BULLETIN VC-5656

natrosol 250™ hydroxyethylcellulose (HEC)

multi-functional, nature-derived rheology modifiers

formulator benefits	formulation benefits
o nature-derived from cellulose, >54% natural origin content according to ISO16128-2:2017 o inherent, primary biodegradability o broad surfactant compatibility o good electrolyte tolerance o effective across a wide pH range, pH 4-10 o compatible with alcohol (up to 60% w/w) o surface treated grades available (R-type) for easy, lump-free processing	o delivers shear-thinning thickening resulting in desirable pour aesthetics and reduced splashing o prevents soil redeposition in cleaning applications o vertical cling from toilet bowl cleaner formulations

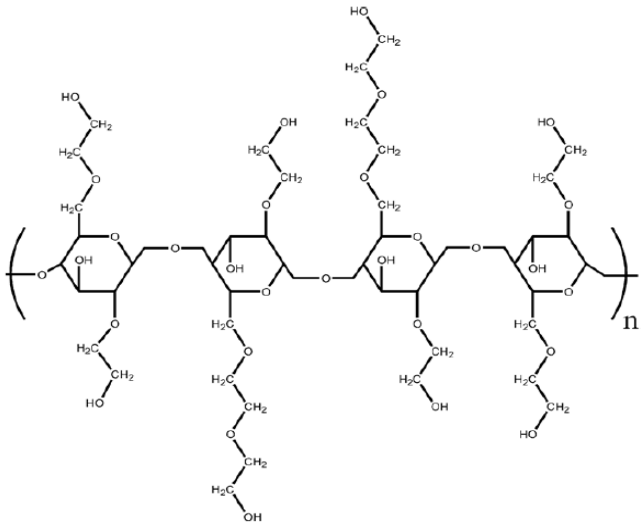
applications

laundry detergents, fabric softeners, dishwashing liquids, toilet bowl cleaner, surface and floor cleaners, hand sanitizers, air freshener gels

product forms gels, liquids, solids

available formulations from Ashland floor cleaner, hand sanitizer

chemistry



description: Hydroxyethylcellulose

typical properties

appearance…… white to off-white powder
moisture content……5% (max)
bulk density (g/ml)……0.5 (varies by type)
solution properties:
pH (1% aqueous solution)…… ~7
surface tension, 0.1%, 20°C ……~67 mN/m
viscosity……..see table below for guidance on viscosity ranges for various Natrosol™ grades

wt% Natrosol™ 250 Hydroxyethylcellulose in aqueous solution

type	1%	2%
HHR	3,400-5,000	-
HHBR	3,400-5,500	-
H, HR, HBR	1,500-2,600	-
M, MR, MBR	-	4,500-6,500

product coding

Natrosol™ 250 Hydroxyethylcellulose grades have designations denoting characteristics like molecular weight/viscosity, solubility profile, and stability. See below for details regarding specific grade designations.

HH, H, M types - These designations convey information about the molecular weight and viscosity of the grade (HH-very high, H-high, M-medium).

R types- This designation denotes that these grades are surface treated with a pH sensitive coating to delay hydration upon introduction to water. This reduces lumping and agglomeration during processing.

B types- These Natrosol™ 250 Hydroxyethylcellulose grades are manufactured using conditions to produce a final product that is less susceptible to degradation by cellulase enzymes. These enzymes are common in the process water of some regions and, if present in final formulations, will have a detrimental impact on long term stability and viscosity.

PC, CS, HC types- These designations denote the suitable applications for the grade, representing personal care, consumer products, and home care, respectively.

formulation guidelines

recommended use levels	0.2-2.5%
temperature/mixing conditions	**Natrosol™ 250 Hydroxyethylcellulose R-types (surface treated grades)** *aqueous formulations* - Add Natrosol 250 HEC to well agitated, room temperature water pH 7 or lower. - Once powder is dispersed adjust pH to 8.5 or higher to trigger dissolution and viscosity build. - Continue mixing until polymer is fully dissolved and a smooth solution texture is observed.

	hydroalcoholic formulations - Add Natrosol 250 HEC powder to the aqueous phase, followed by 1/3 of the formulation alcohol and mix until evenly dispersed - Adjust pH to 8 to trigger dissolution and viscosity build, mix until smooth solution is observed. - Slowly add the remaining alcohol in small portions, mixing until smooth between each addition. **Non-surface treated grades** *aqueous formulations* - Add Natrosol™ Hydroxyethylcellulose 250 to well agitated, cold or room temperature water and mix until no polymer particles are observed. *hydroalcoholic formulations* - Disperse Natrosol™ 250 Hydroxyethylcellulose powder in 1/3 or 1/4 of the formulation alcohol and mix until evenly dispersed. - Add polymer/alcohol slurry to room temperature water and continue mixing to dissolve. - Add the remaining alcohol and mix until smooth solution is observed.
when to add	Polymer is ideally added at the beginning of the formulation to ensure that the polymer is completely hydrated before adding additional ingredients.
tips from Ashland's solvers	- Suitable neutralizers include NaOH, aminomethyl propanol (AMP) and triethanolamine (TEA) - Non-surface treated grades can lump when added directly to water. Dispersing the polymer in a non-solvating liquid (e.g propylene glycol, PEG, alcohols, etc.) at a polymer to liquid ratio of 1:5 before addition to aqueous phase is recommended. - To decrease dissolution time, apply heat once polymer powder is well dispersed.

safety, handling, and storage

It is recommended to use the product in rotation on a first-in first-out basis. The product should be stored under dry and clean conditions in its original packing and away from heat. The product is hygroscopic. The packaging is selected in a way to avoid ingress of moisture, but the water content of the packed product will/may increase if not stored properly.

Additional information concerning safety, handling and storage is supplied in the safety data sheet, which can be made available upon request. Such information includes:

- classification and labelling per regulation for transport and for dangerous substances
- protective measures for storage and handling

A toxicology summary can also be made available, on a confidential basis, by contacting your local Ashland representative.

regulatory

CAS#: 9004-62-0

Other regulatory information is available on request.