

Celquat® SC-230M polymer

Cationic cellulosic for conditioning

INCI: Polyquaternium-10

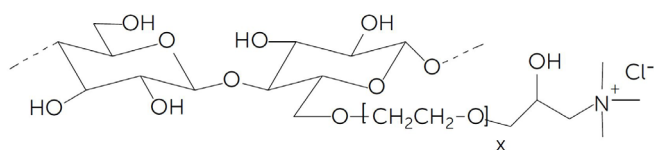
The Celquat SC-230M polymer is a high viscosity building, surfactant compatible cationic conditioner useful in a broad range of personal care products. This water soluble modified cellulosic is highly cationic over the entire useful pH range, is substantive to hair and skin, and provides such aesthetic benefits as improved wet comb, detangling, body, lubricity, and rich feel. It can also contribute significant thickening effects.

Celquat SC-230M polymer is one member of the Celquat family of polymers that are water soluble quaternary cellulose derivatives. Other Celquat polymers offered include:

- Celquat H-100 polymer, Polyquaternium-4
- Celquat L-200 polymer, Polyquaternium-4
- Celquat SC-240C polymer, Polyquaternium-10

Celquat SC-230M polymer is a high viscosity building quaternized conditioning polymer. It is prepared by reacting a trimethyl ammonium substituted epoxide onto the hydroxyl groups of the hydroxyethyl cellulose backbone. This reaction yields a polymer with a dispersed series of cationic charges along the polymer chain. This polymer is a higher viscosity variant of its chemically similar sister product, the Celquat SC-240C polymer.

Celquat SC-230M polymer chemistry



Recommended applications

Celquat SC-230M polymer has excellent conditioning and thickening properties, and can be used in a wide variety of hair and skin applications, including shampoos, conditioners, body/facial washes, cleansers, styling aids and lotions/creams.

Suggested use levels, as supplied

Application	% active
Cleansing applications	0.1-0.5

Features and benefits

- Substantive to hair and skin
- Surfactant compatibility
- Clarity
- Rheology modification
- Lubricity
- Imparts smooth, rich feel to hair and skin
- Forms clear aqueous solutions and non-tacky continuous films
- Improves wet combability
- Improves gloss and anti-static properties on hair



Formulation guidelines

The choice of the appropriate Celquat conditioning polymer to use may depend on the end use. The high viscosity Celquat SC-230M polymer is best suited for thicker pour out cleansing products, creams, and gels. Other Celquat polymers may be better suited for use in actuated products such as mousses and spritzes, as well as lower viscosity shampoo and pour out products.

Solubility

The Celquat SC-230M polymer is water soluble. For optimal results, prepare the Celquat polymer solution as a separate phase. Slowly sift the powder into water while stirring. Sifting slowly will avoid the formation of fisheyes and gels. Heat and moderate agitation will increase the solubility rate of the polymer. The polymer is completely hydrated when the solution is clear and there are no insolubles present. Complete hydration is important to ensure homogeneity, viscosity stability, formulation stability, and clarity.

Surfactant systems containing the Celquat SC-230M polymer can easily be prepared with the fully hydrated Celquat solutions (incompatibilities can result if the Celquat polymer is added directly to the surfactant solutions). The preferred method is to slowly add the surfactants to the fully hydrated Celquat SC-230M polymer solution. Add the nonionic and amphoteric surfactants first and then add the anionic surfactants. Continue mixing until uniform, and then add the balance of ingredients. It is also possible to add a hydrated Celquat SC-230M polymer pre-mix solution to the main batch with good agitation.

Celquat SC-230M polymer is not soluble in such alcohols as ethanol and isopropanol. It can tolerate up to 65% alcohol as a diluent. To incorporate alcohol, solubilize the polymer in a water/alcohol blend or add alcohol to an aqueous polymer solution. At 2% polymer by weight, the Celquat SC-230M polymer will thicken a 65% alcohol solution to a viscosity of approximately 10,000 cps (spindle #5, 50 rpm, 25°C).

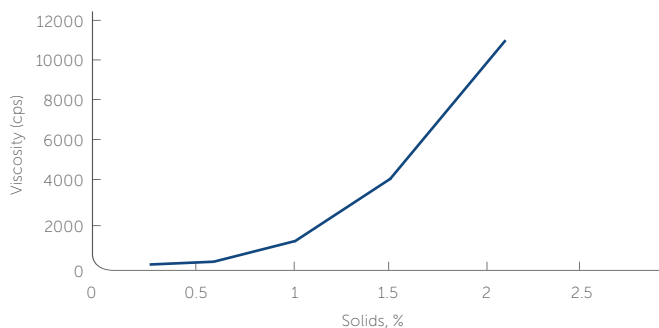
pH stability

Solutions of the Celquat SC-230M polymer are subject to chemical hydrolysis at extreme pH. For optimum stability, a pH range of 4 to 8 is recommended.



Thickening

The Celquat SC-230M polymer provides multifunctional benefits to a formulation. In addition to providing conditioning benefits from a shampoo, the Celquat SC-230M polymer also acts as a thickener. The graph below illustrates the viscosity of Celquat SC-230M polymer at various solids levels.



If additional thickening is required, this polymer can tolerate electrolytes added to build viscosity in concentrated surfactant systems. Other materials can also be used to control viscosity. Commonly used cellulosic type thickeners are effective in raising the solution viscosity, including hydroxyethyl cellulose and hydroxypropyl methylcellulose. Finally, effective associative thickeners can raise the viscosity of solutions containing the Celquat SC-230M conditioning polymer.

Preservation

Aqueous solutions of Celquat polymers are subject to bacteriological growth and enzyme catalyzed degradation. Preservatives suggested for consideration are DMDM hydantoin, methyl p-hydroxybenzoate, propyl p-hydroxybenzoate, Germall® 115 and 2 nitro-2 bromo-1, 3 propanediol. The presence of alcohol will also minimize bacteriological growth.

Compatibility

Surfactant

The Celquat SC-230M polymer is an ideal way of adding conditioning functionality to a shampoo. The polymer was developed to be compatible with a wide variety of anionic, amphoteric, and non-ionic surfactants including:

- Sodium Lauryl Sulfate
- Ammonium Lauryl Sulfate
- Sodium Laureth Sulfate
- Ammonium Laureth Sulfate
- Cocamidopropyl Betaine
- PEG-80 Sorbitan Laurate
- Sodium Lauroamphoacetate
- Olefin Sulfonate
- Cocamide MEA

Performance properties

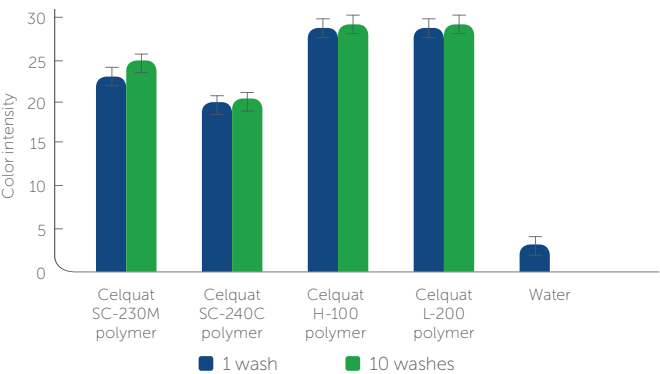
Substantivity

The cationic charge on the Celquat SC-230M polymer makes it substantive to keratinous substrates such as hair and skin.

The substantivity of the Celquat SC-230M polymer has been defined using the Lumicrease Dye Test. In this experiment, dyeing wool swatches with an anionic polyazo sulfonate dye after they have been treated with the cationic polymer quantifies deposition of cationic conditioning polymers. Wool is similar to human hair and skin in adsorptive and charge properties and can be used as an efficient substitute substrate for hair testing. The dye is attracted to the deposited cationic polymer. A colorimeter is used to measure the degree of adsorption on each sample via intensity of the dye. The swatches are tested for deposition after 1 wash (1) and 10 washes (10). The 1 wash data is indicative of substantivity, and a significantly higher value for the 10 wash reading over the 1 wash reading is indicative of build-up.

As is in the graph below, Celquat SC-230M polymer is significantly less substantive than the Celquat L-200 and Celquat H-100 polymers, but is more substantive than the Celquat SC-240C analog. Based on the 10 wash results, this polymer may have some potential for build-up on this substrate.

Substantivity of Celquat conditioning polymers



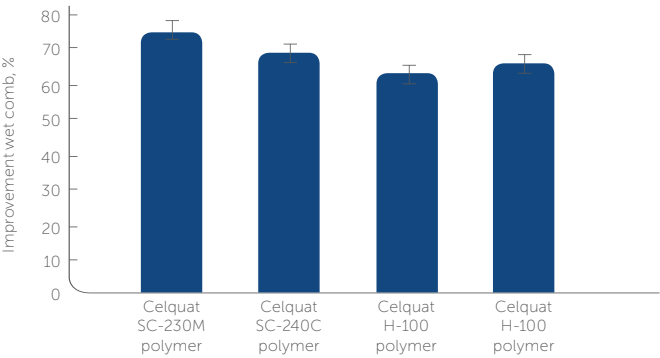
Wet comb performance

The conditioning properties for the Celquat SC-230M polymer are readily seen in wet comb force reduction studies. Rinse-off wet combing properties were tested on damaged hair using the following model shampoo system:

Ingredient	%
Celquat polymer	0.5
Ammonium Laureth Sulfate	10.5
Cocamidopropyl Betaine	3.3
Cocamide MEA	0.5
Preservative	0.4
Ammonium Chloride	0.2
Water	up to 100

The wet combing studies were performed using the Sintech MTS Synergie 200 tensile tester in a constant temperature humidity room. The reported values are the average data from three sets of tresses. Each tress set represents averaged data for three replicates. The results in the graph below show that the Celquat SC-230M polymer significantly reduces wet comb force in the shampoo application after rinse off, more so than the other Celquat polymers.

Wet comb improvement shampoo



Storage and handling

Celquat SC-230M polymer product should be stored in a cool, dry location away from heat, sparks or fire. When not in use, the container should be kept closed to prevent moisture and dust contamination. We recommend that normal precautions be taken to avoid ingestion or contact with eyes. Respiratory protection should be used to avoid dust inhalation. Good industrial hygiene practices should be followed. Please read the MSDS before using this or any other chemical.

Health and safety

A health and safety summary for Celquat SC-230M polymer is available on request. Information on Celquat SC-230M polymer relating to EU Cosmetics Directive 76/768/EEC is also available upon request.

This product may be used in spray applications having a droplet particle size greater than 50 microns. The product has not been properly evaluated for safety clearance for use in pumps and/or aerosols with particle sizes less than 50 microns.

The suitability of the final formulations should be confirmed in all respect by appropriate evaluation. The marketer is advised to evaluate the final formulation with regard to performance and health safety.

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Nouryon

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