @ 1.81 MPa	48.0 °C	151.3 °C

N/A: Not Available

Mechanical Properties (Imperial)

ASTM Method	Description	12110 UV Postcure	12110 Thermal Postcure
D638M	Tensile Strength	8,400 psi	9,500 psi
	Elongation at Break	5.0 %	3.8 %
	Elongation at Yield	N/A	N/A
	Modulus of Elasticity	497,500 psi	427,900 psi
D790M	Flexural Strength	15,700 psi	14,200 psi
	Flexural Modulus	485,900 psi	396,000 psi
D256A	Izod Impact-Notched	0.32 ft lb/in	0.29 ft lb/in
D2240	Hardness (Shore D)	84.5	86.4
D570-98	Water Absorption	0.28 %	0.25 %

N/A: Not Available

Thermal & Electrical Properties (Imperial)

ASTM Method	Description	12110 UV Postcure	12110 Thermal Postcure
E831-00	C.T.E. -40°F –32°F	32.2 µin/in-°F	31.2 µin/in-°F
	C.T.E. 32°F – 122°F	47.5 µin/in-°F	36.1 µin/in-°F
	C.T.E. 122°F – 212°F	69.1 µin/in-°F	45.1 µin/in-°F
	C.T.E. 212°F – 302°F	77.3 µin/in-°F	64.6 µin/in-°F
D150-98	Dielectric Constant 60Hz	3.54	3.41
	Dielectric Constant 1KHz	3.52	3.37
	Dielectric Constant 1MHz	3.39	3.12
D149-97a	Dielectric Strength	421 V/mil	461 V/mil
E1545-00	Tg	139 °F	232 °F
D648-98c	HDT @ 66 psi	127 °F	311 °F
	HDT @ 264 psi	118 °F	304 °F

N/A: Not Available