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Technical Data Sheet

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

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)	10:1.11
Mix Ratio by Volume (B:A)	10:1

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	23 °C (73 °F)	15,000 cP [2]
Accelerator Viscosity	23 °C (73 °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 — 7 min [1]
Open Time		7 min [2]
Set Time (min)	23 °C (73 °F)	22 — 26 min [3]
Time to Structural Strength		28 — 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 3.2 mm (1/8 in) bead of molten adhesive on a non-metallic surface.

[3] Minimum time required to achieve 0.3 MPa (50 psi) of overlap shear strength. Cure times are approximate and depend on adhesive temperature.

[4] Minimum time required to achieve 6.9 MPa (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	Test Method	Temperature	Value
Modulus	ASTM D638, ISO 527	23 °C (73 °F)	1200 MPa (170000 lb/in²) [1]
Tensile Strain at Break			10 % [2]

[1] 3 mm (1/8") thick Type I test specimens; samples pulled at 5 mm/min (0.2 in/min). 2 week dwell at 22 °C (72 °F)

[2] 3 mm (1/8 in) thick Type I test specimens; samples pulled at 5 mm/min (0.2 in/min)

Typical Performance Characteristics

Overlap Shear Strength

Temperature: 23 °C (73 °F)
Dwell Time: 24 h
Test Method: ASTM D1002, ISO 4587

Test Condition	Substrate	Surface Prep	Value
23 °C	ABS	Light Abrasion and Solvent Clean	6.9 MPa (1000 lb/in²) (SF) [1]
23 °C	Acrylic (PMMA)	Light Abrasion and Solvent Clean	11 MPa (1600 lb/in²) (SF) [1]
23 °C	Brass	Light Abrasion and Solvent Clean	11.7 MPa (1700 lb/in²) (AF) [1]
23 °C	Cold Rolled Steel	Light Abrasion and Solvent Clean	24.1 MPa (3500 lb/in²) (CF) [1]
23 °C	Copper	Light Abrasion and Solvent Clean	13.1 MPa (1900 lb/in²) (AF) [1]
23 °C	Epoxy Resin (fiber-reinforced)	Light Abrasion and Solvent Clean	28.3 MPa (4100 lb/in²) (SF) [1]
23 °C	Galvanized Steel	Light Abrasion and Solvent Clean	23.4 MPa (3400 lb/in²) (CF) [1]

Test Condition	Substrate	Surface Prep	Value
23 °C	Polycarbonate (PC)	Light Abrasion and Solvent Clean	7.6 MPa (1100 lb/in²) (SF) [1]
23 °C	Polyester (PET)	Light Abrasion and Solvent Clean	9 MPa (1300 lb/in²) (SF) [1]
23 °C	Polystyrene (HIPS)	Light Abrasion and Solvent Clean	3.1 MPa (450 lb/in²) (SF) [1]
23 °C	Polyvinyl chloride (PVC)	Light Abrasion and Solvent Clean	13.1 MPa (1900 lb/in²) (SF) [1]
23 °C	Stainless Steel	Light Abrasion and Solvent Clean	26.2 MPa (3800 lb/in²) (CF) [1]
23 °C	Aluminum	Etched	31 MPa (4500 lb/in²) (CF) [1]
-40 °C (-40 °F)	Aluminum	Light Abrasion and Solvent Clean	23.4 MPa (3400 lb/in²) (CF) [1]
82 °C (180 °F)	Aluminum	Light Abrasion and Solvent Clean	9.7 MPa (1400 lb/in²) (CF) [1]

[1] 25 mm (1") wide, 12.7 mm (1/2") overlap samples, 25 mm (1") x 102 mm (4") substrates, bondline thickness: 0.13-0.20 mm (5-8 mil)
Separation rate 2.5 mm/min (0.1 in/min) metal, 51 mm/min (2 in/min) plastic, 510 mm/min (20 in/min) rubber.
Substrate thickness: steel 1.5 mm (60 mil), other metal 1.3-1.6 mm (50-64 mil), rubber and plastic 3.2 mm (125 mil)
Cohesive Failure (CF), Adhesive Failure (AF), Mixed Failure (MF), Substrate Failure (SF)

Attribute Name	Test Method	Temperature	Test Condition	Substrate	Surface Prep	Value
Bell Peel	ASTM D3167	23 °C (73 °F)	23 °C	Aluminum	Etched	88 N/cm (50 lb/in) (CF) [1]
Tensile Strength						16.5 MPa (2400 lb/in²) [2]

[1] Floating roller peel; adhesives allowed to cure for 24 hours @RT; 25 mm (1 in) wide samples;
Samples pulled at 15 mm/min (6 in/min)
Cohesive (CF), Adesive (AF) and Substrate (SF) Failure

[2] 3 mm (1/8 in) thick Type I test specimens; samples pulled at 5 mm/min (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, ISO 4587

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 % [2]
1,000 h	66 °C (150 °F)	80 %RH	85 % [2]
1,000 h	85 °C (185 °F)	85 %RH	85 % [2]
1,000 h	23 °C (73 °F)	100 %RH	95 % [2]
1,000 h	32 °C (90 °F)	100 %RH	90 % [2]
1,000 h	49 °C (120 °F)	100 %RH	85 % [2]
1,000 h	23 °C (73 °F)	Salt water (5 wt% in water)	95 % [1]
1,000 h	23 °C (73 °F)	Antifreeze (50 wt% in water)	100 % [1]
1,000 h	23 °C (73 °F)	Oil 10W30	100 % [1]
1,000 h	23 °C (73 °F)	Bleach (10 wt% in water)	95 % [1]
1,000 h	23 °C (73 °F)	Isopropyl Alcohol (IPA)	75 % [1]
1,000 h	23 °C (73 °F)	Diesel Fuel	100 % [1]
1,000 h	23 °C (73 °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

[2] 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, ISO 4587

Dwell Time	Temperature	Environmental Condition	Value
30 min	200 °C (392 °F)		90 % [1]
1,000 h	49 °C (120 °F)	80 %RH	95 % [2]
1,000 h	49 °C (120 °F)	100 %RH	75 % [2]
1,000 h	85 °C (185 °F)	85 %RH	65 % [2]
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

[2] 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, ISO 4587

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 % [2]
23 °C (73 °F)	100 %RH	100 % [2]
23 °C (73 °F)	Hydrochloric acid (16 wt% in water)	100 % [1]
23 °C (73 °F)	Salt water (5 wt% in water)	95 % [1]
23 °C (73 °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

[2] 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

Dispense Properties

Attribute Name	Value
45-50ml Cartridge Nozzle	Quadro (Orange), 16 element, 90mm, 1.7ml, #7100202930
490ml Cartridge Nozzle	Helical (Orange), 18 element, 222mm, 13.0ml, #7100304367

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 under normal conditions of 16° to 27°C (60° to 80°F) and 40 to 60% relative humidity in the original packaging, out of direct sunlight. Refrigeration at 4°C (40°F) will help extend shelf life. Do not freeze. Allow product to reach room temperature prior to use. For best performance, use this product within 12 months from date of manufacture.

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

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 product was manufactured under a 3M quality system registered to ISO 9001 standards.

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