

# 3M

## Epoxy and Hot Melt Adhesives for Electronics

Products and Specifications



# 3M™ Epoxy and Hot Melt Adhesives have the characteristics a

## 3M Epoxy and Hot Melt Specifications®

### Typical Physical Properties

	Product	Base Resin	Volume Mix Ratio (B:A)	Viscosity (cps)	Bonding Range Set Time	Mixed Work Life @ 23°C	Typical Physical Properties	
							Handling Strength @ 23°C	Full Cure Schedule
Scotch-Weld Two-Part Epoxy Adhesives	DP-100	Epoxy	1:1	B-12,000 A-14,000 @ 23°C	NA	3-5 min.	15-20 min.	24-48 hr. @ 23°C or 1-2 hr. @ 65°C
	DP-100 NS	Epoxy	1:1	B-100,000 A-90,000 @ 23°C	NA	3-5 min.	15-20 min.	24-48 hr. @ 23°C or 1-2 hr. @ 65°C
	DP-100 FR	Epoxy	1:1	B-75,000 A-80,000 @ 23°C	NA	4-8 min.	15-20 min.	24-48 hr. @ 23°C or 1-2 hr. @ 65°C
	DP-100 Plus Clear	Epoxy	1:1	B-7,000 A-10,000 @ 25°C	NA	3-4 min.	20 min.	48 hours @ 23°C
	DP-125	Epoxy	1:1	B-4,000 A-26,000 @ 25°C	NA	18-28 min.	2.5 hr.	7 days @ 23°C
	DP-190 Gray	Epoxy	1:1	B-100,000 A-60,000 @ 27°C	NA	90 min.	12-16 hr.	7 days @ 23°C or 2 hr. @ 65°C
	DP-270 <sup>②</sup> Clear/Black	Epoxy	1:1	B-22,000 A-18,000 @ 23°C	NA	60-70 min.	4-6 hr.	2 days @ 23°C or 1 hr. @ 80°C
	DP-420	Epoxy	2:1	B-35,000 A-10,000 @ 23°C	NA	20 min.	2-3 hr.	3-4 days @ 23°C or 1-2 hr. @ 65°C
	DP-460	Epoxy	2:1	B-35,000 A-10,000 @ 23°C	NA	60 min.	4-6 hr.	7 days @ 23°C or 90 min. @ 70°C or 30 min. @ 93°C
	2216 Gray	Epoxy	2:3	B-100,000 A-60,000 @ 27°C	NA	90 min.	8-12 hr.	7 days @ 23°C or 2 hr. @ 65°C
	DP-460 EG	Epoxy	2:1	B-35,000 A-10,000 @ 23°C	NA	60 min.	4-6 hr.	7 days @ 23°C or 90 min. @ 70°C or 30 min. @ 93°C
	DP-4XL EG	Epoxy	2:1	B-35,000 A-12,000 @ 23°C	NA	5-6 hr.	12-18 hr.	7 days @ 23°C or 60 min. @ 120°C
	Scotch-Weld One-Part Epoxy Adhesives	2214-HD	Epoxy	NA	Paste 130 sec. @ 23°C	NA	NA	NA
2214 Hi-Flex		Epoxy	NA	Paste 200 sec. @ 23°C	NA	NA	NA	40 min. @ 121°C or 10 min. @ 149°C or 5 min. @ 177°C
2214 NMF		Epoxy	NA	Paste 100 sec. @ 23°C	NA	NA	NA	40 min. @ 121°C or 10 min. @ 149°C or 5 min. @ 177°C
2290		Epoxy	NA	Solution 40-80	NA	NA	NA	Dry 15 min. @ 121°C and Cure 30 min. @ 177°C
3748		Polyolefin	NA	5000 @ 190°C	45-50 sec.	NA	NA	NA
3748 V-O		Polyolefin	NA	6500 @ 190°C	30 sec.	NA	NA	NA
3764		Ethylene Vinyl Acetate	NA	10,500 @ 190°C	35-40 sec.	NA	NA	NA
Jet-melt Hot Melt Adhesives	3779	Polyamide	NA	8000 @ 190°C	25-30 sec.	NA	NA	NA

NA = Not Applicable • = Not Available ①Note: This technical information and data should be considered representative or typical only and should not be used for specification purposes. ②Scotch-Weld Potting Compound ③3 hr

# and performance profiles to meet most fabrication and assembly ap

				Typical Thermal Properties				
Shore D Hardness	Elongation (%)	Shear Strength (psi)	180° Peel Strength (piw)	Glass Transition Temperature (Tg)	Thermal Conductivity (btu-ft./sq.ft.-hr.°F)	Thermal Coefficient of Expansion (in./in.°C)	Dielectric Constant (1 KHZ @ 23°C)	Stre
81	2	1500 Aluminum	2 Aluminum	33°C @ 46°C	.107	60 x 10 <sup>-6</sup> (-50°C to 30°C)	6.0 (12 mil.)	
80	2	1500 Aluminum	2 Aluminum	34°C	.106 @ 45°C	29 x 10 <sup>-6</sup> (-50°C to 30°C) 149 x 10 <sup>-6</sup> (50°C to 110°C)	•	11
87	2	1500 Aluminum	2 Aluminum	44°C	.111 @ 45°C	60 x 10 <sup>-6</sup> (-50°C to 30°C) 125 x 10 <sup>-6</sup> (80°C to 100°C)	4.7	
83	75	3500 Aluminum	13 Aluminum	29°C	.077	93 x 10 <sup>-6</sup> (5°C to 20°C) 182 x 10 <sup>-6</sup> (40°C to 140°C)	6.6	
55	150	2500 <sup>⑤</sup> Aluminum	35 <sup>⑤</sup> Aluminum	15°C	.089	112 x 10 <sup>-6</sup> (5°C to 20°C) 190 x 10 <sup>-6</sup> (65°C to 140°C)	6.3	
60	20	2200 <sup>⑤</sup> Aluminum	20 <sup>⑤</sup> Aluminum	20°C	.220 @ 44°C	62 x 10 <sup>-6</sup> (-50°C to 30°C) 177 x 10 <sup>-6</sup> (50°C to 100°C)	6.5	83
82	2	2400 Aluminum	2 Aluminum	49°C/48°C	.101 @ 45°C/ .105 @ 45°C	101 x 10 <sup>-6</sup> (-50°C to 30°C)/ 78 x 10 <sup>-6</sup> (-50°C to 30°C)	3.4/3.6	87 70
80	5	4400 Aluminum	49 Aluminum	58°C	.104 @ 45°C	85 x 10 <sup>-6</sup> (-50°C to 30°C) 147 x 10 <sup>-6</sup> (50°C to 110°C)	4.7	69
80	7	4600 Aluminum	50 Aluminum	58°C	.104 @ 45°C	59 x 10 <sup>-6</sup> (-50°C to 30°C) 159 x 10 <sup>-6</sup> (50°C to 110°C)	4.7	11
55	40	2500 Aluminum	25 Aluminum	13°C	.228	102 x 10 <sup>-6</sup> (0°C to 40°C) 134 x 10 <sup>-6</sup> (40°C to 80°C)	5.5	
80	7	4600 Aluminum	50 Aluminum	58°C RT Cure 72°C Ultimate	.104 @ 45°C	59 x 10 <sup>-6</sup> (-50°C to 30°C) 159 x 10 <sup>-6</sup> (50°C to 110°C)	4.6	51
84	•	4500 Aluminum	45 Aluminum	56°C RT Cure 70°C Ultimate	•	73 x 10 <sup>-6</sup> (-50°C to 30°C) 205 x 10 <sup>-6</sup> (50°C to 110°C)	3.9	67
85	2	4500 Aluminum	5 Aluminum	110°C	.231 @ 25°C	49 x 10 <sup>-6</sup> (0°C to 80°C)	10.5	7
81	3	4000 Aluminum	10 Aluminum	84°C	.193 @ 24°C	80 x 10 <sup>-6</sup> (0°C to 80°C)	11.3	8
84	2	4000 Aluminum	7 Aluminum	110°C	.121 @ 43°C	130 x 10 <sup>-6</sup> (-30°C to 100°C)	4.7	15
°C	•	4	10 Aluminum	95°C	•	262 x 10 <sup>-6</sup> (-20°C to 70°C) 534 x 10 <sup>-6</sup> (100°C to 120°C)	5.2	24
25	900	220 FR-4	40 FR-4	•	.101 @ 44°C	470 x 10 <sup>-6</sup> (-10°C to 30°C)	2.3	
26	900	220 FR-4	35 FR-4	•	.111 @ 41°C	155 x 10 <sup>-6</sup> (-10°C to 30°C)	2.3	
18	450	390 Polypropylene	13 Canvas	•	.186 @ 45°C	197 x 10 <sup>-6</sup> (-15°C to 80°C)	3.0	
45	300	700 Oak	18 Canvas	•	.114 @ 45°C	506 x 10 <sup>-6</sup> (-30°C to 130°C)	4.6	

③3 hrs. at 85°C GC/MS ④Water extraction, IC ⑤RT cure with 160°F, 2 hr. post cure ⑥7-day RT cure

# Typical application requirements.

## Typical Electrical Properties

Thickness (mil.)	Dielectric Strength (volts/mil.)	Dissipation Factor (1 KHZ @ 23°C)	Volume Resistivity (ohm-cm. @ 23°C)	Electrolytic Corrosion to Copper	Comments
860	860	.043	$3.5 \times 10^{12}$	Poor	UL 94 HB Meets corrosion resistance requirements Mil-S-46163
1100 (12 mil.)	•	•	$2.2 \times 10^{14}$	Poor	Low flow version of DP-100
•	•	.016	$1.7 \times 10^{14}$	•	UL 94 V-O CFR 25.853 Paragraph A
710	•	.060	$6.7 \times 10^{11}$	•	•
765	•	.140	$1.2 \times 10^{11}$	•	•
830 (12 mil.)	•	.090	$5.0 \times 10^{12}$	Good	Flexible • UL 94 HB Good adhesion to most metals, ceramics & plastics Good for structural bonding
870 (30 mil.)/ 700 (30 mil.)	•	.018	$4.1 \times 10^{14}$	Excellent	Noncorrosive to copper • UL 94 HB Meets corrosion resistance requirement of Mil-S-46163 Non-exotherming potting compounds • RI @ 25°C 1.656
690 (30 mil.)	•	.016	$1.3 \times 10^{14}$	Good	High peel and shear strength Excellent durability Controlled flow • UL 94 HB
1100 (30 mil.)	•	.010	$2.4 \times 10^{14}$	Good	High peel and shear strength Excellent durability Controlled flow • UL 94 HB
408	•	.112	$1.9 \times 10^{12}$	Good	Flexible Meets DOD-A-82720 • UL 94 HB
515 (43 mil.)	•	.010	$2.9 \times 10^{15}$	•	High peel and shear strength Excellent durability Controlled flow
676 (31 mil.)	•	.010	$2.5 \times 10^{16}$	•	High peel and shear strength Excellent durability Controlled flow
77 (37 mil.)	•	.126	$2.8 \times 10^{13}$	Good	High temperature resistant High impact strength • Metallic filled Meets MMM-A-132, Type 1, Class 3 • UL 94 HB
83 (42 mil.)	•	.037	$2.8 \times 10^{13}$	Good	Deaerated Metallic filled • UL 94 HB
1500 (9 mil.)	•	.014	$1.5 \times 10^{14}$	Good	Good electrical properties Non-Metallic filled • UL 94 HB
2400 (4 mil.)	•	.011	$1.2 \times 10^{15}$	Good	21% solids, B-stageable Passes solder float @ 288°C
1300	•	.001	$6.0 \times 10^{17}$	Good	Excellent hot/cold thermal shock resistance Noncorrosive to copper Good polyolefin adhesion • UL 94 V-2
1400	•	.001	$6.0 \times 10^{17}$	Good	Self-extinguishing UL 94 V-O • UL 1410 Noncorrosive to copper per ASTM D 3482 and MIL S-46163 Good thermal shock • Good electrical properties
760	•	.006	$3.3 \times 10^{15}$	Good	Bonds to polyolefins Good shock resistance Low cost, clear • UL 94 V-2
650	•	.120	$5.8 \times 10^{12}$	Good	High temperature resistance • Meets UL 94 V-O Noncorrosive to copper MIL S-46163 Excellent potting material • Good electrical properties



# High-performance adhesives for demanding electronics applications.

*With the ever-increasing sophistication of electronics, you need the most dependable and versatile methods for their fabrication and assembly. 3M™ Scotch-Weld™ epoxies and Jet-melt™ adhesives have the performance characteristics that provide reliable bonds and seals for a broad spectrum of applications. From hard disk drive and printed circuit board fabrication to cellular phone and computer assembly, our adhesives can provide solutions that help improve product performance while streamlining assembly processes and reducing material costs.*



*3M offers dispensing systems to meet the most exacting fabrication and assembly applications.*

## Electronic Grade (EG) Epoxies

For assembly of sophisticated electronics where outgassing and corrosion of material bonds are a concern, our two-part Electronic Grade (EG) epoxies are an excellent alternative to mechanical fasteners and lower-grade adhesives. 3M Scotch-Weld EG epoxies produce far lower contamination levels of ionic and outgassing impurities than typical epoxy adhesives. This makes 3M Scotch-Weld EG epoxies ideal for the fabrication and assembly of critical components.




## One-Part Epoxies

3M Scotch-Weld one-part epoxies provide superior structural adhesive performance where durability, environmental resistance and chemical resistance are essential. One-part epoxies also eliminate mixing, weighing and work life limitations. What's more, they cure on demand when heat is applied, thereby offering flexibility in processing.

## Two-Part Epoxies

If structural performance is a priority, consider the many solutions provided by 3M Scotch-Weld two-part epoxies. They're available in a wide range of formulations, performance profiles and handling characteristics. Precision dispensing is made easy with the 3M EPX™ Applicator System. Duo-Pak™ cartridges also offer room temperature storage and long shelf life for added convenience in many fabrication and assembly operations.

## Packaging Options

Scotch-Weld Epoxy Adhesives*		Jet-melt Hot Melt Adhesives**
Duo-Pak™	Bulk	Stick Sizes
		
37 ml	1 qt	PG (1" x 3")
50 ml	5 gal	TC (.625" x 2")
200 ml		Q (.625" x 8")
400 ml		

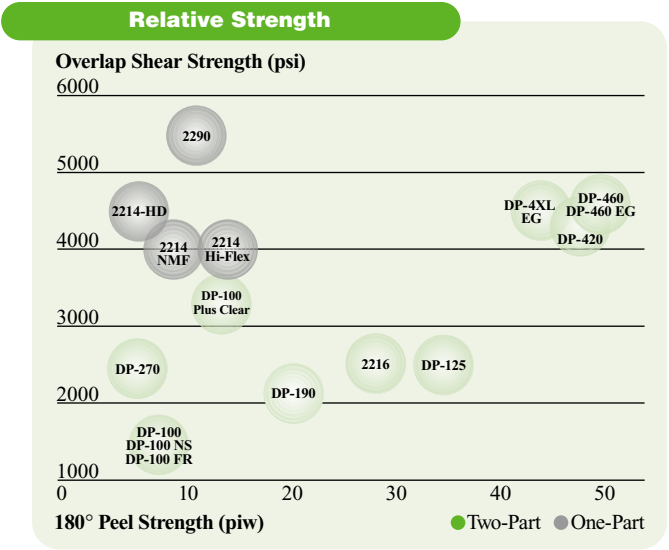
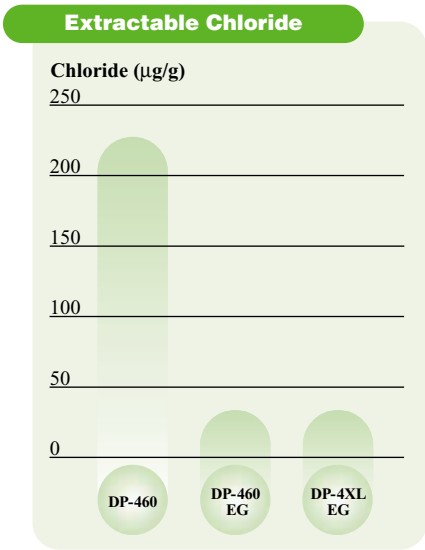
*Whether your priority is precision, convenience, speed or cost efficiency, 3M has the packaging options to meet your needs.*

\* Scotch-Weld adhesive packaging availability can vary by product.  
\*\* Jet-melt adhesive sticks may require specific 3M Polygun™ Applicators.

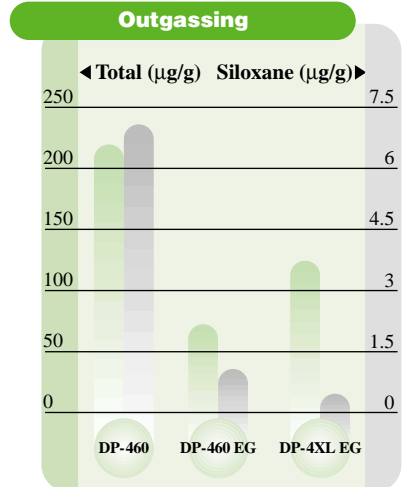
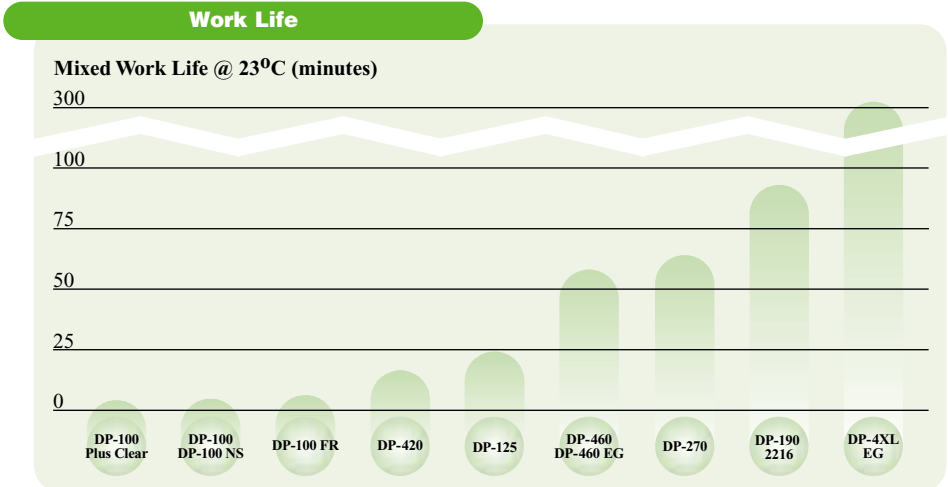
## Hot Melt Adhesives

For applications requiring cost-efficient bonding, sealing, potting or encapsulating, 3M Jet-melt adhesives offer good strength and elastic characteristics.

# Key attribute comparisons for selected 3M™ Scotch-Weld™ Epoxy Adhesives.\*



Check chart for substrates used in measuring strength.



\*Note: This technical information and data should be considered representative or typical only and should not be used for specification purposes.

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