

# Hysol® Electronic Formulated Liquids

Loctite Corporation now offers the newly expanded Hysol® line of room temperature curing epoxies, thermal cure epoxies, one-component epoxies, urethane systems, printed circuit board coatings, electrically/thermally conductive epoxies, and other specialty products. Hysol® Formulated Liquid products are used for a wide variety of applications. Standard products include one and two component encapsulants and potting compounds, in both epoxy and polyurethane chemistries.



Loctite also provides custom-formulated epoxies and polyurethanes, designed to meet the specific demands of our customers' unique applications. The market segments we serve are wide-ranging, and they include filtration (sealing filter media to caps or frames), electrical (potting or encapsulating coils, transformers, and sensors), and electronics (encapsulating printed circuit boards and microelectronics for protection from the elements).



# Hysol® Electronic Formulated Liquid Products

## Epoxy Potting Compounds

HYSOL® SYSTEM		DESCRIPTION	POT LIFE 200 GRAM MASS @ 25°C	VISCOSITY CENTIPOISE @ 25°C	RECOMMENDED CURE	MIX RATIO (BY WEIGHT)
<b>ES0306</b>		A toughened two-component epoxy casting system featuring UL94V-0 rating.	20 min.	21,000	2 hrs. @ 60°C	100/11
<b>ES0397</b>		A two-component epoxy casting system especially recommended for large castings (e.g. transformers)	20 hrs.	57,000	3 hrs. @ 80°C	100/95
<b>ES0495</b>		A two-component epoxy casting system featuring high thermal conductivity with medium viscosity.	60 min.	10,000	24 hrs. @ 25°C plus 2 hrs. @ 60°C	100/7
<b>ES0610</b>		A two-component filled system developed for vacuum impregnation. It is especially recommended for paperwound ignition coil applications.	>8 hrs.	7,200	2 hrs. @ 93°C plus 3 hrs. @ 150°C	100/43
<b>EE0079</b>	<b>HD0070</b>	Clear, low viscosity, two component epoxy casting and adhesive system.	25 min.	1,500	4 hrs. @ 50°C	100/25
<b>EE1068 (EE1067)</b>	<b>HD3561</b>	A black flame-out casting system which meets the UL flammability requirements for 94V-0. EE1067 is the unpigmented version of EE1068.	2 hrs.	1,000	3 hrs. @ 60°C or 48 hrs. @ RT	100/15
	<b>HD0243</b>	A black flame-retardant system designed for applications requiring higher service temperatures.	7-8 hrs.	30,500	2hrs. @ 80°C plus 2 hrs. @ 150°C	100/13
<b>EE1087</b>	<b>HD3404</b>	High thermally conductive black casting systems for applications requiring heat dissipation or transfer. Hardener HD0243 should be used for higher temperature applications.	25 min.	29,000	24 hrs. @ RT or 2 hrs. @ 60°C	100/3
	<b>HD3561</b>		30 min.	8,000	24 hrs. @ RT or 2 hrs. @ 60°C	100/7
	<b>HD0243</b>		8 hrs.	30,000	2 hrs. @ 80°C plus 2 hrs. @ 150°C	100/6

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## Urethane Systems

Hysol® SYSTEM	DESCRIPTION	POT LIFE @ 25°C	VISCOSITY CENTIPOISE @ 25°C	RECOMMENDED CURE
<b>US5546</b>	Formerly Restech-Biwax 82992. Clear, extremely soft, low viscosity re-enterable Poly BD potting compound is designed to protect delicate electronics and assemblies. This can be used as a gel material, it is so soft.	100 gram mass 15 min.	1,400	24-48 hrs. @ 23°C or 1-3 hrs. @ 60-85°C
<b>US5504</b>	Formerly Restech-Biwax 82922. Unfilled, low viscosity, re-enterable Poly BD potting and encapsulant that cures rapidly at ambient conditions.	100 gram mass 5-10 min.	3,800	24 hrs. @ 23°C or 1-3 hrs. @ 60-85°C
<b>US5528</b>	Formerly Restech-Biwax 646. Flexible, flame-retardant potting compound has long pot-life and is low-viscosity. Very low odor and does not contain TDI or mercury compounds.	300 gram mass 45 min.	2,000	12-24 hrs. @ 23°C or 1-3 hrs. @ 60-85°C
<b>US5500</b>	Formerly Restech-Biwax 82878. A Poly BD, re-enterable system will low glass transition temperature so that sensitive components (SMT boards) are not damaged during low temperature exposure.	100 gram mass 10 min.	1,000	16 hrs. @ 25°C or 5-15 min. @ 60-85°C
<b>US5531</b>	Formerly Restech-Biwax 82691. Unfilled, low viscosity, re-enterable Poly BD potting encapsulation compound with excellent low temperature properties. Introduction of this material on a bed of 8-12 mesh sand increases thermal conductivity while decreasing shrinkage and cost.	100 gram mass <60 min.	1,000	2-4 hrs. @ 60-85°C or 24 hrs. @ RT
<b>US5517</b>	Formerly Restech-Biwax 821101. A Poly BD, flame retardant, flexible urethane encapsulant/sealant is excellent for potting electronics devices for protection against environmental hazards. UL recognized V-0 File E94621.	200 gram mass 40-60 min.	2,500	24-48 hrs. @ 25°C or 2-4 hrs. @ 60-85°C
<b>US5551</b>	Formerly Restech-Biwax 82896. A flexible, mineral filled potting compound. It is a low odor system designed to be friendly to the work environment.	100 gram mass 5-10 min.	6,000	2-3 hrs. @ 25°C or 30 min. @ 85°C
<b>US5538</b>	Formerly Restech-Biwax 639. A flexible unfilled potting compound. This system provides low viscosity for good flow and adhesion to many substrates. It is a low odor system designed to be friendly to the work environment.	100 gram mass 20-40 min.	450	24-28 hrs. @ 25°C or 1-3 hrs. @ 60-85°C
<b>US0028</b>	A low viscosity urethane casting system for general purpose use which cures to hardness of Shore A 60. Useful up to 125°C (257°C).	200 gram mass 60 min.	4,500	5 hrs. @ 85°C or 8 hrs. @ 60°C
<b>US0044</b>	Clear, low viscosity urethane casting system featuring optical clarity and ultraviolet resistance. Shore A 90 hardness. Used for decorative doming.	155 gram mass 4 min.	5,000	48 hrs. @ RT or 1 hr @ 85°C
<b>US0127</b>	This is a specially formulated urethane to meet the flammability requirements of UL94 V-0 (non-drip). It cures to a hardness of Shore D 65.	50 gram mass 45 min.	2,900	5 hrs. @ 85°C or 2 hrs. @ 100°C

## Printed Circuit Board Coatings

Hysol® SYSTEM	DESCRIPTION	POT LIFE @ 25°C	VISCOSITY CENTIPOISE @ 25°C	RECOMMENDED CURE	FILM THICKNESS
<b>PC12-007M</b>	A 100% solids epoxy, printed circuit coating for dip or brush application. It may be thinned with aromatic solvent for spray application.	190 min.	Medium	2 hrs. @ 75°C or 4 hrs. @ 65°C	1.5-6 mils
<b>PC16M</b>	High build version of PC12-007M.	190 min.	High	2 hrs. @ 75°C or 4 hrs. @ 65°C	1.5 to 14 mils
<b>PC17M</b>	Solvent based low viscosity epoxy printed circuit coating.	1- 3 days	Low	30 min. @ 25°C plus 180 min. @ 60°C or 90 min. @ 70°C	1 - 3 mils
<b>PC18M</b>	A clear one-component urethane printed circuit coating for brush, dip or spray application. This tough abrasion resistant coating provides excellent environmental protection.	n/a	Low	2 hrs. @ 60°C or 5-7 days. @ RT	2 - 4 mils
<b>PC20M</b>	A one-component acrylic printed circuit coating with excellent clarity up to 110°C. May be repaired with soldering iron or coating and can be removed with suitable solvent.	n/a	High	30 min. @ 25°C plus 45 min. @ 75°C or 24 hrs. @ RT	1 - 4 mils
<b>PC29M</b>	Two component urethane printed circuit coating with excellent moisture resistance.	6 hrs.	Low	2 hrs. @ 100°C or 4 hrs. @ 60°C	2 - 4 mils

# Hysol® Electronic Formulated Liquid Products

## Thermal Cure Epoxies

Hysol® SYSTEM		DESCRIPTION	TYPICAL APPLICATIONS	POT LIFE	VISCOSITY	RECOMMENDED CURE
RESIN	HARDENER			200 GRAM MASS @ 25°C	CENTIPOISE @ 25°C	
RE2039 EE4183	HD0242	An undiluted casting system for moderate elevated temperature applications. Filled resin EE4183 provides improved thermal properties, lower shrinkage and lower coefficient of expansion.	Medium Tg (120°C) material for potting coils and resistors	40-50 min. 50-60 min.	6,000 25,000	1 hr. @ 40°C plus 2 hrs. @ 150°C
EE4183	HD3485	A filled, extremely low exotherm system for very large castings. It has excellent electrical insulation properties and performs well as an encapsulant for high voltage power supplies and bushings.	Very large castings, to 400 lbs. and electrical bushings	24 hrs.	70,000	6 hrs. @ 100°C
RE2039 EE4183	HD0243	A high Tg, humidity resistant casting compound which has excellent chemical resistance and electrical properties. EE4183 is the silica filled resin for improved thermal properties, lower shrinkage and lower coefficient of expansion.	High Tg (132°C) material for potting coils and resistors	7-8 hrs. 7-8 hrs.	10,000 25,000	2 hrs. @ 80°C plus 2 hrs. @ 150°C
EE4183	HD3537	A filled, anhydride cured system with a high Tg temperature. The cured system displays excellent electrical properties through a broad range of frequencies and temperatures up to 200°C (392°F).	Potting transformers and other parts where high temperatures are expected	2 hrs. @ 70°C	400 @ 70°C	3 hrs. @ 120°C plus 16 hrs. @ 160°C

## One Component Epoxies

Hysol® SYSTEM	DESCRIPTION	TYPICAL APPLICATIONS	VISCOSITY CENTIPOISE @ 25°C	RECOMMENDED CURE
E00202	A one-component, non-abrasive filled epoxy encapsulant featuring excellent shelf life, thermal shock and chemical resistance. E00202 should not be used for casting masses larger than 50 grams.	Sealing filter end-caps, general potting	22,000	30 min. @ 110°C plus 30 min. @ 125°C
E08012	Formerly Restech-Biwax 9720. Filled, flame retardant, heat activated, fast cure, 100% solids, low cost, one part potting compound. Low viscosity allows for complete impregnation of small parts. UL File #E94621.	Potting for electrical part requiring UL flammability recognition of V-0 and UL 1446 insulation system to 180°C	8,000	2 hrs. @ 121°C or 4-5 hrs. @ 104°C
E08013	Formerly Restech-Biwax 9726. Filled, non-sag, 100% solids, heat activated temperatures make it ideal for high production processes.	Ideal as a gap cement and for bonding end caps on filters	600,000	10-15 min. @ 149°C or 24-30 min. @ 121°C

## Room Temperature Cure Epoxies

Hysol® SYSTEM		DESCRIPTION	TYPICAL APPLICATIONS	POT LIFE	MIXED VISCOSITY	RECOMMENDED CURE	MIX RATIO (BY WEIGHT)
RESIN	HARDENER			200 GRAM MASS @ 25°C	CPS @ 25°C		
RE2038 EE4143	HD3404	A low viscosity, rigid casting system using a diluted base resin. EE4143 is the silica filled resin for improved thermal properties, lower shrinkage and lower coefficient of expansion.	General potting, solenoids, transformers (small), resistors, capacitors, modules.	20 min. 20 min.	500 3,000	3 hrs. @ 60°C 2 hrs. @ RT or	100/11 100/5.5
RE2039 EE4183	HD3404	An undiluted, 100% solids, rigid casting for optimum physical and electrical properties and chemical resistance. EE4183 is the silica filled resin for improved thermal properties, lower shrinkage and lower coefficient of expansion.	General potting, solenoids, transformers (small), resistors, capacitors, modules.	20 min. 20 min.	3,000 10,500	3 hrs. @ 60°C 2 hrs. @ RT or	100/11 100/5.5
RE2039 EE4183	HD3561	An undiluted, low viscosity casting system that exhibits exceptional resistance to impact and thermal shock. Filled resin EE4183 provides improved thermal properties, lower shrinkage and lower coefficient of expansion. This system adheres extremely well to most surfaces.	Capacitors, clear castings, coils, modules, solid state relays	35 min. 80 min.	600 10,000	24 hrs. @ RT or 3 hrs. @ 60°C	100/30 100/15
RE2039 EE4183	HD3475	A medium viscosity diluted resin based system that offers easy mix ratio and reduced toxicity potential. Filled resin EE4183 provides improved thermal properties, and lower coefficient of expansion.	General potting, higher viscosity than HD3404	25 min. 30 min.	10,000 70,000	2 hrs. @ 60°C or 24-36 hrs. @ 25°C	100/25 100/12.5
ES4212 ES4312 ES4412 ES4512		Extremely versatile black casting system with long pot life, low cost and low exotherm. Its 1-to-1 volume mix ratio and soft filler make it ideal for machine dispensing or hand mixing. ES4312 is a faster curing version of ES4212. ES4412 is a lower viscosity version of ES4312 for faster processing through dispensing equipment or easier flow in restricted packages. ES4512 is the UL94 V-O version.	General potting, coils, modules, small transformers, capacitors	3 hrs. 90-110 min. 90-110 min. 90 min.	35,000 30,000 10,000 (max.) 19,000	24 hrs. @ RT or 3 hrs. @ 60°C	100/100 volume
ES6010		Formerly Restech-Biwax 10420-012. Filled, resilient, highly flame retardant UL File #E94621, low viscosity, good surface appearance potting material.	Potting for electrical parts which require UL flame retardant recognition.	80-100 min.	6,000	24 hrs. @ 25°C or 2 hrs. @ 60°C	100/15.7
ES6005		Formerly Restech-Biwax 10207-278. Resilient, low cost, low viscosity, fast gelling potting compound. UL recognized for HB File #94621 and UL 1444 File #E119293 180°C. Easy mix ratio of 2 to 1 by volume.	Ideal for potting and encapsulating high volume parts.	400 gram mass 10 min.	1,500	16 hrs. @ 25°C or 2 hrs. @ 66°C	100/29.5