Intelimer® 8600 Emulsion polymer

INCI: C8-22 alkyl acrylates/methacrylic acid crosspolymer

Intelimer 8600 emulsion polymer is a film-forming, side chain crystalline polymer utilizing a novel temperature-triggered mechanism to deliver enhanced ingredient retention and improved ingredient spreading, both of which can boost the efficacy of some actives. The polymer is compatible across a wide pH range, making it applicable to both antiaging skin care and to hair care. It can provide rheology benefits as well as other unique, application-specific benefits.

Key advantages

Enhanced retention of ingredients

Intelimer 8600 emulsion polymer forms a novel polymer matrix when spread on skin or hair that physically entrap active ingredients, enhancing their retention on the applied area. This mechanism has been demonstrated to work across a variety of active ingredients and pH levels. The chart **Figure 1** on the next page shows the results of an in vitro retention study, where the amount of salicylic acid retained on water-immersed in vitro skin was measured across time. As the chart suggests, a formulation using Intelimer 8600 emulsion polymer shows significantly better retention of salicylic acid when compared to a control formulation. The formulations used 2% salicylic acid.

More even spreading of ingredients

By physically entrapping ingredients, the Intelimer 8600 emulsion polymer matrix can improve the uniformity of the distribution of active ingredients on skin. For some active ingredients, a more even distribution can lead to enhanced performance. A sunless tanning color change study was conducted using a 5% dihydroxy acetone (DHA) formulation. As **Figure 2** on the next page suggests, a formulation utilizing Intelimer 8600 polymer yielded greater color change after an initial 24-hour period than the control (as measured by the delta E metric). Other tests utilizing actives sensitive to distribution, such as sunscreen actives, have also demonstrated a performance improvement when using Intelimer 8600 polymer.
Durable, water-resistant, and thermally responsive film properties

Intelimer 8600 emulsion polymer forms a durable film which can provide fixative and humidity control benefits in hair care and water resistance benefits across a broader range of applications. Unlike other film formers, the thermosensitive nature of the Intelimer 8600 polymer film enables easy film wash-off at higher temperatures. In hair care, this also enables style-restyle functionality. To illustrate the strength of the polymer film, an SPF wash-off test was conducted. It demonstrates that Intelimer 8600 emulsion polymer is able to retain more sunscreen active on in-vitro skin following aggressive testing of 80 of minutes water immersion with 300 rmps at 40 °C (Figure 3). In other words, Intelimer 8600 emulsion polymer can protect actives and other ingredients from washing away.

Rheological modification

Like all Intelimer polymers, Intelimer 8600 emulsion polymer acts as an associative oil phase thickener. Despite being an emulsion in water, Intelimer 8600 polymer is very hydrophobic and will seek the oil phase when formulated. The chart on the next page (figure 4) demonstrates the oil-thickening efficiency of Intelimer 8600 emulsion polymer in a water-in-oil formulation. Intelimer polymers generally provide best thickening when used in formulations containing a blend of different oils.

Wide compatibility across pH and systems

Intelimer 8600 emulsion polymer has been tested across various types of systems, including low pH skin care systems as well as high pH hair care systems.
**Chemistry**

**Chemical description**

Intelimer 8600 emulsion polymer is a patented, side chain crystalline homopolymer with a long chain acrylate group in the backbone. Intelimer 8600 emulsion polymer has a very sharp melt point with small hysteresis. The polymer’s temperature switch characteristics allow it to exhibit sharp changes in properties such as permeability, adhesion and viscosity.

**Source and GMO status**

Intelimer 8600 emulsion polymer is manufactured in the United States. It is prepared solely from synthetic materials and does not contain and is not derived from genetically modified organisms or any material of animal origin.

**Material handling and storage**

Intelimer 8600 emulsion polymer is not freeze-thaw stable and should be protected from freezing. The product has a shelf life of 12 months from date of manufacture.

Intelimer 8600 polymer dries very quickly and should be sealed tightly in its container. Exposed material may form a dry film or dry polymer chunks; please filter out this material using a filtering cloth bag or cheese-cloth prior to use. For more information, please refer to the Material Safety Data Sheet of this product at airproducts.com/MSDS.

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**Nontacky and nongreasy feel**

Like other Intelimer polymers, Intelimer 8600 emulsion polymer generally helps reduce the level of greasiness and tackiness of oil-containing formulations, providing consumers with a pleasant, powdery feel.

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**Figure 3: In Vitro SPF before/after Water Immersion**

- Competitor poly
- Control (no poly)
- Intelimer 8600

**Figure 4: Viscosity of w/o with 1% Intelimer 8600**

- Intelimer 8600
- Control (blank)
Formulating guidance

Intelimer 8600 emulsion polymer is an easy-to-use product that can be added at any point in the formulation. The polymer can also be used across a wide range of temperatures. For sample formulations using this material, please visit our website at airproducts.com/personalcare

Low recommended use levels

Intelimer 8600 emulsion polymer is used at use levels of 0.5% to 4.0% by active.

No specific order of addition

No specific order of addition is required since Intelimer 8600 polymer can be incorporated in the water phase at any point in the formulation.

Material is cold-processable

Temperature is not a factor in working with this material, enabling cold processing where appropriate.

Disperse in water when using with alcohols

When working with ethanol or other alcohol systems, Intelimer 8600 emulsion polymer should be dispersed in water before adding alcohol or an alcohol/water mixture.

Typical product properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Typical value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Milky white liquid</td>
</tr>
<tr>
<td>Total Solids</td>
<td>45%–49%</td>
</tr>
<tr>
<td>pH</td>
<td>6–7</td>
</tr>
<tr>
<td>Melt Temperature</td>
<td>42–44 °C</td>
</tr>
<tr>
<td>Viscosity @ 25 °C (cPs)</td>
<td>40–100</td>
</tr>
</tbody>
</table>

Intelimer 8600 emulsion polymer is a commercial product and is generally offered in 18 kg pails or 210 kg drums.

Safety and regulatory information

Intelimer 8600 emulsion polymer has not been tested on animals. An analog of this material has been tested for eye and skin irritation. Results suggest that at anticipated usage levels, this polymer should comply with safety protocols established in most regulatory regimes. Further safety information for this product is available upon request.

Intelimer 8600 polymer does use processing aid n-propanol as a preservative at a 5%–9% use level. Although these levels might suggest a hazardous labeling of the neat product, Intelimer 8600 emulsion polymer is safe and would not pose regulatory concern when formulated at anticipated use levels. Please contact us for more information.

For regulatory information, please refer to the Material Safety Data Sheet of this product for more information at airproducts.com/MSDS.

For more information, please contact us at:
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