SilCare® Silicones

Clariant Organomodified Silicones for Personal Care
## Organomodified Silicones for personal care

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Silcare® Silicone 15M50

INCI: Phenyl Trimethicone

Counterproducts:
  ABIL AV 20 – 1000
  Dow Corning 556 (= 15M50) / 558,
  Wacker Belsil PDM 20 - 1000 but Copolymer with
  Dimethicone
Silicone Fluids
SilCare® Silicone 15M50

- Manufactured by patented process that yields higher purity and no latent methanol
- High refractive index

Applications and benefits
- Broad compatibility with Organic Waxes and oils
- Adds gloss and sheen to hair care products
- Reduces white residue in antiperspirant actives
- In Skin Care, acts as a water barrier, leaving the skin soft and smooth
- In Cosmetics, adds emolliency and reduces tackiness
- In sun tan lotions better spreading / efficacy of UV absorbers
Silicone Fluids
SilCare® Silicone 31M50

SilCare® Silicone 31M50

INCI: Caprylyl Trimethicone

- Clariant is single supplier for this product family
- Manufactured by patented process that yields high purity and no latent methanol

Applications and benefits

- Broad compatibility with Organic Waxes and oils
- Identical Sensory characteristics to Phenyl analogues as neat oil; different sensorics in emulsion
- Adds gloss and sheen to hair care products
- In Skin Care, acts as a water barrier, leaving the skin soft and smooth
- In Cosmetics, adds emolliency and reduces tackiness
## Silicone Fluids
### Comparative Study in Emulsions

<table>
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<th>Silicone fluid</th>
<th>INCI</th>
<th>Emulsion stability</th>
<th>Skin feeling</th>
</tr>
</thead>
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<tr>
<td><strong>SilCare® Silicone</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15M50</td>
<td>Phenyl Trimethicone</td>
<td>++</td>
<td>0 oily</td>
</tr>
<tr>
<td><strong>SilCare® Silicone</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31M50</td>
<td>Caprylyl Trimethicone</td>
<td>++</td>
<td>++ dry emolliency</td>
</tr>
<tr>
<td>Dimethicone 50 cSt</td>
<td>Dimethicone</td>
<td>- (Phase separation)</td>
<td>+ standard</td>
</tr>
</tbody>
</table>

- Organosilicone fluids give enhanced emulsion stability vs. Dimethicone.
- Caprylyl Trimethicone improves skin feeling dramatically vs. Phenyl Trimethicone at low dosage (0,4 % tested).
- In emulsions, Phenyl Trimethicones and Caprylyl Trimethicones show significantly different sensorical properties.
Silicone Fluids
Comparative Study in Emulsions

**Test formulation: Antiperspirant Emulsion, low viscosity Si 238/46**

| A | GENAPOL® HS 200 (Clariant) 2.00 %
|   | Steareth-20
|   | EMULSOGEN® HCO 040 (Clariant) 2.00 %
|   | PEG-40 Hydrogenated Castor Oil
|   | HOSTACERIN® DGI (Clariant) 2.00 %
|   | Polyglyceryl-2 Sesquioleate
|   | SilCare® Silicone Fluid 0.40 %
|   | Cetiol OE 5.00 %
|   | Dicapryl Ether
|   | Cetiol LC 5.00 %
|   | Coco Caprylate Caprate

| B | Water ad 100.00 %
|   | LOCRON® LIC (Clariant) 10.00 %
|   | Aluminium Chlorohydrate

| C | Fragrance 0.30 %
|   | Preservative q.s.

**Procedure:**
I  Melt A at approx. 60 °C
II  Heat B to approx. 60 °C
III Add B to I while stirring
IV  At 35 °C add C to I
Silicone Fluids
SilCare® Silicone 41M15

SilCare® Silicone 41M15
INCI: *Caprylyl Methicone*

Counterproducts:
Silsoft 034
Dow Corning Toray FZ-3196

- Clear, colorless liquid for easy formulation
- Emollient, skin conditioning agent
- Excellent sensory properties
- Volatile product, replacement for D6-Cyclomethicone and in addition more water resistant
- Compatibility between mineral oil and e.g. Dimethicones
- Adds high spreadability to formulations
Evaporation loss of different volatile silicone fluids

(2 g, thermogravimetric scale, 60 °C)
Compatabilisation of Cosmetic Base Fluids

- Paraffin oils and Dimethicones are generally not compatible
- SilCare® Silicones 15M50, 31M50 or 41M15 act as compatibilizers
Compatabilization of Cosmetic Base Fluids

- Required quantity of different SilCare® Silicone products to achieve a homogeneous solution of a mixture of Mineral Oil (low viscosity) : Dimethicone (50 cP) = 1 : 1

Amount of SilCare Silicone Added, %
# Solubility of UV filters in SilCare® Silicone Fluids

<table>
<thead>
<tr>
<th></th>
<th>Ethylhexyl Methoxycinnamate (clear liquid) [Eusolex 2292]</th>
<th>Benzophe-none-3 (yellowish powder) [Neo Helipan BB]</th>
<th>Butyl Methoxydibenzoylmethane (white crystals) [Eusolex 2020]</th>
<th>4-Methylbenzylidene Camphor (white powder) [Eusolex 6300]</th>
</tr>
</thead>
<tbody>
<tr>
<td>SilCare® Silicone 15M50</td>
<td>&gt; 50 %</td>
<td>2 %</td>
<td>1 %</td>
<td>5 %</td>
</tr>
<tr>
<td>SilCare® Silicone 31M50</td>
<td>20 %</td>
<td>1 %</td>
<td>&lt; 1 %</td>
<td>5 %</td>
</tr>
<tr>
<td>SilCare® Silicone 41M15</td>
<td>&gt; 50 %</td>
<td>2 %</td>
<td>&lt; 1 %</td>
<td>5 %</td>
</tr>
<tr>
<td>Dimethicone 50 cSt</td>
<td>1 %</td>
<td>&lt; 1 %</td>
<td>&lt; 1 %</td>
<td>&lt; 1 %</td>
</tr>
</tbody>
</table>

- Eusolex 2292 is readily soluble in SilCare® Silicone 15M50, 31M50 and in 41M15

- SilCare® Silicone are better solubilizers for UV filters than Dimethicone
Silicone Specialities
SilCare® Silicone 1M71

SilCare® Silicone 1M71 (> 95 %)

INCI: Stearoxytrimethylsilane

Counterproduct: Dow Corning 580 Wax - only a blend with 50 % stearyl alcohol, not liquid

Stability in Ethanol/Water at different pH
5 % SilCare® Silicone 1M71, 5 % Water, 90 % Ethanol, 25 °C, adjusted to different pH (GC analysis)

<table>
<thead>
<tr>
<th>pH (initial)</th>
<th>% Hydrolysis to stearyl alcohol</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>initial (15 min)</td>
</tr>
<tr>
<td>4.4</td>
<td>&gt; 99</td>
</tr>
<tr>
<td>5.3</td>
<td>&gt; 99</td>
</tr>
<tr>
<td>5.5</td>
<td>55</td>
</tr>
<tr>
<td>6.2</td>
<td>6</td>
</tr>
<tr>
<td>8.1</td>
<td>2</td>
</tr>
<tr>
<td>9.1</td>
<td>2</td>
</tr>
</tbody>
</table>

- SilCare® Silicone 1M71 hydrolyses quickly below pH = 6
- SilCare® Silicone 1M71 is completely stable in alcohols and non-aqueous emollients
Silicone Specialities
SilCare® Silicone 1M71

- Cold process emollient and release system for stearyl alcohol
- Si/Water formulation: room-temperature process possible, excellent skin feel
- Cleansing or baby lotion: high gloss (example: Johnson & Johnson)
- Stabilizing non stable emulsions with released stearyl alcohol (depending on pH)

- Microemulsion: pearl effect forming in the emulsion possible
- Pearlescent hand sanitizers possible

- Functional liquid, US Patent 5 847 179
SilCare® Silicone 1M75

INCI: Retinoxytrimethylsilane

- 12 % active in Soybean Oil, US Patent 5,847,179
- For anhydrous / aprotic formulations
- Latent delivery of Retinol under anhydrous conditions
- Product is a liquid and is formulated easily at room temperature
- Compatible with silicones and organics
- High gloss
Silicone Specialities
SilCare® Silicone SEA

- SilCare® Silicone SEA is a multifunctional, hydrophilically modified, self-emulsifying aminosilicone for all Personal Care applications.

- SilCare® Silicone SEA provides superior conditioning, gloss and brightness in haircare products and is an excellent color protection additive.

- SilCare® Silicone SEA shows excellent effects as skin conditioning agent (reduced stickiness, enhanced silky skinfeel) especially in antiperspirant and perfume formulations.

- SilCare® Silicone SEA is easy to handle in cold processes for rinse-off and leave-on formulations.

- Patented Clariant technology (WO 02/092666, DE102004013795.1)
**SilCare® Silicone SEA**

- Chemical Structure: typical amodimethicone structure substituted with emulsifier groups

  INCI: Trideceth-9 PG-Amidimethicone and Trideceth-12

- Hydrophilic, self emulsifying Aminosiloxane

- Easy to formulate

- High active content (> 80%)

- Odour free, colorless/transparent viscous liquid (1000-3000 mPas)

- Density approx. 1 (20 °C)
Silicone Waxes
SilCare® Silicone 41M65, 41M80 and 41M90

SilCare® Silicone 41M65
INCI: Stearyl Dimethicone

Counterproducts: Abil Wax 9800, Dow Corning 2503 Cosmetic Wax, Silsolft W-18, Wacker Belsil
SDM low melting wax (about 30 °C), low melt viscosity

SilCare® Silicone 41M80
INCI: C_{24-28} Alkyl Dimethicone (pellets, melting point > 60 °C)

SilCare® Silicone 41M90
INCI: C_{30+} Alkyl Dimethicone (pellets, melting point > 70 °C)

Counterproducts: Dow Corning AMS 30 Wax, Abil Wax 9811, Wacker-Belsil CDM 3526 VP
SilCare® Silicone 41M65, 41M80 and 41M90

- Silicone polymers with 45 - 80 % alkyl-substitution
- High substantivity, occlusive and water repellent
- SilCare® Silicone 41M80 and 41M90: Oil thickeners at 5 - 10 % active ingredient, form shear-thinning gels
- Waxes increase SPF of UV filters synergistically
- Enhanced viscosity of W/O, W/Si or O/W emulsions
- Hair waxes without waxy but typical silicone feeling possible
- Pelletized material is easy to handle
# Compatibility of SilCare Silicone Waxes

<table>
<thead>
<tr>
<th>Oil Phase</th>
<th>Thickening effect</th>
<th>Remark</th>
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<tbody>
<tr>
<td></td>
<td>41M80</td>
<td>41M90</td>
</tr>
<tr>
<td>Paraffin Oil</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Isopropyl Palmitate</td>
<td>+</td>
<td>+++</td>
</tr>
<tr>
<td>C12/15 Alkylbenzoate</td>
<td>++</td>
<td>+++</td>
</tr>
<tr>
<td>Soybean Oil</td>
<td>++</td>
<td>+++</td>
</tr>
<tr>
<td>Jojoba Oil</td>
<td>++</td>
<td>+++</td>
</tr>
<tr>
<td>Caprylic/Capric Triglyceride</td>
<td>++</td>
<td>+++</td>
</tr>
<tr>
<td>D5 Cyclomethicone and Caprylic/Capric</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Triglycerides 1:1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D5 Cyclomethicone</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Squalan</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Dicaprylyl Ether</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Alkylsilicones (SilCare® Silicone</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td>41M15)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polyisobutene</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Dimethicone 50 cSt</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Isohexadecane</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Note: Amount needed for good thickening: 5-10 %
Questions?