Technical Data Sheet

3M™ Scotch-Weld™ Acrylic Adhesive
DP8310NS

Product Description

3M™ Scotch-Weld™ Acrylic Adhesive 8310NS is a high-performance, two-part structural acrylic adhesive. This clear adhesive has good overlap shear performance on plastics and metals and provides a clean appearance with minimal surface preparation.

Product Features

- Clear, colorless
- Excellent impact resistance
- Flexible
- Toughened
- Beadless (does NOT contains ceramic particles to control bond line thickness)

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

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

Attribute Name	Value
Mix Ratio by Volume (B:A)	10:1
Mix Ratio by Weight (B:A)	10:1.10

Attribute Name	Temperature	Value
Base Color		Colorless
Accelerator Color		White
Color		Colorless
Base Density		0.98 g/cm³ (8.2 lb/gal) [1]
Accelerator Density		1.08 g/cm³ (9.0 lb/gal) [1]
Accelerator Viscosity	23 °C (73 °F)	9,000 cP (9,000 mPa.s) [2]
Base Viscosity	23 °C (73 °F)	62,000 cP (62,000 mPa.s) [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	Test Method	Temperature	Substrate	Value
Open Time				10 min [1]
Worklife	ASTM D1002, ISO 4587	23 °C (73 °F)	Etched Aluminum	5 min [2]
Time to Handling Strength		23 °C (73 °F)		25 min [3]

Attribute Name	Test Method	Temperature	Substrate	Value
Time to Structural Strength		23 °C (73 °F)		2 h [4]
Time to Full Cure				24 h

[1] 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.

[2] Maximum time that adhesive can remain in a static mixing nozzle and still be expelled and provide at least 80 % of the maximum strength.

[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.

Test Condition: 5 g mass

Attribute Name	Value
Exotherm Max Temp	67 °C (152 °F) [1]

[1] Exotherm determined using the stated mass mixed for 1 minute and then by electronic thermocouple measuring the peak temperature and time to that temperature.

Typical Cured Characteristics

Temperature: 23 °C (73 °F)

Attribute Name	Test Method	Dwell Time	Value
Shore D Hardness	ASTM D2240	7 d	72
Refractive Index			1.5265

Typical Performance Characteristics

Overlap Shear Strength

Temperature: 23 °C (73 °F)
Test Method: ASTM D1002, ISO 4587
Dwell Time: 7 d

Substrate	Surface Prep	Value
ABS	IPA Wipe	8.1 MPa (1170 lb/in²) [1]
Acrylic (PMMA)	IPA Wipe	8.7 MPa (1260 lb/in²) [1]
Polycarbonate (PC)	IPA Wipe	5.0 MPa (730 lb/in²) [2]
PVC	Solvent Wipe	5.1 MPa (740 lb/in²) [1]
Stainless Steel	Solvent Wipe	13.0 MPa (1180 lb/in²) [1]
Aluminum	MEK/Abrade/MEK	12.5 MPa (1820 lb/in²) [1]

[1] 25 mm by 12.7 mm (1" x 1/2"), bondline thickness: 0.07-0.25 mm (3-10 mil). Substrate size: 102mm x 25mm (1" x 4"). Separation rate 1.2 mm/min (0.05 in/min) for metal, 51 mm/min (2 in/min) for plastic, 510 mm/min (20 in/min) for rubber.

Cohesive Failure (CF), Adhesive Failure (AF), Mixed Failure (MF), Substrate Failure (SF)

[2] 25 mm by 12.7 mm (1" x 1/2"), bondline thickness: 0.07-0.25 mm (3-10 mil). Substrate size: 102mm x 25mm (1" x 4"). Separation rate 1.2 mm/min (0.05 in/min) for metal, 51 mm/min (2 in/min) for plastic, 510 mm/min (20 in/min) for rubber.
Cohesive Failure (CF), Adhesive Failure (AF), Mixed Failure (MF), Substrate Failure (SF)

Temperature: 23 °C (73 °F)
Surface Prep: Etched
Test Condition: 23 °C
Substrate: Aluminum

Attribute Name	Test Method	Dwell Time	Value
Bell Peel	ASTM D3167		6.8 N/mm (39 lb/in width) [1]
Overlap Shear Strength	ASTM D1002, ISO 4587	24 h	21.4 MPa (3110 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] 25 mm by 12.7 mm (1" x 1/2"), bondline thickness: 0.07-0.25 mm (3-10 mil). Substrate size: 102mm x 25mm (1" x 4"). Separation rate 1.2 mm/min (0.05 in/min) for metal, 51 mm/min (2 in/min) for plastic, 510 mm/min (20 in/min) for rubber.

Cohesive Failure (CF), Adhesive Failure (AF), Mixed Failure (MF), Substrate Failure (SF)

Substrate: Aluminum
Surface Prep: MEK/Abrade/MEK
Test Condition: Pendulum Impact

Attribute Name	Test Method	Value
Impact Shear Strength	ASTM D950	21.6 J [1]

[1] 21.7J Hammer

Test Condition: 10 mm/min
Test Method: ASTM D638, ISO 527
Temperature: 23 °C (73 °F)

Attribute Name	Value
Elongation	197 % [1]
Modulus	660 MPa [1]
Tensile at Break	16.1 MPa [1]

[1] Type IV dogbone

Attribute Name	Value
Additional Test notes	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: 30 min

Temperature	Test Condition	Value
-40 °C (-40 °F)	-40 °C	31.4 MPa (4560 lb/in²) (251%) [1]
49 °C (120 °F)	49 °C	5.0 MPa (730 lb/in²) (40%) [1]
82 °C (180 °F)	82 °C	1.8 MPa (260 lb/in²) (14%) [1]
200 °C (392 °F)	200 °C	0.1 MPa (20 lb/in²) (1%) [1]

[1] Performance % to control sample @RT. Samples were cured @RT for at least 24h prior to Environmental Exposure.
Overlap shear (OLS) strengths were measured on 1in wide 1/2in overlap specimens on 1in x 4in x .060in substrates.
Jaw separation 0.05 in/min. 10 mil bondline.

Overlap Shear Strength

Surface Prep: MEK / Abrade / MEK
Dwell Time: 7 d
Temperature: 23 °C (73 °F)
Test Method: ASTM D1002, ISO 4587
Substrate: Aluminum

Environmental Condition	Value
85 °C + 85 %RH: 500 hrs	6.2 MPa (900 lb/in²) (49%) [1]
Salt water (5% wt in water): 500 hrs	10.5 MPa (1530 lb/in²) (84%) [1]
Water: 500 hrs	9.9 MPa (1430 lb/in²) (79%) [1]

[1] 25 mm by 12.7 mm (1" x 1/2"), bondline thickness: 0.07-0.25 mm (3-10 mil). Substrate size: 102mm x 25mm (1" x 4"). Separation rate 1.2 mm/min (0.05 in/min) for metal, 51 mm/min (2 in/min) for plastic, 510 mm/min (20 in/min) for rubber.

Cohesive Failure (CF), Adhesive Failure (AF), Mixed Failure (MF), Substrate Failure (SF)

Electrical and Thermal Properties

Attribute Name	Value
Glass Transition Temperature (Tg)	67 °C (152 °F) [1]

[1] Measured at one week via DMA

Coefficient of Thermal Expansion

Test Condition	Value
Below Tg	130.2 µm/(m° C) [1]
Above Tg	222.9 µm/(m° C) [1]

[1] CTE determined using TMA Analyzer using a heating rate of 3 °C per minute. Second heat values given.

Attribute Name	Test Method	Test Condition	Value
Thermal Resistance	DTC 300	50 °C, 25 psi	9.10E-03m²K/W
Thermal Conductivity			0.192 W/m·K

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 16 °C (60 °F) or above to achieve highest bond strength.

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

Storage and Shelf Life

Store under normal conditions of 16° to 27 °C (60° to 80 °F) 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. Use duo-pak containers within 12 months from the date of manufacture. Bulk shelf life may vary; please consult your local 3M contact.

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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