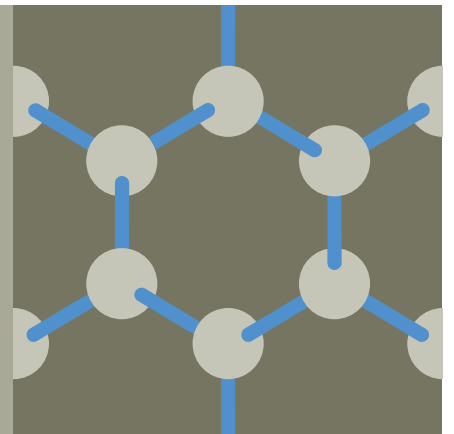




Cardura E10P
**An Easy Process
for High Solids
Acrylic Resins**



Cardura™ Glycidyl Ester E10P

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

Cardura E10P monomer is a bulky and hydrophobic intermediate which is easily incorporated into resins via its reactive epoxy group.

Characteristics:

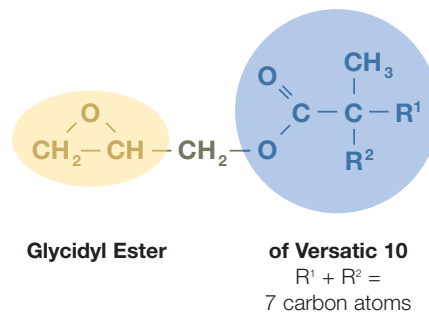
- Epoxy group content approximately: 4170 mmol/kg
- Boiling range: 251 – 278 °C (5 – 95 %)
- Low viscosity (23 °C): 7 mPa·s
- High flame / flash point
- Low colour
- Low vapour pressure
- EINECS and TSCA listed

Structural Features:

- Epoxy group

Performance Characteristics:

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



Structural Features:

- Sterically protected ester group
- Bulky structure

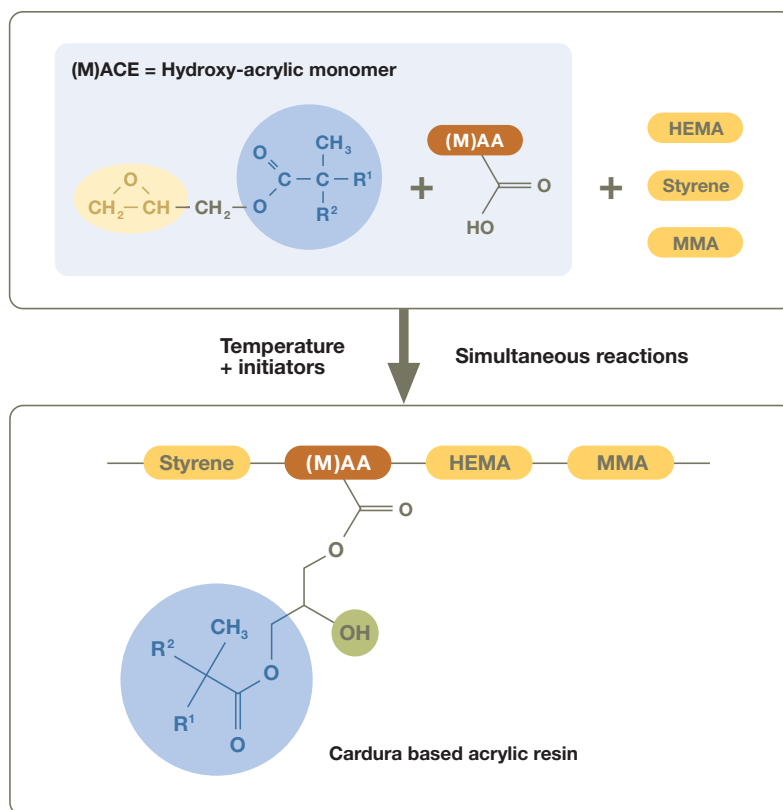
Performance Characteristics:

- Excellent compatibility with polar solvents
- Excellent acid and alkali resistance
- Superior outdoor durability
- Improved gloss
- Improved pigment utilization
- Low solution viscosity
- High solid resins
- Improved polar solvent resistance
- Excellent solubility in aliphatic solvents

Chemistry:

Cardura E10P can easily be incorporated into acrylic polymers by the reaction of its epoxy group with the carboxylic group of (meth)acrylic acid to form a hydroxyl (meth)acrylate monomer called (M)ACE. (M)ACE reacts with the other monomers via a radical polymerisation reaction. The epoxy-acid reaction and the radical polymerization proceed simultaneously.

Incorporation of Cardura E10P in Acrylic Resins



Process:

Cardura E10P is used as a reactive solvent for the preparation of acrylic resins: it is charged into the reactor as part of the initial reactor constituents. This allows to reduce or eliminate the solvent during the polymerisation step and therefore increases the reactor efficiency. Mass polymerisation (without solvent) is possible. The initial reactor charge is heated to the desired polymerisation temperature. (Meth)acrylic acid is then gradually added to the reactor together with the acrylic monomers, styrene and the peroxide initiator over a period of time.

Higher Reaction Temperature:

Thanks to the high boiling point of *Cardura E10P*, a high polymerisation reaction temperature can be maintained at a level where the required low molecular weight is easily achieved.

Very high solids, low viscosity resins are easily produced.

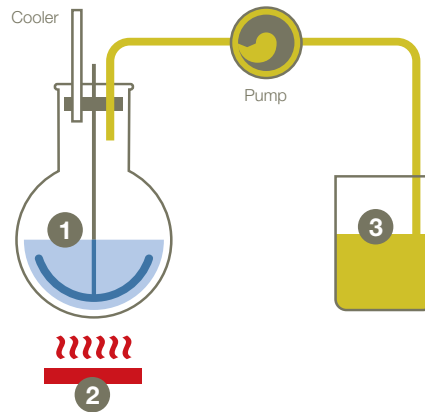
Viscosity / Co-solvent Content:

Cardura E10P reduces the resin viscosity as the polymer has a shorter chain length at a similar molecular weight. Its bulky structure also limits the chain interactions. Therefore the solvent content of solvent-borne paints or the co-solvent content of water-based paints can be reduced.

Introduction of hydroxyl groups:

Cardura E10P introduces hydroxyl groups into the resin via reaction with a carboxylic acid or an amine. These hydroxyl functions can be used, in combination with other hydroxy-functional intermediates, for reaction with the cross-linker, e.g. melamine formaldehyde and polyisocyanate resins.

Preparation Procedure



Step 1: Use *Cardura* as reactive diluent

Step 2: Heat to 140 – 170 °C

Step 3: Add gradually Monomers
+ (meth)acrylic acid
+ initiator

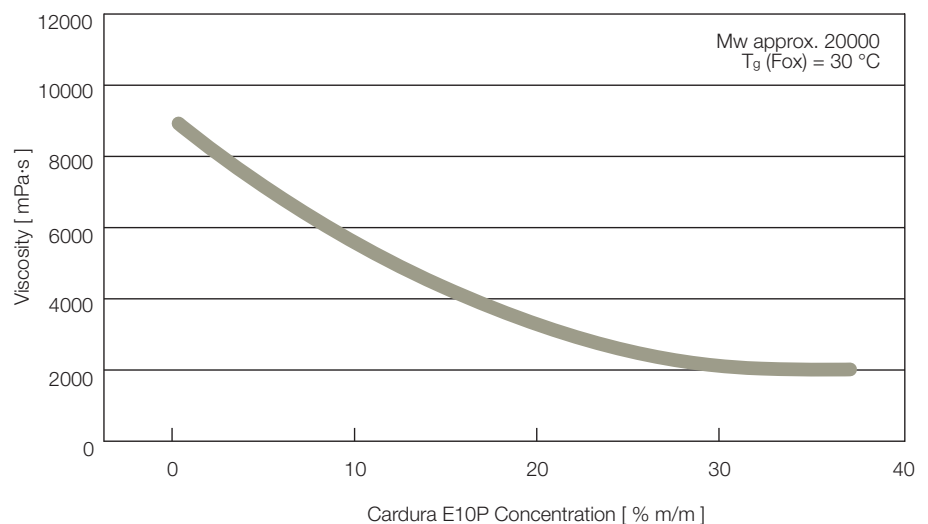
Added Values:

- Easy process
- *Cardura E10P* used as reactive solvent
 - > Higher resin solid content
 - > Higher reactor throughput
- Higher reactive temperature
 - > Low Mw resin
 - > Low VOC acrylic resin

Effect of *Cardura E10P* on Polymer Solution Viscosity

Cardura E10P produces lower viscosity acrylic resins which can be used for low VOC applications.

The higher the concentration of *Cardura E10P*, the lower the polymer viscosity.



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.

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