Hysol® EA 9628H

Epoxy Film Adhesive

Description
Hysol EA 9628H consists of a nylon fabric support material impregnated with a modified epoxy film adhesive that has good stress-environmental resistance and structural properties up to 250°F/121°C. It is recommended for metal-to-metal and sandwich bonds requiring toughness.

Features
Film Adhesive
Excellent Durability
235 - 250°F/113 - 121°C Cure
Applications Include Helicopter Blade Bonding
Good Toughness

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 (77°F/25°C). Support the roll on the core while warming. 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 - This product requires refrigerated storage. Store @ 0°F/-18°C or below for maximum storage life. Warranty life is 12 months from date of shipment when stored @ 0°F/-18°C and 3 months from date of shipment when stored @ 40°F/4°C. 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 /172 to 345 kPa is sufficient to assure proper part mating. The optimum curing limits are 90 minutes @ 235°F/113°C or 60 minutes @ 250°F/121°C using 25 to 100 psi/172 to 689 kPa pressure. This product is relatively heat-up rate insensitive and may be used after an open assembly time of 10 days @ 90°F/32°C.

Open Assembly Time - This adhesive may be used within the following schedule after removing from cold storage:

@ 77°F/25°C	at least 20 days
@ 90°F/32°C	at least 10 days

Curing - Cure of this product may be accomplished with either of the following schedules:
90 minutes @ 235°F/113°C and 25 to 100 psi/172 to 689 kPa autoclave pressure or 25 inch H_g vacuum pressure or 60 minutes @ 250°F/121°C and 25 to 100 psi/172 to 689 kPa autoclave pressure or 25 inch Hg vacuum pressure

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 flammable solvents.

Bond Strength Performance

Flat Double Cantilever Beam Crack Extension

Flat Double Cantilever Beam Crack Extension per ASTM D3433. The crack extension is the distance to which a crack propagates when cleavage force is applied.

G_{1C} (the critical extension to start the crack) = 8Lbf/in (1401 N/m) with 0.030 psf (146 g/m²) film

G_{1a} (the crack extension force at which point the crack from GIc will arrest) = 6 lb/in (1051 N/m) with 0.030 psf (146 g/m²) film

Tensile Lap Shear Strength

Tensile lap shear strength tested per ASTM D1002 after curing for 60 minutes @ 250°F/121°C with 25 psi/172 kPa pressure. Adherends are 2024-T3 Alclad aluminum treated with phosphoric acid anodizing per ASTM D3933.

	Typical Results	
Test Temperature, °F/°C	**psi**	**MPa**
77/25	5,850	40.3
180/82	3,700	25.5
250/121	1,300	9.0

Thermally Exposed Tensile Lap Shear Strength

		Typical Results	
Exposure	**Test Temperature, °F/°C**	**psi**	**MPa**
Control (no exposure):	77/25	5,850	40.3
	180/82	3,700	25.5
	250/121	1,300	9.0
1 year @ 77°F/25°C	77/25	6,100	42.0
1 year @ 180°F/82°C	180/82	3,450	23.8
1 year @ 250°F/121°C	250/121	1,540	10.6

After Exposure to*:	Typical Results	
	psi	**MPa**
Control (no exposure)	6,300	43.4
Anti-icing fluid - 7 days	6,300	43.4
Hydraulic Oil - 7 days	6,300	43.4
H_2O - 30 days	6,300	43.4
JP-4 Jet fuel - 7 days	6,100	42.0
Salt Spray - 95°F/35°C - 30 days	6,100	42.0
95 - 100% RH - 30 days, 120°F/49°C	5,900	40.7

*All exposures tested @ 77°F/25°C.

Water Boil

Tensile Shear Strength was determined @ 77°F/25°C after individual coupons were exposed to boiling tap water. Hysol EA 9628H was cured 60 minutes @ 250°F/121°C under 50 psi/345 kPa autoclave pressure.

	Initial Strength	
	psi	**MPa**
Initial	5,600	38.6
2 days	4,000	27.6
3 days	3,500	24.1
9 days	3,300	22.7

Honeycomb Climbing Drum Peel tested per ASTM D1781

	Typical Results	
Test Temperature, °F/°C	**in• lb/3in**	**M• n/m**
-67/-55	54	80
77/25	60	89
180/82	60	89
250/121	24	36

T-peel Strength tested per ASTM D1876

	Typical Results	
Test Temperature, °F/°C	**psi**	**N• 25 mm**
77/25	35	156
180/82	31	138
250/121	15	67

Flatwise Tensile Strength tested per ASTM C297

	Typical Results	
Test Temperature, °F/°C	**psi**	**MPa**
77/25	1,100	7.6
180/82	650	4.5
250/121	185	1.3

Service Temperature

Service temperature is defined as that temperature at which this adhesive still retains 1000 psi/6.9 MPa using test method ASTM D1002 and is approximately 250°F/121°C.

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

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