D.E.R.™ 671-X75

Epoxy Resin Solution

Description

D.E.R.™ 671-X75 Epoxy Resin Solution is a solid reaction product of epichlorohydrin and bisphenol A dissolved in xylene.

Introduction

D.E.R. 671-X75 Epoxy Resin Solution is a low molecular weight epoxy resin of the "1-type" in a xylene solution. Resin solutions such as this, when formulated with polyamine or polyamide hardeners, form an excellent base for many high quality coatings.

These two-pack coating systems are suitable where cure must be achieved at ambient temperature, and where films must withstand exposure to corrosive atmospheres containing a variety of chemical reagents, solvents or salt water.

The outstanding resistance properties, hardness, excellent adhesion to almost any substrate and flexibility are utilized in a wide variety of finishes, including marine and industrial maintenance coatings. D.E.R. 671-X75 Epoxy Resin Solution can also be used as complimentary resin in non-epoxy coating systems to improve corrosion resistance properties.

Typical Applications

This product is suitable for use in applications such as:

- Marine and Protective Coatings
- Automotive Coatings
- Can and Coil Coatings
- Civil Engineering

Typical Properties

Property(1)	Value	Method
Epoxide Equivalent Weight (g/eq)	430 – 480(2)	ASTM D-1652
Epoxide Pecentage (%)	9.0 – 10.0(2)	ASTM D-1652
Epoxide Group Content (mmol/kg)	2080 – 2330(2)	ASTM D-1652
Color (Gardner)	2 Max.	ASTM D-1544
Viscosity @ 25°C (mPa•s)	7500 – 11500	ASTM D-445
Density @ 25°C (g/ml)	1.09	ASTM D-4052
Non-volatile Content (wt%)	74 – 76	DowM 101188-TE
Solvent	Xylene	
Shelf Life (Months)	24	

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

(2) Based on solids.

Typical Polyamide Cured Clear Coating Formulation

Below is a general purpose clear coating formulation. This kind of formulation is recommended for use where excellent flexibility, water resistance, good chemical and solvent resistance are needed. Either the resin or the hardener (or both) may be pigmented for brushable or sprayable coatings. The polyamide hardener may be partially or completely replaced by the recommended amounts of other polyamide hardeners to achieve the desired coating properties.

Typical Polyamide Cured Clear Coating Formulation *(continued)*

Typical Formulation Part A:	Kilograms
D.E.R.™ 671-X75 Epoxy Resin Solution	406.22
Methyl Isobutyl Ketone	75.58
Total	481.80
Part B:	
Ancamide 220-X70 (Air Products)	127.69
Xylene	121.90
DOWANOL™-PM Glycol Ether	88.07
Total	337.66
Total Composite Blend:	819.46

Typical Properties as Formulated	Value
Viscosity (cSt)	80 – 100
Density (kg/m^3)	981
Solids (wt%)	48.09
Solids, volume (%)	42.44
VOC (g/l)	510
MEK Double Rubs	200 Pass
Front Impact (in*lb)	80
Reverse Impact (in*lb)	40

Formulating Procedure:

Blend the resin and/or curing agent solution thoroughly with the solvents, filter if desired, and package in matching quantities. Slowly and thoroughly blend the curing agent solution into the resin solution. For maximum results, age the blended components for 15 minutes to 1 hour. And apply in a well ventilated area. The blend has a limited pot-life, but should be usable up to 8 to 12 hours with very little viscosity change under normal working conditions.

Brushing Thinner		Spraying Thinner	
Methyl Isobutyl Ketone (wt%)	33	Methyl Isobutyl Ketone (wt%)	45
Xylene (wt%)	33	Xylene (wt%)	50
DOWANOL-PM Glycol Ether (wt%)	34	DOWANOL-PM Glycol Ether (wt%)	3.25
		DOWANOL-DPM Glycol Ether (wt%)	1.75
Total (wt%)	100	Total (wt%)	100

If cured at room temperature, a 30-50 µm film will reach the following degree of cure:
Dry to Handle: 5-8 hours
Full Physical Properties: 3-4 Days
Full Resistance Properties: 6-8 Days.

This corresponds approximately to the following cure cycles at elevated temperatures;
25 minutes at 95°C
15 minutes at 120°C
10 minutes at 150°C
5 minutes at 175°C

Typical Polyamide Cured Clear Coating Formulation *(continued)*

Solvent Resistance Key:

1	No Effect	S	Softening
2	Slight Effect	B	Blistering
3	Moderate Effect	H	Hazing
4	Severe Effect		

Solvent Resistance:

	1 Hour	1 Day	1 Week
Mineral Spirits	1	1-2	2
Xylene	2S	4S	-
Nitroethane	2S	4S	-
Polyglycol, Ether	4S	-	-
Polyglycol, Ether Acetate	3S	4S	-
Methyl Ethyl Ketone	4	-	-
n-Butanol	2S	4	-

Water Resistance:

	Room Temperature 1/30 Days	Boiling Temperature 10/60 minutes
Ambient Cure (7 days)	1 / 1	2 / 4S
Bake Cure (30 min at 120°C)	1 / 1	2 / 4S

Typical Pigmented Epoxy Enamel Formulation

Below is a general purpose gloss enamel recommended for use on docks, boats and other marine fixtures requiring excellent water resistance. This formulation is suitable for brush and roller application and may also be thinned for spray application with the same solvent blends as shown for the clear coating system on the previous page.

Typical Formulation Part A:	Kilograms
D.E.R.™ 671-X75 Epoxy Resin Solution	318.07
Xylene	152.71
Methyl Isobutyl Ketone	94.73
Total	565.51
Part B:	
Ancamide 220-X70 (Air Products)	133.29
Titanium Dioxide (e.g. Ti-Pure R900 ex. DuPont)	207.36
Calcium Carbonate	122.41
Pigment (e.g. iron-oxide Red)	27.20
Bentone 34 (NL Industries)	1.19
Cab-O-Sil TS-720 (Cabot Corporation)	1.19
BYK P 104-S (BYK Chemie)	0.60
Total	493.24
Composite Blend Total	1058.75

Typical Pigmented Epoxy Enamel Formulation *(continued)*

Formulating Procedure

Blend the solution thoroughly with the solvents, filter if desired, and package. Add the fillers and the pigments under high shear to the curing agent solution for dispersing and grinding. Slowly and thoroughly blend the pigment curing agent solution into the resin solution. For maximum results, age the blended components for 15 minutes to 1 hour. And apply in a well ventilated area.

Pigment Volume Concentration (PVC, %)	30.3
Density (kg/m^3)	1269
Solids (wt%)	65.34
Solids, volume (%)	51.94
VOC (g/l)	440
MEK Double Rubs	200 Pass
Front Impact (in*lb)	80
Reverse Impact (in*lb)	40

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 solid epoxy resin solution is supplied in bulk, in 1000 kg intermediate bulk containers or in 220 kg tight-head drums. The resin solution should be stored in a dry place in its original closed packaging. This low molecular weight solid 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 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.

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 (CAS registration number 1330-20-7) 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 (EINECS 202-849-4, CAS number 100-41-4).

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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