



## Redux® 609

Adhesive film for bonding metallic and composite components

### Product Data

#### Description

Redux 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<sup>2</sup> and 300g/m<sup>2</sup>. An unsupported version with areal weight 300g/m<sup>2</sup> 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 <sup>2</sup>	Support	Roll Width mm	Standard Roll m <sup>2</sup>
Redux 609	200	Cotton Scrim	1250	100
Redux 609	300	Cotton Scrim	1250	100
Redux 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 Redux Bonding Technology for optimum procedures.

If there will be a delay between pretreatment and bonding of aluminium, the pretreated surface can be protected with Redux 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<sup>2</sup>, 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.



# Redux 609

## Curing

Redux 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	<b>120</b>	110	100	below 100°C incomplete cure
Time (min)	5	7	8	10	20	30	<b>60</b>	120	240	

## 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 Redux 609 prepared and cured as recommended and under the conditions indicated. They do not and should not constitute specification minima.

### Metal Bonding Strengths

Redux 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	Redux 609 200g/m <sup>2</sup> Supported	Redux 609 300g/m <sup>2</sup> Supported	Redux 609U 300g/m <sup>2</sup> Unsupported
Lap Shear Strength (MPa)	None	22	31	33	43
		50	31	31	
	70°C 95% RH (1000 hrs.)	80		24	
		100		15	
Bell Peel (N/25mm)	None	22	102	76	75
		50		110	
	70°C 95% RH (1000 hrs.)	80		114	
		100		136	
Climbing Drum Peel (Lower skin) (N/76mm)	None	22	141	193	308
		50		250	
		80		250	
		100		288	
Flatwise Tensile (MPa)	None	22	4.5	7	6

### Storage

---

It is recommended to store Redux 609 at -18°C. At this temperature the shelf life will be 18 months. The maximum permissible outlife at 5 - 27°C is 3 months.

Redux 609 adhesives have been formulated for maximum storage life consistent with their high performance. Certain precautions, however, will help to enhance that storage life as follows:

1. When stored Redux 609 adhesives should be kept on a horizontal mandrel passed through the tube core on which the roll is wound. This avoids the risk of local thinning of the film under the weight of the roll.
2. When storing under refrigeration the original packaging should be retained if possible. When returning to the refrigerator after use it is essential to protect the film with a water vapour barrier packaging material such as polythene.
3. On withdrawal from the refrigerator the water vapour barrier packaging should 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).
4. The film should be handled with care whilst in the frozen state since it will be brittle and easily cracked.

### Volatile content

---

Redux 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 Redux 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.
- Redux 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 Material Safety Data Sheet for Redux 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 Redux 609 on request.

### **Important**

All information is believed to be accurate but is given without acceptance of liability. Users should make their own assessment of the suitability of any product for the purposes required. All sales are made subject to our standard terms of sale which include limitations on liability and other important terms.

©Copyright Hexcel Composites  
Publication RTC 019e (Mar 2010)

### **For More Information**

Hexcel is a leading worldwide supplier of composite materials to aerospace and other demanding industries. Our comprehensive product range includes:

- Carbon Fibre
- RTM Materials
- Honeycomb Cores
- Carbon, glass, aramid and hybrid prepregs
- HexTOOL® composite tooling material
- Structural Film Adhesives
- Honeycomb Sandwich Panels
- Engineered Core
- Reinforcement Fabrics

**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:**

<http://www.hexcel.com/contact/salesoffices>