D.E.R.™ 660-X80

Epoxy Resin Solution

Description

D.E.R.™ 660-X80 Epoxy Resin Solution is a semi-solid reaction product of epichlorohydrin and bisphenol A in a xylene solution.

Introduction

D.E.R. 660-X80 Epoxy Resin is an intermediate molecular weight epoxy resin in a xylene solution developed for use in high solids / high build coating formulations. This epoxy resin solution enables the formulation of systems combining 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. 660-X80 Epoxy Resin can form the basis of a two-component coating system with either polyamine, polyamide or polyamidoamine curing agents to provide high quality coatings which are resistant to a number of chemical reagents. These coatings also exhibit the excellent mechanical properties normally associated with epoxy resin systems.

D.E.R. 660-X80 Resin is ideal for medium to heavy duty coatings, such as ship hulls, marine paints, tank linings and industrial maintenance coatings.

Typical Applications

This product is suitable for use in applications such as:

- Civil Engineering
- Marine and Protective Coatings

Typical Properties

Property(1)	Value	Method
Epoxide Equivalent Weight (g/eq)	300 – 335(2)	ASTM D-1652
Epoxide Pecentage (%)	12.8 – 14.3(2)	ASTM D-1652
Epoxide Group Content (mmol/kg)	2985 – 3340(2)	ASTM D-1652
Color (Gardner)	2 Max.	ASTM D-1544
Viscosity @ 25°C (mPa•s)	3500 – 7000	ASTM D-445
Density @ 25°C (g/ml)	1.09	ASTM D-4052
Non-volatile Content (wt%)	79 – 81	DowM 101188
Solvent	Xylene	
Shelf Life (Months)	24	

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

(2) Based on solids.

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.

This semi-solid epoxy resin solution is supplied in bulk or in 215 kg tight-head drums. The resin solution should be stored in a dry place in its original closed packaging. This low molecular weight epoxy resin solution should retain its chemical properties for a period of at least 24 months.

For further handling information consult the Dow brochure entitled, *DOW Epoxy 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.

Clear Varnish Formulation

Below is a general purpose clear varnish formulation for brushing application together with some film and performance data.

Part A	Kilograms
D.E.R.™ 660-X80 Epoxy Resin Solution	100
n-Butanol	5.9
Xylene	15
Part B	
Ancamide 220 (Air Products)	51.1
Composite Blend	202
Solids Content (wt%)	65
Mixing Ratio; Parts Per Hundred Resin	64
Viscosity @ 21°C (mPa•s)	720
Gel-time (100 grams @ 21°C)	35 hours

Clear Coating Properties As Formulated	
Through Drying Time @ 21°C (hours)	12
Film Thickness (µm)	40
Acetone Double Rubs; 1, 2, 3, 7 Days	45, 71, 85, >100
Pendulum Hardness Persoz; 1, 2, 3, 7 Days	85, 230, 235, 290
Adhesion, Cross cut % ok	100
Front Impact (lb*in)	>160
Reverse Impact (lb*in)	>160
Erichesen Indentation Flexibility (mm)	10.4

Two-Component Pigmented Coating

Below is a general purpose epoxy-polyamide maintenance paint formulation for spray application.

Part A	Kilograms
D.E.R.™ 660-X80 Epoxy Resin Solution	125
Thixotrol ST (NL Industries)	0.7
Magnesium Silicate	38.6
Diatomaceous Earth	16.2
Titanium Dioxide	3.6
n-Butanol	21.4
DOWANOL™ PM Glycol Ether	23.2
Total	228.7

Part B	
Ancamide 220 (Air Products)	47.7
Thixotrol ST	0.7
Magnesium Silicate	84.0
Titanium Dioxide	16.8
Yellow Iron Oxide	2.9
Xylene	18.9
Total	171.0
Composite Blend Total	399.7

Formulating Procedure:

Add the fillers and the pigments under high shear to the curing agent solution for dispersing and grinding. Grind down both components to Hegmann 6 after which the solvents are added to reduce the viscosity. Slowly and thoroughly blend the pigmented curing agent solution into the pigmented epoxy resin solution. For maximum results, age the blended components for 45 minutes to 1 hour. And apply in a well ventilated area.

Pigment Volume Concentration (PVC, %)	28.8
Solids, (wt%)	77.9
Solids, Volume (%)	65.0
VOC (g/l)	300
Coating Properties:	
Tack-Free Time (hours)	2
Film Thickness (µm)	95
MEK Double Rubs, 3 days / 7days	84 / 200
Pencil Hardness, 3 days / 7 days	3B / H
Conical Bend, 30% Max. (%)	17

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;
(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

The base epoxy resin component of this epoxy resin solution is regarded as a polymer according to Council Directive 92/32/EEC of 30 April 1992; the 7th Amendment of Council Directive 67/548/EEC, 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.

The xylene solvent component in this epoxy resin solution is listed on EINECS under the registration number 215-535-7. A major impurity of the xylene solvent is ethylbenzene which is registered under EINECS # 202-849-4.

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	Polymer / 215-535-7 (202-849-4)
United States	TSCA	25036-25-3 / 1330-20-7 (100-41-4)
Canada	DSL	25036-25-3 / 1330-20-7 (100-41-4)
Australia	AICS	25036-25-3 / 1330-20-7 (100-41-4)
Japan	ENCS	7-1283 / 3-3 (3-28)
Korea	KECI	KE-24070 / KE-35427 (KE-13532)
Philippines	PICCS	25036-25-3 / 1330-20-7 (100-41-4)
China	SEPA	25036-25-3 / 1330-20-7 (100-41-4)

(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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