SynCore® HC 9872

Syntactic Film

Description
SynCore HC 9872 is a toughened 350°F/177°C curing epoxy, low density syntactic core material. SynCore HC 9872 is co-curable with a wide variety of 350°F/177°C curing epoxy prepreg systems. SynCore HC 9872 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 prepregs

Product Forms

	inches	mm
Typical Film Thickness:	0.010 to 0.060 ± 0.002 0.070 to 0.125 ± 0.004	0.254 to 1.524 ± 0.051 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: SynCore HC 9872 is typically supplied with a reinforcing carrier. The standard carrier is a lightweight non-woven Kevlar® mat.

Handling
This product is in film form and is ready to use as received. SynCore should be removed from cold storage and allowed to warm to room temperature (77°F/25°C) before removing the protective packaging. SynCore 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 SynCore to allow the user easy confirmation of removal.

SynCore 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 SynCore 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 - SynCore HC 9872 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.

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

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

Open Assembly Time - SynCore HC 9872 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, SynCore HC 9872 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 SynCore 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 Mechanical 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

	lb/ft³	kg/m³
Density, maximum (ASTM D792):		
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)

Tensile Properties (ASTM D638)

	Strength		Modulus		
Test Temperature,°F/°C	psi	MPa	psi	MPa	Elongation, %
-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)

	Dry		Wet[1]	
Test Temperature, °F/°C	psi	MPa	psi	MPa
-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

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

Shear Strength (ASTM D2344)

	Dry		Wet[1]	
Test Temperature, °F/°C	psi	MPa	psi	MPa
-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 Modulus[2]

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

Flatwise Tensile Strength[3] (ASTM D2344)

	Dry		Wet[1]	
Test Temperature, °F/°C	psi	MPa	psi	MPa
-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		

Typical Electrical Properties

Surface Resistivity, Ω	3.61 x 10^{15}
Volume Resistivity, Ω • CM	5.91 x 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)(ft²)(°F/ft)	0.068 (0.118 W/(m•k))

[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 SynCore HC HC 9872 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.

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. Empty containers retain product residue and vapors, so obey all precautions when handling empty containers.

ONE PART
WARNING! As with most epoxy based systems, this product may cause eye and skin irritation or allergic dermatitis. Contains epoxy resins.

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Henkel