

## **NATROSOL® PLUS CS, Grade 330** **hydrophobically modified hydroxyethylcellulose (HMHEC)**

### **Personal Care Grade**

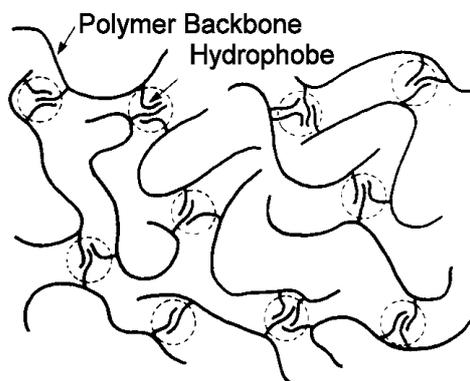
NATROSOL® PLUS CS, Grade 330, HMHEC is an associative cellulosic thickener designed to provide thickening and viscosity stability in both aqueous and surfactant systems. This polymer has potential use in a wide variety of applications, including pharmaceutical and cosmetic products. NATROSOL Plus CS can function as a thickener, binder, stabilizer, film-former, or suspending agent.

### **CHEMICAL AND PHYSICAL PROPERTIES**

NATROSOL Plus CS is a nonionic water-soluble polymer that contains both hydroxyethyl and long-chain alkyl groups. The unique combination of hydrophobic side chains and a hydrophilic polymer backbone differentiates this new polymer from traditional cellulosics. The hydrophobes interact through intramolecular and intermolecular associations, as depicted in the figure below, increasing the viscosity and changing the rheology of NATROSOL Plus CS solutions. NATROSOL Plus CS is known to associate with the hydrophobic groups of surfactants and other formulation ingredients. Finished product rheology is highly dependent on formulation ingredients due to the associative nature of NATROSOL Plus CS.

Solutions of NATROSOL Plus CS form clear films upon drying. Because of its nonionic nature, NATROSOL Plus CS blends well with natural polymers and pigments and is compatible with a wide range of additives, including electrolytes and ionic surfactants.

### **ILLUSTRATION OF HMHEC STRUCTURE**



Hercules does not recommend any use of its products that would violate any patent or other rights.

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**TYPICAL PROPERTIES<sup>(a)</sup>**

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Form as supplied	white to off-white powder
Moisture content (as packed), %	5.0
Ash content (calculated as Na <sub>2</sub> SO <sub>4</sub> ), %, max	4
Bulk density, g/ml	0.75
Brookfield viscosity, <sup>(b)</sup> 1%, cps (mPas)	400
Solution appearance	clear to slightly hazy
Hydration time, min, pH 7.2	12
Surface tension, dynes/cm	62

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<sup>(a)</sup>Not to be construed as product specifications. Specifications are available on request.

<sup>(b)</sup>Brookfield LVT Viscometer, 6 rpm, Spindle No. 3, 25°C.

## INCORPORATION

NATROSOL<sup>®</sup> *Plus* CS modified hydroxyethylcellulose is supplied as a white, free-flowing powder that dissolves readily in hot or cold water. It can be incorporated into a formulation as a premade solution, as a powder, or as a slurry in acidic water, glycols, or selected organic nonsolvents. Like many other cellulosic thickeners, NATROSOL *Plus* CS thickener is surface-treated to temporarily delay hydration of the particles. This allows better dispersion of the particles, and therefore, faster solution times.

## HANDLING

NATROSOL *Plus* CS absorbs moisture from the atmosphere, as do other water-soluble materials. The amount absorbed depends on the relative humidity and temperature of the environment. This product should be stored in tightly closed containers in a dry atmosphere.

## PRODUCT SAFETY

NATROSOL *Plus* CS, with an LD<sub>50</sub> of greater than 5 g/kg, is nontoxic. In repeat-insult patch-testing, this polymer does not indicate a potential for dermal irritation or sensitization in humans. NATROSOL *Plus* CS is a mild ocular irritant. Details of this testing are available on request.

Read and understand the Material Safety Data Sheet (MSDS) before using this product.

**CTFA Nomenclature:** cetyl hydroxyethylcellulose