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Last Revision Date: May, 2022

Technical Data Sheet

3M™ Scotch-Weld™ Metal Bonder Acrylic Adhesive DP8407NS Gray

Product Details

Regulatory Info/SDS

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.

Technical Information Note

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

Typical Uncured Physical Properties

Attribute Name	Value
Viscosity	20,000 cP
Mix Ratio by Weight (B:A)	0.376
Mix Ratio by Volume (B:A)	0.417

Attribute Name	Temperature	Value
Base Color		Brown
Accelerator Color		Dark Gray
Base Density		0.98 g/cm³ [1]
Accelerator Density		1.08 g/cm³ [1]
Base Viscosity	22 °C (72 °F)	15,000 cP [2]
Accelerator Viscosity	22 °C (72 °F)	50,000 cP [2]

[1] Density measured using pycnometer.

[2] Viscosity measured using cone-and-plate viscometer; reported viscosity at 3.8 sec^{-1} shear rate.

Typical Mixed Physical Properties

Attribute Name	Temperature	Value
Density (mixed)		0.99 g/cm³
Worklife		5 to 7 min [1]
Open Time		7 min [2]
Set Time (min)	22 °C (72 °F)	22 to 26 min [3]
Time to Structural Strength		28 to 32 min [4]
Time to Full Cure		1 d

[1] Maximum time that adhesive can remain in a static mixing nozzle and still be expelled without undue force on the applicator. Cure times are approximate and depend on adhesive temperature.

[2] Max time allowed after applying adhesive to a substrate before bond must be closed and fixed. Cure times approximate and depend on adhesive temperature. Hotmelts: The approx. bonding range of a 1/8" bead of molten adhesive on a non-metallic surface.

[3] Minimum time required to achieve 50 psi of overlap shear strength. Cure times are approximate and depend on adhesive temperature.

[4] Minimum time required to achieve 1,000 psi of overlap shear strength. Cure times are approximate and depend on adhesive temperature.

Typical Physical Properties

Attribute Name	Value
Mixed Color	Gray
Cured Color	Gray

Typical Cured Characteristics

Attribute Name	Temperature	Value
Modulus	22 °C (72 °F)	170,000 lb/in² [1]
Tensile Strain at Break		10 % [2]

[1] 1/8" thick Type I test specimens; samples pulled at 0.2 in/min.
ASTM D638
2 week dwell at 23°C (72°F)

[2] 1/8'' thick Type I test specimens; samples pulled at 0.2 in/min.

Typical Performance Characteristics

Overlap Shear Strength

Surface Prep: Light Abrasion and Solvent Clean
Temperature: 22 °C (72 °F)
Dwell Time: 24 h
Test Method: ASTM D1002

Test Condition	Substrate	Value
	ABS	1000 lb/in² (SF) [1]
	Acrylic (PMMA)	1600 lb/in² (SF) [1]
	Brass	1700 lb/in² (AF) [1]
	Cold Rolled Steel	3500 lb/in² (CF) [1]
	Copper	1900 lb/in² (AF) [1]
	Epoxy Resin (Fibre Reinforced)	4100 lb/in² (SF) [1]
	Galvanized Steel	3400 lb/in² (CF) [1]
	Polycarbonate (PC)	1100 lb/in² (SF) [2]
	Polyester (PET)	1300 lb/in² (SF) [1]
	Polystyrene	450 lb/in² (SF) [1]
	Polyvinyl chloride (PVC)	1900 lb/in² (SF) [1]
	Stainless Steel	3800 lb/in² (CF) [1]
	Aluminum	4500 lb/in² (CF) [1]

Test Condition	Substrate	Value
@ -40°F(-40°C)	Aluminum	3400 lb/in² (CF) [1]
@ 180°F(82°C)	Aluminum	1400 lb/in² (CF) [1]

[1] 1min open time, 1/2in overlap, 0.010in bond line thickness, separation rate 0.1 in/min metals, 2 in/min plastics, abraded and solvent wiped substrates, 1/16in metals, 1/8in plastics
Cohesive (CF), Adhesive (AF), and Substrate (SF) Failure

[2] 0.5in overlap, pulled at 0.1 in/min for metals and 2 in/min for plastics, substrates lightly abraded and solvent wiped, 1/16in aluminum and 1/8in plastics, composite thickness varied.
Substrate (SF), Adhesive (AF), Cohesive (CF), Mixed (MF) Failure modes

Attribute Name	Temperature	Substrate	Value
Bell Peel	22 °C (72 °F)	Etched Aluminum	50 lb/in width (CF) [1]
Tensile Strength			2,400 lb/in² [2]

[1] 6 in/min, 1in wide, 1/16in thick
Data from 3M™ EPX™ Applicator System with an EPX static mixer according to manufacturer's directions. Thorough hand-mixing will afford comparable results.
Cohesive (CF), Adesive (AF) and Substrate (SF) Failure

[2] 1/8'' thick Type I test specimens; samples pulled at 0.2 in/min.

Attribute Name	Value
Additional Test notes	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. 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.

Typical Environmental Performance

Overlap Shear Strength

Substrate: Aluminum
Test Method: ASTM D1002

Dwell Time	Temperature	Environmental Condition	Value
30 min	200 °C (392 °F)		90 % [1]
1,000 h	-40 °C (-40 °F)		100 % [1]
1,000 h	149 °C (300 °F)		100 % [1]
1,000 h	49 °C (120 °F)	80%RH	100 % [1]
1,000 h	66 °C (150 °F)	80%RH	85 % [1]
1,000 h	85 °C (185 °F)	85%RH	85 % [1]
1,000 h	22 °C (72 °F)	100%RH	95 % [1]
1,000 h	32 °C (90 °F)	100%RH	90 % [1]
1,000 h	49 °C (120 °F)	100%RH	85 % [1]
1,000 h	22 °C (72 °F)	Salt water (5 wt% in water)	95 % [1]
1,000 h	22 °C (72 °F)	Antifreeze (50 wt% in water)	100 % [1]
1,000 h	22 °C (72 °F)	Oil 10W30	100 % [1]
1,000 h	22 °C (72 °F)	Bleach (10 wt% in water)	95 % [1]
1,000 h	22 °C (72 °F)	Isopropyl Alcohol (IPA)	75 % [1]

Dwell Time	Temperature	Environmental Condition	Value
1,000 h	22 °C (72 °F)	Diesel Fuel	100 % [1]
1,000 h	22 °C (72 °F)	Gasoline	70 % [1]

[1] Performance % to control sample @RT, tested after 24hr dwell @RT.
Cured adhesives can handle short contact to most chemicals or env. cond. Avoid long exposure to:
Temp >100°F + water
Ketone-type solvents (acetone, MEK)
Gasoline and similar liquids

Overlap Shear Strength

Substrate: Cold Rolled Steel
Test Method: ASTM D1002

Dwell Time	Temperature	Environmental Condition	Value
30 min	200 °C (392 °F)		90 % [1]
1,000 h	49 °C (120 °F)	80%RH	95 % [1]
1,000 h	49 °C (120 °F)	100%RH	75 % [1]
1,000 h	85 °C (185 °F)	85%RH	65 % [1]
1,000 h	149 °C (300 °F)		100 % [1]

[1] Performance % to control sample @RT, tested after 24hr dwell @RT.
Cured adhesives can handle short contact to most chemicals or env. cond. Avoid long exposure to:
Temp >100°F + water
Ketone-type solvents (acetone, MEK)
Gasoline and similar liquids

Overlap Shear Strength

Substrate: Polyvinyl chloride (PVC)
Dwell Time: 1,000 h
Test Method: ASTM D1002

Temperature	Environmental Condition	Value
-40 °C (-40 °F)		100 % [1]
49 °C (120 °F)		95 % [1]
66 °C (150 °F)		95 % [1]
85 °C (185 °F)	85%RH	85 % [1]
22 °C (72 °F)	100%RH	100 % [1]
22 °C (72 °F)	Hydrochloric acid (16 wt% in water)	100 % [1]
22 °C (72 °F)	Salt water (5 wt% in water)	95 % [1]
22 °C (72 °F)	Sodium hydroxide (10 wt% in water)	95 % [1]

[1] Performance % to control sample @RT, tested after 24hr dwell @RT.
Cured adhesives can handle short contact to most chemicals or env. cond. Avoid long exposure to:
Temp >100°F + water
Ketone-type solvents (acetone, MEK)
Gasoline and similar liquids

Handling/Application Information

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.

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.

Industry Specifications

EN 45545 test report for details (ISO 5659-2, ISO 5660-1, ISO 5658-2)

Storage and Shelf Life

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.
3M™ Scotch-Weld™ Acrylic Adhesives have a shelf life of 12 months from date of manufacture in unopened original containers kept at recommended storage conditions.

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.

Automotive Disclaimer

Select Automotive Applications: This product is an industrial product and has not been designed or tested for use in certain automotive applications, such as automotive electric powertrain battery or high voltage applications, which may require the product to be manufactured in a IATF certified facility, meet a Ppk of 1.33 for all properties, undergo an automotive production part approval process (PPAP), or fully adhere to automotive design or quality system requirements (e.g., IATF 16949 or VDA 6.3). Customer assumes all responsibility and risk if customer chooses to use this product in these applications.

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ISO Statement

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

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