Scotch-Weld™
Urethane Adhesives
3532 B/A • 3535 B/A • 3549 B/A

Technical Data **January, 2010**

Product Description

- 3M™ Scotch-Weld™ Urethane Adhesives 3532 B/A, 3535 B/A and 3549 B/A are two-component, polyurethane adhesives which cure at room temperature or with heat to form tough, impact-resistant structural bonds. Their adhesion properties are identical and they vary only in work life, cure time and color. They provide excellent adhesion to many primed or painted metal and plastic substrates and are designed to develop sag resistance approximately 30 seconds after mixing.
- 3M™ Scotch-Weld™ Structural Adhesive Primer EC-3901 is suggested for use on metal surfaces to achieve maximum resistance to water, humidity and salt spray. (See Primer Information in Directions for Use section on page 2.)

Typical Physical Properties

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

3M™ Scotch-Weld™ Urethane Adhesive 3532 B/A	**Base**	**Accelerator**
Color (Cured: Brown)	Off-White	Brown
Base	Polyol	Isocyanate
Net Weight (lbs./gal.)	10.3	11.2
Viscosity cps @ 75°F (24°C)	Brookfield RVF #6 sp. @ 20 rpm: 10,000-55,000 cps	Brookfield RVF #5 sp. @ 10 rpm: 15,000-40,000 cps
Mix Ratio: By Weight By Volume	100 100	109 100
Work Life: 100 grams mixed at 75°F (24°C): 5-15 min. **Time to Reach Full Cure @ 75°F (24°C)** 24 hours		

3M™ Scotch-Weld™ Urethane Adhesive 3535 B/A	**Base**	**Accelerator**
Color (Cured: Off-White)	White	Brown
Base	Polyol	Isocyanate
Net Weight (lbs./gal.)	10.9	11.3
Viscosity cps @ 75°F (24°C)	Brookfield RVF #6 sp. @ 10 rpm: 5,000-40,000 cps	Brookfield RVF #5 sp. @ 10 rpm: 15,000-40,000 cps
Mix Ratio: By Weight By Volume	100 100	105 100
Work Life: 100 grams mixed at 75°F (24°C): 45 sec.-240 sec. **Time to Reach Full Cure @ 75°F (24°C)** 8 hours		

Typical Physical Properties *(continued)*

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

3M™ Scotch-Weld™ Urethane Adhesive 3549 B/A	**Base**	**Accelerator**
Color (Cured: Brown)	Off-White	Brown
Base	Polyol	Isocyanate
Net Weight (lbs./gal.)	10.3	11.2
Viscosity cps @ 75°F (24°C)	Brookfield RVF #6 sp. @ 10 rpm: 10,000-40,000 cps	Brookfield RVF #5 sp. @ 10 rpm: 15,000-40,000 cps
Mix Ratio: By Weight By Volume	100 100	109 100
Work Life: 100 grams mixed at 75°F (24°C): 45-70 min. **Time to Reach Full Cure @ 75°F (24°C)** 7 days.		

Application and Equipment Suggestions

These products may be applied with spatula, trowel, or flow equipment. Appropriate two-part metering and mixing equipment is also commercially available.

Directions for Use

1. Surfaces to be bonded must be dry and free from rust, oil, grease and wax. Surfaces can be cleaned with an abrasive such as 3M™ Coated Abrasives (240 grit) followed by wiping with a solvent such as Scotch-Grip™ Solvent No. 3.*

2. **Primer Information:**

   3M™ Scotch-Weld™ Structural Adhesive Primer EC-3901 may be applied by spray or brush. Air dry cycles for periods as short as 1/2 hour have been used successfully with the force dry cycle. Humidity contributes greatly to satisfactory use of this primer. Relative humidity of 25% or lower may cause difficulties and should be thoroughly evaluated in the customers' application.

   The primed surface, after cooling to ambient temperatures, is ready for adhesive bonding. The primed surface should be protected from contamination introduced by dust, fingerprints, oil, etc.

   See Data Sheet for Scotch-Weld Structural Adhesive Primer EC-3901 for directions for use.

   ***Note:** When using solvents, extinguish all ignition sources and follow the manufacturer's precautions and directions for use when handling such materials.

Typical Performance Characteristics

Overlap Shear Strength-Metals: The following are typical data after a full cure showing the adhesion of 3M™ Scotch-Weld™ Urethane Adhesives 3532 B/A, 3535 B/A and 3549 B/A to various metal substrates. All aluminum data were developed on .063-inch thick 2024 T-3 clad aluminum and all steel data on .035-inch cold rolled steel. Test specimens were 1/2-inch overlap, 1-inch wide with .005-inch thick bondlines pulled at a testing rate of .1-inch/min. All values are psi.

Substrate	Test Temperature		
	-40°F (-40°C)	75°F (24°C)	180°F (82°C)
Etched Aluminum	2500	2000	300
Abraded and Solvent Wiped Aluminum	2000	2000	300
Solvent Wiped Aluminum	1000	1000	100
Abraded and Solvent Wiped Steel	2000	1200	100
Solvent Wiped Steel	1000	700	20

Overlap Shear Strength-Plastics: The following are typical data after a full cure showing the adhesion of Scotch-Weld Urethane Adhesives 3532 B/A, 3535 B/A and 3549 B/A to various plastic substrates. All data were developed on 1/8-inch thick, 1/2-inch overlap, 1-inch wide specimens with .005-inch thick bondlines that had been abraded and alcohol wiped prior to bonding. Values are in psi.

Substrate	Test Temperature		
	-40°F (-40°C)	75°F (24°C)	180°F (82°C)
Nylon	240	580	40
Lexan™	1240[3]	1840[3]	125
Plexiglass™	620	1300	70
FRP	1660[3]	1150[3]	180
Rigid PVC	370	960	110
ABS	440[3]	810	300
Polystyrene	330	530	110

[3]Denotes substrate failure.

Tensile and Elongation: Scotch-Weld Urethane Adhesives 3532 B/A, 3535 B/A and 3549 B/A have been tested according to ASTM-D-738 at 2 inches/min. Cure: 1 hour at 250°F (121°C), 30 min. at 285°F (141°C).

Temperature	Tensile	Elongation
Room Temperature	3000 psi	96%

Rate of Strength Buildup: The following are typical test data showing the rate of strength buildup at various temperatures and times.

Typical Performance Characteristics ***(continued)***

3M™ Scotch-Weld™ Urethane Adhesive 3532 B/A at room temperature
Specimens: 1/2-inch overlap fiber reinforced plastic to primed steel, 0.032-inch bondline. Specimens were pulled at 2 inches/min.

Time (Hours)	Overlap Shear Strength (PSI)
0.5	5
1	20
2	90
3	400
4	490
5	560
6	680
7	790
16	1200
24	1550

Scotch-Weld Urethane Adhesive 3532 B/A at various temperatures
Specimens: 1/2-inch overlap shear, fiber reinforced plastic to primed steel .032-inch 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 2-inch/min.

Temperature	Time (Minutes)	Overlap Shear Strength (PSI)
100°F (38°C)	10	0
	30	240
	45	500
	60	650
120°F (49°C)	10	140
	20	480
	30	750
150°F (66°C)	5	120
	10	400
	15	760
180°F (82°C)	5	400
	10	660
	15	900
200°F (93°C)	2	340
	5	660
	10	900
225°F (107°C)	2	440
	5	760
	10	900

3M™ Scotch-Weld™ Urethane Adhesive 3535 B/A at 73°F (23°C)
Specimens: 1/2-inch overlap prepared from 1 x 4-inch x 2024 T-3 clad FPL etched aluminum, .005-inch bondline. Specimens were pulled at 2 inches/min.

Time (Minutes)	Overlap Shear Strength (PSI)
5	0
15	16
30	227
45	689
60	858
75	1202
90	1507
105	1640
120	1460
180	1877

Typical Performance Characteristics ***(continued)***

3M™ Scotch-Weld™ Urethane Adhesive 3535 B/A at 150°F (66°C)
Specimens: 1/2-inch overlap prepared from 1 x 4-inch x 2024 T-3 clad FPL etched aluminum, .005-inch bondline. Specimens were placed in 150°F (66°C) oven and cured for specified time. Time to reach 150°F (66°C) was 4 min. Specimens were then removed and tested at 2-in./min. During testing the specimens were a approximately 125°F (49°C).

Time (Minutes)	Overlap Shear Strength (PSI)
5	844
10	1055
15	1175
20	1165
30	1305
45	1490
60	1455

3M™ Scotch-Weld™ Urethane Adhesive 3549 B/A at room temperature
Specimens: 1/2-inch overlap fiber reinforced plastic to primed steel, 0.32-inch bondline. Specimens were pulled at 2 inches/min.

Time (Hours)	Overlap Shear Strength (PSI)
4	2
6	11
8	80
16	460
24	700
48	1170

Scotch-Weld Urethane Adhesive 3549 B/A at various temperatures
Specimens: 1/2-inch overlap fiber reinforced plastic to primed steel, .032-inch bondline. Specimens were placed in an oven at designated temperature for the specified time. Bonds were then cooled for 1 min. and pulled at a rate of 2 inches/min.

Temperature	Time (Minutes)	Overlap Shear Strength (PSI)
150°F (66°C)	20	53
	30	227
	40	259
	50	508
180°F (82°C)	20	293
	30	391
	40	576
	50	684
200°F (93°C)	10	177
	20	409
	30	614
	40	683
225°F (107°C)	10	392
	20	730

Storage

Store product at 60-80°F (16-27°C) for maximum storage life. Higher temperatures reduce normal storage life. Lower temperatures cause increased viscosity of a temporary nature. Rotate stock on a "first in-first out" basis.

Shelf Life

These products have a shelf life of one year from date of shipment when properly stored in their unopened containers.

Precautionary Information

Refer to Product Label and Material Safety Data Sheet for health and safety information before using this product. For additional health and safety information, call 1-800-364-3577 or (651) 737-6501.

Technical Information

The technical information, recommendations and other statements contained in this document are based upon tests or experience that 3M believes are reliable, but the accuracy or completeness of such information is not guaranteed.

Product Use

Many factors beyond 3M's control and uniquely within user's knowledge and control can affect the use and performance of a 3M product in a particular application. Given the variety of factors that can affect the use and performance of a 3M product, user is solely responsible for evaluating the 3M product and determining whether it is fit for a particular purpose and suitable for user's method of application.

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ISO 9001:2000

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