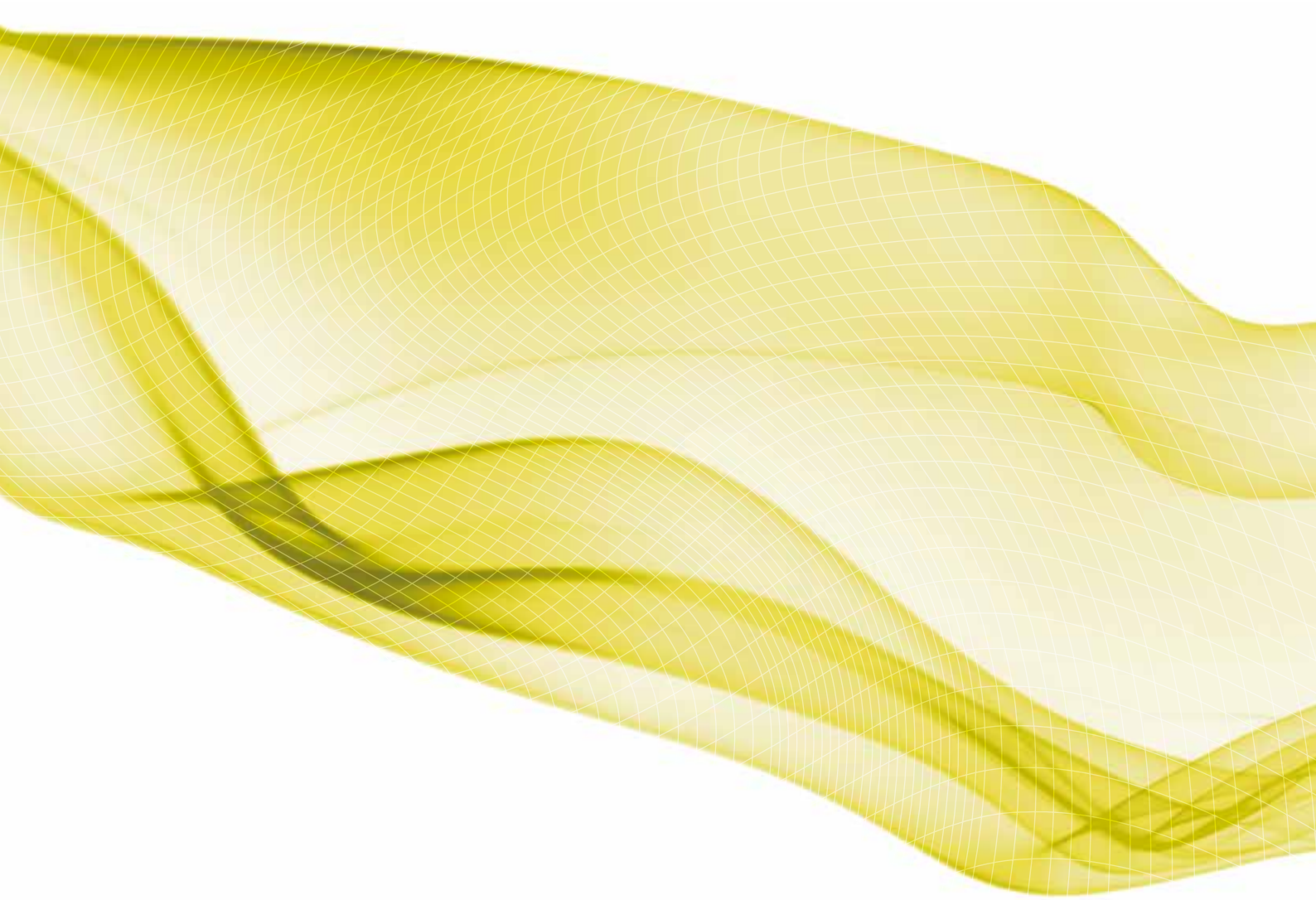
Encapsulation Resins

Meeting the challenge of challenging environments



ELECTROLUBE

THE SOLUTIONS PEOPLE

Encapsulation Resins

- UL approved
- Potting / encapsulating
- Sealing and protection
- Cable jointing
- Coloured and optically clear
- Bespoke and ex-stock

Resin systems are designed to protect and insulate printed circuit boards (PCBs) and electronic components from the threats of harsh and challenging environments, including; moisture, vibration, thermal or physical shock and general contamination. By encapsulating the entire device, resins can form a complete barrier against such environments offering superior performance under extreme conditions.

Potting and encapsulation resins also offer excellent mechanical protection. Mechanical protection can be identified in a number of ways; superior performance is evident in applications involving prolonged exposure or immersion in harsh chemicals, or those exposed to vibrational, thermal or physical shock, for example. The higher level of protection is achieved through the mass of the resin surrounding the unit. This is different for every application however potting and encapsulating resins always provide a far more substantial covering than that offered by conformal coatings.

Due to the bulk of material surrounding the PCB, potting and encapsulation resins are commonly two-part systems which when mixed together form a solid, fully cured material, with no by-products. In cases where the conditions are not considered extreme, Electrolube offer a range of conformal coatings which provide a combination of protection in humid and corrosive environments with ease of application. They can be used for complete coverage or selective application onto the PCB, thus minimising the weight added as a result of applying a protective material.

The Product Range

Epoxy Resins

ER1122 (Clear Amber)

- Excellent adhesion to a wide variety of substrates
- Mix ratio can be altered to vary flexibility
- Good electrical properties
- Can be used as an adhesive or encapsulant

ER1426 (Water white)

- Excellent clarity
- Very low viscosity
- Long useable life
- Ideal for impregnation applications

ER1451 (Clear) and ER1450 (White)

- High water resistance
- Excellent adhesive properties
- Low dielectric constant
- Very low viscosity

ER2162 (Black)

- Exceptional chemical resistance
- Ideal for applications where frequent immersion in fuels may occur
- Good electrical properties
- Flame retardant

ER2183 (Black)

- Good thermal conductivity
- Low viscosity alternative to ER2220
- Enhanced machine mixing and dispensing
- Good all round protection

ER2188 (Black)

- Flame retardant - certified to UL94 V-0
- General purpose potting resin
- Excellent all round protection
- High hardness material

ER2195 (Black)

- Flame retardant - certified to UL94 V-0
- Tough resin with increased durability
- Excellent thermal shock resistance
- For transformers, large castings, rotor arm sealing, pyrotechnical cables, diesel sensors and other automotive applications

ER2218 (Black)

- Low viscosity
- Flame retardant, meets UL94 V-0
- Excellent high temperature stability
- Ideal for applications involving thermal cycling or extreme temperatures for short periods of time, such as rellow applications

ER2219 (Black)

- Single-part epoxy
- Flame retardant
- Heat cure product
- Suitable for dipping and glob-top

ER2220 (Grey)

- Excellent thermal conductivity
- Flame retardant
- No abrasive fillers
- For potting PCBs, power supplies, converters and temperature sensors

Silicone Resins

SC2001 (Dark Grey)

- General purpose silicone resin
- Exceptional flexibility
- Good chemical and water resistance
- Flame retardant

SC2001FD (Dark Grey)

- Fast cure version of SC2001
- Good chemical and water resistance
- Exceptionally wide operating temperature range
- Flame retardant

SC2003 (Dark Grey)

- Highly thixotropic two part potting compound
- A 1:1 ratio for ease of processing
- Flame retardant
- High thermal conductivity

SC3001 (Optically Clear)

- Optically clear, two-part potting compound
- Suitable for use in LED applications or where high level of clarity is required
- Offers exceptional protection for electronics
- Low viscosity – easy to apply even in thin films

Polyurethane Resins

UR5041 (Black)

- Excellent resistance to sea water
- High toughness and tear resistance
- Good adhesion to most substrates
- Properties retained at temperatures down to -60°C

UR5044 (Dark Blue)

- Flame retardant, certified to UL94 V-0
- Soft, re-workable resin
- Flexible even at temperature extremes
- Ideal for prototype circuitry, silicone replacement, and control units

UR5048 (Clear Straw)

- Low viscosity and very low hardness
- Transparent – clear to allow fast fault finding
- Low embedment stress
- Ideal for protecting delicate components from mechanical and thermal shock

UR5083 (Clear Straw)

- Self-healing polyurethane gel
- Low viscosity
- Excellent water resistance
- Ideal for underwater cable jointing

UR5097 (Black)

- Flame retardant, certified to UL94 V-0
- High thermal conductivity
- Low water absorption
- Excellent electrical properties

UR5118 (Black)

- Excellent electrical properties
- Low dielectric constant
- Excellent resistance to sea water
- Very low viscosity

UR5528 (Black)

- Durable with a high degree of toughness
- Excellent adhesion to a wide variety of substrates
- Low viscosity allowing ease of application
- Excellent resistance to acids, alkalis and other aqueous materials

UR5545 (Black)

- Fast-cure system
- Tough, resilient polyurethane resin
- Low viscosity
- Suitable for cable jointing applications

UR5547 (Black) or (UR5581) White

- Semi rigid, flame retardant casting resin
- Water and impact resistant
- Excellent adhesion to a wide variety of substrates
- Ideal for use in potting or cable jointing applications

UR5562 (Optically Clear)

- Water white transparency, ideal for potting LEDs
- Excellent resistance to yellowing when exposed to UV light
- Excellent scratch and mark resistance
- High resistance to weather, acids and alkalis, water and mould growth

UR5604 (Black)

- Flame retardant, certified to UL94 V-0
- Low mixed system viscosity
- Excellent adhesion to a wide variety of substrates
- Good thermal conductivity

UR5608 (Black) or UR5623 (White)

- Flame retardant, certified to UL94 V-0
- Semi-rigid polyurethane resin with exceptional toughness
- Excellent adhesion and chemical resistance
- Fast cure version available

UR5633 (Black)

- Exceptionally high thermal conductivity
- Excellent electrical properties
- Very low water absorption
- Flame retardant

Electrolube also offer an extensive range of bespoke resins, please contact us for further information

Polyurethane Resins

Specialist Property	UR5041 Water Resistance	UR5048 Soft, Low Stress	UR5044 Soft, Re-enterable	UR5528 Tough, High Adhesion	UR5562 Optically Clear	UR5633 Thermally Conductive	UR5604 Tough, Flexible
Colour (Mixed System)	Black	Clear Amber	Dark Blue	Black	Water White	Black	Black
Cured Density (g/ml)	1.18	0.95	1.49	1.07	1.02	1.65	1.54
Mixed System Viscosity (mPa s @ 23°C)	2500	980	3400	2000	300	30000	2000
Mix Ratio by Weight (by Volume)	3.6:1 (3.9:1)	14:1 (19:1)	13.4:1 (20:1)	2.4:1 (2.9:1)	2.2:1 (2.3:1)	12.2:1 (8.8:1)	5.2:1 (3.9:1)
Usable Life (Minutes @ 23°C)	20	20	25	20	17	15	40
Gel Time (Minutes @ 23°C)	60	40	40	35	22	40	90
Cure Time (Hours @ 23°C/60°C)	24/4	24/4	24/3	24/5	24/4	24/4	24/3
Shore Hardness	A85	A12	A40	D57	A95	A90	A75
Thermal Conductivity (W/m.K)	0.25	0.20	0.25	0.25	0.20	1.24	0.45
Temperature Range (°C)	-60 to +125	-60 to +100	-60 to +120	-50 to +125	-40 to +120	-50 to +125	-40 to +130
Maximum Temperature - Short Term (°C)	+130	+100	+130	+130	+130	+130	+155
Dielectric Strength (kV/mm)	20	18	18	25	11	18	18
Volume Resistivity (Ω-cm)	10^{15}	10^{14}	10^{10}	10^{14}	10^{14}	10^{14}	10^{14}
Flame Retardency Level	-	-	V-0	-	-	V-0	V-0
UL94 Approval	No	No	Yes	No	No	No	Yes
RoHS Compliant	Yes	Yes	Yes	Yes	Yes	Yes	Yes

For exact calculated ratios please see the technical data sheet.

Epoxy Resin

Specialist Property	ER2188 General Purpose	ER2220 High Thermal Conductivity	ER2183 Low Viscosity, Thermally Conductive	ER2218 High Temperature Stability	ER1426 Optically Clear	ER1450 Very Low Viscosity	ER1122 Excellent Adhesion
Colour (Mixed System)	Black	Grey	Black	Black	Water white	White	Clear Amber
Cured Density (g/ml)	1.69	2.22	1.95	1.16	1.05	1.10	1.05
Mixed System Viscosity (mPa s @ 23°C)	9000	15000	5000	500	100	250	12000
Mix Ratio by Weight (by Volume)	11:1 (5.5:1)	2.8:1 (8.2:1)	12.8:1 (5.6:1)	3.6:1 (2.8:1)	4:1 (3.4:1)	2.5:1 (2.2:1)	1:1 (0.8:1)
Usable Life (Minutes @ 23°C)	60	120	120	40	120	15	90
Gel Time (@ 23°C)	2.5 hrs	3.0 hrs	7.0 hrs	50 mins	4.0 hrs	30 mins	4 hours
Cure Time (Hours @ 23°C/60°C)	24/2	24/4	24/4	24/4	36/8	12/2	48/4
Thermal Conductivity (W/m.K)	0.91	1.54	1.10	0.28	0.20	0.20	0.20
Temperature Range (°C)	-40 to +120	-40 to +130	-40 to +130	-50 to +150	-40 to +120	-50 to +130	-40 to +120
Maximum Temperature – Short Term (°C)	+140	+150	+150	+245	+130	+150	+140
Dielectric Strength (kV/mm)	10	10	10	10	10	10	12
Volume Resistivity (Ω-cm)	10^{14}	10^{15}	10^{15}	10^{14}	10^{14}	10^{15}	10^{14}
Shore Hardness	D85	D90	D90	D55	D85	D50	D80
Flame Retardency Level	V-0	V-0	V-0	V-0	-	-	-
UL94 Approval	Yes	No	No	No	No	No	No
RoHS Compliant	Yes	Yes	Yes	Yes	Yes	Yes	Yes

For exact calculated ratios please see the technical data sheet.

Silicone Compounds

Specialist Property	SC2001 High Temperature Resistance	SC2001FD Fast Cure	SC2003 Thixotropic	SC3001 Optically Clear
Colour (Mixed System)	Dark Grey	Dark Grey	Dark Grey	Optically Clear
Cured Density (g/ml)	1.40	1.15	1.60	1.04
Mixed System Viscosity (mPa s @ 23ºC)	3500	1800	30000	1800
Mix Ratio by Weight (by Volume)	1:1 (1:1)	1:1 (1:1)	1:1 (1:1)	13:1 (12:1)
Usable Life (Minutes @ 23°C)	30	4	40	30*
Gel Time (Minutes @ 23°C)	60	8	80	180*
Cure Time (Hours @ 23°C)	24	4	24	24*
Shore Hardness	A50	A40	A50	A20
Thermal Conductivity (W/m.K)	0.6	0.4	0.8	0.2
Temperature Range (°C)	-50 to +200	-45 to +200	-60 to +200	-60 to +200
Maximum Temperature - Short Term (°C)	+225	+225	+225	+250
Dielectric Strength (kV/mm)	20	21	20	-
Volume Resistivity (Ω-cm)	10^{15}	10^{15}	10^{15}	10^{14}
Flame Retardency Level	V-0	V-0	V-0	HB
UL94 Approval	No	No	No	No
RoHS Compliant	Yes	Yes	Yes	Yes

**Cure times will be dependent on ambient humidity.*
For exact calculated ratios please see the technical data sheet.

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