

Technical Data Sheet

3M™ Scotch-Weld™ Epoxy Adhesive DP420 Off White

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
- Recognized as meeting UL 94 HB – Underwriters Laboratory Horizontal Burn Flammability Test

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	Off-White	View 

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

Base Color	White
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Accelerator Color	Amber
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Base Viscosity	20000 to 50000 cP	View 
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Notes: Viscosity measured using cone-and-plate viscometer; reported viscosity at 4 sec⁻¹ shear rate.

Accelerator Viscosity	8000 to 14000 cP	View 
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Notes: Viscosity measured using cone-and-plate viscometer; reported viscosity at 4 sec⁻¹ shear rate.

Base Resin	Epoxy
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Accelerator Resin	Amine
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Base Net Weight	9.3 to 9.7 lb/gal
Accelerator Net Weight	9.0 to 9.4 lb/gal
Mix Ratio by Volume (B:A)	2:1
Mix Ratio by Weight (B:A)	2:0.97

Typical Mixed Physical Properties

Property	Values	Additional Information
Open Time	20 min	View 
Notes: POR=Pop Off Rubber		
Worklife, 20g mixed	15 min	View 
Temp C: 23C Temp F: 73F		
Worklife, 10g mixed	20 min	View 
Temp C: 23C Temp F: 73F		
Worklife, 5g mixed	30 min	View 
Temp C: 23C Temp F: 73F		
Time to Full Cure	2 hr	View 
Temp C: 23C Temp F: 73F		
Notes: 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 Physical Properties

Property	Values	Additional Information
Color	Off-white	View 
Test Name: Cured		


Typical Cured Characteristics

Property	Values	Additional Information
Shore D Hardness	77 (85)	View 

Test Method: ASTM D2240

Temp C: 23C
Temp F: 73F


Typical Performance Characteristics

Property	Values	Additional Information
Overlap Shear Strength 7day Aluminum	3500 lb/in ²	View 

Test Method: ASTM D1002

Test Name: Overlap Shear Strength
Dwell/Cure Time: 7.0
Dwell Time Units: day
Temp C: 23C
Temp F: 73F
Environmental Condition: 50%RH
Substrate: Aluminum
Surface Preparation: MEK/Abrade/MEK

Notes: 1in wide 1/2in overlap specimens. 2 panels of 0.05-0.064in x 4in x 7in 2024T-3 clad aluminum bonded and cut to 1in wide samples after 24hr. Jaw separation 0.1 in/min, 0.005-0.008in bondline. Cohesive (CF), Adhesive (AF), and Substrate (SF) Failure

Overlap Shear Strength 7day Cold Rolled Steel	2700 lb/in ²	View 
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Test Method: ASTM D1002

Test Name: Overlap Shear Strength
Dwell/Cure Time: 7.0
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 1in wide 1/2in overlap specimens on 1in x 4in x .060in substrates. Jaw separation 0.1 in/min. 0.005-0.008in bondline. Cohesive (CF), Adhesive(AF), and Substrate(SF) Failure

Overlap Shear Strength 7day Copper	4000 lb/in ²	View 
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Test Method: ASTM D1002

Test Name: Overlap Shear Strength
Dwell/Cure Time: 7.0
Dwell Time Units: day
Temp C: 23C
Temp F: 73F
Environmental Condition: 50%RH
Substrate: Copper
Surface Preparation: MEK/Abrade/MEK

Notes: Overlap shear (OLS) strengths were measured on 1in wide 1/2in overlap specimens on 1in x 4in x 0.05-0.060in substrates. Jaw separation 0.1 in/min. 0.005-0.008in bondline. Cohesive (CF), Adhesive(AF), and Substrate(SF) Failure

Overlap Shear Strength 7day Brass	4100 lb/in ²	View 
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Test Method: ASTM D1002

Test Name: Overlap Shear Strength
Dwell/Cure Time: 7.0
Dwell Time Units: day
Temp C: 23C
Temp F: 73F

Environmental Condition: 50%RH
Substrate: Brass
Surface Preparation: MEK/Abrade/MEK

Notes: Overlap shear (OLS) strengths were measured on 1in wide 1/2in overlap specimens on 1in x 4in x 0.05-0.060in substrates. Jaw separation 0.1 in/min. 0.005-0.008in bondline. Cohesive (CF), Adhesive(AF), and Substrate(SF) Failure

Overlap Shear Strength 7day Stainless Steel

1700 lb/in²

[View](#) 

Test Method: ASTM D1002

Test Name: Overlap Shear Strength

Dwell/Cure Time: 7.0

Dwell Time Units: day

Temp C: 23C

Temp F: 73F

Environmental Condition: 50%RH

Substrate: Stainless 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" x 4" x 0.060" substrate Jaw Separation 0.1in/min Cohesive Failure (CF), Adhesive Failure (AF), Substrate Failure (SF)

Overlap Shear Strength 7day ABS

320 lb/in²

[View](#) 

Test Method: ASTM D1002

Test Name: Overlap Shear Strength

Dwell/Cure Time: 7.0

Dwell Time Units: day

Temp C: 23C

Temp F: 73F

Environmental Condition: 50%RH

Substrate: ABS

Surface Preparation: IPA Wipe

Notes: Overlap shear (OLS) strengths were measured on 1 in. wide 1/2 in. overlap specimens. Bonds made with 1 in x 4 in x 0.125in pieces of substrate with a 0.005-0.008in bondline. Jaw Separation 2in/min Cohesive (CF), Adhesive (AF), Substrate (SF) Failure

Overlap Shear Strength 7day ABS

500 lb/in²

[View](#) 

Test Method: ASTM D1002

Test Name: Overlap Shear Strength

Dwell/Cure Time: 7.0

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. Bonds made with 1 in x 4 in x 0.125in pieces of substrate with a 0.005-0.008in bondline. Jaw Separation 2in/min Cohesive (CF), Adhesive (AF), Substrate (SF) Failure

Overlap Shear Strength 7day Polyvinyl chloride (PVC)

220 lb/in²

[View](#) 

Test Method: ASTM D1002

Test Name: Overlap Shear Strength

Dwell/Cure Time: 7.0

Dwell Time Units: day

Temp C: 23C

Temp F: 73F

Environmental Condition: 50%RH

Substrate: Polyvinyl chloride (PVC)

Surface Preparation: IPA Wipe

Notes: Overlap shear (OLS) strengths were measured on 1 in. wide 1/2 in. overlap specimens. 1" x 4" x 0.125" substrate Jaw separation 2 in/min; 0.005-0.008in bondline. Cohesive Failure (CF), Adhesive Failure (AF), Substrate Failure (SF)

Overlap Shear Strength 7day Polyvinyl chloride (PVC)


300 lb/in²

[View](#) 

Test Method: ASTM D1002

Test Name: Overlap Shear Strength
Dwell/Cure Time: 7.0
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. 1" x 4" x 0.125" substrate Jaw separation 2 in/min; 0.005-0.008in bondline. Cohesive Failure (CF), Adhesive Failure (AF), Substrate Failure (SF)

Overlap Shear Strength 7day Polycarbonate (PC) 400 lb/in² View 

Test Method: ASTM D1002

Test Name: Overlap Shear Strength
Dwell/Cure Time: 7.0
Dwell Time Units: day
Temp C: 23C
Temp F: 73F
Environmental Condition: 50%RH
Substrate: Polycarbonate (PC)
Surface Preparation: IPA Wipe


Notes: Overlap shear (OLS) strengths were measured on 1 in. wide 1/2 in. overlap specimens. 1" x 4" x 0.125" substrate Jaw separation 2 in/min; 0.005-0.008in bondline. Cohesive Failure (CF), Adhesive Failure (AF), Substrate Failure (SF)

Overlap Shear Strength 7day Polycarbonate (PC) 550 lb/in² View 

Test Method: ASTM D1002

Test Name: Overlap Shear Strength
Dwell/Cure Time: 7.0
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. 1" x 4" x 0.125" substrate Jaw separation 2 in/min; 0.005-0.008in bondline. Cohesive Failure (CF), Adhesive Failure (AF), Substrate Failure (SF)

Overlap Shear Strength 7day Acrylic (PMMA) 230 lb/in² View 

Test Method: ASTM D1002

Test Name: Overlap Shear Strength
Dwell/Cure Time: 7.0
Dwell Time Units: day
Temp C: 23C
Temp F: 73F
Environmental Condition: 50%RH
Substrate: Acrylic (PMMA)
Surface Preparation: IPA Wipe







Notes: Overlap shear (OLS) strengths were measured on 1 in. wide 1/2 in. overlap specimens. 1" x 4" x 0.125" substrate Jaw separation 2 in/min; 0.005-0.008in bondline. Cohesive Failure (CF), Adhesive Failure (AF), Substrate Failure (SF)

Overlap Shear Strength 7day Acrylic (PMMA) 280 lb/in² View 

Test Method: ASTM D1002

Test Name: Overlap Shear Strength
Dwell/Cure Time: 7.0
Dwell Time Units: day
Temp C: 23C
Temp F: 73F
Environmental Condition: 50%RH
Substrate: Acrylic (PMMA)

Notes: Overlap shear (OLS) strengths were measured on 1 in. wide 1/2 in. overlap specimens. 1" x 4" x 0.125" substrate Jaw separation 2 in/min; 0.005-0.008in bondline. Cohesive Failure (CF), Adhesive Failure (AF), Substrate Failure (SF)

Overlap Shear Strength 7day Fiber-Reinforced Plastic	350 lb/in ²	View 
<p>Test Method: ASTM D1002</p> <p>Test Name: Overlap Shear Strength Dwell/Cure Time: 7.0 Dwell Time Units: day Temp C: 23C Temp F: 73F Environmental Condition: 50%RH Substrate: Fiber-Reinforced Plastic Surface Preparation: IPA Wipe</p> <p>Notes: Overlap shear (OLS) strengths were measured on 1 in. wide 1/2 in. overlap specimens. 1" x 4" x 0.125" substrate Jaw separation 2 in/min; 0.005-0.008in bondline. Cohesive Failure (CF), Adhesive Failure (AF), Substrate Failure (SF)</p>		
Overlap Shear Strength 7day Fiber-Reinforced Plastic	1300 lb/in ²	View 
<p>Test Method: ASTM D1002</p> <p>Test Name: Overlap Shear Strength Dwell/Cure Time: 7.0 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 Failure Mode: SF</p> <p>Notes: Overlap shear (OLS) strengths were measured on 1 in. wide 1/2 in. overlap specimens. 1" x 4" x 0.125" substrate Jaw separation 2 in/min; 0.005-0.008in bondline. Cohesive Failure (CF), Adhesive Failure (AF), Substrate Failure (SF)</p>		
T-Peel Adhesion -55C Aluminum	5 to 10 lb/in width	View 
<p>Test Method: ASTM D1876</p> <p>Test Name: T-Peel Adhesion Temp C: -55C Temp F: -67F Substrate: Aluminum</p> <p>Notes: T-peel strengths were measured on 1 in. wide bonds. The testing jaw separation rate was 20 inches per minute.</p>		
T-Peel Adhesion 23C Aluminum	50 lb/in width	View 
<p>Test Method: ASTM D1876</p> <p>Test Name: T-Peel Adhesion Temp C: 23C Temp F: 73F Substrate: Aluminum</p> <p>Notes: T-peel strengths were measured on 1 in. wide bonds. The testing jaw separation rate was 20 inches per minute.</p>		
T-Peel Adhesion 82C Aluminum	3 to 5 lb/in width	View 
<p>Test Method: ASTM D1876</p> <p>Test Name: T-Peel Adhesion Temp C: 82C Temp F: 180F Substrate: Aluminum</p> <p>Notes: T-peel strengths were measured on 1 in. wide bonds. The testing jaw separation rate was 20 inches per minute.</p>		
T-Peel Adhesion 23C Etched Aluminum	50 lb/in width	View 

Test Method: ASTM D1876

Test Name: T-Peel Adhesion
Temp C: 23C
Temp F: 73F
Substrate: Etched Aluminum


Notes: T-peel strengths were measured on 1 in. wide bonds. The testing jaw separation rate was 20 inches per minute.

T-Peel Adhesion 23C Etched Aluminum 40 lb/in width View 

Test Method: ASTM D1876

Test Name: T-Peel Adhesion
Temp C: 23C
Temp F: 73F
Substrate: Etched Aluminum

Notes: T-peel strengths were measured on 1 in. wide bonds. The testing jaw separation rate was 20 inches per minute.

T-Peel Adhesion 23C Cold Rolled Steel 40 lb/in width View 

Test Method: ASTM D1876

Test Name: T-Peel Adhesion
Temp C: 23C
Temp F: 73F
Substrate: Cold Rolled Steel
Surface Preparation: Oakite degrease

Notes: T-peel strengths were measured on 1 in. wide bonds. The testing jaw separation rate was 20 inches per minute.

T-Peel Adhesion 23C Cold Rolled Steel 25 lb/in width View 

Test Method: ASTM D1876

Test Name: T-Peel Adhesion
Temp C: 23C
Temp F: 73F
Substrate: Cold Rolled Steel
Surface Preparation: MEK/Abrade/MEK

Notes: T-peel strengths were measured on 1 in. wide bonds. The testing jaw separation rate was 20 inches per minute.


3M™ EPX™ Pneumatic Applicator Delivery Rates

Property	Values	Additional Information
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Pneumatic Applicator Delivery Rates	31.1 lb/in ²	View 
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Test Name: 6mm Nozzle

Notes: 200 ml Applicator – Maximum Pressure 58 psi; Tests were run at maximum applicator pressure.


Pneumatic Applicator Delivery Rates 132 lb/in² View 

Test Name: 10mm Nozzle

Notes: 200 ml Applicator – Maximum Pressure 58 psi; Tests were run at maximum applicator pressure.

Electrical and Thermal Properties

Property	Values	Additional Information
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Volume Resistivity	1.3 x 10 ¹⁴ Ω-cm	View 
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Test Method: ASTM D257

Temp C: 23C

Temp F: 73F

Coefficient of Thermal Expansion	85 x 10 ⁻⁶ m/m/°C
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Coefficient of Thermal Expansion	147 x 10 ⁻⁶ m/m/°C
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Storage and Shelf Life

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

These products have a shelf life of 24 months from date of manufacture in original containers at room temperature.

Industry Specifications

UL 94 HB

Bottom Matter

3M

Industrial Adhesives and Tapes Division

3M Center, Building 225-3S-06

St. Paul, MN 55144-1000

800-362-3550

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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.

References

Property	Values
3m.com Product Page	https://www.3m.com/3M/en_US/p/d/b5005321028/
Safety Data Sheet SDS	https://www.3m.com/3M/en_US/company-us/SDS-search/results/?gsaAction=msdsSRA&msdsLocale=en_US&co=ptn&q=DP420 Off White

ISO Statement

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

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 or (651) 737-6501.

Information

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