Scotch-Weld™

3549 B/A Structural Adhesive

Product Data Sheet

Updated : March 1996
Supersedes : July 1995

Product Description

Scotch-Weld 3549 B/A Structural Adhesive is a two component, polyurethane adhesive which cures at room temperature or with heat to form tough, impact-resistant structural bonds.

It provides excellent adhesion to many primed or painted metal and plastic substrates, and is designed to develop sag resistance approximately 30 seconds after mixing.

3M Primer EC-1945 B/A is suggested for use on metal surfaces to achieve maximum resistance to water, humidity and salt spray. For best results it is also suggested that the primer itself or primer/ adhesive system be heat cured (see primer section).

Physical Properties

Not for specification purposes

	(B) Base	(A) Accelerator
Base	Polyol	Isocyanate
Specific Gravity	1.23	1.34
Mix Ratio	100 by Weight 100 by Volume	109 by Weight 100 by Volume
Viscosity (cPs @ 24°C)	Brookfield RVF #6 sp @ 10 rpm: 10,000-40,000 cPs.	Brookfield RVF #5 sp @ 10 rpm: 15,000-40,000 cPs.
Colour (Cured: Brown)	Off-White	Brown
Work Life	(100 grams mixed at 24°C): 40-70 min. Time to reach full cure at 24°C: 7 days.	
Shelf Life	6 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

Overlap Shear Strength - Metal: The following is typical test data after a full cure showing the adhesion of 3549 B/A, to various metal substrates. All aluminium data was developed on 1.6mm thick 2024 T-3 clad aluminium and all steel data on 0.89mm cold rolled steel. Test specimens were 12.7mm overlap, 25.4mm wide with 127 micron thick bondlines pulled at a testing rate of 2.5mm/min. All values are MPa.

Substrate	Test Temperature		
	-40°C	24°C	82°C
Etched Aluminium	17.2	13.8	2.10
Abraded and Solvent Wiped Aluminium	13.8	13.8	2.10
Solvent Wiped Aluminium	6.9	6.9	0.70
Abraded and Solvent Wiped Steel	13.8	8.3	0.70
Solvent Wiped Steel	6.9	4.8	0.14
Abraded and Solvent	4.1(1)	6.9	0.70
Wiped Steel Primed with 3M Primer EC-1945 B/A.	5.5(2)	13.8	2.10
Abraded and Solvent Wiped Steel Primed with Corogard 9	7.6(1) 8.7(3)	13.8 13.0	2.10 2.10
Abraded and Solvent Wiped Aluminium Primed with 3M Primer EC-1945 B/A.	12.4(1) 14.5(2)	10.3 15.9	1.10 1.40

1) Room temperature cure of primer and adhesive.
2) 30 minutes at 82°C cure of primer and adhesive.
3) 30 minutes at 135°C cure of primer and adhesive.

Overlap Shear Strength - Plastics: The following is test data after a full cure showing the adhesion of 3549 B/A to various plastic substrates. All data was developed on 3.2mm thick, 12.7mm overlap, 25.4 mm wide specimens with 127 micron thick bondlines that had been abraded and alcohol wiped prior to bonding. Values are in MPa.

Substrate	Test Temperature		
	-40°C	24°C	82°C
Nylon	1.7	4.0	0.3
Lexan	8.6(4)	12.7(4)	0.9
Plexiglass	4.3	9.0	0.5
FRP	11.4(4)	7.9(4)	1.2
Rigid PVC	2.6	6.6	0.8
ABS	3.0(4)	5.6	2.1
Polystyrene	2.3	3.7	0.8

4) Denotes substrate failure.

3549 B/A at Room Temperature:
Specimens: 12.7 mm fibre glass reinforced plastic to steel primed with Corogard 9, 800 micron bondline.

Specimens were pulled at 50 mm/minute.

Time (Hours)	Overlap Shear Strength MPa
4	0
6	0.1
8	0.6
16	3.2
24	4.8
48	8.1

3549 B/A at Various Temperatures;
Specimens: 12.7mm overlap fibre glass reinforced plastic to Corogard 9 primed steel, 813 micron bondline.

Specimens were placed in an oven at designated temperature for the specified time. Bonds were then cooled for 1 minute and pulled at a rate of 50mm/minute.

Temperature	Time	Overlap Shear Strength
66°C	20	0.4
	30	1.6
	40	1.8
	50	3.5
82°C	20	2.0
	30	2.7
	40	4.0
	50	4.7
93°C	10	1.2
	20	2.8
	30	4.2
	40	4.7
	50	5.0
107°C	10	2.7
	20	5.0

Tensile and Elongation:
3549 B/A tested according to ASTM D-738 at 50mm/ minute.

Cure: 1 hour at 120°C, 30 minutes at 140°C.

Temperature	Tensile	Elongation
Room Temperature	20.7 MPa	96%

Additional Product Information

This product may be applied with a spatula, trowel or flow equipment. Suitable two-part metering and mixing equipment is available from several companies. Contact your 3M Representative for assistance in selecting application equipment to suit your specific needs.

Clean up can be accomplished with Scotch Grip Brand Solvent No. 2 or 3M Natural Surface Cleaner. When using solvents for clean up, it is essential that proper precautionary measures for handling such materials be observed.

Storage Conditions

Store product at 15-27°C for maximum storage life. Higher temperatures reduce normal storage life. Lower temperatures cause an increased viscosity of a temporary nature. Rotate stock on a "first in-first out" basis. Upon request, our 3M Specialty Tapes & Adhesives Sales Representative will be pleased to advise you of the anticipated shelf life of this product under the storage conditions in your plant.

Directions for Use

Surfaces to be bonded must be free from rust, oil, grease and wax. Surfaces can be cleaned with 3M Brand Coated Abrasives (240 grit) followed by solvent wiping with Scotch-Grip Brand Solvent No. 1 of 2.

Primer Data:
3M Primer EC-1945 B/A is an amine cured epoxy in blended ketone solvent. It has a 1-to-1 mix ratio by volume. Primer may be applied by spray, roller or brush. For spray application, the following equipment or equivalent is suggested:

Spray with syphon type gun, Binks Model 62 with 66SD air cap and 66 fluid tip at 45-60 psi air pressure. One coat is suggested, thickness 10 to 25 microns when dry.

The primer must contain no solvent prior to application of adhesive.

Drying time is dependent upon ambient temperature, air movement and relative humidity. Forced drying will provide uniform performance of the primer. Suggested dry times are approx. 10 minutes at room temperature followed by 30 minutes at 85°C. or a minimum of one hour at room temperature. Shorter dry times may be used. The customer should determine what is best for the end application. Pot life is eight hours after mixing A and B. Primed surface should be kept free of contamination prior to application of adhesive.

Following the precautions shown under "Precautions", mix A and B thoroughly according to the mix ratio specified under "Physical Properties".

Apply evenly to both surfaces to be bonded to achieve maximum strength.

Join the adhesive-coated surfaces and allow to cure at 16°C or above until completely firm.

Keep parts from moving during cure. Only contact pressure is necessary.

Excess adhesive and equipment may be cleaned prior to curing with 3M Industrial Surface Cleaner or 3M Solvent No. 2.

NOTE: When using solvents for cleaning, it is essential that proper safety precautions be observed. Do not use a chlorinated solvent to clean pressurised equipment, including pumps or pressure pots, which may have aluminium or zinc parts.

Date : March 1996
3549 B/A Structural Adhesive

Health & Safety Information

Scotch-weld 3549B/A contains diphenylmethane - 4.4' diisocyanate. Harmful by inhalation. Irritating to eyes, respiratory system and skin. May cause sensitisation be inhalation. Avoid contact with skin and eyes. Do not breathe vapour. Use only in well ventilated areas. Launder contaminated clothing before re-use.

First Aid.

Eye Contact: Rinse immediately with plenty of water and seek medical advice.

Skin Contact: Wash with soap and water.

For further health and safety information, please contact the Toxicology Department at Bracknell Head Office on (0344) 858000.

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.

3M

Specialty Tapes & Adhesives

3M United Kingdom PLC
3M House,
28 Great Jackson Street,
Manchester,
M15 4PA

Customer Service :

Tel 0161 236 8500
Fax 0161 237 1105

3M Ireland
3M House, Adelphi Centre,
Upper Georges Street,
Dun Laoghaire,Co. Dublin,
Ireland

Customer Service :

Tel (01) 280 3555
Fax (01) 280 3509