

## Advanced Materials

# RenShape® 5065

## HIGH PERFORMANCE, HIGH TEMPERATURE EPOXY BOARD

### DESCRIPTION :

The RenShape® 5065 epoxy board is designed for use at temperatures up to 400°F (204°C). The board is well suited for building aerospace master models, lay-up tools for high-temperature curing prepregs, and other heat-resistant tooling. The RenShape® 5065 epoxy board features a low coefficient of thermal expansion to produce models and tools with good accuracy and dimensional stability. It has a very high glass transition temperature of 470°F (243°C).

### ADVANTAGES

- Easy to CNC machine
- Good edge definition
- Good dimensional stability
- Good surface finish
- Prepreg compatible
- High Tg

### ACCESSORIES

#### Epoxy Adhesive

RenLam® 4017 Resin / Ren® 1510 Hardener

### TYPICAL PROPERTIES\*

Property	Test Method	Units	Test Values		
Appearance Color	Visual	Visual	Gray		
Density	ASTM D-792	lb./ft. <sup>3</sup> (g/cm <sup>3</sup> )	49 (0.79)		
Hardness	ASTM D-2240	Shore D	70		
Ultimate Flexural Strength	ASTM D-790	psi (MPa)	4,900 (33.8)		

**TYPICAL  
PROPERTIES\***

**Continued**

Property	Test Method	Units	Test Values		
<b>Flexural Modulus</b>	ASTM D-790	psi (MPa)	425,000 (2931)		
<b>Ultimate Tensile Strength</b>	ASTM D-638	psi (MPa)	3076 (21.2)		
<b>Ultimate Tensile Modulus</b>	ASTM D-638	psi. (Mpa)	397,600 (2742)		
<b>Tg by DMA, E'</b>	ASTM D-4065	°F (°C)	470 (243)		
<b>Tg by TMA</b>		°F (°C)	470 (242.7)		
<b>Compressive Strength</b>	ASTM D-695	psi (MPa)	8,264 (57)		
<b>Compressive Modulus</b>	ASTM D-695	psi (MPa)	203,863 (1406)		
<b>Izod Impact</b>	ASTM D-265	ftlbs/in of notch	0.158		
<b>Coefficient of Thermal Expansion</b>	ASTM D-3386	-22° to 86°F, (in/in/°F)	18 x 10 <sup>-6</sup>		
		-30° to 30°C, (in/in/°C)	32 x 10 <sup>-6</sup>		
		77° to 302°F (in/in/°F)	19.3 x 10 <sup>-6</sup>		
		25° to 150°C (in/in/°C)	34.7 x 10 <sup>-6</sup>		
		77° to 392°F (in/in/°F)	20.3 x 10 <sup>-6</sup>		
		25° to 200°C (in/in/°C)	36.5 x 10 <sup>-6</sup>		

*Tested @ 77°F unless noted*

**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 Product Management Department.

Use RenLam® 4017 with Ren® 1510 adhesive system for bonding. Let it cure 24 hrs. @ room temperature before ramping up tool temperature for 2 hrs. minimum (up to 6 hrs.) @ 150°F. This cure time range is given because of tool size variations which will effect the time at temperature needed at center of mass of bonded tool. Tool can then be machined to shape after this initial cure. Tool should then be run through the cure needed for part before actual part is run through cure on tool. See below cure information.

**IMPORTANT!**

**Post-Cure of parts on RenShape® 5065 Tools:** The temperature differential ( delta T) between the center of the tool and the external surface must never exceed 50°F on either ramp up or cool down. To achieve this, a temperature soak of 6 hours every 50°F up and down in the oven and temperature ramp rates of no more than 1°F/min are recommended, but if the temperature differential would exceed 50°F then these parameters need to be adjusted until it fits. Leave the tool in the oven for at least 6 hours below 100°F before opening doors and exposing the tool to room temperature conditions. Use of RenShape® High Performance Sealer is recommended. When used along with a release system, it greatly helps surface sealing and release.

<b>MACHINING</b>	<b>Roughing Speed</b>	<b>Roughing Feed</b>	<b>Finishing Speed</b>	<b>Finishing Feed</b>
	1,600 RPM	40 IPM (101cm/min.)	10,000 RPM	100 IPM (254cm/min.)

**Cutters: Roughing:** 1 in. (2.5cm) Hog Ball End Mill 4-Flute HS Steel 8% cobalt

**Finishing :** 5/8 in (16mm) Ball End Mill 2-Flute Carbide

**Depth:** Roughing varies from 0.25 in. to 2.5 in. (6mm to 6.35cm) with 40% stepover Finishing depth is 1/8 in. (3mm) leaving a 0.002 in. (0.05mm) scallop height

**These machining parameters are represented as starting points.** Cutter type and material, spindle speed, feed rate, machine power and rigidity all affect machining results. User must determine the best parameters for specific situations.

**STORAGE**

RenShape® 5065 boards should be stored flat in a dry place, in the sealed original container, at temperatures between +2°C and +40°C (+35.6°F and 104°F). Under these storage conditions, the shelf life is 10 years. The product should not be exposed to direct sunlight.

**PRECAUTIONARY STATEMENT :** Huntsman Advanced Materials Americas LLC maintains up-to-date Material Safety Data Sheets (MSDS) on all of its products. These sheets contain pertinent information that you may need to protect your employees and customers against any known health or safety hazards associated with our products. Users should review the latest MSDS to determine possible health hazards and appropriate precautions to implement prior to using this material.

**First Aid!**

Refer to MSDS as mentioned above.

**KEEP OUT OF REACH OF CHILDREN**

**IMPORTANT LEGAL NOTICE**

Sales of the product described herein ("Product") are subject to the general terms and conditions of sale of either Huntsman Advanced Materials LLC, or its appropriate affiliate including without limitation Huntsman Advanced Materials (Europe) BVBA, Huntsman Advanced Materials Americas Inc., or Huntsman Advanced Materials (Hong Kong) Ltd. ("Huntsman"). The following supercedes Buyer's documents.

Huntsman warrants that at the time and place of delivery all Products sold to Buyer shall conform to the specifications provided to Buyer by Huntsman.

While the information and recommendations included in this publication are, to the best of Huntsman's knowledge, accurate as of the date of publication, NOTHING CONTAINED HEREIN (EXCEPT AS SET FORTH ABOVE REGARDING CONFORMANCE WITH SPECIFICATIONS PROVIDED TO BUYER BY HUNTSMAN) IS TO BE CONSTRUED AS A REPRESENTATION OR WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, NONINFRINGEMENT OF ANY INTELLECTUAL PROPERTY RIGHTS, OR WARRANTIES AS TO QUALITY OR CORRESPONDENCE WITH PRIOR DESCRIPTION OR SAMPLE, AND THE BUYER ASSUMES ALL RISK AND LIABILITY WHATSOEVER RESULTING FROM THE USE OF SUCH PRODUCT, WHETHER USED SINGLY OR IN COMBINATION WITH OTHER SUBSTANCES.

No statements or recommendations made herein are to be construed as a representation about the suitability of any Product for the particular application of Buyer or user or as an inducement to infringe any patent or other intellectual property right. Buyer is responsible to determine the applicability of such information and recommendations and the suitability of any Product for its own particular purpose, and to ensure that its intended use of the Product does not infringe any intellectual property rights.

The Product may be or become hazardous. The Buyer should obtain Material Safety Data Sheets and Technical Data Sheets from Huntsman containing detailed information on Product hazards and toxicity, together with proper shipping, handling and storage procedures for the Product, and should comply with all applicable governmental laws, regulations and standards relating to the handling, use, storage,

distribution and disposal of, and exposure to the Product. Buyer shall also take all steps necessary to adequately inform, warn and familiarize its employees, agents, direct and indirect customers and contractors who may handle or be exposed to the Product of all hazards pertaining to and proper procedures for safe handling, use, storage, transportation and disposal of and exposure to the Product, and the containers or equipment in which the Product may be handled, shipped or stored.

Ren, RenShape, RenPatch and RenWeld are registered trademarks of Huntsman LLC or an affiliate thereof in one or more countries, but not all countries.

© 2013 Huntsman Advanced Materials Americas Inc.

**Huntsman Advanced Materials**

10003 Woodloch Forest Drive  
The Woodlands, Texas 77380

Tel: 888-564-9318  
Fax: 281-719-4047  
[www.huntsman.com/advanced\\_materials](http://www.huntsman.com/advanced_materials)

Huntsman Advanced technology Center  
8600 Gosling Rd.  
The Woodlands Tx. 77381  
(281 719-7400