United Adhesives

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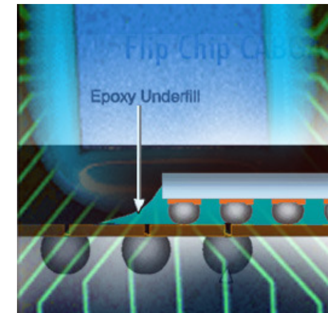
Underfills and Encapsulants



Epoxy based underfill and encapsulant products from United Adhesives are for semiconductor applications such as to attach chip-on-board, bare die, BGA, flip-chip, CSP, etc, or to under-fill the gap between die /chip and substrate, or to encapsulate dies, chips, components, or powder devices.

They provide various superior features such as:

- Excellent capillary flow capability.
- High Tg formulation for high temperature stability.
- Very low CTE formulation to minimize the thermal mismatch.
- High voltage insulation formulation.
- Strong bond to FR4, ceramic, polyimide, metals, and other difficult materials.
- Good dielectric property. Low current leakage.
- Thermally conductive underfills are also available.

Name	TUF1210	UF1225	UF1230	UF1240	RUF1250	SE1260
Features / Advantages	Thermally conductive underfill. Capillary Flow. Dielectric. Low thermal expansion and high Tg.	Extremely Low CTE underfill with high Tg. Capillary Flow. Good Dielectric. Low current leakage.	Low CTE, high Tg underfill. Excellent thermal stability. Capillary flow. Good Dielectric. Low current leakage.	High bonding strength with rubber toughened. Capillary flow. Strong bond to polyimide, silicone nitride surfaces.	Reworkable underfill formulation. Capillary Flow. Apply heat to lift the BGA / die.	Soft epoxy encapsulant for thermal stress release. Capillary flow. Excellent bonding to most plastic and metal surfaces.
Typical Application	Semiconductor encapsulant for chip-on-board, Bare Die, BGA, CSP, etc, that need to good heat dissipation	For applications that require extreme low CTE such as in Flip-Chip, Chip-on-Board devices.	Underfilling or encapsulating for chip-on-board, bare die, BGA, flip-chip, CSP,applications that require low CTE.	For underfill or encapsulation applications in electronics that require strong bonding and toughness.	To underfill components such as chip-on-board, bare die, BGA, flip-chip, CSP, etc. that require reworkable capability.	Low stress bond & flexible underfill. Bond to PBT, PPS, Nylon, PC, Phenolics and other difficult materials.
Viscosity @25C (cps)	15,000	9,000	8,000	5,000	4,000	5,000
Part / Component	One	One	One	One	One	One
Work life (hr)	24 hrs @25C	24 hrs @25C	24 hrs @25C	24 hrs @25C	24 hrs @25C	24 hrs @25C
Cure Rate	125C 25 min	150C 15 min	125C 25 min	125C 30 min	125C 30 min	125C 30 min
Shelf Life (days)	> 3 months @ -40C	> 3 months @ -40C	> 3 months @ -40C	> 3 months @ -40C	> 3 months @ -40C	> 3 months @ -40C
Thermal Stability	-80 to 200C	-80 to 200C	-80 to 200C	-80 to 200C	-80 to 200C	-80 to 180C
Tg	125	150	155	125	115	< 85
CTE (ppm/C)	< 80 (above Tg) 23 (below Tg)	125 (above Tg) 53 (below Tg)	< 80 (above Tg) < 20 (below Tg)	< 80 (above Tg) < 20 (below Tg)	< 110 (above Tg) < 50 (below Tg)	115
Storage Shear Modulus	7.0 Gpa	3.7 Gpa	7.6 Gpa	7.0 Gpa	5.0 Gpa	Shore A =65
Volume Resistivity (Ohm-cm)	> 10E14	> 10E14	> 10E14	> 10E14	> 10E14	> 10E13
Dielectric Strength (KV/mm)	> 500 V/mil	> 500 V/mil	> 500 V/mil	> 500 V/mil	> 500 V/mil	> 400 V/mil
Dielectric Constant @100Hz, 25C	3.5	3.5	3.5	3.5	3.5	4.0
Adhesion (Al/Al Lap Shear, psi)	> 1800 psi	> 2200 psi	> 1800 psi	> 1800 psi	> 1500 psi	> 500 psi
Thermal Conductivity (W/mK)	1.0	~ 0.7	~ 0.6	~ 0.6	~ 0.5	~ 0.3

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Properties of Underfills