# Technical data sheet

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|---|---|
| Product: | 3532 |
| Manufacturer: | 3M DEUTSCHLAND GMBH |
| Product group: | KLEBSTOFF |
| Article group: | 2-K KLEBSTOFF |
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## 3M™ SCOTCH-WELD™ 3532/3535/3549 B/A

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# 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<br>By Volume | 100<br>100 | 109<br>100 |
| **Work Life: 100 grams mixed at 75°F (24°C):** 5-15 min.<br>**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<br>By Volume | 100<br>100 | 105<br>100 |
| **Work Life: 100 grams mixed at 75°F (24°C):** 45 sec.-240 sec.<br>**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<br>By Volume | 100<br>100 | 109<br>100 |
| **Work Life: 100 grams mixed at 75°F (24°C):** 45-70 min.<br>**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.

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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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