

EBECRYL[®] 8311

Urethane Acrylate Nanocomposite

INTRODUCTION

EBECRYL 8311 is an aliphatic urethane acrylate nanocomposite that exhibits low viscosity and high reactivity in ultraviolet (UV) light or electron beam (EB) curable coatings. EBECRYL 8311 can be easily incorporated into at any stage of formulating. Films of EBECRYL 8311 exhibit good weatherability, outstanding hardness, chemical, and scratch and abrasion resistance coupled with very low haze development after abrasion. EBECRYL 8311 is designed to be used as the main oligomer in formulations requiring a high degree of hardness, scratch, abrasion resistance and low development after abrasion

PERFORMANCE HIGHLIGHTS

EBECRYL 8311 is characterized by:

- Good compatibility and stability
- Low viscosity
- Light color
- Excellent reactivity
- Outstanding hardness
- Low haze development after abrasion
- No agglomeration or sedimentation
- PETA free

UV/EB cured products containing EBECRYL 8311 are characterized by the following performance properties:

- Excellent optical clarity
- High gloss
- Toughness (vs. penta- and hexa-functional acrylates)
- Outstanding scratch and abrasion resistance
- Chemical resistance
- Improved barrier properties

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 8311 may be applied via direct or reverse roll, offset gravure, metering rod, slot die, knife over roll, air knife, curtain, immersion, spin and spray coating methods. EBECRYL 8311 is recommended for:

- Coatings requiring high scratch/abrasion resistance and improved adhesion
- Coatings requiring low development after abrasion resistance
- As a modifying oligomer to increase cure speed, solvent resistance and abrasion resistance

TYPICAL PROPERTIES

Appearance	Clear liquid
Color, Gardner scale	≤2
Viscosity at 25°C, cP	9500

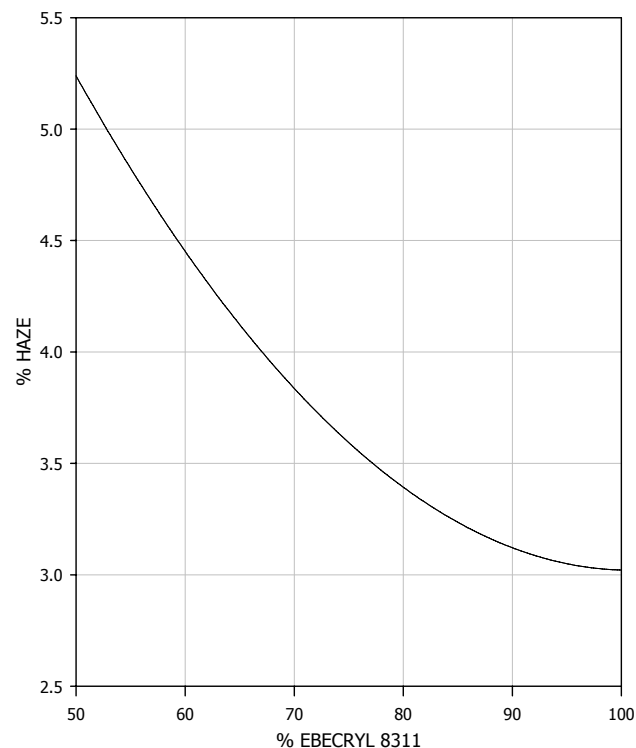
TYPICAL CURED PROPERTIES⁽²⁾

Tensile strength, psi	5200
Elongation at break, %	2.5
Young's modulus, psi	500,000

ABRASION RESISTANCE

Graph I illustrates how the percentage of EBECRYL 8311 in a coating impacts abrasion resistance. Coatings were applied to 10 mil polycarbonate substrate at ~12 μ thickness and UV cured⁽³⁾ to achieve a non-marring surface. The coatings were subjected to abrasion⁽⁴⁾ and haze of the abraded area measured⁽⁵⁾. The decrease in haze with increasing amounts of EBECRYL 8311 demonstrates improved abrasion resistance.

Graph I
EBECRYL 8311
Haze Development after Abrasion



(1) Standard Methods of Testing available upon request.

(2) UV cured 125 μ thick films.

(3) 2-600 watt/inch Fusion type H lamps

(4) Taber Industries 5130, 100 cycles, CS 10F wheels, 500 g weights

(5) BYK Gardner haze-gard plus



STORAGE AND HANDLING

Before using EBECRYL 8311, consult the **Material Safety Data Sheet** for additional information on safety and handling procedures, and recommended personal protective equipment.

The maximum recommended storage temperature for EBECRYL 8311 is 38°C (100°F). High temperature and fire conditions can cause uncontrolled polymerization with rapid evolution of heat and pressure rise, which may result in violent rupture of the storage tanks or containers. Never store in direct sunlight or adjacent to heated compartments. Containers should be kept closed and away from oxidizing agents, acids, alkalies, peroxides, free radical initiators, photosensitizers, rust, and x-ray or ultraviolet radiation. Procedures that displace oxygen from the material, such as sparging with nitrogen, should be avoided.

PRECAUTIONS

Avoid contact with skin and eyes and breathing vapors. Contains materials that may cause injury to the eyes and skin. Sensitization may occur. Skin irritation may not occur immediately and contact may go unnoticed for up to 48 hours. Solvents should not be used to clean skin because of increased penetration potential. Contaminated clothing, shoes, belts and other leather goods should be removed immediately. Incinerate contaminated leather goods, including shoes. Wash contaminated clothing thoroughly before reuse.

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

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