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3M™ Scotch-Weld™ Epoxy Adhesive DP190 Translucent

Product Description

3M™ Scotch-Weld™ Epoxy Adhesive DP190 Translucent is a 1:1 mix ratio similar to 3M™ Scotch-Weld™ Epoxy Adhesive 2216 B/A Translucent but faster curing.

Product Features

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

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
Base Color	Clear	
Accelerator Color	Amber	
Base Viscosity	2,000-8,000 cP	Room Temperature
Accelerator Viscosity	7,000-15,000 cP	Room Temperature
Base Resin	Epoxy	
Accelerator Resin	Amine	
Base Net Weight	9.3 to 9.7 lb/gal	
Accelerator Net Weight	8.2 to 8.6 lb/gal	
Mix Ratio by Volume (B:A)	1:1	
Mix Ratio by Weight (B:A)	1.15:1	

Typical Mixed Physical Properties

Property	Values	Method	Test Condition	Notes	Substrate
Worklife	80 min	3M C3180	Room Temperature	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, 2g mixed	80 min	3M C3180	Room Temperature	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, 20g mixed	60 min	3M C3180	Room Temperature	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.	

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Typical Mixed Physical Properties (continued)

Property	Values	Method	Test Condition	Notes	Substrate
Tack Free Time	4 h	3M C3173		Involves dispensing 0.5 gram amount of adhesive onto substrate and testing periodically for no adhesive transfer to metal spatula.	
Time to Handling Strength	6 h	3M C3179		Time to handling strength taken to be that required to achieve a 50 psi overlap shear (OLS) strength using aluminum substrates.	Aluminum
Time to Full Cure	14 day			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.	

Rate of Strength Buildup (OLS)	Dwell/Cure Time
10 lb/in²	60 min
200 lb/in²	6 hr
800 lb/in²	24 hr
1200 lb/in²	7 days
1800 lb/in²	1 month
1800 lb/in²	3 months

Property: Rate of Strength Buildup (OLS)
Method: ASTM D1002
Test Condition : Room Temperature
Substrate: Etched Aluminum
Substrate Notes: 0.005-0.008in bondline
notes: Overlap shear (OLS) strengths were measured on 1 in. wide 1/2 in. overlap specimens. These bonds were made individually using 1 in. x 4 in. pieces of substrate. 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.; rubber, 0.125 in.; plastics, 0.125 in.

Typical Cured Characteristics

Property	Values	Method	Dwell/Cure Time	Notes	Test Condition
Tensile Strength	2750 lb/in²	ASTM D882	2 hr Room Temperature, plus 2 hr @ 160°F(71°C)	Samples were 2" dumbbells with .0125" neck and .030" sample thickness. Separation rate was 2 inches per minute.	
Color	Translucent			Colors may vary from nearly white to yellow/amber. Adhesive performance is not affected by color variation.	

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Typical Cured Characteristics (continued)

Property	Values	Method	Dwell/Cure Time	Notes	Test Condition
Shore D Hardness	35	ASTM D2240			Room Temperature
Weight Loss by Thermal Gravimetric Analysis (TGA)	1 %	ASTM E1131		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.	390°F(199°C)
Weight Loss by Thermal Gravimetric Analysis (TGA)	5 %	ASTM E1131		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.	594°F(312°C)
Thermal Shock Resistance	Pass 5 cycles without cracking	3M C3174		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.	Potted Washer Olyphant Test, 100°C [air] to -50°C [liquid]

Typical Performance Characteristics

Elongation: 120 %

Conditions
Dwell/Cure Time: 2 hr Room Temperature, plus 2 hr @ 160°F(71°C)
Methods
ASTM D882
Additional Information
notes: Samples were 2 in. dumbbells with .0125 in. neck and .030 in. sample thickness. Separation rate was 2 inches per minute.

Overlap Shear Strength	Substrate
1800 lb/in²	Etched Aluminum
850 lb/in²	Sanded Aluminum (60 grit)
850 lb/in²	Cold Rolled Steel
650 lb/in²	Wood - Fir
260 lb/in²	Glass
300 lb/in²	Glass with 3M™ Scotch-Weld™ Primer EC3901
400 lb/in²	Polycarbonate (PC)
350 lb/in²	Acrylic (PMMA)
1000 lb/in²	Fiberglass Reinforced Plastic

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Typical Performance Characteristics (continued)

Overlap Shear Strength	Substrate
400 lb/in²	ABS
650 lb/in²	Polyvinyl chloride (PVC)
90 lb/in²	Polypropylene (PP)

Property: Overlap Shear Strength
Method: ASTM D1002
Dwell/Cure Time: 24 hr @ Room Temperature + 2 hr @ 160°F(71°C)
Test Condition : Room Temperature
Substrate Notes: 0.005-0.008in bondline
notes: Overlap shear (OLS) strengths were measured on 1 in. wide 1/2 in. overlap specimens. These bonds were made individually using 1 in. x 4 in. pieces of substrate. 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.; rubber, 0.125 in.; plastics, 0.125 in.

Environmental Resistance (OLS)	Dwell/Cure Time
1700 lb/in²	24 hr @ Room Temperature + 2 hr @ 160°F(71°C)
3200 lb/in²	24 hr @ Room Temperature + 2 hr @ 240°F(116°C)
1400 lb/in²	1 wk Room Temperature + 1 wk @ 90°F(32°C)/90% RH
3500 lb/in²	1 wk Room Temperature + 1 wk 248°F(120°C)
1700 lb/in²	1 wk Room Temperature + 1 wk H2O immersion

Property: Environmental Resistance (OLS)
Method: ASTM D1002
Test Condition : Room Temperature
Substrate: Etched Aluminum
Substrate Notes: 0.005-0.008in bondline
notes: Overlap shear (OLS) strengths were measured on 1 in. wide 1/2 in. overlap specimens. These bonds were made individually using 1 in. x 4 in. pieces of substrate. 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.; rubber, 0.125 in.; plastics, 0.125 in.

Overlap Shear Strength (at Temperature)	Test Condition
3500 lb/in²	-67°F(-55°C)
1200 lb/in²	Room Temperature
290 lb/in²	120°F(49°C)
200 lb/in²	150°F(66°C)
160 lb/in²	180°F(82°C)

Property: Overlap Shear Strength (at Temperature)
Method: ASTM D1002
Dwell/Cure Time: 24 hr @ Room Temperature + 2 hr @ 160°F(71°C)
Substrate: Etched Aluminum
Substrate Notes: 0.005-0.008in bondline
notes: Overlap shear (OLS) strengths were measured on 1 in. wide 1/2 in. overlap specimens. These bonds were made individually using 1 in. x 4 in. pieces of substrate. 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.; rubber, 0.125 in.; plastics, 0.125 in.

Typical Performance Characteristics (continued)

T-Peel Adhesion	Test Condition
3 lb/in width	-67°F(-55°C)
20 lb/in width	Room Temperature
3 lb/in width	120°F(49°C)
2 lb/in width	150°F(66°C)
1 lb/in width	180°F(82°C)

Property: T-Peel Adhesion
Method: ASTM D1876
Dwell/Cure Time: 24 hr @ Room Temperature + 2 hr @ 160°F(71°C)
Substrate: Etched Aluminum
Substrate Notes: 0.005-0.008in bondline
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.

Solvent Resistance	Environmental Condition
A	Immersed in Acetone one hour
A	Immersed in Acetone one month
A	Immersed in Isopropyl Alcohol one hour
A	Immersed in Isopropyl Alcohol one month
A	Immersed in Freon TF one hour
A	Immersed in Freon TF one month
A	Immersed in Freon TMC one hour
B	Immersed in Freon TMC one month
A	Immersed In 1, 1, 1 - Trichloroethane one hour
A	Immersed In 1, 1, 1 - Trichloroethane one month
A	Immersed in RMA Flux one hour
A	Immersed in RMA Flux one month

Property: Solvent Resistance
Dwell/Cure Time: 24 hr @ Room Temperature + 2 hr @ 160°F(71°C)
notes: Solvent resistance was determined using cured samples (1/2 in. x 4 in. x 1/8 in. thickness) immersed n the test solvent for 1 hour and 1 month. After the allotted period of time, the sample was removed and visually examined for surface attack as compared to the control. Key: A - Unaffected - no change to color or surface texture. B - Slight attack - noticeable swelling of surface. C - Moderate/severe attack - extreme swelling of surface.

3M™ EPX™ Pneumatic Applicator Delivery Rates

Pneumatic Applicator Delivery Rates: 112 g/min

Conditions
Test Condition : 48.5/50 ml Applicator – Maximum Pressure 50 psi. 1/4 in. Nozzle
Additional Information
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

Glass Transition Temperature (Tg)		Test Condition
10 °C	50 °F	Onset
27 °C	80 °F	Mid-Point

Property: Glass Transition Temperature (Tg)
notes: Glass Transition Temperature (Tg) determined using DSC Analyzer with a heating rate of 68°F (20°C) per minute. Second heat values given.

Thermal Conductivity		
3.9 × 10^-3 Cal/s/cm/°C	13.6 W/m/K	0.079 (btu-ft)/(h-ft²-°F)

Property: Thermal Conductivity
Method: C177
Test Condition : 110°F on .25 inch samples
notes: Thermal conductivity determined using C-matic Instrument using 2 in. diameter samples.

Property	Values	Method	Test Condition	Notes
Dielectric Constant	6.2	ASTM D150	1 KHz, Room Temperature	
Dissipation Factor	0.16	ASTM D150	1 KHz, Room Temperature	
Dielectric Strength	875 V/mil	ASTM D149		Sample Thickness Approx. 30 mil.
Volume Resistivity	7.5 × 10^10 Ω-cm	ASTM D257	Room Temperature	
Coefficient of Thermal Expansion	86		Below Tg(41-68°F [5-20°C] range)	TCE determined using TMA Analyzer using a heating rate of 50°F (10°C) per minute. Second heat values given.
Coefficient of Thermal Expansion	166		Above Tg(167-284°F [75-140°C] range)	TCE determined using TMA Analyzer using a heating rate of 50°F (10°C) per minute. Second heat values given.

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.

Handling/Application Information (continued)

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 Translucent 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.

Handling/Application Information (continued)

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.

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.

Trademarks

References

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 Translucent

Family Group

	DP190 Translucent	DP190 Gray
Time to Handling Strength (h) Substrate: Aluminum	6	8 to 12
Worklife (min) Test Condition: Room Temperature	80	90

Table continued on next page

Family Group (continued)

	DP190 Translucent	DP190 Gray
Shore D Hardness Test Condition: Room Temperature	35	60
Color	Translucent	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.

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.

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