Formulation

Name No. Description
CLEAR SOLID DEODORANT STICK 1246 NINOL® CAA provides fragrance solubilization while maintaining clarity in the formulation.

Formulation INGREDIENTS:

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>% by Weight</th>
<th>Functionality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deionized Water</td>
<td>q.s. to 100.00</td>
<td>Diluent</td>
</tr>
<tr>
<td>Propylene Glycol</td>
<td>63.00</td>
<td>Solvent</td>
</tr>
<tr>
<td>Sodium Stearate OP-200V (Hallstar) Sodium Stearate</td>
<td>8.00</td>
<td>Thickener</td>
</tr>
<tr>
<td>NINOL® CAA</td>
<td>5.00</td>
<td>Surfactant, Thickener</td>
</tr>
<tr>
<td>Sodium Chloride</td>
<td>1.15</td>
<td>Viscosity Adjuster</td>
</tr>
<tr>
<td>Fragrance</td>
<td>2.50</td>
<td>Fragrance</td>
</tr>
<tr>
<td>Dye</td>
<td>q.s.</td>
<td>Dye</td>
</tr>
</tbody>
</table>

Total 100.00

Procedure
1. In a suitable vessel equipped with heating and agitation capabilities, add Deionized Water and Propylene Glycol. Heat to 50ºC with mixing.
2. Add Sodium Stearate and mix until clear. Avoid aeration.
3. Add NINOL® CAA and Sodium Chloride, mixing well and avoiding aeration.
4. Begin heating to 75ºC. Mix until everything is dissolved and begin cooling.
5. Cool to 70ºC and add Fragrance. Mix until everything dissolved.
6. Add dye. Mix until everything dissolved.
7. Cool to 65ºC and fill container.

Physical Properties
Appearance at 25ºC Translucent solid

Storage/ Stability
25ºC at 6 months Stable

This formulation was evaluated for turbidity (clarity in the appearance) compared to two other formulations: Deodorant Stick with NINOL® 40-CO and Deodorant Stick without Amides. The formulation containing NINOL® CAA showed better clarity (384 NTU) than the other two formulations (with NINOL® 40-CO: 446 NTU, without amide: 801 NTU). A lower value equals better clarity. All testing was completed using the Turbidity Analysis Test Method (SM 110-A).

External Comment
Marketing Notes: NINOL® CAA provides fragrance solubilization while maintaining clarity of the formulation. Advanced clear formulation leaves no white residue. Provides odor protection, glides on smooth. BCI = 86. Total Biorenewable Carbon Index (BCI) was calculated only for the Stepan surfactants used in this formulation. Other ingredients were not evaluated. For further information on Stepan’s BCI, visit www.stepan.com.

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