



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

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

Product Description	Areal Weight psf	Roll Width in.	Standard Roll ft ²
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 aluminum, 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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**Application**

1. Allow sufficient time for the adhesive to warm to room temperature (60°F - 80°F) before removing the protective polyethylene.
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 polyethylene 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 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 a real weights of 0.015, 0.02, 0.03 and 0.06 pfs, and Redux® 312/5 at areal weight 0.06psf, 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					
	160	5400	5700	6000	6200	5510
	175	4800	4600	5500	5700	4300
	212	4600	4600	5100	4300	
			2500			
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

Storage

Redux® 312 has been formulated for maximum storage life consistent with its high performance. Certain precautions however will help to enhance that storage life as follows:

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 vapor barrier packaging material such as polyethylene.
3. On withdrawal from the refrigerator the water vapor 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 while in the frozen state since it will be brittle and easily cracked.

On receipt, Redux® 312 will have a storage life of at least 12 months at 0°F plus an additional shop life of 1 month at below 80°F.

Volatile content

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

Redux® 112 surface pretreatment protection solution (primer)
Redux® 212/NA and 206/NA foaming film adhesives

Handling and safety precautions

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 polyethylene 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.



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 Defense. Certificates of Conformity and Test Reports can be issued for batches of Redux® 312 on request.

Important

Hexcel Corporation believes, in good faith, that the technical data and other information provided herein is materially accurate as of the date this document is prepared. Hexcel reserves the right to modify such information at any time. The performance values in this data sheet are considered representative but do not and should not constitute specification minima. The only obligations of Hexcel, including warranties, if any, will be set forth in a contract signed by Hexcel or in Hexcel's then current standard Terms and Conditions of Sale as set forth on the back of Hexcel's Order Acknowledgement.

For More Information

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

- Carbon Fiber
- RTM Materials
- Honeycomb Cores
- Carbon, glass, aramid and hybrid prepregs
- 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 click here: <http://www.hexcel.com/contact/salesoffices> .