

April, 2016

3M™ Scotch-Weld™ Urethane Adhesive DP605NS Off White

Product Description

3M™ Scotch-Weld™ Urethane Adhesive DP605 NS Off-White is a two-part, non-sag urethane adhesive. It provides tough, flexible bonds with good adhesion to a wide variety of substrates, especially wood and many properly abraded and cleaned plastics. Good adhesion can also be obtained on painted metals and ceramics and glass. For maximum bond durability under moisture conditions, priming of glass is required.

Product Features

- Tough, flexible bonds
- Non-Sag/Thixotropic
- 1:1 Mix Ratio
- 5 minute worklife
- Bonds wood and many plastics
- Low Halogen Content



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	White		
Accelerator Color	Tan		
Base Density	8.8 to 9.2 lb/gal		
Accelerator Density	9.7 to 10.2 lb/gal		
Base Viscosity	11 to 20 s	Room Temperature	(Approx.) time to deliver 20 gms @ 20 psi through a .104" orifice
Accelerator Viscosity	11 to 20 s	Room Temperature	(Approx.) time to deliver 20 gms @ 20 psi through a .104" orifice
Mix Ratio by Volume (B:A)	1:1		
Mix Ratio by Weight (B:A)	1:1		

Typical Mixed Physical Properties

Property	Values	Test Condition	Method	Substrate	Notes
Worklife, 10g mixed	5 min	@ Room Temperature, 10 g, 1/4" thick			
Time to Handling Strength	15 to 20 min	Room Temperature	3M C3179	Aluminum	Time to handling strength taken to be that required to achieve a 50 psi overlap shear (OLS) strength using aluminum substrates.
Time to Full Cure	48 h	Room Temperature			The cure time is defined as that time required for the adhesive to achieve a minimum of 80% of the ultimate strength as measured by aluminum-aluminum OLS.

Typical Cured Characteristics

Property	Values	Test Condition	Notes	Method
Color	Off-White	Cured		
Total Chlorine	670 ppm		Halogen content measured using ion chromatography; "low halogen" defined by International Electrotechnical Commission (IEC) Standard 61249-2-21 as having less than 900 ppm chlorine, less than 900 ppm bromine, and less than 1,500 ppm total halogens.	
Total Bromine	<10 ppm		Halogen content measured using ion chromatography; "low halogen" defined by International Electrotechnical Commission (IEC) Standard 61249-2-21 as having less than 900 ppm chlorine, less than 900 ppm bromine, and less than 1,500 ppm total halogens.	
Total Halogens	<800 ppm		Halogen content measured using ion chromatography; "low halogen" defined by International Electrotechnical Commission (IEC) Standard 61249-2-21 as having less than 900 ppm chlorine, less than 900 ppm bromine, and less than 1,500 ppm total halogens.	
Shore D Hardness	60 to 65	Room Temperature		ASTM D2240
Weight Loss by Thermal Gravimetric Analysis (TGA)	5 %	572°F(300°C)	Weight loss by Thermal Gravimetric Analysis reported as that temperature at which 5% weight loss occurs by TGA in air at 5°C (41°F) rise per minute.	ASTM E1131

Typical Performance Characteristics

Property	Values	Method	Test Condition	Substrate	Substrate Notes	Notes
Elongation	100 %	ASTM D882				

Table continued on next page

Typical Performance Characteristics (continued)

Property	Values	Method	Test Condition	Substrate	Substrate Notes	Notes
Bell Peel	33 lb/in width	ASTM D3167	Room Temperature	Aluminum	0.025in thick; 0.064in bondline	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
650 lb/in ²	Aluminum	MEK/Abrade/MEK	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
660 lb/in ²	Cold Rolled Steel	MEK/Abrade/MEK	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
700 lb/in ²	Acrylic (PMMA)	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

Table continued on next page

Typical Performance Characteristics (continued)

Overlap Shear Strength	Substrate	Surface Preparation	Notes
720 lb/in ²	Polycarbonate (PC)	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. AF: adhesive failure CF: cohesive failure SF: substrate failure</p>
640 lb/in ²	ABS	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. AF: adhesive failure CF: cohesive failure SF: substrate failure</p>
550 lb/in ²	Polystyrene Foam	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. AF: adhesive failure CF: cohesive failure SF: substrate failure</p>

Table continued on next page

Typical Performance Characteristics (continued)

Overlap Shear Strength	Substrate	Surface Preparation	Notes
470 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.
640 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.
620 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
1340 lb/in ²	@ -67°F(-55°C)
650 lb/in ²	Room Temperature

Table continued on next page

Typical Performance Characteristics (continued)

Overlap Shear Strength (at Temperature)	Test Condition
340 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
85 %	Water Vapor, 150°F(66°C) 80% RH, 30 days
65 %	Water Soak, Room Temperature, 30 days
95 %	IPA, Room Temperature, 30 days immersion

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.

Electrical and Thermal Properties

Property	Values	Notes	Method	Test Condition
Glass Transition Temperature (Tg) by DSC	41 °C	Glass transition temperature (Tg) determined using Perkin Elmer (DSC) Analyzer with a heating rate of 20°C (68°F) per minute. Second heat values given.		
Dielectric Constant	3.1		ASTM D150	1 KHz, Room Temperature
Dissipation Factor	0.021		ASTM D150	1 KHz, Room Temperature
Dielectric Strength	640 V/mil		ASTM D149	Room Temperature
Thermal Conductivity	0.101 (btu-ft)/(h-ft ² -°F)	Thermal conductivity determined using C-matic Instrument with 2 in. diameter samples.	C177	113°F(45°C)

Table continued on next page

Electrical and Thermal Properties (continued)

Property	Values	Notes	Method	Test Condition
Volume Resistivity	$1.0 \times 10^{14} \Omega\text{-cm}$		ASTM D257	Room Temperature
Coefficient of Thermal Expansion	$121 \times 10^{-6} \text{ m/m/}^\circ\text{C}$	TCE determined with TMA Analyzer using a heating rate of 50°F (10°C) per minute. Second heat values given.		below 41°C
Coefficient of Thermal Expansion	$219 \times 10^{-6} \text{ m/m/}^\circ\text{C}$	TCE determined with TMA Analyzer using a heating rate of 50°F (10°C) per minute. Second heat values given.		above 41°C

Handling/Application Information**Directions for Use**

3M™ Scotch-Weld™ Urethane Adhesive DP605NS 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 200 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.

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.

*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.

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

1. 3m.com Product Page
Url: http://www.3m.com/3M/en_US/company-us/all-3m-products/~//3M-Scotch-Weld-Urethane-Adhesive-DP605NS?N=5002385+3293242126&rt=rud
2. Safety Data Sheet
Url: https://www.3m.com/3M/en_US/company-us/SDS-search/results/?gsaAction=msdsSRA&msdsLocale=en_US&co=ptn&q=DP605NS Off White

ISO Statement

This Industrial Adhesives and Tapes Division product was manufactured under a 3M quality system registered to ISO 9001 standards.

Technical Information

The technical information, guidance, and other statements contained in this document or otherwise provided by 3M are based upon records, tests, or experience that 3M believes to be reliable, but the accuracy, completeness, and representative nature of such information is not guaranteed. Such information is intended for people with knowledge and technical skills sufficient to assess and apply their own informed judgment to the information. No license under any 3M or third party intellectual property rights is granted or implied with this information.

Product Selection and Use

Many factors beyond 3M's control and uniquely within user's knowledge and control can affect the use and performance of a 3M product in a particular application. As a result, customer is solely responsible for evaluating the product and determining whether it is appropriate and suitable for customer's application, including conducting a workplace hazard assessment and reviewing all applicable regulations and standards (e.g., OSHA, ANSI, etc.). Failure to properly evaluate, select, and use a 3M product and appropriate safety products, or to meet all applicable safety regulations, may result in injury, sickness, death, and/or harm to property.

Warranty, Limited Remedy, and Disclaimer

Unless a different warranty is specifically stated on the applicable 3M product packaging or product literature (in which case such warranty governs), 3M warrants that each 3M product meets the applicable 3M product specification at the time 3M ships the product. 3M MAKES NO OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR ARISING OUT OF A COURSE OF DEALING, CUSTOM, OR USAGE OF TRADE. If a 3M product does not conform to this warranty, then the sole and exclusive remedy is, at 3M's option, replacement of the 3M product or refund of the purchase price.

Limitation of Liability

Except for the limited remedy stated above, and except to the extent prohibited by law, 3M will not be liable for any loss or damage arising from or related to the 3M product, whether direct, indirect, special, incidental, or consequential (including, but not limited to, lost profits or business opportunity), regardless of the legal or equitable theory asserted, including, but not limited to, warranty, contract, negligence, or strict liability.

