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[1]

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

NA = Not Applicable • = Not Available [1]Note: This technical information and data should be considered representative or typical only and should not be used for specification purposes. [2]Scotch-Weld Potting Compound [3]3 hr

nd performance profiles to meet most fabrication and assembly

				Typical Thermal Properties			
Shore D Hardness	Elongation (%)	Shear Strength (psi)	180º Peel Strength (piw)	Glass Transition Temperature (Tg)	Thermal Conductivity (btu-ft./sq.ft.-hr.ºF)	Thermal Coefficient of Expansion (in./in./ºC)	Dielectric Constant (1 KHZ @ 23ºC)
81	2	1500 Aluminum	2 Aluminum	33ºC @ 46ºC	.107	60 x 10^{-6} (-50ºC to 30ºC)	6.0 (12 mil.)
80	2	1500 Aluminum	2 Aluminum	34ºC	.106 @ 45ºC	29 x 10^{-6} (-50ºC to 30ºC) 149 x 10^{-6} (50ºC to 110ºC)	•
87	2	1500 Aluminum	2 Aluminum	44ºC	.111 @ 45ºC	60 x 10^{-6} (-50ºC to 30ºC) 125 x 10^{-6} (80ºC to 100ºC)	4.7
83	75	3500 Aluminum	13 Aluminum	29ºC	.077	93 x 10^{-6} (5ºC to 20ºC) 182 x 10^{-6} (40ºC to 140ºC)	6.6
55	150	2500⑤ Aluminum	35⑤ Aluminum	15ºC	.089	112 x 10^{-6} (5ºC to 20ºC) 190 x 10^{-6} (650ºC to 140ºC)	6.3
60	20	2200⑤ Aluminum	20⑤ Aluminum	20ºC	.220 @ 44ºC	62 x 10^{-6} (-50ºC to 30ºC) 177 x 10^{-6} (50ºC to 100ºC)	6.5
82	2	2400 Aluminum	2 Aluminum	49ºC/48ºC	.101 @ 45ºC/ .105 @ 45ºC	101 x 10^{-6} (-50ºC to 30ºC)/ 78 x 10^{-6} (-50ºC to 30ºC)	3.4/3.6
80	5	4400 Aluminum	49 Aluminum	58ºC	.104 @ 45ºC	85 x 10^{-6} (-50ºC to 30ºC) 147 x 10^{-6} (50ºC to 110ºC)	4.7
80	7	4600 Aluminum	50 Aluminum	58ºC	.104 @ 45ºC	59 x 10^{-6} (-50ºC to 30ºC) 159 x 10^{-6} (50ºC to 110ºC)	4.7
55	40	2500 Aluminum	25 Aluminum	13ºC	.228	102 x 10^{-6} (0ºC to 40ºC) 134 x 10^{-6} (40ºC to 80ºC)	5.5
80	7	4600 Aluminum	50 Aluminum	58ºC RT Cure 72ºC Ultimate	.104 @ 45ºC	59 x 10^{-6} (-50ºC to 30ºC) 159 x 10^{-6} (50ºC to 110ºC)	4.6
84	•	4500 Aluminum	45 Aluminum	56ºC RT Cure 70ºC Ultimate	•	73 x 10^{-6} (-50ºC to 30ºC) 205 x 10^{-6} (50ºC to 110ºC)	3.9
85	2	4500 Aluminum	5 Aluminum	110ºC	.231 @ 25ºC	49 x 10^{-6} (0ºC to 80ºC)	10.5
81	3	4000 Aluminum	10 Aluminum	84ºC	.193 @ 24ºC	80 x 10^{-6} (0ºC to 80ºC)	11.3
84	2	4000 Aluminum	7 Aluminum	110ºC	.121 @ 43ºC	130 x 10^{-6} (-30ºC to 100ºC)	4.7
•	4	5500 Aluminum	10 Aluminum	95ºC	•	262 x 10^{-6} (-20ºC to 70ºC) 534 x 10^{-6} (100ºC to 120ºC)	5.2
25	900	220 FR-4	40 FR-4	•	.101 @ 44ºC	470 x 10^{-6} (-10ºC to 30ºC)	2.3
26	900	220 FR-4	35 FR-4	•	.111 @ 41ºC	155 x 10^{-6} (-10ºC to 30ºC)	2.3
18	450	390 Polypropylene	13 Canvas	•	.186 @ 45ºC	197 x 10^{-6}(-15ºC to 80ºC)	3.0
45	300	700 Oak	18 Canvas	•	.114 @ 45ºC	506 x 10^{-6} (-30ºC to 130ºC)	4.6

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

application requirements.

Typical Electrical Properties

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

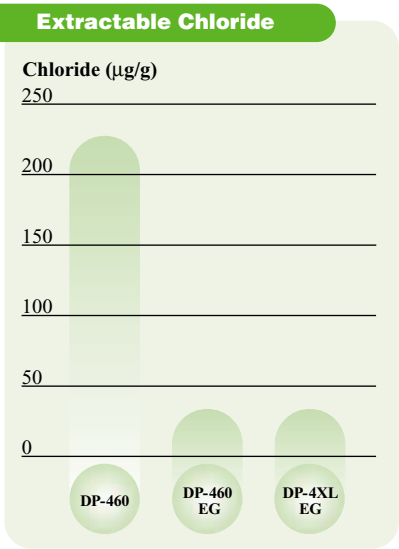
*Scotch-Weld adhesive packaging availability can vary by product.
** Jet-melt adhesive sticks may require specific 3M Polygun™ Applicators.

Hot Melt Adhesives

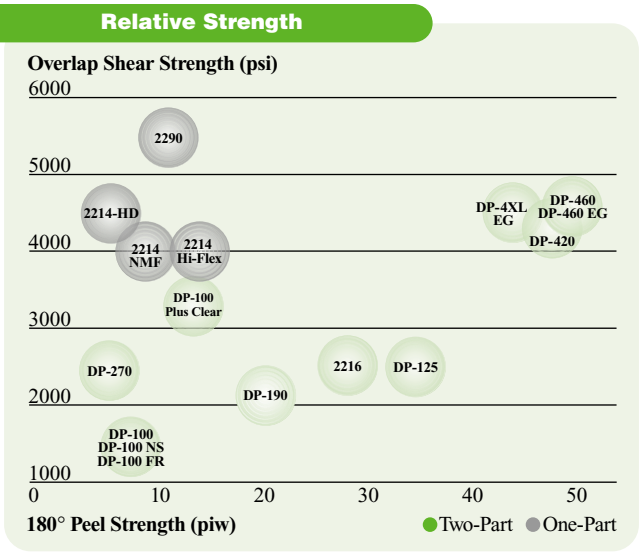
For applications requiring cost-efficient bonding, sealing, potting or encapsulating, 3M Jet-melt adhesives offer good strength and elastic characteristics.

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

Extractable Chloride

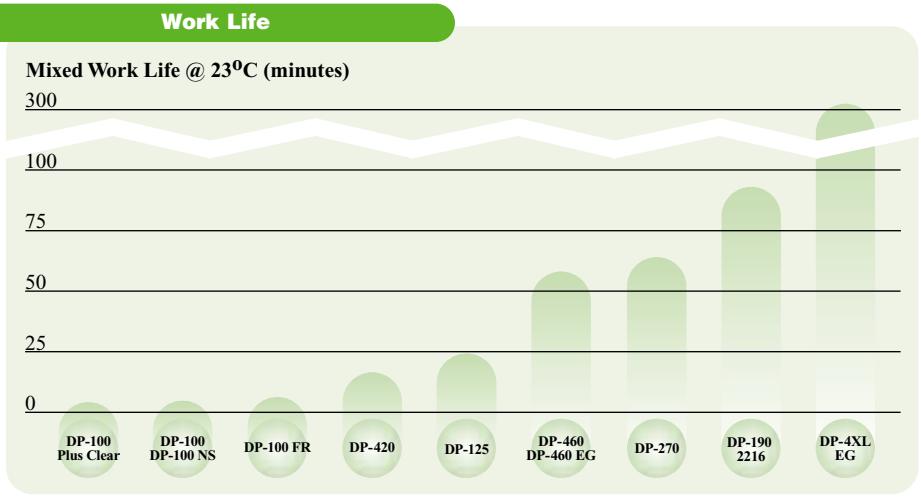


Relative Strength

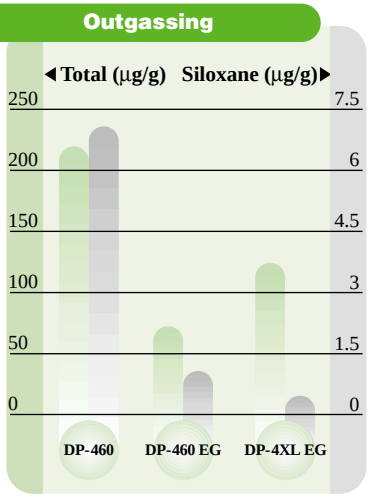


Check chart for substrates used in measuring strength.

Work Life



Outgassing



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Industrial Business

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