

## Coatings Additives

### Delivering Complete Rheology Solutions

*We provide our customers with differentiated solutions for their formulation needs through our leadership position in water-soluble polymers and our extensive industry knowledge.*

#### Aqualon Products for Coatings

Aqualon, a business unit of Hercules Incorporated, is a global leader in thickeners and rheology modifiers for waterborne coatings. Natrosol® hydroxyethylcellulose and Natrosol® Plus modified hydroxyethylcellulose are the industry standards for thickening latex paints.

To complement our cellulose and complete our portfolio, Aqualon developed the line of Aquaflo® nonionic synthetic associative thickeners (NSATs). These liquid thickeners have gained rapid market acceptance superior flow and leveling, high film build, excellent spatter resistance, and full gloss development.

Aqualon's rheology modifiers deliver consistent, superior performance at very low use levels, typically less than 1% in waterborne coating formulations. Primary attributes include the following:

- **Efficient thickening with superior batch-to-batch consistency**
- **Flow and leveling**
- **Full gloss development**
- **Mechanical and freeze-thaw stability**
- **Spatter resistance**
- **Storage stability and bio-resistance**

Worldwide, Aqualon has offices, production facilities, laboratories, and specialized sales representatives dedicated to the coatings industry. Application specialists are working in our laboratories in Germany, Mexico, Russia, Singapore, and the United States. They support new product development, give technical assistance and advice to our customers, and have state-of-the-art analytical and testing equipment at their disposal.



With fifty years of experience, a rapidly growing product portfolio, and outstanding technical support, we are uniquely positioned to deliver *complete rheology solutions* for our customers.

#### Our Pallet

Aqualon's "pallet" encompasses a portfolio of "complete rheology solutions". These products work alone or often times, compliment each other to deliver superior performance in your paint and coatings products. Aqualon's technical sales staff and dedicated research and development personnel work together closely with our worldwide customer base. We are constantly assessing market trends and developing the next generation of coatings additives for our customers. This dedicated industry organization and broad product pallet enables Aqualon to provide the best solutions today and develop better solutions for tomorrow's paint and coatings industry.



Aqualon's complete rheology solutions for coatings includes:

- **Natrosol® hydroxyethylcellulose** delivers robust, consistent thickening in both interior and exterior paints. A creamy in-can consistency, excellent water resistance and a pseudoplastic rheology profile characterize paints thickened with Natrosol hydroxyethylcellulose. In addition, Natrosol hydroxyethylcellulose serves as a protective colloid in emulsion polymerization.
- **Natrosol® B hydroxyethylcellulose** delivers all the benefits of standard Natrosol, but in addition, offers dramatically enhanced biostability. This bioresistant HEC will maintain stability even in the presence of cellulase enzyme produced by microbial activity.
- **Natrosol® Plus modified hydroxyethylcellulose** is an associative thickener that delivers the benefits of Natrosol and Natrosol B hydroxyethylcellulose along with improved spatter resistance, higher high-shear viscosity, and in many cases, enhanced leveling.
- **Natrosol FPS® fluidized polymer suspensions** are solvent-free, liquid versions of Natrosol hydroxyethylcellulose, Natrosol B hydroxyethylcellulose and Natrosol Plus modified hydroxyethylcellulose.
- **Aquaflow® synthetic rheology modifiers** provide superior flow and leveling, excellent spatter resistance, and full gloss development in latex paints. These products are supplied as easy-to-handle liquids in drum, tote, or bulk packaging.
- **Culminal® methylhydroxypropylcellulose** and **methylhydroxyethylcellulose** are used to control in-can consistency, flow and leveling, high-shear viscosity, and storage stability of interior and exterior flat emulsion paints.

### Natrosol® Hydroxyethylcellulose

Natrosol® hydroxyethylcellulose delivers robust, consistent thickening in both interior and exterior paints. A creamy in-can consistency, excellent water resistance and a pseudoplastic rheology profile characterize paints thickened with Natrosol hydroxyethylcellulose.

Natrosol hydroxyethylcellulose functions by thickening the aqueous phase of paints. Nonionic Natrosol is fully compatible with typical pigments, binders, surfactants, dispersants, coalescents

and preservatives used in water based latex paints. As a result, paints made with Natrosol hydroxyethylcellulose exhibit outstanding color acceptance, color development, and viscosity retention on tinting.

Natrosol hydroxyethylcellulose is provided as a white, free flowing powder that dissolves easily in hot or cold water. Natrosol B hydroxyethylcellulose couples the benefits of Natrosol hydroxyethylcellulose with improved bioresistance. Both are available in a wide range of aqueous viscosities which gives the formulator control of low-shear thickening efficiency and high-shear viscosity.

### Natrosol® Plus Modified Hydroxyethylcellulose

Natrosol® Plus modified hydroxyethylcellulose delivers the benefits of Natrosol® and Natrosol® B hydroxyethylcellulose along with improved spatter resistance, higher high-shear viscosity and enhanced leveling.

	Aqualon Products F	
	Aquaflow NLS-200	Aquaflow NLS-205/220 <sup>1</sup>
Consistent rheology build	LS	LS
Viscosity retention upon tinting		
Flow and leveling	•	•
Full gloss development	•	•
Spatter resistance	•	•
Biostability (enzyme resistance)	•	•
Solvent-free product		•

<sup>1</sup>NLS-200 for U.S. market.

Although Natrosol Plus modified hydroxyethylcellulose is an associative thickener and thus, interacts with latex, pigments and surface-active paint ingredients, it is also an efficient aqueous phase thickener. It does not exhibit the formulation sensitivity of synthetic associative thickeners. As a result, paints thickened with Natrosol® Plus modified hydroxyethylcellulose have good tint strength, excellent color acceptance and viscosity retention on tinting.

Natrosol Plus modified hydroxyethylcellulose is provided as a white, free flowing powder that is readily incorporated into paints. It is also available as a fluidized suspension.



### Natrosol FPS® Fluidized Polymer Suspensions

Natrosol FPS® fluidized polymer suspensions are solvent-free, liquid versions of Natrosol® hydroxyethylcellulose, Natrosol® B hydroxyethylcellulose, and Natrosol® Plus modified hydroxyethylcellulose.

The pourable, pumpable Natrosol FPS products eliminate dust, reduce hydration time, and can boost thickening efficiency by up to 10% compared to their powdered counterparts.

Natrosol FPS is available in a range of aqueous viscosities.

### Aquaflow® Rheology Modifiers

Aquaflow® rheology modifiers are Aqualon's newest line of nonionic synthetic associative thickeners (NSATs). These liquid solutions of hydrophobically-modified polyacetal-polyether (HMPAPE) polymers thicken via self-association and interaction with other coatings ingredients.

such as thickening efficiency, flow and leveling. Compared to other VOC-free low shear effective nonionic associative thickeners, Aquaflow NLS-205 has superior dissolution properties in terms of dissolution time and controlled viscosity development. Both features allow for a carefree and 'robust' handling of the material. The product allows formulation of cost effective paint systems and satisfies a broad range of rheology demands.

Aquaflow NHS-300, a high shear effective product, is designed for boosting ICI viscosity. Aquaflow NHS-310 is a low viscosity version of Aquaflow NHS-300 developed for easy in-plant handling. Both products contain no organic solvents.

All Aquaflow NSAT thickeners are fully compatible with Natrosol® hydroxyethylcellulose, Natrosol® Plus modified hydroxyethylcellulose and Natrosol FPS® products.

### Culminal® and Combizell® Methylcellulose Derivatives

Culminal® and Combizell® methylcellulose (MC) and methylcellulose mixed cellulose ether (methylhydroxypropylcellulose (MHPC) and methylhydroxyethylcellulose [MHEC]) are used to control in-can consistency and storage stability of interior and exterior flat emulsion paints. Compared to other cellulose ethers chemistries the methylcellulose and derivatives have a slightly more Newtonian flow characteristic providing increased high shear viscosity.

Typical binder systems that combine well with methylcellulose and derivatives are styrene-acrylics and VA/VeoVa polymer emulsions.

Culminal and Combizell are especially suited for Italian tempera formulations because of the compatibility with Bianco Meudon calcium carbonate extenders. To facilitate processing, Culminal and Combizell products are available in four grinds. Some types have retarded solubility. Culminal and Combizell products dissolve in cold water but not in hot water. Aqueous solutions at a 2% concentration (20°C) have a Brookfield RVT viscosity range of 400-27,500 mPa·s.

To learn more about Aqualon, contact your sales representative or visit us online at [www.aqualon.com](http://www.aqualon.com).

### Functional Properties

Aquaflow NHS-300	Culminal	Natrosol	Natrosol B	Natrosol Plus
HS	LS	LS	LS	LS
•	•	•	•	•
•				•
•	•		•	•
•	•	•	•	•

LS = Low shear effective thickener HS = High shear effective thickener

Aquaflow nonionic rheology modifiers provide superior flow and leveling, ICI viscosity control, full gloss development, and excellent spatter resistance.

Aquaflow NLS-200 and Aquaflow NLS-210 are low-shear effective products, recommended for increasing Stomper viscosity. In most formulations, Aquaflow NLS-210 imparts higher thickening efficiency and more pseudoplastic rheology than Aquaflow NLS-200.

Aquaflow NLS-205 is the solvent-free equivalent of Aquaflow NLS-200 and exhibits similar paint performance characteristics



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