



FORTEGRA™ 100 Epoxy Toughener

Description FORTEGRA™ 100 Epoxy Toughener is a low viscosity toughening agent designed for use in epoxy systems.

Introduction FORTEGRA 100 Epoxy Toughener is a low viscosity, high efficiency second phase toughening agent designed for use in epoxy formulations. FORTEGRA 100 Epoxy Toughener provides improved toughness without significantly affecting the viscosity, glass transition temperature, corrosion resistance, cure rate or chemical resistance of the final coating or composite.

FORTEGRA 100 Epoxy Toughener can be easily formulated into standard bisphenol A and bisphenol F epoxy systems as it does not participate in the epoxy cure reaction. Once formulated with epoxy resin, a wide variety of curing agents are available for use with these products. The most frequently used are aliphatic polyamines, polyamides, amidoamines, cycloaliphatic amines, phenolics, anhydrides and modified versions of these curing agents.

FORTEGRA 100 Epoxy Toughener must be added only to the epoxy side of a thermoset formulation. FORTEGRA 100 Epoxy Toughener can be incorporated under either high or low shear conditions and can also be post-added to the epoxy side of a formulation as long as care is taken to ensure that it is completely mixed into the epoxy before the curing agent side of the formulation is added.

As a second phase toughening agent, FORTEGRA 100 Epoxy Toughener is effective when formulated at a specific volume fraction of the finished film or part. In a typical epoxy formulation, 3% to 8% by dry volume is needed to achieve the toughening effect.

Typical Applications This product is suitable for use in applications such as:

- Adhesives
- Civil Engineering
- Composites
- Marine and Protective Coatings
- Photocure Coatings
- Potting and Encapsulation

Typical Properties

Property ⁽¹⁾	Value	Method
Appearance	Opaque Viscous Liquid	ASTM D-1652
Color (Platinum Cobalt)	100 Max.	ASTM D-1209
Viscosity @ 20°C (mPa•s)	4500	ASTM D-445
@ 25°C (mPa•s)	3600	ASTM D-445
@ 35°C (mPa•s)	2000	ASTM D-445
Density @ 25°C (g/ml / lbs/gal)	1.03 / 8.32	ASTM D-4052
Non-Volatile Content (wt%)	100	DowM 101188-TE
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.

FORTEGRA™ 100 Epoxy Toughener is supplied in bulk, in 1200 kg intermediate bulk container (IBC) or in 200 kg tight-head drums. The resin should be stored in a dry place in its original closed packaging. FORTEGRA 100 Epoxy Toughener should retain its chemical properties for a period of at least 24 months.

Product Handling

FORTEGRA 100 Epoxy Toughener is a homogenous material with some unique material properties. Because of the high purity of the product, it may begin to crystallize and thus become hazy and viscous if its temperature falls below 20°C. At temperatures below 15°C, the material becomes very difficult to pump with common equipment. This situation is entirely reversible by heating the product to 20°C. The following guidelines should be followed for the effective handling of this product:

- (a) FORTEGRA 100 Epoxy Toughener should be maintained above 20°C for at least 4 days prior to use to allow easy product transfer.
- (b) FORTEGRA 100 Epoxy Toughener should not be exposed to temperatures below 15°C to prevent high levels of crystallization.
- (c) FORTEGRA 100 Epoxy Toughener can be heated to 65°C for extended periods of time without harming its toughening properties. Some oxidative discoloration may occur, however, changing the product color to yellow or yellow/orange.

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 world-wide. 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);

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* Responsible Care is a service mark of the American Chemistry Council in the United States

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Medical Application Policy (*continued*)

- (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 will 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

FORTEGRA™ 100 Epoxy Toughener is a polymeric material which 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 are, 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⁾		Trade Secret
Europe	EINECS	Polymer
United States	TSCA	Yes
Canada	DSL	Yes
Australia	AICS	Yes
Japan	ENCS	Yes
Korea	KECI	Yes
Philippines	PICCS	Yes
China	SEPA	Yes

(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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