



# Flexisperse™ 300

Antiscalant polymer

## Overview

- Aqueous, partially neutralized sodium polyacrylate
  - Designed as an excellent general purpose antiscalant, effective over a broad range of pH, water hardness and temperature conditions
  - Prevents formation of a wide variety of scales through multiple mechanisms including sequestration of hardness ions, crystal distortion or modification, and dispersion
  - Cost effective and thermally stable dispersant for high solids slurries of inorganic pigments
  - FDA 21 CFR Food Additive approvals:
    - §173.310 Boiler water additive\*
    - §175.105 Adhesives
    - §176.170 Components of paper
    - §176.180 Components of paper
- \*when fully neutralized with sodium
- INCI Name: Sodium polyacrylate

## Applications

- Industrial Water Treatment as a General Purpose Antiscalant and Dispersant
- Oil Field scale inhibitor for preventing scale in well formation and production equipment
- Oil Field drilling deflocculant, particularly in fresh water drilling muds
- Textile sour additive for dyeing and finishing of textiles
- General purpose dispersing agent that allow stable, high solids slurries for minerals, clays, inorganic pigments and fillers including  $\text{CaCO}_3$  and  $\text{TiO}_2$

## Technical Information

Flexisperse 300 is a partially neutralized sodium polyacrylate homopolymer specifically designed for scale and hardness control. Flexisperse 300 is one of the most commonly applied scale inhibitor polymers in the Industrial Water Treatment industry, used to control the formation of  $\text{CaCO}_3$ ,  $\text{CaSO}_4$  and other mineral salt scales on heat exchange surfaces of cooling towers and boilers.

Flexisperse 300 is a cost effective and thermally stable dispersant for a variety of inorganic pigments including Kaolin Clay,  $\text{CaCO}_3$ ,  $\text{TiO}_2$ , and Iron Oxides for paper coating and surface treatment applications, processing, and transport of high solids slurries.

In Oil Field applications, Flexisperse 300 helps to control scale development in well formations as well as production equipment. Flexisperse 300 is a functional dispersant/deflocculation agent and flow modifier for drilling fluids, particularly fresh water drilling muds.

Flexisperse 300ND is offered as a high actives spray dried version and Flexisperse 300N as a fully neutralized version. ICT also has the ability to make and an ammonium salt version.

## Formulary

Use at a rate of 5-10 ppm solids to control scale build-up in cooling towers, boilers and heat exchangers. 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 liquid
Color	Colorless to pale amber
Odor	Mild
Ionic character	Anionic
Water solubility	Soluble
Average molecular weight (Mw)	2,000-3,000
Viscosity @25°C (Brookfield), MPa·s/cps	100-500
Total solids, %	48.0±1.0
pH (as is)	3.5±0.5
Density@25°C, g/ml	1.25±0.1
Boiling Point	100°C
Flash point	None (aqueous)
Storage	Stable to freezing
Shelf life	12 months

## Packaging and Handling

Flexisperse 300 is available in:  
Bulk (44,000 lbs)  
275 gallon totes (Net Wt. 2750 lbs)  
55 gallon plastic drums (Net Wt. 550 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 300

## Effective Scale Inhibition

With an optimal molecular weight and molecular weight distribution in the recognized effective range of 2,000-3,000, Flexisperse 300 treatment inhibits scale formation by three primary, non-stoichiometric mechanisms: **Threshold effect**, **Crystal Distortion effect**, and **Dispersion properties**.

### Threshold effect

Flexisperse 300 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. Flexisperse 300 polymer strands adsorb onto formed seeds, and act to delay crystal nucleation and subsequent growth and resultant scale formation.

### Crystal Distortion effect

For formed and growing crystals, Flexisperse 300 polymer strands adsorbed onto the crystal matrix distort and disrupt the 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 300 adsorbed onto crystals and particles resist agglomeration through electrostatic repulsion, and/or steric hindrance and act 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. Through the mechanism of electrostatic repulsion, Flexisperse 300 works effectively as a dispersant of inorganic mineral pigments. An effective dispersant may significantly reduce energy required to incorporate solids into a dispersion, reduced the viscosity of a dispersion or paste, and allow for higher solids loading in the dispersion.

Unlike sequestering agents that function necessarily on a stoichiometric basis, Flexisperse 300 functions at very low ratios of polymer to precipitating salt, for example as little as 5 ppm Flexisperse 300 can avoid precipitation of as much as 500 ppm  $\text{CaCO}_3$ . Unlike stoichiometric sequestering agents, the mixed mechanism of Threshold effect, Crystal Distortion effect and Dispersion properties exhibited by Flexisperse 300 does not result in metal complexes that can react or catalyze reactions.

## Applications

In Industrial water treatment, especially open recirculating cooling towers and circuits, Flexisperse 300 is effective at inhibiting scale formation and precipitation of calcium carbonate, calcium oxalate, calcium sulfate, barium sulfate and other low solubility salts. Other Industrial water treatment applications include use as a dispersant for boiler sludge control.

The unique calcium salt solubilization properties of Flexisperse 300 in Oil Field applications include use as a scale inhibitor for preventing calcium salt scale downhole and on production equipment. Other Flexisperse 300 Oil Field applications include use in the formulation of aqueous drilling fluids as flow modifiers, stabilizers, sticking control additives and deflocculants. Flexisperse 300 is a functional dispersant/deflocculation agent and flow modifier for drilling fluids, particularly fresh water drilling muds.

Acute and chronic toxicity tests demonstrate that under US EPA criteria, polycarboxylates are "practically non-toxic," the lowest EPA category for toxicity, to aquatic organisms. With use applications ranging from food to leave-on cosmetics, Flexisperse 300 is listed and in compliance with major chemical registries in the world:

This information relates only to the specific material referred to herein and not to its use in combination with any other material or in any process, unless explicitly stated herein. Such information is, to the best of our knowledge and belief, accurate and reliable as of the date compiled; however, no warranty, guarantee or other representation is made as to its accuracy, reliability, or completeness, or regarding any liabilities arising from others' intellectual property rights. ID# 20210212