Technical data sheet

Product:	DP604NS
Manufacturer:	3M DEUTSCHLAND GMBH
Product group:	KLEBSTOFF
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3M™ SCOTCH-WELD™ DP604NS

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Scotch-Weld™
Urethane Adhesive DP604NS, Black

Technical Data Sheet Dezember 2023

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.

Features

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

Suggested Applications:

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)

Note: The data in this sheet were generated using the 3M™ EPX Applicator System equipped with an EXP static mixer, according to manufacturer's directions. Thorough hand-mixing will afford comparable results.

Typical Uncured Physical Properties

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

Property	Condition	DP604NS, Black
Appearance	Part B Part A	Clear Yellowish Opaque Black
Mix Ratio (B:A)	By volume By weight	1:1 1:1
Viscosity[1], centipoise	Part B Part A	800 - 2000 cP 1500 - 3500 cP
Density, lb/gal	Part B Part A	8.3-8.7 8.5-8.9
Work Life @ 23°C (73°F)	10 g, 1/4" thick, @ 25°C (77°F)	4 minutes

[1]Brookfield CP #3 @ 20 rpm, 24°C (75°F)

Typical Cured Physical Properties

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

Property	Condition	DP604NS, Black
Appearance	Cured	Black
Time to Handling Strength	50 PSI Overlap shear strength	20 minutes
Hardness After Cure		85 Shore A
Elastic Modulus (ASTM D638)	24°C (75°F)	6700 psi
Strain at Break (ASTM D638)	24°C (75°F)	420%
Temperature Range	Continuous Exposure	-51°C (-60°F) to 121°C (250°F)

Typical Adhesive Performance Characteristics

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

Aluminum, Overlap Shear, at Temperature (PSI) (ASTM D1002)

Temperature	DP604NS, Black
-40°C (-40°F)	1340
23°C (73°F)	650
82°C (180°F) (15 min.)[1]	340

[1]Represents time in test chamber oven before test.

Overlap Shear, Tested @ 23°C (73°F) (PSI) (ASTM D1002)

Product		DP604NS, Black
Aluminum	MEK/abrade/MEK	650
Cold Rolled Steel	MEK/abrade/MEK	660
Nylon	IPA/abrade/IPA	470
Polycarbonate	IPA/abrade/IPA	720
Acrylic	IPA/abrade/IPA	700
SMC	IPA/abrade/IPA	640
Rigid PVC	IPA/abrade/IPA	620
ABS	IPA/abrade/IPA	640
HIPS	IPA/abrade/IPA	550

Aluminum (etched) , Floating Roller peel, Tested @ 23°C (73°F) (PIW) (ASTM D3167)

Temperature	DP604NS, Black
23°C (73°F)	33

Typical Adhesive Performance Characteristics *(continued)*

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

Environmental Resistance, Aluminum (etched)
Measured by Overlap Shear Tested @ 23°C (73°F) (PSI) (ASTM D1002)

Environment	Condition	DP604NS, Black
Room Temperature	23°C (73°F)/50% RH, 30 days	100%
Water Vapour	66°C (150°F)/ 80% RH, 30 days	120%
IPA	23°C (73°F) 30 days; tested on ABS	90%

Substrates and Testing

A. Overlap Shear (ASTM D1002)

Overlap Shear (ASTM D-1002-64, 3M Test Method C-236) 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 thickness of the adhesive bond line was approximately 0.005". All strengths were measured at 23°C (73°F) except when noted.

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. and samples were allowed to cure at 24°C (75°F) and approximately 50% RH for 1 week before tested. The separation rate of the testing jaws was 0.1 inch per minute for metals and 2 inches per minute for plastics.

B. Floating Roller Peel (Bell Peel) (ASTM D3167)

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.

C. Cure Cycle

All bonds were cured 7 days at 23°C (73°F) at 50% RH before testing or subjected to further conditioning or environmental aging.

Handling and Application Information

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 50 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 88°C ± 5°C (190°F ± 10°F) for 10-20 minutes. Rinse immediately in large quantities of cold running water (3M test method C-2802).
2. Optimized FPL Etch Solution (1 litre):

Material	**Amount**
Distilled Water	700 ml plus balance of litre (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 litre 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 litre. Heat mixed solution to 66 to 71°C (150 to 160°F).

Dissolve1.5 grams of 2024 bare aluminum chips per litre of mixed solution. Gentle agitation will help aluminum dissolve in about 24 hours.

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

Surface Preparation ***(Continued)***

Dry – air dry approximately 15 minutes followed by force dry at 60°C (140°F) 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 88°C ± 5°C (190°F ± 10°F) 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.

3M™ Scotch-Weld™
Urethane Adhesive
DP604NS, Black

Storage	Store products at 15-27°C (60-80°F) for maximum shelf life.
Shelf Life	These products have a shelf life of 12 months from date of manufacture in original duo-pak containers at room temperature.
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ISO 9001

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