CVC Thermoset Specialties

An Emerald Performance Materials Company

TECHNICAL BULLETIN

ERISYS™ GE-11
para-tertiary Butyl Phenyl Glycidyl Ether
Aromatic Monofunctional Epoxy Reactive Diluent
CAS NO. 3101-60-8

DESCRIPTION

ERISYS GE-11, epoxidized para-tertiary butyl phenol, is an aromatic mono-epoxide. GE-11 is intended for use as a reactive diluent for high viscosity epoxy resins and it is compatible at all concentrations with those resins. Resin/ diluent blends can be cured using any curing agent for epoxy resins.

GE-11, due to its aromatic structure, is not as efficient in viscosity reduction as aliphatic diluents ERISYS GE-5, GE-6, GE-7, or GE-8. However, performance properties of epoxy formulations diluted with GE-11 are modified less than those of systems containing the aliphatic monofunctional diluents. Depending on concentration, properties such as gel time, room temperature strength, and modulus of a GE-11 diluted formulation remain relatively unchanged compare to an undiluted resin. However, a decline in elevated temperature performance, as indicated by decreasing Tg with increasing GE-11 concentration occurs (see table and graphs below). Cured formulations containing GE-11 exhibit excellent moisture resistance. ERISYS GE-11's low vapor pressure, low odor and exceptionally low residual epichlorohydrin level make it ideally suited for environmentally difficult applications. Another feature of GE-11 is its ability to reduce the tendency of certain epoxy resins to crystallize, thereby producing formulations with improved homogeneity.

APPLICATIONS

- ❑ Potting & Encapsulation
- ❑ Electronics
- ❑ Flooring
- ❑ Concrete/Civil Engineering Adhesives
- ❑ General Purpose Adhesives
- ❑ Tooling
- ❑ Laminating

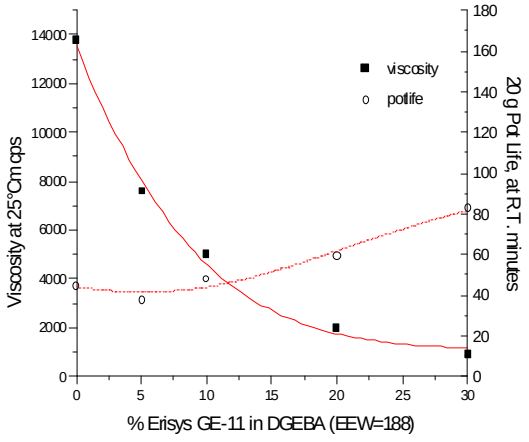
TYPICAL PROPERTIES

Appearance	Clear, Clean
Viscosity @ 25°C, cps	20 – 30
Epoxide Equivalent Weight, g/eq	215–240
Gardner Color, max	1
Residual Epichlorohydrin, max ppm	10
Hydrolyzable Chloride, max %	0.10
Weight per Gallon, @ 25°C, lbs.	8.5 ± 0.1
Water Content, max %	0.10
Flash Point, °C (°F)	121 (>250)

HANDLING PROPERTIES

The use of ERISYS GE-11 will effect the handling and cured properties of resin formulations. The effects of these changes are shown below.

VISCOSITY AND POT LIFE



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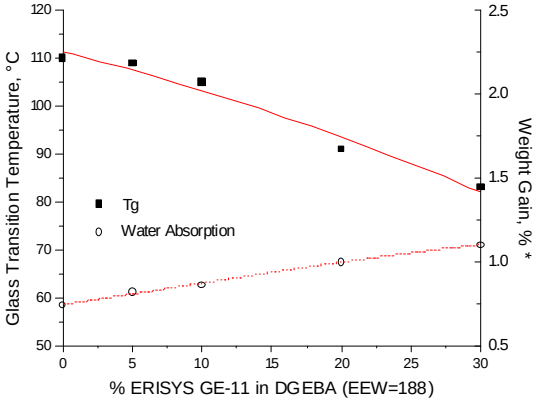
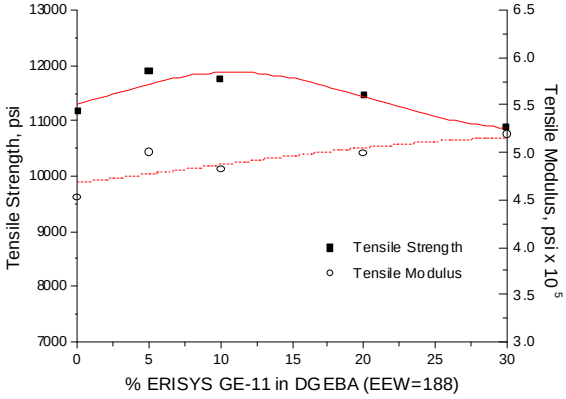
HANDLING PROPERTIES (Continued)

Tg and MOISTURE PICKUP



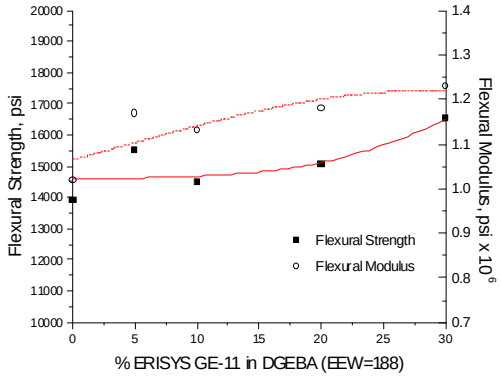
TENSILE PROPERTIES



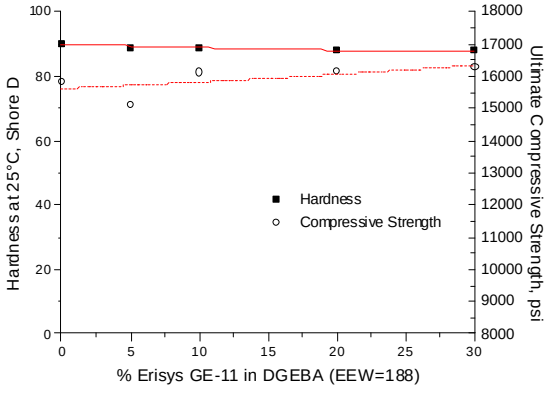
*After 2 hours in boiling water

THE EFFECT OF ERISYS GE-11 ON THE CURED PROPERTIES OF LIQUID EPOXY RESIN (EEW 188) CURED WITH TETA

FLEXURAL PROPERTIES



HARDNESS and COMPRESSIVE STRENGTH



PROPERTIES OF DGEBA/GE-11/TETA SYSTEMS

FORMULATION, pbw	A	B	C	D	E
DGEBA (EEW-188)	100.0	95.0	90.0	80.0	70.0
ERISYS GE-11	0	5.0	10.0	20.0	30.0
Triethylenetetramine	13.0	12.8	12.7	12.4	12.1
RESULTS					
HANDLING PROPERTIES					
Viscosity @ 25° C of resin					
portion only, cps	13,800	7,600	5,000	2,000	900
20 g Pot Life, hours:minutes	0:45	0:38	0:48	0:59	1:23
CURED PROPERTIES*					
TENSILE					
Strength, psi	11,165	11,890	11,745	11,455	10,875
MPa	77	82	81	79	75
Elongation, %	4.2	4.6	5.2	3.4	2.7
Modulus, psi	4.53E + 05	5.00E + 05	4.82E + 05	4.99E + 05	5.19E + 05
MPa	3,127	3,449	3,324	3,440	3,580
FLEXURAL					
Strength, psi	13,920	15,515	14,500	15,080	16,530
MPa	96	107	100	104	114
Modulus, psi	1.02E + 06	1.17E + 06	1.13E + 06	1.18E+06	1.23E + 06
MPa	7,063	8,097	7,781	8,108	8,453
COMPRESSIVE					
Strength at yield, psi	7,067	7,200	7,267	7,700	8,100
MPa	49	50	50	53	56
Ultimate strength, psi	15,833	15,133	16,133	16,167	16,267
MPa	109	104	111	111	112
HARDNESS @ 25°C,					
D durometer	90	89	89	88	88
GLASS TRANSITION TEMPERATURE,					
° C	110	109	105	91	83
° F	230	228	221	196	181
WATER ABSORPTION, WEIGHT GAIN AFTER:					
28 Days in 25°C water, %	0.77	0.78	0.79	0.80	0.86
2 Hours in boiling water, %	0.74	0.82	0.86	1.0	1.1

*Cure: gel at R.T. + 2 hours at 100°C

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HEALTH & SAFETY PRECAUTIONS

ERISYS GE-11 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-11 for additional safety and handling information. The MSDS is revised as new data becomes available.

PACKAGING & AVAILABILITY

ERISYS GE-11 is available in 55 gallon steel non-returnable drums (470 lbs. net) and 5 gallon plastic pails (40 lbs. net). Bulk deliveries are available on special request.

DISCLAIMER

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