HexBond™ 609

Adhesive film for bonding metallic and composite components

HEXCEL

Product Data Sheet

Description

HexBond™ 609 is a 120°C curing modified epoxy film adhesive containing a cotton scrim for easy handling and glue-line thickness control. It is available at standard areal weights of 200g/m^2 and 300g/m^2. An unsupported version with areal weight 300g/m^2 is also available.

Features

- Flexible cure cycle
- Good lap shear performance at temperatures ranging from -55°C to 80°C
- Good peel properties from -55°C to 80°C
- Good properties in sandwich structures from -55°C to 80°C
- Good tack to assist in adhesive joint assembly
- Less than 1% volatile content
- Suitable for bonding a wide range of substrates

Applications

- Aluminium to aluminium bonding
- Sandwich bonding with a variety of skins and cores

Form

Blue, supported, flexible film adhesive having the following dimensions:

Product Description	Areal Weights g/m^2	Support	Roll Width mm	Standard Roll m^2
HexBond™ 609	200	Cotton Scrim	1250	100
HexBond™ 609	300	Cotton Scrim	1250	100
HexBond™ 609U	300	-	1250	100

The film is protected on one side by polythene and on the other side by release paper.

Instructions For Use

Pretreatment

It is essential that all substrates of the final bonded structure to be used are free of contamination and in as ideal a state for bonding as possible. As pretreatment will significantly vary dependent on substrates being used, please refer to the Hexcel publication HexBond™ Bonding Technology for optimum procedures.

If there will be a delay between pretreatment and bonding of aluminium, the pretreated surface can be protected with HexBond™ 112 to conserve the good bonding surface. Bonding can be delayed for up to 2 months without deterioration of the pretreated surface.

Application

1. If stored cold allow sufficient time for the adhesive to warm to room temperature (15°C to 27°C) before removing the sealed packaging.
2. Cut the film to the shape and size required.
3. Remove the release paper and position the adhesive on the prepared bonding surface.
4. Remove the polythene backing sheet.
5. Complete the joint assembly and apply pressure, at 140 – 350 kN/m^2, while the adhesive is being cured. For sandwich structures the pressure application 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™ 609 should be cured at 120±5°C for 60 minutes to obtain optimum properties, alternative cure cycles are given below. Enough time should be allowed for heat to penetrate evenly through the assembled parts to ensure that the adhesive reaches that temperature before timing starts. A cure pressure of around 350 kPa and heat up rate of approximately 5°C per minute is recommended during cure. After curing it is recommended that components are cooled to below 70°C before releasing the pressure.

Alternative Cure Cycles

Temperature (°C)	180	170	160	150	140	130	120	110	100
Time (min)	5	7	8	10	20	30	60	120	240

below 100°C incomplete cure

Mechanical Properties

All the performance values given in this data sheet are based on experimental results obtained during testing under laboratory conditions. They are typical values expected for HexBond™ 609 prepared and cured as recommended and under the conditions indicated. They do not and should not constitute specification minima.

Metal Bonding Strengths

HexBond™ 609 was used to bond Alclad 2024-T3 Aluminium test specimens; the Aluminium was pretreated in accordance with DTD 915B (ii) [chromic/ sulphuric acid pickling]. The honeycomb tests used HexWeb® 7.9-1/4-40(5052)T Aluminium honeycomb.

Test	Environmental Conditioning	Test Temperature °C	HexBond™ 609 200g/m² Supported	HexBond™ 609 300g/m² Supported	HexBond™ 609U 300g/m² Unsupported
Lap Shear Strength (MPa)	None	22 50 80 100	31 31	33 31 24 15	43
	70°C 95% RH (1000 hrs.)	22 80		24 3	
Bell Peel (N/25mm)	None	22 50 80 100	102	76 110 114 136	75
	70°C 95% RH (1000 hrs.)	22 80		71 50	
Climbing Drum Peel (Lower skin) (N/76mm)	None	22 50 80 100	141	193 250 250 288	308
Flatwise Tensile (MPa)	None	22	4.5	7	6

Adhesives storage life

Shelf Life: 18 months at -18°C
Out Life: 90 days at 19 – 27°C

The storage life is considered to have expired when either of these conditions has elapsed.

Refer to the box label to determine the specific batch expiry date.

Definitions

Shelf life: The maximum storage time for HexBond™ adhesives from date of manufacture, when stored continuously in a sealed moisture-proof bag at -18°C.

Out life: The maximum accumulated time allowed at 19 – 27°C between removal from the freezer for use and return to freezer after use.

Storage Conditions

HexBond™ 609 has been formulated for maximum storage life consistent with its high performance. 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.

Volatile content

HexBond™ 609 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.

Handling precautions

When used properly HexBond™ 609 film adhesives presents a low risk of handling hazard for the following reasons:

- The film is covered on both sides by protective release paper and polythene sheet which are not removed until final component assembly. It should be cut to shape before removing the protective coverings and virtually no handling of the film is necessary.
- The film is volatile-free at normal room temperature.
- The film is splash-free, leak-free, spillage-free.
- HexBond™ 609 is tacky at normal room temperature which assists the placement of the adhesive.

However, the usual precautions necessary when handling synthetic resins should be observed. A Safety Data Sheet for HexBond™ 609 is available on request.

Release Certification
The Quality System at Hexcel Composites Duxford has been certified to ISO 9001 by Lloyd's Register Quality Assurance, and is approved by the UK Civil Aviation Authority and Ministry of Defence. Certificates of Conformity and Test Reports can be issued for batches of HexBond™ 609 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
- HiMax™ multiaxial reinforcements
- HexPly® prepregs
- HexMC®-i molding compounds
- HexFlow® RTM resins
- HexBond™ adhesives
- HexTool® tooling materials
- HexWeb® honeycombs
- Acousti-Cap® sound attenuating honeycomb
- Engineered core
- Engineered products
- Polyspeed® laminates & pultruded profiles
- HexAM™ additive manufacturing

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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