



## Advanced Materials

# RenShape® 2000\*

### ALUMINUM REINFORCED POLYMER BOARD FOR COMPOSITE INJECTION MOLD TOOLING

\* Patent Applied for

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#### DESCRIPTION :

RenShape® 2000 is a new generation of board specifically designed for tool building applications. While product development has focused on injection molding applications, many other mold uses are envisioned where high strength and excellent thermal resistance are coupled with direct milling production of the tool.

RenShape® Moldmaking System expand our offering of technology for bridge tooling to take our customers from prototypes to short-run production while shortening the development cycle to final tooling and reducing costs.

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#### ADVANTAGES :

- Fast milling, typically at least 5 times faster than aluminum
- No benching typically required
- No internal cooling required
- Very rapid “one step” tooling process
- Accurate parts
- Hundreds of engineering resin parts have been produced

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#### APPLICATIONS :

RenShape® 2000 has been developed for injection tooling applications. Multiple decreases of milling and benching time have been achieved with a mold making material capable of producing hundreds of injection molded engineering resin parts to production tolerance standards.

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#### ACCESSORIES :

RenShape® High Performance Sealer for sealing machined-tool surfaces of RenShape® 2000 Boards.

RenGel® 4026 with Ren® 1501 can be used to bond abraded and cleaned pieces of RenShape® 2000 board for use up to 149°C

Renlam® SW 5210 Ren® HY 5211 can be used to bond abraded and cleaned pieces of RenShape® 2000 board for use up to 200°C



**TYPICAL PROPERTIES :**

Tested @ 77 °F (25 °C) unless otherwise noted.

<b>Property</b>	<b>ASTM Test Method</b>	<b>Test Value</b>
Color	Visual	Gray
Density, g/cc (lb./ft <sup>3</sup> )	D-792	1.8 (112)
Hardness (Shore D)	D-2240	91
Flexural Strength, psi, 5 % strain	D-790	12,000
Flexural Modulus, psi	D-790	1.2 x 10 <sup>6</sup>
Ultimate Tensile Strength, psi	D-638	9,000
Tg by DMA, E' onset, °F (°C)	D-4065	455 (234)
Tg by TMA, °F (°C)	D-3386	435 (225)
Compressive Strength, psi	D-695	36,500
Coefficient of Thermal Expansion	D-3386	
in/in °F (-68 ° to 121 °F)		23 x 10 <sup>-6</sup>
in/in °C (-20 ° to 100 °C)		42x 10 <sup>-6</sup>
Specific Heat		
J/g °C (40 ° to 100 °C)		1.18 – 1.30
Cal/g °C (40 ° to 100 °C)		0.28 – 0.31
Thermal Conductivity, W/m °K		1

**Note :** These physical properties are reported as typical test values obtained by our test laboratory. If assistance is needed in establishing product specifications, please consult with our Quality Control Department.

**CONSTRUCTION :**

Finished molds should be sealed with RenShape<sup>®</sup> High Performance Sealer before use.

Molds should be filled as rapidly as possible during injection. Mold cooling with apparatus such as an “Air Knife” is suggested. Cycle times for standard wall-thickness parts typically range from 45 to 120 seconds.

A mold supporting structure such as a pocket or chase is recommended. Slab tooling techniques may be possible.

**MACHINING :**

	<u><b>Roughing Speed</b></u>	<u><b>Roughing Feed</b></u>	<u><b>Finishing Speed</b></u>	<u><b>Finishing Feed</b></u>
	6,000 – 10,000 RPM	240 IPM	15,000 RPM	Variable
Cutters :		Roughing – ¾” Ball End Mill Carbide		
		Finishing – 3/32” Diameter Carbide		
Depth :		Roughing – 5/32”		
		Finishing – 0.006 stepover		
Blades :		High-helix carbide tipped, 3-tooth saw blades are recommended.		

Specialty Saw Blades such as Lenox<sup>®</sup> 3T-TriMaster<sup>®</sup> or 2.3 TriMaster<sup>®</sup> (for faster cut) are available from the following company :



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American Saw and Manufacturing Company (800) 628-8810

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**STORAGE/HANDLING :**

Store boards flat in original cartons at 36°F to 104°F (2°C to 40°C). In accord with good industrial practice, handle with due care. Avoid dusty conditions, use adequate ventilation. Avoid breathing dust. Avoid contact with eyes, skin, and clothing. Wash thoroughly after handling.

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**SHELF LIFE :**

Provided this material is stored under the recommended storage condition in the original container, it will remain in useable condition for 10 years.

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**CAUTION :**

Do not use this product until the MSDSs have been read and understood. To protect against any potential health risks presented by our products, the use of proper personal protective equipment (PPE) is recommended. Eye and skin protection is normally advised. Respiratory protection may be needed if mechanical ventilation is not available or is insufficient to remove vapors. For detailed PPE recommendations and exposure control options consult the product MSDS or a Huntsman EHS representative.

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