Scotch-Weld™
Urethane Adhesive
DP640 Brown

Technical Data Sheet January 2017

Product Description

3M™ Scotch-Weld™ Urethane Adhesive DP640 Brown is a two-part, non-sag urethane adhesives. 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.

Note: This product is sold in bulk as 3M™ Scotch-Weld™ Urethane Adhesive 3549 Brown.

Features

- Tough, flexible bonds
- Non-Sag/Thixotropic
- 40 minute worklife
- Bonds wood and many plastics

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

Property	Condition	3M™ Scotch-Weld™ DP640
Appearance	Part B Part A	Pink/Purple Tan
Mix Ratio (B:A)	By volume By weight	1:1 1:1
Viscosity[1]	Part B Part A	10,000-40,000 15,000-55,000
Density	Part B Part A	10.0 – 10.5 11.1 – 11.5
Work Life @ 73°F (23°C)	10 g, 1/4" thick	40 minutes

[1]Viscosity measured using Brookfield RVF, spindle #6, 10 RPM @ 80°F (27°C)

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 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	DP640 Brown
Appearance	Brown
Shore A Hardness (ASTM D 2240)	70 – 80
Time to Handling Strength[1]	6 – 8 hrs @ 23°C (73°F)
Cure Time[2]	7 days @ 23°C (73°F)
Elongation[3]	100%
Electrical	
Dielectric Constant (ASTM D 150)	5.9 @ 1 KHz @ 23°C
Dissipation Factor (ASTM D 150)	0.12 @ 1 KHz @ 23°C
Dielectric Strength (ASTM D 149)	470 volts/mil
Volume Resistivity (ASTM D 257)	2.6 x 10^{14} ohm-cm

1. Handling strength determined per 3M test method C-3179. Time to handling strength taken to be that time required to achieve 50 psi OLS strength using aluminum substrates.
2. 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.
3. Elongation is determined using 3M test method C-3094/ASTM D 882.

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	DP640 Brown
-40°F (-40°C)	3300
73°F (23°C)	2160
180°F (82°C) (15 min.)[1]	450

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

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

Typical Adhesive Performance Characteristics *(continued)*

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

Product		DP640 Brown
Aluminum	MEK/abrade/MEK	2160
Cold Rolled Steel	MEK/abrade/MEK	1960
Nylon	IPA/abrade/IPA	740
Polycarbonate	IPA/abrade/IPA	1210
Acrylic	IPA/abrade/IPA	1150
SMC	IPA/abrade/IPA	900
Rigid PVC	IPA/abrade/IPA	1180
ABS	IPA/abrade/IPA	1160
HIPS	IPA/abrade/IPA	460

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

Temperature	DP640 Brown
73°F (23°C)	64

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

Environment	Condition	DP640 Brown
Room Temperature	73°F(23°C)/50% RH, 30 days	100%
Water Vapor	150°F (66°C)/ 80% RH, 30 days	90%
IPA	73°F(23°C, 30 days, tested on ABS	100%

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 73°F (23°C) 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 75°F (24°C) 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 73°F (23°C) 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 DP640 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, 200 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).

Dissolve1.5 grams of 2024 bare aluminum chips per liter of mixed solution. Gentleagitation 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.

Surface Preparation ***(Continued)***

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.

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Storage

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

Shelf Life

These products have a shelf life of 12 months in original duo-pak containers at room temperature.

Technical Information

The technical information, recommendations and other statements contained in this document are based upon tests or experience that 3M believes are reliable, but the accuracy or completeness of such information is not guaranteed.

Product 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. Given the variety of factors that can affect the use and performance of a 3M product, user is solely responsible for evaluating the 3M product and determining whether it is fit for a particular purpose and suitable for user's method of application.

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ISO 9001:2008

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