

3M™ Scotch-Weld™ Urethane Adhesive DP604NS Black

Last Revision Date: February, 2019



Product Description

3M™ Scotch-Weld™ Urethane Adhesive DP604NS 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

- Fast Setting
- Easy Mixing, Non-Sag formulation
- 1:1 Mix Ratio
- Low Temperature Flexibility

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	Additional Information
Color	Black	View 

Notes: Colors may vary from nearly white to yellow/amber. Adhesive performance is not affected by color variation.

Base Color	Clear Yellowish
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Accelerator Color	Opaque Black
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Base Density	8.3 to 8.7 lb/gal
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Accelerator Density	8.5 to 8.9 lb/gal
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Base Viscosity	800 to 2000 cP	View 
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Temp C: 23C
Temp F: 72F

Notes: Brookfield CP #3 @ 20 rpm,

Accelerator Viscosity	1500 to 3500 cP	View 
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Temp C: 23C
Temp F: 72F

Notes: Brookfield CP #3 @ 20 rpm,

Mix Ratio by Volume (B:A)	1:1
Mix Ratio by Weight (B:A)	1:1

Typical Mixed Physical Properties

Property	Values	Additional Information
Open Time	4 min	View 

Notes: Maximum time allowed after applying adhesive to one substrate before bond must be closed and fixed in place. Cure times are approximate and depend on adhesive temperature. For hotmelts: The approximate bonding range of a 1/8" bead of molten adhesive on a non-metallic surface.

Worklife, 10g mixed	4 min	View 
Temp C: 23C Temp F: 73F		
Time to Handling Strength	20 min	View 

Temp C: 23C
Temp F: 73F

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

Typical Physical Properties

Property	Values	Additional Information
Color	Black	View 
Test Name: Cured		

Typical Cured Characteristics

Property	Values	Additional Information
Modulus	6700 lb/in ²	View 

Test Method: ASTM D638

Test Condition: Room Temperature

Shore A Hardness	85	View 
Test Method: ASTM D2240		
Temp C: 23C		

Temp F: 73F

Strain at Break	420 %	View 
Test Method: ASTM D638		
Test Condition: Room Temperature		
Temperature Range	-60-250 °F (-51-121 °C)	View 
Test Condition: Continuous		
Temperature Range	-51-121 °C	View 
Test Condition: Continuous		

Typical Performance Characteristics

Property	Values	Additional Information
Long Term Temperature Resistance	121 °C	View 
Test Condition: Long Term (day, weeks)		
Minimum Long Term Temperature Resistance	-51 °C	View 
Test Condition: Long Term (day, weeks)		
Long Term Temperature Resistance	250 °F	View 
Test Condition: Long Term (day, weeks)		
Minimum Long Term Temperature Resistance	-60 °F	View 
Test Condition: Long Term (day, weeks)		
Bell Peel	33 lb/in width	View 

Test Method: ASTM D3167

Temp C: 23C

Temp F: 72F

Substrate: Etched Aluminum

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. AF: adhesive failure CF: cohesive failure SF: substrate failure

Overlap Shear Strength 7day Aluminum	650 lb/in ²	View 
Test Method: ASTM D1002		
Test Name: Overlap Shear Strength		
Dwell/Cure Time: 7		
Dwell Time Units: day		
Temp C: 23C		
Temp F: 73F		
Environmental Condition: 50%RH		
Substrate: Aluminum		
Surface Preparation: MEK/Abrade/MEK		

Notes: Overlap shear (OLS) strengths were measured on 1 in. wide 1/2 in. overlap specimens. These bonds were made individually using 1 in. x 4 in. pieces of substrate except for aluminum. Two panels 0.063 in. thick, 4 in. x 7 in. of 2024T-3 clad aluminum were bonded and cut into 1 in. wide samples after 24 hour. 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, 0.125 in.; plastics, 0.125 in. Cohesive Failure (CF), Adhesive Failure (AF), Substrate Failure (SF)

Overlap Shear Strength 7day Cold Rolled Steel

660 lb/in²View 

Test Method: ASTM D1002

Test Name: Overlap Shear Strength

Dwell/Cure Time: 7

Dwell Time Units: day

Temp C: 23C

Temp F: 73F

Environmental Condition: 50%RH

Substrate: Cold Rolled Steel

Surface Preparation: MEK/Abrade/MEK

Notes: Overlap shear (OLS) strengths were measured on 1 in. wide 1/2 in. overlap specimens. These bonds were made individually using 1 in. x 4 in. pieces of substrate except for aluminum. Two panels 0.063 in. thick, 4 in. x 7 in. of 2024T-3 clad aluminum were bonded and cut into 1 in. wide samples after 24 hour. 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, 0.125 in.; plastics, 0.125 in. Cohesive Failure (CF), Adhesive Failure (AF), Substrate Failure (SF)

Overlap Shear Strength 7day ABS

640 lb/in²View 

Test Method: ASTM D1002

Test Name: Overlap Shear Strength

Dwell/Cure Time: 7

Dwell Time Units: day

Temp C: 23C

Temp F: 73F

Environmental Condition: 50%RH

Substrate: ABS

Surface Preparation: IPA Wipe/Abrade/IPA Wipe

Notes: Overlap shear (OLS) strengths were measured on 1 in. wide 1/2 in. overlap specimens. These bonds were made individually using 1 in. x 4 in. pieces of substrate except for aluminum. Two panels 0.063 in. thick, 4 in. x 7 in. of 2024T-3 clad aluminum were bonded and cut into 1 in. wide samples after 24 hour. 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, 0.125 in.; plastics, 0.125 in. Cohesive Failure (CF), Adhesive Failure (AF), Substrate Failure (SF)

Overlap Shear Strength 7day Polyvinyl chloride (PVC)

620 lb/in²View 

Test Method: ASTM D1002

Test Name: Overlap Shear Strength

Dwell/Cure Time: 7

Dwell Time Units: day

Temp C: 23C

Temp F: 73F

Environmental Condition: 50%RH

Substrate: Polyvinyl chloride (PVC)

Surface Preparation: IPA Wipe/Abrade/IPA Wipe

Notes: Overlap shear (OLS) strengths were measured on 1 in. wide 1/2 in. overlap specimens. These bonds were made individually using 1 in. x 4 in. pieces of substrate except for aluminum. Two panels 0.063 in. thick, 4 in. x 7 in. of 2024T-3 clad aluminum were bonded and cut into 1 in. wide samples after 24 hour. 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, 0.125 in.; plastics, 0.125 in. Cohesive Failure (CF), Adhesive Failure (AF), Substrate Failure (SF)

Overlap Shear Strength 7day Polycarbonate (PC)

720 lb/in²View 

Test Method: ASTM D1002

Test Name: Overlap Shear Strength

Dwell/Cure Time: 7

Dwell Time Units: day

Temp C: 23C

Temp F: 73F

Environmental Condition: 50%RH

Substrate: Polycarbonate (PC)

Surface Preparation: IPA Wipe/Abrade/IPA Wipe

Notes: Overlap shear (OLS) strengths were measured on 1 in. wide 1/2 in. overlap specimens. These bonds were made individually using 1 in. x 4 in. pieces of substrate except for aluminum. Two panels 0.063 in. thick, 4 in. x 7 in. of 2024T-3 clad aluminum were bonded and cut into 1 in. wide samples after 24 hour. 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, 0.125 in.; plastics, 0.125 in. Cohesive Failure (CF), Adhesive Failure (AF), Substrate Failure (SF)

Overlap Shear Strength 7day Acrylic (PMMA)	700 lb/in ²	View 
<p>Test Method: ASTM D1002</p> <p>Test Name: Overlap Shear Strength Dwell/Cure Time: 7 Dwell Time Units: day Temp C: 23C Temp F: 73F Environmental Condition: 50%RH Substrate: Acrylic (PMMA)</p> <p>Notes: Overlap shear (OLS) strengths were measured on 1 in. wide 1/2 in. overlap specimens. These bonds were made individually using 1 in. x 4 in. pieces of substrate except for aluminum. Two panels 0.063 in. thick, 4 in. x 7 in. of 2024T-3 clad aluminum were bonded and cut into 1 in. wide samples after 24 hour. 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, 0.125 in.; plastics, 0.125 in. Cohesive Failure (CF), Adhesive Failure (AF), Substrate Failure (SF)</p>		

Overlap Shear Strength 7day Fiber-Reinforced Plastic	640 lb/in ²	View 
<p>Test Method: ASTM D1002</p> <p>Test Name: Overlap Shear Strength Dwell/Cure Time: 7 Dwell Time Units: day Temp C: 23C Temp F: 73F Environmental Condition: 50%RH Substrate: Fiber-Reinforced Plastic Surface Preparation: IPA Wipe/Abrade/IPA Wipe</p> <p>Notes: Overlap shear (OLS) strengths were measured on 1 in. wide 1/2 in. overlap specimens. These bonds were made individually using 1 in. x 4 in. pieces of substrate except for aluminum. Two panels 0.063 in. thick, 4 in. x 7 in. of 2024T-3 clad aluminum were bonded and cut into 1 in. wide samples after 24 hour. 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, 0.125 in.; plastics, 0.125 in. Cohesive Failure (CF), Adhesive Failure (AF), Substrate Failure (SF)</p>		

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.

Handling/Application Information

Application Examples

- Building & Construction Maintenance & Repair
- Manufacturing & Assembly
- Bonds wood or metal door sills to concrete and seals permanently
- Bonds wood and metal door frames to wood or metal structure
- Bonds wood paneling to wood or plaster
- As a combination structural adhesive and sealant in construction applications
- Bonding of aluminum shades to glass
- Damming material against corrosion
- Sealing fabric water hoses
- General bonding and sealing (structural sealing)

Directions for Use

3M™ Scotch-Weld™ Urethane Adhesive DP604NS 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 and 400 ml configurations. 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.

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.

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

D. Isopropyl Alcohol Wipe Only Surface Preparation

Wipe surface with an isopropyl alcohol soaked swab.* 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.

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.

References

Property	Values
3m.com Product Page	https://www.3m.com/3M/en_US/company-us/all-3m-products/~//3M-Scotch-Weld-Urethane-Adhesive-DP604NS/?N=5002385+3293242471&rt=rud
Safety Data Sheet SDS	https://www.3m.com/3M/en_US/company-us/SDS-search/results/?gsaAction=msdsSRA&msdsLocale=en_US&co=ptn&q=DP604NS 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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