

LOCTITE HC 9872 AERO

Syntactic Film

(KNOWN AS SynCore[®] HC 9872)

INTRODUCTION

LOCTITE HC 9872 AERO is a toughened 350°F/177°C curing epoxy, low density syntactic core material. LOCTITE HC 9872 AERO is co-curable with a wide variety of 350°F/177°C curing epoxy prepreg systems. LOCTITE HC 9872 AERO is supplied as a continuous film of controlled thickness, width, and density.

FEATURES

- Lightweight Syntactic Core Material
- Modified Epoxy
- 350°F/177°C Cure
- Co-curable with prepgres

Product Forms

	<u>inches</u>	<u>mm</u>
Typical Film Thickness:	0.010 to 0.060 ± 0.002	0.254 to 1.524 ± 0.051
	0.070 to 0.125 ± 0.004	1.778 to 3.175 ± 0.102
Film Widths:	Standard 12 inches (30.6 cm); other widths may be available as special order	
Roll Lengths:	Up to 200 feet (61 m) depending on film thickness	
Reinforcing Carriers:	Supplied with a lightweight non-woven Kevlar [®] Mat or Glass reinforcing carrier	

Handling

This product is in film form and is ready to use as received. Syntactic film should be removed from cold storage and allowed to warm to room temperature (77°F/25°C) before removing the protective packaging. Syntactic film has protective liners on it which must be removed prior to parts assembly (see "Applying" below). The liners will always be a contrasting color from the Syntactic film to allow the user easy confirmation of removal.

Syntactic film in thicknesses exceeding 0.040 in/1.061mm on roll stock is inclined to form wrinkles due to natural tensions encountered during the winding operation. If roll stock is being used and wrinkles are encountered, Henkel recommends removing the film material from the roll and letting it relax for a period of 24 - 48 hours at room temperature (77°F/25°C). Once material is cut from the roll, the balance of the material on the roll should be taped lightly to prevent the balance of the roll from relaxing.

An alternative product form for Syntactic film is 12 in x 24 in (30.48 cm x 60.96 cm) sheet stock and is highly recommended for thicknesses above 0.040 in/1.016mm.

Application

Storage Life - LOCTITE HC 9872 AERO requires refrigerated storage. Store @ 0°F/-18°C or below for maximum storage life. Warranty life @ 0°F/-18°C or below is 12 months. Store in sealed desiccated polyethylene bag provided. Allow adequate time for the container to warm to room temperature before opening for use.



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Applying - Syntactic film is a pliable film with tack and drape. Syntactic film can be cut to any desired shape using ordinary razor knives or scissors. Razor knives with templates as guides work best. After cutting the syntactic film, remove the polyethylene release film by peeling it back from a corner. For thin syntactic films, a slight rub with dry ice on the polyethylene will assist in releasing the film from the syntactic film. Apply the syntactic film to the prepreg lay-up. Because of syntactic film's tack, all it takes is a light amount of pressure to secure the edge of the syntactic film to the prepreg stack. A Teflon tool is recommended to smooth the film. This tacks the syntactic film in place and prevents air entrapment. After the syntactic film is applied to prepreg lay-up, remove the coated release paper.

Henkel recommends trimming the syntactic film back about half an inch from the edge or damming the edge of the laminate to restrict resin flow.

Open Assembly Time - LOCTITE HC 9872 AERO may be used within the following schedule after removing from cold storage:

- @ 77°F/25°C at least 15 days
- @ 90°F/32°C at least 10 days

Curing - In general, LOCTITE HC 9872 AERO is cured successfully using the cure cycle and bagging procedures recommended for co-curing epoxy prepreg systems.

Cleanup - Little cleanup should be required. However, uncured syntactic film may be removed effectively with ketone solvents in well ventilated areas. Saturate cloth or industrial wipes with solvent and apply just enough to do the job. Avoid contaminating uncured parts with spray or spillage. Wear respirators equipped with organic vapor cartridges, impervious rubber gloves, and safety goggles when handling solvents. Consult solvent container labels for skin and flammability warnings.

Typical Physical Performance Properties

Typical Uncured Properties

Gel time @ 350°F/177°C:	5-15 minutes
Volatiles @ 350°F/177°C, 60 min:	1% by weight maximum
Flexibility @ 77°F/25°C:	pliable and drapable
Working life @ 77°F/25°C:	15 days
Flow at 50 psi/0.34 MPa, 350°F/177°C:	25-50%

Typical Cured Properties

Density, maximum (ASTM D792):	<u>lb/ft³</u>	<u>kg/m³</u>
for film 0.020 inch (0.508 mm) or less	49	785
for film 0.030 inch (0.762 mm) or greater	42	673

Coefficient of Thermal Expansion:	52µm/m°C before T _g (190°C)
	220µm/m°C after T _g (190°C)



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Typical Mechanical Performance Properties**Tensile Properties (ASTM D638)**

<u>Test Temperature, °F/°C</u>	<u>Strength</u>		<u>Modulus</u>		<u>Elongation</u>
	<u>psi</u>	<u>MPa</u>	<u>psi</u>	<u>MPa</u>	<u>%</u>
-67/-55	4,700	32.4			
77/25	4,800	33.1	400,000	2,758	1.24
180/82	4,000	27.6	320,000	2,206	1.26
350/177	3,300	22.8	240,000	1,655	1.77

Compressive Strength (ASTM D1621)

<u>Test Temperature, °F/°C</u>	<u>Dry</u>		<u>Wet¹</u>	
	<u>psi</u>	<u>MPa</u>	<u>psi</u>	<u>MPa</u>
-67/-55	10,000	68.9		
77/25	8,800	60.7	6,800	46.9
180/82	7,000	48.3	10,000	41.9
350/177	5,200	35.9	1,500	10.3

Compressive Modulus

<u>Test Temperature, °F/°C</u>	<u>psi</u>	<u>MPa</u>
77/25	375,000	2,586

Shear Strength (ASTM D2344)

<u>Test Temperature, °F/°C</u>	<u>Dry</u>		<u>Wet¹</u>	
	<u>psi</u>	<u>MPa</u>	<u>psi</u>	<u>MPa</u>
-67/-55	6,000	41.4		
77/25	6,800	41.4	4,500	31.0
180/82	5,000	34.5	4,000	27.6
350/177	3,100	21.4	2,200	15.2

Shear Modulus²

<u>Test Temperature, °F/°C</u>	<u>psi</u>	<u>MPa</u>
-67/-55	167,000	1,151
77/25	150,000	1,034
250/121	115,000	793

Flatwise Tensile Strength³ (ASTM D2344)

<u>Test Temperature, °F/°C</u>	<u>Dry</u>		<u>Wet¹</u>	
	<u>psi</u>	<u>MPa</u>	<u>psi</u>	<u>MPa</u>
-67/-55	3,000	20.7		
77/25	3,300	22.8		
180/82	2,800	17.2	2,800	19.3
300/149	2,500	21.4		
350/177	2,400	16.5		





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Typical Electrical Properties

Surface Resistivity, Ω	3.61×10^{15}
Volume Resistivity, Ω • CM	5.91×10^{14}
Dielectric Constant, 10 GHz	1.94
20 GHz	1.91
Loss Tangent, 10 GHz	0.016
20 GHz	0.016
Thermal Conductivity, Btu/(hr)(ft ²)(°F/ft)	0.068 (0.118 W/(m•k))

Note:

1. Wet conditioning was attained by exposing the specimens to 95-100% relative humidity at 160°F/ 71°C for 31 days.
2. Based on calculated results.
3. The short beam shear and flatwise tensile testing was performed on a composite containing a 0.040" (1.016mm) core of LOCTITE HC 9872 AERO co-cured between two 0.015" (3.81mm) thick unidirectional carbon/epoxy face sheets.

Handling Precautions

Do not handle or use until the Material Safety Data Sheet has been read and understood. For industrial use only.

DISPOSAL INFORMATION

Dispose of spent remover and paint residue per local, state and regional regulations. Refer to HENKEL TECHNOLOGIES MATERIAL SAFETY DATA SHEET for additional disposal information.

PRECAUTIONARY INFORMATION

General:

As with most epoxy based systems, use this product with adequate ventilation. Do not get in eyes or on skin. Avoid breathing the vapors. Wash thoroughly with soap and water after handling.

Before using this product refer to container label and HENKEL TECHNOLOGIES MATERIAL SAFETY DATA SHEET for additional precautionary, handling and first aid information.





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Note

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