



HexBond™ 679

Low temperature cure adhesive film for bonding metallic and composite components



Product Data Sheet

Description

HexBond™ 679 is a modified epoxy film adhesive, designed for low temperature cure in out-of-autoclave applications. It contains a 30 g/m² non-woven polyester/glass support for easy handling and bond-line thickness control. The product offers higher tack and lower cure viscosity to aid with substrate wetting. It is available with a resin areal weight of 250 g/m².

Features

- Fully compatible with HexPly® M79
 - Cure cycle as low as 70°C for 8 hours (typically 4 hours @ 80°C)
 - Well adapted to a wide range of processing pressures (0.3 – 5 bar)
 - Diuron-free chemistry
 - Less than 1% volatile content
- Suitable for bonding a wide range of substrates (-55°C to 80°C)
 - Good lap shear and peel performance
 - Outstanding properties in sandwich structures (honeycomb & foam cores)
- Excellent tack life to assist in adhesive joint assembly
- Superior shelf-life (6 weeks @ +23°C)
- Translucent resin after cure for easy quality inspection

Applications

- Aluminium to aluminium bonding
- Steel to steel bonding
- CFRP/GFRP to CFRP/GFRP bonding
- CFRP and GFRP to aluminium bonding
- CFRP and GFRP to steel bonding
- Sandwich bonding with a variety of skins and cores (e.g. PVC, VE, glass, polyester, aluminium, steel)

Form

Off-white, translucent, flexible film adhesive having the following dimensions:

Product Description	Resin areal weight g/m ²	Support	Film Width mm	Film length m
HexBond™ 679	250	PES/Glass fleece	1220	50

The non-woven polyester/glass fleece, used as support, has a nominal areal weight of 30 g/m². The film is protected with a release paper on one side.

Instructions for use

Pretreatment

It is essential that all substrates to be bonded are free of contamination. Please refer to the Hexcel publication HexBond™ Bonding Technology for guidance on optimum procedures. If there is a delay between pretreatment and bonding of aluminium, the pre-treated surfaces can be protected with HexBond™ 112 to conserve a good bonding surface. Bonding can be delayed by up to 2 months without deterioration of the pre-treated surfaces.



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1. If stored cold, allow sufficient time for the adhesive to warm to room temperature (18°C to 25°C) before removing the sealed packaging to prevent any condensation from contaminating the film.
2. Cut the film to the shape and size required.
3. Remove the release paper and position the adhesive on the prepared bonding surface.
5. Complete the joint assembly and apply pressure throughout the cure process.

For sandwich structures, the applied pressure should be selected to suit the type of core and skins being used. After the adhesive has cured, it is advisable to maintain pressure on the bonded assembly until it has cooled sufficiently to be handled without discomfort.

Curing

HexBond™ 679 can be cured typically at 80°C for 4 hours to obtain optimum properties. Enough time should be allowed for heat to penetrate evenly through the assembled parts to ensure that the adhesive reaches the required cure temperature before timing starts. A cure pressure or vacuum typically between 0.3 and 5 bars and heat-up rate typically between 0.5 to 5°C per minute are recommended during cure. After curing, it is recommended that components are cooled below 70°C before releasing pressure or vacuum.

Resin Matrix Properties

Dynamic Thermal Properties by DSC (ISO 11357-5)

Cure from -40 to 270°C @ 10°C/min ⁽¹⁾

- Uncured T_g: 3 – 6°C
- T_{Onset}: 120 – 130°C
- T_{Peak}: 140 – 150°C
- Enthalpy: 70 – 100 J/g

(1) Data obtained from neat resin upon delivery

Isothermal Cure Properties by DSC (ISO 11357-5)

Temperature	Cure Time (95% conversion)
70°C	≤ 480 min
80°C	≤ 240 min
90°C	≤ 120 min
100°C	≤ 80 min
110°C	≤ 60 min
120°C	≤ 40 min

- Optimal cured T_g: 100°C +/- 5°C (following 4 hours @ 80°C) ⁽²⁾

(2) according to ISO 11357-2 using a 10°C/min ramp rate, -40 to 270°C

- Density (ISO1183-1): 1.1 – 1.2 g/cm³
- Color: off-white – yellowish
- Tack: moderate/high



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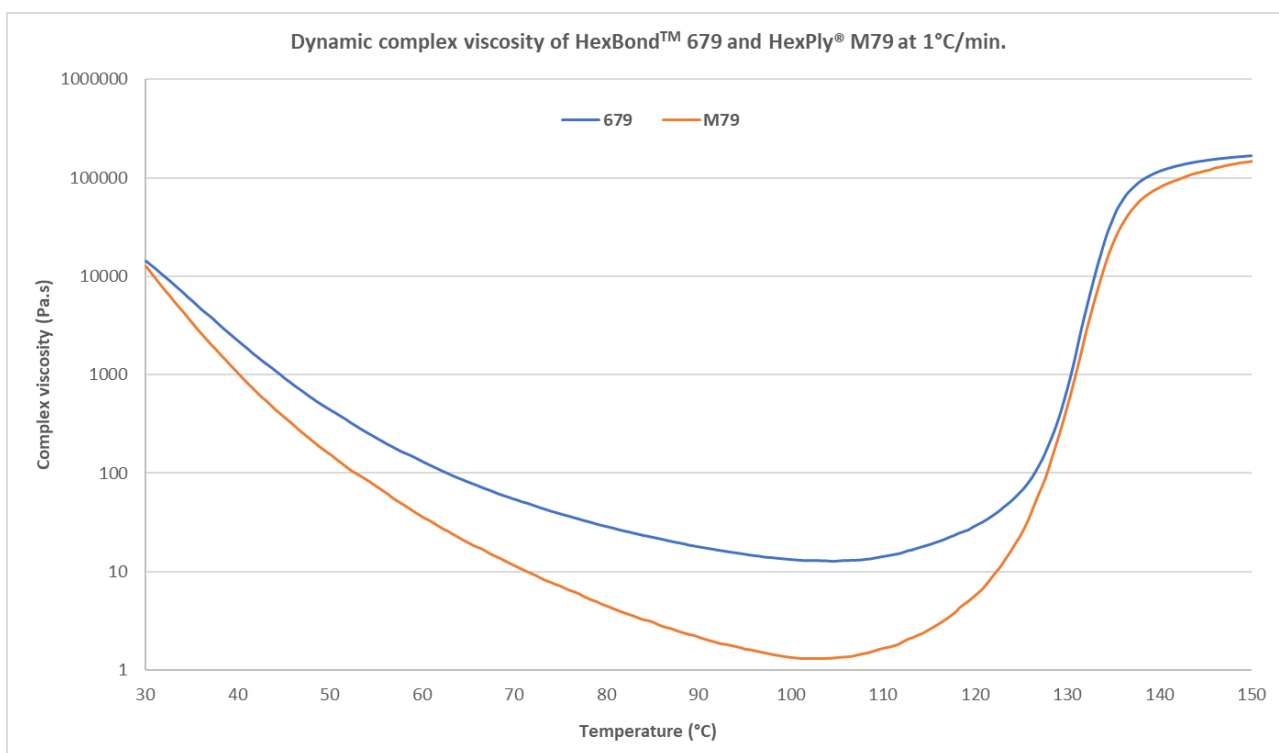
Typical Curing Conditions

- Recommended heat-up rate: 0.5 – 5°C/min
- Recommended cure cycle: 25 – 80°C @ 1°C/min, 4 hours @ 80°C
- Pressure or vacuum gauge: 0.3 – 5bar

The optimum cure cycle, heat-up rate and dwell period is dependent on component size, layup construction, oven capacity and thermal mass of tool.

Typical Viscosity Profile

(Data obtained from plate-plate rheometry, temperature run in reference to ISO 6721-10; Representative of a selected, single batch)





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Mechanical Properties

All the performance values provided in this data sheet are based on experimental results obtained during testing under laboratory conditions. They are typical values expected for HexBond™ 679 when prepared and cured as recommended.

Metal and Core Bonding Strengths

HexBond™ 679 was used to bond 2024-T3 aluminium and mild steel test specimens. The aluminium was pretreated in accordance with DTD 915B (ii) [chromic/sulphuric acid pickling]. The steel was cleaned with acetone prior to preparing the test specimens. The climbing drum peel tests were performed using HexWeb® 7.9-1/4-40(5052)T aluminium honeycomb bonded to pretreated 2024-T3 aluminium skins with HexBond™ 679.

Test	Substrate	Test Temperature (°C)	HexBond™ 679 250g/m² Supported
Lap Shear Strength (MPa) <i>BS EN 2243-1</i>	Aluminium	22	29
	Steel		31
Climbing Drum Peel (N/76mm) <i>BS EN 2243-3</i>	Aluminium honeycomb	22	165

Shelf Life ⁽³⁾

(Stored sealed, in dry conditions and in absence of direct sunlight)

- @ +30°C 3 weeks
- @ +23°C 6 weeks
- @ +5°C 6 months
- @ -18°C 18 months

(3) Shelf Life refers to the minimum time at given temperature after which the resin is being impaired in its thermal or rheological properties. An increase in uncured Tg above NTP temperature limitation (NIST) defines the end of shelf-life of the resin matrix.

Storage Conditions

HexBond™ 679 has been specifically formulated for long storage life. However certain precautions can help to enhance storage life as follows:

1. When not in use rolls of film adhesive should be stored at -18°C in their original, sealed packaging.
2. To avoid the risk of local thinning of the film under its own weight, the roll should be kept on a horizontal mandrel passed through the tube core on which the roll is wound.
3. When returning rolls to refrigeration it is essential to protect the film by sealing it within a water vapour barrier packaging material such as polythene. Original packaging should be used where possible.
4. On withdrawal from refrigeration the water vapour barrier packaging must not be removed until the roll of adhesive has reached room temperature. This may take up to 24 hours depending on the size of the roll and the temperature involved. Failure to observe this will result in the film becoming damp.
5. The film must be handled with care whilst in the frozen state since it will be brittle and easily cracked.



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Volatile content

HexBond™ 679 has a very low volatile content, usually well below 1%. In practice, the loss in weight when cured is negligible and emission of volatile products is not of practical significance.

Precautions for Use

HexBond™ 679 is only available in supported adhesive film format. The usual precautions when handling uncured synthetic resins should be observed. The use of clean disposable inert gloves provides protection for the operator and avoids contamination of the material and other components. The film is volatile-free, splash-free, leak-free and spillage-free at normal room temperature. HexBond™ 679 is tacky at normal room temperature, which assists the placement of the adhesive. A Safety Data Sheet is available on request.

For more information

Hexcel is a leading worldwide supplier of composite materials to aerospace and industrial markets. Our comprehensive range includes:

- HexTow® carbon fibers
- HexForce® reinforcements
- HexPly® prepregs
- HexMC®-i molding compounds
- HexAM® additive manufacturing
- HexMC® molding compounds
- HexFlow® RTM resins
- HexBond™ adhesives
- HexTool® tooling materials
- HexWeb® honeycombs
- Acusti-Cap® sound attenuating honeycomb
- Engineered core
- Engineered products
- Polyspeed™ laminates

For US quotes, orders and product information call toll-free 1-800-688-7734. For other worldwide sales office telephone numbers and a full address list, please go to:

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