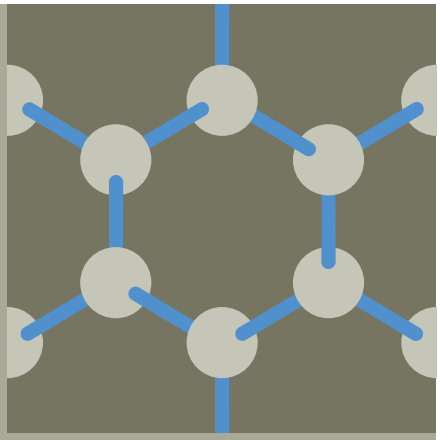
Product Bulletin

HEXION™
Specialty Chemicals

# Versatic Derivatives
## Cardura / VeoVa / ACE monomers



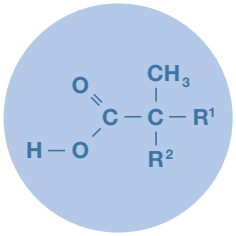
## Versatic™ Acid 10

All Versatic Derivatives are based on Neodecanoic acid and contain a unique highly branched non-polar alkyl group. The bulky, highly branched, aliphatic Versatic structure will improve hydrophobicity, hydrolytic stability, alkalinity resistance, UV stability, and chemical resistance. The non-polar nature also causes systems to exhibit improved flow, leveling and adhesion.

The structure is then modified with different chemical functional groups allowing reaction into a variety of polymers, chemical compounds and products.

Several families of Versatic Acid based compounds are available based on the functionality of the reactive group. With Glycidyl, Vinyl, Acrylate, Hydroxyl and Acid functionality the versatility of these products is limitless.

While some are commonly used as a building block or modifier for acrylic, polyester, vinyl, urethane, and epoxy based resins, others are used as additives, chemical intermediates, and reactive diluents. Versatic derivatives are suitable for use in Aqueous, Solvent, Powder, UV Curable and other 100% solids systems.




**Versatic Acid 10**
$R^1 + R^2 =$
7 carbon atoms

## VeoVa™ Monomer 10

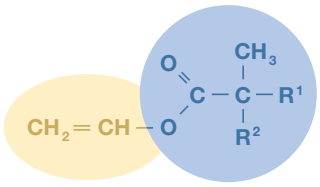
The Vinyl Esters of Versatic Acid have a highly branched aliphatic structure which contributes to the enhancement of key performance properties. Inclusion of the branched Versatic structure in a polymer chain sterically protects the ester bonds of *VeoVa* and of the adjacent monomer units against hydrolysis resulting in greatly improved alkali resistance. *VeoVa* monomers improve resistance to water and other polar materials as well. Finally, they will not be degraded by UV light and therefore will not cause yellowing.

*VeoVa* is commonly used in vinyl and acrylic polymers, where it improves the hydrolytic stability, adhesion and water resistance dramatically. Emulsion polymers based on VeoVa show a clear improvement in pigment wetting and scrub resistance. Such emulsions can also be used for high quality low-VOC decorative paints and industrial coatings.

*VeoVa* based emulsions can be easily stabilized with protective colloid or surfactants. The colloid route makes it possible to produce high quality wet or spray dried binders used in a variety of adhesives. Suitable for use in solvent and water borne systems, it's hydrophobicity can offset the water sensitivity created by hydrophilic additives that are sometimes used.

Applications:

- Industrial Coatings
- Interior and Exterior Decorative Paints
- Water Repellent Systems
- Wood Glues and Pressure Sensitive Adhesives
- Construction Adhesives
- Redispersible Powders and Concrete Admixtures
- Textile and Non-Woven Binders




**Vinyl Ester of Versatic 10**
$R^1 + R^2 =$
7 carbon atoms

## Cardura™ Glycidyl Ester E10P

Utilized for decades as a building block for automotive OEM, refinish clear coats and CED coats, this Glycidyl Ester of Versatic Acid exhibits UV stability, acid etch resistance and a unique ability to create high solids low viscosity polymers with good substrate wetting.

The epoxy functionality allows for reactions with amines, acids, alcohol and many other reagents to allow *Cardura* to be further functionalized for use in Acrylic, Polyester, Epoxy based resins and Urethanes as either a polymeric building block or reactive diluent.

The relatively high boiling point and low viscosity make it an ideal reaction medium for high temperature polymerization where it can be incorporated into the polymer. This feature also allows *Cardura* to replace solvent which is sometimes used as a reaction medium in the manufacture of higher viscosity systems thus eliminating the need for solvent stripping.

It can be modified with amines to create novel adducts and curing agents for epoxy systems with improved flow and solubility.

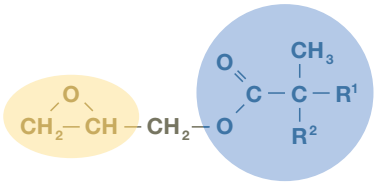
When used as a reactive diluent, its low viscosity and volatility along with resistance to crystallization provide unique performance.

More recently, work on synthesizing *Cardura* based maleate resins and diols have greatly expanded the areas where this product can bring its unique properties.

Applications:

Cardura is commonly used in:

- Automotive Coatings
- Civil Engineering
- Industrial and Marine Coatings
- Coil Coatings
- UV Curable Systems



**Glycidyl Ester** **of Versatic 10**

$R^1 + R^2 =$ 7 carbon atoms

## ACE™ Hydroxyl Acrylate Monomer

Derived from the reaction of *Cardura* with Acrylic Acid, this adduct contains both an hydroxyl and acrylate functionality. Its ability to reduce viscosity, surface tension, to improve adhesion, to promote hydrolytic and UV stability makes it useful as a reactive diluent in UV curable systems. It also offers improved flexibility and pigment utilization because of the ambivalent nature.

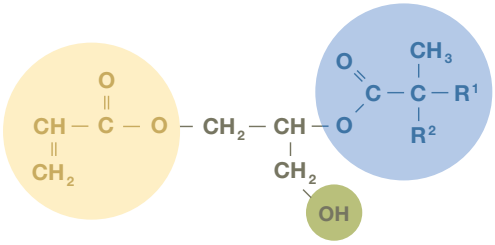
*ACE* is free of heavy metals and tin catalyst. It has a low irritancy level.

In addition to its use as a reactive diluent, *ACE* can also be used as an end capping agent during the synthesis of UV curable oligomers.

In the manufacture of conventional binders, the acrylic functionality allows this monomer to be polymerized with a wide variety of monomers including styrene, acrylic and vinyls. The pendant hydroxyl group is then available for further polymerization, crosslinking or adhesion improvements.

Applications:

- Coatings
- Adhesives
- Inks
- Optical fiber coatings
- UV curable systems
- Emulsions



**Acrylic Acid Adduct** **of Cardura**

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**World Headquarters / North America:**

**Hexion Specialty Chemicals, Inc.**
180 East Broad Street
Columbus, OH 43215-3799
+1 614 225 4000

**Regional Headquarters:**

**Asia**

**Hexion Specialty Chemicals Singapore Pte Ltd.**
Lippo Plaza # 3701
222 Central Huai Hai Road
Shanghai 200021 China
+86 21 3318 4800

**Australia**

**Hexion Specialty Chemicals Australia Pty.**
2-8 James Street
Laverton North Victoria 3026
Australia
+61 39 369 2377

**Europe**

**Hexion Specialty Chemicals B.V.**
Koddeweg 67
3194 DH Hoogvliet
Rotterdam, The Netherlands
+31 10 295 4000

**Latin America**

**Hexion Química Indústria e Comércio Ltda.**
Rua Cyro Correa Pereira, 2525
Area-Sul – CIC
81450-090 Curitiba, Brazil
+55 41 212 1600


HEXION™


**Hexion Specialty Chemicals B.V. Versatics**
Koddeweg 67
3194 DH Hoogvliet
Rotterdam, The Netherlands
+31 10 295 4000

**Hexion Specialty Chemicals Versatics**
1600 Smith Street, 24th Floor
Houston, TX 77002
USA
+1 877 859 2800

**Hexion Specialty Chemicals Belgium SA Versatics**
Avenue Jean Monnet 1
1348 Ottignies Louvain-La-Neuve
Belgium
+32 10 49 7200

**Hexion Specialty Chemicals Singapore Pte Ltd Versatics**
1 Kim Seng Promenade, Great World City
#10-02/03 East Tower, Singapore 237994
Singapore
+65 6830 5000


For worldwide locations visit **hexion.com**