Emulsifiers for Personal Care Applications
Clariant Emulsifiers for Personal Care

- Overview of Clariant Emulsifiers
- Emulsifier Basics:
  - Components of emulsions
  - HLB Basics
  - HLB of Clariant Products
  - O/W vs W/O
- Clariant Emulsifier Lines
- Emulsifier Selection Guide
**Overview: Clariant Emulsifiers for Personal Care**

<table>
<thead>
<tr>
<th>O/W Emulsifiers</th>
<th>HLB</th>
<th>O/W Emulsifiers/Solubilizers</th>
<th>HLB</th>
<th>W/O Emulsifiers/Thickeners</th>
<th>HLB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hostaphat KL 340 D</td>
<td>14</td>
<td>Genapol C-100</td>
<td>14</td>
<td><a href="#">Hostacerin DGI</a></td>
<td>3-4</td>
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<tr>
<td>Trilaureth-4 Phosphate</td>
<td></td>
<td>Coceth-3</td>
<td></td>
<td>Polyglyceryl-2 Sesquisostearate</td>
<td></td>
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<tr>
<td>Hostaphat KW 340D</td>
<td>10-11</td>
<td>Genapol HS 200</td>
<td>15</td>
<td><a href="#">Hostacerin EWO</a></td>
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<tr>
<td>Triceteareth-4 Phosphate</td>
<td></td>
<td>Steareth-20</td>
<td></td>
<td>Polyglyceryl-2 Sesquisostearate (and) Ethylhexylstearate (and)</td>
<td></td>
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<td></td>
<td></td>
<td>[Jojoba oil (and) Beeswax (and)</td>
<td></td>
<td>Magnesium Stearate (and) Aluminum Stearate (and) Carnauba wax</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Magnesium Stearate (and) Aluminum</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Stearate (and) Carnauba wax</td>
<td></td>
<td></td>
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<tr>
<td>Hostaphat CC 100</td>
<td>10</td>
<td>Genapol LA 230</td>
<td>17</td>
<td><a href="#">Hostacerin T-3</a></td>
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<tr>
<td>Cetyl Phosphate</td>
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<td>Laureth-23</td>
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<td>Ceteareth-3</td>
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<tr>
<td>Hostaphat CS 120</td>
<td>7</td>
<td>Genapol O 100</td>
<td>12</td>
<td>Genapol HS 020</td>
<td>5</td>
</tr>
<tr>
<td>Stearyl Phosphate</td>
<td></td>
<td>Oleth-10</td>
<td></td>
<td>Steareth-2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Genapol O 200</td>
<td>15</td>
<td>Genapol O 020</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oleth-20</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Solubilizers**

- Emulsogen HCO 040
- Emulsogen HCW 049

**Notes:**
- HLB: Hydrophile-Lipophile Balance
- Clariant Emulsifiers for Personal Care and other applications.
Emulsifiers

- An emulsion is a mixture of two immiscible substances
  - Oil and water
  - One substance (dispersed phase) is dispersed in the other (continuous phase)
- Emulsions are unstable and require energy input (shaking, stirring, homogenizers, or spray processes) to form
  - Over time, emulsions tend to revert to the stable state of oil separated from water
  - Emulsifiers can increase the kinetic stability of emulsions so that, once formed, the emulsion does not change significantly over years of storage
- Emulsifiers are surface active agents that stabilize emulsions
  - Lower the interfacial tension between the phases
Basic Components of an Emulsion

- The phase in which an emulsifier is more soluble constitutes the continuous phase (Bancroft rule)
  - Oil in Water emulsions – use emulsifying agents that are more soluble in water than in oil (High HLB surfactants).
  - Water in Oil emulsions – use emulsifying agents that are more soluble in oil than in water (Low HLB surfactants).
### Liquid Emulsion Types

#### Oil Dispersed in Water (O/W)
- Good spreadability on skin
- Inexpensive and easy to produce
- “cold/cold processing”
- Good physical stability
- Good stability below 0°C
- Cooling effect on the skin

#### Water Dispersed in Oil (W/O)
- Occlusive effect ("moisturizing")
- Water resistant
- Luster, shine, brilliance
- High degree of opacity
- Less prone to microbiological contamination
- Can feel heavy on skin, greasy
# Emulsifier Selection: HLB Concept

- An emulsifier molecule contains both hydrophilic and hydrophobic groups
  - HLB is the Hydrophilic-Lipophilic Balance (HLB)
  - The ratio of hydrophilic to hydrophobic affects emulsification
- Emulsifiers and Surfactants have an HLB value

- The HLB Concept is a semi-empirical procedure for selecting an appropriate emulsifier (or blend of emulsifiers) to prepare an emulsion

- For any particular type of emulsion, there is an optimum HLB for stability
  - Oils have a specific polarity (they have an HLB requirement)
  - The HLB value of the emulsifier should be matched with the HLB requirement of the oil

Fast efficacy screening tests using HLB Concept

- Dissolve the emulsifier in the oil phase
- Add water
- Shake this mixture (e.g. ten times)
- Observe and measure the time until separation occurs

- The emulsion that lasts longest is the most stable one!
  - No polymeric stabilizer: water thin viscosity yields fast separation (seconds)
- By using blends of high HLB and low HLB emulsifiers, the full range of HLB values can be covered.
Emulsifier Selection Guidelines

- Some basic guidelines for selecting the right emulsifiers for your particular system are as follows:

- Mixtures of emulsifiers tend to form more stable emulsions than a single emulsifier, especially if a blend of water-soluble (HLB > 10) and oil soluble (HLB < 10) is used.
  - The HLB value of materials blended together is a weighted average of their relative amounts, multiplied by their individual HLB values.
  - For example, a mixture of 50% emulsifier A (HLB 4) and 50% emulsifier B (HLB 12) has an HLB of 8.
    \[(0.5 \times 4) + (0.5 \times 12) \approx 8\]

- Test different types of emulsifiers, even with the same HLB, as their solubilizing and stabilizing power for the same system may vary considerably.
Summary: Using HLB to Select the Emulsifier(s)

- Use the HLB of emulsifiers and materials to be emulsified in selecting the right emulsifier to use
- Consider the type of emulsion
  - O/W emulsion: use high HLB emulsifier
  - W/O emulsion: use low HLB emulsifier
- Match the HLB of the emulsifier to the HLB requirement of the oil

HLB values can be found in literature sources\(^1\) or they can be determined experimentally. A simple empirical\(^2\) method for estimating the HLB for alcohol ethoxylates is to divide the weight percent content of ethylene oxide by 5, as shown in the equation below:

\[
\text{HLB (alcohol ethoxylates)} \approx \frac{\%\text{EO}}{5}
\]

Selected Clariant Emulsifier HLB Values

- Hostacerin DGI
- Hostacerin DGMS
- Hostacerin WO
- Hostacerin T-3
- Hostaphat CS 120
- Hostacerin DGSB
- Genapol O 050
- Hostaphat KW 340 D
- Hostaphat KL 340 D
- Hostacerin DGL
- Emulsogen HCO 040

<table>
<thead>
<tr>
<th>HLB Value</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-2</td>
<td>Anti-foam additives</td>
</tr>
<tr>
<td>3-6</td>
<td>W/O-emulsifiers</td>
</tr>
<tr>
<td>7-9</td>
<td>Wetting agents</td>
</tr>
<tr>
<td>8-18</td>
<td>O/W emulsifiers</td>
</tr>
<tr>
<td>13-15</td>
<td>Surfactants, detergents</td>
</tr>
<tr>
<td>15-18</td>
<td>Solubilizers</td>
</tr>
</tbody>
</table>
Clariant Emulsifiers for Personal Care

- Hostaphat® phosphoric acid esters
- Hostacerin® polyglyceryl esters
- Genapol® fatty alcohol ethoxylates
- Emulsogen® alkyl ether carboxylates and hydrogenated castor oil ethoxylates
Hostaphat®
Phosphoric Acid Esters
Hostaphat® Phosphoric Acid Esters

- Hostaphat emulsifiers all fall into the HLB range for O/W emulsifiers
- Excellent emulsifiers of mineral oils and vegetable oils, and function especially well in combination with low amounts of hydrophilic co-emulsifiers such as Hostapon CLG (Sodium Lauroyl Glutamate)
- Some Hostaphat emulsifiers are pre-neutralized, others can be neutralized in situ with your choice of neutralizing agent to create a tailor-made salt just right for your formulation.

**Hostaphat Emulsifiers can be used as:**
- Primary Emulsifier (typically at 1.5-2.5%)
- Co-Emulsifier/Stabilizer (typically at 0.2-0.5%)

Hostaphat emulsifiers can be used over a wide pH range (pH 2-9) and can yield a wide range of viscosities.
Properties of Emulsions made with Hostaphat® emulsifiers

- Hostaphats are effective at low levels and highly compatible with both non-polar and polar oils.
  - S. Gatti et al., Phosporic acid esters – Application as cosmetic emulsifiers at low levels, dragoco report, 26 (2/1979), 27-45.

- The esters show some analogy to natural phospholipid structures, which indicates mildness and compatibility with human skin.
  - K.F. de Polo et al., Cetylphosphates as cosmetic emulsifiers, DCI (9/1989), 26-84.

- Emulsions with phosphoric acid esters exhibit generally low particle sizes leading to stable emulsions, easy and uniform dispersion on the skin and good skin-feel.
**Key Benefits of Hostaphat Emulsifiers**

<table>
<thead>
<tr>
<th>Excellent Emulsion Stability</th>
<th>Stable over broad pH range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Easy to handle liquids or free-flowing powders or flakes</td>
<td>High interfacial activity with polar and non-polar oils</td>
</tr>
<tr>
<td>Compatible with anionics, cationics or nonionics</td>
<td>Low usage concentration</td>
</tr>
<tr>
<td>Preservative free</td>
<td>Colorless, odorless</td>
</tr>
<tr>
<td>Excellent skin feel</td>
<td>Plant derived</td>
</tr>
<tr>
<td>High chemical stability in emulsions</td>
<td></td>
</tr>
</tbody>
</table>

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**Hostaphat® Emulsifiers for Personal Care**

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FUN/ICC, Personal Care (Copyright Clariant. All rights reserved.)
## Hostaphat® Emulsifiers

<table>
<thead>
<tr>
<th>Type</th>
<th>HLB</th>
<th>Appearance</th>
<th>Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hostaphat KL 340 D</td>
<td>14</td>
<td>Approx. 90%, colorless clear liquid</td>
<td>Excellent for paraffin oil and ester oils, ideal for skin milk, lotion (low viscosity formulations); suitable for sunscreen lotions</td>
</tr>
<tr>
<td>Trilaureth-4 Phosphate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hostaphat KW 340 D</td>
<td>10-11</td>
<td>Approx. 90%, white wax</td>
<td>Excellent for paraffin oil and ester oils, ideal for creams (mid-high viscous formulations), hand creams</td>
</tr>
<tr>
<td>Triceteareth-4 Phosphate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hostaphat CS 120</td>
<td>7</td>
<td>EO-free Approx. 100% powder</td>
<td>Anionic emulsifier in acid form, suitable for creams and lotions, used in place of soap as emulsifier with better stability</td>
</tr>
<tr>
<td>Stearyl Phosphate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hostaphat CC 100</td>
<td>10</td>
<td>EO-free Approx. 100% powder</td>
<td>Anionic emulsifier in acid form, supports small droplets, good feel on skin</td>
</tr>
<tr>
<td>Cetyl Phosphate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hostaphat CK 100</td>
<td>10</td>
<td>EO-free Approx. 100% powder</td>
<td>Anionic emulsifier – potassium salt, outstanding for sunscreen oil phase</td>
</tr>
<tr>
<td>Potassium Cetyl Phosphate</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Hostacerin® Polyglyceryl Esters
**Hostacerin® Polyglyceryl Esters**

- Clariant’s Hostacerin line of Polyglyceryl esters add yet another option to bring versatility and stability to your emulsions
  - With HLBs ranging from ~3 to ~15, they comprise both W/O emulsifiers and O/W emulsifiers, as well as excellent solubilizers
- The various Hostacerin types can either be used alone, or can be combined with the Hostaphat grades, or with other nonionic or ionic emulsifiers to provide outstanding stability with a full range of oil types
- Complete emulsifier packages also available containing a combination of hard to handle ingredients in one easy to use blend (Hostacerin WO, Hostacerin EWO)

- NON IONIC and EO-FREE
**Hostacerin® Grades**

**Diagram:**
- **Lauric acid + 10 C₂H₄O**: Hostacerin DGL (m+n=10)
- **Stearic acid**: Hostacerin DGMS + 4 C₂H₄O
- **Isostearic acid**: Hostacerin DGSB (m+n=4)

**Equations:**
1. \( R-C-O-CH₂-CH₂-O-CH₂-CH₂-O-C-R \)
2. \( O(C₂H₄O)ₘH \)
3. \( O(C₂H₄O)ₙH \)

**Chemical Structures:**
- Lauric acid
- Stearic acid
- Isostearic acid

**Ingredients:**
- Glycerin
- Diglycerine
- Lauric acid
- Stearic acid
- Isostearic acid

**Hostacerin WO**
Hostacerin DGI, Mineral Oil, Microcrystalline Wax, Beeswax, Aluminum Stearate, Magnesium Stearate
## Hostacerin® Emulsifiers

<table>
<thead>
<tr>
<th>Type</th>
<th>HLB</th>
<th>Appearance</th>
<th>Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hostacerin DGSB</td>
<td>7-8</td>
<td>Approx. 100%, white, wax-like</td>
<td>O/W emulsifier for vegetable oil emulsions; Co-emulsifier and viscosity enhancer for make-up formulations and foundation creams (enhances viscosity); good spreading on skin;</td>
</tr>
<tr>
<td>Hostacerin DGL</td>
<td>15</td>
<td>Approx. 100%, Clear liquid</td>
<td>Well suited for O/W emulsions, esp. triglyceride oil types, with a high water content; good solubilizer for essential oils</td>
</tr>
<tr>
<td>Hostacerin DGI</td>
<td>3-4</td>
<td>Approx. 100%, clear, low visc. liquid</td>
<td>W/O emulsifier; excellent on mineral and ester oils; good spreading and skin feel; soft creams; can be combined with for O/W with hydrophilic emulsifiers</td>
</tr>
<tr>
<td>Hostacerin DGMS</td>
<td>5-6</td>
<td>Approx. 100%, white pellets</td>
<td>Emulsifier or co-emulsifier; excellent emulsification of vegetable oils; leaves a pleasant feel on the skin; synergistic effects with ionic emulsifiers</td>
</tr>
<tr>
<td>Hostacerin WO</td>
<td>4-5</td>
<td>Pale soft paste</td>
<td>Based on Hostacerin DGI, W/O emulsion base with all-around emulsifying action; easy to formulate</td>
</tr>
</tbody>
</table>
**Hostacerin® EWO**

- mineral oil free water-in-oil emulsifier base with all-round emulsifying action
- without EO-containing components
- very easy to formulate plus time reduced production process:
  - high melting stearates already preblended
- especially suitable for the production of rich formulation such as night creams
- Composition: INCI designation
  - Polyglyceryl-2 Sesquiisostearate
  - Ethylhexylstearate
  - Jojoba oil (Simmondsia Chinensis)
  - Beeswax (Cera Alba)
  - Magnesium Stearate
  - Aluminum Stearate
  - Carnauba wax (Copernicia Cerifera)
Hostacerin® DGI

- INCI designation: Polyglyceryl-2 Sesquioleostearate

Benefits and Applications:
- high emulsifying effect on mineral oil and ester oils
- emulsifier without ethylene oxide
- listed in the German BDIH list of ingredients for natural cosmetic
- pale yellow, liquid: emulsification without heating
- good spreading effect and pleasant skin feeling are achieved in water-in-oil emulsions
- high chemical stability
**Jojoba oil**

- **INCI designation:** *buxus chinensis* (jojoba) oil
- One of the most popular natural oils
- Provides smooth and non-greasy feeling on the skin
- Chemically very similar to human sebum
- Natural SPF (sun protection factor) of 3-4
- Gentle to damaged skin
- Non-comedogenic
Carnauba wax

- INCI designation: Copernicia Cerifera (carnauba) wax
- Known as the "queen of waxes" due to high melting point melting
- Derives the carnauba palm (Copernicia prunifera)
- Carnauba wax is a prominent ingredient in cosmetic formulas:
  - decorative cosmetics such as: lipsticks, eyeliners, mascara, eye shadows, foundations
  - skin care
  - sun care
Genapol®
Fatty Alcohol Ethoxylates
Genapol® Fatty Alcohol Ether Emulsifiers

- Versatile ethoxylates for personal care formulations
- Clariant offers a wide range of fatty alcohol ethoxylate emulsifiers and solubilizers having a wide variety of hydrophobes and a wide range of hydrophilicities

General Benefits

- Tailor-made emulsifiers: choose the exact HLB desired
- Excellent chemical stability
- pH-stability
- Good stability in the presence of electrolytes and actives (e.g. AHA’s, antiperspirants salts, UV-absorbers)
<table>
<thead>
<tr>
<th>Emulsifier</th>
<th>INCI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genapol® C 100</td>
<td>Coceth-10</td>
</tr>
<tr>
<td>Genapol® LA 230</td>
<td>Laureth-23</td>
</tr>
<tr>
<td>Genapol® HS 020</td>
<td>Steareth-2</td>
</tr>
<tr>
<td>Genapol® HS 200</td>
<td>Steareth-20</td>
</tr>
<tr>
<td>Genapol® O 020</td>
<td>Oleth-2</td>
</tr>
<tr>
<td>Genapol® O 100</td>
<td>Oleth-10</td>
</tr>
<tr>
<td>Genapol® O 200</td>
<td>Oleth-20</td>
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</table>
**Genapol® O Series: Oleth-X**

<table>
<thead>
<tr>
<th>Genapol O 020</th>
<th>Oleth-2</th>
<th>liquid</th>
<th>HLB 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genapol O 100</td>
<td>Oleth-10</td>
<td>soft wax (25°C)</td>
<td>HLB 12</td>
</tr>
<tr>
<td>Genapol O 200</td>
<td>Oleth-20</td>
<td>wax (30°C)</td>
<td>HLB 15</td>
</tr>
</tbody>
</table>

- Nonionic emulsifier and thickener (emulsions, hair treatment rinses, styling products, gels)
- Emulsogen LP: special clear product (narrow range ethoxylate), clear soluble in oil, unlike standard Oleth-5
**Genapol® LA Series Laureth-X**
*Linear C12-16 Alcohol + Ethylene Oxide*

<table>
<thead>
<tr>
<th>Product</th>
<th>Component</th>
<th>Form</th>
<th>HLB</th>
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</thead>
<tbody>
<tr>
<td>Genapol LA 030</td>
<td>Laureth-3</td>
<td>liquid</td>
<td>8</td>
</tr>
<tr>
<td>Genapol LA 040</td>
<td>Laureth-4</td>
<td>liquid</td>
<td>9</td>
</tr>
<tr>
<td>Genapol LA 070</td>
<td>Laureth-7</td>
<td>liquid</td>
<td>12</td>
</tr>
</tbody>
</table>

- Thickener for surfactant systems, solubilizer

**Viscosity Chart**

- Genapol LA 230
  - Laureth-23, liquid, HLB 17
  - Solubilizing agent, dispersion stabilizer, binder, coating excipient (pigment dispersions, hair color creams, hair gels)

**Ethersulfate/betaine**

- 7:3, 15% AI; pH 5.5
Genapol® HS Series: Steareth-X Stearyl Alcohol + Ethylene Oxide

- Genapol HS 020 Steareth-2 wax (40°C) HLB 5
- Genapol HS 200 Steareth-20 wax HLB 15

Nonionic emulsifier and thickener; solubilizer for essential oils and actives; PIT emulsions, hair color emulsions, hair treatment rinses
Emulsogen® Emulsifiers and Solubilizers
Emuslogen® Emulsifiers and Solubilizers

- Hydrogenated castor oil ethoxylates (HLB ~ 14 – 16)
  - Emulsogen HCO 040    PEG-40 Hydrogenated Castor Oil
  - Emulsogen HCW 049    PEG-40 Hydrogenated Castor Oil
    - Liquid blend of HCO 040 and water
# Emulsogen Product Line

<table>
<thead>
<tr>
<th>Type</th>
<th>Chemical name</th>
<th>% Active</th>
<th>Appearance (20°C)</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCO 040</td>
<td>PEG-40 hydrogenated castor oil ( R-(O-CH_2CH_2)_{40}OH )</td>
<td>100</td>
<td>Waxy</td>
<td>Solubilizer for perfumes, essential oils, O/W emuls., shampoos and bath</td>
</tr>
<tr>
<td>HCW 049</td>
<td>PEG-40 hydrogenated castor oil</td>
<td>90</td>
<td>Liquid</td>
<td>Same as HCO 040 but liquid form</td>
</tr>
</tbody>
</table>
Select Guide Formulations Using Clariant Emulsifiers

Skin Care and Cleansing
Sun Protection/After-Sun
Hair Care

Clariant offers a selection of guide recipes demonstrating some of the possible formulations containing Clariant Emulsifiers
Clariant emulsifier selection guide: WO Emulsions

WO emulsions

- Lotions
  - Vegetable based + environmentally friendly claims: Hostacerin® DGI
    - listed in the German BDIH list of ecological ingredients
    - liquid, easy to handle
    - low concentrations sufficient
    - stable emulsions with all types of oils
  - Mineral oil-free formulations: Hostacerin® DGI
    - liquid, easy to handle
    - pleasant skin feeling
    - suitable for polar vegetable oils
Clariant emulsifier selection guide: WO Emulsions

- **Creams**
  - Traditional WO creams: Hostacerin® WO
    - optimized all-round emulsifier for stable WO creams
    - based on Hostacerin DGI mixed with WO stabilizers
    - universal emulsifying spectrum
    - high temperature stability of WO creams
  - Vegetable based + environmentally friendly claims: Hostacerin® DGI
    - listed in the German BDIH list of ecological ingredients
    - liquid, easy to handle
    - low concentrations sufficient
    - stable emulsions with all types of oils including polar vegetable oils
Clariant emulsifier selection guide: OW Emulsions

- **Lotions**
  - Economical formulations: Hostaphat® KL 340 D
    - liquid, cold-cold process possible
    - low concentrations sufficient
    - stable emulsions with all types of oils, high stability in sunscreen systems
    - good spreadability on skin
  - Vegetable based + environmental friendly claims: Hostacerin® DGI + Hostapon® KCG
    - listed in the German BDIH list of ecological ingredients
    - mineral oil-free formulations possible
    - low concentrations sufficient
    - stable emulsions with all types of oils including polar vegetable oils
  - Alternative for lotions based on soap: Hostaphat® CS 120
    - lower concentrations sufficient
    - skin compatible pH of 5.5 instead of alkaline pH possible
    - no soaping (whitening) effect, no need for silicone oil to prevent this effect
    - no co-emulsifier needed
Clariant emulsifier selection guide: OW Emulsions

- Emulsifier-free cream-gels
  - Emulsifier-free: Aristoflex® AVC
    - cream gels are stabilized by high yield formed by Aristoflex AVC
    - very stable appearance, surprising break on skin while used
    - refreshing water release, very pleasant powdery feeling

- With polymeric emulsifier: Arisotflex® PEA / Aristoflex® PEA 70
  - texture between cream gel and classic cream
  - for light refreshing emulsions (after sun, after shave)
  - Aristoflex PEA 70 liquid, easy to handle
Clariant emulsifier selection guide: OW Emulsions

- **Creams**
  - Traditional OW creams: Hostaphat® KW 340 D
    - low concentrations required
    - emulsions with high storage stability
    - combination with Hostacerin® DGSB leads to powerful blend for vegetable oils
  
  - Vegetable based + environmental friendly claims: Hostacerin® + Hostapon® KCG
    - listed in the German BDIH list of ecological ingredients
    - mineral oil-free formulations possible
    - low concentrations sufficient
    - stable emulsions with all types of oils including polar vegetable oils
  
  - Cost effective sun screens: Hostaphat® CC 100
    - low price Cetyl Phosphate
    - neutralisation easily done during emulsion formation