



# Redux® 312

Modified epoxy film adhesive

*Product Data*

## Description

Redux® 312 is a high strength 250°F curing film adhesive, suitable for metal to metal bonding and sandwich constructions, where operating temperatures of up to 212°F may be experienced.

A supported version, Redux® 312/5, is available with a woven nylon carrier for bond line thickness control.

## Features

- Short cure cycle - cures in 30 minutes at 250°F
- Good mechanical performance up to 212°F
- Suitable for composite to composite bonding
- Low volatile content (solventless process)

## Applications

- Metal to metal bonding
- Sandwich constructions
- Composite to composite bonding

## Forms

Grey flexible film adhesive, available in 5 areal weights; 4 in unsupported form and one with a woven nylon carrier.

Product Description	Areal Weights psf	Roll Width in.	Standard Roll ft <sup>2</sup>
Redux® 312	0.015	21	645
Redux® 312UL	0.02	21	645
Redux® 312L	0.03	21	645
Redux® 312	0.06	21	645
Redux® 312/5	0.06	21	645

## 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® 112 surface pretreatment protection solution to conserve the optimum bonding surface. This will enable bonding to be delayed for up to 2 weeks without deterioration of the pretreated surface. The correct application of Redux® 112 should not alter the bonding performance of Redux® 312 (for full application details consult the relevant data sheet).

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# Redux 312

## Application

1. Allow sufficient time for the adhesive to warm to room temperature (60°F - 80°F) 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 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® 312 should be cured at 250°F ± 5°F for 30 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 25 - 50 psi and heat up rates of approximately 5°F per minute are recommended during cure. After curing it is recommended that components are 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® 312 prepared and cured as recommended and under the conditions indicated. They do not and should not constitute specification minima.

## Metal Bonding Strengths

Redux® 312 at areal weights of 0.015, 0.02, 0.03 and 0.06 psf, and Redux® 312/5 at areal weight 0.06 psf, were used to bond Alclad 2024-T3 aluminum test specimens; the aluminum was pretreated in accordance with DTD 915B (ii) (chromic/sulphuric acid pickling). The honeycomb tests used Hexcel's 7.9-1/4-40 (5052) T aluminum honeycomb.

Test	Test Temperature °F	Redux® 312 0.015 psf	Redux® 312 0.02 psf	Redux® 312 0.03 psf	Redux® 312 0.06 psf	Redux® 312/5 0.06 psf
Lap Shear Strength psi	70			6000	6200	
	160	5400	5700	5500	5700	5510
	175	4800	4600	5100		4300
	212	4600	4600	2500	4300	
Bell Peel lbs/in	70		52	55	52	55
Climbing Drum Peel in-lb/3in	70		22	39	80	57
Flatwise Tensile psi	70		800	1020	1320	1250

## Modified epoxy film adhesive

### Storage

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It is recommended to store Redux® 312 at 0°F. At this temperature the shelf life will be 18 months. The maximum permissible outlife at 65 - 80°F is one month.

1. When stored at room temperature (less than 80°F) 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

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Redux® 312 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

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Redux® 112 surface pretreatment protection solutions (primer)  
Redux® 212/NA foaming film adhesives

### Handling and safety precautions

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In common with all Redux® adhesives in film form, Redux® 312 is particularly free from handling hazards 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.
- Virtually tack-free (dry) at normal room temperature. The film is dependent on elevated temperature for wetting-out the adherend surfaces.
- Volatile-free at normal room temperature.
- 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® 312 is available on request.



# Redux 312

## 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 312 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 Fibre
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- Carbon, glass, aramid and hybrid prepregs
- RTM Materials
- HexTOOL® composite tooling material
- Structural Film Adhesives
- Honeycomb Cores
- Engineered Core

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