



Scotch-Weld™

Epoxy Adhesives

DP125 Translucent and Gray

Technical Data

October 2018

Product Description

3M™ Scotch-Weld™ Epoxy Adhesive DP125 Translucent is a faster curing version of the 3M™ Scotch-Weld™ Epoxy Adhesive 2216 Translucent B/A. The worklife and cure time has been reduced from hours and days for the Scotch-Weld epoxy adhesive 2216 Translucent B/A to minutes and hours. Final shear and peel strengths remain similar or even slightly improved compared to the Scotch-Weld epoxy adhesive 2216 Translucent.

Scotch-Weld epoxy adhesive DP125 Gray is a filled, pigmented version of the Scotch-Weld epoxy adhesive DP125 Translucent and has similar performance and flexibility properties.

Available in bulk containers as 3M™ Scotch-Weld™ Epoxy Adhesive 125 B/A Translucent and 125 B/A Gray.

Features

- 25 minute worklife
- Flexible
- Translucent or Gray
- High peel and shear strength
- Controlled flow (gray)
- 1:1 mix ratio

Typical Uncured 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™ Epoxy Adhesive DP125 Translucent | 3M™ Scotch-Weld™ Epoxy Adhesive DP125 Gray |
|--|-----------------------------|---|--|
| Base Resins | | Epoxy/Amine | Epoxy/Amine |
| Viscosity¹, Approximate @ 80°F | Base (B) Accelerator (A) | 2,000-8,000 cps 22,000-33,000 cps | 35,000-75,000 cps 45,000-65,000 cps |
| Net Weight (Lbs./gal.) | Base (B) Accelerator (A) | 9.3-9.7 8.4-8.6 | 10.3-10.7 8.5-8.9 |
| Color | Base (B) Accelerator (A) | Clear Amber | Gray Amber |
| Mix Ratio (B:A) | By Volume By Weight | 1:1 1.10:1 | 1:1 1.2:1 |
| Worklife² @ 73°F | 2 gram 20 gram | 25 min. 18 min. | 25 min. 15 min. |

Footnotes:

1. Viscosity determined using 3M test method C-1d. Procedure involves Brookfield RVF, #7 spindle, 20 rpm and 80°F. Measurement taken after 1 minute.
2. Worklife determined using 3M test method C-3180. Procedure involves periodically measuring a 2 gram mixed mass for self leveling and wetting properties. This time will also approximate the usable worklife in an 3M™ EPX Applicator mixing nozzle.

3M™ Scotch-Weld™ Epoxy Adhesives DP125 Translucent and Gray

Typical Cured Properties

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

Footnotes:

2. Worklife determined using 3M test method C-3180. Procedure involves periodically measuring a 2 gram mixed mass for self leveling and wetting properties. This time will also approximate the usable worklife in an 3M™ EPX Applicator mixing nozzle.
3. Tack-free time determined per 3M test method C-3173. Involves dispensing 0.5 gram amount of adhesive onto substrate and testing periodically for no adhesive transfer to metal spatula.
4. Handling strength determined per 3M test method C-3179. Time to handling strength taken to be that required to achieve a 50 psi OLS strength using aluminum substrates.
5. The cure time is defined as that time required for the adhesive to achieve a minimum of 80% of the ultimate strength as measured by aluminum-aluminum OLS.
6. Tensile and Elongation. Used procedure in 3M test method C-3094/ATSM D 882. Samples were 2 in. dumbbells with .0125 in. neck and .030 in. sample thickness. Separation rate was 2 inches per minute. Samples cured 2 hrs RT plus 2hrs/160°F.
7. Weight loss by TGA reported as that temperature at which 5% weight loss occurs by TGA in air at 5°C rise per minute per ASTM 1131-86.
8. TCE determined using TMA Analyzer using a heating rate of 10°C per minute. Second heat values given.
9. Glass Transition Temperature (Tg) determined using DSC Analyzer with a heating rate of 20°C per minute. Second heat values given.
10. Thermal conductivity determined using ASTM C177 and C-matic Instrument using 2 in. diameter samples.
11. Thermal shock resistance run per 3M test method C-3174. Involves potting a metal washer into a 2 in. x 0.5 in. thick section and cycling this test specimen to colder and colder temperatures.

Physical

| | 3M™ Scotch-Weld™ Epoxy Adhesive DP125 Translucent | 3M™ Scotch-Weld™ Epoxy Adhesive DP125 Gray |
|--|---|--|
| Color | Translucent | Gray |
| Hardness (ASTM D 2240) Shore D | 55 | 70 |
| Worklife² | 20-30 minutes | 20-30 minutes |
| Tack-free Time³ | ≈ 2 hrs | ≈ 2 hrs |
| Time to Handling Strength⁴ | ≈ 2.5 hrs | ≈ 2.5 hrs |
| Full Cure Time⁵ | 7 days | 7 days |
| Elongation⁶ | 150% | 120% |
| Tensile Strength⁶ | 2500 psi | 3300 psi |

Thermal

| | 3M™ Scotch-Weld™ Epoxy Adhesive DP125 Translucent | 3M™ Scotch-Weld™ Epoxy Adhesive DP125 Gray |
|---|---|--|
| Weight Loss by Thermal Gravimetric Analysis (TGA)⁷ | 1% @ 164°C 5% @ 301°C | 1% @ 176°C 5% @ 303°C |
| Thermal Coefficient of Expansion (TCE) by TMA⁸ ($\infty \times 10^{-6}$ units/unit/°C) Below Tg Above Tg | 112 (5-20°C range) 190 (65-140°C range) | 98 (5-20°C range) 187 (65-140°C range) |
| Glass Transition Temperature (Tg) by DCS⁹ Onset Mid-Point | 3°C 15°C | 12°C 23°C |
| Thermal Conductivity¹⁰ (@ 110°F on .250 in. samples) BTU - ft./ft. ² - hr. - °F) Cal./sec. - cm - °C) Watt/m - °C | .089 .37 x 10 ⁻³ .154 | .087 .36 x 10 ⁻³ .151 |
| Thermal Shock Resistance¹¹ Potted Washer Olyphant Test (3M Test Method C-3174) +100°C [air] to -50°C [liquid] | Pass 5 cycles without cracking | Pass 5 cycles without cracking |

Electrical

| | 3M™ Scotch-Weld™ Epoxy Adhesive DP125 Translucent | 3M™ Scotch-Weld™ Epoxy Adhesive DP125 Gray |
|---|---|--|
| Dielectric Constant @ 1 KHz @ 23°C (ASTM D 150) | 6.3 | 6.3 |
| Dissipation Factor @ 1 KHz @ 23°C (ASTM D 150) | 0.14 | 0.13 |
| Dielectric Strength (ASTM D 149) Sample Thickness Approx. 30 mil | 765 volts/mil | 680 volts/mil |
| Volume Resistivity (ASTM D 257) | 1.2 x 10 ¹¹ ohm-cm | 1.0 x 10 ¹¹ ohm-cm |

3M™ Scotch-Weld™ Epoxy Adhesives DP125 Translucent and Gray

Typical Adhesive Performance Characteristics

The following product performance data was obtained in the 3M laboratory under the conditions specified. The following data show typical results obtained with the 3M™ Scotch-Weld™ Adhesives when applied to properly prepared substrates, cured, and tested according to the specifications indicated. The data was generated using the 3M™ EPX Applicator System equipped with an EPX applicator static mixer, according to manufacturer's directions. Thorough hand mixing should afford comparable results.

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

Overlap Shear Strength (OLS) to¹² (Bonds cured 24 hrs @ RT + 2 hrs 160°F)

Footnotes:

12. Overlap shear (OLS) strengths were measured on 1 in. wide 1/2 in. overlap specimens. These bonds were made individually using 1 in. x 4 in. pieces of substrate. The thickness of the bond line was 0.005-0.008 in. All strengths were measured at 70°F except where noted. (Test per ASTM D 1002-72.)

The separation rate of the testing jaws was 0.1 in. per minute for metals, 2 in. per minute for plastics and 20 in. per minute for rubbers. The thickness of the substrates were: steel, 0.060 in.; other metals, 0.05-0.064 in.; rubber, 0.125 in.; plastics, 0.125 in.

| | 3M™ Scotch-Weld™ Epoxy Adhesive DP125 Translucent | 3M™ Scotch-Weld™ Epoxy Adhesive DP125 Gray |
|--------------------------------------|---|--|
| Etched Aluminum | 2500 psi | 3400 psi |
| Sanded Aluminum (60 grit) | 1400 psi | 2200 psi |
| Cold Rolled Steel | 1500 psi | 1900 psi |
| Wood, Fir | 700 psi | 900 psi |
| Glass, Borosilicate | 250 psi | 400 psi |
| Glass, +3M™ Scotch-Weld™ Primer 3901 | 200 psi | 250 psi |
| Polycarbonate | 700 psi | 880 psi |
| Acrylic | 420 psi | 550 psi |
| Fiberglass | 1200 psi | 1800 psi |
| ABS | 460 psi | 520 psi |
| PVC | 500 psi | 750 psi |
| Polypropylene | 25 psi | 60 psi |

Rate of Strength Buildup (OLS on Etched Aluminum)¹²

Bonds tested after:

| | 3M™ Scotch-Weld™ Epoxy Adhesive DP125 Translucent | 3M™ Scotch-Weld™ Epoxy Adhesive DP125 Gray |
|------------|---|--|
| 3 hrs @ RT | 100 psi | 250 psi |
| 6 hrs @ RT | 300 psi | 500 psi |
| 1 day @ RT | 1300 psi | 1700 psi |
| 1 wk @ RT | 1900 psi | 2300 psi |
| 1 mo @ RT | 2050 psi | 3300 psi |

Environmental Aging (OLS on Etched Aluminum)¹²

Bonds tested after:

| | 3M™ Scotch-Weld™ Epoxy Adhesive DP125 Translucent | 3M™ Scotch-Weld™ Epoxy Adhesive DP125 Gray |
|---|---|--|
| 24 hrs RT + 2 hrs @ 160°F | 2300 psi | 4500 psi |
| 24 hrs RT + 2 hrs @ 240°F | 3300 psi | 5000 psi |
| 1 wk RT + 1 wk @ 90°F/90% RH | 2600 psi | 3500 psi |
| 1 wk RT + 1 wk 248°F | 4600 psi | 5400 psi |
| 1 wk RT + 1 wk H ₂ O Immersion | 2100 psi | 3000 psi |

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Typical Adhesive
Performance
Characteristics
(continued)

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

Overlap Shear Strength vs Temperature¹²

(Bonds cured 24 hr @ RT + 2 hrs @ 160°F)

| Bonds tested at | 3M™ Scotch-Weld™ Epoxy Adhesive DP125 Translucent | 3M™ Scotch-Weld™ Epoxy Adhesive DP125 Gray |
|-----------------|---|--|
| -67°F | 4000 psi | 3400 psi |
| 70°F | 2500 psi | 4300 psi |
| 120°F | 400 psi | 700 psi |
| 150°F | 190 psi | 450 psi |
| 180°F | 150 psi | 400 psi |

180° Peel Strength vs Temperature¹³

(Bonds cured 24 hr @ RT + 2 hrs @ 160°F)

| | 3M™ Scotch-Weld™ Epoxy Adhesive DP125 Translucent | 3M™ Scotch-Weld™ Epoxy Adhesive DP125 Gray |
|-------|---|--|
| -67°F | 3 piw | 3 piw |
| 70°F | 35 piw | 35 piw |
| 120°F | 10 piw | 18 piw |
| 150°F | 3 piw | 3 piw |
| 180°F | 2 piw | 2 piw |

Solvent Resistance¹⁴

| | 3M™ Scotch-Weld™ Epoxy Adhesive DP125 Translucent | 3M™ Scotch-Weld™ Epoxy Adhesive DP125 Gray |
|----------------------|---|--|
| | One Hour/One Month | One Hour/One Month |
| Acetone | A/A | A/A |
| Isopropyl Alcohol | A/A | A/A |
| Freon TF | A/A | A/A |
| Freon TMC | A/B | A/B |
| 1,1,1-Trichlorethane | A/A | A/A |
| RMA Flux | A/A | A/A |

Key: A - Unaffected, B - Slight Attack, C - Moderate/Severe Attack

Footnotes:

- Overlap shear (OLS) strengths were measured on 1 in. wide 1/2 in. overlap specimens. These bonds were made individually using 1 in. x 4 in. pieces of substrate. The thickness of the bond line was 0.005-0.008 in. All strengths were measured at 70°F except where noted. (Test per ASTM D 1002-72.)
The separation rate of the testing jaws was 0.1 in. per minute for metals, 2 in. per minute for plastics and 20 in. per minute for rubbers. The thickness of the substrates were: steel, 0.060 in.; other metals, 0.05-0.064 in.; rubber, 0.125 in.; plastics, 0.125 in.
- T-peel strengths were measured on 1 in. wide bonds at 73°F. The testing jaw separation rate was 20 inches per minute. The substrates were 0.020 in. thick. (Tests per ASTM D 1876-61T.)
- Solvent resistance was determined using cured (24 hrs RT + 2 hrs 160°F) samples (1/2 in. x 4 in. x 1/8 in. thickness) immersed in the test solvent for 1 hour and 1 month. After the allotted period of time the sample was removed and visually examined for surface attack as compared to the control.

3M™ Scotch-Weld™ Epoxy Adhesives DP125 Translucent and Gray

3M™ EPX Pneumatic Applicator Delivery Rates

50 ml Applicator – Maximum Pressure 50 psi

| Adhesive* | 1/4 in. Nozzle gms/minute |
|---|------------------------------|
| 3M™ Scotch-Weld™ Epoxy Adhesive DP125 Translucent | 63.6 |
| 3M™ Scotch-Weld™ Epoxy Adhesive DP125 Gray | 26.4 |

*Tests were run at a temperature of 70°F ± 2°F (21°C ± 1°C) and at maximum applicator pressure.

Handling/Curing Information

Directions For Use

1. For high strength structural bonds, paints, oxide films, oils, dust, mold release agents and all other surface contaminants must be completely removed. However, the amount of surface preparation directly depends on the required bond strength and the environmental aging resistance desired by user. For specific surface preparations on common substrates, see the section on surface preparation.
2. Use gloves to minimize skin contact. **Do not** use solvents for cleaning hands.
3. Mixing.

For Duo Pak Cartridges

3M™ Scotch-Weld™ Epoxy Adhesives DP125 Translucent and Gray are supplied in a dual syringe plastic duo-pak cartridge as part of the 3M™ EPX Applicator System. To use, simply insert the duo-pak cartridge into the EPX applicator and start the plunger into the cylinders using light pressure on the trigger. Next, remove the duo-pak cartridge cap and expel a small amount of adhesive to be sure both sides of the duo-pak cartridge are flowing evenly and freely. If automatic mixing of Part A and Part B is desired, attach the EPX applicator mixing nozzle to the duo-pak cartridge and begin dispensing the adhesive. For hand mixing, expel the desired amount of adhesive and mix thoroughly. Mix approximately 15 seconds after uniform color is obtained.

For Bulk Containers

Mix thoroughly by weight or volume in the proportions specified in the typical uncured properties section. Mix approximately 15 seconds after uniform color is obtained.

4. For maximum bond strength, apply adhesive evenly to both surfaces to be joined.
5. Application to the substrates should be made within 20 minutes. Larger quantities and/or higher temperatures will reduce this working time.
6. Join the adhesive coated surfaces and allow to cure at 60°F (16°C) or above until completely firm. Heat up to 200°F (93°C), will speed curing. These products will cure in 7 days @ 75°F (24°C).
7. Keep parts from moving during cure. Contact pressure necessary. Maximum shear strength is obtained with a 3-5 mil bond line.
8. Excess uncured adhesive can be cleaned up with ketone type solvents.*

***Note:** When using solvents, extinguish all ignition sources, including pilot lights, and follow manufacturer's precautions and directions for use.

Adhesive Coverage (typical): A 0.005 in. thick bondline will yield a coverage of 320 sq. ft./gallon.

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Epoxy Adhesives

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Surface Preparation

For high strength structural bonds, paint, oxide films, oils, dust, mold release agents and all other surface contaminants must be completely removed. However, the amount of surface preparation directly depends on the required bond strength and the environmental aging resistance desired by user.

The following cleaning methods are suggested for common surfaces:

Steel:

1. Wipe free of dust with oil-free solvent such as acetone, isopropyl or alcohol solvents.*
2. Sandblast or abrade using clean fine grit abrasives.
3. Wipe again with solvent to remove loose particles.*
4. If a primer is used, it should be applied within 4 hours after surface preparation.

Aluminum:

1. Alkaline Degrease: Oakite 164 solution (9-11 oz./gallon water) at 190°F ± 10°F for 10-20 minutes. Rinse immediately in large quantities of cold running water.
2. Acid Etch: Place panels in the following solution for 10 minutes at 150°F ± 5°F.

| | |
|--------------------------------|------------------------|
| Sodium Dichromate | 4.1 - 4.9 oz./gallon |
| Sulfuric Acid, 66°Be | 38.5 - 41.5 oz./gallon |
| 2024-T3 aluminum (dissolved) | 0.2 oz./gallon minimum |
| Tap water as needed to balance | |
3. Rinse: Rinse panels in clear running tap water.
4. Dry: Air dry 15 minutes; force dry 10 minutes at 150°F ± 10°F.
5. If primer is to be used, it should be applied within 4 hours after surface preparation.

Note: Read and follow supplier's environmental, health, and safety documentation for these chemicals prior to preparation of this solution.

Plastics/Rubber:

1. Wipe with isopropyl alcohol.*
2. Abrade using fine grit abrasives.
3. Wipe with isopropyl alcohol.*

Glass:

1. Solvent wipe surface using acetone or MEK.*
2. Apply a thin coating (0.0001 in. or less) of primer such as 3M™ Scotch-Weld™ Metal Primer EC3901 to the glass surfaces to be bonded and allow the primer to dry before bonding.

***Note:** When using solvents, extinguish all ignition sources, including pilot lights, and follow manufacturer's precautions and directions for use.

Application Equipment Suggestions

For small or intermittent applications the 3M™ EPX Applicator System is a convenient method of application.

For larger applications these products may be applied by use of flow equipment.

Two part meter/mixing/proportioning/dispensing equipment is available for intermittent or production line use. These systems may be desirable because of their variable shot size and flow rate characteristics and are adaptable to many applications.

3M™ Scotch-Weld™ Epoxy Adhesives DP125 Translucent and Gray

Storage Store products at 60-80°F (16-27°C) for maximum shelf life.

Shelf Life These products have a shelf life of 24 months in their unopened original 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.

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Industrial Adhesives and Tapes Division

3M Center, Building 225-3S-06
St. Paul, MN 55144-1000
800-362-3550 • 877-369-2923 (Fax)
www.3M.com/structuraladhesives

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