3M™ Scotch-Weld™ Structural Epoxy Adhesive EC-9323 B/A

Technical Data Sheet

Introduction

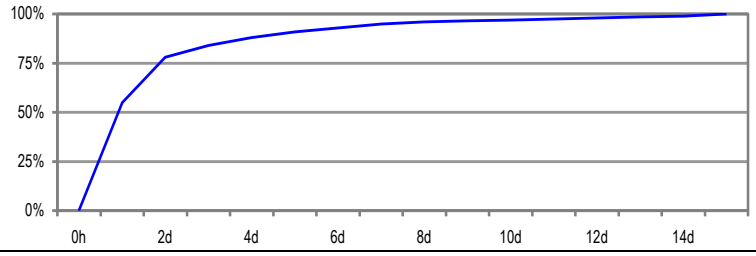
3M™ Scotch-Weld™ Structural Epoxy Adhesive EC-9323 B/A and EC-9323-150 B/A are two-component epoxy paste adhesive which cure at room temperature or with mild heat to form a tough, impact resistant structural bond. It has an excellent adhesion to a wide variety of substrates such as metals, glass, ceramics and plastics, incl. GFRP and CFRP. Once cured it provides extremely high shear and peel strength over a wide temperature range, with outstanding resistance to harsh environments and chemicals commonly encountered in aerospace applications.

Key advantages are:

- Toughened system providing extremely high shear and peel strength
- Wide service temperature range
- Outstanding environmental resistance
- Full room temperature processing

Product Characteristics

NOTE: All technical data and information in this data sheet should be considered representative or typical only and should not be used for specification purposes.

General Properties	**Part B**	**Part A**
Colour	Off-white	Red-purple to dark violet [a]
Base	Modified epoxy	Modified amine
Consistency	Thixotropic paste	Slight gel
Typical uncured density	1.18 g / cm³	1.06 g / cm³
Viscosity	700 Pas	18 Pas
Mix ratio by volume (by weight)	100 (100)	30 (27)
Colour, mixed	Red to dark violet [a]	
Solid content	100 %	
Work life [b] at 23 ± 2 °C	150 minutes	
Typical strength build-up at 23 ± 2 °C		
Handling strength [c] at 23 ± 2 °C	4-5 hours	
Full cure cycle	14 days at room temperature	
Packaging	Cans and pails	

(a) Depending on the age of the product *(b) 50 g of mixed adhesive* *(c) Time to reach 1 MPa Overlap Shear Strength*

Product Performance

The following data show typical values obtained with Scotch-Weld™ EC-9323 B/A on unprimed, sulfochromic etched, 2024 T3 aluminium. The samples have been cured for 15 days at room temperature, if not stated otherwise. To control the bond line thickness, approximately 1 wt. % of glass beads, 90 – 150 µm diameter were added to the adhesive.

Mechanical properties		Test temperature	Result	Test method
Overlap shear strength Al 2043 T3		-55 °C	38 MPa	EN 2243-1
		23 °C	36 MPa	EN 2243-1
		80 °C	22 MPa	EN 2243-1
		120 °C	4 MPa	EN 2243-1
		150 °C	2 MPa	EN 2243-1
	Stainless steel	23 °C	27 MPa (e)	EN 2243-1
	CFRP epoxy matrix	23 °C	28 MPa (d) (e)	EN 2243-1
	PMMA	23 °C	3 MPa (d) (e)	EN 2243-1
Floating roller peel strength AL 2043 T3		-55 °C	120 N/25mm	EN 2243-2
		23 °C	170 N/25mm	EN 2243-2
		80 °C	145 N/25mm	EN 2243-2
Impact resistance		23 °C	17,4 kJ/m²	ANFOR NF 76-115

(d) Substrate Failure *(e) cured for 2 hours at 65 °C*

Environmental Ageing

The following data show typical values obtained with Scotch-Weld™ EC-9323 B/A after 750 hours exposure to different media and environments to determine the aging resistance. The samples have been cured for 15 days at room temperature.

Mechanical properties		Test temperature	Result	Test method
Overlap shear strength Al 2043 T3	Demineralized water at 23 ± 2 °C	23 °C	34 MPa	EN 2243-1
	Gasoline super at 23 ± 2 °C	23 °C	36 MPa	EN 2243-1
	Engine oil (20W40) 23 ± 2 °C	23 °C	36 MPa	EN 2243-1
	Hydraulic fluid skydrol 500B at 23 ± 2 °C	23 °C	37 MPa	EN 2243-1
	JP4 fluid at 23 ± 2 °C	23 °C	36 MPa	EN 2243-1
	5 % Salt spray at 23 ± 2 °C	23 °C	34 MPa	EN 2243-1
	Hot / Wet 70 °C, ≥ 95% R.H.	23 °C	33 MPa	EN 2243-1
	Dry heat at 120 ± 2 °C	23 °C	35 MPa	EN 2243-1

3M™ Scotch-Weld™ Structural Epoxy Adhesive EC-9323-150 B/A

Scotch-Weld™ EC-9323-150 B/A is a product modification of Scotch-Weld™ EC-9323 B/A. There are no significant differences in terms of performance. It contains 1 wt % of glass beads 90 – 150 µm diameter for bond line thickness control. Slight differences can be observed in density and viscosity.

Handling

Refer to product label and 3M Safety Data Sheet (SDS) for health and safety information before using this product. For SDS requirements, please visit our website www.3m.com/sds

Instructions for use

The following information is provided as a general application guide based on typical conditions and applications. However, it is recognized that no two applications are identical due to differing assemblies, methods of heat and pressure application, production equipment and other environmental factors. It is therefore suggested that experiments be run as per the application requirements to determine optimum conditions for your specific application and to determine suitability of product for the intended use.

Surface Preparation

The strength and durability of a bonded joint are dependent on proper treatment of the surface to be bonded. An acclimated, thoroughly cleaned, dry, grease-free surface is essential for maximum performance. Cleaning methods which will produce a break free water film on metal surfaces are generally satisfactory. At the very least, joint surfaces should be cleaned with a good

proprietary degreasing agent and mechanically abraded, e.g. with 3M Scotch-Brite™ 7447. Abrading should be followed by a second degreasing treatment, e.g. with 3M 08984 Adhesive Cleaner.
Optimum processing temperature for substrates and adhesive is around room temperature of 23 °C.

Application

This product consists of two parts. Combine Part B and Part A in a separate container just prior to application in the proportions specified. **Note:** Mix ratio deviations above +/- 5 % have significant influence on material performance. Mix both components thoroughly until a uniform colour is obtained. **Important:** Be careful when mixing quantities larger than 100 grams, because exothermic reaction may occur. Apply adhesive to parts to be bonded before the work life expires, e.g. by spatula. **Note:** Work life depends to some extent on mixed quantity and the shape of the container. Use of a shallow container will minimize the quantity impact. In order to obtain optimum mechanical performance, the joint components should be assembled and clamped as soon as the adhesive has been applied and before end of the work time. A fixation of the joint and an even contact pressure throughout the joint area during cure will ensure optimum performance. Maximum shear strength is obtained with 0.10 – 0.20 mm bond line thickness. Close the containers after use to protect the material against humidity.

Curing

Once mixed, Scotch-Weld™ EC-9323 B/A will gel in 3 hours, build up handling strength in 4-5 hours and fully cure within 14 days at room temperature. **Note:** Lower temperature will slow down the reaction times. Curing time can be accelerated by mild heat. Following times and temperatures will result in a full cure:

- 14 days at 23 ± 2 °C
- 2 hours at 65 ± 2 °C
- 15 minutes at 100 ± 2 °C

Note: The curing temperature may have influence on the final product performance.

Cleaning

Excess uncured adhesive 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 instructions for use.

Storage

Store the product at room temperature or below. Shelf life is minimum 12 months from date of shipment in the original unopened packaging. The product expiry date can be found on the Certificate of Analysis (CoA) as well as on the product label.

Automotive and Aerospace Solutions Division
www.3m.com/aerospace

Issue date: 04/2022
Reference: 260