

# Preliminary Product Data Sheet

## Somos<sup>®</sup> 9420 EP White

**Robust, Accurate, Functional Epoxy Resin for Stereolithography  
For Solid State (355 nm) Laser Systems  
A White Material that Mimics Engineering Plastics**

### Description

DSM Somos<sup>®</sup> 9420 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. With mechanical properties that mimic many engineering plastics, parts created from Somos<sup>®</sup> 9420 exhibit superior fatigue properties, strong memory retention and high quality up-facing and down-facing surfaces. Somos<sup>®</sup> 9420 also offers a good balance of properties between rigidity and functionality. The resulting part properties are ideal for master patterns in rubber molding applications. This material is also useful in creating parts for applications where durability and robustness are critical requirements (e.g., automobile components, electronic housings, medical products, large panels and snap-fit parts).

### Application

Somos<sup>®</sup> 9420 Photopolymer is used in the solid imaging process to build three-dimensional parts.



### Physical Properties – Liquid

|            |                                 |
|------------|---------------------------------|
| Appearance | Opaque white                    |
| Viscosity  | ~450 cps at 30°C                |
| Density    | ~1.13 g/cm <sup>3</sup> at 25°C |

### Optical Properties at 355 nm

|                 |   |
|-----------------|---|
| E <sub>c</sub>  | 15.0 mJ/cm <sup>2</sup><br><small>[critical exposure]</small>                                 |
| D <sub>p</sub>  | 0.16 mm (0.0064 inch)<br><small>[slope of cure-depth vs. ln(E) curve]</small>                 |
| E <sub>10</sub> | 78 mJ/cm <sup>2</sup><br><small>[exposure that gives 0.254 mm (0.010 inch) thickness]</small> |

# DSM Somos<sup>®</sup>

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## Mechanical Properties (Metric)

| ASTM Method | Description           | Somos® 9420 UV    | ABS*<br>(transparent) | Polypropylene*        |
|-------------|-----------------------|-------------------|-----------------------|-----------------------|
| D638M       | Tensile Strength      | 32 - 38 MPa       | 45.7 MPa              | 31 - 37.2 MPa         |
|             | Elongation at Break   | 17 - 29 %         | 41.6 %                | 7 - 13% (yield)       |
|             | Poisson's Ratio       | 0.43              | N/A                   | N/A                   |
|             | Modulus of Elasticity | 1,380 - 1,830 MPa | 2,000 MPa             | 1,138 - 1551 MPa      |
| D790M       | Flexural Strength     | 35 - 36 MPa       | 73.5 MPa              | 41 - 55 MPa           |
|             | Flexural Modulus      | 1,270 - 1,320 MPa | 2,300 MPa             | 1,172 MPa - 1,724 MPa |
| D256A       | Izod Impact-Notched   | 0.28 J/cm         | 1.6 J/cm              | 21 - 75 J/cm          |
| D2240       | Hardness (Shore D)    | 76                | N/A                   | N/A                   |
| D570-98     | Water Absorption      | 0.93 %            | 0.20 - 0.45 %         |                       |

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

N/A: Not Available

## Thermal & Electrical Properties (Metric)

| ASTM Method | Description              | Somos® 9420 UV                             | ABS*<br>(transparent)   | Polypropylene*  |
|-------------|--------------------------|--|---|---|
| E831-00     | C.T.E. -40°C – 0°C       | 96.8 $\mu\text{m}/\text{m}^\circ\text{C}$  |   |   |
|             | C.T.E. 0°C – 50°C        | 149.5 $\mu\text{m}/\text{m}^\circ\text{C}$ |   |   |
|             | C.T.E. 50°C – 100°C      | 178.7 $\mu\text{m}/\text{m}^\circ\text{C}$ | 60 – 130 $\mu\text{m}/\text{m}^\circ\text{C}$<br><i>(no temp range given)</i> | 50 - 146 $\mu\text{m}/\text{m}^\circ\text{C}$<br><i>(no temp range given)</i> |
|             | C.T.E. 100°C – 150°C     | 144.0 $\mu\text{m}/\text{m}^\circ\text{C}$ |   |   |
| D150-98     | Dielectric Constant 60Hz | 5.33                                       | 3.7   |   |
|             | Dielectric Constant 1KHz | 4.66                                       |   | 2.9 - 4<br><i>(no frequency specified)</i>                                    |
|             | Dielectric Constant 1MHz | 3.94                                       | 3.7   |   |
| D149-97a    | Dielectric Strength      | 14.1 kV/mm                                 | 13.8 – 19.7 kV/mm   | 14.7 - 30.0 kV/mm   |
| E1545-00    | T <sub>g</sub>           |  |   | 41 °C   |
| D648-98c    | HDT @ 0.46 MPa           | 59 - 63 °C                                 | 94 – 207 °C   | 150 °C  |
|             | HDT @ 1.81 MPa           | 42 °C                                      | 86.4 – 194 °C   | 61.3°C  |

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N/A: Not Available

# Preliminary Product Data Sheet

## Mechanical Properties (Imperial)

| ASTM Method | Description           | Somos® 9420 UV        | ABS*<br>(transparent) | Polypropylene*        |
|-------------|-----------------------|-----------------------|-----------------------|-----------------------|
| D638M       | Tensile Strength      | 4,700 - 5,400 psi     | 6,628 psi             | 4,500 - 5,400 psi     |
|             | Elongation at Break   | 17 - 29 %             | 41.6 %                | 7 - 13 % (yield)      |
|             | Poisson's Ratio       | 0.43                  | N/A                   | N/A                   |
|             | Modulus of Elasticity | 200,000 - 265,000 psi | 290,000 psi           | 165,000 - 225,000 psi |
| D790M       | Flexural Strength     | 5,010 - 5,040 psi     | 10,660 psi            | 6,000 - 8,000 psi     |
|             | Flexural Modulus      | 184,000 - 191,000 psi | 344,000 psi           | 170,000 - 250,000 psi |
| D256A       | Izod Impact-Notched   | 0.53 ft lb/in         | 1.5 - 2.0 ft lb/in    | 0.4 - 1.4 ft-lb/in    |
| D2240       | Hardness (Shore D)    | 76                    | N/A                   | N/A                   |
| D570-98     | Water Absorption      | 0.93 %                | 0.2 - 0.45 %          |                       |

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

N/A: Not Available

## Thermal & Electrical Properties (Imperial)

| ASTM Method | Description              | Somos® 9420 UV                        | ABS*<br>(transparent)  | Polypropylene*   |
|-------------|--------------------------|---------------------------------------|--|--|
| E831-00     | C.T.E. 10°F – 32°F       | 53.8 $\mu\text{in/in-}^\circ\text{F}$ |  |  |
|             | C.T.E. 32°F – 60°F       | 83.0 $\mu\text{in/in-}^\circ\text{F}$ |  |  |
|             | C.T.E. 60°F – 88°F       | 99.3 $\mu\text{in/in-}^\circ\text{F}$ | 33 – 72 $\mu\text{in/in-}^\circ\text{F}$<br><i>(no temp range given)</i> | 28 - 81 $\mu\text{in/in-}^\circ\text{F}$<br><i>(no temp range given)</i> |
|             | C.T.E. 88°F – 115°F      | 80.0 $\mu\text{in/in-}^\circ\text{F}$ |  |  |
| D150-98     | Dielectric Constant 60Hz | 5.33                                  | 3.7  |  |
|             | Dielectric Constant 1KHz | 4.66                                  |  | 2.9 - 4.0<br><i>(no frequency specified)</i>                             |
|             | Dielectric Constant 1MHz | 3.94                                  | 3.7  |  |
| D149-97a    | Dielectric Strength      | 358 V/mil                             | 350 - 500 V/mil  | 373 -762 V/mil   |
| E1545-00    | T <sub>g</sub>           |                                       |  | 106 °F   |
| D648-98c    | HDT @ 66 psi             | 139 - 145 °F                          | 201 - 405 °F   | 302 °F   |
|             | HDT @ 264 psi            | 108 °F                                | 187 - 381 °F   | 142.3 °F   |

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