

Technical Data Sheet

3M™ Scotch-Weld™ Epoxy Adhesive DP190 Gray

Product Description

3M™ Scotch-Weld™ Epoxy Adhesive DP190 Gray is a 1:1 by volume mix ratio of 3M™ Scotch-Weld™ Epoxy Adhesive 2216 B/A Gray and exhibits good peel, shear and environmental aging properties.

Available in bulk containers as 3M™ Scotch-Weld™ Epoxy Adhesive 2216 B/A.


Product Features

- 90 minute worklife
- High shear and peel strength
- Flexible
- 1:1 mix ratio
- Gray
- 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

Property	Values	Additional Information
Color	Gray	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	Gray
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Base Viscosity	75,000-150,00 cP	View 
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Temp C: 23C
Temp F: 72F


Accelerator Viscosity	40,000-80,000 cP	View 
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Temp C: 23C
Temp F: 72F



Base Resin	Epoxy
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Accelerator Resin	Amine
Base Net Weight	11.0 to 11.4 lb/gal
Accelerator Net Weight	10.6 to 11.0 lb/gal
Mix Ratio by Volume (B:A)	1:1
Mix Ratio by Weight (B:A)	1.06:1

Typical Mixed Physical Properties

Property	Values	Additional Information
Open Time	90 min	View 


Notes: POR=Pop Off Rubber


Worklife, 20g mixed	90 min	View 
Test Method: 3M C3180 Temp C: 23C Temp F: 73F Notes: Procedure involves periodically measuring a 2 gram mixed mass for self leveling and wetting properties. This time will also approximate the usable worklife in an 3M™ EPX™ Applicator mixing nozzle.		
Worklife	90 min	View 


Test Method: 3M C3180

Temp C: 23C
Temp F: 73F







Notes: Procedure involves periodically measuring a 2 gram mixed mass for self leveling and wetting properties. This time will also approximate the usable worklife in an 3M™ EPX™ Applicator mixing nozzle.

Time to Handling Strength	8 to 12 hr	View 
Temp C: 23C Temp F: 73F Notes: Minimum time required to achieve 50 psi of overlap shear strength. Cure times are approximate and depend on adhesive temperature.		

Tack Free Time	6 hr	View 
Test Method: 3M C3173 Notes: Involves dispensing 0.5 gram amount of adhesive onto substrate and testing periodically for no adhesive transfer to metal spatula.		

Time to Full Cure	7 day	View 
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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.

Time to Full Cure	8 to 12 hr	View 
<p>Temp C: 23C Temp F: 73F</p> <p>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.</p>		
Rate of Strength Buildup 1hr	10 lb/in ²	View 
<p>Test Method: ASTM D1002</p> <p>Test Name: Overlap Shear Strength Dwell/Cure Time: 1.0 Dwell Time Units: hr Temp C: 23C Temp F: 72F Substrate: Etched Aluminum</p> <p>Notes: 1 in wide 1/2 in overlap specimens with 1 in x 4 in substrates. 0.005-0.008in bondline. Jaw separation 0.1 in/min. Substrate thickness 0.05-0.064 in</p>		
Rate of Strength Buildup 6hr	50 lb/in ²	View 
<p>Test Method: ASTM D1002</p> <p>Test Name: Overlap Shear Strength Dwell/Cure Time: 6.0 Dwell Time Units: hr Temp C: 23C Temp F: 72F Substrate: Etched Aluminum</p> <p>Notes: 1 in wide 1/2 in overlap specimens with 1 in x 4 in substrates. 0.005-0.008in bondline. Jaw separation 0.1 in/min. Substrate thickness 0.05-0.064 in</p>		
Rate of Strength Buildup 1day	1000 lb/in ²	View 
<p>Test Method: ASTM D1002</p> <p>Test Name: Overlap Shear Strength Dwell/Cure Time: 1.0 Dwell Time Units: day Temp C: 23C Temp F: 72F Substrate: Etched Aluminum</p> <p>Notes: 1 in wide 1/2 in overlap specimens with 1 in x 4 in substrates. 0.005-0.008in bondline. Jaw separation 0.1 in/min. Substrate thickness 0.05-0.064 in</p>		
Rate of Strength Buildup 7day	2000 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: 72F Substrate: Etched Aluminum</p> <p>Notes: 1 in wide 1/2 in overlap specimens with 1 in x 4 in substrates. 0.005-0.008in bondline. Jaw separation 0.1 in/min. Substrate thickness 0.05-0.064 in</p>		
Rate of Strength Buildup 1month	2200 lb/in ²	View 
<p>Test Method: ASTM D1002</p>		

Test Name: Overlap Shear Strength
Dwell/Cure Time: 1.0
Dwell Time Units: month
Temp C: 23C
Temp F: 72F
Substrate: Etched Aluminum

Notes: 1 in wide 1/2 in overlap specimens with 1 in x 4 in substrates. 0.005-0.008in bondline. Jaw separation 0.1 in/min. Substrate thickness 0.05-0.064 in

Rate of Strength Buildup 3month	2500 lb/in ²	View
<p>Test Method: ASTM D1002</p> <p>Test Name: Overlap Shear Strength Dwell/Cure Time: 3.0 Dwell Time Units: month Temp C: 23C Temp F: 72F Substrate: Etched Aluminum</p> <p>Notes: 1 in wide 1/2 in overlap specimens with 1 in x 4 in substrates. 0.005-0.008in bondline. Jaw separation 0.1 in/min. Substrate thickness 0.05-0.064 in</p>		

Typical Physical Properties

Property	Values	Additional Information
Color	Gray	View
<p>Test Name: Cured</p>		

Typical Cured Characteristics

Property	Values	Additional Information
Shore D Hardness	60	View

Test Method: ASTM D2240

Temp C: 23C
Temp F: 73F

Tensile Strength	3500 lb/in ²	View
<p>Test Method: ASTM D882</p> <p>Dwell/Cure Time: 2.0 Dwell Time Units: hr Temp C: 23C Temp F: 72F Environmental Condition: +2 hr @ 160F(71C)</p> <p>Notes: Samples were 2 in. dumbbells with 0.125 in. neck and .030 in. sample thickness. Separation rate was 2 inches per minute.</p>		

Weight Loss by Thermal Gravimetric Analysis (TGA)	1%	View
<p>Test Method: ASTM E1131</p> <p>Temp C: 247C Temp F: 477F</p> <p>Notes: Weight loss by Thermal Gravimetric Analysis reported as that temperature at which 5% weight loss occurs by TGA in air at 5°C (9°F) rise per minute.</p>		


Weight Loss by Thermal Gravimetric

Analysis (TGA) 5 % [View](#) 

Test Method: ASTM E1131

Temp C: 337C
Temp F: 639F

Notes: Weight loss by Thermal Gravimetric Analysis reported as that temperature at which 5% weight loss occurs by TGA in air at 5°C (9°F) rise per minute.


Thermal Shock Resistance Pass 5 cycles without cracking [View](#) 

Test Method: 3M C3174

Notes: Involves potting a metal washer into a 2 in. x 0.5 in. thick section and cycling this test specimen to colder and colder temperatures.

Typical Performance Characteristics

Property	Values	Additional Information
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Elongation (%)	30 %	View 
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Test Method: ASTM D882

Dwell/Cure Time: 2.0
Dwell Time Units: hr
Temp C: 23C
Temp F: 72F
Environmental Condition: +2 hr @ 160F(71C)

Notes: Samples were 2 in. dumbbells with 0.125 in. neck and .030 in. sample thickness. Separation rate was 2 inches per minute.

T-Peel Adhesion -55C Etched Aluminum 3 lb/in width [View](#) 

Test Method: ASTM D1876

Test Name: T-Peel Adhesion
Temp C: -55C
Temp F: -67F
Substrate: Etched Aluminum

Notes: T-peel strengths were measured on 1 in. wide bonds at 73°F (23°C). The testing jaw separation rate was 20 inches per minute. The substrates were 0.020 in. thick. Samples dwelled for 24 hrs at 23C + 2 hrs at 71C before testing.

T-Peel Adhesion 23C Etched Aluminum 20 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 at 73°F (23°C). The testing jaw separation rate was 20 inches per minute. The substrates were 0.020 in. thick. Samples dwelled for 24 hrs at 23C + 2 hrs at 71C before testing.

T-Peel Adhesion 49C Etched Aluminum 10 lb/in width [View](#) 

Test Method: ASTM D1876

Test Name: T-Peel Adhesion
Temp C: 49C
Temp F: 120F
Substrate: Etched Aluminum

Notes: T-peel strengths were measured on 1 in. wide bonds at 73°F (23°C). The testing jaw separation rate was 20 inches per minute. The substrates were 0.020 in. thick. Samples dwelled for 24 hrs at 23C + 2 hrs at 71C before testing.

T-Peel Adhesion 66C Etched Aluminum 4 lb/in width

View 

Test Method: ASTM D1876

Test Name: T-Peel Adhesion
Temp C: 66C
Temp F: 150F
Substrate: Etched Aluminum

Notes: T-peel strengths were measured on 1 in. wide bonds at 73°F (23°C). The testing jaw separation rate was 20 inches per minute. The substrates were 0.020 in. thick. Samples dwelled for 24 hrs at 23C + 2 hrs at 71C before testing.

T-Peel Adhesion 82C Etched Aluminum 2 lb/in width View 

Test Method: ASTM D1876

Test Name: T-Peel Adhesion
Temp C: 82C
Temp F: 180F
Substrate: Etched Aluminum

Notes: T-peel strengths were measured on 1 in. wide bonds at 73°F (23°C). The testing jaw separation rate was 20 inches per minute. The substrates were 0.020 in. thick. Samples dwelled for 24 hrs at 23C + 2 hrs at 71C before testing.

Solvent Resistance Acetone 1hr A View 

Environmental Condition: 24hr @ RT + 2hr @ 160F(71C) + Acetone 1hr

Notes: Cured OLS samples immersed in solvent and after dwell, examined for surface attack compared to control. A: Unaffected, no color or texture change B: Slight attack, slight swelling of surface. C: Moderate/severe attack, extreme swelling of surface.

Solvent Resistance Acetone 1month A View 

Environmental Condition: 24hr @ RT + 2hr @ 160F(71C) + Acetone 1mo

Notes: Cured OLS samples immersed in solvent and after dwell, examined for surface attack compared to control. A: Unaffected, no color or texture change B: Slight attack, slight swelling of surface. C: Moderate/severe attack, extreme swelling of surface.

Solvent Resistance Isopropyl Alcohol 1hr A View 

Environmental Condition: 24hr @ RT + 2hr @ 160F(71C) + Isopropyl Alcohol 1hr

Notes: Cured OLS samples immersed in solvent and after dwell, examined for surface attack compared to control. A: Unaffected, no color or texture change B: Slight attack, slight swelling of surface. C: Moderate/severe attack, extreme swelling of surface.

Solvent Resistance Isopropyl Alcohol 1month A View 

Environmental Condition: 24hr @ RT + 2hr @ 160F(71C) + Isopropyl Alcohol 1mo

Notes: Cured OLS samples immersed in solvent and after dwell, examined for surface attack compared to control. A: Unaffected, no color or texture change B: Slight attack, slight swelling of surface. C: Moderate/severe attack, extreme swelling of surface.

Solvent Resistance Freon TF 1hr A View 

Environmental Condition: 24hr @ RT + 2hr @ 160F(71C) + Freon TF 1hr

Notes: Cured OLS samples immersed in solvent and after dwell, examined for surface attack compared to control. A: Unaffected, no color or texture change B: Slight attack, slight swelling of surface. C: Moderate/severe attack, extreme swelling of surface.

Solvent Resistance Freon TF 1month A View 

Environmental Condition: 24hr @ RT + 2hr @ 160F(71C) + Freon TF 1mo

Notes: Cured OLS samples immersed in solvent and after dwell, examined for surface attack compared to control. A: Unaffected, no color or texture change B: Slight attack, slight swelling of surface. C: Moderate/severe attack, extreme swelling of surface.

Solvent Resistance Freon TMC 1hr

A

[View](#) 

Environmental Condition: 24hr @ RT + 2hr @ 160F(71C) + Freon TMC 1hr

Notes: Cured OLS samples immersed in solvent and after dwell, examined for surface attack compared to control. A: Unaffected, no color or texture change B: Slight attack, slight swelling of surface. C: Moderate/severe attack, extreme swelling of surface.

Solvent Resistance Freon TMC 1month

A

[View](#) 

Environmental Condition: 24hr @ RT + 2hr @ 160F(71C) + Freon TMC 1mo

Notes: Cured OLS samples immersed in solvent and after dwell, examined for surface attack compared to control. A: Unaffected, no color or texture change B: Slight attack, slight swelling of surface. C: Moderate/severe attack, extreme swelling of surface.

Solvent Resistance 1, 1, 1 - Trichloroethane
1hour

A

[View](#) 

Environmental Condition: 24hr @ RT + 2hr @ 160F(71C) + 1, 1, 1 - Trichloroethane 1hr

Notes: Cured OLS samples immersed in solvent and after dwell, examined for surface attack compared to control. A: Unaffected, no color or texture change B: Slight attack, slight swelling of surface. C: Moderate/severe attack, extreme swelling of surface.

Solvent Resistance 1, 1, 1 - Trichloroethane
1month

A

[View](#) 

Environmental Condition: 24hr @ RT + 2hr @ 160F(71C) + 1, 1, 1 - Trichloroethane 1mo

Notes: Cured OLS samples immersed in solvent and after dwell, examined for surface attack compared to control. A: Unaffected, no color or texture change B: Slight attack, slight swelling of surface. C: Moderate/severe attack, extreme swelling of surface.

Solvent Resistance RMA Flux 1hr

A

[View](#) 

Environmental Condition: 24hr @ RT + 2hr @ 160F(71C) + RMA Flux 1hr

Notes: Cured OLS samples immersed in solvent and after dwell, examined for surface attack compared to control. A: Unaffected, no color or texture change B: Slight attack, slight swelling of surface. C: Moderate/severe attack, extreme swelling of surface.

Solvent Resistance RMA Flux 1month

A

[View](#) 

Environmental Condition: 24hr @ RT + 2hr @ 160F(71C) + RMA Flux 1mo

Notes: Cured OLS samples immersed in solvent and after dwell, examined for surface attack compared to control. A: Unaffected, no color or texture change B: Slight attack, slight swelling of surface. C: Moderate/severe attack, extreme swelling of surface.

3M™ EPX™ Pneumatic Applicator Delivery Rates

Property	Values	Additional Information
Pneumatic Applicator Delivery Rates	11.9 g/min	View 
Notes: Tests were run at a temperature of 70°F ± 2°F (21°C ± 1°C) and at maximum applicator pressure.		
Pneumatic Applicator Delivery Rates	46 g/min	View 
Notes: Tests were run at a temperature of 70°F ± 2°F (21°C ± 1°C) and at maximum applicator pressure.		
Pneumatic Applicator Delivery Rates	16.9 g/min	View 
Notes: Tests were run at a temperature of 70°F ± 2°F (21°C ± 1°C) and at maximum applicator pressure.		


Electrical and Thermal Properties

Property	Values	Additional Information
Glass Transition Temperature (Tg)	20 °C	View
Notes: Glass Transition Temperature (Tg) determined using DSC Analyzer with a heating rate of 68°F (20°C) per minute. Second heat values given.		
Glass Transition Temperature (Tg)	68 °F	View
Notes: Glass Transition Temperature (Tg) determined using DSC Analyzer with a heating rate of 68°F (20°C) per minute. Second heat values given.		
Glass Transition Temperature (Tg)	7 °C	View
Notes: Glass Transition Temperature (Tg) determined using DSC Analyzer with a heating rate of 68°F (20°C) per minute. Second heat values given.		
Glass Transition Temperature (Tg)	45 °F	View
Notes: Glass Transition Temperature (Tg) determined using DSC Analyzer with a heating rate of 68°F (20°C) per minute. Second heat values given.		
Dielectric Constant 1KHz	6.5	View
Test Method: ASTM D150 Temp C: 23C Temp F: 72F		
Dissipation Factor 1KHz	0.09	View
Test Method: ASTM D150 Temp C: 23C Temp F: 72F		
Thermal Conductivity	90.9 x 10 ⁻² Cal/s/cm/°C	View
Test Method: C177 Temp F: 110F Notes: Thermal conductivity determined using C-matic Instrument using 2 in. diameter samples.		
Thermal Conductivity	38.1 W/m/K	View
Test Method: C177 Temp F: 110F Notes: Thermal conductivity determined using C-matic Instrument using 2 in. diameter samples.		
Thermal Conductivity	0.22 (btu-ft)/(h-ft ² -°F)	View
Test Method: C177 Temp F: 110F Notes: Thermal conductivity determined using C-matic Instrument using 2 in. diameter samples.		
Volume Resistivity	5.0 x 10 ¹² Ω-cm	View

Test Method: ASTM D257

Temp C: 23C

Temp F: 73F

Coefficient of Thermal Expansion	62	View 
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Notes: TCE determined using TMA Analyzer using a heating rate of 10°C per minute. Second heat values given.

Coefficient of Thermal Expansion	177	View 
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Notes: TCE determined using TMA Analyzer using a heating rate of 10°C per minute. Second heat values given.

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 in their unopened original containers from date of manufacture.

Industry Specifications

UL 94 HB

Bottom Matter

3M

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Automotive Disclaimer

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Handling/Application Information

Application Equipment

For smaller or intermittent applications, the 3M™ EPX™ Applicator is a convenient method of application.

For larger applications these products may be applied by use of flow equipment. Two part meter/mixing/proportioning/dispensing equipment is available for intermittent or production line use. These systems may be desirable because of their variable shot size and flow rate characteristics and are adaptable to many applications.

Directions for Use

1. For high strength structural bonds, paints, oxide films, oils, dust, mold release agents and all other surface contaminants must be completely removed. However, the amount of surface preparation necessary directly depends on the required bond strength and the environmental aging resistance desired by the user. For suggested surface preparations on common substrates, see the section on surface preparation.

2. Mixing

For Duo Pak Cartridges

3M™ Scotch-Weld™ Epoxy Adhesives DP190 Gray is supplied in a dual syringe plastic duo-pak cartridge as part of the 3M™ EPX™ Applicator system. To use, simply insert the duo-pak cartridge into the EPX applicator and start the plunger into the cylinders using light pressure on the trigger. 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 automatic mixing of Part A and Part B is desired, attach the EPX applicator mixing nozzle to the duo-pak cartridge and begin dispensing the adhesive. For hand mixing, expel the desired amount of adhesive and mix thoroughly. Mix approximately 15 seconds after uniform color is obtained.

For Bulk Containers

Mix thoroughly by weight or volume in the proportions specified in the typical uncured properties section. Mix approximately 15 seconds after uniform color is obtained.

3. For maximum bond strength, apply adhesive evenly to both surfaces to be joined.
4. Application to the substrates should be made within 75 minutes. Larger quantities and/or higher temperatures will reduce this working time.
5. Join the adhesive coated surfaces and allow to cure at 60°F (16°C) or above until completely firm. Heat up to 200°F (93°C) will speed curing. These products will cure in 7 to 14 days @ 75°F (24°C).
6. Keep parts from moving during cure. Contact pressure necessary. Maximum shear strength is obtained with a 3-5 mil bond line.
7. Excess uncured adhesive can be cleaned up with ketone type solvents.*

*Note: When using solvents, extinguish all ignition sources, including pilot lights, and follow manufacturer's precautions and directions for use.

Adhesive Coverage (typical): A 0.005 in. thick bondline will yield a coverage of 320 sqft/gallon.

Surface Preparation

For high strength structural bonds, paint, oxide films, oils, dust, mold release agents and all other surface contaminants must be completely removed. However, the amount of surface preparation necessary directly depends on the required bond strength and the environmental aging resistance desired by the user.

The following cleaning methods are suggested for common surfaces:

Steel:

1. Wipe free of dust with oil-free solvent such as acetone, isopropyl or alcohol solvents.*
2. Sandblast or abrade using clean fine grit abrasives.
3. Wipe again with solvent to remove loose particles.
4. If a primer is used, it should be applied within 4 hours after surface preparation.

Aluminum:

1. Alkaline Degrease: Oakite 164 solution (9-11 oz./gallon water) at 190°F (87°C) ± 10°F for 10-20 minutes. Rinse immediately in large quantities of cold running water.*
2. Acid Etch: Place panels in the following solution for 10 minutes at 150°F (65°C) ± 5°F.*

Sodium Dichromate 4.1 - 4.9 oz./gallon

Sulfuric Acid, 66°Be 38.5 - 41.5 oz./gallon

2024-T3 aluminum (dissolved) 0.2 oz./gallon minimum

Tap water as needed to balance

3. Rinse: Rinse panels in clear running tap water.

4. Dry: Air dry 15 minutes; force dry 10 minutes at 150°F (65°C) ± 10°F.
5. If primer is to be used, it should be applied within 4 hours after surface preparation.

Plastics/Rubber:

1. Wipe with isopropyl alcohol.*
2. Abrade using fine grit abrasives.
3. Wipe with isopropyl alcohol.*

Glass:

1. Solvent wipe surface using acetone or MEK.*
2. Apply a thin coating (0.0001 in. or less) of 3M™ Scotch-Weld™ Metal Primer EC3901 or equivalent to the glass surfaces to be bonded and allow the primer to dry before bonding.

*Note: When using solvents, extinguish all ignition sources, including pilot lights, and follow manufacturer's precautions and directions for use.

References

Property	Values
3m.com Product Page	https://www.3m.com/3M/en_US/p/d/b5005321034/
Safety Data Sheet SDS	https://www.3m.com/3M/en_US/company-us/SDS-search/results/?gsaAction=msdsSRA&msdsLocale=en_US&co=ptn&q=DP190 Gray

Family Group

Link Tags:

- DP190 Translucent
- DP190 Gray

Products	Open Time	Shore D Hardness	Worklife	Time to Handling Strength	Color
DP190 Translucent	80 min	35	N/A	N/A	N/A
DP190 Gray	90 min	60	90 min	8 to 12 hr	Gray

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

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.

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