DANOX®
HC-30
NEW CONDITIONING AGENT
FOR HAIR CARE

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Marketing & Sales Manager SCA
Barcelona, April 15th 2015

SURFACTANTS FOR CONSUMERS APPLICATIONS

in-cosmetics®
THE LEADING GLOBAL BUSINESS EVENT FOR PERSONAL CARE INGREDIENTS
Gran Via, Barcelona, 14-16 April 2015

VISIT US AT BOOTH 7G20

KAO
CONTENTS

1. Cationic surfactants in hair conditioning

2. DANOX® HC-30
   • Product definition
   • Properties
     • Formulation
     • Performance
     • Example formulations

3. Summary
Which are the benefits of using a hair conditioner?

**INTRODUCTION**

**IMPROVE THE APPEARANCE OF HAIR**

- Reduce combing force
- Increase shine and gloss
- Fly away control

**REDUCE THE EFFECTS OF EXTERNAL FACTORS**

- Environmental
- Chemical
- Mechanical
1. CATIONIC SURFACTANTS FOR HAIR CONDITIONING
CATIONIC SURFACTANTS IN HAIR CONDITIONING

HAIR CONDITIONERS COMPOSITION
- Cationic surfactant
- Fatty alcohol
- Additives

CATIONIC SURFACANT
- Conditioning agent
- Fly away control
- Emulsifier

FATTY ALCOHOL
- Re-fattening agent
- Conditioning properties
- Viscosity builder
Use of cationics

**USE OF CATIONICS (2010-2014)**

<table>
<thead>
<tr>
<th>ALKYLQUATS</th>
<th>AMIDOAMINES</th>
<th>ESTERQUATS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH₃</td>
<td>O</td>
<td>RCOO(CH₂)₂</td>
</tr>
<tr>
<td>CH₃</td>
<td>N</td>
<td>CH₂CH₂OH</td>
</tr>
<tr>
<td>N⁺</td>
<td>R</td>
<td>CH₃</td>
</tr>
<tr>
<td>Cl⁻</td>
<td>R</td>
<td>CH₃SO₄⁻</td>
</tr>
<tr>
<td>Cetyl (R=C16) - CTAC</td>
<td>Stearyl (R=C18) - SAPDMA</td>
<td>RCOO(CH₂)₂</td>
</tr>
<tr>
<td>Behenyl (R=C22) - BTAC</td>
<td>Behenyl (R=C22) - BAPDMA</td>
<td>CH₂CH₂OH</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EQ</td>
</tr>
</tbody>
</table>
Classification of cationic surfactants

- Cost
- Performance
- Ecotoxicology

**ALKYLQUATS**

- Cetyl (R=C16) - CTAC
- Behenyl (R=C22) - BTAC

**AMIDOAMINES**

- Stearyl (R=C18) - SAPDMA
- Behenyl (R=C22) - BAPDMA

**ESTERQUATS**

- RCOO(CH₂)₂ CH₃CH₂OH
- RCOO(CH₂)₂ CH₃SO₄⁻
- EQ

---

**Bubble Size: Cost per Active Matter**

- CTAC
- SAPDMA
- BAPDMA
- EQ

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KAO CHEMICALS EUROPE | DANOX® HC-30
2. DANOX® HC-30

- Product definition
- Properties
  - Formulation
  - Performance
- Example formulations
DANOX® HC-30: PRODUCT DEFINITION

**ESTERQUAT**
- Good combing forces

**AMIDOAMINE**
- High fly-away control
- Good sensory properties

**SYNERGY by COMBINING CATIONIC ACTIVES**
- Good combing forces
- High fly-away control
- Good sensory properties

PERFORMANCE BENEFITS
INDIVIDUAL CATIONICS

COMBINATION
Synergy by combining cationic actives

**COMBING FORCE**
(damaged hair, force grams)

<table>
<thead>
<tr>
<th></th>
<th>EQ</th>
<th>Amidoamine</th>
<th>Combination</th>
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</thead>
<tbody>
<tr>
<td>wet</td>
<td>206</td>
<td>260</td>
<td>217</td>
</tr>
<tr>
<td>dry</td>
<td>39</td>
<td>42</td>
<td>37</td>
</tr>
</tbody>
</table>

**FLY-AWAY CONTROL**
(natural hair, Volts)

<table>
<thead>
<tr>
<th></th>
<th>EQ</th>
<th>Amidoamine</th>
<th>Combination</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>12,925</td>
<td>36</td>
<td>589</td>
</tr>
</tbody>
</table>
DANOX® HC-30: PRODUCT DEFINITION

INCI NAME

• Behenamidopropyl Dimethylamine (and)
• Dipalmitoylethyl Hydroxyethylmonium Methosulfate (and)
• Cetyl Alcohol (and)
• Stearyl Alcohol (and)
• Lactic Acid

Appearance (25°) White pellets
Cationic surfactant 30 - 34%
Dropping point 58 - 62°C

Product composition

33% CATIONIC
67% FATTY ALCOHOL
DANOX® HC-30: PRODUCT DEFINITION

**PROPERTIES**

- Eco-friendly ingredients
- No solvents
- Non-flammable
- Solid
- Two-in-one product

**BENEFITS**

- Low environmental impact
- Improved transport cost
- No storage restrictions
- Ready to use
- Improved logistics / time saving
# DANOX® HC-30: PRODUCT DEFINITION

## Appearance & labeling

<table>
<thead>
<tr>
<th></th>
<th>DANOX® HC-30</th>
<th>Cetrimonium Chloride</th>
<th>Behentrimonium Chloride</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Appearance</strong></td>
<td>33% Blend of cationics</td>
<td>30% Cationic</td>
<td></td>
</tr>
<tr>
<td></td>
<td>67% Fatty alcohol</td>
<td>70% Water</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30% Cationic</td>
<td>85% Cationic</td>
<td></td>
</tr>
<tr>
<td></td>
<td>70% Water</td>
<td>15% Isopropanol</td>
<td></td>
</tr>
<tr>
<td><strong>Labeling</strong></td>
<td>![Safety symbol]</td>
<td>![Safety symbol]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>H315 Causes skin irritation.</td>
<td>H312 Harmful in contact with skin.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>H318 Causes serious eye damage.</td>
<td>H314 Causes severe skin burns and eye damage.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>H373 May cause damage to organs through prolonged or repeated exposure if swallowed.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>H400 Very toxic to aquatic life.</td>
<td>H410 Very toxic to aquatic life with long lasting effects.</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Calculation method (not tested on animals)</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>![Safety symbol]</td>
<td>![Safety symbol]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>H228 Flammable solid.</td>
<td>H315 Causes skin irritation.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>H312 Harmful in contact with skin.</td>
<td>H318 Causes serious eye damage.</td>
<td></td>
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<td>H400 Very toxic to aquatic life.</td>
<td>H373 May cause damage to organs through prolonged or repeated exposure if swallowed.</td>
<td></td>
</tr>
</tbody>
</table>

*Calculation method (not tested on animals)
Use level

**DANOX® HC-30**

<table>
<thead>
<tr>
<th>range (%)</th>
<th>APPLICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5 – 3.5</td>
<td>Serum</td>
</tr>
<tr>
<td>4.0 – 6.0</td>
<td>Standard Hair Conditioners</td>
</tr>
<tr>
<td>6.0 – 8.0</td>
<td>Repairing Hair Conditioners</td>
</tr>
<tr>
<td>10.0 – 12.0</td>
<td>Hair masks</td>
</tr>
</tbody>
</table>

Recommended dosage is between 2.5 and 12% of DANOX® HC-30:

- If less than 2.5% of DANOX® HC-30 is used, the addition of a viscosity builder is recommended.
- If more than 12% of DANOX® HC-30 is added, the addition of a hydrotrope is recommended.
How to work with

1. Heat water up to 75°C.
2. Add DANOX® HC-30 as it is. Stir until homogeneous (approx. 30 minutes) at high speed but avoiding air incorporation.
3. Cool down to room temperature with slower stirring speed.
4. Add preservative, fragrance and other additives and adjust pH if necessary. Recommended pH is between 3 and 4, to improve the formulation’s stability and the performance.
How to work with
**DANOX® HC-30: PROPERTIES / FORMULATION**

**Other formulation processes**

**STANDARD PROCESS**
- **75°C**
- **Water Phase**
  - Water
- **Fatty Phase**
  - **DANOX® HC-30**
  - Emulsification
  - Cool to RT
- **Additives**
  - pH adjustment

**ADDITION OF THE FATTY PHASE MELTED**
- **75°C**
- **Water Phase**
  - Water
- **Fatty Phase**
  - **DANOX® HC-30** + fatty additional ingredients
  - Emulsification
  - Cool to RT
- **Additives**
  - pH adjustment

**STARTING 50% WATER**
- **75°C**
- **Water Phase**
  - 50% Water
- **Fatty Phase**
  - **DANOX® HC-30**
  - Emulsification
  - 50% water
  - Cool to RT
- **Additives**
  - pH adjustment

**Recommended process**
- DANOX® HC-30 can be melted with other fatty alcohols or silicones

**Save energy and time**
- Reduce time of cooling step

KAO CHEMICALS EUROPE | DANOX® HC-30
Detangling on natural caucasian hair

- Similar to Behentrimonium Chloride
- Better than Cetrimonium Chloride

* Formulations contain: 1.5% active cationic and 3% fatty alcohol
Combing force on caucasian natural hair

- Similar to Behentrimonium Chloride
- Better than Cetrimonium Chloride

* Formulations contain: 1.5% active cationic and 3% fatty alcohol
Fly-away control on caucasian natural hair (20ºC/ 30%HR)

• Better fly-away control than Behentrimonium Chloride and Cetrimonium Chloride

* Formulations contain: 1.5% active cationic and 3% fatty alcohol
Compatibility with silicones

Silicones can lead to instability of the formulation as well as reducing the viscosity of the formula, but DANOX® HC-30 easily emulsifies silicones, leading to a stable and viscous emulsion.

DANOX® HC-30 acts as an emulsifier and viscosity builder, reducing the need of extra ingredients in the formulation.

* Base: 1.5% active cationic and 3% fatty alcohol

Dimethicone 60000 cSt
## Hair conditioner formulations

### BASIC HAIR CONDITIONER

<table>
<thead>
<tr>
<th>INGREDIENT</th>
<th>% w/w</th>
</tr>
</thead>
<tbody>
<tr>
<td>DANOX® HC-30</td>
<td>4.5</td>
</tr>
<tr>
<td>Perfume(^{(1)})</td>
<td>0.5</td>
</tr>
<tr>
<td>Preservative(^{(2)})</td>
<td>0.5</td>
</tr>
<tr>
<td>Water</td>
<td>Up to 100%</td>
</tr>
</tbody>
</table>

(1) SMOOTH HAIR SS148692 supplied by KAO-Fragrances.
(2) Glydant Plus (INCI Name: DMDM Hydantoin (and) Iodopropynyl Butylcarbamate) supplied by Lonza.

### SMOOTHING HAIR CONDITIONER

<table>
<thead>
<tr>
<th>INGREDIENT</th>
<th>% w/w</th>
</tr>
</thead>
<tbody>
<tr>
<td>DANOX® HC-30</td>
<td>4.0</td>
</tr>
<tr>
<td>Dimethicone ( (60000\text{cSt})^{(1)} )</td>
<td>1.0</td>
</tr>
<tr>
<td>Cetyl Hydroxyethylcellulose</td>
<td>0.015</td>
</tr>
<tr>
<td>Preservative(^{(2)})</td>
<td>0.5</td>
</tr>
<tr>
<td>Water</td>
<td>Up to 100%</td>
</tr>
</tbody>
</table>

(1) DC 200 Fluid (60000 cSt) supplied by Dow Corning.
(2) Mirocare SB (INCI: Water (and) Sodium Benzoate (and) Potassium Sorbate) supplied by Thor.
## Hair conditioner formulations

### Nourishing Hair Conditioner

<table>
<thead>
<tr>
<th>INGREDIENT</th>
<th>% w/w</th>
</tr>
</thead>
<tbody>
<tr>
<td>DANOX® HC-30</td>
<td>4.0</td>
</tr>
<tr>
<td>KALCOL® 8098 (Stearyl Alcohol)</td>
<td>0.9</td>
</tr>
<tr>
<td>KALCOL® 6098 (Cetyl Alcohol)</td>
<td>0.6</td>
</tr>
<tr>
<td>Dimethicone (60000cSt)(1)</td>
<td>1.0</td>
</tr>
<tr>
<td>Preservative(2)</td>
<td>0.5</td>
</tr>
<tr>
<td>Water</td>
<td>Up to 100%</td>
</tr>
</tbody>
</table>

(1) DC 200 Fluid (60000 cSt) supplied by Dow Corning.
(2) Mirocare SB (INCI: Water (and) Sodium Benzoate (and) Potassium Sorbate) supplied by Thor.

### Repairing Hair Conditioner

<table>
<thead>
<tr>
<th>INGREDIENT</th>
<th>% w/w</th>
</tr>
</thead>
<tbody>
<tr>
<td>DANOX® HC-30</td>
<td>4.7</td>
</tr>
<tr>
<td>KAO SOFCARE® GP-1 (PPG-3 Caprylyl Ether)</td>
<td>1.0</td>
</tr>
<tr>
<td>Amodimethicone(1)</td>
<td>2.0</td>
</tr>
<tr>
<td>Tocopheryl Acetate(2)</td>
<td>0.5</td>
</tr>
<tr>
<td>Preservative(3)</td>
<td>0.5</td>
</tr>
<tr>
<td>Perfume(4)</td>
<td>0.5</td>
</tr>
<tr>
<td>Water</td>
<td>Up to 100%</td>
</tr>
</tbody>
</table>

(1) DC 8500 (INCI Name: Bis (C13-15 Alkox) PG Amodimethicone), supplied by Dow Corning. (2) Dermofeel E74A supplied by Dr. Straetmans. (3) Geogard 221 (INCI Name: Dehydroacetic Acid, Benzyl Alcohol) supplied by Lonza. (4) YOUTH STYLE SH137817 supplied by KAO-Fragrances.
Hair conditioner formulations

### SHINE HAIR MASK

<table>
<thead>
<tr>
<th>INGREDIENT</th>
<th>% w/w</th>
</tr>
</thead>
<tbody>
<tr>
<td>DANOX® HC-30</td>
<td>10.0</td>
</tr>
<tr>
<td>KAO SOFCARE® GP-1 (PPG-3 Caprylyl Ether)</td>
<td>0.75</td>
</tr>
<tr>
<td>Amodimethicone&lt;sup&gt;(1)&lt;/sup&gt;</td>
<td>0.75</td>
</tr>
<tr>
<td>Preservative&lt;sup&gt;(2)&lt;/sup&gt;</td>
<td>0.5</td>
</tr>
<tr>
<td>Perfume&lt;sup&gt;(3)&lt;/sup&gt;</td>
<td>1</td>
</tr>
<tr>
<td>Water</td>
<td>Up to 100%</td>
</tr>
</tbody>
</table>

(1) Silsoft AX (INCI: Bis-Cetearyl Amodimethicone) supplied by Momentive. (2) Mirocare SB (INCI: Water (and) Sodium Benzoate (and) Potassium Sorbate) supplied by Thor. (Alcohol) supplied by Harcros. (3) SMOOTH HAIR SS148692 supplied by KAO-Fragrances.

### SILICONE-FREE HAIR MASK

<table>
<thead>
<tr>
<th>INGREDIENT</th>
<th>% w/w</th>
</tr>
</thead>
<tbody>
<tr>
<td>DANOX® HC-30</td>
<td>5.5</td>
</tr>
<tr>
<td>KAO SOFCARE® GP-1 (PPG-3 Caprylyl Ether)</td>
<td>0.5</td>
</tr>
<tr>
<td>Chelating Agent&lt;sup&gt;(1)&lt;/sup&gt;</td>
<td>0.1</td>
</tr>
<tr>
<td>Tocopheryl Acetate&lt;sup&gt;(2)&lt;/sup&gt;</td>
<td>0.1</td>
</tr>
<tr>
<td>Preservative&lt;sup&gt;(3)&lt;/sup&gt;</td>
<td>0.5</td>
</tr>
<tr>
<td>Perfume&lt;sup&gt;(4)&lt;/sup&gt;</td>
<td>0.5</td>
</tr>
<tr>
<td>Water</td>
<td>Up to 100%</td>
</tr>
</tbody>
</table>

(1) H-Quest L-50 (INCI Name: Sodium Glucoheptonate), supplied by Harcros. (2) Dermofeel E74A supplied by Dr. Straetmans. (3) Surcide CP (INCI Name: Dehydroacetic Acid, Benzyl Alcohol) supplied by Harcros. (4) KAO MOISTURE SR147672 supplied by KAO-Fragrances.
3. SUMMARY
DANOX® HC-30: SUMMARY

General benefits for the manufacturer

PRODUCT
• Solid product
• 100% active
• Non flammable
• Non labeled for the environment

DURING FORMULATION
• Easy to handle
• Two ingredients in one
• Easy to disperse
• Single step formulation process

INGREDIENTS
• Vegetable origin
• Non toxic for aquatic environment
• Biodegradable
DANOX® HC-30:
SUMMARY

General benefits for the consumer

• High conditioning
• Excellent fly-away control
• General holistic feeling

INGREDIENTS
• Vegetable origin
• Non toxic for aquatic environment
• Biodegradable
THANK YOU
VERY MUCH FOR YOUR ATTENTION!
IN MEMORIAM OF OUR WORKMATES
March, 24th
Flight Barcelona-Düsseldorf
Germanwings-GWI9525