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3M™ Scotch-Weld™ Epoxy Adhesive DP100FR

Product Description

3M™ Scotch-Weld™ Epoxy Adhesive DP100 FR is a two-part flame retardant (self-extinguishing) version of Scotch-Weld DP100. 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.

Product 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: As listed in code Federal Regulations, FAA, DOT Regulations 25.853 paragraph a.)
- Does not contain brominated or antimony-based flame retardants.



Technical Information Note

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

Typical Uncured Physical Properties

Property	Values	Notes	Temp C	Temp F
Color	Cream	Colors may vary from nearly white to yellow/amber. Adhesive performance is not affected by color variation.		
Base Viscosity	45,000-90,000 cP	Brookfield RVF #7 spindle at 20 rpm.	23C	72F
Accelerator Viscosity	40,000-120,000 cP	Brookfield RVF #7 spindle at 20 rpm.	23C	72F
Base Resin	Epoxy			
Base Net Weight	10.6 to 11.0 lb/gal			
Accelerator Net Weight	10.1 to 10.5 lb/gal			
Mix Ratio by Volume (B:A)	1:1			
Mix Ratio by Weight (B:A)	1:0.95			

Typical Mixed Physical Properties

Property	Values	Temp C	Temp F	Notes	Method	Test Name	Dwell/ Cure Time	Dwell Time Units	Substrate	Substrate Notes
Worklife, 20g mixed	4 to 8 min	23C	73F	Approximate time during which a 20 gram quantity of mixed resin at 73°F (23°C) will adequately wet out on a substrate.						
Rate of Strength Buildup 4hr	1650 lb/in ²	23C	72F	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 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.	ASTM D1002	Overlap Shear Strength	4	hr	Etched Aluminum	0.005-0.008in bondline

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Typical Mixed Physical Properties (continued)

Property	Values	Temp C	Temp F	Notes	Method	Test Name	Dwell/ Cure Time	Dwell Time Units	Substrate	Substrate Notes
Rate of Strength Buildup 1day	2200 lb/in ²	23C	72F	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 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.	ASTM D1002	Overlap Shear Strength	1	day	Etched Aluminum	0.005-0.008in bondline
Rate of Strength Buildup 20min	1250 lb/in ²	23C	72F	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 except for aluminum. Two panels 0.063 in. thick, 4 in. x 7 in. of 2024T-3 clad aluminum were bonded and cut into 1 in. wide samples after 24 hour. 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.; rubbers, 0.125 in.; plastics, 0.125 in. Cohesive Failure (CF), Adhesive Failure (AF), Substrate Failure (SF)	ASTM D1002	Overlap Shear Strength	20	min	Aluminum	7mil bondline
Rate of Strength Buildup	450 lb/in ²	23C	72F	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 except for aluminum. Two panels 0.063 in. thick, 4 in. x 7 in. of 2024T-3 clad aluminum were bonded and cut into 1 in. wide samples after 24 hour. 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.; rubbers, 0.125 in.; plastics, 0.125 in. Cohesive Failure (CF), Adhesive Failure (AF), Substrate Failure (SF)	ASTM D1002	Overlap Shear Strength	10	min	Aluminum	7mil bondline

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Typical Mixed Physical Properties (continued)

Property	Values	Temp C	Temp F	Notes	Method	Test Name	Dwell/Cure Time	Dwell Time Units	Substrate	Substrate Notes
Rate of Strength Buildup	0 lb/in ²	23C	72F	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 DP100 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. T-Peel strengths were measured on 1" wide bonds. The testing jaw separation rate was 10 inches per minute.	ASTM D1002	Overlap Shear Strength	5	min	Aluminum	0.032in thick; 7mil bondline
Open Time	6 min			Maximum time allowed after applying adhesive to one substrate before bond must be closed and fixed in place. Cure times are approximate and depend on adhesive temperature. For hotmelts: The approximate bonding range of a 1/8" bead of molten adhesive on a non-metallic surface.						
Time to Handling Strength	10 to 20 min	23C	73F	Minimum time required to achieve 50 psi of overlap shear strength. Cure times are approximate and depend on adhesive temperature.						

Time to Full Cure	Notes
24 to 48 hr	24 to 48 hr Time to develop 80% of maximum overlap shear values.
24 to 48 hr	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.

Property: Time to Full Cure
 Temp C: 23C
 Temp F: 73F

Typical Cured Characteristics

Property	Values	Notes	Method	Temp C	Temp F
Modulus	650000 lb/in ²	Determined using DMA.			
Shore D Hardness	87		ASTM D2240	23C	73F

Typical Performance Characteristics

Property	Values	Method	Test Name	Dwell Time	Cure Units	Temp C	Temp F	Environmental Conditions	Substrate	Substrate Notes	Surface Preparation	Notes
Overlap Shear Strength 7day Aluminum	1050 lb/in ²	ASTM D1002	Overlap Shear Strength	7	day	23C	73F	50%RH	Aluminum	0.005-0.008 in. bondline	MEK/Al	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 except for aluminum. Two panels 0.063 in. thick, 4 in. x 7 in. of 2024T-3 clad aluminum were bonded and cut into 1 in. wide samples after 24 hour. 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.; rubbers, 0.125 in.; plastics, 0.125 in. Cohesive Failure (CF), Adhesive Failure (AF), Substrate Failure (SF)
Overlap Shear Strength 7day Cold Rolled Steel	1100 lb/in ²	ASTM D1002	Overlap Shear Strength	7	day	23C	73F	50%RH	Cold Rolled Steel	0.005-0.008 in. bondline	MEK/Al	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 except for aluminum. Two panels 0.063 in. thick, 4 in. x 7 in. of 2024T-3 clad aluminum were bonded and cut into 1 in. wide samples after 24 hour. 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.; rubbers, 0.125 in.; plastics, 0.125 in. Cohesive Failure (CF), Adhesive Failure (AF), Substrate Failure (SF)

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Typical Performance Characteristics (continued)

Property	Values	Method	Test Name	Dwell Time	Dwell Cure Units	Temp C	Temp F	Environmental Conditions	Substrate	Substrate Notes	Surface Preparation	Notes
T-Peel Adhesion	2 lb/in width	ASTM D1876		7	day	23C	73F		Etched 2024 T3 Aluminum	0.032in thick; 17 - 20 mil bondline		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 DP100 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. T-Peel strengths were measured on 1" wide bonds. The testing jaw separation rate was 10 inches per minute.

Electrical and Thermal Properties

Property	Values	Test Condition	Notes
Glass Transition Temperature (Tg)	61 °C 142 °F	Mid-Point	Glass Transition Temperature (Tg) determined using DSC Analyzer with a heating rate of 68°F (20°C) per minute. Second heat values given.

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 DP100 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.

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.

*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).

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 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.

Storage and Shelf Life

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.

When stored in the original, unopened container at the storage conditions suggested, 3M™ Scotch-Weld™ Epoxy Adhesive DP100 FR has a shelf life of 24 months from the date of manufacture.

Industry Specifications

UL 94 V-O (File E61941)

14 CFR 25.853

Trademarks

3M, Scotch-Weld and EPX are trademarks of 3M Company.

References

Property	Values
3m.com Product Page	https://www.3m.com/3M/en_US/company-us/all-3m-products/-/3M-Scotch-Weld-Epoxy-Adhesive-DP100FR/?N=5002385+3293241729&rt=rud
Safety Data Sheet SDS	https://www.3m.com/3M/en_US/company-us/SDS-search/results/?gsaAction=msdsSRA&msdsLocale=en_US&co=ptn&q=DP100FR

3M™ Scotch-Weld™ Epoxy Adhesive DP100FR

Typical Physical Properties

Color: Cream

Conditions

Test Name: Cured

ISO Statement

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

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.

Information

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