



Redux® 610

Flame retarded epoxy film adhesive for bonding metallic and composite parts

Product Data

Description

Redux 610 is a modified, flame-retarded epoxy film adhesive curing at 250°F. It is suitable for bonding metal to metal and for sandwich structures where flame retardancy and low heat release are required. Redux 610 is a hot melt film which is free from solvents and consequently has a very low volatile content.

Features

- Cures in 1 hour at 250°F
- Good lap-shear performance up to 212°F
- Good peel performance in sandwich structures up to 175°F
- Meets the heat release requirements of IMO test MSC 61(67)
- Good tack, drape and handleability
- Very low volatile content and low out gassing properties
- Available unsupported or with a very lightweight glass carrier

Applications

- Metal to metal bonding
- Sandwich constructions
- Flame retardant performance

Form

Product Description	Areal Weight psf	Support	Roll Width in	Standard Roll ft ²
Redux 610W	0.03	Woven Glass	49	1075
Redux 610W	0.06	Woven Glass	49	1075
Redux 610W	0.09	Woven Glass	49	1075
Redux 610U	0.06	Unsupported	49	1075

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

Instructions For Use

Pre-treatment

It is essential that all components of the final bonded structure are free from contamination and in as ideal a state for bonding as possible. As pre-treatment varies significantly depending on the components used, please refer to the Hexcel publication Redux Bonding Technology for optimum procedures. If there will be a delay between pretreatment and bonding of aluminum, 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 cold stored, allow sufficient time for the adhesive to warm to room temperature (59° - 80°F) 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 20.3 - 50 psi, 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 610

Curing

Redux 610 should be cured at $250 \pm 5^\circ\text{F}$ for 60 minutes to obtain optimum properties. Enough time should be allowed for heat to penetrate through the assembled parts to ensure that the adhesive reaches temperature before the timing starts. Cure pressures of around 20.3 - 50 psi and heat-up rates of up to 5°F per minute are recommended during cure. After curing it is recommended that components be cooled to below 160°F before releasing the pressure.

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 610 prepared and cured as recommended and under the conditions indicated. They do not and should not be considered as specification minima.

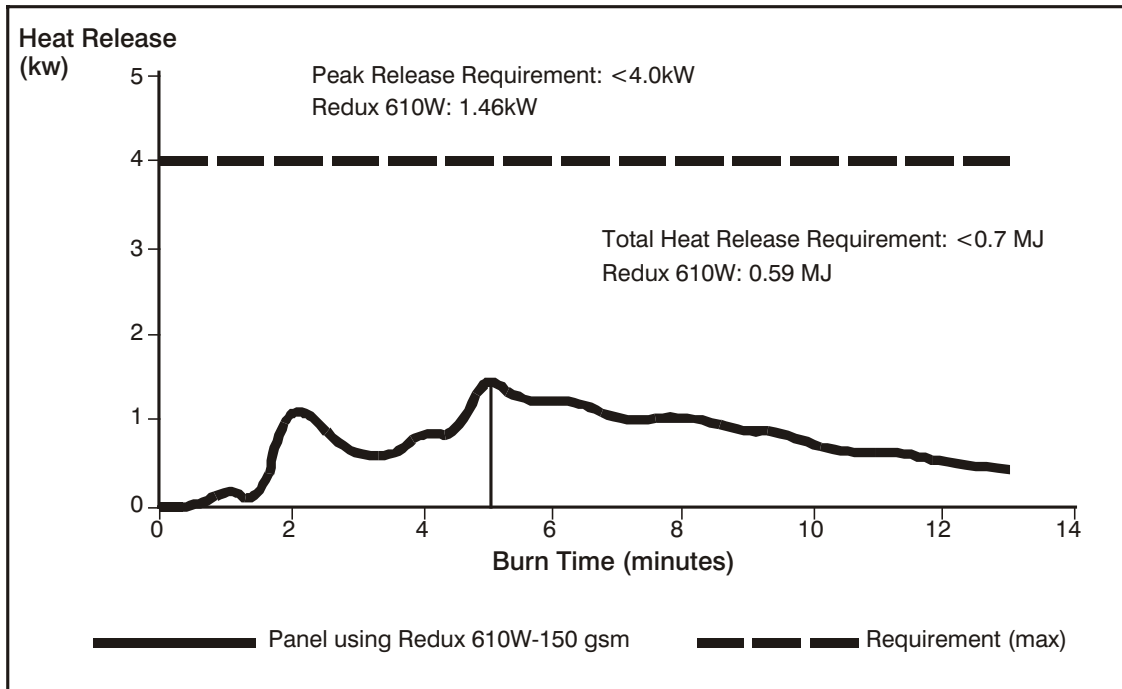
Metal Bonding Strengths

Redux 610 was used to bond Alclad 2024-T3 aluminum test specimens; the aluminum was pre-treated in accordance with DTD 915 b(ii) [chromic/sulphuric acid pickling]. The honeycomb tests used HexWeb® 7.9-1/4-40(5052)T aluminum honeycomb.

Test	Test Temperature °F	Redux 610W 0.03 psf	Redux 610W 0.06 psf	Redux 610U 0.06 psf
Lap Shear Strength psi	72	4350	4350	3770
	122	4060	3480	
	176	3625	2755	
	212	2465	1885	
Climbing-Drum Peel lb/3in	72	31.4	53.8	60.5
	176	22.4	78.5	
Floating Roller Peel lb/in	72	22.4	23.5	-
	176	24.0	-	

Spread of Flame Performance

Redux 610 was used to bond high pressure melamine laminates to HexWeb® aluminum honeycomb [2.3 – 3/8 – 15 (3003)] to produce panels for spread of flame tests in accordance with IMO test MSC 61(67).



Storage

It is recommended to store Redux 610 at 0°F. At this temperature the shelf life will be 18 months. The maximum permissible outlife at 65 - 80°F is 3 months.

Redux 610 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 610 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 610 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 610 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 610 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 610 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 610 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.

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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
- Reinforcement Fabrics
- Structural Film Adhesives
- Honeycomb Sandwich Panels
- Engineered Core

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