



Redux® 200 series

Foaming adhesive films



Product Data Sheet

Description

The Redux 200 series is a range of foaming adhesive films presented in sheet form. They expand during the cure cycle to fill gaps and adhere strongly to all parts of the structure with which they come into contact.

Redux foaming adhesive films are compatible with Redux film adhesives as follows:

Foaming Adhesive Films	Application	Cure Temperature °C	Associated Film Adhesives
Redux 212-NA	Low foaming ratio. Suitable for vacuum and non vacuum cure	120	Redux 312, 609
Redux 208/5-NA	Higher foaming ratio. Suitable for applications not requiring vacuum	175	Redux 308, 322
Redux 219/2-NA	Suitable for thin sections	175	Redux 319, 322, 340(SP), 641

Features

- High strength at temperatures from -55°C to 220°C.
- Less than 1% volatiles emitted during cure.
- Suitable for aluminium and fibre-reinforced composite sandwich constructions.
- Expansion ratios from 1:2.0 to 1:2.2

Applications

- Joining honeycomb core sections.
- Bonding of honeycomb core to edge members.
- Bonding inserts into sandwich structures.

Form

Dry flexible films of dimensions 1.25 m x 0.2 m, and with a standard thickness of 1.52 mm, lined on both sides with protective covers. A standard pack contains 8 sheets of the above dimensions.



Instructions for Use

Pretreatment

It is essential that all substrates to be used are free of contamination and in as ideal a state for bonding as possible. As pretreatment will significantly vary dependent on substrates being used, please refer to the Hexcel publication Redux Bonding Technology for optimum procedures.

If there will be a delay between pretreatment and bonding of aluminium, the pretreated surface can be protected with Redux 112 to conserve the good bonding surface. Bonding can be delayed for up to 3 months without deterioration of the pretreated surface.

Application

1. Allow sufficient time for the adhesive to warm to room temperature (19° to 27°C) before removing the sealed packaging.
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 100 - 350 kN/m², while the adhesive is being cured.
For sandwich structures the pressure application should be selected to suit the type of core and skins being 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.

When inserting the cut film (single layers recommended) between the core and the inner face of each edge member as assembly of the panel proceeds, do not try to push the film into place after the pieces have been positioned. Spring the core segments and other panel components tightly together so that the film is held firmly in place and cannot sag as it is heated. Complete the panel assembly as quickly as possible to minimise the risk of it being disturbed, and apply clamps or other suitable means of restraint to prevent relative movement of the parts either before or during the cure cycle.

Curing

The recommended cure cycles are:

Adhesive	Cure Cycle
Redux 212-NA	60 minutes at 120°C±5; heat up rate 5°C /min
Redux 208/5-NA Redux 219/2-NA	60 minutes at 175°C ±5; heat up rate 5°C/min

Variations from this cure cycle are possible and further information may be obtained from Hexcel on request.

When an autoclave is being used to bond assemblies containing Redux foaming films or any assembly containing unvented honeycomb core, it is recommended that the vacuum line should be opened to atmosphere before heat-up is commenced, and should be left open throughout the cycle. This will ensure more even expansion of the foam. When heating the assembly to curing temperature allow adequate time for heat to penetrate the whole assembly so that the adhesive is properly cured throughout the depth of the panel.



Performance Data

Following the recommended cure cycles as detailed above, the following typical performance data have been obtained. These results are for guidance only, they do not constitute specification minima for this product.

Product Adhesive	Expansion ratio	Vertical flow	Cure Temperature °C	Aluminium double lap shear (1.6 mm gap)			
				22°C	100°C	120°C	150°C
Redux 212-NA	1: 2.0	-	120	8.5 MPa	5.0 MPa		
Redux 208/5-NA	1: 2.2	<1mm	175	10.0 MPa		4.5 MPa	
Redux 219/2-NA	1: 2.0	<1mm	175	9.0 MPa			4.5 MPa

Performance Data

When used properly Redux Foaming Adhesive Films present a low risk of handling hazard for the following reasons:

- Film may be cut to shape with release paper covers in place avoiding contact with the bare film.
- The film is virtually tack free and volatile free at temperatures below 22°C.
- There are no problems with splashing, leaking or spillage from the film.

However, the usual precautions when handling synthetic resins should be observed and the use of clean polythene gloves is particularly recommended when handling film adhesives and pretreated components.

A Material Safety Data Sheet for each product in the Redux 200 Series is available on request.

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 200 series 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 sheets of film adhesive should be stored at -18°C in their original, sealed packaging.
2. Sheets of film should be stored in their boxes in a horizontal position.
3. When returning sheets to refrigeration it is essential to protect them by sealing within a water vapour barrier packaging material such as polythene.
4. On withdrawal from refrigeration the water vapour barrier packaging must not be removed until the sheets of adhesive have reached room temperature. This may take up to 24 hours. Failure to observe this could result in the sheets becoming damp.
5. Sheets must be handled with care whilst in the frozen state since they will be brittle and easily liable to cracking.



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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® 200 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® adhesives
- HexTool® tooling materials
- HexWeb® honeycombs
- Acousti-Cap® sound attenuating honeycomb
- Engineered core
- Engineered products

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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