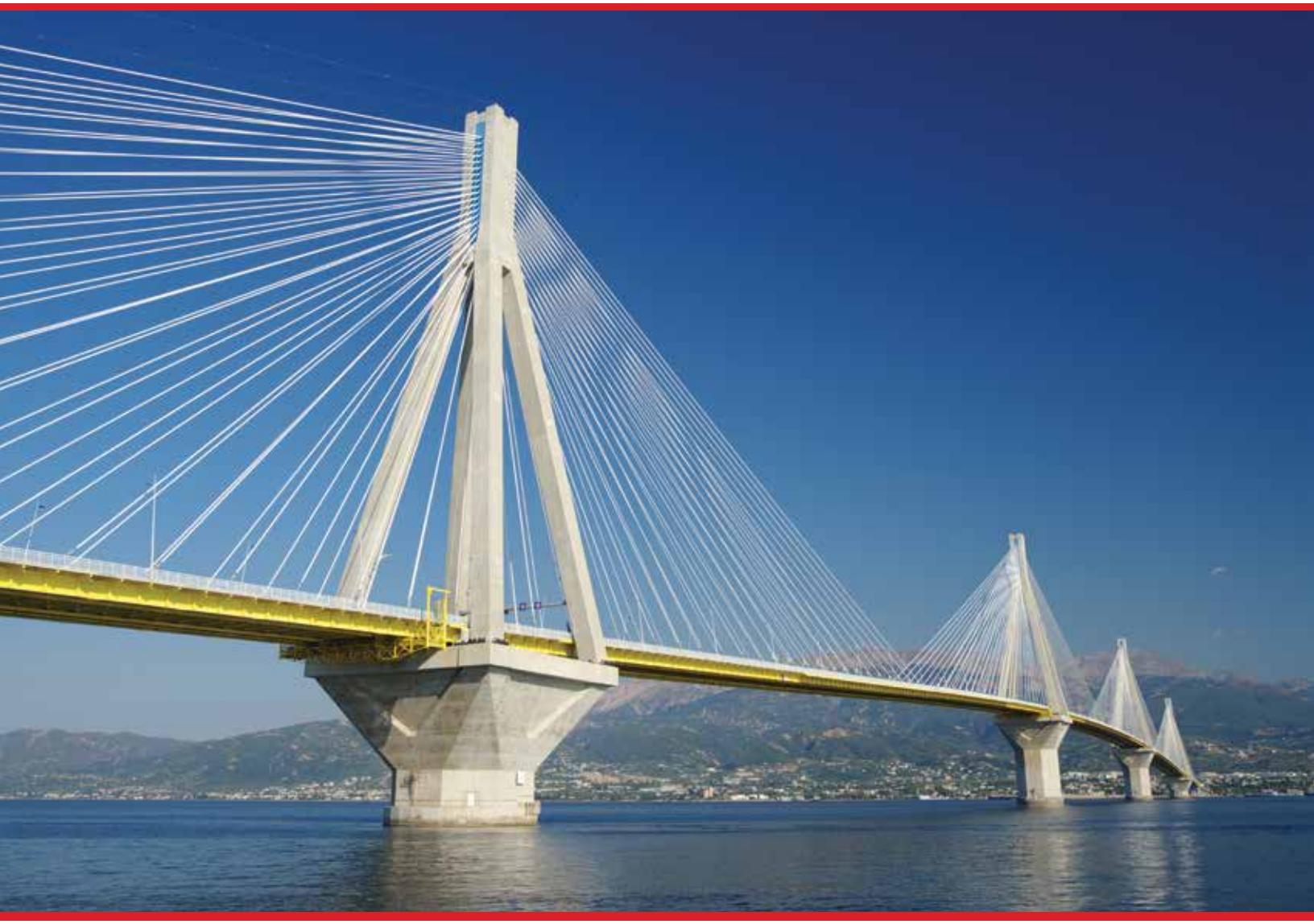
Olin™

EPOXY

NORTH AMERICA EPOXY RESINS



EXPANDING OPPORTUNITIES FOR PERFORMANCE AND DIFFERENTIATION

Epoxy technology is a fundamental building block for innovation across broad and diverse industries around the world. Olin is leading the way, applying advanced epoxy chemistry to address critical material challenges and help meet society's energy, transportation, electronics and infrastructure needs.

Olin is a global supplier of epoxy resins, diluents, curing agents and intermediates. With more than 50 years of innovation, we offer advanced epoxy products and solutions based on the industry's leading product and process technology. And, as one of the most vertically integrated epoxy suppliers, we are a highly reliable source of supply.

Olin is committed to your success. To better assist you during each stage of formulation development, we have compiled this convenient overview of resin products available in North America. Use it in combination with product information for our robust line of epoxy hardeners to compare product options and decide which Olin products provide the performance required in your applications.

This guide presents a comprehensive listing of epoxy resins available from Olin. For assistance in choosing the right product for your formulation, or to investigate emerging innovation, please contact us. You'll find contact information on the back of this brochure.

CALCULATION OF STOICHIOMETRIC RATIOS

To obtain optimal properties with poly-functional epoxide-reactive curing agents, particularly the amines, it is desirable to react the resin and the curing agent at approximately stoichiometric quantities. To determine the ratio required, calculations can be made as follows, using D.E.H.™ 20 epoxy hardener ($NH_2 - CH_2 - CH_2 - NH - CH_2 - CH_2 - NH_2$) as an example:

1

To calculate the Amine H equivalent weight, use the following equation:

Equation 1

$$\text{Amine H eq wt} = \frac{\text{Molecular Weight of amine}}{\text{no. of active hydrogens}}$$

Example

$$\text{Amine H eq wt D.E.H. 20} = \frac{103.2}{5} = 20.6 \text{ gr/eq}$$

2

To calculate the stoichiometric ratio of D.E.H.™ 20 hardener to use with D.E.R. 331™ epoxy resin having an epoxide equivalent weight of 189:

Equation 2

$$\text{phr}^{1} \text{ of amine} = \frac{\text{Amine H eq wt x 100}}{\text{Epoxide eq wt of resin}}$$

Example

phr D.E.H. 20 hardener to be used with D.E.R.™ 331 epoxy resin

$$\text{phr} = \frac{20.6 \times 100}{189} = 10.9$$

3

Frequently, epoxy resins are blended, filled, or modified with reactive and non-reactive components. It is therefore necessary to adjust the concentration of the curing agent to cure only the portion of the mix that is reactive; e.g., the resins and any reactive diluent present. This may be simply done by calculating the epoxide equivalent weight (EEW) of the total mix and then applying equation 2 to determine the amount of curing agent to add to 100 parts of formulation.

Equation 3

$$\text{EEW of mix} = \frac{\text{Total wt}}{\frac{\text{Wt a}}{\text{EEW a}} + \frac{\text{Wt b}}{\text{EEW b}} + \frac{\text{Wt c}}{\text{EEW c}}}$$

Total weight includes all materials, both reactive and non-reactive. The only materials reactive with the curing agent are a, b, c, etc., and are characterized by an epoxy ring.

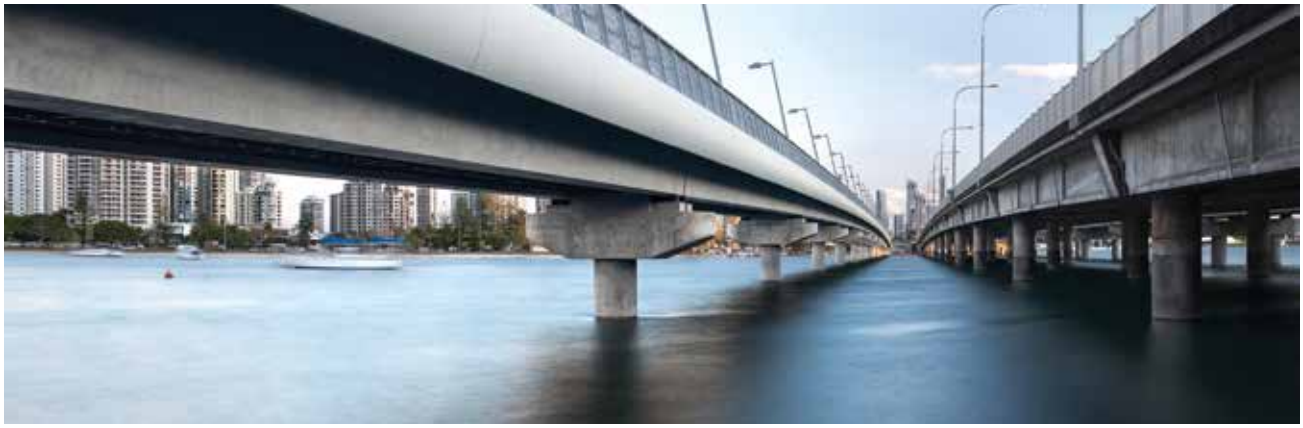
Example

100 parts D.E.R. 331	Average EEW 189
100 parts D.E.R. 337	Average EEW 240
30 parts BDDGE (diluent)	Average EEW 130
230 parts filler	–
460 total	

$$\text{EEW of mix} = \frac{460}{\frac{100}{189} + \frac{100}{240} + \frac{30}{130}} = \frac{460}{1.176} = 391$$

By Equation 2

$$\text{Amount D.E.H. 20} = \frac{20.6 \times 100}{391} = 5.27 \text{ parts per hundred parts filled formulation}$$



Liquid Epoxy Resins

Product	EEW (g/eq)	Viscosity @25 °C (mPa•s)	Description
Bisphenol A Epoxy Resins			
D.E.R.™ 330	176-185	7,000-10,000	Lower viscosity bisphenol A epoxy resin allowing the use of fewer diluents or more fillers in the formulation. Offers longer pot life versus the standard resin and slightly improved resistance properties when used in heat curing (composite) applications.
D.E.R. 331™	182-192	11,000-14,000	Industry standard bisphenol A-based liquid epoxy resin. Offers excellent mechanical, thermal and chemical resistance properties in multiple applications. Shows improved reactivity versus competitive alternatives.
D.E.R. 332	171-175	4,000-6,000	High purity diglycidyl ether of bisphenol A. Its high purity and low oligomer content assure uniform performance, exceptionally low viscosity and improved elevated temperature properties over standard epoxy resins. This resin grade is mainly used in electrical encapsulation applications.
D.E.R. 383	176-183	9,000-10,500	Lower viscosity bisphenol A epoxy resin allowing the use of fewer diluents or more fillers in the formulation. Offers longer pot life versus the standard resin and slightly improved resistance properties when used in heat curing (composite) applications.
D.E.R. 3171	187-194	14,000-18,000	Liquid epoxy resin with minimal crystallization tendency. A general purpose liquid epoxy resin that does not contain reactive diluents, benzyl alcohol, or solvents.
Modified Bisphenol A Epoxy Resins			
D.E.R.™ 317	192-203	16,000-25,000	High viscosity, fast reacting (20% faster than D.E.R.™ 331™) liquid epoxy resin designed for adhesive applications requiring quick gelling with amine curing agents.
D.E.R. 321	180-188	500-700	Very low viscosity resin allowing large amounts of fillers. Cure rate similar to undiluted resins. Improved acid resistance can be observed. For floorings, grouting, concrete reinforcement, structural adhesives, crack injection and castings.
D.E.R. 3212	179-193	750-1,400	Similar to D.E.R. 321 epoxy resin but of higher viscosity, maintaining more mechanical strength.
D.E.R. 322	183-193	5,500-8,500	Low diluent content resin combining significant viscosity reduction while maintaining mechanical strength properties.
D.E.R. 323	190-204	1,000-1,200	Low viscosity liquid epoxy resin with reduced surface tension. Offers excellent wetting and flow. The low diluent content results in the improved mechanical properties over D.E.R. 324 epoxy resin.
D.E.R. 324	195-204	600-800	Offers low viscosity and low surface tension to wet the surface better, giving better adhesion and slightly lower viscosity at any given filler loading. The diluent increases pot life, flexibility (impact resistance) and acid resistance, but limits the solvent resistance. Prone to crystallization.
D.E.R. 325	185-206	850-2,800	Low viscosity liquid epoxy resin with reduced surface tension. Offers excellent wetting and flow. The low diluent content results in the improved mechanical properties over D.E.R. 323 and D.E.R. 324 epoxy resin.
D.E.R. 326	204-210	600-900	Low viscosity liquid epoxy resin with minimal crystallization tendency. Offers low surface tension, excellent wetting and flow.
D.E.R. 3274	160-180	1,300-1,500	Bi-functional reactive diluent containing resin offering reduced viscosity while only affecting the mechanical and thermal properties moderately.
D.E.R. 333	192-198	2,300-4,600	Low viscosity catalyzed epoxy resin for pre-preg applications.
D.E.R. 3401	175-215	1,500-3,500	Low viscosity rapidly reacting bisphenol A/F epoxy resin designed for fast-curing coatings, adhesives and mortars. It can be used as the sole epoxy or in combination with other epoxy resins. Benefits include rapid cure, return to service, low emissions or substance of concern content, low viscosity and good chemical resistance.
D.E.R. 346	176-183	2,000-5,000	Low viscosity catalyzed epoxy resin for pre-preg applications.
D.E.R. 362	185-205	4,500-6,500	Chemically modified liquid epoxy resin without diluent with minimal crystallization tendency. Offers excellent flow and high gloss coatings/floorings. This resin is used in building applications above and below ground, on road and bridge construction, as well as in underwater applications.

Liquid Epoxy Resins (Continued)

Product	EEW (g/eq)	Viscosity @25 °C (mPa•s)	Description
Modified Bisphenol A/Bisphenol F Epoxy Resins			
D.E.R.™ 352	172-181	5,700-7,700	Economic bisphenol-A/F liquid epoxy resin.
D.E.R. 353	190-200	800-1,000	Low viscosity epoxy resin with very low crystallization tendency. Offers low surface tension to wet the surface better, giving better adhesion. The diluent increases pot life, flexibility (impact resistance) and acid resistance.
Bisphenol F Epoxy Resins			
D.E.R.™ 354	167-174	3,400-4,200	Unmodified bisphenol F-based epoxy resin of low viscosity. Improves crystallization resistance of other epoxy resins and gives improvement in solvent resistance. Frequently used in solvent-free coatings, floor coverings, adhesives or composite applications.
Flexible Epoxy Resins and Reactive Diluents			
D.E.R.™ 3913	345 - 365	7,500-9,500	Designed to impart flexibility into epoxy binder systems. In combination with suitable curing agents, high elongations at break can be achieved, at room temperature as well as at -20 °C.
D.E.R. 721	285-310	5-10	C12-C14 alkyl glycidyl ether.
D.E.R. 723	175-187	5-10	An aromatic liquid epoxy resin based on a reaction product of epichlorohydrin and ortho-cresol. Designed as modifier for other aromatic epoxy resin systems. Offers cutting power and good reactivity, and increases mechanical properties of the cured system.
D.E.R. 731	130-145	12-24	1,4-butanediol diglycidyl ether.
D.E.R. 732	310-330	60-70	Longer chain length polyglycol diepoxide liquid resin. Applications include coatings and adhesives for improved flexibility, elongation and impact resistance.
D.E.R. 736	175-205	30-60	Shorter chain polyglycol diepoxide liquid resin for improved flexibility, elongation and impact resistance in coatings and adhesives.
D.E.R. 741	135-150	100-200	An aliphatic reactive diluent bearing on average of slightly more than two epoxy groups per molecule. Its multi-functionality allows developing systems that are fast curing at low temperatures, and more resistant to chemical attack and to heat than other diluted epoxy formulations.
D.E.R. 742	110-130	200-280	Containing on average three epoxy groups per molecule. Multi-functionality allows development of systems that are fast curing at low temperatures, and more resistant to chemical attack and to heat than other diluted epoxy formulations.
D.E.R. 750	176-186	2,500-4,500	Flexibilized epoxy resin suitable for civil engineering compounds (crack bridging), adhesives or for improvement of the toughness of fiber reinforced composites.

Liquid Epoxy Toughening Agents and Toughened Epoxy Resins

Product	EEW (g/eq)	Viscosity @25 °C (mPa•s)	Description
FORTEGRA™ 100	NA	3,000-4,000	Low-viscosity toughening agent designed for use in amine-cured epoxy systems.
FORTEGRA 202	NA	4,500-8,000	Low-viscosity toughening agent designed for use with epoxy systems to provide a transparent thermoset product. This product has no migration and provides significant adhesion improvement.
FORTEGRA 352	248-268	5,500-8,500[1]	A stable dispersion of preformed toughening particles in a modified epoxy resin.

[1]at 70 °C

Solid Toughened Epoxy Resins

Product	EEW (g/eq)	Softening Point (°C)	Description
FORTEGRA™ 104	960-1,060	NA	Specialty 4-type solid epoxy resin with improved toughness and impact resistance designed for fusion bonded epoxy abrasion resistant overcoats.
FORTEGRA 304	920-1,090	105-115	Specialty solid resin designed to improve flexibility and impact resistance of fusion bonded epoxy coatings. Melt viscosity at 150 °C is 8,000 - 23,000 mPas.
FORTEGRA 310	400-450	105-117	Specialty resin designed to improve flexibility and impact resistance of fusion bonded epoxy coatings with high glass transition temperature (up to 170 °C). Melt viscosity at 150 °C is 5,000 - 15,000 mPas.

Epoxy Novolac Resins

Product	EEW (g/eq)	Viscosity @25 °C (mPa•s)	Description
D.E.N.™ 425	169-175	9,500-12,500	Approximately 2.5 functional liquid epoxy novolac resin bridging between standard liquid epoxy resin and semi-solid epoxy novolac resins. When used in combination with a fast curing agent no post-cure is required and thermosets are obtained with excellent mechanical and especially solvent resistance properties.
D.E.N. 431	172-179	1,100-1,700[1]	Multi-functional (±2.8) epoxy novolac resin of lower molecular weight for application where solvents cannot be tolerated and application viscosity (temperature) needs to remain relatively low. Used in adhesives, electrical and structural laminates and castings for elevated temperature service and excellent chemical resistance.
D.E.N. 431-EK98	172-179	5,000-25,000	Solution of D.E.N. 431 in methyl-ethyl ketone.
D.E.N. 438	176-181	31,000-40,000[1]	Highly functional (±3.6) epoxy novolac resin offering the best mechanical, temperature and chemical resistance performance with workable viscosity. Recognized as a standard for high-temperature applications.
D.E.N. 438L	176-181	27,500-32,500[1]	Lower viscosity version of D.E.N. 438 epoxy novolac resin to allow higher solids and/or lower viscosity formulations.
D.E.N. 438-A85	176-181	500-1,200	Solution of D.E.N. 438 in acetone mainly for laminating or prepreg applications.
D.E.N. 438-EK85	176-181	600-1,600	Solution of D.E.N. 438 in methyl-ethyl ketone mainly for laminating or prepreg applications.
D.E.N. 438-MAK80	176-181	600-1,200	Solution of D.E.N. 438 in methyl n-amyl ketone mainly for laminating or prepreg applications.
D.E.N. 438-MK75	176-181	200-600	Solution of D.E.N. 438 in methyl iso-butyl ketone mainly for laminating or prepreg applications.
D.E.N. 438-X80	176-181	1,200-2,000	Solution of D.E.N. 438 in xylene. Main use in wet-paint systems with high temperature or chemical resistance requirements.
D.E.N. 439	191-210	15,000-35,000[2]	Highly functional (±3.8) epoxy novolac resin with improved reactivity. The higher viscosity offers a means of obtaining good drape and limited tack in prepreg formulations.
D.E.N. 439-H	191-210	23,000-29,000[2]	Highly functional epoxy novolac resin with lower processing variability.
D.E.N. 439-EK85	191-210	4,000-10,000	Solution of D.E.N. 439 in methyl-ethyl ketone mainly for laminating or prepreg applications.
D.E.N. 440	187-192	50,000-90,000[2]	Extremely high functional (± 4.4) epoxy novolac resin. Offers highest performance in this product group with regards to mechanical, temperature and chemical resistance properties.

[1]at 51.7 °C [2]at 71 °C

Liquid Brominated Resins

Product	EEW (g/eq)	Viscosity @25 °C (mPa•s)	Description
D.E.R.™ 530-A80	425-440	1,500-2,500	Standard brominated epoxy resin in acetone with about 20.5% bromine on solids.
D.E.R. 538-A80	465-495	800-1,800	Brominated epoxy resin in acetone with about 20% bromine on solids. Offers less flow during lamination versus D.E.R. 530-A80 epoxy resin.
D.E.R. 592-A80	350-370	1,000-2,400	Brominated epoxy resin in acetone with about 17% bromine on solids. Offers best dimensional stability and better chemical resistance than standard resins.
D.E.R. 593	350-370	400-1,100	Brominated epoxy resin in propylene glycol monomethyl ether with about 17 wt% bromine on solids. Allows quicker cure and higher Tg due to the large amount of catalyst that can be added.

Solid Brominated Resins

Product	EEW (g/eq)	Softening Point (°C)	Description
D.E.R.™ 542	305-355	52-62	Solid epoxy resin of tetrabromo bisphenol A epichlorohydrin type. Used for electrical laminate applications.
D.E.R. 560	440-470	78-85	Solid brominated epoxy resin used for electrical laminate applications.

Specialty Epoxy Resins for Electrical Laminate Applications

Product	EEW (g/eq) on Solid	Solid %	Viscosity @25 °C (mPa•s)	Description
XZ 92566.00	825-1,000		3,000-9,000 cSt	High molecular weight mid Tg epoxy resin modified with oxazolidone to improve toughness. To be used as a flow control agent as well.
XZ 92748.00	176-181	84-86		Epoxy novolac resin solution, suitable for mid~high Tg halogen-free electrical laminates.
XZ 92757.00	195-210	84-86	500-4,000	Epoxy novolac resin solution, suitable for high Tg halogen-free electrical laminates.
XZ 97103.00	280-305	74-76	500-2,500	Low molecular weight high Tg epoxy resin modified with oxazolidone to improve toughness. To be used as an adhesion promoter as well.

Solid Epoxy Resins

Product	EEW (g/eq)	Softening Point (°C)	Description
Low Molecular Weight Solids			
D.E.R.™ 661	500-560	75-85	Unmodified standard "1-type" solid epoxy resin. Excellent base for many high quality chemical-resistant coatings withstanding exposure to corrosive atmospheres.
D.E.R. 6116	520-560	80-90	Low molecular weight "1.5-type" epoxy resin offers excellent flow in standard and low temperature cure powder coating systems. Suggested in cases where D.E.R. 662E resin does not provide adequate flow.
D.E.R. 662	585-635	84-94	Standard "2-type" epoxy resin with good flow.
D.E.R. 662E	590-630	87-93	Standard "2-type" epoxy resin for excellent flow in standard as well as in low application temperature cure applications.
D.E.R. 6224	675-725	88-98	Low molecular weight "2.5-type" epoxy resin specifically designed for decorative powder coatings requiring excellent gloss and flow.
D.E.R. 6225	650-725	87-95	Chemically modified bisphenol A solid epoxy resin for very high flow and gloss powder coating applications. Specifically suitable for thin film applications.
D.E.R. 692H	660-720	89-97	A low molecular weight 2.5 type solid epoxy resin containing 2 wt% of a polyacrylate flow modifier. Designed especially for decorative powder coating applications requiring excellent flow and gloss.
D.E.R. 662UH	675-750	90-98	Low molecular weight "2.5-type" epoxy resin for decorative powder coatings requiring excellent gloss and flow.
D.E.R. 6330-A10	780-900	98-106	Solid epoxy resin master-batch resin containing 10 wt% of a silicone-free flow agent.
D.E.R. 8230WS	770-860	82-95	Master batch resin for powder coatings. The siloxane flow modifier provides maximum transparency in clear powder coatings. Also the flow modifier provides good slip and mar resistance.
Medium Molecular Weight Solids			
D.E.R.™ 663U	730-820	92-102	Medium molecular weight "3-type" epoxy resin for both pure epoxy and epoxy/polyester hybrid powder coatings requiring good gloss and smoothness.
D.E.R. 663UE	740-800	98-104	Medium molecular weight "3-type" epoxy resin for both pure epoxy and epoxy/polyester hybrid powder coatings requiring excellent flexibility.
D.E.R. 664	875-955	100-110	Medium molecular weight "4-type" epoxy resin containing an esterification catalyst. Esters prepared by reacting this resin with fatty acids have very consistent viscosities and acid values.
D.E.R. 664U	875-955	100-110	Medium molecular weight "4-type" epoxy resin to provide improved gloss and smoothness.
D.E.R. 664UE	860-930	104-110	Medium molecular weight "4-type" epoxy resin for functional coatings to provide improved flexibility.
High Molecular Weight Solids			
D.E.R.™ 6155	1,250-1,400	105-125	Medium molecular weight "5 type" solid epoxy resin designed for powder coatings that require greater flexibility.
D.E.R. 667E	1,600-1,950	126-137	High molecular weight "7-type" solid epoxy resin with improved solution stability. Suitable for metal decoration, interior and exterior can coatings, tube and drum linings, coil primers and many other industrial applications.
D.E.R. 668-20	2,000-3,500	135-146	High molecular weight "8-type" epoxy resin designed for can and coil coatings. Offers improved flexibility versus equivalent 7-type epoxy resins.
D.E.R. 669-20	3,500-5,500	142-162	Highest molecular weight solid epoxy resin, of the "9-type," for can and coil coatings. Offers enhanced reactivity versus the E-version.
D.E.R. 669E	2,500-4,000	61-72	Highest molecular weight solid epoxy resin, of the "9-type," for can and coil coatings. Shows improved solution storage stability.

Solid Epoxy Resins (Continued)

Product	EEW (g/eq)	Viscosity @25 °C (mPa•s)	Description
Specialty Solids			
D.E.R.™ 642U	520-560	92-98	Novolac modified solid resin for functional powder coatings. In combination with other resins it provides excellent corrosion and chemical resistance along with good mechanical properties.
D.E.R. 672U	750-850	110-120	Novolac modified, higher molecular weight solid epoxy resin for more flexible, corrosion resistant epoxy powder coating. Extra edge-coverage can be obtained by the addition of 10-50% of this resin grade to the pipe or internal drum lining formulation.
D.E.R. 6508	380-420	95-105	Specialty resin designed for high glass transition temperature fusion bonded epoxy coatings up to 150 °C.
D.E.R. 6510HT	410-440	105-114	Specialty resin designed for high glass transition temperature fusion bonded epoxy coatings up to 170 °C.
D.E.R. 6615	500-550	78-86	Solid epoxy resin suitable for a low temperature cure, down to approximately 110 °C. It is based on patented process technology that allows a combination of low melt viscosity and a sufficiently high softening point.
D.E.R. 664HA	750-850	105-115	Specialty resin designed to provide enhanced adhesion for epoxy and epoxy polyester hybrid decorative and fusion bonded epoxy.

Epoxy Resin Solutions

Product	EEW (g/eq)	Visc=osity @25 °C (mPa•s)	Description
D.E.R.™ 331-X95	190-205	2,000-3,000	Solution of D.E.R. 331 with xylene.
D.E.R. 337-DA97	230-278	2,400-3,900[1]	Solution of D.E.R. 337 with diacetone alcohol.
D.E.R. 337-X80	230-260	500-1,200	Solution of D.E.R. 337 in xylene. The excellent resistance and physical properties for epoxy coal tar combinations and higher solids content marine coatings.
D.E.R. 337-X90	230-250	5,000-15,000	Solution of D.E.R. 337 in xylene. Higher solids content than D.E.R. 337-X80 epoxy resin solution.
D.E.R. 338-X90	230-280	5,000-50,000	Solution of a semi-solid epoxy resin in xylene.
D.E.R. 3680-X90	230-270	1,200-3,200	Chemically modified low molecular weight epoxy resin in xylene. Offers lower viscosity allowing higher solids contents at similar corrosion protection properties. Improves lower temperature curing.
D.E.R. 660-MAK80	300-350	1,000-5,000	Solution of D.E.R. 660 epoxy resin in methyl n-amylketone (MAK).
D.E.R. 660-PA80	300-350	1,500-4,500	Solution of D.E.R. 660 epoxy resin in propyl acetate. The solvent choice makes it possible to formulate coatings without solvents listed as hazardous air pollutants.
D.E.R. 660-X80	300-335	3,500-7,000	Solution of D.E.R. 660 epoxy resin in a xylene solution for high solids/build coatings. Combines the high solids and chemical resistance of liquid epoxy resins with the outstanding adhesion, flexibility and fast cure of higher molecular weight solid epoxy resin.
D.E.R. 661-A75	500-550	800-2,500	Low viscosity solution of D.E.R. 661 solid epoxy resin in acetone.
D.E.R. 661-A80	475-575	3,500-8,500	Intermediate viscosity solution of D.E.R. 661 solid epoxy resin in acetone.
D.E.R. 671-MAK75	425-550	3,000-15,000	Solution of D.E.R. 671 in methyl n-amyl ketone for industrial protective coatings.
D.E.R. 671-PM75	425-500	9,500-15,000	Solution of D.E.R. 671 in propylene glycol monomethyl ether for industrial protective coatings.
D.E.R. 671-R75	435-460	15,000-27,000	Solution of D.E.R. 671 in Aromatic 100 for industrial protective coatings.
D.E.R. 671-T75	425-550	2,200-10,000	Solution of D.E.R. 671 in toluene, for industrial protective coatings.
D.E.R. 671-X75	430-480	7,500-11,500	Solution of D.E.R. 671 in xylene. Industry standard for heavy-duty anti-corrosive coatings.
D.E.R. 671-XM75	425-550	2,500-9,000	Solution of D.E.R. 671 in xylene/methyl isobutyl ketone, for industrial protective coatings.
D.E.R. 684-EK40	2,800 min.	600-2,500	Solution of an ultra-high molecular weight epoxy resin. It has essentially no epoxy functionality and provides coatings with outstanding physical and chemical resistance properties by solvent evaporation alone. Main applications include maintenance and flash primers, shop coats, wire enamels, road markers and clear coatings for brass, chrome and aluminum.

[1]at 51.7 °C

Solvents

Solid epoxy resins and epoxy novolacs can be dissolved in different solvents at different concentration levels to make the resin solution. The solvents that Olin Epoxy utilizes are listed in the following table for your reference. Please contact your Olin Epoxy representative for further information.

Solvent List	HAPS Free	VOC Exempt
Alcohol		
Methanol		
Ethanol	•	
2-Propanol	•	
1-Propanol	•	
Diacetone alcohol	•	
N-Butanol	•	
2-Butoxyethanol	•	
Glycol Ether and Acetate		
Propyl acetate	•	
Isobutyl acetate	•	
N-butyl acetate	•	
Propylene glycol monomethyl ether	•	
Propylene glycol monomethyl ether acetate	•	
Ethylene glycol monobutyl ether	•	
Dipropylene glycol monomethyl ether	•	
Ethylene glycol		
Hydrocarbon		
Hexane		
Ethyl benzene		
Toluene		
Xylene		
Aromatic 100	<5% HAPS	
Ketone		
Acetone	•	•
MEK	•	
MIBK		
MAK	•	

Waterborne Epoxies

Olin Epoxy is pushing waterborne technology to new levels. The solvent-free nature of these products can help formulators meet stringent VOC regulations, including zero VOC formulations, in the development of high-performance coatings.

Our waterborne epoxies have been shown to perform as well as solvent-borne technologies, giving formulators the opportunity to gain solvent-level performance while also meeting environmental and performance goals.

Waterborne Epoxy Benefits

- Solvent-free formulation capability
- Easy mixing with other waterborne components
- Manufactured without the use of APEO[1] surfactants
- Low odor
- Shear stable
- Easy water clean-up
- High gloss
- Early hardness
- Good abrasion
- Chemical resistance
- Freeze stable curing agents

[1]Alkyl phenol ethoxylates

Typical Properties – Waterborne Epoxy Resins

Product	EEW, as supplied (g/eq)	Solids (wt%)	Description
D.E.R.™ 915	1050	46-48	Waterborne dispersion of "1-type" solid epoxy resins for 2-component coating systems. Offers good corrosion protection on steel as well as fast-drying on mineral substrates.
D.E.R. 916	330	57-59	Semi-solid epoxy novolac resin dispersion designed for 2-component coating systems. Can produce highly cross-linked matrices, providing excellent heat and chemical resistance similar to solvent-borne novolac systems.
D.E.R. 917	310	63-65	Liquid epoxy emulsion designed for use in waterborne 2-component coating systems. Is also used as cross-linking agent for other aqueous (acrylic) systems.

Low Viscosity Epoxy and Novolacs

Heavy-duty coating performance requirements call for high-performance epoxy solutions. Solvent-free, low-viscosity resins from Olin Epoxy can be used to achieve both high volume solids and high pigment concentration (PVC), while maintaining good application and metal protection properties.

Olin's low viscosity epoxies and novolacs are suited for applications in challenging environmental conditions such as low temperatures and high humidity. They can be used to formulate coatings for marine use, as well as for linings in chemical tanks. All of these are low viscosity liquid epoxy resins (free of any organic solvent) that facilitate high solids coating formulations with low volatile organic compound (VOC) emissions, while minimizing compromises in performance. They can be cured with multiple types of curing agents (hardeners).

Olin Epoxy low-viscosity technologies can overcome many of the disadvantages inherent in current high-solids systems. In particular, Olin Epoxy technologies can combine ease of application using conventional spray equipment and demonstrate similar performance compared to traditional epoxy systems.

Low Viscosity Epoxy and Novolacs Benefits

- Solvent-free formulation capability
- Enables primers with excellent balance of:
  - Application properties
  - Corrosion resistance
  - Chemical resistance
- High achievable volume solids and PVC
- High sprayability
- Long pot life
- Exceptional cured coating properties
- DLVNE™ products have higher chemical and thermal resistance

Typical Properties[1] - Low Viscosity Epoxy and Novolacs

Product	EEW (g/eq)	Viscosity @25 °C (mPa•s)	Description
DLVE™ 18	160-175	400-1,000	Low viscosity liquid epoxy resin modified with a cycloaliphatic polyglycidyl ether for high solids coating formulations with ultra low volatile organic compound (VOC) emissions and ease of application. Excellent corrosion protection and chemical resistance. Can be cured with multiple types of curing agents (hardeners).
DLVE 19	185-200	2,600-4,200	Low viscosity epoxy resin modified with a cycloaliphatic polyglycidyl ether for high solids coating formulations with low volatile organic compound (VOC) emissions, excellent application, corrosion and chemical resistance. Can be cured with multiple types of curing agents (hardeners).
DLVE 52	165-180	350-550	Ultra low viscosity epoxy resin modified with a cycloaliphatic polyglycidyl ether (free of any organic solvent) for high solids coating formulations with low volatile organic compound (VOC) emissions, excellent application, corrosion and chemical resistance. This resin is more hydrophobic and can provide better surface wetting. Can be cured with multiple types of curing agents (hardeners).
DLVNE™ 59	160-175	2,000-4,000	Low viscosity novolac resin modified with a cycloaliphatic polyglycidyl ether (free of any organic solvent) for high solids coating formulations with low volatile organic compound (VOC) emissions. Balance of properties similar to solvent-borne novolac.
DLVNE 60	166-176	1,100-1,900[2]	Low viscosity novolac resin modified with a cycloaliphatic polyglycidyl ether (free of any organic solvent) that facilitates high solids coating formulations with low volatile organic compound (VOC) emissions, improved application, and strong chemical and thermal resistance.
DLVNE 61	155-170	4,500-6,500	Medium low viscosity novolac resin modified with a cycloaliphatic polyglycidyl ether (free of any organic solvent) that facilitates high solids coating formulations with low volatile organic compound (VOC) emissions, improved application, and strong chemical and thermal resistance.

[1]All grades are 100% solids [2]at 51.7 °C

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