



# Flexisperse™ 735

Dispersant and scale inhibitor polymer

## Overview

- Unique, aqueous sulfonated copolymers designed for use in industrial process water applications
- Engineered for exceptional performance in highly stressed thermal and electrolyte environments
- Optimum stabilization of calcium phosphate, hydroxyapatite, calcium carbonate and zinc
- Prevents calcium sulfate and calcium oxalate scales
- High-performance inhibitor and dispersant for highly alkaline systems
- Prevents formation of a wide variety of scales through multiple mechanisms, primarily threshold effect and crystal distortion
- Cost effective and thermally stable with superior dispersant performance for high solids slurries of inorganic pigments including iron oxide, iron hydrates and colloidal iron

## Applications

- Industrial Water Treatment as a General Purpose Antiscalant for severe service conditions
- Boiler sludge dispersant
- Metallurgy applications for preventing sedimentation of ferric oxide
- Oil Field scale inhibitor for preventing scale in well formation and production equipment
- Oil Field applications demanding performance under thermally and electrolytically stressed conditions
- Pulp and Paper processing dispersant and scale inhibitor particularly in thermally and electrolytically stressed conditions

## Technical Information

Flexisperse 735 is an aqueous sulfonated copolymer with high calcium tolerance for dispersion, suspension and scale inhibition of calcium carbonate, calcium phosphate and zinc scale. With unique composition and optimized molecular weight, multifunctional Flexisperse 735 is a high performance dispersant for scale and deposit control under a wide range of stressed and high concentration conditions.

By combining carboxylic group monomers (scale inhibition and dispersion) and sulfonic acid group monomers (strong polarity) in an optimized copolymer, Flexisperse 735 is a very strong dispersant for keeping silt and commonly encountered inorganic particles suspended to prevent settling out onto heat transfer surfaces.

## Formulary

With excellent thermal and chemical stability, Flexisperse 735 can be used and stored over a broad range of temperature and pH (4-10). The exceptional stability characteristics enables the formulator to develop high pH, maximum shelf life treatments with complementary and synergistic additives for preventing sludge, scale and corrosion in water treatment applications. Use at a rate of 5-10 ppm solids to control scale build-up on equipment and heat exchange surfaces. In Oil Field applications, 5-10 ppm solids is effective for scale control on equipment and downhole.

## Typical Properties

PROPERTY	VALUE
Appearance	Clear to slightly hazy, light yellow liquid
Odor	Mild
Ionic character	Anionic
Water solubility	Soluble
Average molecular weight (Mw)	18,000-22,000
Viscosity @25°C (Brookfield), MPa·s/cps	150-250
Total solids, %	32.0±1.0
pH (as is)	4.5±0.5
Density@25°C, g/ml	1.20±0.1
Boiling Point	100°C
Flash point	None (aqueous)
Storage	Stable to freezing
Shelf life	12 months

## Packaging and Handling

Flexisperse 735 is available in:  
Bulk (44,000 lbs)  
275 gallon totes (Net Wt. 2500 lbs)  
55 gallon plastic drums (Net Wt. 500 lbs)

Refer to the Safety Data Sheet (SDS) for information on the safe use, handling, and disposal of this product.

DOT Classification: Non-Regulated

Whether you're looking for a replacement product or an ingredient for a specific attribute, give us a call. We can provide assistance based upon your particular formulation requirements and composition; please feel free to contact us.

**Please refer to back page for important information**

## Flexisperse 735

### Strong Scale Dispersion and Inhibition in highly alkaline conditions

Stressed conditions comprising environments of high alkalinity, high hardness, high electrolyte concentrations and/or high temperature represent extreme conditions that can overwhelm the functionality of simple polyacrylates in controlling hard water scale and deposits.

Combining the two functionalities of a strong acid (sulfonate) and a weak acid (carboxylate) to overcome the deficiencies of simple polyacrylate homopolymers results in optimal scale and deposit control performance in stressed conditions. Sulfonated copolymers also exhibit a higher charge density and resist polymer “coiling” and “balling” that can lead to precipitation and loss of functionality, allowing for performance in thermally and electrolytically stressed conditions. Sulfonated copolymers have been developed through applications testing and proven in the field as effective tools in controlling scale and hard water salt deposits.

Unlike sequestering agents that function necessarily on a stoichiometric basis, Flexisperse 735 functions at very low ratios of polymer to precipitating salt, for example as little as 5 ppm Flexisperse 735 can avoid precipitation of as much as 500 ppm  $\text{CaCO}_3$ . Unlike stoichiometric sequestering agents, the mixed mechanism of Threshold and Crystal Distortion effects exhibited by Flexisperse 735 does not result in metal complexes that can react or catalyze reactions.

### FDA Food Additive approvals

Flexisperse 735 complies with the following US FDA Sections regarding indirect food additives:

- 21 CFR§173.310 Boiler water additive\*
- 21 CFR§176.170 Components of paper\*\*
- 21 CFR§176.180 Components of paper\*\*

\*not to exceed 20 ppm active in boiler feedwater  
\*\*used as a scale inhibitor prior to the sheet-forming operation in the manufacture of paper and paperboard used at a level not to exceed 1.0kg of copolymer per ton of dry paper and paperboard

## Functionality

With an optimal molecular weight and molecular weight distribution in the recognized effective range of 18,000-22,000, Flexisperse 735 treatment inhibits scale formation by three primary, non-stoichiometric mechanisms: **Threshold effect**, **Crystal Distortion effect** and **Dispersion properties**.

### Threshold effect

Flexisperse 735 exhibits a Threshold/Solubility enhancement effect, associating and complexing with hard water ions to retard the formation of insoluble hard water salts or scale “seeds,” and preventing scale seeds from growing into scale crystals, thereby reducing the precipitation of low solubility inorganic salts.

### Crystal Distortion effect

For formed and growing crystals, Flexisperse 735 polymer strands adsorb onto the crystal matrix to distort and disrupt crystal growth. Crystal Distortion effect results in irregular, readily fracturable particles that do not effectively adhere to surfaces and are more easily removed during cleaning processes.

### Dispersion properties

Flexisperse 735 adsorbed onto crystals and particles resists agglomeration through electrostatic repulsion, and/or steric hindrance and acts to disperse the crystals and particles. Dispersed crystals and particles are less likely to deposit on surfaces, and once in solution, less likely to redeposit.

## Applications

Flexisperse 735 is a multifunctional copolymer antiscalant and dispersant optimized for performance in stressed conditions and environment in a wide range of water treatment and heat exchange applications. With excellent thermal and chemical stability, Flexisperse 735 can be used and stored over a broad range of temperature and pH. The exceptional stability characteristics enables the formulator to develop high pH, maximum shelf life treatments with complementary and synergistic additives for preventing scale and corrosion in water treatment applications.

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