HEXION

Technical Data Sheet

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HELOXY™ Modifier 107

Product Description

HELOXY™ Modifier 107 is the diglycidyl ether of cyclohexane dimethanol. While it is primarily used as a reactive diluent or viscosity reducing modifier for epoxy resin formulations, it also can effectively serve as a reactive intermediate for further synthesis of various cycloaliphatic based resins.

Application Areas/Suggested Uses

- To improve air release and wetting characteristics or to increase pot life in electrical, potting, encapsulation, and impregnation applications
- To maintain high reactivity yet provide workable viscosity at room temperature when using novolac or other high functionality epoxy resins

Benefits

- Reduces viscosity of epoxy formulations while maintaining most cured state properties
- Provides excellent cured state resistance to creep or deformation under high stress
- Is an effective means of incorporating a cycloaliphatic structure into the polymer chain

Sales Specification

Property	Units	Value	Test Method/Standard
Weight per Epoxide	g/eq	155-165	ASTM D1652
Viscosity at 25°C	cP	55-75	ASTM D445
Color	Gardner	1 max.	ASTM D1544
Epichlorohydrin	mg/kg	10 max.	SMS 2445

Typical Properties

Property	Units	Value	Test Method/Standard
Density	lbs/gal	9.0-9.2	ASTM D1475
Flash point, Setaflash	°F	>200	

General Information

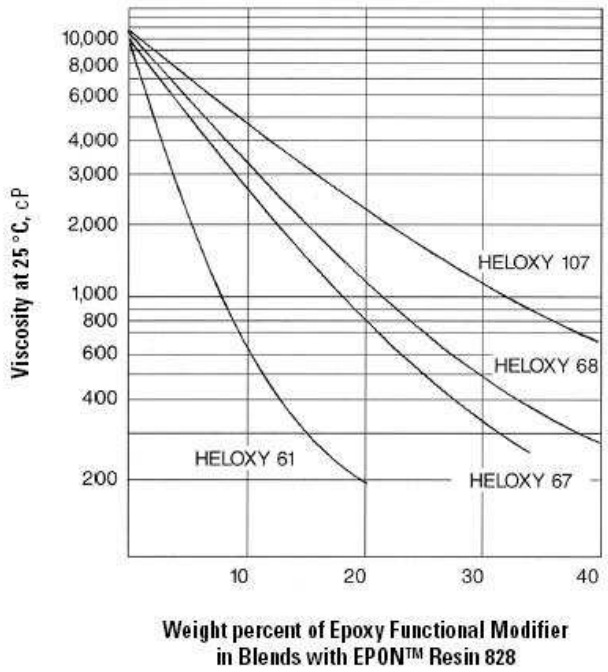
HELOXY Modifier 107 is fully compatible with the entire bisphenol A based series of epoxy resins as well

as higher functionality epoxy resins. Concentrations of up to 40 percent of HELOXY Modifier 107 have been employed for viscosity reduction. Performance properties of systems containing this resin are maintained at higher modifier concentrations than is possible with monoepoxide diluents and most diepoxide diluents.

Effect of HELOXY Modifier 107 modifications on the properties of various EPON™ Resin 828 based systems is demonstrated by data presented in Table 1. Substituting HELOXY Modifier 107 for Epon Resin 828 or other unmodified resins generally results in slight increases in flexibility. As with all diluting modifiers, use of HELOXY Modifier 107 decreases chemical resistance and elevated temperature performance. To minimize such losses, the lowest concentration of HELOXY Modifier 107 necessary to obtain desired reduction in viscosity should be used. The viscosity reduction efficiency of HELOXY Modifier 107 when blended with Epon Resin 828 is compared to that of other HELOXY Modifiers by data illustrated in Figure 1.

When formulating with HELOXY Modifier 107, the concentration of curing agent to be used will likely be different than in the case of an unmodified system. The proper curing agent combining ratio should always be calculated in order to ensure proper stoichiometric balance.

Figure 1 / **Viscosity Dilution Effectiveness of HELOXY Modifiers**



Performance Properties

Table 1 / **Effects of HELOXY Modifier 107 on Properties of Epoxy Resin Systems**

			Aliphatic Amine		Aromatic Amine		Anhydride	
	Method	Units	A	B	C	D	E	F
Composition								
EPON Resin 828		pbw	100	75	100	75	100	75

HELOXY Modifier 107		pbw	—	25	—	25	—	25
Triethylenetetramine		pbw	13	13.5	—	—	—	—
EPIKURE™ Curing Agent 3484		pbw	—	—	20	21	—	—
Methyltetrahydrophthalic Anhydride		pbw	—	—	—	—	79	82
Diethylaminoethanol		pbw	—	—	—	—	0.5	0.5
Handling Properties at 25°C								
Viscosity, Resin Portion		cP	11,000	1,620	11,000	1,620	11,000	1,620
Gel time, 100g @ 23 °C		min.						
At 23 °C, 100 g			37	46	—	—	—	—
At 93 °C, ¼ in. thick			—	—	54	93	—	—
At 150 °C, stroke method			—	—	—	—	5.2	5.6
At 170 °C, stroke method			—	—	4.5	5.7	—	—
Peak Exotherm, 100g @ 23 °C		°C	223	212	—	—	—	—
Cured State Properties [1]								
Heat Deflection Temperature	ASTM D648	°C	67	66	173	149	117	101
Tensile strength, Ultimate	ASTM D638	psi	9,600	11,600	10,700	10,200	13,500	12,900
Tensile elongation at Break		%	1.7	3.7	4.0	4.6	6.3	6.0
Tensile Modulus, Initial		ksi	590	520	420	380	510	490
Flexural Strength, Ultimate	ASTM D790	psi	16,700	17,900	14,500	14,600	21,900	21,000
Flexural Modulus, Initial		ksi	570	510	400	370	480	480
Compressive Strength, Ultimate	ASTM D695	psi	19,100	11,700	32,000	36,000	46,000	38,000
Compressive Yield Strength		psi	10,100	9,500	17,900	15,400	16,500	16,000
Izod Impact – notch	ASTM D256	ft.•lb./in.	0.40	0.47	0.45	0.48	0.43	0.53
Weight Loss, 24 hrs. @ 150 °C		%	0.29	0.33	0.23	0.36	0.04	0.06
Percent Absorbtion [2]								
Water		%						

24 hrs.			0.17	0.20	0.23	0.24	0.14	0.13
1 week			0.46	0.56	0.64	0.65	0.34	0.34
5% Acetic Acid		%						
24 hrs.			1.53	2.84	0.23	0.24	0.13	0.13
1 week			4.83	7.44	0.64	0.65	0.34	0.33
Solvent [3]		%						
24 hrs.			0.88	1.89	0.05	0.06	0.04	0.07
1 week			1.97	3.52	0.18	0.23	0.09	0.28
Dielectric Constant [4]	ASTM D150		4.26	4.32	4.24	4.27	3.61	3.68
Dissipation Factor [4]			0.022	0.026	0.037	0.042	0.014	0.016

[1] Determined on 0.125 in. thick specimens at 23 °C. Systems A and B cured two weeks at 25 °C. Systems C and D cured two hours at 93 °C, plus two hours at 150 °C. Systems E and F curedtwo hours at 93 °C, plus two hours at 175 °C.

[2] Weight gain of 3 in. x 1 in. x 0.125 in. Specimens totally immersed in reagent at 25 °C.

[3] 50:50 by weight mix of isopropanol and xylene.

[4] Determined at 106 hertz.

Safety, Storage & Handling

Please refer to the MSDS for the most current Safety and Handling information.

Please refer to the Hexion web site for Shelf Life and recommended Storage information.

HELOXY Modifier 107 should be stored in tightly sealed containers in a dry location at normal room temperature. Some epoxy material can crystallize during storage. The tendency to do so is affected by storage conditions, composition, and other factors. Should crystallization occur, it may be converted to liquid by opening the drum bung and gently warming to temperatures not to exceed 50 °C (122 °F).

Exposure to these materials should be minimized and avoided, if feasible, through the observance of proper precautions, use of appropriate engineering controls and proper personal protective clothing and equipment, and adherence to proper handling procedures. **None of these materials should be used, stored, or transported until the handling precautions and recommendations as stated in the Material Safety Data Sheet (MSDS) for these and all other products being used are understood by all persons who will work with them.** Questions and requests for information on Hexion Inc. ("Hexion") products should be directed to your Hexion sales representative, or the nearest Hexion sales office. Information and MSDSs on non-Hexion products should be obtained from the respective manufacturer.

Packaging

Available in bulk and drum quantities.

Contact Information

For product prices, availability, or order placement, call our toll-free customer service number at: 1-877-859-2800

For literature and technical assistance, visit our website at: www.hexion.com

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