



Redux® 641

Modified epoxy film adhesive for bonding
metallic and composite components

Product Data

Description

Redux 641 is a high temperature modified epoxy film adhesive curing at 175°C. It is suitable for bonding metal to metal and for sandwich structures where operating temperatures are experienced up to 175°C for short periods, or 150°C for continuous operation. Redux 641 is a hot melt film which is free from solvents and consequently has a very low volatile content.

Features

- Cures in 1 hour at 175°C
- Good hot lap shear performance up to 150°C
- Good peel performance in sandwich structures at temperatures up to 150°C
- Excellent metal-metal peel properties
- Excellent drape and handleability
- Very low volatile content

Applications

- Metal to metal bonding
- Sandwich constructions with a variety of skins and cores.

Form

Product Description	Areal Weights g/m ²	Support	Roll Width mm	Standard Roll m ²
Redux 641K	300	Knitted Polyester	1250	100
Redux 641K	150	Knitted Polyester	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 to be used are free of contamination and are in as ideal a state for bonding as possible. As pretreatment varies significantly depending on the substrates used, please refer to the Hexcel publication Redux Bonding Technology for optimum procedures.

If there is to be a delay between the pretreatment and bonding of aluminium, the pretreated surface should be protected with Redux 119 surface pretreatment protection solution to conserve the optimum bonding surface. This will enable bonding to be delayed for up to 2 months without deterioration of the pretreated surface. The correct application of Redux 119 should not alter the bonding performance of Redux 641 (for full application details consult the relevant data sheet).



Redux 641

Application

1. If stored cold allow sufficient time for the adhesive to warm to room temperature 15°C to 27°C before removing the protective polythene.
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 140-700kN/m² while the adhesive is being cured. For sandwich structures the pressure application should be selected to suit the type of core 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

Redux 641 should be cured at 175 ± 5°C 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 that temperature before timing starts. Cure pressures of around 140-700 kPa and heat up rates of up to 5°C per minute are recommended during cure. After curing it is recommended that components are cooled to below 70°C 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 641 prepared and cured as recommended and under the conditions indicated. They do not and should not constitute specification minima.

Metal Bonding Strengths

Redux 641 at areal weights indicated in the tables were 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® CR111-3/16-5052-0.002" aluminium honeycomb.

Test	Test Temperature °C	Redux 641K 150 g/m ²	Redux 641K 300 g/m ²
Lap Shear Strength (MPa)	22	28	37
	125		28
	150		20
	175		12
Floating Roller Peel (N/25mm)	22	115	185
	85		170
Flatwise Tensile (MPa)	22	4	8
	150		
	175		
Climbing Drum Peel (N/76mm)	22		350

Storage

It is recommended to store Redux 641 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 641 has been formulated for maximum storage life consistent with its high performance. Certain precautions, will help to enhance the storage life as follows:

1. When stored at room temperature 5 - 27°C it 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 641 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.

Associated products

Redux 119 surface pretreatment protection solutions (primers).
Redux 219/2-NA and 219/3-NA foaming film adhesives.

Handling and safety precautions

When used properly Redux 641 film adhesives present a low risk of handling hazard for the following reasons:

- 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.
- It has low tack at normal room temperature. The film is dependent on elevated temperature for wetting-out the adherend surfaces.
- The film is volatile-free at normal room temperature.
- It is splash-free, leak-free, spillage-free.

However, the usual precautions necessary when handling synthetic resins should be observed. A Material Safety Data Sheet for Redux 641 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 641 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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- Carbon, glass, aramid and hybrid prepregs
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- Structural Film Adhesives
- Honeycomb Sandwich Panels
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