All About Resins

TECHNICAL DATA SHEET

Energy Curable Resins

EBECRYL® 8701

Aliphatic Urethane Triacrylate

INTRODUCTION

EBECRYL 8701 is an aliphatic urethane triacrylate designed to bridge the gap between high surface hardness and excellent outdoor durability. EBECRYL 8701 can be used in applications requiring a combination of hardness, increased Tg, chemical resistance, and outdoor durability. Films of EBECRYL 8701 cured by ultraviolet light (UV) or electron beam (EB) exhibit a unique combination of surface hardness and outdoor durability typically not found in one molecule. Over time, EBECRYL 8701 may crystallize to a waxy solid form.

PERFORMANCE HIGHLIGHTS

EBECRYL 8701 is characterized by:

- Light color
- Low odor

UV/EB cured products containing EBECRYL 8701 are characterized by the following performance properties:

- Excellent exterior durability
- Excellent abrasion resistance
- Good surface hardness
- Non yellowing
- Stain resistant
- Good adhesion
- Toughness

The actual properties of UV/EB cured products also depend on the selection of other formulation components, such as reactive diluents, additives and photoinitiators.

SUGGESTED APPLICATIONS

Formulated UV/EB curable products containing EBECRYL 8701 may be applied via direct or reverse roll, offset gravure, metering rod, slot die, knife over roll, air knife, curtain, immersion and spin coating methods, as well as screen printing. EBECRYL 8701 is recommended for use in:

- Plastic coatings requiring good exterior durability, chemical resistance and scratch resistance
- Automotive OEM or Re-finish
- Coatings for wood
- Metal coatings
- Post-formable coatings for metal tube and conduit
- Optical coatings
- Non-yellowing topcoats for wood
- Pigmented coatings for wood
- Screen inks
- Exterior durable coatings

SPECIFICATIONS	VALUE
Appearance(1)	Clear liquid
NCO, %, max.	0.2

TYPICAL PHYSICAL PROPERTIES

Color, Gardner scale	≤2
Density, g/ml at 25°C	1.13
Functionality, theoretical(2)	3
Oligomer, % by weight	100
Viscosity, 60°C, cP/mPa·s	4500

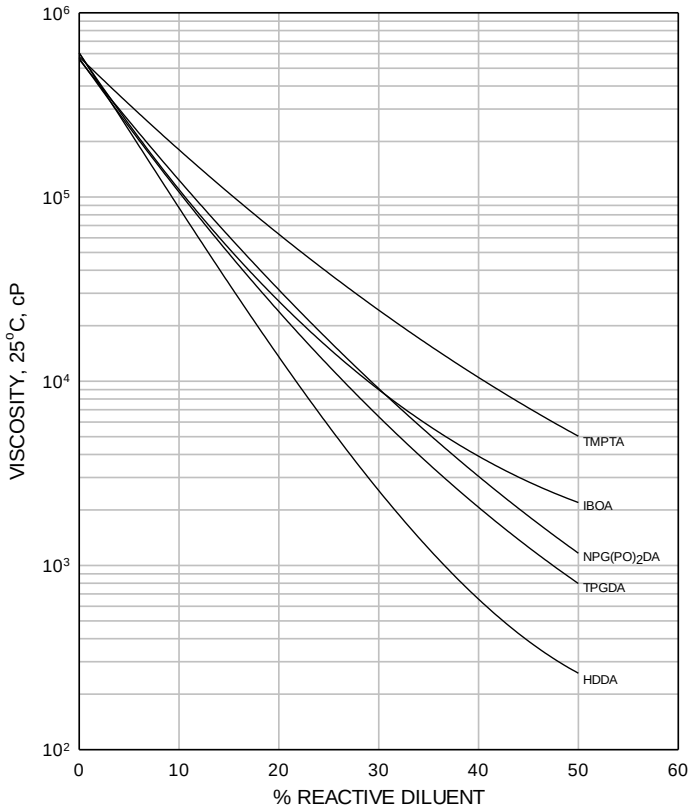
TYPICAL CURED PROPERTIES(3)

Tensile strength, psi (MPa)	7800 (54)
Elongation at break, %	4.0
Young's modulus, psi (MPa)	250000 (1724)
Glass transition temperature, °C(4)	75

GRAPH I

EBECRYL 8701

Viscosity Reduction with Reactive Diluents



(1) *Non-crystalline*
(2) *Theoretical determination based on the undiluted oligomer.*
(3) *UV cured 125 µ thick films.*
(4) *Determined by Dynamic Mechanical Analysis.*

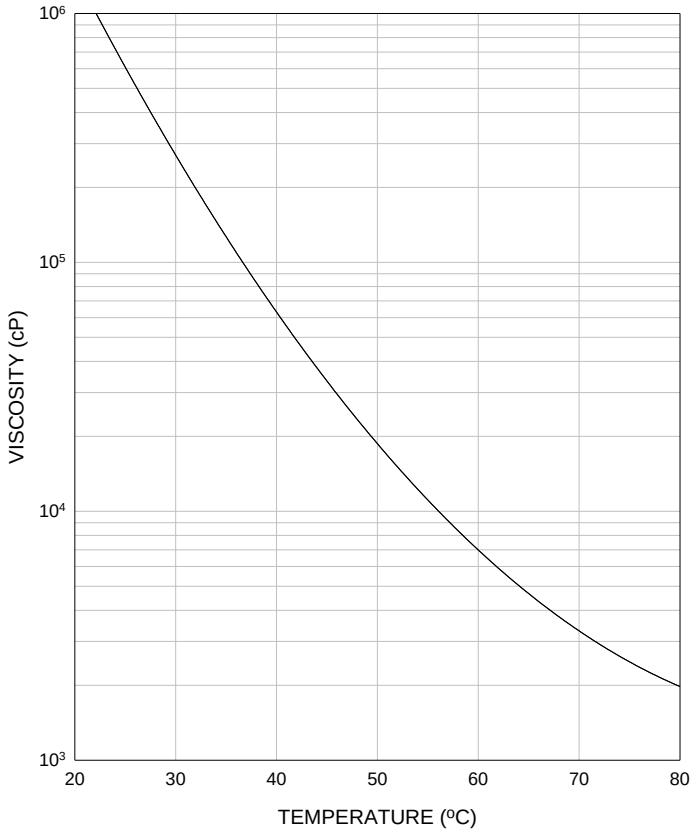
VISCOSITY REDUCTION

Graph I shows the viscosity reduction of EBECRYL 8701 with 1,6-hexanediol diacrylate (HDDA), isobornyl acrylate (IBOA)(1), neopentyl glycol propoxylate diacrylate ($NPG(PO)_2DA$)(1) trimethylolpropane triacrylate (TMPTA)(1) and tripropylene glycol diacrylate (TPGDA)(1).. Although viscosity reduction can be achieved with non-reactive solvents, reactive diluents are preferred because they are essentially 100 percent converted during UV/EB exposure to form a part of the coating or ink, thus reducing solvent emissions. The specific reactive diluents used will influence performance properties such as hardness and flexibility.

Graph II illustrates the change in viscosity of EBECRYL 8701 with increasing temperature.

GRAPH II

EBECRYL 8701
Viscosity vs. Temperature



STORAGE AND HANDLING

Before using EBECRYL 8701, consult the **Safety Data Sheet** for additional information on safety and handling procedures, and recommended personal protective equipment.

The recommended storage temperature range for EBECRYL 8701 is 4°C to 40°C (39°F to 104°F). Care should be taken not to expose the product to high temperature conditions, direct sunlight, ignition sources, oxidizing agents, alkalis or acids. This might cause uncontrollable polymerization of the product with the generation of heat. Storage and handling should be in stainless steel, amber glass, amber polyethylene or baked phenolic lined containers. Procedures that remove or displace oxygen from the material should be avoided. Do not store this material under an oxygen free atmosphere. Dry air is recommended to displace material removed from the container.

At typical ambient temperatures, EBECRYL 8701 will crystallize and exhibit a waxy solid form. This crystallization can be removed by heating containers of EBECRYL 8701 to a uniform temperature of 70°C. Ovens or hotboxes are recommended methods of heating. Heating tapes should not be used. In typical formulations, EBECRYL 8701 does not exhibit signs of crystallization.

PRECAUTIONS

Avoid contact with eyes and skin. Direct contact with this material may cause moderate eye and skin irritation. Contact with skin may cause a cross-allergic reaction in persons already sensitized to acrylate materials. Wash thoroughly after handling. Keep container tightly closed. Use with adequate ventilation.

Please refer to the **Guide to Safety, Health and Handling of Acrylate Oligomers and Monomers** for additional information on the safe handling of acrylates.

(1) Products of Allnex