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SELECTOR GUIDE

AUTOMOTIVE ELECTRONICS

CONDUCTIVE ADHESIVES - MATERIALS FOR HARSH ENVIRONMENT PROTECTION - UNDERFILL ENCAPSULANTS

ELECTRICALLY CONDUCTIVE ADHESIVES

Product	Chemistry	Viscosity at 25°C (Pa.s)	Application Method			Recommended Cure Schedule
			Printing	Dispensing	Jetting ⁽¹⁾	
Electrically Conductive Adhesives						
CE 3516 LCL	Epoxy/Ag	65 - 75	•			30 min @ 140°C
8175 AJ	Epoxy/Ag	110 - 140	•			5 min @ 150°C
XCE 3050	Epoxy/Ag	60		•		30 min @ 150°C
XCY 80247	Epoxy Hybrid/Ag	20 - 30		•		30 s @ 110°C
JM 7000	Cyanate Ester/Ag	8		•		30 min @ 150°C + 30 min @ 300°C
CF 3350	Epoxy/Ag	Film				30 min @ 150°C

Electrically Conductive Adhesives for Non-Noble Metallizations

XCE 3104 XL	Epoxy/Ag	50	•	•		10 min @ 150°C
XCE 80258-2iP	Epoxy/Ag	40 - 80	•			1 h @ 150°C
CE 3921-2	Epoxy/Ag	400 - 800	•			15 min @ 150°C

Low Stress Electrically Conductive Adhesives

CE 8500	Modified Epoxy/Ag	120 - 140		•		40 min @ 150°C
CE 3520-3	Epoxy/Ni	60 - 88		•	•	30 min @ 150°C
XCE 80239	Epoxy/Ag	30 - 60		•		3 min @ 150°C
XCS 80091-1 ⁽²⁾	Silicone/Ag	30 - 50		•		1 h @ 150°C
XCA 3556 HF	Acrylate/Ag	30 - 40		•		30 s @ 110°C

Lowest Temperature Cure	Volume Resistivity (Ohm.cm) Typical Value	Temperature Range of Use	Features
2 h @ 120°C	0,0003	-45 to +150°C	One-component, non-bleeding, epoxy adhesive with low outgassing, eliminating wicking and bridging under small components.
6 min @ 130°C	0,0009	-45 to +150°C	Fast curing, stress absorbing, epoxy adhesive for surface mount component attach. Compatible with SMT assembly lines.
1 h @ 130°C	0,0001	-50 to +150°C	One-component, stress absorbing, microelectronic grade adhesive for die and component attach.
90 s @ 80°C	0,0003	-45 to +150°C	One-component adhesive providing very fast cure at low temperature; suitable for high throughput applications.
30 min @ 150°C	0,002	up to +350°C	High strength, high reliability, one-component adhesive for die attach in hermetically sealed packages.
2 h @ 125°C	0,0002	-40 to +180°C	Film adhesive providing excellent electrical and thermal conductivity; ideal for RF applications. Void-free bondline assures consistency in operation of device.
15 min @ 125°C	0,0005	-45 to +125°C	One-component, epoxy adhesive with stable contact resistance on Ni/Au, Cu and SnPb. Compatible with existing SMT assembly lines.
1 h @ 150°C	0,0003	-45 to +150°C	One-component epoxy adhesive providing high mechanical strength; stable contact resistance on Cu and 100% Sn.
90 min @ 120°C		-45 to +150°C	One-component, adhesive with low and stable contact resistance on Cu and Sn; suitable for 0201 size components.
90 min @ 120°C	0,0002	-45 to +200°C	One-component, low stress adhesive for mismatched CTE applications. High thermal conductivity.
1 h @ 120°C	0,2	-45 to +125°C	One-component, low stress adhesive for mismatched CTE; good shielding properties.
15 min @ 120°C	0,0008	-45 to +125°C	One-component, low stress adhesive for mismatched CTE. Compatible with existing SMT assembly lines.
35 min @ 140°C	0,0004	-45 to +200°C	One-component, silicone adhesive for applications where a very high degree of flexibility is required.
90 s @ 80°C	0,0004	-45 to +125°C	One-component, low stress adhesive providing fast cure at low temperatures.

INSULATING THERMALLY CONDUCTIVE ADHESIVES

Product	Chemistry	Viscosity at 25°C (Pa.s)	Lowest Temperature Cure	Fastest Time Cure	Durometer Hardness
282	1K Epoxy	600	4 h @ 100°C	15 min @ 175°C	85D
E 3503-1	1K Epoxy	60	30 min @ 100°C	5 min @ 150°C	75D
E 8502-1	1K Epoxy	45	90 min @ 120°C	15 min @ 175°C	40-50A
XTE 80264 [®]	1K Epoxy	35	30 min @ 100°C	10 min @ 150°C	87D
8700 K	1K Epoxy	45	2 h @ 160°C	1 h @ 175°C	
563 K	1K Epoxy	Film	2 h @ 125°C	30 min @ 150°C	

ENCAPSULANTS AND COATINGS FOR HARSH ENVIRONMENT PROTECTION

Product	Chemistry	Viscosity at 25°C (Pa.s)	Lowest Temperature Cure	Fastest Time Cure	Durometer Hardness
1495 K/Catalyst 9	2K Epoxy	21	20 h @ 25°C	1 h @ 65°C	95D
1495 K/Catalyst 23LV	2K Epoxy	10	24 h @ 25°C	2 h @ 65°C	90D
2651-40 W 1/Catalyst 27-1	2K Epoxy	3	4 h @ 120°C	4 h @ 120°C	94D
2850 FT/Catalyst 23 LV	2K Epoxy	5,6	24 h @ 25°C	4 h @ 65°C	92D
2850 FT/Catalyst 27-1	2K Epoxy	8	4 h @ 120°C	4 h @ 120°C	94D
E 2534 FR/Catalyst 9	2K Epoxy	350	24 h @ 25°C	2 h @ 65°C	90D
E 3104	2K Epoxy	13	45 min @ 60°C	40 min @ 80°C	80D
G 508-1	1K Epoxy	27	2 h @ 120°C	12 min @ 180°C	85D
933-48 [®]	1K Epoxy	150	150 min @ 120°C	12 min @ 175°C	85D
E 2527 FR	1K Epoxy	16	1 h @ 120°C	15 min @ 150°C	86D
XE 70202 ^{®2,3}	1K Epoxy	17	60 min @ 120°C	30 min @ 150°C	90D
U 2500	2K PU	6	48 h @ 25°C	4 h @ 60°C	70A
U 2500 FR	2K PU	19	24 h @ 25°C	4 h @ 60°C	70A
U 2500 HTR	2K PU	8	24 h @ 25°C	4 h @ 60°C	70A
XU 90226	2K PU	25	72 h @ 25°C	4 h @ 65°C and 2 h @ 120°C	80A
S 5225	2K Silicone	2,4	16 h @ 25°C	30 min @ 150°C	53A
UV 7993 ^{®2,3}	1K EP/UR	0,12	UV + 50 h @ >70% RH	UV + 100 h @ >50% RH	80A
SC 3613	1K Silicone	3,5	30 min @ 120°C		15-30A

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Temperature Range of Use	Thermal Conductivity (W/m.K)	Features
-40 to +180°C	1,3 substrates.	Screen printable with high thermal conductivity; excellent adhesion to aluminum and ceramic
-40 to +125°C	0,8	One-component, low temperature cure, thermally conductive adhesive for attachment of high power LEDs.
-45 to +200°C	0,6	One-component, low modulus, thermally conductive adhesive for mismatched CTE applications.
-45 to +150°C	2,3	Developed for bonding heat dissipation parts and components; can be applied by automatic syringe dispensing.
-65 to +200°C	0,6	Hybrid component attach with excellent adhesion to thin and thick film gold; meets MIL-STD-883, Method 5011.
-40 to +180°C	1,0	Resiliency for mismatched CTE substrates; uniform bondline for heat sink and lid seal; custom preforms option.

Temperature Range of Use	Thermal Conductivity (W/m.K)	Features
-40 to +130°C	1,1	Good chemical resistance and physical strength; good heat dissipation.
-65 to +105°C	1,0	Low viscosity; low stress; good heat dissipation; excellent thermal shock and impact resistance.
-40 to +175°C	0,5	High service temperature performance; good chemical resistance.
-65 to +105°C	1,1	Low stress; high heat dissipation; excellent thermal shock and impact resistance.
-40 to +175°C	1,1	High service temperature performance, good chemical resistance.
-40 to +130°C	1,5	Halogen-free, flame retardant, thermally conductive encapsulant with UL 94 V-0 listed rating.
-40 to +80°C	0,4	Epoxy sealant with excellent impact and vibration resistance and high cohesive strength.
-40 to +180°C	0,7	Halogen-free, flame retardant material with excellent resistance to different solvents.
-40 to +180°C	NA	Excellent thermal shock and chemical resistance; excellent high temperature resistance.
-40 to +180°C	0,6	Halogen-free, one-component, flame retardant encapsulant.
-40 to +180°C	0,5	Low stress, low viscosity encapsulant.
-40 to +125°C	0,5	Flexible polyurethane encapsulant.
-40 to +125°C	0,7	Flame retardant, flexible polyurethane encapsulant.
-40 to +150°C	0,5	Flexible, polyurethane encapsulant with high service temperature.
-40 to +125°C	NA	Flexible, lightweight polyurethane.
-60 to +220°C	NA	Very low stress; extremely wide temperature range of use; excellent penetration into tight components; primerless adhesion.
-40 to +105°C	NA	Dip, spray, or flow coating; UV light + moisture cure ideal for temperature sensitive substrates; compatible with standard PCB materials.
-40 to +200°C	NA	Optically clear; high purity for semiconductor applications; low stress elastomer; IC and hybrid passivation.

ADHESIVES AND SEALANTS

Product	Chemistry	Viscosity at 25°C (Pa.s)	Lowest Temperature Cure	Fastest Time Cure	Durometer Hardness
A 164-1	1K Epoxy	20	60 min @ 120°C	20 min @ 160°C	85D
A 316-7	1K Epoxy	42	30 min @ 120°C	2 min @ 180°C	> 85D
A 316-48	1K Epoxy	50	30 min @ 100°C	1 min @ 160°C	86D
A 401	1K Epoxy	85	60 min @ 120°C	5 min @ 180°C	> 80D
G 909	1K Epoxy	Paste	90 min @ 100°C	20 min @ 150°C	78D
2332 ²⁾	1K Epoxy	75	90 min @ 100°C	20 min @ 150°C	75D
2780-45	1K Epoxy	65	90 min @ 120°C	20 min @ 160°C	88D
E 3508 MOD 3	1K Epoxy	30	20 min @ 90°C	5 min @ 140°C	88D
XE 80100	1K Epoxy	12	90 min @ 120°C	15 min @ 175°C	80-85D
XU 80228	2K PU	Paste	90 min @ 25°C	10 min @ 110°C	75D

UNDERFILL ENCAPSULANTS

Product	Chemistry	Viscosity at 25°C (Pa.s)	Work Life at 25°C	Underfill Time (s)	Recommended Cure Schedule(s)	Filler Content (%)
E 1216	Epoxy	# 3 @ 5 rpm : 6	4 days	17 ⁽⁴⁾	10 min @ 130°C 5 min @ 150°C	44
E 1172 A	Epoxy	# 3 @ 5 rpm : 17	48 h	33 ⁽⁵⁾	6 min @ 135°C 3 min @ 150°C	66

²⁾not available in Japan

NA = Not Applicable

⁽⁴⁾1 cm travel @ 80°C on glass 180 μ gap ⁽⁵⁾1 cm travel @ 90°C on glass 100 μ gap

Immersion Performance after 1000 h

Immersion Condition	U 2500 HTR	G 508-1	2850 FT/27-1	2651-40 W 1/27-1
Synthetic Oil @ 25°C	+	++	++	++
Synthetic Oil @ 140°C	0	++	++	++
Brake Fluid @ 25°C	0	++	++	++
ATF @ 25°C	+	++	++	++
ATF @ 140°C	0	++	++	++
Salt Water (5%) @ 25°C	+	++	++	++
Salt Water (5%) @ 85°C	+	+	+	+
Euro Diesel @ 25°C	0	++	++	++
Euro Diesel @ 65°C	0	++	++	++
Reference Fuel C @ 25°C	0	+	++	++

++ Highly recommended

+ Recommended

0 Not Recommended

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Temperature Range of Use	Thermal Conductivity (W/m.K)	Features
-40 to +125°C	NA	Good adhesion and peel strength to metal, glass, plastics; excellent thermal shock resistance.
-40 to +155°C	0,4	Excellent thermal stability and chemical resistance.
-40 to +180°C	0,4	Oxide-filled but pourable; excellent heat resistance; fast cure times.
-40 to +155°C	0,5	Good thermal conductivity; good high temperature resistance; bonds well to metal, glass, plastics, and ceramics.
-40 to +150°C	NA	Very high adhesive strength over broad temperature range; low temperature flexibility; good to bond dissimilar substrates.
-40 to +150°C	NA	One-component, low temperature curing, high strength, epoxy adhesive.
-40 to +180°C	0,6	Non-abrasive filler; excellent thermal shock resistance; excellent adhesive strength.
-40 to +150°C	NA	Low temperature, fast curing adhesive.
-45 to +200°C	NA	One-component, low stress, modified epoxy adhesive with high service temperature.
-40 to +125°C	NA	Flexible, heat resistant, polyurethane sealant.

CTE (ppm/°C)	Tg (°C)	Features
34	115	One-component, non-anhydride curing capillary flow underfill for BGA, CSP. E 1216 is designed for high volume assembly operations that require an underfill that flows very fast and fully cures in the length of one reflow oven.
27	135	One-component, non-anhydride curing underfill providing fast flow, fast cure and enhanced moisture resistance. Formulated for use with very fine pitch area array devices and flip chips, easily underfilling devices with 25 micron geometries.

XE 70202	S 5225	2332	E 3508 MOD 3	2780-45	A 316-7
++	+	++	++	++	++
++	0	++	++	++	+
++	++	+	+	++	++
++	0	++	++	++	++
++	0	+	++	++	+
++	+	+	++	++	++
+	+	0	+	+	+
++	0	++	++	++	++
++	0	0	++	++	+
++	0	0	+	++	++



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