ABSTRACT
Vertasil® TM-L01 is a Gelest multi-functional hybrid fluid offering a natural component from limonene—the major ingredient of citrus rind oil—and a low molecular weight siloxane.

With consumers demanding more natural or “greener” ingredients in their products, Vertasil® TM-L01 offers formulators another alternative to D5 & D5/D6 blends. Vertasil® TM-L01 shares similar properties to cyclopentasiloxane including compatibility and solubility in common cosmetic ingredients, viscosity, and sensory experience on skin. The cleansing properties of Vertasil® TM-L01 offer the formulator an additional benefit in a variety of personal care and cosmetic products.

PHYSICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>TM-L01</th>
<th>Cyclopentasiloxane</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
<td>Colorless</td>
<td>Colorless</td>
</tr>
<tr>
<td>Refractive Index</td>
<td>1.426</td>
<td>1.398</td>
</tr>
<tr>
<td>Organic Compatiblity</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Viscosity (cSt)</td>
<td>4-5</td>
<td>3.8-3.9</td>
</tr>
<tr>
<td>Volatility</td>
<td>Slight</td>
<td>Yes</td>
</tr>
<tr>
<td>Flash Point °C</td>
<td>&gt;85</td>
<td>77</td>
</tr>
<tr>
<td>Boiling Point °C</td>
<td>295</td>
<td>210</td>
</tr>
</tbody>
</table>

Low surface tension enables Vertasil® TM-L01 to spread easily on the skin. As a result, the hybrid fluid will reduce the tack of materials such as natural waxes, butters, and oils. It exhibits the typical silicone “slip”, provides a non-greasy application, and incorporates a silky soft after feel in formulations that is more lubricious on skin than D5. Overall, in-house panelists reported that the feel of Vertasil® TM-L01 is comparable to an improvement over D5 at a 1:1 ratio in an oil or wax and in finished formulations.

SOLUBILITY
Vertasil® TM-L01 has improved solubility characteristics over cyclopentasiloxane, permitting greater compatibility with common raw materials including natural oils and waxes, hydrocarbons, esters, and sunscreens.

<table>
<thead>
<tr>
<th>Solubility</th>
<th>TM-L01</th>
<th>Cyclopentasiloxane</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Oils</td>
<td>Soluble</td>
<td>Soluble</td>
</tr>
<tr>
<td>Castor Oil</td>
<td>Insoluble</td>
<td>Insoluble</td>
</tr>
<tr>
<td>Esters</td>
<td>Soluble</td>
<td>Soluble</td>
</tr>
<tr>
<td>Butters</td>
<td>Soluble</td>
<td>Soluble</td>
</tr>
<tr>
<td>Natural Waxes</td>
<td>Soluble</td>
<td>Soluble</td>
</tr>
<tr>
<td>Lanolin Oil</td>
<td>Soluble</td>
<td>Soluble</td>
</tr>
<tr>
<td>Silicones</td>
<td>Soluble</td>
<td>Soluble</td>
</tr>
<tr>
<td>Vitamin E</td>
<td>Soluble</td>
<td>Soluble</td>
</tr>
<tr>
<td>Hydrocarbons</td>
<td>Soluble</td>
<td>Soluble</td>
</tr>
</tbody>
</table>

CLEANSING PROPERTIES
The gentle cleansing properties of Vertasil® TM-L01 are due to the insertion of limonene onto an emollient silicone segment. This combination offers the formulator an additional benefit in bath, cleansing products, and wipes.

BENEFITS
Used in combination with natural or synthetic ingredients, Vertasil® TM-L01 benefits when compared to D5 or D6 include:

- Non Volatile, More Environmentally Friendly
- Contains a Natural Component
- Improved Sensory Experience
- Reduced Tack and Greasiness
- Richer, Lubricious After Feel
- Soft and Silky After Feel
- Improved Spreadsability
- Fast absorption on Skin
- Colorless & Odorless
- Light & Dry Skin Feel
- Cleansing Properties

VERTASIL® TM-L01 LIMONENYLTRISILOXANE:
INCI: Methylcyclohexenyl Isopropyl Trisiloxane
A Multifunctional Cyclomethicone Replacement

RECOMMENDED USES
Use in the following products to replace D5 or D5/D6:
- Sunscreens, Tanning Oils, and After Sun Products
- Foundations, Lip Products, and Color Cosmetics
- Men’s Grooming Products
- Bath & Cleaning Products
- Creams and Lotions
- Hair Care
- Wipes
- Sticks

FORMULATION
Cleansing Milk with Vertasil® TM-L01

**Phase A**
Deionized Water q.s.
Ultrare 20³ Acrylates/C10-20 Acrylates Crosspolymer 0.20
Actives q.s.
Zemea® Propanediol 1.00

**Phase B**
Vertasil® TM-L01 Limonenytrimiloxane 10.00
Liponate® IPM Isopropyl Myristate
PG3-0³ Polyglyceryl-3 Oleate 2.00
Tween™ 80⁵ Polysorbate 80 0.50
Vitamin E Tocopherol 0.50

**Phase C**
Red 40⁶ q.s.
Preservative q.s.
Grapefruit & Fragrance 0.50
Wheatgrass⁷ 100.00

**Suppliers:**
³ DuPont™ Labele. ⁴ Gelest. ⁵ Croda. ⁶ The Lebemen Co. ⁷ Formula L2-068