



Redux® 335

Adhesive film for bonding metallic and composite components

Product Data

Description

Redux® 335 is a film adhesive curing at 250°F. It is available in a range of standard areal weights from 0.015 to 0.06 psf. It is available either unsupported or with knitted and/or matt carrier for additional glue thickness control.

Features

- Cures in 60 minutes at 250°F for optimum properties
- Good lap shear performance at temperatures ranging from -67°F to 212°F
- Excellent peel properties from -67°F to 180°F
- Excellent properties in sandwich structures from -67°F to 180°F
- Good performance with 250°F – curing fiber reinforced composites in either co-cure or secondary bonding processes
- Good drape at temperatures as low as 50°F
- Less than 1% volatile content

Applications

- Aluminum to aluminum bonding
- Fiber-reinforced composite to composite bonding
- Aluminum honeycomb sandwich bonding
- Aramid honeycomb sandwich bonding

Forms

Blue film adhesive, available supported and unsupported at the following weights and dimensions

Product Description	Areal Weight psf	Support	Standard Roll ft ²
Redux® 335U	0.03	None	540
Redux® 335U	0.06	None	540
Redux® 335K	0.03	Woven nylon	540
Redux® 335K	0.06	Woven nylon	540
Redux® 335M	0.03	Matt	540
Redux® 335M	0.06	Matt	540

The film is protected on one side by white polyethylene 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.

Redux® Bonding Technology Manual refers to the use of primers for the protection of certain pretreated surfaces prior to bonding. In the case of the Redux® 335 range, the recommended primer is Redux® 112. Application, drying and curing conditions for Redux® primers are available in the Redux® Primers Data Sheet.

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Application

1. Allow sufficient time (e.g. for a full roll, about 24 hours) for the adhesive to warm to room temperature (60-80°F)
2. Cut the film to the shape and size required
3. Remove the release paper and position the exposed film surface against the prepared bonding surface.
4. Remove the polyethylene backing sheet
5. Complete the joint assembly and secure against relative movement of the parts while the adhesive is being cured.

Please refer to the Redux® Bonding Technology Manual for further details.

Curing

Redux® 335 should be cured at 250°F ±5°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 that temperature before timing starts. A cure pressure of around 50 psi and heat up rate of approximately 5°F per minute is 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® 335 prepared and cured as recommended and under the conditions indicated. They do not and should not constitute specification minima.

Metal Bonding Strengths

Redux® 335 was 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.

Redux® 335 (Unsupported)

Test	Test Temperature (°F)	Redux® 335U 0.03 psf	Redux® 335U 0.06 psf
Lap Shear Strength psi	70 140 200	6300 4300 2500	6800 5200 2600
Bell Peel lbs/in	70	52	50
Climbing Drum Peel in-lb/3in	70	80	162

Redux® 335K (Knitted carrier) and Redux® 335M (Matt carrier)

Test	Test Temperature °F	Redux® 335K 0.03 psf	Redux® 335K 0.06 psf	Redux® 335M 0.03 psf	Redux® 335M 0.06 psf
Lap Shear Strength psi	70 140 200	3800 2800 1300	5700 4300 1900	4900 3500 1600	6000 3900 1700
Bell Drum Peel lbs/in	70	52	72	49	59
Climbing Drum Peel in-lb/3in	70	48	102		40

Storage

Redux® 335 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® 335 will have a storage life of at least 6 months at 0°F plus an additional shop life of 1 month at below 80°F.

Volatile content

Redux® 335 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 and safety precautions

In common with all Redux® adhesives in film form, Redux® 335 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® 335 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® 335 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> .