ECOSENSE™ NS 667 Surfactant  
ECOSENSE™ NS 669 Surfactant

High-performance, seed oil-based nonionic surfactants with excellent environmental and handling properties

Applications
ECOSENSE™ NS 667 Surfactant and ECOSENSE™ NS 669 Surfactant are designed for home care application, especially low foaming laundry products and hard surface cleaner. ECOSENSE™ NS 667 Surfactant and ECOSENSE™ NS 669 Surfactant are biodegradable nonionic surfactants that meet most environmental and handling safety standards worldwide, while offering excellent performance and economics across a wide range of parameters.

Typical Properties
Specification Writers: These values are not intended for use in preparing specifications.

<table>
<thead>
<tr>
<th>Property</th>
<th>ECOSENSE™ NS 667 Surfactant</th>
<th>ECOSENSE™ NS 669 Surfactant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Colorless or pale yellow liquid</td>
<td>Colorless or pale yellow liquid</td>
</tr>
<tr>
<td>Active content (%)</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>HLB</td>
<td>9.7</td>
<td>11.1</td>
</tr>
<tr>
<td>Cloud point (°C)</td>
<td>37</td>
<td>57</td>
</tr>
<tr>
<td>Surface tension (dyne/cm)</td>
<td>29</td>
<td>29</td>
</tr>
<tr>
<td>Pour point (°C)</td>
<td>&lt; 4</td>
<td>4</td>
</tr>
</tbody>
</table>

Environmental Profile
ECOSENSE™ NS 667 Surfactant and ECOSENSE™ NS 669 Surfactant are excellent candidates for use in "green" products such as environmentally friendly cleaners. They are readily biodegradable, per the OECD 301 test. They do not pose any requirement for environmental classification or special labeling for formulated products sold almost anywhere in the world. ECOSENSE™ NS 667 Surfactant and ECOSENSE™ NS 669 Surfactant have an aquatic toxicity range of > 1 mg/L in the most sensitive species. And they are not a source of VOCs (Volatile Organic Compounds).
Comparison of Product Performance

<table>
<thead>
<tr>
<th></th>
<th>ECOSENSE™ NS 667 Surfactant and ECOSENSE™ NS 669 Surfactant</th>
<th>Guerbet Alcohol Alcoxylate</th>
<th>Nonylphenol Ethoxylate</th>
<th>Primary Alcohol Ethoxylate</th>
<th>Branched Alcohol Ethoxylate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biodegradability</td>
<td>★★★★</td>
<td>☆☆☆☆☆</td>
<td>☆</td>
<td>★★★★★</td>
<td>★★★★</td>
</tr>
<tr>
<td>Aquatic toxicity</td>
<td>★★★★★</td>
<td>☆☆☆☆</td>
<td>☆</td>
<td>☆☆☆☆</td>
<td>☆☆☆☆</td>
</tr>
<tr>
<td>Detergency</td>
<td>★★★★★</td>
<td>☆☆☆☆</td>
<td>★★★★★</td>
<td>★★★★★</td>
<td>★★★★</td>
</tr>
<tr>
<td>Wetting</td>
<td>★★★★★</td>
<td>☆☆☆☆</td>
<td>★★★★★</td>
<td>★★★★★</td>
<td>★★★★</td>
</tr>
<tr>
<td>Low temperature fluidity</td>
<td>★★★★★</td>
<td>☆☆☆☆</td>
<td>★☆☆☆</td>
<td>★☆☆☆</td>
<td>★☆☆☆</td>
</tr>
<tr>
<td>Narrow gelling</td>
<td>★★★★★</td>
<td>☆☆☆☆</td>
<td>★☆☆☆</td>
<td>★☆☆☆</td>
<td>★☆☆☆</td>
</tr>
</tbody>
</table>

**Performance**

***Excellent Detergent Performance***

Figure 1 compares detergency performance of ECOSENSE™ NS 669 Surfactant and a number of other nonionic surfactants. In this Dow test, ECOSENSE™ NS 669 Surfactant shows very good detergency in comparison to nonionics recognized for this capability, and significantly higher detergency levels than several other alternatives. ECOSENSE™ NS 667 Surfactant and ECOSENSE™ NS 669 Surfactant offer excellent removal of soils at low concentrations.

![Detergency performance graph](image)

**Figure 1.** Detergency of Nonionic Surfactants in Model

Tergometer SRI; JIS standard stained cotton, 5% additives in HDL formula, 0.83g/L detergent, 131ppm CaCO3 (Ca/Mg), 120rpm, 10 min wash + 3 min rinse, 3 cycles, 25 °C

**Foam Property – Low Foam and Rapid Foam Collapse**

ECOSENSE™ NS 667 Surfactant and ECOSENSE™ NS 669 Surfactant are moderate foaming materials that also feature very rapid foam collapse. Figure 2 displays Ross-Miles foam profiles obtained by Dow laboratory testing for ECOSENSE™ NS 667 Surfactant and ECOSENSE™ NS 669 Surfactant as well as other products. This foaming property makes ECOSENSE™ NS 667 Surfactant and ECOSENSE™ NS 669 Surfactant excellent candidates for front-loading fabric detergents and hard surface cleaners that must minimize both foam generation and persistence. The rapid foam collapse can also improve rinsability. The foam profile is even lower with more rapid collapse at higher temperatures. They can help improve formulation efficiency and reduce or eliminate the need for foam control agents.
Figure 2. Comparative Ross-Miles foam profile

Fast Wetting
Dow tests show that ECOSENSE™ NS 669 Surfactant provides fast fabric wetting, as shown in Figure 3. ECOSENSE™ NS 669 Surfactant wets twice as fast as primary alcohol ethoxylate surfactants and 25% faster than nonylphenol ethoxylates with similar cloud points. This accelerated wetting can improve cleaning performance, reduce cycle times for manufacturing processes and reduce the amount and cost of surfactant used in a formulation.

Figure 3. Draves wetting performance, 0.05% aqueous surfactant at 25°C
Narrow Gel Range – Easy Handling

Among nonionic surfactants, ECOSENSE™ NS 667 Surfactant and ECOSENSE™ NS 669 Surfactant stand out as easy to store, handle, and incorporate into formulations. Figure 4 shows the narrow gel range of ECOSENSE™ NS 667 Surfactant and ECOSENSE™ NS 669 Surfactant. These products have improved handling due to their lower viscosity profiles, making them easier to pump, pour and blend. They are ideal choices for concentrates and systems designed for use with cold water or in cold environments.

![Graph showing the narrow gel range of ECOSENSE™ NS 667 Surfactant and ECOSENSE™ NS 669 Surfactant.](image)

**Figure 4.** Narrow gel range

**Handling Precautions**

PRODUCT SAFETY INFORMATION REQUIRED FOR SAFE USE IS NOT INCLUDED IN THIS DOCUMENT. BEFORE HANDLING, READ PRODUCT AND SAFETY DATA SHEETS AND CONTAINER LABELS FOR SAFE USE, PHYSICAL AND HEALTH HAZARD INFORMATION. THE SAFETY DATA SHEET IS AVAILABLE ON THE DOW WEBSITE AT DOW.COM, OR FROM YOUR DOW SALES APPLICATION ENGINEER, OR DISTRIBUTOR, OR BY CALLING DOW CUSTOMER SERVICE.

**Limitations**

This product is neither tested nor represented as suitable for medical or pharmaceutical uses.

**Health and Environmental Information**

To support customers in their product safety needs, Dow has an extensive Product Stewardship organization and a team of product safety and regulatory compliance specialists available in each area.

For further information, please see our website, dow.com or consult your local Dow representative.

**Disposal Considerations**

Dispose in accordance with all local, state (provincial) and federal regulations. Empty containers may contain hazardous residues. This material and its container must be disposed in a safe and legal manner.

It is the user’s responsibility to verify that treatment and disposal procedures comply with local, state (provincial) and federal regulations. Contact your Dow Technical Representative for more information.
**Product Stewardship**

Dow has a fundamental concern for all who make, distribute, and use its products, and for the environment in which we live. This concern is the basis for our product stewardship philosophy by which we assess the safety, health, and environmental information on our products and then take appropriate steps to protect employee and public health and our environment. The success of our product stewardship program rests with each and every individual involved with Dow products - from the initial concept and research, to manufacture, use, sale, disposal, and recycle of each product.

**Customer Notice**

Dow strongly encourages its customers to review both their manufacturing processes and their applications of Dow products from the standpoint of human health and environmental quality to ensure that Dow products are not used in ways for which they are not intended or tested. Dow personnel are available to answer your questions and to provide reasonable technical support. Dow product literature, including safety data sheets, should be consulted prior to use of Dow products. Current safety data sheets are available from Dow.