BULLETIN VC-5655-2 (supersedes VC-5655-1)

natrosol 250™ hydroxyethylcellulose (HEC)

multi-functional, nature-derived rheology modifiers

formulator benefits

- nature-derived from sustainable wood[1] and cotton-based cellulose
  - 54% natural origin content[2]
  - cotton linters are 100% recycled content[3]
- inherent, primary biodegradability
- non-ionic, efficient thickeners suitable for use across a wide range of personal care applications
- effective across a wide pH range (4-10)
- high salt tolerance and broad surfactant compatibility, enabling clear formulations
- surface treated grades available (R-type) for easy, lump-free processing
- compatible with alcohol (up to 60% w/w)

formulation benefits

- delivers efficient, shear-thinning thickening for easy spreading upon application
- stabilizes foam and lather
- improves emulsion stability
- imparts lubricity and slip to skin and hair care formulations
- inhibits syneresis formation and imparts desirable shear-thinning properties for toothpaste formulations
- gives a glossy, smooth toothpaste ribbon appearance

[1] suppliers have made commitments to utilize standards set by the Forest Stewardship Council (FSC) and/or Program for the Endorsement of Forest Certification (PEFC).
[1] according to ISO16128-2:2017
[3] suppliers have received third party certifications including the Global Recycled Standard (GRS 4.0) and SCS Recycled Content Standard, certifying that their cotton linters are 100% recycled content.

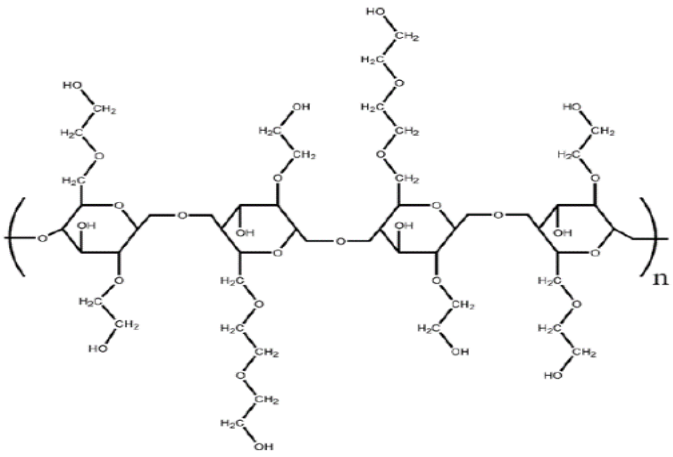
applications

liquid soaps, hair conditioner, hand sanitizers, shave gel and foams, AP/DEO products, color cosmetics, lubricant gels, hair styling gels, serums, skin creams, lotions, toothpastes, mouthwash

product forms gels, liquids, solids, emulsions

available formulations from Ashland hair conditioners, styling gels, hair serums, skin and hair care lotions, hand sanitizer, toothpastes

chemistry



INCI name: 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 (2% aqueous solution)…..…… ~7
surface tension, 0.1%, 20°C ……..~67 mN/m
viscosity…… see table below for guidance on viscosity ranges for various Natrosol™ 250 Hydroxyethylcellulose grades

	wt% Natrosol™ 250 Hydroxyethylcellulose in aqueous solution	
type	1%	2%
HHR	3,400-5,000	-
H, HR	1,500-2,600	-
M, MR	-	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, L types - These designations convey information about the molecular weight and viscosity of the grade (HH-very high, H-high, M-medium, L-low).

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. Surface treatment is not available on pharma grades.

B types- These Natrosol™ 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 types- These designations denote the suitable applications for the grade, representing personal care, cosmetic.

Pharma types- Designates suitability for pharmaceutical applications

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 Hydroxyethylcellulose 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™ 250 Hydroxyethylcellulose 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
Component ingredients are listed in the China IECIC-2015
All personal care and pharmaceutical grades produced under cGMP conditions
Other regulatory information is available on request.