



PRODUCT INFORMATION

HIGH TECHNOLOGY MATERIALS

MERECO 4580 SERIES

EPOXY RESIN ENCAPSULATING COMPOUND FOR MICRO ELECTRONIC CIRCUIT ELEMENTS AND MICRO-MODULE APPLICATIONS

MERECO 4580 is an epoxy resin encapsulating compound without solvents, reactive diluents or other degrading adulterants. The mineral filler system, permanently suspended by intrinsic dispersion, does not settle, either during storage or during cure. Physical and electrical properties are thereby uniform throughout the entire cured mass.

MERECO 4580, when fully cured, exhibits excellent chemical resistance (conventional chemical epoxy resin strippers will not attack **MERECO 4580**), good mechanical strength and machinability.

MERECO 4580, used as a general purpose encapsulating compound, has gained recognition and acceptance as a reliable standard for diverse applications. The availability of four low viscosity curing agents provides a variety of working lives and curing schedules. Minimal shrinkage, coupled with maximum physical and electrical properties, make **MERECO 4580** especially well suited to the stringent requirements of high-density circuit packages, miniaturized component assemblies, circuit elements, and micro-module encapsulations.

OUTSTANDING FEATURES OF MERECO 4580 SERIES WITH:

MERECO HARDENER 6	Low viscosity; linear shrinkage; low exotherm; short heat cure for maximum properties
MERECO HARDENER 12	Moderate viscosity; high compressive strength; room temperature cure.
MERECO HARDENER 14	Low viscosity and exotherm; long working life; short heat cure to maximum properties.
MERECO HARDENER 19	Lowest viscosity hardener system; high impact strength; high heat distortion temperature; heat cure required.

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FORM 1105 REV. 0

MERECO TECHNOLOGIES GROUP * 1505 MAIN STREET * WEST WARWICK, R.I. 02893 * (401) 822-9300 * Fax (401) 822-9311

PROCEDURE FOR USING MERECO 4580 SERIES

1. Measure 100 parts of any **MERECO 4580 SERIES** compound. To aid penetration into extremely tight voids or coil windings, preheat the resin before mixing.
2. Measure the proper parts of **MERECO HARDENER** (see Table I).
3. Thoroughly mix the curing agent into the **MERECO 4580 SERIES** compound. Mechanical mixing is preferable to hand mixing.
4. Deaerate and pour at room temperature.
5. Suggested curing schedules are listed in Table II. Other cure schedules are applicable within the range of properties required. Post-curing for maximum physical and electrical properties is recommended.

TABLE I - CURING AGENT MIXING DATA

	<u>MERECO HARDENER</u>			
	<u>6</u>	<u>12</u>	<u>14</u>	<u>19</u>
Parts HARDENER for 100 parts MERECO 4580 SERIES compound				
By weight	8.3	8.0	5.0	10.0
By volume	12.9	11.8	8.4	15.1
Viscosity (25°C), cP	10,500	12,500	9,500	5,000
Pot Life (25°C), minutes	80	65	210	65
Gel Time (25°C), minutes	110	75	300	165
Peak Exotherm (100g at 25°C), °C	81	114	82	88

TABLE II - RECOMMENDED CURING SCHEDULES

<u>MERECO HARDENER</u>	<u>CURE SCHEDULE</u>	<u>POST-CURE</u>
6	Room temperature, gel plus 2 hr. at 150°F, or 30 min. at 240°F	2 hr. at 150°F or 90 min. at 180°F
12	Room temperature (maximum properties attained in 4 days)	Optional: 30 min. at 240°F, or 3 hr. at 180°F
14	1 hr. at 180°F, or 90 min. at 145°F	Optional: 1 hr. at 180°F
19	Room temperature gel plus 2 hr. at 150°F	2 hr. at 150°F

TABLE III - TYPICAL PROPERTIES OF FULLY CURED MERECO 4580 SERIES*

PROPERTY	TEST METHOD	PROPERTY VALUE HARDENER			
		6	12	14	19
<u>Physical</u>					
Shrinkage, linear	Mereco	0.006	0.007	0.005	0.009
Density, lbs. in ⁻³	D792	0.048	0.050	0.047	0.047
Specific Gravity (25°/25°C)	792	1.35	1.37	1.30	1.31
Tensile Strength, psi	638	9,000	9,400	9,400	11,600
Compressive Strength, psi	D695	17,000	12,000	20,000	18,450
Flexural Strength, psi	790	15,000	8,000	17,000	17,500
Impact Resistance (Izod), ft-lbs. inch ⁻¹ notch	256	0.28	0.42	0.53	0.68
Hardness, Rockwell	D785	M-106	M-105	M-110	M-105
<u>Thermal</u>					
Expansion Coefficient, °C ⁻¹	D696	29 x 10 ⁻⁶	31 x 10 ⁻⁶	29 x 10 ⁻⁶	29 x 10 ⁻⁶
Thermal Conductivity, cal·sec ⁻¹ ·cm ⁻¹ ·°C ⁻¹	C-177	13.9 x 10 ⁻⁴	13.7 x 10 ⁻⁴	13.4 x 10 ⁻⁴	13.2 x 10 ⁻⁴
Operating Temperature Range, °C	Mereco	-55 to 125	-55 to 125	-55 to 125	-55 to 125
Thermal Shock Resistance	MIL-I-16923C	passes	passes	passes	passes
Deflection Temperature (264 psi), °C	648	102	110	104	105
<u>Electrical</u>					
Dielectric Strength, V·mil ⁻¹	D149	405	380	420	360
Volume Resistivity, ohm·cm	257				
25°C		3 x 10 ¹⁶	8 x 10 ¹⁶	9 x 10 ¹⁶	8 x 10 ¹⁵
100°C		8 x 10 ¹⁰	7 x 10 ¹²	6 x 10 ¹³	5 x 10 ⁹
Dielectric Constant (10 ³ Hz)	150	4.3	4.2	4.1	4.1
Dissipation Factor (10 ³ Hz)	150	0.016	0.018	0.018	0.018

*Values listed are for Standard ASTM test procedures unless otherwise designated. Properties listed are typical and are not intended as specifications.

TABLE IV - Typical Properties of Uncured Mereco 4583 and Curing Agents*

PROPERTY	MEREKO 4583				
	BASE	6	12	14	19
Color	Black	Amber	Amber	Colorless	Colorless
Form	Syrup	Liquid	Liquid	Liquid	Liquid
Specific Gravity, (25°C/25°C)	1.40	0.90	0.95	0.83	0.93
Viscosity (25°C), cP	45,000	35	60	10	15
Flash Point, °F	390	145	360	145	145

*Properties listed are typical only and are intended as specifications

STORAGE

MEREKO HARDENER 6, 12, 14 and 19 are amines. They are hygroscopic, absorbing moisture which increases viscosity and reactivity. They are also basic, absorbing carbon dioxide which destroys the reactive amine groups. **MEREKO HARDENER 6, 14 and 19** are combustible liquids with a flash point of 145°F. Store inside in a cool, dry, well ventilated area and away from sources of ignition.

MEREKO 4580 SERIES are epoxy resins. The products are uniform liquids when packaged, but frequently crystallize at room temperature because the pure diglycidyl ether of bisphenol-A has a melting point of 42°C.

Crystallization is induced by cold temperatures or seeding by ordinary dust particles. The product is restored to the liquid state by application of low heat (50° to 60°C) and stirring.

Store all products inside and in a cool, dry, well ventilated area. When kept tightly closed in the original containers at temperatures from 50° to 90°F, the warranted shelf-life is 6 months.

HANDLING PRECAUTIONS

Consult Material Safety Data Sheet before handling. Keep containers closed when not in use. Check uniformity of contents before using. These products are chemicals. Observe good industrial hygiene practices. Avoid breathing vapors. Irritation may result from repeated skin contact. Prevent eye contact. Effective ventilation, goggles and protective clothing are recommended for personnel. In case of accidental skin contact, wash the affected area with soap and water. In case of eye contact, flush eyes thoroughly with water and consult a physician. Contaminated clothing should be promptly removed and not worn until thoroughly cleaned. Discard contaminated leather. Wash thoroughly after handling and before eating, drinking, smoking or using the toilet.

DB 4580 Series

MERECO HARDENER 6, 12, 14 and 19 are liquids with a mildly ammoniacal odor and corrosive properties somewhat like ammonia. Contact with skin, eyes and mucosae causes burns. Avoid contact and breathing of vapors which might cause sensitization. Keep **MERECO HARDENER 6, 14 and 19** away from sources of ignition.

MERECO 4580 SERIES are combustible liquids (OSHA IIIB) having a mild odor. Contact with skin, eyes and mucosae causes irritation and may cause sensitization and dermatitis. Avoid contact. Do not inhale. Avoid heat, sparks or flame.

All products are for industrial use only.

AVAILABILITY AND ORDER INFORMATION

A. PACKAGING

These MERECO products are available as two-component kits consisting of separate containers of epoxy resin and curing agent. Standard packaging is in half-pint, pint, quart, gallon, five gallon and 55 gallon containers. Other kit sizes are available on special order.

B. COLOR

Black (MERECO 4583) is the standard color. **MERECO 4580 SERIES** is available in a range of colors as listed below. Special colors can be supplied to customer specifications.

<u>Product</u>	<u>Color</u>	<u>Product</u>	<u>Color</u>	<u>Product</u>	<u>Color</u>
4580	Tan	4583	Black	4586	Blue
4581	Yellow	4584	Red	4587	Green
4582	Brown	4585	Orange	4588	White
				4589	Gray

C. ORDERING

Specify the name, number, color, quantity and container size. Orders may be placed with your MERECO area factory representative or directly to MERECO TECHNOLOGIES, 1505 MAIN STREET, WEST WARWICK, RI 02893. Minimum order size is one hundred dollars. Evaluation kits are available on request.

AUXILIARIES

Clean hands with waterless **METATERGE 1421**.

Clean uncured MERECO resins from utensils and equipment with formulated **METATERGE 1405** (not flammable or corrosive; water soluble).

For vigorous stripping of stubborn, cured resins, use **METASTRIP 705**. It is a highly active corrosive solvent.

For mold release, use our **METAPART 7521** or **METAPART 7582**.

For air release, use **MERECO XLN-760** (non-silicone).

RELATED MERECO LITERATURE

Resin Selector Guide

Product Information Bulletins

- METATERGE 1405.** - Uncured epoxy remover
- METATERGE 1421.** - Power hand cleaner
- META-STRIP DP-705.** - Energetic stripper
- METAPART 7521.** - Epoxy and urethane mold release
- METAPART 7582.** - Fluorocarbon mold release agent
- MERECO XLN-760.** - Air release

MERECO TECHNOLOGIES offers a broad line of silicones and epoxies for coatings, encapsulating, potting, sealing and adhering. Call or write to request information on your needs and help with your problems. Our toll free number is 1-800-556-7164. Our fax number is 401 822-9311.