

BULLETIN VC-966-2 (supersedes VC-966-1)

benecel™ hydroxypropyl methylcellulose(HPMC)

nature-derived rheology modifiers that enhance the sensory experience

formulator benefits

- nature-derived from sustainable wood¹ and cotton-based cellulose
 - 80% natural origin content²
 - cotton linters are 100% recycled content³
- enhances foam and foam stability
- non-ionic thickener, compatible with both anionic and cationic ingredients including other rheology modifiers
- broad surfactant compatibility including sulfate-free surfactants
- enables reduction in surfactant, improving formulation's cost and sustainability profile

formulation benefits

- enhances sensorial experience from hair and skin care formulas
- imparts luxurious feel and texture
- enables milder formulations through surfactant reduction
- compatible with ethanol for use with hand-sanitizer applications

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).

² 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.

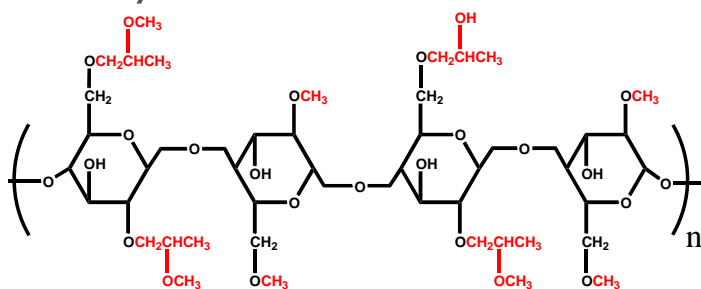
applications

skin and hair care applications

product forms clear and opaque shampoos and body washes, liquid soaps, 2-in-1 shampoos, facial cleansers, bubble baths, shave creams, hair styling products, hand sanitizers, lotions and creams, dish wash, bar soap

available formulations from Ashland facial cleansers, shampoos, body washes, hand sanitizers

chemistry



INCI name: Hydroxypropyl methylcellulose

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typical properties

viscosity and other specifications of benecel™ hpmc

The standard method for the viscosity measurement of aqueous solutions prescribes the use of Ubbelohde (capillary) viscometers, at 20 °C for products with viscosity less than 600 mPa·s at 2% concentration and the use of Brookfield (rotational) viscometers for products with viscosity greater than or equal to 600 mPa·s at 2%.

Benecel type	Viscosity range m Pa. s	Methoxyl Content, %	Hydroxypropyl Content, %	Gelation Temperature. °C	Particle size, laser, in µm
E4M	2,700- 5,040	28-30	7-12	~58	Dv90: 170-250
E10M	7,500- 14,000	28-30	7-12	~58	Dv90: <295
K4M	2,700-5,040	20-24	7-12	75-85 ¹	Dv90: 170-250
K35M	26,250-49,000	20-24	7-12	75-85 ¹	Dv90: 170-250
K100M	75,000-140,000	20-24	7-12	75-85 ¹	Dv90: 170-250
K200M	150,000-280,000	20-24	7-12	75-85 ¹	Dv90: 170-250

appearance..... white to off-white powder
 moisture content.....5% (max)
 ash content, as sulphate ash for all types.....1.5% max
 NaCl.....0.8% max
 chlorides.....0.5% max
 solutions in water, typical values:
 pH (1% aqueous solution, 20°C) 5-8
 surface tension, 0.1%, 20°C44-55 mN/m
 density, at 2%, 20°C.....1.0032g/ml

formulation guidelines

recommended use levels	0.2%-2.0% polymer
temperature/mixing conditions	<p>hot/cold water process</p> <ol style="list-style-type: none"> 1. Take 1/3 available water and heat to >80°C, Hot water is needed to prevent polymer from lumping. 2. Add polymer slowly with mixing. When added mix for 10 minutes 3. While mixing add 2/3 cold water. The colder the water the faster the solubility. 4. Bring temperature close to 25°C while mixing. 5. Mix for about 45 minutes or until solution is smooth and lump free. Mixing speed should be sufficiently high so solution turns over. adjust mixing speed as needed. 6. Add additional ingredients of formulation. <p>hot water process</p> <ol style="list-style-type: none"> 1. Heat water to >80°C. Hot water is needed to prevent polymer from lumping. 2. Add polymer slowly while mixing, mix for 10 minutes. 3. Turn off heat; bring temperature close to 25°C while mixing. 4. Mix for about 45 minutes or until solution is smooth and lump free. Mixing speed should be sufficiently high so solution turns over. Adjust mixing speed as needed.

	<p>5. Add additional ingredients.</p> <p>slurrying with non-solvating solvents (heat is NOT required)</p> <ol style="list-style-type: none"> 1. Add polymer to non-solvating solvent such as glycerol, PEG, propylene glycol, ethanol, fragrance etc. at the preferred ratio of non-solvent to Benecel of 6:1 2. Mix slurry so that all the polymer is "wetted" by the non-solvent 3. Add water to slurry (preferred) or add slurry to water, making sure there is no polymer settling in slurry container. 4. Mix for about 45 minutes or until solution is smooth and lump free. Mixing speed should be sufficiently high so that solution turns over. Adjust mixing speed as needed 5. Add remaining ingredients.
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	It is important to ensure that the polymer is fully hydrated using one of the procedures described above. This will ensure maxing compatibility and prevent the formation of hydrogels ("fish eyes") in the formulation that are extremely difficult to remove once they are formed. Once the polymer is hydrated additional ingredients and heat and pH adjustment can be applied if needed.

safety, handling, and storage

The products are supplied in multi-ply paper bags with polyethylene inner liner, with the following net weights:

Type K100M:.....16kg

Type E10M, E4M, K4M, K35M, K200M:...18.14 kg

Type K100 LV: 20 kg

Benecel™ high purity hydroxypropyl methylcelluloses do not have an expiration date. 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 dry.

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 Ashland's toxicology department.

regulatory

CAS#: 9004-65-3

Component ingredients are listed in the China IECIC-2015

Other regulatory information is available on request.