3M™ Scotch-Weld™ EC-3500-2 B/A and PMF

Structural Void Filling Compound

Product Description

3M™ Scotch-Weld™ EC-3500-2 B/A and Scotch-Weld™ EC-3500-2 PMF (Pre-Mixed and Frozen) are heat curing, low density, structural void filling compounds based on epoxy chemistry. The products are designed for use on honeycomb sandwich structures, for example as edge close-out and corner reinforcement, as well as local reinforcement for mechanical fixation or complex gap filling. The void filler is compatible with metal and non-metal constructions that are typically found in aircraft designs. The cured materials offer high mechanical performance on a wide temperature range with excellent chemical resistance.

Key Features

- High performance from -55 °C to 175 °C for structural applications
- Potting material, designed to reinforce honeycomb cores
- Low density material for light weight design
- PMF: Deaerated product for enhanced structural durability

Product Characterization

The following technical information and data should be considered representative or typical only and should not be used for specification purposes.

General properties	EC-3500-2 B/A		EC-3500-2 PMF
Base	Epoxy		Epoxy
Consistency	Thixotropic pastes		Thixotropic, high viscous paste
Colour	B: Off-White	A: Dark grey	Dark grey
Mix Ratio by weight	B: 100	A: 100	- One Part Product
by volume	B: 100	A: 93	- One Part Product
Volatile content	Less than 1,5 %		Less than 1,5 %
Recommended Heat Rate	2 – 5 K / min		2 – 5 K / min
Minimum Cure Cycle [1]	60 minutes at 125 °C		60 minutes at 125 °C
Typical Cured Density	0,65 g/ccm		0,70 g/ccm
In-Service Temperature	From - 55 °C to 175 °C		From - 55 °C to 175 °C
Work Life [2] / Shop Life [3]	48 hours at 23 ± 2 °C [2]		≥ 3 days at 23 ± 2 °C [3]
Packaging	Cans and Pails		Cartridges

[1] for more detailed information see chapter “handling, application, storage” on page 3.

[2] 100g of mixed material.

[3] shop life is depending on application approach.

Product Performance

The following product performance data was obtained in the 3M Laboratory under the conditions specified. The data should be considered as typical or representative only and should not be used for specification purpose. The values represent typical average product performance. The following cure cycles have been taken into account:

- Cure Cycle A: 60 minutes at 125 ± 5 °C at atmospheric pressure (heat rate 3 °C / minute)
- Cure Cycle B: 60 minutes at 175 ± 5 °C at atmospheric pressure (heat rate 3 °C / minute)

3M™ Scotch-Weld™ EC-3500-2 B/A

Mechanical Properties	Temperature / Medium	Cure Cycle A	Cure Cycle B
Compressive Strength ISO 604 ; Specimen size : 12,5 x 12,5 x 25 mm³	23 ± 2 °C	63 MPa	50 MPa
	80 ± 2 °C	53 MPa	Not tested
	135 ± 2 °C	Not tested	28 MPa
	175 ± 2 °C	Not tested	18 MPa
Resistance to Fluids & Fluid Absorption ISO 604 Specimen size : 12,5 x 12,5 x 25 mm³	Reference compression strength value at 23 ± 2 °C	-	50 MPa
	2000 h, 70 ± 2 °C, 85 % RH tested at 23 ± 2 °C	-	53 MPa
	2000 h, 70 ± 2 °C, 85 % RH tested at 120 ± 2 °C	-	20 MPa

3M™ Scotch-Weld™ EC-3500-2 PMF

Mechanical Properties	Temperature / Medium	Cure Cycle A [3]	Cure Cycle B [3]
Compressive Strength ISO 604 ; Sample size : 12,5 x 12,5 x 25 mm³	23 ± 2 °C	81 MPa	76 MPa
	120 ± 2 °C	50 MPa	44 MPa
	135 ± 2 °C	45 MPa	36 MPa
	180 ± 2 °C	-	19 MPa
Resistance to Fluids & Fluid Absorption ISO 604 Sample size : 12,5 x 12,5 x 25 mm³ The samples have standardized been immersed in the environments for 1000 hours, if not mentioned otherwise.	Reference compression strength value at 23 ± 2 °C	-	78 MPa
	2000 h, 70 ± 2 °C, 85 % RH tested at 23 ± 2 °C	-	55 MPa (1,1 %)
	2000 h, 70 ± 2 °C, 85 % RH tested at 120 ± 2 °C	-	19 MPa (1,0 %)
	Demineralised water at 23 ± 2 °C	-	43 MPa (1,4 %)
	Fuel JP4, F40 at 23 ± 2 °C	-	61 MPa (0,5 %)
	Skydrol 500B at 23 ± 2 °C	-	62 MPa (0,9 %)

[3] Average cured density of above specimens at 23 ± 2 °C: 0.73 g / ccm

Handling, Application, Storage

Precautionary Information

Refer to product label and Material Safety Data Sheet (MSDS) for health and safety information before using this product. For MSDS visit our website www.3M.com/msds.

Instructions for use

While this information is provided as general application guideline based upon typical conditions, it is recognized that no two applications are identical due to, among other things, differing assemblies, methods of heat and pressure application, production equipment and other limitations. It is therefore suggested that experiments be run, within the actual constrains imposed to determine optimum conditions for your specific application and to determine suitability of product for particular intended use.

Process step	Instruction
Preparation	A thoroughly cleaned, dry, grease-free surface is essential for maximum performance. For repeatable results the material and the substrates should be in the range of 20 - 25 °C object temperature. In order to prevent moisture condensation for Scotch-Weld EC-3500-2 PMF defreezing keep the material in original closed packaging while acclimatisation.
EC 3500-2 B/A	This product consists of two parts. Mix Part B and Part A thoroughly manually or automatically by weight or volume in the proportions specified on the product. Mix manually approximately 15 seconds after a uniform colour is obtained. For repeatable performance keep mixing ratio in a range of ± 5 %. The work life in mixed condition is around 48 hours.
EC 3500-2 PMF	This product consists of one part. **Note:** The temperature has an influence on the product viscosity. Higher temperatures will generate lower viscosity. For repeatable application results keep the product and substrate temperature in a constant range. Apply the product manual per spatula, or semi- to full automatic with an application device. **Caution**: Avoid high application pressures. It might result in a density increase and performance change. **Note:** Product viscosity will increase while room temperature storage, which influences the shop life. Do not defreeze more material than needed within shop life.
Curing and processing	Cure the product at 125 °C or above (max. recommended curing temperature: 185 °C) in heat press or autoclave. Keep heat rate in a range of 2 – 5 °C / minute. Higher temperatures generate faster curing times. The following times and temperatures will result in a full cure: ▪ 60 minutes at 125 ± 2 °C ; heat rate 2-5°C / minute ▪ 50 minutes at 175 ± 2 °C; heat rate 2-5 °C / minute Finish the shape mechanically after curing by using e.g. abrasive- or milling- processes. This product is paintable.
Cleaning	Excess uncured void filler can be cleaned with ketone type solvents. After cure the adhesive can be removed mechanically. **NOTE:** When using solvents, extinguish all ignition sources, including pilot lights, and follow the manufacturer's precautions and directions for use.
Storage and handling of EC-3500-2 B/A	Store the product at room temperature or below. Shelf life is minimum 12 months from date of shipment in their original unopened containers. The specific expiry date is mentioned on the product label.
Storage and handling of EC-3500-2 PMF	Store the product at -18 °C or below. Shelf life below -18 °C is minimum 3 months from date of shipment in their original unopened containers or cartridges. The specific expiry date is mentioned on the product label.

For additional information on this product contact your local 3M Aerospace Sales Representative or visit our homepage at www.3m.eu/aerospace.

Automotive and Aerospace Solutions Division
European Aerospace Laboratory
www.3m.eu/aerospace

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