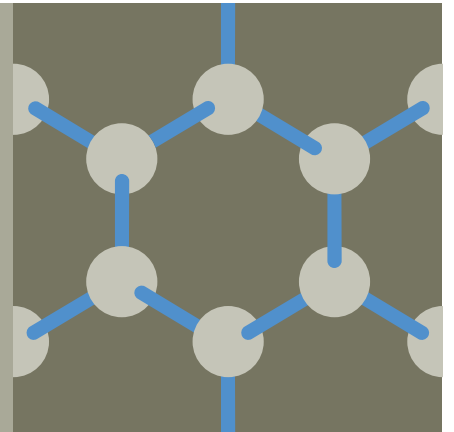




Cardura E10P and ACE
**For UV Curing
Applications**



Cardura™ Glycidyl Ester E10P

Cardura E10P is the glycidyl ester of Versatic™ acid 10, a highly branched carboxylic acid containing 10 carbon atoms.

Characteristics:

Carbon Durable Glycidyl Ester with 10 carbon atoms backbone:

- Boiling range: 251 – 278 °C (5 – 95 %)
- Low viscosity (23 °C): 7 mPa·s
- High flame / flash point
- Low colour
- Low vapour pressure
- EINECS and TSCA listed

Typical Uses:

- As building block for oligomer preparation
- As monomer for cationic polymerization



Structural Features:

- Epoxy group

Performance Characteristics:

- Highly reactive towards amines, acids, alcohols
- Enhanced metal adhesion

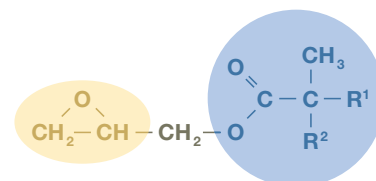


Structural Features:

- Sterically protected ester group
- Bulky structure

Performance Characteristics:

- Excellent acid and alkali resistance
- Superior outdoor durability
- Improved gloss
- Improved pigment utilization
- High solid resins
- Enhanced adhesion to plastics
- Hydrophobicity
- Improved chemical resistance



Glycidyl Ester

of Versatic 10

R¹ + R² =
7 carbon atoms

Changing through Acrylation into:

ACE™ Hydroxyl Acrylate Monomer

ACE, a mono functional epoxy acrylate has a unique structure combining a bulky hydrophobic tail, a pendant hydroxyl group and an acrylate functionality.

Characteristics:

- Clear liquid
- Viscosity: < 300 mPa·s
- High flame / flash point
- Low colour
- Low volatility
- EINECS and TSCA listed
- Homopolymer T_g: 0 °C
- Low acid and epoxy residuals
- Free of heavy metal and tin catalysts
- Theoretical OH value: 5.7 %
- low irritancy level: draize value 0.9

Typical Uses:

- Reactive diluent for UV formulations
- Reactive diluent for UV oligomers
- End capping agent in urethane acrylate oligomers
- Building block for acrylate oligomers



Structural Features:

- Acrylate functionality

Performance Characteristics:

- Excellent UV reactivity



Structural Features:

- Hydroxyl group

Performance Characteristics:

- Cure with isocyanates or melamines
- Oligomer synthesis

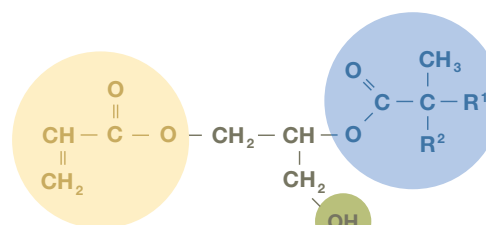


Structural Features:

- Bulky structure

Performance Characteristics:

- Superior outdoor durability
- Improved gloss
- Improved pigment utilization
- High solid resins
- Enhanced adhesion to plastics
- Hydrophobicity
- Improved chemical resistance



Acrylic Acid Adduct

of Cardura

Dual Cure:

ACE has a pendant hydroxyl group which allows cure with cross-linkers, like melamine formaldehyde or polyisocyanate resins. The pendant hydroxyl group can also be used for further oligomerization.

ACE can be used as a reactive diluent in UV curable applications such as adhesives, inks, plastic and metal coatings.

ACE and Cardura E10P are also attractive building blocks for acrylate oligomers such as epoxy, urethane and polyester acrylate oligomers.

Enhanced Pigment Utilization:

ACE and Cardura E10P are ambivalent molecules, both hydrophobic and polar. This explains the improved pigment utilization in pigmented UV formulations.

Chemical and Acid Resistance:

ACE and Cardura E10P improve the chemical resistance of coatings by reducing the permeability to polar and aggressive chemicals and by the steric protection of the ester bonds.

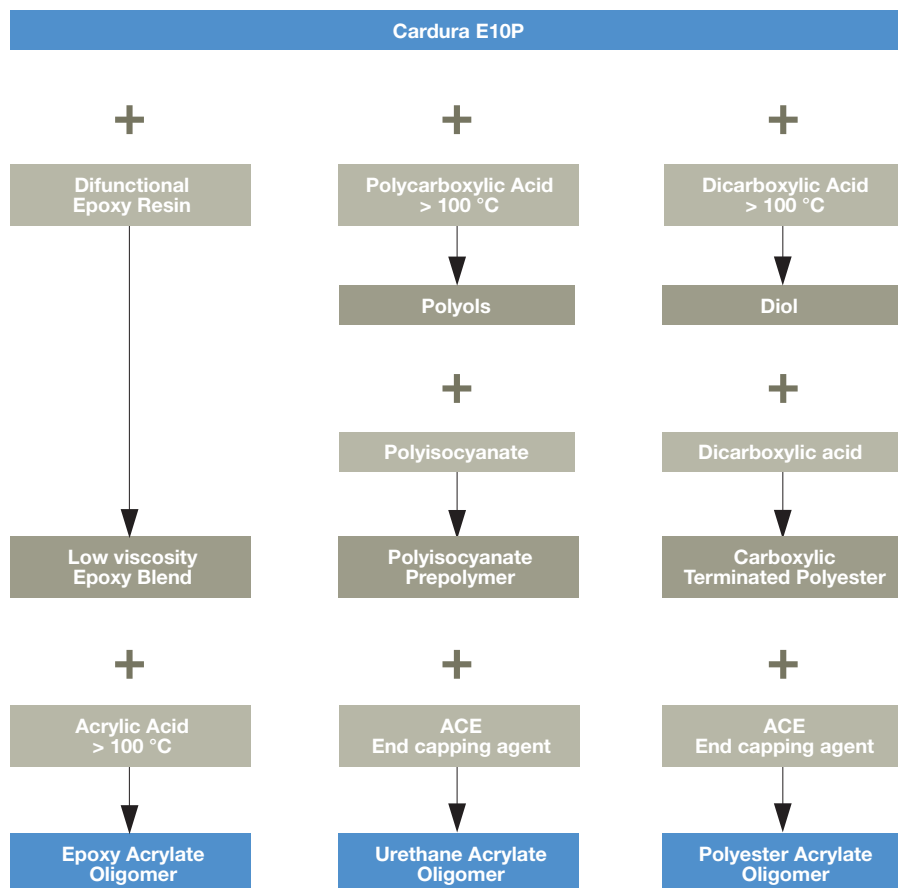
Oligomer Viscosity Reduction:

The reaction between the epoxy group of Cardura E10P and the acid compounds is very selective. This reaction can also be done at relatively low temperature (>100 °C). As a consequence, oligomers with a narrower molecular weight distribution and lower viscosity at equivalent molecular weight can be achieved.

Added values of Cardura E10P and ACE in acrylate oligomer synthesis are:

- Low reaction temperature and selective reaction
 - Narrow molecular weight distribution
 - Oligomer with low viscosity
- Hydrophobicity
 - Improved chemical and water resistance
 - Better wetting to apolar substrates
- Ambivalent molecule
 - Improved pigment utilization
- Improved adhesion to substrate

Reaction pathways for high performance acrylate oligomers:



Cardura E10P can be incorporated in epoxy acrylate oligomers. The epoxy group of Cardura E10P reacts easily with the acid group of acrylic acid. An epoxy acrylate oligomer with a low viscosity, enhanced chemical and water resistance can then be produced.

The hydroxyl group of ACE can be used to end cap either the polyisocyanate prepolymer or the carboxylic terminated polyester. This results in an urethane or polyester acrylate oligomer with a better adhesion to apolar substrates.

The Global Leader in Thermoset Resins

As the world's largest producer of thermoset resins and the leader in adhesive and structural resins and coatings, Hexion Specialty Chemicals meets customers' specific application needs with a total solutions approach of products and services.

Hexion offers the broadest range of thermoset resin technologies and unmatched technical support – and provides them around the globe.

With our extensive research and development capabilities and applications know-how, we are uniquely able to work in partnership with customers to co-develop better products and systems.

Plus, Hexion's worldwide production network facilitates assured supply and prompt delivery wherever our customers do business.

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