NOVOSIL® 812

A uniquely novel specialty silicone polymer designed for use of a prestigious textile softener providing excellent softness with silky and drapable feel as well as hydrophilic characteristics to quickly absorb water/perspiration on fabrics.

NOVOSIL 812 is a 100% actives linear silicone copolymer with high molecular weight, yet manageable viscosity, developed to deliver excellent aesthetics, hydrophilicity and process-ability virtually without oil spot and gum-up issue in textile finishing bath.

NOVOSIL 812 is applicable for all types of fabric, most desirably for high-end cotton knits, cotton sheets, denim, corduroy as well as any types of cotton blended fabrics. This prestigious textile softener also imparts cotton-like feel if applied on polyester.

Softness of NOVOSIL 812, particularly the macro-emulsion is optimally balanced to provide silky, drape and voluminous touch together that can help textile retailers meet the increasing consumer demands for garments that are comfortable to wear, have a silky look, touch and feel and can be marked as “breathable” garments. These features are best achieved by improving the general aesthetics of the garment.

In addition, both micro-emulsion and macro-emulsion of NOVOSIL 812 are extremely shear stable, even at the highly alkaline (up to pH12) and high temperature condition in textile finishing bath, which such severe conditions are often encountered when dyes need to be stripped off a poorly dyed fabric.

**Typical Physical Properties**

- Appearance : Pale Yellow Liquid
- Specific gravity (25/25°C) : 0.98
- Silicone Active Contents (%) : 100
- Viscosity(cps, 25°C) : 7,000~10,000
- Preferred diluent : water with surfactants

*Typical properties should not be used as specifications. The specifications are available if contacting NOVOSIL TECHNOLOGY CO., LTD.*
Features and Benefits

- Optimally balanced softness to provide silky, drape-able, voluminous and bouncy feel together on cotton and cotton blends
- Increase hydrophilicity on synthetic fabrics; Minimal impact on the hydrophilic nature of cellulosic fabrics
- Cotton-like feel if applied to polyester and polyester blends
- Helps improve elasticity on spandex blended fabrics
- Enhance durable softness to home laundries
- Stable in broaden range of bath pH (up to pH12) and temperature (up to 90°C) conditions in textile finishing
- Virtually 3-in-1 handle of full softness, slickness and resilience from the macro-emulsion
- Excellent bath stability in virtually all types of textile finishing process including jet finish, over-flow finish, jigger, high speed padding and yarn finish
- May be re-dyeable and over-dyeable
- 100% actives linear silicone copolymer; but readily emulsified to generate alkaline stable micro- or macro-emulsion in a simple mixer
- Causes virtually non-yellowing of white and light shaded fabrics
- Not affect fabric color shade
- APEO free

Potential Applications

NOVOSIL 812 contains 100% actives linear silicone copolymer; hence it needs to be applied as a water emulsion. Despite of 100% actives silicone copolymer, owing to its polar nature, NOVOSIL 812 can be easily emulsified by using simple mixing devices and containers widely available throughout the industry. There is no need for homogenization or colloid milling to emulsify NOVOSIL 812.

Silicone macro-emulsions, i.e., milky white emulsions typically provide superior smooth, drape and bouncy feel to the micro-emulsions. But it is inevitable for silicone macro-emulsions to cause stability issue in finishing bath. NOVOSIL 812 macro-emulsion provides full softness, slickness and reliance with excellent bath stability in even alkaline and high temperature finishing condition.

Optimum dose levels of NOVOSIL 812 are subject to type of fabric and level of softness required, but 10~40g/lt of 20% silicone actives emulsion are typically recommended.
Guide Formulation for NOVOSIL 812 Macro-emulsion

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>wt.%</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tridecyl Alcohol 3EO Ethoxylated</td>
<td>0.66</td>
<td>TDA-3</td>
</tr>
<tr>
<td>Tridecyl Alcohol 12EO Ethoxylated</td>
<td>3.37</td>
<td>TDA-12</td>
</tr>
<tr>
<td>Butyl Carbitol</td>
<td>2.83</td>
<td></td>
</tr>
<tr>
<td>NOVOSIL 812</td>
<td>20.0</td>
<td></td>
</tr>
<tr>
<td>Water #1</td>
<td>20.0</td>
<td></td>
</tr>
<tr>
<td>Water #2</td>
<td>53.14</td>
<td></td>
</tr>
<tr>
<td>Preservative</td>
<td>As required</td>
<td></td>
</tr>
</tbody>
</table>

**Emulsifying Procedure**

1. Charge TDA-3, TDA-12 and butyl carbitol in a mixer, and stir at 300~500 rpm for 5~10 min till fully homogeneous.

2. While keeping to stir at 300~500 rpm, slowly charge NOVOSIL 812 in the mixer. And then, continue stirring at 300~500 rpm for 10~20 min till completely homogenous.

3. While stirring at 500 rpm, slowly charge Water #1 in the mixer. The viscosity will be increased with more addition of the water. Occasionally scrap a grease-like substance if appeared on wall inside of the mixer. Mix the scrapped substance into the mixer.

4. After completely charging Water #1, slowly charge Water #2 in the mixer while agitating at 500 rpm. The addition speed of Water #2 can be faster if the reduced viscosity is observed.

5. If required, add a preservative into the mixer and keep stirring at 300 rpm for 5 min. Packing through a filter.

Guide Formulation for NOVOSIL 812 Micro-emulsions

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>Formulation 1 (wt.%)</th>
<th>Formulation 2 (wt.%)</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOVOSIL 812</td>
<td>10.0</td>
<td>20.0</td>
<td></td>
</tr>
<tr>
<td>Tridecyl Alcohol 6EO ethoxylated</td>
<td>2.3</td>
<td>2.0</td>
<td>TDA-6</td>
</tr>
<tr>
<td>Tridecyl Alcohol 12EO ethoxylated</td>
<td>1.7</td>
<td>6.0</td>
<td>TDA-12</td>
</tr>
<tr>
<td>Butyl Carbitol</td>
<td>1.0</td>
<td>4.0</td>
<td></td>
</tr>
<tr>
<td>Acetic Acid</td>
<td>0.3</td>
<td>0.6</td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td>84.7</td>
<td>67.4</td>
<td></td>
</tr>
<tr>
<td>Preservative</td>
<td>As required</td>
<td>As required</td>
<td></td>
</tr>
</tbody>
</table>

Typical appearance of micro-emulsion
**Emulsifying Procedure**

1. Charge NOVOSIL 812, TDA emulsifiers and butyl carbitol in a mixer, and stir at 800~1,000 rpm for 20~30 min till fully homogeneous.

2. While keeping to stir at 800~1,000 rpm, slowly charge half of water NOVOSIL 812 in the mixer. And then, continue to stir till completely homogenous.

3. Separately prepare an acetic solution by diluting acetic acid with the other half of water.

4. Reduce agitating speed to 400~500 rpm, and continue stirring for 20min.

5. Packing through a filter

**Performance Data**

**SHEAR STABILITY**

<table>
<thead>
<tr>
<th>Bath pH</th>
<th>Micro-emulsion of NOVOSIL 812</th>
<th>Macro-emulsion of NOVOSIL 812</th>
<th>Amino Silicone Micro-emulsion</th>
<th>Benchmark</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Clear &amp; Stable</td>
<td>Stable with no silicone oil droplets</td>
<td>Unstable, Silicone oil droplets</td>
<td>Clear &amp; Stable</td>
</tr>
<tr>
<td>12</td>
<td>Clear &amp; Stable</td>
<td>Stable with no silicone oil droplet</td>
<td>Unstable, many silicone oil droplets</td>
<td>Unstable, Silicone oil droplets</td>
</tr>
</tbody>
</table>

**ALKALINE STABILITY AT BOILING**

Test Conditions:
Shear 100g/l of 20% NOVOSIL 812 micro-emulsion at 2,000rpm, 80°C and pH12

Test Results:
*No separation, silicone oil droplets, silicone residue are observed.*

1% active NOVOSIL 812 (at room temperature) 1% active NOVOSIL 812 (after boiling) 1% active Amino (after boiling)

*Note: Actual results may vary with type of fabric and test condition*

**NOVOSIL TECHNOLOGY CO., LTD**

Singapore Technology Center and China Manufacturing Integrated for Serving Globally

*NOVOSIL is a trademark of NOVOSIL TECHNOLOGY*
Product Safety, Handling and Storage

Customers considering the use of this product should review the latest Material Safety Data Sheet and label for product safety information, handling instructions, personal protective equipment if necessary, and any special storage conditions required. Material Safety Data Sheets are available upon request, from any NOVOSIL TECHNOLOGY representative. Use of other materials in conjunction with NOVOSIL TECHNOLOGY products (for example, primers) may require additional precautions. Please review and follow the safety information provided by the manufacturer of such other materials.

Limitations

All formulations, procedures, performance data, benefits and advantages are included as illustrative examples only. NOVOSIL TECHNOLOGY makes no representation or warranty of any kind with respect to all information in this document, including, without limitation, concerning the efficacy or safety of any product manufactured by using the information stated in here.

Packing

NOVOSIL 812 is in drum of 202kgs net weight.