HELOXY™ Epoxy Functional Modifiers

Hexion Inc. epoxy functional product line of HELOXY™ Modifiers allows formulators to adjust their systems to achieve specific application and performance properties. By choosing the right reactive modifier, formulators can achieve the desired performance improvement, whether it's improved flexibility, reduced viscosity, or better UV resistance or impact strength.

HELOXY Modifiers are epoxy functionalized alcohols, diols, polyols and acids. Hexion offers three classes of HELOXY Modifiers: monofunctional glycidyl ethers, polyfunctional glycidyl ethers and polyfunctional flexibilizers.

The monofunctional HELOXY Modifier products include both aliphatics and aromatics and are primarily utilized as diluents for a variety of epoxy resins.

The polyfunctional HELOXY Modifier products are aliphatics which provide an increase in the chemical resistance and mechanical performance of the system. The cycloaliphatic modifier offers improved UV resistance when compared to an aromatic modifier. The trifunctional modifier increases the crosslink density of a system.

The HELOXY Modifier products that are flexibilizers can improve wetting performance, offer good color properties for outdoor applications, and can increase the impact strength and toughness of a system.

Areas of application for HELOXY Modifiers include formulations for coatings, civil engineering, adhesives, FRP applications, potting and molding.

Key Benefits

- Improved cured system flexibility
- Increased peel and impact strength
- Increased levels of filler loading
- Improved resin wetting action
- Reduced viscosity and surface tension

At A Glance

The Formulator's Choice

Each of these modifiers provides unique benefits for epoxy resin formulators. Specific properties of our epoxy modifiers, as well as the chemical structure and comments about each product's performance, can be found on the technical summary chart. Keep this chart handy for quick reference whenever you require high performance epoxy modifiers. For a detailed review of the performance and handling properties of HELOXY Modifiers, please refer to the "HELOXY Modifier Selection Guide."

For additional information about any or all of these products, visit our website at **www.hexion.com/epoxy**

Table 1: HELOXY™ Monofunctional Aliphatic Glycidyl Ethers						
Product	**Chemical Type**	**Viscosity @ 25 °C (cP)**	**Weight per Epoxide**	**Color[1] (max)**	**Density (lb/gal)**	**Comments**
HELOXY 8	Alkyl C12-C14 Glycidyl Ether	6–9	280–295	< 1	7.5	Excellent dilution efficiency and provides very good elongation characteristics. Very good substrate and filler wetting. Low odor.
HELOXY 61	Butyl Glycidyl Ether	1–2	145–155	< 1	7.7	Modifier with the highest dilution effect, yet minimal loss of physical performance. Allows for increased filler loading and provides good substrate wetting.
HELOXY 116	2-Ethylhexyl Glycidyl Ether	2–4	215–225	< 1	7.6	Excellent dilution efficiency with low volatility. Provides an alternative to BGE.

[1] Gardner Color Scale

Table 2: HELOXY Monofunctional Aromatic Glycidyl Ethers						
Product	**Chemical Type**	**Viscosity @ 25 °C (cP)**	**Weight per Epoxide**	**Color[1] (max)**	**Density (lb/gal)**	**Comments**
HELOXY 62	Cresyl Glycidyl Ether	5–10	175–195	< 2	9.0	Efficient diluent with retention of tensile characteristics. High retention of both moisture and chemical resistance. Low volatility.
HELOXY 65	p-tert-Butyl Phenyl Glycidyl Ether	20–30	225–240	< 1	8.5	Moderate dilution efficiency with exceptional moisture and chemical resistance. Good electrical properties with low volatility.

[1] Gardner Color Scale

Table 3: HELOXY™ Polyfunctional Glycidyl Ethers						
Product	**Chemical Type**	**Viscosity at 25 °C (cP)**	**Weight per Epoxide**	**Color[1] (max)**	**Density (lb/gal)**	**Comments**
HELOXY 48	Trimethyol Propane Triglycidyl Ether	120–180	138–154	< 2	9.6	Trifunctionality increases crosslink density which maintains or increases reactivity. Moderate dilution efficiency. Exceptional retention of HDT and tensile properties as well as chemical resistance.
HELOXY 67	1,4 Butanediol Diglycidyl Ether	10–20	124–137	< 1	9.2	Superior difunctional viscosity reducer with lower volatility[2]. Good retention of physical properties and chemical resistance. Useful in water-reducible systems due to observable water solubility.
HELOXY 68	Neopentyl Glycol Diglycidyl Ether	13–25	130–145	< 1	8.9	Good viscosity reduction with minimum loss of properties; difunctional with low volatility. Most widely used viscosity modifier with good chemical resistance. Good wetting and air release properties.
HELOXY 107	Cyclo Hexane Dimethanol Diglycidyl Ether	55–75	155–165	< 2	9.1	Difunctional modifier gives moderate viscosity reduction with minimum loss of properties. Good for chemical resistance as well as applications requiring minimum deformation under load (i.e. superior creep resistance).

[1] Gardner Color Scale

[2] Compared to Heloxy Modifiers 61 or 116

Table 4: HELOXY Flexibilizers						
Product	**Chemical Type**	**Viscosity at 25 °C (cP)**	**Weight per Epoxide**	**Color[1] (max)**	**Density (lb/gal)**	**Comments**
HELOXY 71	Dimer Acid Diglycidyl Ester	400–900	390–470	< 10	8.2	Improves impact strength and toughness as an epoxy flexibilizer. Provides resistance to thermal shock.
HELOXY 505	Castor Oil Polyglycidyl Ether	250–500	500–650	< 6	8.5	Imparts flexibility, impact and thermal shock resistance. Good low temperature flexibilization performance. Also allows high peel strength for adhesives. Lower odor.

[1] Gardner Color Scale

Table 5: CARDURA™ Glycidyl Ester						
Product	**Chemical Type**	**Viscosity at 25 °C (cP)**	**Weight per Epoxide**	**Color[1] (max)**	**Density (lb/gal)**	**Comments**
CARDURA E10P	Neodecanoic Acid Glycidyl Ester	5–10	235–244	≤ 35	8.0	Good dilution efficiency and excellent water resistance characteristics. Helps to decrease the tendency of the epoxy resin to crystallize. Lower volatility. [2]

[1] Platinum-Cobalt Color Scale

[2] Compared to Heloxy Modifiers 61 or 116

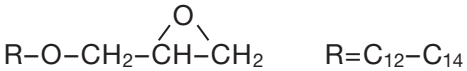
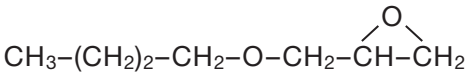
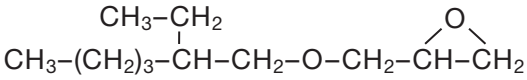
Table 6: HELOXY™ Monofunctional Aliphatic Glycidyl Ethers		
Product	**Chemical Type**	**Structure**
HELOXY Modifier 8	Alkyl C12-C14 Glycidyl Ether	
HELOXY Modifier 61	Butyl Glycidyl Ether	
HELOXY Modifier 116	2-Ethylhexyl Glycidyl Ether	

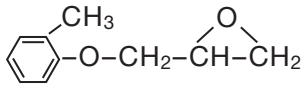
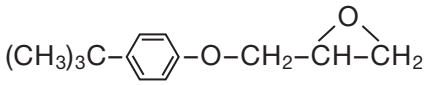
Table 7: HELOXY Monofunctional Aromatic Glycidyl Ethers		
Product	**Chemical Type**	**Structure**
HELOXY Modifier 62	Cresyl Glycidyl Ether	
HELOXY Modifier 65	p-tert-Butylphenyl Glycidyl Ether	

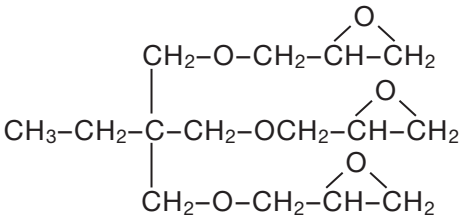
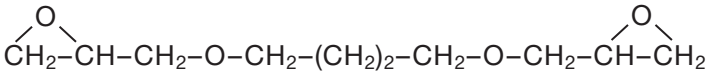
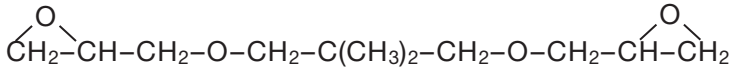
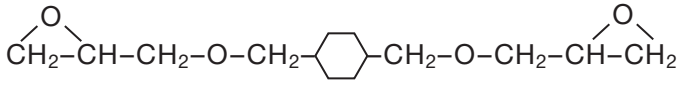
Table 8: HELOXY Polyfunctional Glycidyl Ethers		
Product	**Chemical Type**	**Structure**
HELOXY Modifier 48	Trimethyol Propane Triglycidyl Ether	
HELOXY Modifier 67	1,4 Butanediol Diglycidyl Ether	
HELOXY Modifier 68	Neopentyl Glycol Diglycidyl Ether	
HELOXY Modifier 107	Cyclohexane Dimethanol Diglycidyl Ether	

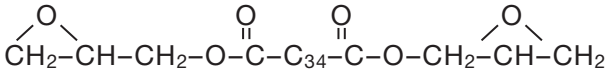
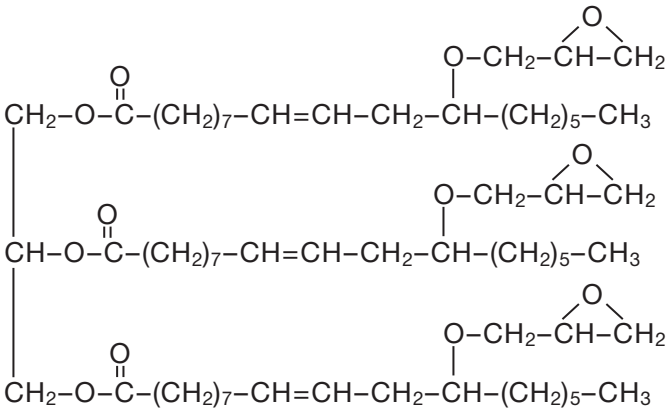
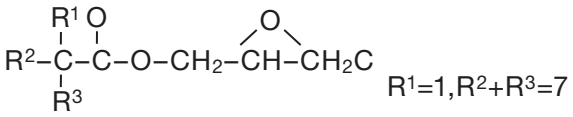
Table 9: HELOXY™ Flexibilizers		
Product	**Chemical Type**	**Structure**
HELOXY Modifier 71	Dimer Acid Diglycidyl Ester	
HELOXY Modifier 505	Castor Oil Polyglycidyl Ether	

Table 10: Cardura™ Glycidyl Ester		
Product	**Chemical Type**	**Structure**
Cardura E10P	Neodecanoic Acid Glycidyl Ester	

Safety, Storage and Handling

Please refer to the Material Safety Data Sheet (MSDS) for the most current Safety and Handling information. Please refer to the Hexion website 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 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 products should be directed to your Hexion sales representative, or the nearest Hexion sales office. Information and MSDSs about 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 +1 866 443 9466.

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

Hexion: Helping you make it in today's world.

Our global team produces the best in specialty chemicals and performance materials and provides the technical expertise to customize them to your exact needs. The result? Specific solutions, not generic products, leading to thousands of breakthroughs that improve bottom lines and enhance lives.

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