

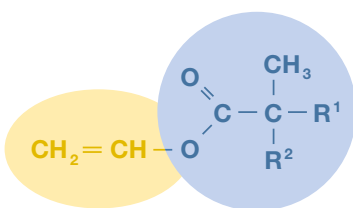
Coatings / Paints / Additives / Adhesives



VeoVa™ Monomers Applications and Advantages



VeoVa monomers are typically combined with vinyl acetate, (meth)acrylate monomers and/or ethylene to produce polymeric binders. These are usually water-based vinyl ester binders, but solvent-borne VeoVa vinyl ester polymers and powders can also be produced.



 **Vinyl Ester**

 **Versatic Acid 10**

R¹ + R² = 7 carbon atoms

Typical polymer systems include:

- Copolymers of VeoVa monomer and VAM
- Terpolymers of VeoVa monomer with VAM and acrylate monomers
- Terpolymers of VeoVa monomer with VAM and methacrylate monomers
- Terpolymers of VeoVa monomer with VAM and ethylene
- Copolymers of VeoVa monomer with acrylate and/or methacrylate monomers
- Solution polymers that can comprise styrene as comonomer

All VeoVa vinyl ester emulsions can readily be stabilized using surfactants. The binders containing VeoVa monomer, VAM and optionally ethylene or acrylate as a third monomer can also be stabilized using protective colloids like hydroxyethyl cellulose or polyvinyl alcohol, in combination with surfactants.

The VeoVa vinyl ester containing polymers, or the VeoVa monomer, are used in a variety of markets and end-uses:

- Latices for decorative emulsion paint - plasters and renders
- Spray-dried redispersible powders for decorative plasters and renders
- Latices and spray-dried redispersible powders for mortar admixtures
- Latices for adhesives including pressure sensitive adhesives, construction and wood adhesives
- Latices for industrial paints and coatings
- Thermoplastic and thermoset solution polymers for various applications, including automotive paints, industrial coatings and cosmetics
- Various specialty applications such as fuel additives
- Aqueous dispersions for industrial applications
- Reactive diluent for specific, heat-cured unsaturated polyesters initiated by peroxide or using UV or EB radiation

Technical advantages of VeoVa monomers in their current and potential applications

Latex binders for emulsion paints and coatings

Good processing and handling properties:

VeoVa monomers copolymerises readily and randomly with vinyl acetate at high steady-state conversion levels. Batch reproducibility is very good, reactor fouling is minimal and hence, cleaning costs and downtime are low when compared to other comonomers such as acrylates.

VeoVa vinyl ester latices are compatible with other raw materials and easily formulated into emulsion paints. They exhibit good shear stability, which is required during paint processing and results in low production of off-spec paint.

The shelf life of VeoVa vinyl ester based emulsion paints is very good because of good hydrolytic stability providing stable viscosity and pH.

The binders can be stabilized using surfactants or protective colloids. Both types of emulsion paints based on VeoVa monomer have very good rheological properties, resulting in easy application, good hiding power and good film build. This leads to lower labour cost during painting.

Very good outdoor durability:

VeoVa monomer is not sensitive to UV light or alkaline hydrolysis. It also protects neighbouring vinyl acetate units from saponification by steric hindrance because of the non-polar nature of the alkyl groups. When vinyl acetate / VeoVa vinyl ester latices are used as paint binders for alkaline substrates such as concrete, these properties lead to good long term exterior performance under varied climate conditions.

Concrete and mortar additives

Hydrolytic stability:

Re-dispersible powders or wet latices are mixed with cement which, by its nature, is very alkaline. In this application, the excellent hydrolytic stability of VeoVa monomer is even more important than in paints, where it protects vinyl acetate based polymers from degradation.

Water resistance:

VeoVa monomers improve the hydrophobicity of both vinyl acetate based redispersible powders and acrylic based wet latex systems. Used as admixtures, these VeoVa vinyl ester containing polymers improve the water resistance of the concrete.

Water repellency:

VeoVa monomer introduces polymeric hydrophobicity which has more permanence than with additives. This is demonstrated by the improved long term performance and retention of the film's mechanical strength under humid conditions. This property can be exploited to produce water repellent systems, such as anticorrosion paints, especially when VeoVa monomer is copolymerised with (meth)acrylate monomers. The hydrophobicity also makes the production of water resistant adhesives and masonry sealers possible.

Good pigment compatibility and binding power:

The bulky Versatic group present in VeoVa monomers provides excellent pigment compatibility leading to efficient pigment utilisation and paint colour development.

The good wet mechanical film strength introduced by VeoVa monomers also significantly improves the pigment binding power of vinyl acetate based latices. This enables the use of high concentrations of cheap extenders in matt interior emulsion paint types.

VeoVa monomers modify the hardness and flexibility of the polymer:

VeoVa 10 monomer is frequently used as a flexibilising monomer. At incorporation levels of 20–30%, a good hardness/flexibility balance is usually obtained. If higher hardness is required, VeoVa 9 monomer can be used.

Compatibility with polyvinyl alcohol:

VeoVa vinyl ester / vinyl acetate, VeoVa vinyl ester / vinyl acetate / (meth)acrylate or VeoVa vinyl ester / vinyl acetate ethylene latices can be stabilised with polyvinyl alcohol (PVOH). This is critical for success in redispersible powder applications, because PVOH facilitates convenient spray-drying and re-dispersion of the powder.

Latex binders for adhesives

Water resistance:

Veova monomers improve the hydrophobicity of vinyl acetate based and acrylic based latex systems. These Veova vinyl ester containing polymers show improved water resistance in pressure sensitive, laminating or construction adhesives.

Compatibility with polyvinyl alcohol:

Veova vinyl ester /vinyl acetate, Veova vinyl ester /vinyl acetate / (meth)acrylate or Veova vinyl ester /vinyl acetate /ethylene latices can be stabilised with polyvinyl alcohol (PVOH). The presence of PVOH enables the production of adhesives that are suitable for gluing wood or laminating vinyl or other sheets to wood or MDF.

Hydrolytic stability:

When adhesives are used to glue e.g. carpets to a cementitious floor, it is important to avoid hydrolysis of the binder, as this leads to undesired emissions of volatile compounds or deterioration of the performance.

In these applications, the hydrolytic stability of Veova again offers formulating latitude to protect other monomers from degradation.

Solution polymers

Veova vinyl ester based polymers can also be made directly by solution polymerisation. Many solvents are suitable due to the favourable solubility characteristics that Veova monomers bring when used in low Kb solvents. Veova monomers can be polymerised in solution with either vinyl acetate or (meth)acrylate monomers. For the polymerisation of styrene with Veova vinyl ester

and (meth)acrylates, it is necessary to work at higher temperatures, using optimised monomer feed and temperature profiles. Whereas all Veova monomers deliver outstanding performance, Veova 9 monomer is of particular interest. This monomer has an attractive combination of properties, with both a high Tg and excellent UV and chemical resistance.

100% solids polymers

Veova monomers can be polymerised with (meth)acrylate monomers and styrene in the absence of solvents, to yield polymers in bulk. This can be achieved by making good use of reactivity differences between Veova vinyl ester and the other monomers,

especially styrene. The resulting polymer can be diluted with solvents or dispersed in water, usually with the aid of small amounts of co-solvent. Finally, the 100 % solids polymer can be processed to yield a powder coating.

Aqueous dispersions

Solution and 100 % solids polymers, if provided with sufficient acid groups, can be directly dispersed into water after neutralisation with a suitable

amino alcohol. Such aqueous dispersions deliver coatings with good UV and chemical resistance and low VOC levels.

Handling precautions

For more detailed information on all aspects of Health, Safety and Handling, please reference the Safety Data Sheets of Veova monomers, which are available from your local Hexion Inc. (Hexion) representative or distributor.

The precautions advised therein should be strictly observed. For details related to other products listed in this bulletin, please contact the suppliers of those products.

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