

An Emerald Performance Materials Company

ERISYS® GE-21
1,4-Butanediol Diglycidyl Ether
Aliphatic Difunctional Epoxy
Reactive Diluent
CAS No. 2425-79-8

DESCRIPTION

ERISYS GE-21, epoxidized Butanediol, is a low viscosity, aliphatic, diepoxide. It is intended for use as a reactive diluent for high viscosity epoxy resins. GE-21 is compatible at all concentrations with those resins and resin/diluent blends can be cured using any epoxy resin curing agent.

As a result of its chemical structure GE-21 is not as efficient in viscosity reduction as the aliphatic monofunctional reactive diluents ERISYS GE-5, GE-6, GE-7, and GE-8. However, the performance properties of epoxy formulations diluted with GE-21 are modified to a lesser degree than those of systems containing the aliphatic monofunctional diluents. Depending on concentration, properties such as gel time, strength, and modulus of a GE-21 diluted formulation remain relatively unchanged compared to an undiluted resin (see graphs and table below). The difunctionality of GE-21 helps to produce formulations with improved chemical and heat resistance compared to formulations containing monofunctional diluents.

GE-21 does not affect the pot life of precatalyzed epoxy resin/acid anhydride formulations. Formulations containing GE-21 exhibit excellent wettability making them ideal candidates for composite and impregnation applications. GE-21 has low moisture, hydrolyzable chloride and residual epichlorohydrin contents. Its exceptionally low color makes GE-21 the diluent of choice in color critical applications.

APPLICATIONS

- Filament Winding
- Concrete/Civil Engineering Adhesives
- Laminating/Assembly Adhesives
- Structural Adhesives
- Vacuum Pressure Impregnation (VPI)
- Electronic Encapsulants
- Flooring

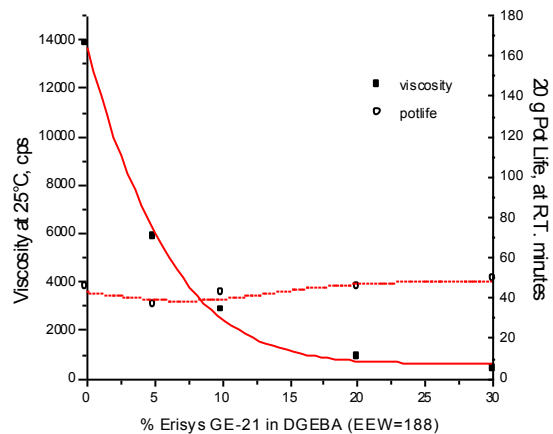
TYPICAL PROPERTIES

Appearance	Clear, Clean
Viscosity @ 25°C, cps	10 – 18
Epoxide Equivalent Weight, g/eq	120 – 130
APHA Color, max	100
Residual Epichlorohydrin, max ppm	10
Hydrolyzable Chloride, max %	0.10
Weight per Gallon, @ 25°C, lbs.	9.2 ± 0.1
Flash Point, °C (°F)	>110(>230)

HANDLING PROPERTIES

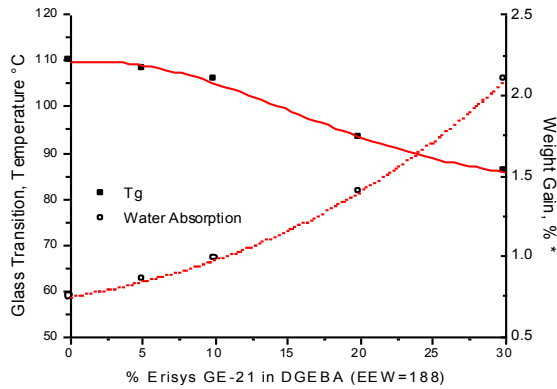
The use of ERISYS GE-21 will affect the handling and cured properties of resin formulations. The effects of these changes are shown below.

VISCOSITY AND POT LIFE

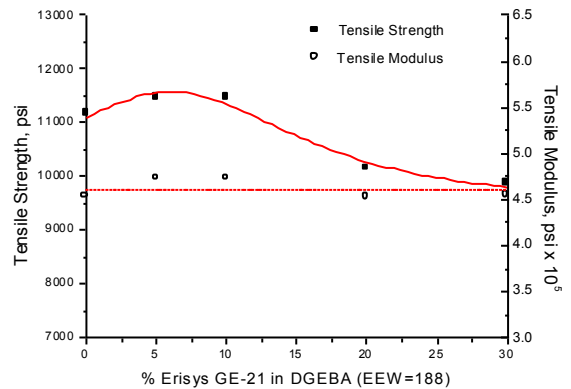


HANDLING PROPERTIES (Continued)

Tg and MOISTURE PICKUP



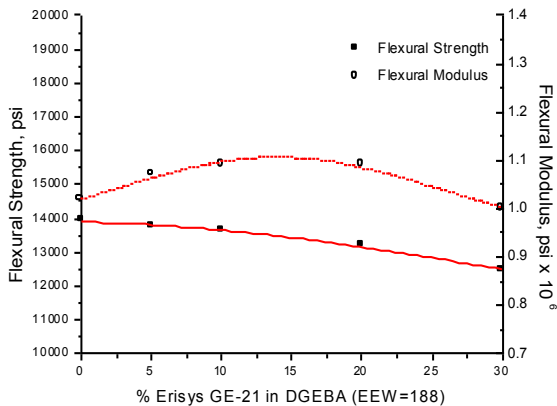
TENSILE PROPERTIES



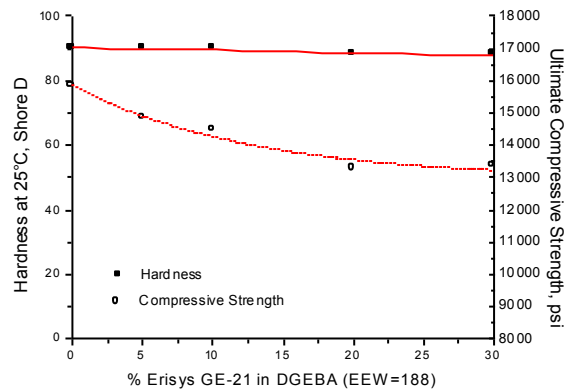
*After 2 hours in boiling water

THE EFFECT OF ERISYS GE-21 ON THE CURED PROPERTIES OF LIQUID EPOXY RESIN (EEW 188) CURED WITH TETA

FLEXURAL PROPERTIES



HARDNESS and COMPRESSIVE STRENGTH



PROPERTIES OF DGEBA/GE-21/TETA SYSTEMS

FORMULATION, pbw	A	B	C	D	E
DGEBA (EEW-188)	100.0	95.0	90.0	80.0	70.0
ERISYS GE-21	0	5.0	10.0	20.0	30.0
Triethylenetetramine	13.0	13.2	13.4	13.9	14.4
RESULTS					
HANDLING PROPERTIES					
Viscosity @ 25° C of resin					
portion only, cps	13,800	5,820	2,824	864	385
20 g Pot Life, minutes	0:45	0.36	0:42	0:45	0:49
CURED PROPERTIES*					
TENSILE					
Strength, psi	11,165	11,455	11,455	10,150	9,860
MPa	77	79	79	70	68
Elongation, %	4.2	5.4	7.8	6.6	6.4
Modulus, psi	4.53E + 05	4.72E + 05	4.72E + 05	4.52E + 05	4.54E + 05
MPa	3,127	3,255	3,256	3,115	3,133
FLEXURAL					
Strength, psi	13,920	13,775	13,630	13,195	12,470
MPa	96	95	94	91	86
Modulus, psi	1.02E + 06	1.07E + 06	1.09E + 06	1.09E+06	1.00E + 06
MPa	7,063	7,400	7,490	7,524	6,920
COMPRESSIVE					
Strength at yield, psi	7,067	7,600	7,685	7,767	8,033
MPa	49	52	53	54	55
Ultimate strength, psi	15,833	14,850	14,467	13,270	13,367
MPa	109	102	100	92	92
HARDNESS @ 25°C,					
D durometer	90	90	90	88	88
GLASS TRANSITION TEMPERATURE,					
° C	110	108	106	93	86
° F	230	226	223	199	187
WATER ABSORPTION, WEIGHT GAIN AFTER:					
28 Days in 25°C water, %	0.77	0.84	0.98	1.3	1.9
2 Hours in boiling water, %	0.74	0.85	0.98	1.4	2.1

*Cure: gel at R.T. + 2 hours at 100°C

HEALTH & SAFETY PRECAUTIONS

ERISYS GE-21 is not a primary skin irritant and sensitizer. However, as with any epoxy material, irritation can result from repeated or prolonged contact. The symptoms of this irritation may appear as a mild reddening or a more pronounced rash. It is, therefore, important to avoid skin contact where possible. Rubber gloves, full eye protection, and protective clothing are recommended.

Refer to the **CVC Thermoset Specialties** Material Safety Data Sheet on ERISYS GE-21 for additional safety & handling information. The MSDS is revised as new data becomes available.

PACKAGING & AVAILABILITY

ERISYS GE-21 is available in 55 gallon steel non-returnable drums (480 lbs. net) and 5 gallon plastic pails (45 lbs. net). Bulk deliveries are available on special request.

DISCLAIMER

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