



Technical Data Sheet

3M™ Scotch-Weld™ Epoxy Adhesive DP420NS Black

Product Description

3M™ Scotch-Weld™ Epoxy Adhesives are high performance, two-part epoxy adhesives offering outstanding shear and peel adhesion, and very high levels of durability.

Product Features

- High shear strength
- High peel strength
- Outstanding environmental performance
- Easy mixing
- 20 minute worklife
- Controlled flow
- Recognized as meeting UL 94 HB

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

| Attribute Name | Value |
|---------------------------|--------------------|
| Color | Black ¹ |
| Mix Ratio by Volume (B:A) | 2:1 |
| Mix Ratio by Weight (B:A) | 2:0.97 |

¹ Colors may vary from nearly white to yellow/amber. Adhesive performance is not affected by color variation.

| Attribute Name | Temperature | Value |
|------------------------|-------------|---------------------------------|
| Base Color | | Black |
| Accelerator Color | | Amber |
| Base Resin | | Epoxy |
| Accelerator Resin | | Amine |
| Base Net Weight | | 1.13 — 1.17 g/cm ³ |
| Accelerator Net Weight | | 1.09 — 1.14 g/cm ³ |
| Base Viscosity | 23 °C | 190000 — 270000 cP ¹ |
| Accelerator Viscosity | 23 °C | 60000 — 130000 cP ¹ |

¹ Viscosity measured using cone-and-plate viscometer; reported viscosity at 4 sec⁻¹ shear rate.

Typical Mixed Physical Properties

| Attribute Name | Temperature | Value |
|---------------------|-------------|----------------------|
| Open Time | | 20 min ¹ |
| Set Time (min) | 23 °C | 120 min ² |
| Worklife, 5g mixed | 23 °C | 30 min |
| Worklife, 10g mixed | 23 °C | 20 min |
| Worklife, 20g mixed | 23 °C | 15 min |

¹ Max time allowed after applying adhesive to a substrate before bond must be closed and fixed. Cure times approximate and depend on adhesive temperature. Hotmelts: The approx. bonding range of a 3.2 mm (1/8 in) bead of molten adhesive on a non-metallic

surface.

² Minimum time required to achieve 0.3 MPa (50 psi) of overlap shear strength. Cure times are approximate and depend on adhesive temperature.

Typical Physical Properties

| Attribute Name | Value |
|----------------|-------|
| Cured Color | Black |

Typical Cured Characteristics

Temperature: 23 °C

| Attribute Name | Test Method | Value |
|------------------|-------------|-------|
| Shore D Hardness | ASTM D2240 | 85 |

Typical Performance Characteristics

Overlap Shear Strength

Temperature: 23 °C

Dwell Time: 7 d

Test Method: ASTM D1002, ISO 4587

| Substrate | Surface Prep | Value |
|--------------------------|--------------------------|----------------------|
| Aluminum | MEK/Abrade/MEK | 24 MPa ¹ |
| Cold Rolled Steel | MEK/Abrade/MEK | 17 MPa ¹ |
| Stainless Steel | MEK/Abrade/MEK | 27 MPa ¹ |
| Copper | MEK/Abrade/MEK | 21 MPa ¹ |
| Brass | MEK/Abrade/MEK | 24 MPa ¹ |
| ABS | IPA Wipe/Abrade/IPA Wipe | 6 MPa ¹ |
| Polycarbonate (PC) | IPA Wipe/Abrade/IPA Wipe | 3.2 MPa ¹ |
| Acrylic (PMMA) | IPA Wipe/Abrade/IPA Wipe | NT MPa ¹ |
| Fiber-Reinforced Plastic | IPA Wipe/Abrade/IPA Wipe | 26 MPa ¹ |
| Polyvinyl chloride (PVC) | IPA Wipe/Abrade/IPA Wipe | NT MPa ¹ |

¹ 25 mm (1") wide, 12.7 mm (1/2") overlap samples, 25 mm (1") x 102 mm (4") substrates, bondline thickness: 0.13-0.20 mm (5-8 mil)
Separation rate 2.5 mm/min (0.1 in/min) metal, 51 mm/min (2 in/min) plastic, 510 mm/min (20 in/min) rubber.
Substrate thickness: steel 1.5 mm (60 mil), other metal 1.3-1.6 mm (50-64 mil), rubber and plastic 3.2 mm (125 mil)
Cohesive Failure (CF), Adhesive Failure (AF), Mixed Failure (MF), Substrate Failure (SF)

Bell Peel

Substrate: Aluminum

Test Method: ASTM D3167

| Temperature | Value |
|-------------|-----------------------|
| -55 °C | NT N/cm ¹ |
| 23 °C | 102 N/cm ¹ |
| 82 °C | NT N/cm ¹ |

¹ 12.7 mm (0.5 in) wide bonds. Jaw separation 15 cm/min (6 in/min). 0.64 mm (0.025 in) thick substrate. 1.6 mm (0.064 in) bondline

Handling/Application Information

Directions for Use

3M™ Scotch-Weld™ Epoxy Adhesive DP420 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 (see rate of strength build up).

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.

3. Rinse immediately in large quantities of clear running tap water.

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

5. 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.

Industry Specifications

UL 94 HB

Storage and Shelf Life

Store under normal conditions of 16° to 27°C (60° to 80°F) and 40 to 60% relative humidity in the original packaging, out of direct sunlight. For best performance, use this product within 24 months from date of manufacture.

Precautionary Information

Refer to Product Label and Material Safety Data Sheet for health and safety information before using this product. For additional health and safety information, call 1-800-364-3577

Automotive Disclaimer

Select Automotive Applications:

This product is an industrial product and has not been designed or tested for use in certain automotive applications, such as automotive electric powertrain battery or high voltage applications, which may require the product to be manufactured in a IATF certified facility, meet a Ppk of 1.33 for all properties, undergo an automotive production part approval process (PPAP), or fully adhere to automotive design or quality system requirements (e.g., IATF 16949 or VDA 6.3). Customer assumes all responsibility and risk if customer chooses to use this product in these applications.

Information

Precautionary Information: Refer to product label and Material Safety Data Sheet for health and safety information before using the product. For information, please contact your local 3M Office. You can click or scan QR code to see contact detail or visit www.3M.com Important Information: All statements, technical information and recommendations contained in this document are based upon tests or experience that 3M believes are reliable. However, many factors beyond 3M's control can affect the use and performance of a 3M product in a particular application, including the conditions under which the product is used and the time and environmental conditions in which the product is expected to perform. Since these factors are uniquely within the user's knowledge and control, it is essential that the user evaluate the 3M product to determine whether it is fit for a particular purpose and suitable for the user's method or application. All questions of liability relating to this product are governed by the terms of the sale subject, where applicable, to the prevailing law. Values presented have been determined by standard test methods and are average values not to be used for specification purposes. Our recommendations on the use of our products are based on tests believed to be reliable but we would ask that you conduct your own tests to determine their suitability for your applications. This is because 3M cannot accept any responsibility or liability direct or consequential for loss or damage caused as a result of our recommendations.

ISO Statement

This product was manufactured under a 3M quality system registered to ISO 9001 standards.

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