



D.E.R.[™] 330

Liquid Epoxy Resin

Description

D.E.R.[™] 330 Liquid Epoxy Resin is a reaction product of epichlorohydrin and bisphenol A.

Introduction

D.E.R. 330 Epoxy Resin is a liquid epoxy resin processed to provide low viscosity without the use of diluents. The physical strength, toughness, excellent adhesion, chemical resistance and low shrinkage properties have established liquid epoxy resins as major raw materials for high quality solvent-free coatings, linings, industrial flooring, grouts and concrete reinforcements. They have also found application in the fields of tooling, encapsulation, adhesives, filament winding and laminates. D.E.R. 330 Resin can also serve as a basis for advanced polymers for a variety of solvent-borne, water-borne and UV-curable resins. A wide variety of curing agents is available to cure this liquid epoxy resin at ambient conditions. The most frequently used are aliphatic polyamines, polyamides, and modified versions of these. If anhydride or catalytic curing agents are employed, elevated temperatures cures are necessary and long post-cures are required to develop full end properties.

Typical Applications

This product is suitable for use in applications such as:

- Adhesives
- Casting and Tooling
- Civil Engineering
- Composites
- Automotive Coatings
- Can and Coil Coatings
- Marine and Protective Coatings
- Photocure Coatings
- Potting and Encapsulation

Typical Properties

Property ⁽¹⁾	Value	Method
Epoxide Equivalent Weight (g/eq)	176 – 185	ASTM D-1652
Epoxide Percentage (%)	23.5 – 24.4	ASTM D-1652
Epoxide Group Content (mmol/kg)	5400 – 5680	ASTM D-1652
Color (Platinum Cobalt)	125 Max.	ASTM D-1209
Viscosity @ 25°C (mPa·s)	7000 – 10000	ASTM D-445
Hydrolyzable Chloride Content (ppm)	500 Max.	ASTM D-1726
Water Content (ppm)	700 Max.	ASTM E-203
Density @ 25°C (g/ml)	1.16	ASTM D-4052
Epichlorohydrin Content (ppm)	5 Max.	DowM 101321
Shelf Life (Months)	24	

(1) Typical properties, not to be construed as specifications.

Safety and Handling

The Dow Chemical Company provides its customers with a product specific Material Safety Data Sheet (MSDS) or Safety Data Sheet (SDS) to cover potential health effects, safe handling, storage, use and disposal information. Dow strongly encourages its customers to review the MSDS or SDS on its products and other materials prior to their use.

Safety and Handling
(continued)

This liquid epoxy resin is supplied in bulk, in 1000 kg intermediate bulk containers or in 240 kg tight-head drums. The resin should be stored in a dry place in its original closed packaging. This low viscosity epoxy resin should retain its chemical properties for a period of at least 24 months.

For further handling information, consult the Dow brochure entitled, *DOW Epoxy Resins Product Stewardship Manual, Safe Handling and Storage*, Form No. 296-00312 and the technical bulletin *Product Coding, Shelf-life and Storage Stability*, Form No. 296-01657.

D.E.R.™ 330 Liquid Epoxy Resin can crystallize. This reversible, physical phenomena can be greatly avoided by storing the resin at temperatures not below 25°C. For additional information also consult the technical bulletin *Crystallization of Liquid Epoxy Resins*, Form No. 296-01652.

Typical Filament Winding Formulation

The Dow epoxy system based on D.E.R. 330 Liquid Epoxy Resin, XZ 87744.00 Experimental Hardener and 1-methylimidazole (1-MI) accelerator is especially suitable for the filament winding process where low viscosity and long pot life are required. This system provides good mechanical and electrical properties, as well as high temperature resistance and low moisture absorption. An accelerator 1-methylimidazole, benzyldimethylamine (BDMA) or other traditional tertiary amine accelerators such as Ancamine K-54 (from Air Products) can be used. The system can be used for insulating tubes/ pipes in high tension applications and in general purpose pipe manufacture. The corrosion resistance with respect to acids, potable water and hydrocarbons is particularly good.

Typical Filament Winding Formulation⁽¹⁾

Basic Formulation		Parts By Weight
Resin	D.E.R. 330 Resin	100
Hardener	XZ 87744.00 Hardener	90
Accelerator	1-MI	0.5-2.0
Initial Viscosity @ 23°C (mPa·s)		600
Initial Viscosity @ 40°C (mPa·s)		200

(1) Typical properties, not to be construed as specifications.

Typical Reactivity⁽¹⁾ on 250 grams mass binder

Formulation	A	B	C	D
	Parts By Weight	Parts By Weight	Parts By Weight	Parts By Weight
D.E.R. 330 Resin	100	100	100	100
XZ 87744.00 Hardener	90	90	90	90
Accelerator 1-MI	0.5	1.0	1.5	2.0
Properties				
Pot Life @ 23°C, hr. (1500 mPa·s)	20	14	10	8
Pot Life @ 23°C, hr. (3000 mPa·s)	30	25	21	17
Pot Life @ 23°C, hr. (5000 mPa·s)				21
Pot Life @ 40°C, hr. (1500 mPa·s)	13	9	7	5
Gel Time @ 40°C, hr.	30	20	15	10
Gel Time @ 90°C, minutes.	50	38	30	10

(1) Typical properties, not to be construed as specifications.

Typical Filament Winding Formulation (continued)

XZ 87744.00 Hardener is a liquid methyltetrahydro phthalic anhydride (MTHPA) curing agent particularly suitable for curing liquid epoxy resins where a low viscosity, long pot life system is required. XZ 87744.00 Hardener is suitable for use in the manufacture of fiber reinforced composites where production methods such as filament winding, wet lay-up and pultrusion are used.

Typical Filament Winding Properties As Formulated⁽¹⁾

Property	Result
Flexural Test	
Modulus, (kN/mm ²)	3.5
Strength (N/mm ²)	140
Maximum Strain (%)	5 – 6
Tensile Test	
Modulus (kN/mm ²)	3.5
Strength (N/mm ²)	85
Breaking Strain (%)	5.0
Thermal Properties (2 hours @ 130°C)	
Average Coefficient of Thermal Expansion (23-80°C) (ppm/K)	65
Heat Deflection Temperature (°C)	115 – 130
Glas Transition Temperature	145°C, Formulation A
	140°C, Formulation B
	135°C, Formulation C
	130°C, Formulation D

(1) Typical properties, not to be construed as specifications.

Product Stewardship

The Dow Chemical Company has a fundamental concern for all who make, distribute, and use its products, and for the environment in which we live. This concern is the basis of our Product Stewardship philosophy by which we assess the health and environmental information on our products and then take the appropriate steps to protect employee and public health and the environment. The Dow Chemical Company has enduring commitments to Responsible Care® in the management of chemicals worldwide. Our Product Stewardship program rests with every individual involved with Dow products from the initial concept and research to the manufacture, sale, distribution, and disposal of each product.

Customer Notice

Dow encourages its customers and potential users of Dow products to review their applications for such products from the standpoint of human health and environmental quality. To help ensure that Dow products are not used in ways for which they were not intended or tested, Dow personnel are available to assist customers in dealing with ecological and product safety considerations. Your Dow sales representative can arrange for the proper contacts. Dow literature, including MSDS or SDS, should be consulted prior to the use of Dow products.

Medical Application Policy

Dow will not knowingly sell or sample any product or service ("Product") into any commercial or developmental application that is intended for:

- (a) permanent (long term) contact with internal body fluids or internal body tissues. Long term is a use which exceeds 72 continuous hours (except 30 days for PELLETHANE™ Polyurethane Elastomers);
- (b) use in cardiac prosthetic devices regardless of the length of time involved (cardiac prosthetic devices include, but are not limited to, pacemaker leads and devices, artificial hearts, heart valves, intra-aortic balloons and control systems and ventricular bypass assisted devices);
- (c) use as a critical component in medical devices that support or sustain human life; or
- (d) use specifically by pregnant women or in applications designed specifically to promote or interfere with human reproduction.

Additionally, all Products intended for use in pharmaceutical applications must pass the then current Pharmaceutical Liability Guidelines. For additional information please contact your regular Dow representative.

Food Contact Applications

When properly formulated and cured for food contact applications, this resin will comply with the U.S. Food, Drugs and Cosmetics Act as amended under Food Additive Regulation 21 CFR 175.300 (b)(3)(viii)(a); "Epoxy resins, as basic polymer". This use is also subject to good manufacturing practices and any limitations specified in each regulation. Please consult the regulations for complete details.

If your applications include food contact requirements, please contact your Dow representative for further information and forthcoming EC regulations. Also consult the Dow data sheet, *Food Additive Status for Epoxy Resins, Curing Agents and Epoxy Novolac Resins*, Form No. 296-01425.

Regulatory Status

This liquid epoxy resin is regarded as a polymer according to the 6th Amendment of Council Directive 67/548/EEC and as substances according to Council Directive 92/32/EEC of 30 April 1992; the 7th Amendment of that same directive. The substance has been reported to the European Commission as No-Longer Polymer (NLP), is registered under NLP number 500-033-5, and is, therefore, exempt from the European Inventory of Existing Chemical Substances (EINECS). In addition, Dow confirms that the chemicals and intentional additives which form the basis of this product are listed on EINECS.

For more information on the regulatory status of this product, please refer to the MSDS or SDS for this product.

Chemical Inventory Listing

CAS Number ⁽¹⁾		25036-25-3 / 1330-20-7 (100-41-4)
Europe	EINECS	NLP # 500-033-5
United States	TSCA	25085-99-8
Canada	DSL	25085-99-8
Australia	AICS	25085-99-8
Japan	ENCS	7-1279
Korea	KECI	KE-24083
Philippines	PICCS	25085-99-8
China	SEPA	25085-99-8

(1) Please refer to the MSDS or SDS for this product to ensure this CAS number is consistent with the product(s) you use.

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