



D.E.R.[™] 684-EK40

Epoxy Resin Solution

Description

D.E.R.[™] 684-EK40 Epoxy Resin Solution is an ultra high molecular weight solid reaction product of epichlorohydrin and bisphenol A dissolved in methyl ethyl ketone.

Introduction

D.E.R. 684-EK40 Epoxy Resin Solution provides coatings with outstanding physical and chemical resistance properties by solvent evaporation alone. Products formulated with D.E.R. 684-EK40 Epoxy Resin Solution offer the hardness, flexibility, toughness, adhesion and chemical resistance properties of epoxy resins in a convenient lacquer form.

D.E.R. 684-EK40 Epoxy Resin Solution has essentially no epoxy functionality but can be cross-linked through the hydroxyl groups along the polymer backbone. Cross-linking materials of the urea, melamine, phenolic and polyisocyanate types may be used. Once cross-linked with hardeners these systems have improved solvent resistance, improved resistance to some chemicals and improved hot-water resistance.

Ambient cured thermoplastic coatings based solely on D.E.R. 684-EK40 Resin Solution, when properly formulated, can also provide excellent flexibility, moisture barrier properties, and good adhesion to a variety of substrates. Because of the high molecular weight and the hydrogen bonding tendencies of D.E.R. 684-EK40 Resin Solution, solvent release can sometimes be a problem. Clear films of this resin at a thickness above 25 µm should be force dried to remove traces of solvent and obtain optimum properties. Pigmented films offer improved solvent release, however, optimum properties are obtained by force-drying. Coatings based on D.E.R. 684-EK40 Resin Solution can be used in maintenance primers and topcoats, flash primers, shop coats, wire enamels, road markers (primers) and as clear coatings for brass, chrome and aluminum.

Typical Applications

This product is suitable for use in applications such as:

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

Typical Properties

Property ⁽¹⁾	Value	Method
Epoxide Equivalent Weight (g/eq)	2800 Min. ⁽²⁾	ASTM D-1652
Epoxide Percentage (%)	1.5 Max. ⁽²⁾	ASTM D-1652
Epoxide Group Content (mmol/kg)	360 Max. ⁽²⁾	ASTM D-1652
Color (Gardner)	3 Max.	ASTM D-1544
Viscosity @ 25°C (cSt)	600 – 2500	ASTM D-445
Density @ 25°C (g/ml)	0.94	ASTM D-4052
Volatiles (%)	59 – 61	DowM 101188
Solvent	Methyl Ethyl Ketone	ASTM D-1963
Shelf Life (Months)	12	

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

(2) Based on Solids.

**One-component
Thermoplastics
Zinc-rich Primer**

Zinc-rich primers provide sacrificial cathodic protection as shop primers and marine coating systems. Zinc-rich primers provide outstanding corrosion resistance, especially in aggressive corrosive environments. Zinc-rich primers are intended for structural steel members rather than for thin-gauge metal sheets. The primer must be in intimate contact with the clean metal, otherwise it will not provide cathodic protection to the metal. The zinc and the steel form a tiny electrical cathodic cell that protects the steel at the expense of the zinc. Of course the zinc primer also provides a little 'barrier' protection as well.

D.E.R.™ 684-EK40 Epoxy Resin Solution provides a binder system that forms a tough resistant film by solvent evaporation alone. The thickener should be thoroughly dispersed in the resin/solvent system and then the zinc dust should be added slowly with high agitation. Upon standing, the zinc will form a soft pack which can be readily re-dispersed. Alternately, the zinc may be added with thorough agitation immediately before application.

Typical Starting Point Formulation	Parts By Weight
D.E.R. 684-EK40 Resin Solution	123.5
Bentone 27 (NL Industries) or similar	6.8
Acetone	45.4
Toluene	49.0
Diacetone Alcohol	29.9
Zinc Dust	680.4
Total	935

Viscosity (cSt)	140
Density (g/cm ³)	2.48
% Zinc in dry film	92.4
Pigment : Binder	13.8 : 1
% Solids, weight	78.7
% Solids, volume	36.7
VOC (g/l)	528

The formulation should be reduced to 15 seconds on a # 4 Ford cup for spray application. The spray should be adjusted to apply a wet coat. During the application, the reduced formulation should be stirred occasionally to ensure pigment dispersion. A suggested spraying thinner composition is given below:

DOWANOL™ PMA Acetate	30%
Toluene	50%
Methyl Ethyl Ketone	20%

For all coating systems, the performance of a painting system is strongly dependent on the quality of the surface preparation. Although several techniques are employed in the market place; shot-blasting remains the most chosen method.

**Air-drying White
High-gloss
Lacquer**

The following product formulation uses D.E.R. 684-EK40 Epoxy Resin Solution to provide a white coating with outstanding physical and chemical resistance properties by solvent evaporation alone. This coating system lends itself to a variety of priming applications and provides excellent flexibility, moisture barrier properties, and good adhesion to a variety of substrates.

**Air-drying White
High-gloss
Lacquer
(continued)**

Typical Starting Point Formulation	Parts By Weight
D.E.R.™ 684-EK40 Resin Solution	388.0
Titanium Dioxide	100.0
Magnesium Silicate	15.0
Bentone 34 (NL Industries) or similar	8.0
Ethyl Glycol Acetate	283.0
Aromatic Naphtha	79.0
Paint Additive No.6 (Dow Corning) or similar	0.3
Total	873.3

Pigment : Binder	36 : 64
% Solids, weight	31.8
Pigment Volume Concentration (5)	19.7

In order to reduce the application viscosity, if required, the thinner composition as mentioned on the previous page can be employed.

**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.

D.E.R. 684-EK40 Epoxy Resin Solution is supplied in bulk or in 190 kg tight-head drums. The epoxy resin solution should be stored in a dry place in its original closed packaging. This solid epoxy resin solution should retain its chemical properties for a period of at least 12 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 Dow technical bulletin, *Product Coding, Shelf-life and Storage Stability*, Form No. 296-01657.

**Product
Stewardship**

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D.E.R. 684-EK40 Epoxy Resin Solution

Form No. 296-01455-1007X-TD

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

This resin solution does NOT comply with the U.S. Food, Drugs and Cosmetics Act as amended under Food Additive Regulation 21 CFR 175.300. If your applications include food contact requirements, please contact your Dow representative for further information and forthcoming EC regulations.

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 exempt from the European Inventory of Existing Chemical Substances (EINECS). Dow confirms that the chemicals and intentional additives which form the basis of this product are listed on EINECS. The ethyl methyl ketone solvent component (CAS registration number 000078-93-3) in this epoxy resin solution is listed on EINECS under the registration number 201-159-0.

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 / 78-93-3
Europe	EINECS	Polymer / 201-159-0
United States	TSCA	25036-25-3 / 78-93-3
Canada	DSL	25036-25-3 / 78-93-3
Australia	AICS	25036-25-3 / 78-93-3
Japan	ENCS	7-1283 / 2-542
Korea	KECI	KE-24070 / KE-24094
Philippines	PICCS	25036-25-3 / 78-93-3
China	SEPA	25036-25-3 / 78-93-3

(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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