



# Scotch-Weld™

## Metal Bonder Acrylic Adhesive

### DP8407NS Gray

Preliminary Technical Data Sheet

September 2016

#### Product Description

3M™ Scotch-Weld™ Metal Bonder Acrylic Adhesive DP8407NS Gray is a high performance, two-part acrylic adhesive that offers excellent shear, peel, and impact performance. This toughened product provides excellent adhesion to many plastics and metals, including those with slightly oily surfaces. This special formulation provides outstanding durability on metal substrates (including bare steel, copper, brass, bronze, and galvanized steel), even when exposed to high temperature and humidity environments.

#### Product Features

- Excellent strength and durability on bare metals, plastics, and other materials
- Toughened
- Outstanding peel and impact strength
- 10:1 mix ratio
- Increased cure speed with applied heat
- Contain glass beads (0.010" diameter) to control bond line thickness

**Note:** Unless otherwise indicated, all properties measured at 72°F (22°C).

**Note:** The following data are taken from tests conducted on a limited number of production runs. 3M will continue to test samples from additional manufacturing lots and issue a new Technical Data Sheet if the results change.

#### 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.

Property		3M™ Scotch-Weld™ Metal Bonder Acrylic Adhesive	
		DP8407NS Gray	
Color	Base (B) Accelerator (A)	Brown Dark Gray	
Viscosity <sup>1</sup>	Base (B) Accelerator (A)	15,000 cP 50,000 cP	
Density <sup>2</sup>	Base (B) Accelerator (A)	0.98 g/cm <sup>3</sup> 1.08 g/cm <sup>3</sup>	
Mix ratio	By volume	10 Parts B : 1 Part A	
	By weight	9 Parts B : 1 Part A	
Note: Cure times are approximate and depend on adhesive temperature.			
Work life <sup>3</sup>		5–7 minutes	
Open time <sup>4</sup>		6–8 minutes	
Time to handling strength <sup>5</sup>		22–26 minutes	
Time to structural strength <sup>6</sup>		28–32 minutes	

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1. Viscosity measured using cone-and-plate viscometer; reported viscosity at 3.8 sec<sup>-1</sup> shear rate.
2. Density measured using pycnometer.
3. Maximum time that adhesive can remain in a small static mixing nozzle and still be expelled without undue force on the applicator.
4. Maximum time allowed after applying a small amount of adhesive to one substrate before bond must be closed and fixed in place.
5. Minimum time required to achieve 50 psi of overlap shear strength.
6. Minimum time required to achieve 1,000 psi of overlap shear strength

### Typical Mixed Physical Properties

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

Property	3M™ Scotch-Weld™ Metal Bonder Acrylic Adhesive
	DP8407NS Gray
Color	Gray
Full cure time	24 hours
Viscosity	20,000 cP
Density	0.99 g/cm <sup>3</sup>

### 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.

#### Overlap Shear (psi)<sup>7</sup>

Substrate	3M™ Scotch-Weld™ Metal Bonder Acrylic Adhesive
	DP8407NS Gray
Aluminum	4,500 CF
Stainless steel	3,800 CF
Cold rolled steel	3,500 CF
Galvanized steel	3,400 CF
Copper	1,900 AF
Brass	1,700 AF
PVC	1,900 SF
ABS	1,000 SF
Acrylic	1,600 SF
Polycarbonate	1,100 SF
Polystyrene	450 SF
Polyester (fiber-reinforced)	1,300 SF
Epoxy resin (fiber-reinforced)	4,100 CF
Aluminum (tested at -40°F)	3,400 CF
Aluminum (tested at 180°F)	1,400 CF

7. Overlap shear values measured using ASTM D1002; 1 min open time; adhesive allowed to cure for 24 hours at room temperature; 1/2" overlap; 0.010" bond line thickness; samples pulled at 0.1 in/min for metals and 2 in/min for plastics; all surfaces prepared with light abrasion and solvent clean; substrates used were 1/16" thick metals and 1/8" thick plastics; failure modes: AF: adhesive failure CF: cohesive failure SF: substrate failure

**Note:** This adhesive has relatively low adhesion to low surface energy plastics (such as polypropylene, polyethylene, TPO, acetal, and PTFE). Applications involving any of these materials should be carefully evaluated by the end user for suitability.

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### Typical Cured 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.

### Mechanical Properties<sup>8</sup>

Property	3M™ Scotch-Weld™ Metal Bonder Acrylic Adhesive
	DP8407NS Gray
Tensile modulus (psi)	TBD
Tensile strength (psi)	TBD
Tensile strain at break (%)	TBD

8. Tensile properties measured using ASTM D638; adhesives allowed to cure for 2 weeks at room temperature; 1/8" thick Type I test specimens; samples pulled at 0.2 in/min.

### Environmental Resistance<sup>9</sup>

Condition	Substrate	3M™ Scotch-Weld™ Metal Bonder Acrylic Adhesive
		DP8407NS Gray
300°F (149°C)	Aluminum	100%
-40°F (-40°C)		100%
120°F (49°C) + 80% relative humidity		100%
150°F (66°C) + 80% relative humidity		85%
185°F (85°C) + 85% relative humidity		85%
Water		95%
90°F (32°C) Water		90%
120°F (49°C) Water		85%
Salt water (5 wt% in water)		95%
Gasoline		70%
Diesel fuel		100%
Motor oil		100%
Antifreeze (50 wt% in water)		100%
Isopropyl alcohol		75%
Bleach (10 wt% in water)		95%
392°F (200°C) for 30 minutes		90%

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## Typical Cured Physical Properties

(continued)

Condition	Substrate	3M™ Scotch-Weld™ Metal Bonder Acrylic Adhesive	
		DP8407NS Gray	
300°F (149°C)	Cold Rolled Steel	100%	
120°F (49°C) + 80% relative humidity		95%	
185°F (85°C) + 85% relative humidity		65%	
120°F (49°C) Water		75%	
392°F (200°C) for 30 minutes		90%	
Condition	Substrate	3M™ Scotch-Weld™ Metal Bonder Acrylic Adhesive	
		DP8407NS Gray	
-40°F (-40°C)	PVC	100%	
120°F (49°C) + 80% relative humidity		95%	
150°F (66°C) + 80% relative humidity		95%	
185°F (85°C) + 85% relative humidity		85%	
Water		100%	
Salt water (5 wt% in water)		95%	
Hydrochloric acid (16 wt% in water)		100%	
Sodium hydroxide (10 wt% in water)		95%	

9. Values indicate overlap shear test performance retained after 1,000 hours of continuous exposure relative to a control sample left at room temperature; samples conditioned for 24 hours at room temperature and 50% relative humidity prior to tests.

**Note:** Fully-cured structural adhesives can withstand short-term incidental contact with almost any solvent, chemical, or environmental condition. However, long-term continuous exposure of this acrylic adhesive to the following liquids should be avoided:

1. Elevated temperature (>120°F) water
2. Ketone-type solvents (acetone, MEK)

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

### Floating Roller Peel (lb/inch width)<sup>10</sup>

Substrate	3M™ Scotch-Weld™ Metal Bonder Acrylic Adhesive	
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Aluminum	50 CF	

10. Floating roller peel values measured using ASTM D3167; adhesives allowed to cure for 24 hours at room temperature; 1" wide samples; 0.017" bond line thickness; samples pulled at 6 in/min; aluminum surfaces etched; substrates used were 1/16" thick and 0.020" thick aluminum; failure modes: AF: adhesive failure CF: cohesive failure SF: substrate failure

**Note:** The data in this sheet were generated using the 3M™ EPX™ Applicator System equipped with an EPX static mixer, according to manufacturer's directions. Thorough hand-mixing will afford comparable results.

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## Directions for Use

1. To obtain the highest strength structural bonds, paint, oxide films, oils, dust, mold release agents, and all other surface contaminants must be completely removed. The amount of surface preparation depends on the required bond strength and environmental aging resistance desired by user. For suggested surface preparations on common substrates, see the section on surface preparation.

### 2. **Mixing For Duo-Pak Cartridges**

Store cartridges with cap end up to allow any air bubbles to rise towards the tip. To use, simply insert the cartridge into the EPX applicator and start the plunger into the cylinders using light pressure on the trigger. Then remove the cap and expel a small amount of adhesive to ensure material flows freely from both sides of cartridge. For automatic mixing, attach an EPX mixing nozzle to the cartridge and begin dispensing the adhesive. For hand mixing, expel the desired amount of adhesive and mix thoroughly. Mix approximately 15 seconds after obtaining a uniform color.

### **Mixing For Bulk Containers**

Mix thoroughly by weight or volume in the proportion specified on the product label or in the typical uncured properties section. Mix approximately 15 seconds after obtaining a uniform color.

3. Apply adhesive and join surfaces within the open time listed for the specific product.

Larger quantities and/or higher temperatures will reduce this working time. The adhesive and all materials should be at 60°F (16°C) or above to achieve highest bond strength.

4. Allow adhesive to cure at 60°F (16°C) or above until completely firm. Applying heat up to 150°F (66°C) will increase cure speed.

5. Keep parts from moving during cure. Apply contact pressure or fixture in place if necessary. Optimum bond line thickness ranges from 0.005 to 0.020 inch; shear strength will be maximized with thinner bond lines, while peel strength reaches a maximum with thicker bond lines.

6. 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.

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## Surface Preparation

3M™ Scotch-Weld™ Metal Bonder Acrylic Adhesives are designed to be used on painted or coated metals, most plastics, and some bare metals. The following cleaning methods are suggested for common surfaces:

### Painted/coated metals:

1. Wipe surface free of dust and dirt with clean cloth and pure isopropyl alcohol.\*
2. Sandblast or lightly abrade using clean fine grit abrasives. Do not completely remove the paint layer or coating down to bare steel.
3. Wipe again with clean cloth and pure isopropyl alcohol to remove loose particles.\*

### Metals:

1. Wipe surface free of dust and dirt with clean cloth and pure acetone.\*
2. Sandblast or lightly abrade using clean fine grit abrasives.
3. Wipe again with clean cloth and pure acetone to remove loose particles.\*

### Plastics:

1. Wipe surface free of dust and dirt with clean cloth and pure isopropyl alcohol.\*
2. Lightly abrade using fine grit abrasives.
3. Wipe again with clean cloth and pure isopropyl alcohol to remove loose particles.\*

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

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**Storage** Store product at 80°F (27°C) or below. Refrigeration at 40°F (4°C) will help extend shelf life. Do not freeze. Allow product to reach room temperature prior to use.

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**Shelf Life** 3M™ Scotch-Weld™ Acrylic Adhesives have a shelf life of 18 months from date of shipment from 3M in unopened original containers kept at recommended storage conditions.

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**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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**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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## ISO 9001

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