

WaterShed® XC 11122

Transparent, durable, strong, water-resistant resin for stereolithography
For Solid State (355 nm) Laser Systems

Description

WaterShed XC is a low viscosity liquid photopolymer that produces strong, tough, water-resistant, ABS-like parts. Most importantly parts created with WaterShed 11122 are nearly colorless, and look more like true, clear engineered plastic.

In addition WaterShed XC has been formulated with the DSM Somos Oxetane Advantage™— an advanced chemistry platform that produces parts with outstanding water resistance and high dimensional stability.

Application

WaterShed XC 11122 offers many properties that mimic traditional engineering plastics including ABS and PBT. This makes the material ideal for many applications in the automotive, medical and consumer electronics markets and include:

- Lenses
- Packaging
- Water flow analysis
- RTV patterns
- Durable concept models
- Wind tunnel testing
- Quickcast patterns



11120



WaterShed XC

Photo courtesy of Dyncept

Physical Properties – Liquid

Appearance	Optically clear
Viscosity	~260 cps at 30°C
Density	~1.12 g/cm ³ at 25°C

Optical Properties at 355 nm

E_c	~11.5 mJ/cm ² <small>[critical exposure]</small>
D_p	0.16 mm (~.0065 inch) <small>[slope of cure-depth vs. ln(E) curve]</small>
E_{10}	54 mJ/cm ² <small>[exposure that gives 0.254 mm (.010 inch) thickness]</small>

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Mechanical Properties (Metric)

ASTM Method	Description	WaterShed 11122	ABS* (transparent)	Polybutylene Terephthalate*
D638M	Tensile Strength	47.1 - 53.6 MPa	45.7 MPa	55 MPa
	Elongation at Break	11 - 20 %	41.6 %	20 %
	Elongation at Yield	3.3 - 3.5 %	N/A	3.5 - 9 %
	Modulus of Elasticity	2,650 - 2,880	2,000 MPa	2,700 MPa
D790M	Flexural Strength	63.1 - 74.2 MPa	73.5 MPa	80 MPa
	Flexural Modulus	2,040 - 2,370 MPa	2,300 MPa	2,500 MPa
D256A	Izod Impact-Notched	0.2 - 0.3 J/cm	1.6 J/cm	1.2 J/cm
D542	Index of Refraction	1.512 - 1.515	1.52	N/A
D2240	Hardness (Shore D)	N/A	N/A	98 - 120 (Rockwell R)
D1004	Graves Tear	150,288 N/m	N/A	N/A
D570-98	Water Absorption	0.35 %	0.20 - 0.45 %	0.16 %

* <http://www.matweb.com>

N/A: Not Available

Thermal & Electrical Properties (Metric)

ASTM Method	Description	WaterShed 11122	ABS* (transparent)	Polybutylene Terephthalate*
E831-00	C.T.E. -40°C – 0°C	66 - 67 $\mu\text{m}/\text{m}\cdot\text{°C}$	60 - 130 $\mu\text{m}/\text{m}\cdot\text{°C}$ <i>(no temp range given)</i>	50 - 145 $\mu\text{m}/\text{m}\cdot\text{°C}$ <i>(no temp range given)</i>
	C.T.E. 0°C – 50°C	90 - 96 $\mu\text{m}/\text{m}\cdot\text{°C}$		
	C.T.E. 50°C – 100°C	170 - 189 $\mu\text{m}/\text{m}\cdot\text{°C}$		
	C.T.E. 100°C – 150°C	185 - 189 $\mu\text{m}/\text{m}\cdot\text{°C}$		
D150-98	Dielectric Constant 60Hz	3.9 - 4.1	3.7	2.9 - 4.0 <i>(no frequency specified)</i>
	Dielectric Constant 1KHz	3.7 - 3.9		
	Dielectric Constant 1MHz	3.4 - 3.5	3.7	
D149-97a	Dielectric Strength	15.4 - 16.3 kV/mm	13.8 - 19.7 kV/mm	14.7 - 30 kV/mm
E1545-00	Tg	39 - 46 °C		41 °C
D648-98c	HDT @ 0.46 MPa	45.9 - 54.5 °C	94 - 207 °C	150 °C
	HDT @ 1.81 MPa	49.0 - 49.7 °C	86.4 - 194 °C	61.3 °C

* <http://www.matweb.com>

N/A: Not Available

Mechanical Properties (Imperial)

ASTM Method	Description	WaterShed I1122	ABS* (transparent)	Polybutylene Terephthalate*
D638M	Tensile Strength	6831 - 7774 psi	6,628 psi	7977 psi
	Elongation at Break	11 - 20 %	41.6 %	20 %
	Elongation at Yield	3.3 - 3.5 %	N/A	3.5 - 9 %
	Modulus of Elasticity	384 - 418 kpsi	290,000 psi	391,602 psi
D790M	Flexural Strength	9,152 - 10,756 psi	10,660 psi	11,603 psi
	Flexural Modulus	296 - 344 kpsi	344,000 psi	362,594 psi
D256A	Izod Impact-Notched	0.4 - 0.6 ft lb/in	1.5 - 2.0 ft lb/in	0.56 ft lb/in
D542	Index of Refraction	1.513 - 1.515	1.52	N/A
D2240	Hardness (Shore D)	N/A	N/A	98 - 120 (Rockwell R)
D1004	Graves Tear	833 - 858 lbf/in	N/A	N/A
D570-98	Water Absorption	0.35 %	0.2 - 0.45 %	0.16 %

* <http://www.matweb.com>

N/A: Not Available

Thermal & Electrical Properties (Imperial)

ASTM Method	Description	WaterShed I1122	ABS* (transparent)	Polybutylene Terephthalate*
E831-00	C.T.E. 10°F – 32°F	37 $\mu\text{in/in-}^\circ\text{F}$		
	C.T.E. 32°F – 60°F	50 - 53 $\mu\text{in/in-}^\circ\text{F}$		
	C.T.E. 60°F – 88°F	94 - 105 $\mu\text{in/in-}^\circ\text{F}$	33 – 72 $\mu\text{in/in-}^\circ\text{F}$ <i>(no temp range given)</i>	28 - 81 $\mu\text{in/in-}^\circ\text{F}$ <i>(no temp range given)</i>
	C.T.E. 88°F – 115°F	103 - 105 $\mu\text{in/in-}^\circ\text{F}$		
D150-98	Dielectric Constant 60Hz	3.9 - 4.1	3.7	
	Dielectric Constant 1KHz	3.7 - 3.9		2.9 - 4.0 <i>(no frequency specified)</i>
	Dielectric Constant 1MHz	3.4 - 3.5	3.7	
D149-97a	Dielectric Strength	390 - 413 V/mil	350 - 500 V/mil	373 - 762 V/mil
E1545-00	T _g	102 - 109 °F		106 °F
D648-98c	HDT @ 0.46 MPa	115 - 130 °F	201 - 405 °F	302 °F
	HDT @ 1.81 MPa	120 °F	187 - 381 °F	142.3 °F

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