3M

Scotch-Weld™

Epoxy Adhesive

DP110 Translucent and Gray

Technical Data **December, 2009**

Product Description

3M™ Scotch-Weld™ Epoxy Adhesive DP110 Translucent and Gray are two-part epoxy adhesives which combine a fast cure with flexibility.

Features

- Controlled flow
- Duo-Pak cartridge dispensing system
- 20 minute handling strength
- Good adhesion to many plastics and metals

Typical Uncured Physical Properties

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

Product		Scotch-Weld Epoxy Adhesive DP110 Translucent	Scotch-Weld Epoxy Adhesive DP110 Gray
Viscosity @ 72°F (23°C), 73°F (24°C) (CPS)	Base Accelerator	30,000 - 70,000 30,000 - 70,000	40,000 - 90,000 40,000 - 90,000
Base Resin	Base Accelerator	Modified Epoxy Amine	Modified Epoxy Amine
Color	Base Accelerator	Translucent White Light Yellow	White Black
Net Weight (Lbs./Gallon)	Base Accelerator	9.1 - 9.4 9.0 - 9.3	9.1 - 9.4 9.0 - 9.3
Mix Ratio B : A	Volume Weight	100 : 100 100 : 99	100 : 100 100 : 99
Worklife @ 73°F (24°C) (minutes)		8 - 13	8 - 13

Typical Cured Physical Properties

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

Product	Scotch-Weld Epoxy Adhesive DP110 Translucent	Scotch-Weld Epoxy Adhesive DP110 Gray
Color	Yellow Translucent	Gray
Shore D Hardness (approx.)	40	45
Elongation (approx.)	40%	40%

3M™ Scotch-Weld™
Epoxy Adhesives
DP110 Translucent and Gray

Typical Cured Thermal Properties

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

Product	3M™ Scotch-Weld™ Epoxy Adhesive DP110 Translucent	3M™ Scotch-Weld™ Epoxy Adhesive DP110 Gray
Thermal Conductivity BTU/Hr/Ft^2/°F/Ft.	.106 @ 113°F (45°C)	.104 @ 113°F (45°C)
Thermal Coefficient of Expansion		
-58°F (-50°C) - 32°F (0°C)	80 x 10^{-6}	73 x 10^{-6}
-58°F (-50°C) - 166°F (110°C)	200 x 10^{-6}	165 x 10^{-6}
Glass Transition Temp.	55°F (13°C)	61°F (16°C)

Typical Cured Electrical Properties

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

Product	Scotch-Weld Epoxy Adhesive DP110 Translucent	Scotch-Weld Epoxy Adhesive DP110 Gray
Dielectric Strength (volts/mil)	520	470
Volume Resistivity (ohms - cm)	4.5 x 10^{10}	6.9 x 10^{10}

Typical Adhesive Performance Characteristics

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

The following product performance data was obtained in the 3M laboratory under the conditions specified. The following data show typical results obtained with Scotch-Weld epoxy adhesive DP110 Translucent and Gray when applied to properly prepared substrates and cured for 48 hours at 73°F (23°C) under 2 psi pressure and tested according to the specifications indicated.

Note: All data developed after a 48 hour cure @ 75°F (24°C) under 2 psi pressure unless noted otherwise.

A. Aluminum Overlap Shear

Overlap shear shear strength was measured on FPL etched 1 in. wide by 1/2 in. overlap specimens. The bonds were made from 2 panels of 4 in. x 7 in. x .063 in., 2024 T3 clad aluminum bonded together and cut into 1 in. wide specimens. The separation rate of the testing jaws was .1 in./minute. Tests similar to ASTM D-1002.

Test Temp	Scotch-Weld Epoxy Adhesive DP110 Translucent	Scotch-Weld Epoxy Adhesive DP110 Gray
-67°F (-55°C)	2500 psi	2700 psi
75°F (24°C)	2500 psi	3500 psi
160°F (71°C)	270 psi	270 psi
180°F (82°C)	200 psi	250 psi

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.

B. Aluminum T-Peel

T-Peel bonds were measured on 1 in. wide specimens cut from two FPL etched 8 in. x 8 in. x .032 in., 2024 T3 clad aluminum panels bonded together. The separation note of the testing jaws was 20 in./minute. Tests similar to ASTM D-1876.

Test Temp	3M™ Scotch-Weld™ Epoxy Adhesive DP110 Translucent	3M™ Scotch-Weld™ Epoxy Adhesive DP110 Gray
75°F (24°C)	20 piw	20 piw

C. Overlap shear on abraded metals, plastics, and rubber

Overlap shear 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 substrates were: cold rolled, galvanized and stainless steel – 0.056-0.062 in., copper – 0.032 in., brass – 0.036 in., rubbers – 0.125 in., plastics – 0.125 in. All surfaces were prepared by solvent wiping/abrading/solvent wiping.

The jaw separation rate used for testing was 0.1 in. per minute for metals, 2 in. per minute for plastics, and 20 in. per minute for rubbers.

Substrate	Overlap Shear (psi) @ 75°F (24°C)	
	Scotch-Weld Epoxy Adhesive DP110 Translucent	Scotch-Weld Epoxy Adhesive DP110 Gray
Aluminum/Aluminum	1000	2300
Cold Rolled Steel/Cold Rolled Steel	1500	2500
Stainless Steel/Stainless Steel	1500	2450
Galvanized Steel/Galvanized Steel	1500	2600
Copper/Copper	1500	1750
Brass/Brass	1500	2450
Styrene Butadiene Rubber/Steel	80 - 100	80 - 100
Neoprene Rubber/Steel	40 - 60	40 - 60
ABS/ABS Plastic	500	680
PVC/PVC, Rigid	400	390
Polycarbonate/Polycarbonate	500	660
Acrylic/Acrylic	250	480
Fiber Reinforced Polyester/Fiber Reinforced Polyester	1400*	1400*

*The substrate broke during the test instead of the bond.

Environmental Resistance

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

Overlap shear specimens were prepared on aluminum as above and exposed to the environment conditions described below.

Environment	Overlap Shear (psi) @ 75°F (24°C)			
	3M™ Scotch-Weld™ Epoxy Adhesive DP110 Translucent		3M™ Scotch-Weld™ Epoxy Adhesive DP110 Gray	
	Etched	Abraded	Etched	Abraded
Initial	2500	1000	2500	2300
30 days tap water @ 75°F (24°C)	2300	1250	2300	1250
3 days, 160°F (71°C), 100% rel. humidity	1200	700	1200	700
14 days in 5% salt spray @ 95°F (35°C)	500	150	500	150

Note: Avoid using either Scotch-Weld epoxy adhesive DP110 Translucent or Gray on metals where the bonded parts will experience high humidity/hot water conditions. User must test thoroughly adhesive performance for any environments which will be encountered.

3M™ EPX™ Pneumatic Applicator Delivery Rates

400 ml Applicator – Maximum Pressure 73 psi

Adhesive*	6mm Nozzle gms/minute	10mm Nozzle gms/minute
Scotch-Weld epoxy adhesive DP110 Gray	8.3	31.5
Scotch-Weld epoxy adhesive DP110 Gray 100°F (38°C)	14.0	50.3

200 ml Applicator – Maximum Pressure 58 psi

Scotch-Weld epoxy adhesive DP110 Gray	6.6	25.6
Scotch-Weld epoxy adhesive DP110 Gray 100°F (38°C)	35.1	115.9
Scotch-Weld epoxy adhesive DP110 Gray 125°F (49°C)	53.8	129.6
Scotch-Weld epoxy adhesive DP110 Gray 150°F (66°C)	332.0	687.0**

50 ml Applicator – Maximum Pressure 50 psi

Adhesive*	1/4 in. Nozzle gms/minute
Scotch-Weld epoxy adhesive DP110 Translucent	6.3 6.2 (nozzle cut back 2 divisions)
Scotch-Weld epoxy adhesive DP110 Gray	12.3 12.1 (nozzle cut back 2 divisions)

*Tests were run at a temperature of 70°F ± 2°F (21°C ± 1°C) and at maximum applicator pressure.
**Did not mix adequately.

Handling/Curing Information

Directions for Use

1. For high strength structural bonds, paint, oxide films, oils, dust, mold release agents and all other surface contaminants must be completely removed from substrates to be bonded. However, the amount of surface preparation necessary directly depends on the user's required bond strength, environmental aging resistance and economic practicalities. For specific surface preparations on common substrates, see the section on surface preparation.
2. These products consist of two parts.

   Mixing

   For Duo-Pak Cartridges

   3M™ Scotch-Weld™ Epoxy Adhesive DP110 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 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 a uniform color is obtained.

   For Bulk Containers

   Mix thoroughly by weight or volume in the proportions specified on the product label or in the uncured properties section. Mix approximately 15 seconds after a uniform color is obtained.
3. For maximum bond strength apply product evenly to both surfaces to be joined.
4. Application to the substrates should be made within 8 minutes. Larger quantities and/or higher temperatures will reduce this working time.
5. 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 fully cure in 48 hours @ 75°F (24°C).
6. Keep parts from moving during cure. Contact pressure necessary. Maximum shear strength is obtained with a 3-5 mil bond line.
7. Excess uncured adhesive can be cleaned up with ketone type solvents.*

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

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

Application Equipment Suggestions

These products may be applied by spatula, trowel or flow equipment.

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

Surface Preparation

For high strength structural bonds, paint, oxide films, oils, dust, mold release agents and all other surface contaminants must be completely removed from substrate to be bonded. However, the amount of surface preparation necessary directly depends on the user's required bond strength, environmental aging resistance and economic practicalities.

The following cleaning methods are suggested for common surfaces:

Steel:

1. Wipe free of dust with oil-free solvent such as acetone or isopropyl 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 (88°C ± 23°C) 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 (66°C ± 23°C).

Sodium Dichromate	4.1 - 4.9 oz./gallon
Sulfuric Acid, 66°Be	38.5 o 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 (66°C ± 23°C).
5. If primer is to be used, it should be applied within 4 hours after surface preparation.

Plastics/Rubber:

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

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

Storage

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

Shelf Life

These products have a shelf life of two years in their unopened original bulk containers and 15 months in duo-pak containers from date of shipment.

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

This Industrial Adhesives and Tapes Division product was manufactured under a 3M quality system registered to ISO 9001:2000 standards.

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