

Technical Information

BULLETIN VC-528B
(Supersedes VC-528A)

NATROSOL® 250 Hydroxyethylcellulose — Performance as a Thickener for Liquid Soaps

Aqualon has evaluated the performance of NATROSOL® 250HR and 250HHR hydroxyethylcellulose as thickeners for liquid soaps. The surfactant compatibility, thickening efficiency, and pseudoplastic (shear-thinning) rheology of Natrosol provide the following benefits in liquid soap formulations:

<u>Features of Natrosol</u>	<u>Benefit</u>
High viscosity development	Salt can be eliminated, reducing irritancy
Shear-thinning rheology	Thick, rich appearance of soap in the bottle; low viscosity during dispensing for easy application
Surfactant compatibility	Homogeneous appearance maintained during storage
Surface activity	Reduction in surfactant level with no sacrifice in lather
Water-binding capacity	Emollient feel
Solution clarity	Transparent soaps easily formulated

Two starting point formulations follow. By incorporating Natrosol 250HHR into the opaque liquid soap formula, the surfactant level was kept to 8.0%—as much as half the level seen in typical formulas. Yet the final soap viscosity was 4,000 cps (mPas). This reduction in surfactant level provides cost benefits in addition to the benefit of reduced irritancy.

Traditionally, transparent soaps have been thickened with salts such as ammonium chloride. However, these salts can be irritating at the levels that provide high viscosity. Natrosol 250HR at a 1.0% concentration thickens this soap to a viscosity of 3,900 cps (mPas).

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Opaque Liquid Soap (NO9-01W)

Natrosol® 250HHR hydroxyethylcellulose effectively boosts the viscosity of this lower actives opaque shampoo base. At a surfactant solids level of only 7.3%, the addition of Natrosol yields a rich liquid soap with a viscosity of 4,000 cps (mPas) (Brookfield LVT at 30 rpm, 25°C).

<u>Ingredients</u>	<u>Weight %</u>
Water	75.88
Sodium C14-C16 olefin sulfonate, 40% active	7.50
Sodium lauroyl sarcosinate, 30% active	6.66
Cocamidopropyl betaine, 35% active	6.66
Glycol stearate	1.00
Natrosol 250HHR CS hydroxyethylcellulose	0.80
Propylene glycol	0.50
Glycerin	0.50
Tetrasodium EDTA	0.30
Stearalkonium chloride	0.10
Methyl paraben	0.10
	<hr/> 100.00

Procedure

1. Disperse the Natrosol in water with good agitation. Mix until fully dissolved. Moderate heating or an increase in solution pH to slightly alkaline will accelerate hydration.
2. Disperse the methyl paraben in the propylene glycol. Add to the Natrosol solution. Mix until dissolved.
3. While slowly stirring the water-soluble polymer solution, add the stearalkonium chloride, olefin sulfonate, and glycol stearate. Heat the mixture to 80°C until all of the glycol stearate has melted and the solution has turned opaque.
4. Add the remaining ingredients while cooling the solution slowly to room temperature.
5. Add color and fragrance.

Transparent Toilet Soap (NO9-02W)

Natrosol 250HR gives viscosity and pseudoplastic flow to this transparent hand soap. The excellent lathering properties of the formula are attributed to the combination of olefin sulfonate, sodium lauroyl sarcosinate, and cocamide MEA. The finished liquid soap has a viscosity of 3,900 cps (mPas) (Brookfield LVT at 30 rpm, 25°C).

<u>Ingredients</u>	<u>Weight %</u>
Water	65.70
Sodium C14-C16 olefin sulfonate, 40% active	20.00
Sodium lauroyl sarcosinate, 30% active	10.00
Cocamide MEA	3.00
Natrosol 250HR CS	1.00
Disodium EDTA	0.20
Methyl paraben	0.10
	<hr/> 100.00

Procedure

1. Disperse the Natrosol in water with good agitation. Mix until fully dissolved.
2. Add the methyl paraben to the Natrosol solution. Mix until fully dissolved.
3. In a separate vessel, combine the surfactants, heat to 80°C, and mix until homogeneous.
4. Add the surfactant solution to the water-soluble polymer solution and mix until well blended.
5. Add the disodium EDTA and cool to room temperature.

Raw Materials and Their Sources

<u>CFTA Adopted Name</u>	<u>Trademark</u>	<u>Supplier</u>
Stearylalkonium chloride	Ammonyx 4002	Stepan Chemical Company Northfield, Illinois
Sodium C14-C16 olefin sulfonate	Bio-Terge AS-40	Stepan Chemical Company Northfield, Illinois
Sodium lauroyl sarcosinate	Hamposyl L-30	W. R. Grace & Company Nashua, New Hampshire
Cocamidopropyl betaine	Lexaine C	Inolex Chemical Company Philadelphia, Pennsylvania
Cocamide MEA	Monamid CMA	Mona Industries Inc. Paterson, New Jersey
Tetrasodium EDTA	Perma Kleer 100	Stepan Chemical Company Northfield, Illinois

Product Safety

Read and understand the Material Safety Data Sheets (MSDS) before using the products referred to in this bulletin.

8-93

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