HEXION

Technical Data Sheet

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HELOXY™ Modifier 61

Product Description

HELOXY™ Modifier 61 is a commercial grade butyl glycidyl ether. A low viscosity, virtually colorless monoepoxide, it is widely used in the viscosity reducing modification of epoxy resin formulations.

Benefits

- Most efficient epoxy resin viscosity reduction of all common epoxy functional modifiers
- Outstanding substrate and filler wetting characteristics
- Excellent retention of physical strength and thermal properties of base formulations

Sales Specification

Property	Units	Value	Test Method/Standard
Weight per Epoxide		145-155	
Viscosity at 25°C	cP	1-2	
Color	Gardner	<1	ASTM D1544

Typical Properties

Property	Units	Value	Test Method/Standard
Density	lbs/gal	7.6-7.8	

General Information

The relatively low molecular weight of HELOXY 61 makes it the most efficient common monoepoxide in reducing the viscosity of basic epoxy resin formulations. A comparison of this property to that of other representative Heloxy modifiers is illustrated in Figure 1.

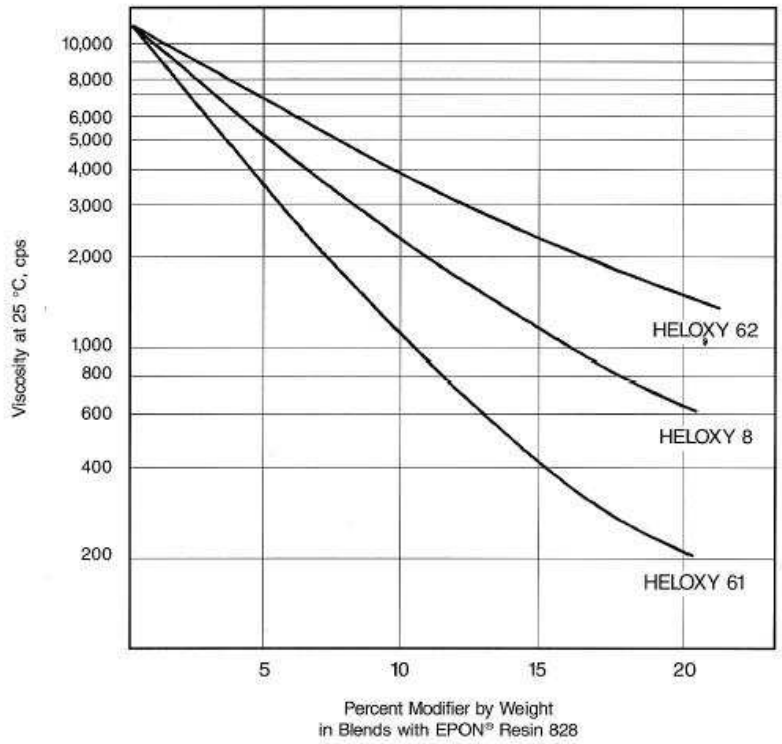
As with any monoepoxide, modification of basic epoxy resins with HELOXY 61 reduces the average functionality of the mixture thereby lowering overall cured state performance. However, due to its excellent viscosity reduction characteristics, relatively low levels of HELOXY 61 are normally needed to attain desired viscosity reductions and these compromises in performance properties are held to a minimum. In any application, the amount of HELOXY 61 used in the formulation should be limited to that necessary to yield the required viscosity reduction. The maximum recommended quantity of HELOXY 61 is about 20 percent by weight of the resin portion.

HELOXY 61 is compatible with other epoxy resins in all proportions and is easily blended with liquid resins at room temperature. If preferred, a pre-blend of HELOXY 61 and a standard bisphenol A based liquid epoxy resin at a viscosity selected for easy handling is available as EPON™ Resin 815C. For information on properties and suggested uses of this resin, please consult the appropriate product literature.

Curing agents that are recommended for unmodified basic liquid epoxy resins can also be used with compositions containing HELOXY 61. When calculating the proper stoichiometric amount of curing agent to be used with HELOXY 61 modified resins, differences in epoxy content of the resin resulting from this modification are small and can generally be ignored at modification levels below 10 parts per hundred resin (phr).

Unless excessive amounts of HELOXY 61 are used, the physical properties of the cured systems are not seriously affected at room temperature. However, physical and electrical properties at elevated temperatures may be reduced considerably. Data listed in Table 1 illustrate the effect of HELOXY 61 on systems cured with various curing agents including conventional polyamines, anhydrides, and EPIKURE™ 3072 Curing Agent.

Figure 1 / **Viscosity reduction with HELOXY Modifiers**



Performance Properties

Table 1 / **Typical Properties of epoxy resin systems containing HELOXY Modifier 61**

	Method	Units	A	B	C	D	E
Composition							
EPON Resin 828		pbw	100	90	80	90	90
HELOXY 61 Modifier		pbw	–	10	20	10	10
EPIKURE 3234		pbw	12.9	13.3	13.6	–	—
EPIKURE 3072 Curing Agent		pbw	——	——	——	36	80
Hexahydrophthalic Anhydride		pbw	100	90	80	—	0.5
Diethylaminoethanol		pbw	–	10	20	90	90
Handling Properties at 25°C							
Viscosity, Resin Portion		cP	13,250	970	215	970	970
Gel time, 100g @ 23 °C		min.	44	52	72	49	–
¼ in. thick, @ 93 °C		min.	–	–	–	–	80
Peak Exotherm, 100g @ 23 °C		°C	223	213	222	166	–
Cured State Properties [1]							
Heat Deflection Temperature	ASTM D648	°C	103	75	53	59	106
Tensile strength, Ultimate	ASTM D638	psi	10,050	10,100	6,500	9,000	12,600
Tensile elongation at Break		%	3.7	5.6	7.4	6.4	7.4
Tensile Modulus, Initial		ksi	450	480	480	430	480
Flexural Strength, Ultimate	ASTM D790	psi	18,700	18,700	14,300	13,400	20,400
Flexural Modulus, Initial		ksi	470	490	440	400	480
Compressive Strength, Ultimate	ASTM D695	psi	33,400	31,300	32,600	27,900	50,800
Compressive Yield Strength		psi	15,650	13,600	11,800	12,800	16,100
Izod Impact – notch	ASTM D256	ft.•lb./inch	0.45	0.62	0.63	0.52	0.45
Weight Loss, 24 hrs. @ 150 °C		%	0.24	0.65	1.83	0.91	0.20
Percent Absorbtion [2]							
Water		%					

24 hrs.			0.16	0.11	0.18	0.24	0.09
1 week			0.38	0.35	0.64	0.64	0.26
5% Acetic Acid		%					
24 hrs.			0.21	0.53	1.68	1.28	0.09
1 week			0.58	1.48	4.7	3.35	0.25
Solvent [3]		%					
24 hrs.			0.02	-0.09	0.07	5.80	0.01
1 week			0.05	-0.19	0.69	–	0.07
Dielectric Constant [4]	ASTM D150		3.91	4.07	4.08	3.82	3.53
Dissipation Factor [4]			0.031	0.029	0.028	0.017	0.012
Volume Resistivity,		ohm•cm					
at 25 °C			2.3 (1015)	2.8 (1014)	–	–	–
at 66 °C			6.1 (1013)	209(1013)	–		
at 93 °C			2.4 (1012)	2.8 (1011)	–	–	–
at 130 °C			3.6(109)	<109	–	–	–

[1]Determined on 0.125 thick specimens at 23 °C. Systems A through C cured 16 hours at 25 °C plus 2 hours at 100 °C. System D cured 14 days at 25 °C. System E cured 2 hours at 93 °C plus 2 hours at 200 °C.
[2]Weight gain of 3 inch x 2 inch x 0.125 inch 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.

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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