

KELTROL[®] CG

NATURE-BASED RHEOLOGY CONTROL



YOU CAN

KELTROL® CG

COSMETIC GRADE XANTHAN GUM

Nature-Based Rheology Control

In cosmetic and personal care products, more than any other consumer product, rheology control is a vital component of the product's functionality. Rheology control is important for suspension on the shelf for visual appeal, and even more important for desired flow and spread properties when in use.



When selecting the most appropriate rheology modifier, many factors must be taken into consideration. The desired flow behavior or texture, the required shelf-life, the production equipment available, compatibility with other ingredients, regulatory compliance...and of course cost-in-use...are all considerations.

In addition to functionality, consumers want to buy effective, healthy and natural products that protect their skin, as well as their environment. The natural category has exploded and now accounts for 7% of the global personal care market and is growing at double digit rates (Source: HAPPI Magazine, July 2008). While the industry grapples with the definition of natural and organic, CP Kelco follows the strict US FDA and USDA guidelines of the food industry for compliance and guidance in supporting these label claims.

As Mother Nature Intended

Our products are derived from natural, renewable raw materials, and CP Kelco strives to preserve nature's functionality by minimizing modification during processing.

The KELTROL® CG Line of Xanthan Gums is produced by a fermentation process using the bacterium *Xanthomonas campestris*. The composition and structure of xanthan gum produced by commercial fermentation is identical to the naturally occurring polysaccharide formed by *Xanthomonas campestris* on plants belonging to the cabbage family, where it occurs naturally.

Process control and rigorous quality standards throughout production guarantee consistent, reliable product performance.

Uniqueness of KELTROL® CG Products

Pseudoplastic (shear thinning) flow properties – As shown in Figure 1, low use levels of KELTROL CG xanthan gums produce products that exhibit pseudoplastic (shear-thinning) rheology. At low shear rates, the high viscosity stabilizes emulsions and suspensions, and provides a long shelf-life for the end product.

At the high shear rates that occur when consumers apply lotion or cream to the skin, KELTROL CG products provide low viscosity, making application to the skin easier. This shear-thinning property at high shear rates also simplifies the manufacturing process for easy pumping and pouring.

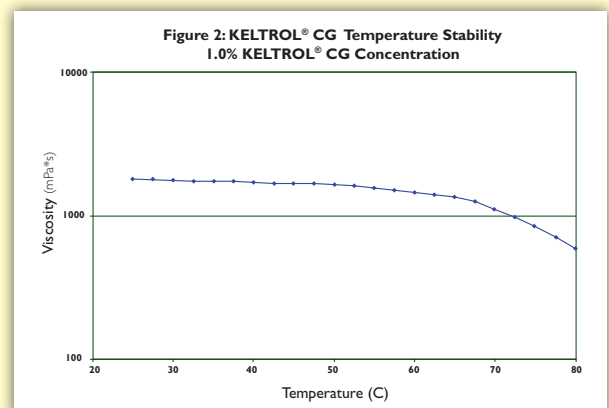
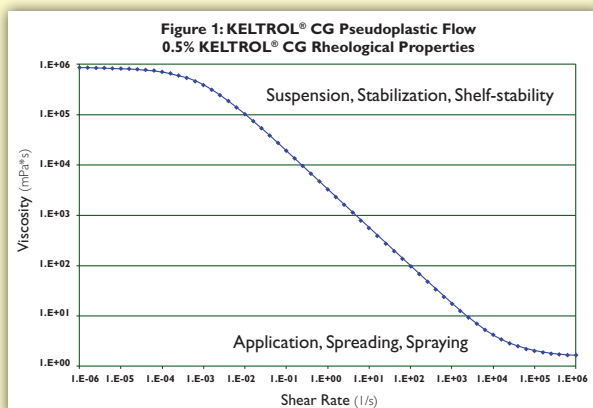
Process Tolerance: Wide pH and temperature ranges

KELTROL CG grades maintain their beneficial rheology throughout a wide pH and temperature range, which provides for consistent quality in transit and on the shelf, and the widest possible range for formulation flexibility. Figure 2 demonstrates that for a skin lotion made with KELTROL CG, the viscosity does not vary significantly between room temperature and is stable well beyond body temperature.

In the manufacturing process, KELTROL CG is soluble in both hot and cold water, and is highly resistant to enzymatic degradation.

Salt compatibility

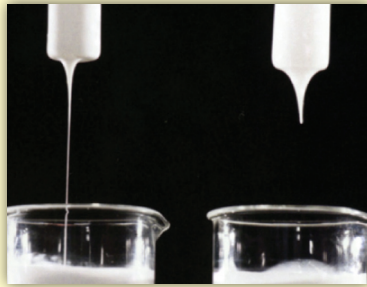
When sunscreen formulations are used at the beach, interaction with saltwater can result in compatibility problems with certain polymers. KELTROL CG is stable in the presence of salt water and does not bead up like certain other polymers. The resistance to salt also allows the application of a consistent film thickness both before and after entering the water, which improves sun protection. More importantly for the consumer, KELTROL CG has the ability to improve wash-off resistance due to its slowly dissolving soluble film that improves the stay-power of important sunscreen protection components.



...you can

Spanning the Gamut of Flow

Standard KELTROL CG is an excellent stabilizer; it pumps and flows well and is very temperature tolerant. However, due to its high extensional viscosity, when used at higher concentrations, as in body washes and lotions, this product can exhibit stringy flow or a grainy appearance.



KELTROL® CG KELTROL® CG-SFT
Comparison of Extensional Viscosity

For formulations that need better 'snap' or break (i.e., lower extensional viscosity), KELTROL CG-SFT is a modified form of KELTROL CG that has a lower extensional viscosity, thereby providing reduced stringiness.

Overall, CG-SFT gives a significant improvement in the overall aesthetics of the formulation. The product is less grainy and much smoother in appearance and flow, especially in surfactant systems.

Specifically Designed for Cosmetic Compatibility

CP Kelco cosmetic grade (CG) products have low bacterial plate counts – not more than 1,000 cfu/g – making them suitable for use in a wide variety of cosmetic and personal care applications. All KELTROL CG grades are tested to ensure compliance with the purity criteria defined in the monographs for xanthan gum in the current editions of the *US Pharmacopoeia/National Formulary*, *Japanese Pharmaceutical Excipients*, and *European Pharmacopoeia*. For applications with tighter micro specifications, KELTROL CG-T has been developed, which has a specification of not more than 100 cfu/g.

Formulation Versatility

The KELTROL CG grades are essentially odorless, and have no impact on product fragrance or color. Compatibility of KELTROL CG with anionic, amphoteric, and nonionic surfactants and typical emollients or skin actives is excellent. Because these products are anionic polysaccharides, they are not compatible with certain cationic materials. KELTROL CG is compatible with aloe vera and most other skin protection additives. Additionally, the KELTROL CG line is well suited for both zinc oxide and titanium dioxide sunscreen products.

Members of the KELTROL CG Family

CP Kelco offers a range of biopolymers to thicken, suspend and stabilize emulsions and other water-based systems. The KELTROL® CG line of xanthan gum products can be used to modify the texture of personal care products and to stabilize suspensions, oil-in-water emulsions and foams against separation. Creams and lotions made with KELTROL CG products provide lubricity, uniform spreading, and a pleasant, light skin feel.

CP Kelco strives to be customer-needs driven. While there are certain benefits that apply to the use of any of the KELTROL CG grades, several line extensions have been created to help address individual manufacturing and formulation needs.

What you can expect from all of the CG products:

- Enhanced stability of emulsions, suspensions and foams
- Flow control during and after application to the skin or hair
- Provides a light, silky skin-feel
- Thins during processing, then quickly recovers its viscosity

GRADE	MESH SIZE (TYLER STANDARD SCREEN)	SOLUTION CLARITY	DIFFERENTIATING CHARACTERISTICS
KELTROL® CG	80/180µ	Translucent	Standard grade
KELTROL® CG-F	200/75µ	Translucent	Extra-fine mesh when rapid hydration is required
KELTROL® CG-T	80/180µ	Transparent	For applications that require transparency
KELTROL® CG-RD	14/1.18mm	Transparent	Agglomerated. Disperses easily and hydrates effectively under nearly all mixing conditions
KELTROL® CG-SFT	80/180µ	Transparent	Formulation aesthetics that exhibit smooth texture and reduced stringiness

Putting it all together... Application Opportunities

The family of KELTROL® CG products can apply to multiple consumer products in the cosmetics and personal care area. Below are some performance guidelines as well as some recommended use levels to help get started formulating products... that Mother Nature intended.



Shaving Creams

KELTROL CG is compatible with typical shave cream ingredients. Provides excellent foam stability and added slip/lubricity.

Recommended Use: Very low use levels – 0.05%-0.3% – are sufficient to impart needed functionality.

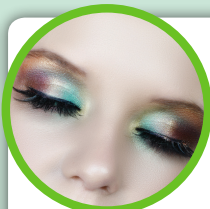


Foundation Make-Up

KELTROL CG stabilizes the oil phase, suspends pigments and is both non-toxic and non-irritating.

Upon application, viscosity is reduced, resulting in make-up that spreads easily and uniformly.

Recommended Use: A highly-pigmented product, foundation make-up requires a high level of suspending agent. In combination with magnesium aluminum silicate, 0.5% KELTROL CG helps reduce 'slip', and enables the proper application.



Eye Make-Up

For many eye shadows and eye preparations containing an oil phase, KELTROL CG provides efficient emulsion stabilization.

KELTROL CG also acts as a suspending agent for the insoluble pigments, while its low viscosity during application will make the cosmetic easy to apply.

Recommended Use: Levels of KELTROL CG for eye cosmetics in cream and lotion form range from 0.2-0% to 0.6%, depending on the amount of water and rheology desired. Use level for eye shadows with insoluble pigments is between 0.5%-0.8%.



Creams & Lotions

Primarily oil-in-water emulsions, these products need to be creamy with no trace of oiliness or wetness. The high viscosity of KELTROL CG at low shear rates effectively stabilizes these emulsions and imparts a 'light and silky' skin feel when applied. KELTROL CG also keeps emulsions stable during temperature fluctuations, ensuring consistent quality in transit, as well as on the shelf.

Recommended Use: Levels for creams are 0.4%-0.6% and for lotions, 0.2%-0.5%, depending on the amount of water and the rheology desired.



Suntan Lotions & Sunscreens

KELTROL CG stabilizes the oil phase and delivers the active ingredients uniformly, even when

interacting with sea water: When exposed to extreme variations in temperature, KELTROL CG keeps the product stable.

KELTROL CG also acts as a suspending agent in physical sunblock while its low viscosity during application will make the material easy to apply.

Recommended Use: Levels for suntan lotions and sunscreens are 0.2%-0.6%, depending on the amount of water and the rheology desired.



Face Masques & Packs

KELTROL CG, with its high at-rest viscosity, effectively suspends the insoluble materials in face masques and packs.

Recommended Use: Highly pigmented face masques require KELTROL CG at levels between 0.5%-1.0%. 'Semi-liquid' face masques and packs require 0.3%-0.5% to modify the rheological characteristics.



Hand Foams, Body washes, Hand Soaps, Shampoos

(Surfactant Systems)

In systems with high surfactant loading, unique compatibility and flow properties are required. KELTROL CG-SFT is specially designed to have excellent surfactant compatibility and makes a less grainy, less stringy formulation.

Recommended Use: Due to the need for suspension, a higher-than-typical use level of 1.0%-1.4% is required.

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