What if...

KELTROL®
ADVANCED PERFORMANCE XANTHAN GUM

IMPROVED HYDRATION

Less Energy
shorter mix times
Solubility
Acidic pH
High salt media
Low water systems
Improved Hydration
Less energy
shorter mix times
Solubility
acidic pH
High salt media
Low water systems

Redefining Xanthan gum
LSRV
Hydration rate
More relevant specifications
faster throughput
reduction in use-level
More efficient
less warehouse space
lower freight costs
Improved suspension
High LSRV
pH extremes
Stability
salt levels
Temperature
Lower use levels

YOUCAN
Today’s economic climate demands supplier ingenuity to help manufacturers stay competitive and profitable. This performance goes well beyond ingredient cost. Performance-based ingredient companies must deliver manufacturing efficiencies, superior end-product performance and consistent quality – all factors that support cost savings. CP Kelco has responded with the introduction of KELTROL® Advanced Performance xanthan gum: A product that provides more of what the industry expects from xanthan gum.

CP Kelco’s KELTROL® brand of xanthan gum is globally recognized for its efficient and effective rheology modification and suspension in processed food and beverages. KELTROL is the standard by which all other xanthan gum is measured. By continuously improving process designs, infrastructure and fermentation expertise, CP Kelco has earned the reputation as the leader in innovation by creating new fermentation products designed to address specific market needs.

Creating – and Meeting – Higher Expectations

By combining a novel fermentation design with a patent pending production process, CP Kelco has improved xanthan gum performance to provide a new series of products designed to meet our customers’ needs in terms of efficiency, productivity and stability.

KELTROL Advanced Performance exceeds current industry expectations in three specific areas:

**Enhanced Hydration Rate**
- 2-3x faster than typical xanthan gum in tap water and in 1% salt solutions
- Up to 10x faster in higher levels of salt

**Tremendous Hydration Tolerance and Completeness**
- Hydrates in high salt levels
- Excellent hydration in high solids systems
- Even hydrates in the presence of acid!

**Superior Viscosity**
- Higher viscosity at low shear rates for enhanced suspension and emulsion stabilization.

*typical is defined as standard 80 mesh xanthan gum

**Enhanced Hydration**

Hydrocolloids must be hydrated to be functional. Hydrocolloids hydrate best in de-ionized or softened water in which the levels of salts and acids are negligible. In addition, high levels of soluble solids are avoided when possible, as limited available water inhibits hydration. Typical xanthan gum is no exception.

Unlike typical xanthan gum, KELTROL Advanced Performance exhibits excellent hydration properties even in the presence of salt, acid, and soluble solids. Graph 1 demonstrates the hydration rate of multiple lots of KELTROL Advanced Performance vs. typical xanthan gum from various suppliers in a 3% NaCl solution. Results clearly show that KELTROL Advanced Performance hydrates 3-10 times faster than typical xanthan gum under these conditions. In addition, KELTROL Advanced Performance shows improved hydration in media such as 3% citric acid and 40% sugar/4% salt.

The superior hydration characteristics of KELTROL Advanced Performance open up the possibilities of increasing production throughputs, streamlining processes, and correcting batching errors/ facilitating re-working of materials.

**Superior Viscosity For Enhanced Functionality**

The viscosity of xanthan gum is typically measured using a 1% solution of xanthan gum in 1% KCl, measured using a Brookfield LVF viscometer at 60 rpm at 25°C. This method provides a consistent, easy measurement for the quality control of xanthan gum. However, this measurement does not provide a real indication of the actual performance in the final application due to an unrealistic use level and shear rate.

CP Kelco qualifies KELTROL Advanced Performance with a more relevant viscosity test, Low Shear Rate Viscosity (LSRV). The LSRV test utilizes a 0.25% solution of xanthan gum and a 3 rpm shear rate. This new text method provides a better indicator of stability performance at low use levels and low shear rates – the point where stability is needed most.
KELTROL Advanced Performance was specifically designed to provide higher viscosities at low shear rates versus typical xanthan gum in the market today. Why is this important? It is the viscosity at low shear rates that provides suspension of particulates and enhanced emulsion stability of products. The higher low shear rate viscosity of KELTROL Advanced Performance means it provides superior stabilization.

The benefits a producer can expect from superior low shear rate viscosity:

- Improved stability over time.
- Enhanced cling.
- Opportunity to refine gum use level for the same performance.

Due to KELTROL Advanced Performance high pseudoplasticity (high viscosity at low shear rates and low viscosity at high shear rates), manufacturers will see benefits from ease of pumping. Higher LSRV = Better Suspension. Due to its very high LSRV (+/-1900), KELTROL Advanced Performance has outstanding suspension properties. After 3 days, the 2-stage-deposit separating vinaigrette made with KELTROL Advanced Performance shows superior suspension of hard-to-suspend poppy seeds.

After 80 days (CP Kelco internal extended shelf-life studies), the separating vinaigrette made with KELTROL Advanced Performance still shows superior suspension of hard-to-suspend poppy seeds.

Higher LSRV = Emulsion Tightness. Due to the high LSRV of KELTROL Advanced Performance, emulsion stability and ‘tightness’ are improved, resulting in extended shelf-life. In both full-fat and reduced-fat oil/water emulsions – even at 20% lower inclusion levels – KELTROL Advanced Performance provides a finer and more uniform emulsion formation, resulting in better stability.

Increased Ion Tolerance = Increased Consistency. Graph 2 shows viscosity vs. gum concentration at the very low shear rate of 0.1s⁻¹. KELTROL Advanced Performance was compared to typical 80 mesh xanthan gum in 0.01M and 0.5M sodium solutions. These salt concentrations are equivalent to 0.06% NaCl and 3% NaCl, respectively. At typical xanthan use levels of 0.05 - 0.2%, KELTROL Advanced Performance gave very similar viscosities in both sodium solutions, highlighting its tolerance to ions. As expected, typical 80 mesh xanthan gum resulted in lower viscosities. Therefore, to achieve a target viscosity, e.g. 100mPa’s, significantly higher use levels are required for typical xanthan gum (75% and 160% respectively) compared to KELTROL Advanced Performance.

Specifications Designed for Performance

In an effort to ensure performance of an ingredient, a developer often increases the use level to compensate for variability – this costs money. Due to its new patent pending process and design, KELTROL Advanced Performance provides the opportunity to reduce the overall xanthan gum use level and purchase quantities by up to 15%, depending upon the application and end use range. But this doesn’t guarantee consistency does it? In order to help ensure consistent performance and reliability, CP Kelco has designed two new product specifications for KELTROL Advanced Performance to guide the user on appropriate inclusion levels for predictable performance.

<table>
<thead>
<tr>
<th>0.25% Viscosity STW</th>
<th>1700-2200 mPa*s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydration</td>
<td>&lt; 4 minutes to 90%</td>
</tr>
</tbody>
</table>
KELTROL® Advanced Performance
(4-Square Value Determination Plan)

SQUARE 1: Ingredient Costs

- Reduction in use level compared with typical xanthan gums
- Significantly lower use levels vs. typical xanthan gums = reductions in transportation costs, packaging, energy, freight, internal handling and warehouse demands.

SQUARE 2: Preparation

- Hydration times reduced by up to 50% compared with typical xanthan gums
- Can hydrate under acidic conditions; e.g., 3% citric acid, high salt conditions; e.g., 3% NaCl, and high solids, e.g., 40% sucrose
- Order of addition flexibility - salts and acids do not need be added after the xanthan gum

SQUARE 3: Productivity

- Enables more batches per shift
- Significantly reduces processing times due to faster hydration rates
- Minimizes or eliminates batch-to-batch clean up since order of addition is not as critical
- Potential to simplify batch processing
- Facilitates re-working of materials

SQUARE 4: Quality

- More consistent final product
- Easy pumping and spraying
- Improved suspension
- Increased product stability under extremes in pH, salt levels and temperatures
- Excellent enzyme compatibility
- Extended shelf-life of finished product

Ready for Combination
Combined Intermediate Batch
Processing and Filling
Finished Product Sale

VALUE DELIVERY

ARGENTINA
CP Kelco Argentina S.A.
Bolivar 187 - 6th A
C1066AAC Buenos Aires
Argentina
Tel: +54 11 4331-8483
Fax: +54 11 4331-8483

AUSTRIA
CP Kelco Austria
41 Devon Street
Cheltenham VIC 3192
Australia
Tel: +61 3 9427 7700
Fax: +61 3 9584 9448

BELGIUM
CP Kelco Belgium b.v.b.a.
Industrieweg 150
BE-3338 Beringen
Belgium
Tel: +32 11 45 86 56
Fax: +32 11 42 03 61

BRAZIL
CP Kelco Brasil
Rua Teixeira Marques, 845
Caixa Postal 21
Chácara São José, Limeira
São Paulo, Brazil
CEP: 13045-127
Tel: +55 19 3404 4600
Fax: +55 19 3451 1948

CHINA
CP Kelco Shanghai Rep. Office
J.M. Huber Investment (China) Ltd
7F, Xingyi Tech. Plaza
No.418 Guiping Road
Cao Hsii Jing Hi-Tech Park
Xuhui District,
Shanghai 200233
Tel: +86 21 5175 8488
Fax:+86 21 5175 8499

DENMARK
CP Kelco ApS
Ved Banes 16
DK-4033 Lille Skensved
Denmark
Tel: +45 56 16 56 16
Fax: +45 56 16 94 46

FINLAND
CP Kelco Oy
Kuhamontie 2
PL 500
FI-44101 Aninkaisto
Finland
Tel: +358 (0) 3 518-3000
Fax: +358 (0) 3 518-3003

FRANCE
CP Kelco France
123 Rue Jules Guesde
FR-92300 Levallois-Perret
France
Tel: +33 (0) 1 49 03 78 00
Fax: +33 (0) 1 49 03 78 29

GERMANY
CP Kelco Germany GmbH
Pomosin-Werk 5
DE-23775 Großenbrode
Germany
Tel: +49 4367 715 0
Fax: +49 4367 715 111

JAPAN
CP Kelco Japan ApS
Izumi Kameyachio Bldg, 8-1, Higashi-Azabu 1-chome
Minato-ku, Tokyo 106-0044
Japan
Tel: +81 3 3560 7313
Fax: +81 3 3560 7316

KOREA
CP Kelco Korea
Room 525, Office tel.
The 3rd complex, King’s Garden,
Nae-Su Dong, Jong Ro Gu,
Noryangjin-dong, Gangnam-gu,
Seoul, Korea .
110-070
Tel: +82 2 545 6022

MEXICO
CP Kelco México
Torre Zentrum
Av. Santa Fe #495 piso 4
Col. Cruz Manca
Del. Cuajimalpa
Mexico 05349, D.F.
Tel: +52 (55) 33007840
Fax: +52 (55) 33005510

THE NETHERLANDS
CP Kelco B.V.
Postbus 31
6500 AA Nijmegen
The Netherlands
Tel: +31 24 371 9900
Fax: +31 24 371 9999

INDIA
CP Kelco Services ApS
India Rep. Office
401-4019 Olbers Garden
Estates
Chandivali Farms Road / Off Saki Vihar Road
Andheri (E), Mumbai – 400 072
India
Tel: +91 22 2847 4607
Fax: +91 22 2847 6066

POLAND
MALT OFFICE PARK
ul.Abpa A. Baranicka
88 building D
PL-61-131 Poznan, Poland
Tel: +48 61 625 85 55
Fax: +48 61 625 85 57

ROSA
CP Kelco ApS
(Moscow Representative Office)
32/2, building 4
Kadashevkaya emb. Business Center
“Kadashevkaya Slobozi”
RLI-11530 Moscow
Russia
Tel: +7 495 937 36 47/48
Fax: +7 495 937 36 27

SINGAPORE
CP Kelco Singapore Pte., Ltd.
151 Lorong Chuan #06-07 New Tech Park
Singapore 556741
Tel: +65 6491 9100
Fax: +65 6491 9110

UNITED KINGDOM
CP Kelco UK Limited
Cleeve Court, Cleeve Road
Shepherdswell
Rye, East Sussex,  TN37 1PD
United Kingdom
Tel: +44 (0) 1722 369 400
Fax: +44 (0) 1722 369 401

UNITED STATES
GLOBAL HEADQUARTERS
CP Kelco U.S. Inc.
1000 Parkwood Circle
Suite 1000
Atlanta, GA 30339
USA
Tel: (678) 247-3700
Fax: (678) 535-2687

E-mail: solutions@cpkelco.com

© 2010 CP Kelco U.S., Inc. (G) Edited 04/11

www.cpkelco.com