

# Somos<sup>®</sup> Momentum<sup>™</sup>

## Stereolithography

**Additive manufacturing, and more specifically stereolithography (SL), has enabled a faster route to market for footwear, while reducing development cost and aiding development of more complex shoe designs. With Somos<sup>®</sup> Momentum, Stratasys provides a compelling solution that combines rich feature detail and dimensional stability with more efficient printing outcomes available without compromising on surface quality and dimensional accuracy.**

Footwear manufacturers face a multitude of challenges, from developing durable solutions to managing design and the range of sizes required. They continue to seek more effective means to develop new designs to meet increasingly diverse customer needs, while also striving to quicken the pace of design and innovation. Additive manufacturing for footwear tooling has played a key role, and the inherent design flexibility, feature detail and surface quality offered by SL has led this technology into the mainstream. Footwear manufacturers continue to push for faster design iteration, shorter route to market and more cost- and time-efficient approaches.

Stratasys collaborated with key footwear manufacturers to develop an additive manufacturing material that addresses the specific needs for footwear tooling. **Somos<sup>®</sup> Momentum** offers higher part accuracy, quality and fine feature detail. The outstanding accuracy of the resin allows the forming of sharp features which in turn enables the creation of detailed soles not only in initial design, but also translated into the aluminum mold. In addition, the pink color of the material makes it easy to discern key features in the design and to inspect the parts for surface defects. Taking this technology a step further, direct printing of the sole will omit the need for detailing or texturing, speeding up the traditional tooling process up to 60%, enabling a cost reduction up to 30%.



### Key Benefits

- Highly efficient stereolithography material
- High accuracy and surface quality
- Complex shapes and feature detail
- Eliminates chemical texturing process
- Color facilitates inspection of feature detail and quality
- Overall cost saving during development and manufacturing

### Ideal Applications

- Footwear tooling

LIQUID PROPERTIES		OPTICAL PROPERTIES		
Appearance	Pink	E <sub>c</sub>	13 mJ/cm <sup>2</sup>	[critical exposure]
Viscosity	~340 cps @ 30°C	D <sub>p</sub>	6.25 mils	[slope of cue-depth vs. ln (E) curve]
Density	~1.16 g/cm <sup>3</sup> @ 25°C	E <sub>10</sub>	64 mJ/cm <sup>2</sup>	[exposure that gives 0.254 mm (.010 inch) thickness]

MECHANICAL PROPERTIES		UV POSTCURE	
ASTM Method	Property Description	Metric	Imperial
D638M	Tensile Modulus	2,510 MPa	364 ksi
D638M	Tensile Strength	37 MPa	5.4 ksi
D638M	Elongation at Break		7.5%
D638M	Elongation at Yield		3%
D790M	Flexural Strength	67.3 MPa	9.8 ksi
D2240	Flexural Modulus	2,200 MPa	319 ksi
D256A	Izod Impact (Notched)	26 J/m	0.49 ft-lb/in
D638M	Poisson's Ratio		0.41
D2240	Hardness (Shore D)		79
D570-98	Water Absorption		0.4%

THERMAL/ELECTRICAL PROPERTIES		UV POSTCURE	
ASTM Method	Property Description	Metric	Imperial
E831-05	C.T.E. -40–0°C (-40–32°F)	63 $\mu\text{m}/\text{m}^{\circ}\text{C}$	35 $\mu\text{in}/\text{in}^{\circ}\text{F}$
E831-05	C.T.E. 0–50°C (32–122°F)	89 $\mu\text{m}/\text{m}^{\circ}\text{C}$	49 $\mu\text{in}/\text{in}^{\circ}\text{F}$
E831-05	C.T.E. 50–100°C (122–212°F)	170 $\mu\text{m}/\text{m}^{\circ}\text{C}$	95 $\mu\text{in}/\text{in}^{\circ}\text{F}$
E831-05	C.T.E. 100–150°C (212–302°F)	172 $\mu\text{m}/\text{m}^{\circ}\text{C}$	96 $\mu\text{in}/\text{in}^{\circ}\text{F}$
D150-98	Dielectric Constant 60 Hz		3.8
D150-98	Dielectric Constant 1 KHz		3.7
D150-98	Dielectric Constant 1 MHz		3.4
D149-97A	Dielectric Strength	17.9 kV/mm	454 V/mil
D648	HDT @ 0.46 MPa (66 psi)	46°C	115°F
D648	HDT @ 1.81 MPa (264 psi)	41°C	106°F

These values may vary and depend on individual machine processing and post-curing practices.

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