

3M

Scotch-Weld™

Epoxy Adhesive

DP-100 FR

Technical Data

December, 2009

Product Description

3M™ Scotch-Weld™ Epoxy Adhesive DP-100 FR is a two-part flame retardant (self-extinguishing) version of Scotch-Weld DP-100. It meets the UL94 V-O Burn Test requirements and has a work life of 4-8 minutes after mixing. It is ideal for many applications requiring a self-extinguishing structural epoxy adhesive system.

Features

- Fast Cure
- Cream Color
- Easy Mixing
- Meets UL 94 V-O (File No. E61941)
- Passes 14 CFR 25.853 (60 Sec. Vertical Burn Test)¹
- Does not contain brominated or antimony-based flame retardants.

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.

Viscosity² @ 23°C (73°F)	Base (B) Accelerator (A)	45,000 - 90,000 cps 40,000 - 120,000 cps
Base Resin		Epoxy
Color		Cream ⁴
Net Weight Lbs./Gallon	Base (B) Accelerator (A)	10.6 - 11.0 10.1 - 10.5
Mix Ratio (B:A)	By Volume By Weight	1 : 1 1 : 0.95
Worklife³ @ 23°C (73°F)	20 g mixed	4-8 minutes

¹ As listed in code Federal Regulations, FAA, DOT Regulations 25.853 paragraph a.

² Brookfield RVF #7 spindle at 20 rpm.

³ Approximate time during which a 20 gram quantity of mixed resin at 73°F (23°C) will adequately wet out on a substrate.

⁴ Color may vary from nearly white to yellow/amber. Adhesive performance is not affected by color variation.

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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.

Physical

Color	Cream ⁹
Shore D Hardness⁴	87
Time to Handling Strength⁵	10-20 min. @ 73°F (23°C)
Cure Time⁶	24-48 hrs. @ 73°F (23°C)
Glass Transition Temperature⁷ (Tg)	142°F (61°C)
Modulus of Elasticity⁸	650,000 psi

⁴ ASTM D 2240.

⁵ Time to develop 50 psi overlap shear properties.

⁶ Time to develop maximum overlap shear properties.

⁷ Determined using DSC and heating rate of 68°F (20°C) per minute.

⁸ Determined using DMA.

⁹ Color may vary from nearly white to yellow/amber. Adhesive performance is not affected by color variation.

Handling/Application Information

Directions for Use

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 necessary depends on the required bond strength and the environmental aging resistance desired by user. For specific surface preparations on some common substrates, see the section on surface preparation.

3M™ Scotch-Weld™ Epoxy Adhesive DP-100 FR is 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 simultaneous mixing of Part A and Part B is desired, attach the EPX mixing nozzle to the duo-pak cartridge and begin dispensing the adhesive.

When mixing Part A and Part B manually, the components must be mixed in the ratio indicated in the Physical Uncured Properties section. Thorough mixing of the two components is required to obtain optimum properties.

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

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Handling/Application Information *(continued)*

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 necessary depends on the required bond strength and the environmental aging resistance desired by user.

The following cleaning methods are suggested for these 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.

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

Aluminum:

1. Alkaline Degrease: Oakite 164 solution (9-11 oz./gallon water) at 190°F (88°C) ± 10°F (-13°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 (66°C) ± 5°F (-15°C).

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	

Note: Read and follow component suppliers environmental, health and safety recommendations prior to preparing this etch solution.

3. Rinse: Rinse panels in clean running tap water.
4. Dry: Air dry 15 minutes; force dry 10 minutes at 190°F (88°C) ± 10°F (5°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.*

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

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Handling/Application Information (continued)

Surface Preparation (continued)

Glass

1. Solvent wipe surface using acetone or methyl ethyl ketone (MEK).*
2. Apply a thin coating (0.0001 in. or less) of primer such as 3M™ Scotch-Weld™ Structural Adhesive Primer EC-3901 to the glass surfaces to be bonded and allow the primer to dry before bonding.

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

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 were obtained in the 3M laboratory under the conditions specified. The following data show typical results obtained with the 3M™ Scotch-Weld™ Epoxy Adhesive DP-100 FR when applied to properly prepared substrates, cured, and tested according to the specifications indicated. This data was generated using the 3M™ EPX™ Applicator System equipped with an EPX static mixer, according to manufacturer's directions. Thorough manual mixing should afford comparable results.

Overlap Shear⁹ at R.T.

Aluminum -Etched MEK/abrade/MEK	2200 psi 1050 psi
Cold Rolled Steel-MEK/abrade/MEK	1100 psi
ABS	420 psi
PVC	240 psi
Polycarbonate	200 psi
Polyacrylic	145 psi
FRP	600 psi

Overlap Shear⁹ After Environmental Exposure

50% RH / 25°C (77°F) 30 days	2200 psi
Tap Water (30 days) 23°C (73°F)	2100 psi
Salt Spray (30 days) 23°C (73°F)	2700 psi

Overlap Shear⁹ at Various Temperatures

-67°F (-55°C)	1250 psi
73°F (23°C)	2200 psi
180°F (82°C) (15 min.)*	800 psi

⁹Overlap Shear (ASTM D 1002-64)

Overlap shear (OLS) strengths were measured on 1" wide 1/2" overlap specimens. These bonds were made individually using 1" x 4" pieces of substrate except for aluminum. Two panels 0.063" thick, 4" x 7" of 2024 T-3 clad aluminum were bonded and cut into 1" wide samples after 24 hours. The thickness of the bond line was 0.005-0.008". All strengths were measured at 73°F (23°C) except where noted.

The separation rate of the testing jaws was 0.1" per minute for metals, 2" per minute for plastics. The thickness of the substrates were: metals, 0.060"; plastics, 0.125".

*Time in test chamber oven before test.

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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.

90° T-Peel¹⁰ Adhesive

Aluminum, etched 2024 T-3 (.032")	17-20 mil bond line	2 piw
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¹⁰T-peel (ASTM D 1876-61T)

T-Peel strengths were measured on 1" wide bonds at 73°F (23°C). The testing jaw separation rate was 10 inches per minute. The substrates were 0.032" thick.

With the exception of rate of strength build-up tests, all bonds were cured 7 days at 73°F (23°C)/50% relative humidity before testing or subjected to further conditioning or environmental aging.

Rate of Strength Build-Up

Aluminum, Overlap Shear (7 mil Bond line)

Bonds Tested at 73°F (23°C)

Time (substrate bonding to time tested)

5 minutes	0 psi
10 minutes	450 psi
20 hours	1250 psi
4 minutes	1650 psi
24 hours	2200 psi

Storage

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

Shelf Life

When stored in the original, unopened container at the storage conditions suggested, this product has a shelf life of 15 months.

3M™ Scotch-Weld™ Epoxy Adhesive DP-100 FR

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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