



Redux[®] 322

Modified epoxy film adhesive



Product Data Sheet

Description

Redux[®] 322 is a high performance 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 220°C for short periods, or 200°C for continuous operation. Redux[®] 322 is a hot melt film which is free from solvents and consequently has a very low volatile content.

Features

- Cure at 175°C
- Good co-cure potential with 175°C curing prepregs
- Good hot lap shear performance
- Good high temperature performance in metal sandwich structures
- Low volatile content and low out gassing properties
- Available with or without a woven nylon carrier

Applications

- Metal to metal bonding
- Sandwich constructions

Form

Instructions For Use

Product Description	Areal Weights g/m ²	Support	Roll Width mm	Standard Roll m ²
Redux [®] 322U	300	None	533	40
Redux [®] 322	240	Woven nylon carrier	533	40
Redux [®] 322	300		533	40
Redux [®] 322	380		533	40

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 metals, the pretreated surface should be protected with Redux[®] 122 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[®] 122 should not alter the bonding performance of Redux[®] 322 (for full application details consult the relevant data sheet).



Application

1. Allow sufficient time for the adhesive to warm to room temperature (19°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 while the adhesive is being cured at 140-700 KPa. 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[®] 322 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[®] 322 prepared and cured as recommended and under the conditions indicated. They do not and should not constitute specification minima.

Metal Bonding Strengths

Redux[®] 322 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). Redux[®] 122 primer was used after the pretreatment. The honeycomb tests used HexWeb[®] 7.9-1/4-40(5052)T aluminium honeycomb.

Test	Units	Test Temp °C	Redux [®] 322U 300g/m ²	Redux [®] 322 240g/m ²	Redux [®] 322 300g/m ²	Redux [®] 322 380g/m ²
Lap-Shear Strength	MPa	23	22	21	22	22
		150	26	21	21	23
		18	-	17	-	20
Climbing Drum Peel	N/75mm	23	90	447*	265	450
Flatwise Tension	MPa	23	9	-	7	8
		150	7	-	5	6

* Result based on prepreg skins and HexWeb[®] HRH10-3.2-64

Outgassing

Test Method	Property	Typical Result
ESA PSS-01-702	Total Mass Loss (TML) %	1.740
	Recovered Mass Loss (RML) %	0.410
	Collected Volatile Condensed Material (CVCM) %	0.000



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Adhesives storage life

Shelf Life: 18 months at -18°C

Out Life: 90 days at 19-27°C

The storage life is considered to have expired when either of these conditions has elapsed. Refer to the box label to determine the specific batch expiry date.

Definitions

Shelf life: The maximum storage time for Redux[®] adhesives from date of manufacture, when stored continuously in a sealed moisture-proof bag at -18°C.

Out life: The maximum accumulated time allowed at 19-27°C between removal from the freezer for use and return to freezer after use.

Storage Conditions

Redux[®] 322 has been formulated for maximum storage life consistent with its high performance. However certain precautions can help to enhance storage life as follows:

1. When not in use rolls of film adhesive should be stored at -18°C in their original, sealed packaging.
2. To avoid the risk of local thinning of the film under its own weight, the roll should be kept on a horizontal mandrel passed through the tube core on which the roll is wound.
3. When returning rolls to refrigeration it is essential to protect the film by sealing it within a water vapor barrier packaging material such as polythene. Original packaging should be used where possible.
4. On withdrawal from refrigeration the water vapor barrier packaging must 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.
5. The film must be handled with care whilst in the frozen state since it will be brittle and easily cracked.

Volatile content

Redux[®] 322 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[®] 122 surface pretreatment protection solution (primer).

Redux[®] 219/2-NA foaming film adhesive.

Handling and safety precautions

When used properly Redux[®] 322 film adhesives presents 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.
- Low tack 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[®] 322 is available on request.



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Release Certification

The Quality System at Hexcel 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® 322 on request.

For more information

Hexcel is a leading worldwide supplier of composite materials to aerospace and industrial markets. Our comprehensive range includes:

- HexTow® carbon fibers
- HexForce® reinforcements
- HiMax™ multiaxial reinforcements
- HexPly® prepregs
- HexMC® molding compounds
- HexFlow® RTM resins
- Redux® & HexBond™ adhesives
- HexTool® tooling materials
- HexWeb® honeycombs
- Acousti-Cap® sound attenuating honeycomb
- Engineered core
- Engineered products
- Polyspeed® laminates & pultruded profiles
- HexAM™ additive manufacturing

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 go to:

<http://www.hexcel.com/contact/salesoffice>

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