Product: Panalane®, a versatile cosmetic base oil, meets a wide range of cosmetic needs:
• Color cosmetics
• Lipsticks
• Sunscreen emulsions
• Moisturizers
• Baby care
• Cleansing creams
• Acne creams
• Hair relaxers
• Hair grooms
• Antiperspirants
• Shave gels

Panalane®, hydrogenated polyisobutene, is a versatile cosmetic emollient ideal for a wide variety of personal care products. It is available in a low and high viscosity grade that are easily blendable (L-14E and H-300E).

Panalane®s are ideal for use in color cosmetic and lip products due to their characteristic rich feel, waterproofing capability and moisturizing effects. Panalane reduces emulsion droplet size and increases viscosity. It facilitates ease of application in lip treatments and improving wear resistance, thus limiting bleeding and feathering.

Panalane® H-300E is an effective waterproofing agent for sunscreen formulations. It is affordable, easy to use, safe and non-irritating to skin. Panalane® can be readily emulsified at room temperature.

A control sunscreen formulation containing a commonly used waterproofing polymer was compared to a sunscreen formulation containing Panalane® H-300E.

Both sunscreen formulations exhibited a static SPF of 17. After water immersion testing, the SPF of the control was reduced to 12 compared to 15 for the Panalane® H-300E formulation. The fact that typical sunscreen filters are soluble at high levels in Panalane® H-300E makes it an ideal waterproofing agent for these systems.

In clinical studies Panalane® L-14E was proven to increase skin hydration by reducing the rate of water evaporation from the skin’s surface, as measured by trans-epidermal water loss (TEWL). Retention of skin moisture content was also confirmed by increased skin conductance measurements. Skin texture improved significantly within minutes after application of Panalane® containing formulations, showing a clear contrast and fine texture. Therefore, it was effective in producing long lasting effects in retaining skin moisture content and thus improving skin tone and texture.

Panalane® is a registered trademark of INEOS Oligomers

Panalane®:
• Nonflammable
• Non-whitening on drying
• Enhances SPF retention after water exposure*
• Non-comedogenic
• Waterproofing*
• Nonirritating to eyes & skin
• Moisturizing
• Easily emulsified
• Clear viscous liquid
• > 99% pure (by weight)

* Only Panalane® H-300E

Panalane® is stable:
• Across the pH range
• To oxidation
• At temperatures up to 500°F (260°C)
• To chemical attack
• Up to 257°F (125°C) for an extended time period

Panalane® is an affordable alternative to high priced esters yet it provides the elegant “feel” that cosmetic formulations demand. Panalane® is approved for use worldwide, including Japan.

Panalane® SPECIFICATIONS PROPERTIES CHART

<table>
<thead>
<tr>
<th></th>
<th>L-14E</th>
<th>H-300E</th>
</tr>
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<tbody>
<tr>
<td>Viscosity (cSt) @ Temp. (°C)</td>
<td>38; 27.0 min; 37.0 max</td>
<td>99:635min; 690 max</td>
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<tr>
<td>Color, haze-free, APHA, Max.</td>
<td>10</td>
<td>20</td>
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<tr>
<td>Haze, APHA, Max.</td>
<td>5</td>
<td>10</td>
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<tr>
<td>Bromine Index, Max.</td>
<td>1000</td>
<td>1000</td>
</tr>
</tbody>
</table>

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Lipo Chemicals, Inc. 207 19th Avenue, Paterson, NJ 07504 | T. 973.345.8600 | F. 973.345.8365 | www.lipochemicals.com
**PANALANE® TYPICAL PROPERTIES**

<table>
<thead>
<tr>
<th></th>
<th>L-14E</th>
<th>H-300E</th>
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</thead>
<tbody>
<tr>
<td>Molecular Weight, Mn</td>
<td>370</td>
<td>1300</td>
</tr>
<tr>
<td>Flash Point (°C)</td>
<td>&gt;138</td>
<td>&gt;235</td>
</tr>
<tr>
<td>Cleveland Open Cup</td>
<td>&gt;115</td>
<td>&gt;160</td>
</tr>
<tr>
<td>Pensky-Martens Closed Cup</td>
<td>28.8</td>
<td>80.9</td>
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<tr>
<td>Surface Tension. Dynes/cm, 25°C</td>
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<tr>
<td>Appearance</td>
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<td>Clear, colorless</td>
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<tr>
<td>Odor</td>
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<td>Odorless</td>
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<tr>
<td>Specific Gravity @ 15.5°C</td>
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<tr>
<td>Viscosity (SUS) @ 100 °C</td>
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<td>Refractive Index</td>
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<td>Product Code</td>
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</tbody>
</table>

**(A) Short Term Evaluation of Trans-epidermal Water Loss**

Panalane® L-14E was shown to reduce trans-epidermal water loss in dry skin and retain skin hydration as measured by enhanced conductance. (B) Study was performed on 10 female panelists and the average percentage of TEWL or conductance shown. Application of blank formulation and formulation containing, Caprylic/Capric Triglyceride (MCT), were performed for controls.

**Assessment of Skin Tone & Texture Upon Application of a Formulation Containing Panalane® L-14E:**

Studies of a formula containing 8% Panalane® L-14E applied to the skin resulted in fine texture with clear contrast between lines and planes as compared to Caprylic/Capric Triglyceride (MCT), a blank formulation, untreated skin or before application of this formulation. Results from two panelists are shown.

**Emollients**