Scotch-Weld™

9323 B/A Structural Adhesive

Product Data Sheet

Updated : October 2007
Supersedes: March 1996

Product Description

9323 B/A is a two part room temperature curing adhesive offering the following advantages:

Extremely high strength.

Toughened Epoxy system with good elevated temperature resistance.

High environmental resistance.

Mixed adhesive is thixotropic for ease of application.

Available in 3M premetered applicator.

High impact resistance.

Physical Properties

Not for specification purposes

	BASE	ACCELERATOR
	Toughened Epoxy	Modified Amine
Specific Gravity	1.15	1.10
Mix Ratio By Weight By Volume	100 100	27 29
Consistency	Thixotropic paste	Red paste
Solids Content	100%	100%
Colour	Off White	Orangy Purple
Work Life	50g mixed material 2 hours 30 minutes 127g mixed material 2 hours 158g mixed material 1 hour	
Standard 3M Shelf Life	24 months from date of despatch by 3M when stored in the original carton at 21°C (70°F) & 50 % Relative Humidity	

Performance Characteristics

Not for specification purposes

Service Temperature Range	-55°C to 82°C (-67°F to 180°F)	In low load bearing applications the adhesive bonds in temperatures up to 150°C.
Water Resistance	Good	
Weathering Resistance	Good	
Fuel and Oil Resistance	Excellent	

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Performance Characteristics (Cont...)
Not for specification purposes

Overlap Shear Strength on FPL etched 1.6mm thick 2024 T3 clad aluminium.

Test Conditions	15 Days at RT		24 Hours at RT + 1 hour at 80°C		2 hours at 65°C	
	N/mm²	psi	N/mm²	psi	N/mm²	psi
-55°C	38.1	5525	29.0	4200	23.7	3535
23°C	36.2	5250	40.8	5915	39.6	5740
60°C	29.0	4200	32.0	4640	Not Tested	
82°C	22.1	3200	23.4	3390	25.4	3680
120°C	4.0	580	3.5	505	Not Tested	
150°C	2.6	380	2.5	360	Not Tested	

T-Peel Strength on FPL etched 0.8mm thick 2024 T3 clad aluminium.

In order to ensure optimum peel properties with this product, it is recommended that joints be assembled within 20 minutes of applying the adhesive to the surfaces. Prior to application the above work lives remain valid.

Test Conditions	24 hours at RT + 1 hour at 80°C		2 hours at 65°C	
	N/cm	piw	N/cm	piw
-55°C	10.3	6	11.6	6.5
+23°C	52.2	30	58.5	33
+82°C	43.3	25	54.3	31

Durability on etched aluminium.

Values refer to overlap shear strength on 1.6mm thick 2024 T3 clad aluminium.

Test Conditions	15 Days at room temperature		2 hours at room temperature + 60 minutes at 80°C	
	N/mm²	psi	N/mm²	psi
Control				
30 Days Immersion	38.2	5540	41.6	6030
Water at RT	34.3	4970	38.9	5640
Gasoline at RT	36.6	5300	38.0	5510
M.15 at RT	30.2	4380	32.0	4640
JP4 at RT	35.8	5190	39.3	5700
Engine Oil at RT (20W40)	36.4	5280	40.9	5885
Hydraulic Oil at RT (Skydroll 500B)	37.3	5410	36.8	5335
5% Salt Spray at 35°C	33.9	4870	35.1	5090
120°C Dry Heat	34.9	5060	33.1	4800
70°C, 95% RH	32.8	4755	35.3	5120
50°C, 95% RH	37.0	5365	36.0	5220

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Impact Strength

The following data show typical data obtained with bonds made and tested using an IZOD pendulum impact device according to AFNOR 76-115 test method.

Substrates:
Upper 25mm x 25mm x 8mm.
Lower 35mm x 25mm x 8mm.

2024T3 etched aluminium.

Glue line thickness: 0.125mm

Unit : kJ/m²

	15 Days at RT	1 hour at 80°C	2 hours at 56°C
Impact Value	17.4 ± 4.4	28.7 ± 3.3	32.2 ± 3.2

Suggested Cleaning Procedure for Aluminium:

Vapour Degrease - Hang skins in condensing vapours of perchloroethylene for 5 minutes.

Alkaline Degrease - Immerse in Oakite No. 164 solution (9-11 oz/gallon water) at 82°C to 93°C (180°F to 200°F) for 10 - 20 minutes. Rinse in generous quantities of clear running water.

Acid Etch - Place in either of the following solutions for 10 minutes at 66°C ± 4°C (150°F ± 5°F).

Rinse - Rinse face sheet in clear running water.

Dry - Air dry 15 minutes, force dry 10 minutes with parts at 66°C ± 4°C.

If primer is to be used, priming should be done within 4 hours of surface preparation.

	A (FPL Etch)	B
Distilled Water	30 parts by wt	30 parts by wt
Sulphuric Acid	10 parts by wt	10 parts by wt
Sodium Dichromate	1 part by wt	4 parts by wt

Cure Cycle:

In general the curing of 9323 B/A to a thermoset condition is a time-temperature relationship. The only pressure requirements are that the parts must be held in contact and alignment during the cure cycle.

To effect a useful cure in a reasonable length of time, a minimum temperature of 24°C (75°F) is required. The following cure cycle is suggested to obtain dense glue lines which give the standards reported.

Standard Room Temperature Cure:

Prepare overlap shear bonds in the manner described and allow to cure as follows:

Apply 2 psi bonding pressure uniformly to the bond line using dead weights.

Allow Panels to cure undisturbed at a temperature of 24°C (75°F) for 24 to 48 hours.

In addition to standard room temperature cure, the following times and temperatures will give a minimum of 2,000 psi tensile shear at 24°C (75°F) on acid etched aluminium.

Temperature		Time
5°C	(40°F)	7 days
66°C	(150°F)	120 minutes
121°C	(250°F)	5 minutes
177°C	(350°F)	2 minutes

Additional Product Information

Work Life:
The work life of mixed 9323 B/A is approximately 2 hours 30 minutes in a mass of 50grams at an ambient temperature of 23°C.

The work life of the mixed adhesive will be lengthened by reducing the temperature or amount of adhesive and will be shortened by higher temperature or larger amounts of adhesive.
Caution: Heat is generated during cure.

Directions for Use

Proper adhesive application is as important as proper joint design, surface preparation and adhesive choice to obtain maximum joint properties. Poor adhesive application techniques can result in partial or complete failure of an assembly.

9323 B/A performance data was developed using the following suggested procedures. Variation from these procedures should be fully evaluated by the user to ensure bond properties sufficient to meet the requirements of any particular assembly.

Surface Preparation:
A thoroughly cleaned, dry, grease-free surface is essential for maximum performance. Cleaning methods, which will produce a break free water film on a metal surface are generally satisfactory.

Adhesive Mixing:
Mix only those amounts of adhesive which can be used within the work life of the mixture. To achieve optimum physical properties of the adhesive, mixing of the base and accelerator must be very thorough. Care should be taken not to incorporate excessive air into the adhesive during mixing and application as entrapped air will tend to give a porous and weakened bond. When weighing the components, be sure that containers are free of wax or oil. When thoroughly mixed the adhesive should be a uniform colour. As a final check to ensure that the components are adequately mixed, spread a thin film on white paper and examine closely for streaks of base or accelerator. Temperature of the adhesive should not exceed 27°C (80°F) during mixing.

Equipment Suggestions:
Application can be carried out with a spatula, trowel or flow equipment. Suitable two part metering and mixing equipment is available. Contact your 3M Representative for assistance in selecting application equipment to suit your specific needs.

Bond Line Thickness:
Optimum performance is obtained with a 0.002" to 0.005" (0.05 - 0.125mm) cured bond line. For maximum peel strength allow 0.010" (0.25mm) glue line thickness.
Coverage 4m²/litre (at 0.010" thickness).

Clean Up:
Excess adhesive can be cleaned prior to curing with Scotch-grip Solvent No. 2.
NOTE: Solvent No. 2 is flammable. When using solvents for clean up it is essential that proper safety precautions are observed.

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Applications	Bonds metal, glass, ceramics, plastics, composites and rigid rubbers.	Particularly suited to applications requiring resistance to harsh environments. e.g. oil, gasoline, anti-freeze, dry heat.
Health and Safety Information	Refer to product label and Material Safety Data Sheet for health and safety information before using the product. For information please contact your local 3M Office **http://www.3M.fi/teollisuus**	
Specifications	May be released to AFS 1899 and DTD 900/1622.	Water Research Council Approval.

Important Notice

All statements, technical information and recommendations contained in this document are based upon tests or experience that 3M believes are reliable. However, many factors beyond 3M's control can affect the use and performance of a 3M product in a particular application, including the conditions under which the product is used and the time and environmental conditions in which the product is expected to perform. Since these factors are uniquely within the user's knowledge and control, it is essential that the user evaluate the 3M product to determine whether it is fit for a particular purpose and suitable for the user's method or application. All questions of liability relating to this product are governed by the terms of the sale subject, where applicable, to the prevailing law.

Note

Values presented have been determined by standard test methods and are average values not to be used for specification purposes.
Our recommendations on the use of our products are based on tests believed to be reliable but we would ask that you conduct your own tests to determine their suitability for your applications.
This is because 3M cannot accept any responsibility or liability direct or consequential for loss or damage caused as a result of our recommendations.

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