

February, 2019

3M™ Scotch-Weld™ Urethane Adhesive DP620NS Black

Product Description

3M™ Scotch-Weld™ Urethane Adhesive DP620NS is a black, rapid setting, two-component polyurethane. It is packaged as 1:1 ratio liquids in a duo-pak cartridge. With the squeeze of the trigger, the components are automatically mixed and easily dispensed as a bubble-free non-sag paste.

Product Features

- Medium open time
- 1:1 Mix Ratio
- Bonds to a wide variety of substrates
- Easy Mixing, Non-Sag formulation
- Low Temperature Flexibility
- Low shrinkage



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	Test Condition	Notes
Base Color	Clear Yellowish		
Accelerator Color	Opaque Black		
Base Density	9.0 to 9.4 lb/gal		
Accelerator Density	9.5 to 9.9 lb/gal		
Base Viscosity	3000 to 6000 cP	Room Temperature	Brookfield CP #52 @ 50 rpm
Accelerator Viscosity	1000 to 5000 cP	Room Temperature	Brookfield CP #52 @ 50 rpm
Mix Ratio by Volume (B:A)	1:1		
Mix Ratio by Weight (B:A)	1:1		

Typical Mixed Physical Properties

Property	Values	Test Condition	Notes
Worklife, 10g mixed	20 min	@ Room Temperature, 10 g, 1/4" thick	
Time to Handling Strength	4 h	Room Temperature	Minimum time required to achieve 50 psi of overlap shear strength. Cure times are approximate and depend on adhesive temperature.

Typical Cured Characteristics

Property	Values		Method	Test Condition
Modulus	131,000 lb/in ²		ASTM D638	Room Temperature
Strain at Break	110 %		ASTM D638	Room Temperature
Temperature Range	-51 to 121 °C	-60 to 250 °F		Continuous Exposure
Color	Black			Cured
Shore D Hardness	50		ASTM D2240	Room Temperature

Typical Performance Characteristics

Bell Peel: 30 lb/in width

Conditions

Test Condition : Room Temperature

Substrate: Aluminum

Substrate Notes: 0.025in thick; 0.064in bondline

Methods

ASTM D3167

Additional Information

notes: Bell peel strengths were measured on 1 in. wide bonds at the temperatures noted. The testing jaw separation rate was 6 in. per minute. The bonds were made with 0.064 in. bonded to 0.025 in. thick adherends.

Overlap Shear Strength	Substrate	Surface Preparation	Notes
2880 lb/in ²	Aluminum	MEK/Abrade/MEK	<p>Overlap Shear strength was measured on 1" wide x 1/2" overlap specimen. These bonds were made individually using 1" x 4" pieces of substrates except for Aluminum. Two panels 0.063 in. thick, 4 in. x 7y in of 2024T-3 clad aluminum were bonded and cut into 1 in. wide samples after 24 hours.</p> <p>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, 0.125in.; plastics, 0.125 in. The separation rate of the testing jaws was 0.1 inch per minute for metals and 2 inches per minute for plastics.</p> <p>AF: adhesive failure CF: cohesive failure SF: substrate failure</p>
1700 lb/in ²	Cold Rolled Steel	MEK/Abrade/MEK	<p>Overlap Shear strength was measured on 1" wide x 1/2" overlap specimen. These bonds were made individually using 1" x 4" pieces of substrates except for Aluminum. Two panels 0.063 in. thick, 4 in. x 7y in of 2024T-3 clad aluminum were bonded and cut into 1 in. wide samples after 24 hours.</p> <p>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, 0.125in.; plastics, 0.125 in. The separation rate of the testing jaws was 0.1 inch per minute for metals and 2 inches per minute for plastics.</p> <p>AF: adhesive failure CF: cohesive failure SF: substrate failure</p>
400 lb/in ²	Acrylic (PMMA)	IPA Wipe/Abrade/IPA Wipe	<p>Overlap Shear strength was measured on 1" wide x 1/2" overlap specimen. These bonds were made individually using 1" x 4" pieces of substrates except for Aluminum. Two panels 0.063 in. thick, 4 in. x 7y in of 2024T-3 clad aluminum were bonded and cut into 1 in. wide samples after 24 hours.</p> <p>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, 0.125in.; plastics, 0.125 in. The separation rate of the testing jaws was 0.1 inch per minute for metals and 2 inches per minute for plastics.</p> <p>AF: adhesive failure CF: cohesive failure SF: substrate failure</p>

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Typical Performance Characteristics (continued)

Overlap Shear Strength	Substrate	Surface Preparation	Notes
430 lb/in ²	Polycarbonate (PC)	IPA Wipe/Abrade/IPA Wipe	Overlap Shear strength was measured on 1" wide x 1/2" overlap specimen. These bonds were made individually using 1" x 4" pieces of substrates except for Aluminum. Two panels 0.063 in. thick, 4 in. x 7y in of 2024T-3 clad aluminum were bonded and cut into 1 in. wide samples after 24 hours. 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, 0.125in.; plastics, 0.125 in. The separation rate of the testing jaws was 0.1 inch per minute for metals and 2 inches per minute for plastics. AF: adhesive failure CF: cohesive failure SF: substrate failure
630 lb/in ²	ABS	IPA Wipe/Abrade/IPA Wipe	Overlap Shear strength was measured on 1" wide x 1/2" overlap specimen. These bonds were made individually using 1" x 4" pieces of substrates except for Aluminum. Two panels 0.063 in. thick, 4 in. x 7y in of 2024T-3 clad aluminum were bonded and cut into 1 in. wide samples after 24 hours. 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, 0.125in.; plastics, 0.125 in. The separation rate of the testing jaws was 0.1 inch per minute for metals and 2 inches per minute for plastics. AF: adhesive failure CF: cohesive failure SF: substrate failure
310 lb/in ²	Polystyrene Foam	IPA Wipe/Abrade/IPA Wipe	Overlap Shear strength was measured on 1" wide x 1/2" overlap specimen. These bonds were made individually using 1" x 4" pieces of substrates except for Aluminum. Two panels 0.063 in. thick, 4 in. x 7y in of 2024T-3 clad aluminum were bonded and cut into 1 in. wide samples after 24 hours. 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, 0.125in.; plastics, 0.125 in. The separation rate of the testing jaws was 0.1 inch per minute for metals and 2 inches per minute for plastics. AF: adhesive failure CF: cohesive failure SF: substrate failure
310 lb/in ²	Nylon	IPA Wipe/Abrade/IPA Wipe	Overlap Shear strength was measured on 1" wide x 1/2" overlap specimen. These bonds were made individually using 1" x 4" pieces of substrates except for Aluminum. Two panels 0.063 in. thick, 4 in. x 7y in of 2024T-3 clad aluminum were bonded and cut into 1 in. wide samples after 24 hours. 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, 0.125in.; plastics, 0.125 in. The separation rate of the testing jaws was 0.1 inch per minute for metals and 2 inches per minute for plastics.

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Typical Performance Characteristics (continued)

Overlap Shear Strength	Substrate	Surface Preparation	Notes
700 lb/in ²	SMC	IPA Wipe/Abrade/IPA Wipe	Overlap Shear strength was measured on 1" wide x 1/2" overlap specimen. These bonds were made individually using 1" x 4" pieces of substrates except for Aluminum. Two panels 0.063 in. thick, 4 in. x 7y in of 2024T-3 clad aluminum were bonded and cut into 1 in. wide samples after 24 hours. 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, 0.125in.; plastics, 0.125 in. The separation rate of the testing jaws was 0.1 inch per minute for metals and 2 inches per minute for plastics.
480 lb/in ²	Polyvinyl chloride (PVC)	IPA Wipe/Abrade/IPA Wipe	Overlap Shear strength was measured on 1" wide x 1/2" overlap specimen. These bonds were made individually using 1" x 4" pieces of substrates except for Aluminum. Two panels 0.063 in. thick, 4 in. x 7y in of 2024T-3 clad aluminum were bonded and cut into 1 in. wide samples after 24 hours. 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, 0.125in.; plastics, 0.125 in. The separation rate of the testing jaws was 0.1 inch per minute for metals and 2 inches per minute for plastics.

Property: Overlap Shear Strength
 Method: ASTM D1002
 Dwell/Cure Time: 7 days @ Room Temperature
 Test Condition : Room Temperature
 Substrate Notes: 0.005in bondline

Overlap Shear Strength (at Temperature)	Test Condition
2800 lb/in ²	@ -40°F(-40°C)
2880 lb/in ²	Room Temperature
550 lb/in ²	15 min @ 180°F(82°C) in test chamber before test

Property: Overlap Shear Strength (at Temperature)
 Method: ASTM D1002
 Dwell/Cure Time: 7 days @ Room Temperature
 Substrate: Aluminum
 Substrate Notes: 0.005in bondline
 notes: Overlap Shear strength was measured on 1" wide x 1/2" overlap specimen. These bonds were made individually using 1" x 4" pieces of substrates except for Aluminum. Two panels 0.063 in. thick, 4 in. x 7y in of 2024T-3 clad aluminum were bonded and cut into 1 in. wide samples after 24 hours. 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, 0.125in.; plastics, 0.125 in. The separation rate of the testing jaws was 0.1 inch per minute for metals and 2 inches per minute for plastics.

Environmental Resistance (OLS)	Environmental Condition
100 %	30 days at Room Temperature
120 %	Water Vapor, 150°F(66°C) 80% RH, 30 days
60 %	Water Soak, Room Temperature, 30 days
90 %	IPA, Room Temperature, 30 days immersion

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Typical Performance Characteristics (continued)

Environmental Resistance (OLS)	Environmental Condition
80 %	Gasoline: 30 days immersion @ Room Temperature

Property: Environmental Resistance (OLS)

Method: ASTM D1002

Dwell/Cure Time: 7 days @ Room Temperature

Test Condition : Room Temperature

Substrate: Etched Aluminum

Substrate Notes: 0.005in bondline

notes: Overlap Shear strength was measured on 1" wide x 1/2" overlap specimen. These bonds were made individually using 1" x 4" pieces of substrates except for Aluminum. Two panels 0.063 in. thick, 4 in. x 7y in of 2024T-3 clad aluminum were bonded and cut into 1 in. wide samples after 24 hours. 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, 0.125in.; plastics, 0.125 in. The separation rate of the testing jaws was 0.1 inch per minute for metals and 2 inches per minute for plastics.

Handling/Application Information

Application Ideas

- Prototype building
- Bonding of dis-similar substrates
- As a combination structural adhesive and sealant in construction applications
- General bonding and sealing (structural sealing)

Directions for Use

3M™ Scotch-Weld™ Urethane Adhesive DP620NS is supplied in dual syringe plastic duo- pak cartridges as part of the 3M™ EPX™ Applicator System. The duo-pak cartridges are supplied in 48.5 ml configuration. To use the EPX cartridge system simply insert the duo-pak cartridge into the EPX applicator. 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 typical uncured properties section of this data sheet. Complete 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 uses because of their variable shot size and flow rate characteristics and are adaptable to most applications.

Apply adhesive to clean, dry surfaces, joint parts and secure until adhesive sets.

Handling/Application Information (continued)

Surface Preparation

The following surface preparations were used for substrates described in this Technical Data Sheet.

A. Aluminum Etch

Optimized FPL Etch - 3M (test method C-2803)

1. Alkaline degrease – Oakite 164 solution (9-11 oz./gallon water) at 190°F ± 10°F (88°C ± 5°C) for 10-20 minutes. Rinse immediately in large quantities of cold running water (3M test method C-2802).

2. Optimized FPL Etch Solution (1 liter):

Material Amount

Distilled Water 700 ml plus balance of liter (see below)

Sodium Dichromate 28 to 67.3 grams

Sulfuric Acid 287.9 to 310.0 grams

Aluminum Chips 1.5 grams/liter of mixed solution

To prepare 1 liter of this solution, dissolve sodium dichromate in 700 ml of distilled water. Add sulfuric acid and mix well. Add additional distilled water to fill to 1 liter.

Heat mixed solution to 66 to 71°C (150 to 160°F).

Dissolve 1.5 grams of 2024 bare aluminum chips per liter of mixed solution. Gentle agitation will help aluminum dissolve in about 24 hours.

To FPL etch panels, place them in the above solution at 150 to 160°F (66 to 71°C) for 12 to 15 minutes.

Note: Review and follow precautionary information provided by chemical suppliers prior to preparation of this etch solution.

Rinse immediately in large quantities of clear running tap water.

Dry – air dry approximately 15 minutes followed by force dry at 140°F (60°C) maximum for 10 minutes (minimum).

3. Both surface structure and chemistry play a significant role in determining the strength and permanence of bonded structures. It is therefore advisable to bond or prime freshly primed clean surfaces as soon as possible after surface preparation in order to avoid contamination and/or mechanical damage. Please contact your 3M sales representative for primer recommendations.

B. Oakite Degrease

Oakite 164 solutions (9-11 oz./gallon of water) at 190°F ± 10°F (88°C ± 5°C) for 2 minutes. Rinse immediately in large quantities of cold running water.

C. MEK/Abrade/MEK

Wipe surface with a methyl ethyl ketone (MEK) soaked swab, abrade and wipe with a MEK soaked swab.* Allow solvent to evaporate before applying adhesive.

D. Isopropyl Alcohol Wipe Only Surface Preparation

Wipe surface with an isopropyl alcohol soaked swab.* Allow solvent to evaporate before applying adhesive.

E. Isopropyl Alcohol/Abrade/Isopropyl Alcohol Surface Preparation

Wipe surface with an isopropyl alcohol soaked swab, abrade using clean fine grit abrasives, and wipe with an isopropyl alcohol soaked swab.* Then allow solvent to evaporate before applying adhesive.

*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 products at 60-80°F (15-27°C) for maximum shelf life.

These products have a shelf life of 18 months from date of manufacture in original duo-pak containers at room temperature.

Trademarks

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

References

Safety Data Sheet (SDS)

https://www.3m.com/3M/en_US/company-us/SDS-search/results/?gsaAction=msdsSRA&msdsLocale=en_US&co=ptn&q=DP620NS Black

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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