PLAINTIFF'S EXHIBIT
UC-1017

Dr Miller - Halloway Files

File: Bakelite Liquid Epoxy Resins + Hardeners (F-42461)

A23140

BAKELITE® LIQUID EPOXY HARDENER ZZL-0822
(POLYGLYCOLDIAMINE H-221)

BAKELITE® Liquid Epoxy Hardener ZZL-0822, a polyglycoldiamine, is a light colored, low-viscosity epoxy curing agent that imparts flexibility and high impact resistance to epoxy systems. It has low temperature thermal shock resistance and excellent adhesion. When properly combined with Liquid Bisphenol A-based resins, this hardener provides low viscosity and moderate pot life. BAKELITE® ZZL-0822 can be used in proper combination with all BAKELITE Epoxy Hardeners to attain desired properties.

BAKELITE® ZZL-0822 is recommended for use in adhesives, tooling, electrical encapsulation, troweling compounds, and coatings. Working time in coatings can be further extended by the addition of a ketone solvent (10-15% on resin weight).

TYPICAL PHYSICAL PROPERTIES

Determined on typical commercial material

Chemical Type	Polyglycoldiamine
Viscosity at 25°C. (WC-31-I)	10-25 centipoises
Amine Equivalent, g./g. mol amine hydrogen	55
Specific Gravity at 25/25°C. (WC-1-E)	1.01
Average Weight per Gallon at 25°C.	8.38 – 8.46
Pot Life, minutes-50 g. at 77°F. with Liquid Epoxy Resin[a]	40
Parts by Weight per 100 Parts Liquid Epoxy Resin[a]	29
Color, Gardner (1933) Color Standards	1, maximum

[a] Epoxy equivalent = 190.

NOTE: Union Carbide (WC) standard testing methods are available upon request. Contact the nearest Sales Office; see the back page for addresses and phone numbers.

F-44996

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TYPICAL STARTING FORMULATIONS

CASTINGS (Limited to small volume unless highly filled)

High Impact Resistance

Bis-A, Type II	100 pbw
BAKELITE® ZZL-0822[a]	29 pbw
Pot Life (100 g.-mass)	40 minutes
Flexural Strength at 25°C.	12,300 psi.
Tensile Strength at 25°C.	8,500 psi.
Tensile Elongation	3.5%
Izod Impact, ft.-lb./in. notch	1.5
Gardner Impact, 6-mil film	>130 in.-lb.
Heat Deflection Temperature	55°C.

These systems can be filled with conventional fillers to reduce cost and/or change cured properties.

Highly Flexible Compounds

Bis-A, Type II	88 pbw
Butyl Glycidyl Ether	2 pbw
Triphenyl Phosphite[b]	10 pbw
BAKELITE® ZZL-0822[a]	26 pbw
Pot Life (100 g.-mass)	40 minutes

Produces a tough rubbery system.

FLOORING APPLICATIONS

Red Troweling Compound (High Impact, Good Chemical Resistance)

Part A

Bis-A, Type II	100 pbw
CELLOSOLVE Solvent[a]	10 pbw
Titanium Dioxide[c]	10 pbw
Red Iron Oxide[c]	5 pbw
Silica, 100 mesh[c]	500 pbw
Pot Life (100 g.-mass)	one hour

Apply with trowel

Part B

BAKELITE® ZZL-0822	15 pbw
EH-30 or[d] DMP-30	5 pbw

(continued)

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ADHESIVES

	I	II
Bis-A, Type II	100 pbw	100 pbw
BAKELITE® ZZL-0822[a]	29 pbw	29 pbw
UNION CARBIDE® A-187 Silane[a]	–	1.3 pbw
Asbestos Floats[c]	30 pbw	30 pbw
CALIDRIA® RG-144 Asbestos Thixotrope[a]	5 pbw	5 pbw
Cured 7 days at 25°C. (77°F.)		
Lap Shear Strength, Al-Al	2000 psi.	3590 psi.
After seven days immersion in 100°F. water	2434 psi.	3520 psi.

[a]Union Carbide [b]Monsanto/Hooker [c]Local supply [d]Thiokol Chemical/Rohm and Haas

STORAGE

BAKELITE® Liquid Epoxy Hardener ZZL-0822 is hygroscopic in nature, and, being basic, will absorb carbon dioxide with consequent destruction of the reactive amine group. Therefore, storage in sealed containers is recommended. If properly sealed, BAKELITE® Liquid Epoxy Hardener ZZL-0822 will keep indefinitely.

TOXICOLOGICAL PROPERTIES

BAKELITE® Liquid Epoxy Hardener ZZL-0822 is moderately toxic. Skin contact or breathing of vapors of BAKELITE® ZZL-0822 should be avoided or sensitization may result. The liquid may also cause skin irritation and eye injury.

BAKELITE® Epoxy Hardener	Single Oral LD_{50}, Rats, g./kg.	Single Skin Penetration LD_{50}, Rabbits, ml./kg.	Single Inhalation Concentrated Vapor or Specific Concentration in ppm., Rats	Primary Skin Irritation, Rabbits	Eye Injury, Rabbits
ZZL-0822	4.29 ml.	2.50	8 hours killed 2/12	Burns	Severe

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PACKAGING AND LABELING

The standard package for BAKELITE® Liquid Epoxy Hardener ZZL-0822 is a lined, 55-gallon, nonreturnable, closed-head, black steel drum (DOT 17E) containing 500 lb. net. The package will be plainly marked with the product, batch, and container numbers and the quantity. In addition, it will bear a label with the warning statement: KEEP DRY – STORE INSIDE.

PRECAUTIONARY LABELING

On the basis of the toxicological, physical, and chemical properties of BAKELITE® Liquid Epoxy Hardener ZZL-0822, precautionary labeling used on the containers is as follows:

BAKELITE® LIQUID EPOXY HARDENER ZZL-0822

DANGER! CAUSES BURNS

Do not get in eyes, on skin, on clothing.
Avoid breathing vapor.
Keep container closed.
Use with adequate ventilation.
Wash thoroughly after handling.

FIRST AID: In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician. Wash clothing before reuse.

FOR INDUSTRY USE ONLY

UNION CARBIDE

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