



Hysol[®] EA 9658 Epoxy Film Adhesive

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Description

Hysol EA 9658 is a new technology, nacelle film adhesive. It combines high temperature strength controlled flow to minimize hole blockage and flash/flow clean up in the shop. It features approximately three times the toughness of Hysol EA 9689 and is suitable for metal, composite and honeycomb bonding where continuous exposure to temperatures up to 350°F/177°C is important. The unsupported version may be reticulated for optimum bond strength. Hysol EA 9658 is offered with the companion low VOC, water-based nacelle primer EA9258.1.

Features

Increased toughness with high temperature performance
Designed for composite, metal or honeycomb
State of the art flow control to minimize hole blockage and excess flash/flow
Thermally stable – tested for 6000 hours at 350°F/177°C
Offered with a companion low VOC water-based chromated primer
Subject of 2006SAMPE Paper - HIGH STRENGTH AND DURABILITY NACELLE FILM ADHESIVE, HYSOL[®] EA9658. Copy available from our technical service desk at +1.925.458.8278 or email to tech.aero@us.henkel.com

Handling

This product is in film form and is ready to use as received. The adhesive should be removed from cold storage and allowed to warm to room temperature. All moisture should be removed from the protective packaging before opening. The adhesive film has a protective liner(s) on it, which must be removed prior to parts assembly (see "Applying" below). The liner(s) will always be a contrasting color from the adhesive to allow the user easy confirmation of removal.

Application

Storage Life - Hysol EA 9658 requires refrigerated storage. Store @ 0°F/-18°C or below for maximum storage life. Warranty life @ 0°F/-18°C is 12 months from date of shipment. Store only in sealed containers to prevent moisture contamination. Allow all moisture to evaporate from container before opening for use.

Applying - Bonding surfaces should be clean, dry and properly prepared. For optimum surface preparation consult the Hysol Surface Preparation Guide. The adhesive film, with one liner left on it, may be tacked to the detail part for cutting to shape and size. The liner should remain with the adhesive until just before assembly of the detail to the other faying surface. This will minimize contamination of the adhesive bond. The bonded parts should be held in contact until the adhesive has cured. Usually 25 to 50 psi /1.2 to 2.4 kPa is sufficient to assure proper mating.

Open Assembly Time - Hysol EA 9658 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 - Hysol EA 9658 may be cured for 1 hour @ 350°F/177°C. Heat up rate to the cure temperature is not critical, but should be between 4° and 7°F (2.2° and 4°C) per minute. Pressure should be applied before heating the parts to be bonded and maintained until cool down of the assembly.

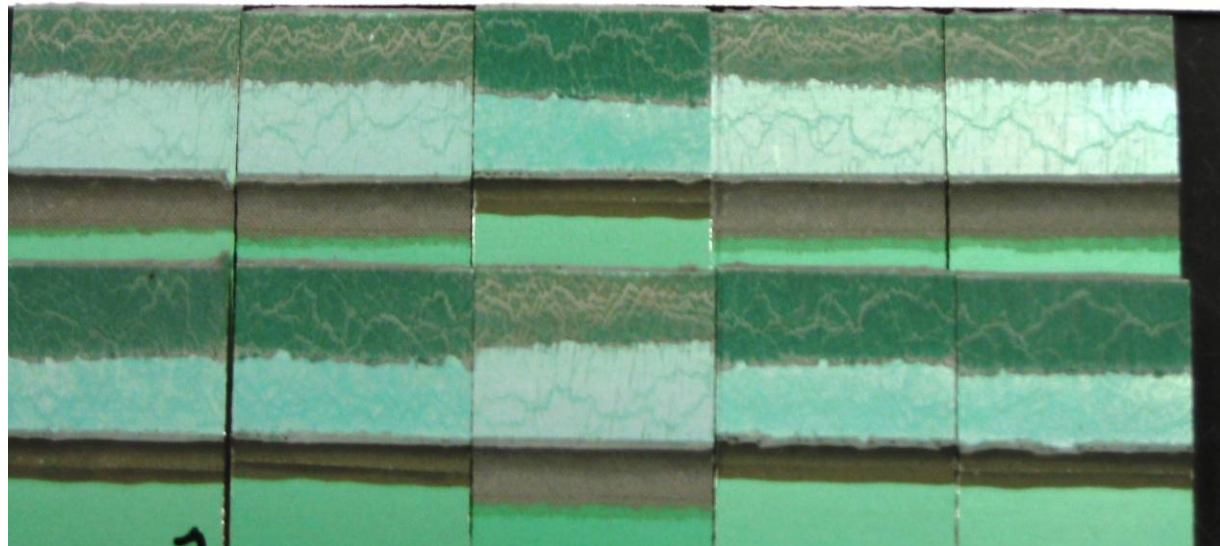
Cleanup - It is important to remove excess adhesive from the part and bonding tools before it hardens. Once the adhesive is cured, it is difficult to remove except by mechanical abrasion. Uncured adhesive may be removed with a ketone solvent in a well-ventilated area. Saturate a clean cloth or industrial wiper with solvent and apply just enough to do the job. Be careful to prevent any solvent from entering the uncured bondline, as solvent will degrade the final bond performance. Consult with your supplier's information pertaining to the safe and proper use of solvents.

Bond Strength Performance

Tensile Lap Shear Strength

Tensile lap shear strength tested per ASTM D1002 after curing 1 hour @ 350°F/177°C. Adherends are 2024-T3 bare aluminum treated with phosphoric acid anodizing per ASTM D3933. Performance is comparable when tested with two state of the art corrosion inhibiting primers, Hysol EA 9205R (solvent based) and Hysol EA 9258.1 (chromated, water borne).

Typical Results for Film Weight										
Test	0.06 psf (290 g/m ²) Uns 9658/9258.1			0.10 psf (490 g/m ²) Glass 9658/9258.1			0.10 psf (490 g/m ²) Glass 9689/9205R			
	Temperature °F/°C	PSI	MPa	PSI	MPa	PSI	MPa			
-67/-55	4300	29.6	4300	29.6	3900	26.9				
77/25	4900	36.2	5100	35.4	4000	27.6				
250/121	4130	28.5	4200	29.0	3400	23.4				
350/177	3000	20.6	2900	20.0	3000	20.6				



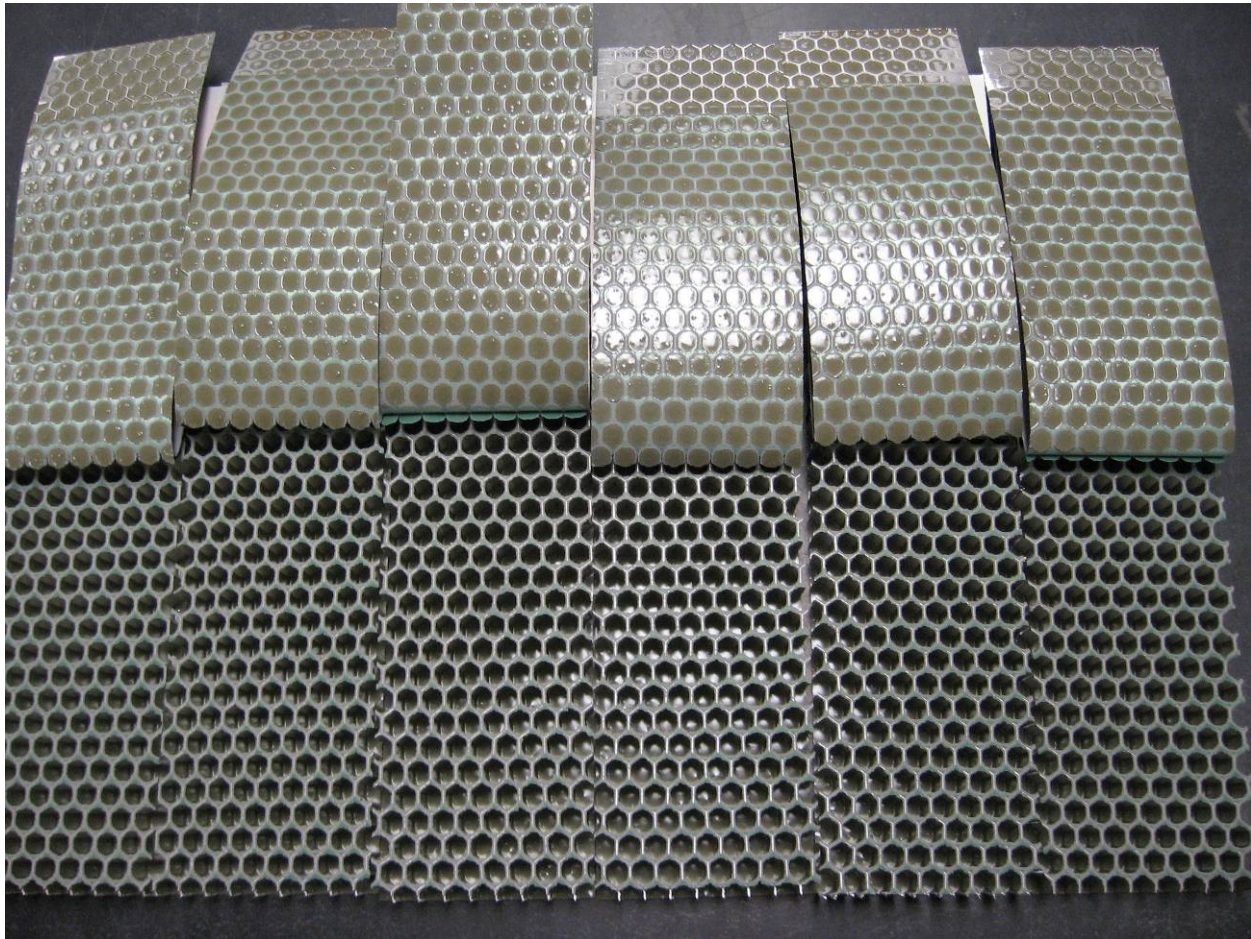
<i>Room Temperature Bell Peel</i>												
Typical Results for Film Weight												
Test	0.06 psf (290 g/m ²) UNS 9658/9258.1				0.10 psf (490 g/m ²) Glass 9658/9258.1				0.10 psf (490 g/m ²) Glass EA9689/EA9205R			
	Temperature	PLI		N/25mm	PLI		N/25mm	PLI		N/25mm		
<u>°F/°C</u>												
77/25		14		62		12		53		3		13

Honeycomb Sandwich Performance

Honeycomb sandwich strength tested after curing 1 hour @ 350°F/175°C. Adherends are 2024-T3 bare aluminum with 3/8 inch (9.50mm) cell 5052 non-perforated aluminum core. The 0.06 psf (290 g/m²) unsupported film was reticulated onto the core.

Honeycomb Climbing Drum Peel Strength

Typical Results for Film Weight							
Test	0.06 psf (290 g/m ²) Uns EA9658/EA9258.1		0.10 psf (490 g/m ²) NWG EA9658/EA9258.1		0.10 psf (490 g/m ²) Glass EA9689/EA9205R		
	Temperature	in lb/3 in	m•N/m	in lb/3 in	m • N/m	in lb/3 in	m • N/m
<u>°F/°C</u>							
77/25	15	22.2	25	37.1	20	29.7	



Flatwise Tensile Strength

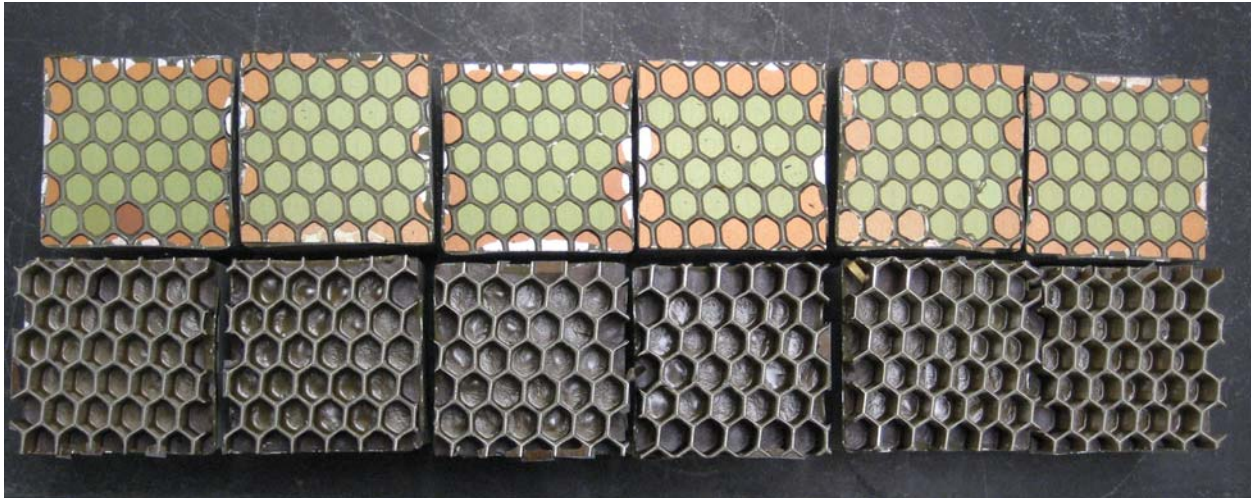
Typical Results for Film Weight						
Test	0.06 psf (290 g/m ²) UNS EA9658/EA9258.1		0.10 psf (490 g/m ²) NWG EA9658/EA9258.1		0.10 psf (490 g/m ²) Glass EA9689/EA9205R	
Temperature						
<u>°F/°C</u>	PSI	Mpa	PSI	Mpa	PSI	MPa
77/25	1230	8.5	1150	7.9	900	6.2
350/177	650	4.5	620	4.3	580	4.0

Flatwise Tensile per ASTM C297

EA 9658 .06 Uns			Thermal Aging	
Test	<u>Initial</u>		<u>After 6000 hr aging @350°F / 177°C aging</u>	
Temperature	PSI	MPa	PSI	MPa
<u>°F/°C</u>				
77/25	1230	8.5	900	6.2
350/177	650	4.5	450	3.1

EA9658 0.10 glass				
77/25	1150	7.9	900	6.2
350/177	620	4.3	450	3.1

Thermally aged specimen were drilled through each cell wall with a 0.10 inch (2.5mm) diameter drill for thermal exposure.



Handling Precautions

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

For industrial use only. See www.henkelna.com/aerospace for MSDS.

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. **THIS PRODUCT DOES NOT CONTAIN REFRACTORY CERAMIC FIBERS.**

ONE PART

CAUTION! This material may cause eye and skin irritation or allergic dermatitis. It contains epoxy resins.

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