

Information Sheet

Veova Based Binders for High-pH Biocide-free Paints

Veova™ 10 Vinyl Ester

HEXION
Responsible Chemistry

Biocide-free Organosilicate Paints

Eco-friendly Protection through High-pH Coatings

Increasing concerns about the allergenicity and ecotoxicity of biocides, coupled with increasing regulatory restrictions, are driving the development of biocide-free paints as more eco-friendly and sustainable alternatives.

One route to biocide-free paints involves using high-pH organosilicate paints. These paints inhibit microbial growth due to their highly alkaline nature, eliminating the need for in-can preservatives.

Key Requirements for High-pH Biocide-free Paints

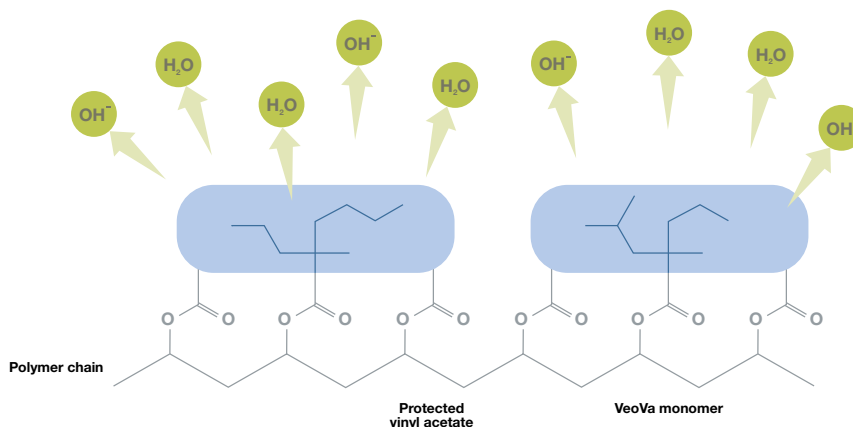
Formulation Stability and Performance Criteria

Organosilicate paints require formulations that exhibit exceptional stability at elevated pH >10-11 levels. Additionally, they must offer superior adhesion to various substrates, excellent durability against weathering and abrasion, and resistance to UV degradation. Moreover, they should provide breathability to prevent moisture buildup, while still delivering long-lasting color retention.

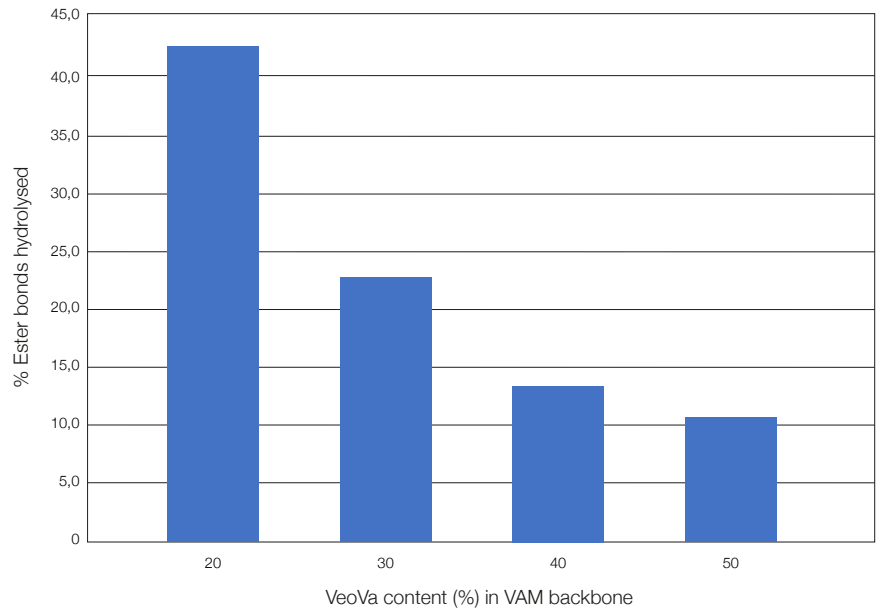
Veova Vinyl Ester Protects the Polymer Backbone

Enhancing Polymer Stability with the Umbrella Effect

Veova monomer can be copolymerized with vinyl acetate (VAM) and acrylates to produce highly alkaline resistant emulsion polymers. Veova 10 vinyl ester provides a highly branched tertiary structure with bulky and hydrophobic hydrocarbon groups that protect the neighboring molecules in a polymer backbone from hydrolysis. This is called the “umbrella effect”.



Veova vinyl ester – vinyl acetate copolymer



Alkali resistance of vinyl acetate / VeoVa 10 copolymer latices

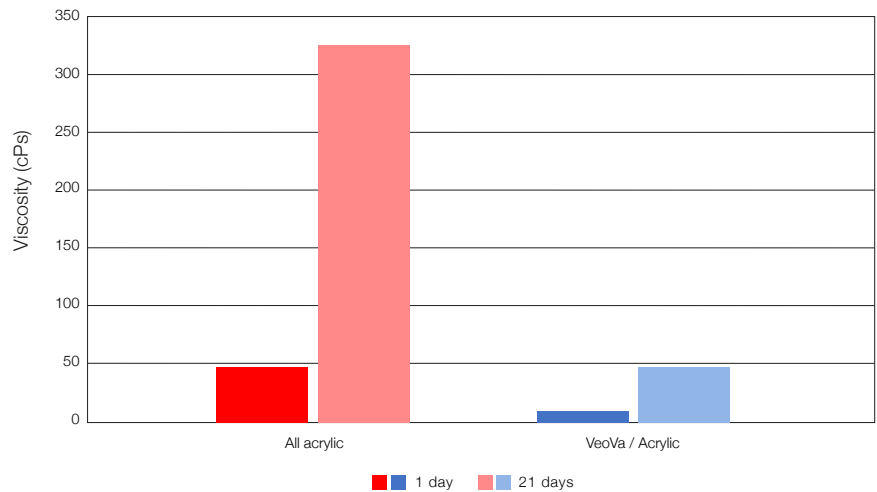
Silicate Compatibility

Superior Stability in Alkaline Conditions

Emulsions based on VeoVa vinyl ester have excellent compatibility with silicates.

VeoVa-containing acrylic and vinyl emulsions, when mixed with potassium hydroxide and potassium silicate at pH 11.4, remain stable for 8 weeks without any pH decrease or significant viscosity variation.

Compatibility testing at 40°C confirms the superior performance of VeoVa modified acrylic binders versus all-acrylic binder types. VeoVa/acrylic polymers show better viscosity stability compared to an acrylic system based on 2-ethylhexylacrylate.



Viscosity evolution after 21 days of storage at 40°C

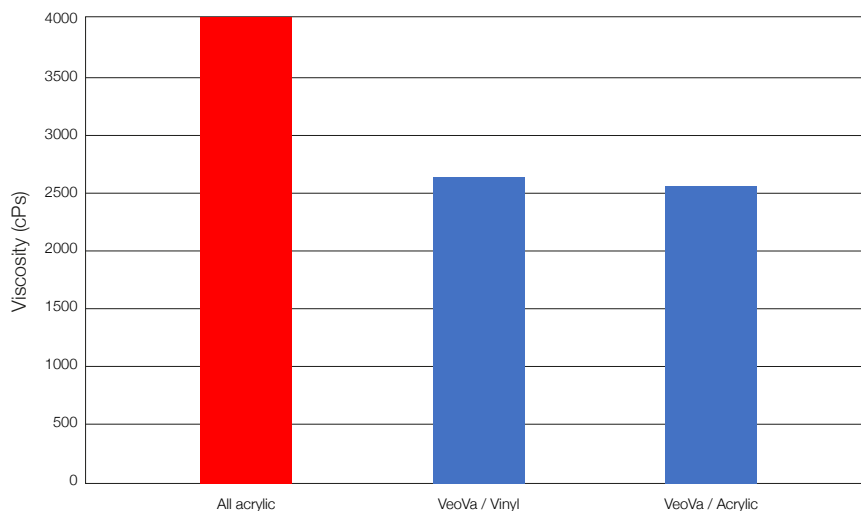
High-pH Paint Stability

Long-Term Stability in Organosilicate Paints

Incorporating VeoVa monomer into vinyl or acrylic emulsions enhances paint stability and provides superior viscosity control during storage. Organosilicate paints formulated with VeoVa-based binders exhibit long-term stability, demonstrating their robust resistance to degradation over time. This will ensure consistent quality over time, extending the shelf life of paints.

8 weeks stability testing at 40°C confirms the exceptional performance of VeoVa-based paints.

Both VeoVa/acrylic and Vinyl/VeoVa polymers exhibit superior viscosity stability compared to an all-acrylic system.



Viscosity after 8 weeks at 40°C (all paints starting from equal viscosity)

Summary

Improved Polymers for High-pH biocide-free Paints based on VeoVa Monomers

The bulky branched structure of VeoVa vinyl ester makes it an ideal monomer for producing emulsion polymers with excellent hydrolysis resistance, an important property for high pH biocide-free paints.

- Allows for the easy preparation of stable organosilicate paints
- Safeguarding of long-term paint integrity in highly alkaline environments
- Better performance versus all acrylics

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HXN-903 06/24

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