

# WaterClear® Ultra 10122

Optically Clear, Colorless, Rigid, Stereolithography Resin  
For Solid State (355nm) Laser Systems

### Description

DSM Somos® WaterClear Ultra 10122 is a next generation optically clear resin with ABS like properties and good temperature resistance. It produces colorless, functional, accurate parts that simulate acrylic in appearance. Based on the Oxetane Advantage™, the parts also have improved water resistance over the original WaterClear 10120 resin. WaterClear Ultra is a fast, low viscosity, general-purpose resin.

### Application

Ideal for applications requiring optical clarity such as:

- Automotive lenses
- Bottles
- Fluid flow analysis
- Packaging prototypes
- Light pipes

Can also be used for concept, functional models and master patterns.



### Physical Properties –

Appearance	Optically clear, Colorless
Viscosity	~165 cps at 30°C
Density	~1.13 g/cm <sup>3</sup> at 25°C

### Optical Properties at 355 nm

$E_c$	~10.0 mJ/cm <sup>2</sup> <small>[critical exposure]</small>
$D_p$	0.16 mm (~.0065 inch) <small>[slope of cure-depth vs. ln(E) curve]</small>
$E_{10}$	47 mJ/cm <sup>2</sup> <small>[exposure that gives 0.254 mm (.010 inch) thickness]</small>

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# Mechanical Properties (Metric)

ASTM Method	Description	Somos® WaterClear® Ultra UV Postcure	Acrylic
D638M	Tensile Strength	55 - 56 MPa	47 - 79 MPa
	Tensile Modulus	2,860 - 2,900 MPA	2,200 - 3,800 MPa
	Elongation at Break	6 - 9 %	1 - 30 %
	Elongation at Yield	4 %	4 %
	Poisson's Ratio	0.40 - 0.42	0.37 - 0.45
D790M	Flexural Strength	82 - 85 MPa	88 - 138 MPa
	Flexural Modulus	2,410 - 2,570 MPa	3,000 - 3,500 MPa
D256A	Izod Impact-Notched	0.24 - 0.26 J/cm	0.15 J/cm
D2240	Hardness (Shore D)	86 - 87	63 - 97
D570-98	Water Absorption	1.1 %	0.3 - 2.0 %
D542	Index of Refraction	1.515	1.498

N/A: Not Available

# Thermal & Electrical Properties (Metric)

ASTM Method	Description	Somos® WaterClear® Ultra UV Postcure	Acrylic
E831-00	C.T.E. -40°C – 0°C	63.6 - 66.8 $\mu\text{m}/\text{m}^\circ\text{C}$	
	C.T.E. 0°C – 50°C	87.8 - 93.0 $\mu\text{m}/\text{m}^\circ\text{C}$	
	C.T.E. 50°C – 100°C	164.3 - 171.9 $\mu\text{m}/\text{m}^\circ\text{C}$	
	C.T.E. 100°C – 150°C	149.9 - 167.1 $\mu\text{m}/\text{m}^\circ\text{C}$	
D150-98	Dielectric Constant 60Hz	3.0 - 3.2	4.0
	Dielectric Constant 1KHz	3.3 - 3.6	3.5
	Dielectric Constant 1MHz	3.0 - 3.2	3.0
D149-97a	Dielectric Strength	14.5 - 15.5 kV/mm	18 - 60 kV/mm
E1545-00	Tg	42 - 46 °C	100 - 105°C
D648-98c	HDT@ 0.46 MPa	46 - 47 °C	80 - 103°C
	HDT @ 1.82 MPa	42 - 43°C	80 - 103°C
	Thermal postcure		
	HDT @ 0.46 MPa	59 - 61 °C	
	HDT @ 1.82 MPa	49 - 50°C	

# Mechanical Properties (Imperial)

ASTM Method	Description	Somos® WaterClear® Ultra UV Postcure	Acrylic
D638M	Tensile Strength	7.9 - 8.1 ksi	6.8 - 11.5 ksi
	Tensile Modulus	414 - 421 ksi	319 - 551 ksi
	Elongation at Break	6 - 8 %	1 - 30 %
	Elongation at Yield	4 %	4 %
	Poisson's Ratio	0.40 - 0.42	0.37 - 0.45
D790M	Flexural Strength	11.8 - 12.4 ksi	12.8 - 20.0 ksi
	Flexural Modulus	349 - 373 ksi	435 - 508 ksi
D256A	Izod Impact-Notched	0.44 - 0.48 ft-lb/in	0.3 ft-lb/in
D2240	Hardness (Shore D)	86 - 87	63 - 97
D570-98	Water Absorption	1.1 %	0.3 - 2.0 %
D542	Index of Refraction	1.515 %	1.498

N/A: Not Available

# Thermal & Electrical Properties (Imperial)

ASTM Method	Description	Somos® WaterClear® Ultra UV & Thermal Postcure	Acrylic	
E831-00	C.T.E. -40°F – 32°F	35.3 - 37.1 $\mu\text{in/in-}^\circ\text{F}$		
	C.T.E. 32°F – 122°F	48.8 - 51.7 $\mu\text{in/in-}^\circ\text{F}$		
	C.T.E. 122°F – 212°F	91.3 - 95.5 $\mu\text{in/in-}^\circ\text{F}$		
	C.T.E. 212°F – 302°F	83.3 - 92.9 $\mu\text{in/in-}^\circ\text{F}$		
D150-98	Dielectric Constant 60Hz	3.0 - 3.2	4.0	
	Dielectric Constant 1KHz	3.3 - 3.6	3.5	
	Dielectric Constant 1MHz	3.0 - 3.2	3.0	
D149-97a	Dielectric Strength	367 - 393 V/mil	456 - 1520 V/mil	
E1545-00	T <sub>g</sub> (TMA)	108 - 115°F	212 - 221°F	
D648-98c	HDT @ 66 psi	115 - 116°F	176 - 217°F	
	HDT @ 264 psi	108 - 110°F	176 - 217°F	
	Thermal postcure			
	HDT @ 66 psi	139 - 142°F		
HDT @ 264 psi	120 - 122°F			

N/A: Not Available