Berol® 360 and Berol® 366

The next generation of more sustainable high-performance degreasers are vegetable-based narrow range ethoxylates, suitable for use in household, industrial and institutional (I&I) cleaning applications. These two primary surfactants provide outstanding degreasing - achieved with more sustainable raw materials.

Our dedicated cleaning team is always focused on developing new, advanced technologies to help formulators create new products to delight consumers and end-users.

As a result, we are excited to introduce Berol 360 and Berol 366, both of which are new, unique narrow-range ethoxylate (NRE) surfactant degreasers for use in high-performance cleaning formulations. Berol 360 is targeted for tough I&I applications, where performance is paramount. Berol 366 is targeted towards household applications where mildness in use is consumer-preferred. Both materials are produced from vegetable-based raw materials, and the finished products are provided to customers with RSPO-certification.

These technologies have been developed to address the consumer and broader market demand for more environmentally benign products without sacrificing the technical and environmental performance customers expect.

Key benefits

- Offers proven, efficient degreasing performance coupled with better handling characteristics versus standard ethoxylates in household and I&I applications
- Performs on a par with synthetic NRE’s while providing secondary consumer/regulatory advantages – low odor, low viscosity, more biobased and RSPO-certified
- Gives formulators a novel choice when formulating green cleaning products
- Helps answer the consumer desire for more sustainable cleaning
- Can be incorporated into formulations that can achieve third party sustainability recognition, such as EU Ecolabel

Why narrow range ethoxylates?

In comparison with standard fatty alcohol ethoxylates, NRE’s:

- Have a high proportion of targeted ethoxylation to give optimized degreasing performance
- Have lower amounts of unreacted alcohol which causes odor
- Have lower amounts of higher ethoxylates which cause foaming, viscosification and have poor degreasing performance

Made from sustainably-sourced, vegetable oils – RSPO certified

Berol 360 and Berol 366 are both manufactured from a sustainably derived, vegetable-based raw material. As a member of the roundtable on sustainable palm oil (RSPO), Nouryon is committed to finding raw materials from sustainable sources when available, to reduce the upstream environmental impact of our products. They come with RSPO mass balance (MB) certification when issued. These products are also mild in the environment when released, with both products complying at an ingredient level with the requirements of EU Ecolabel and Nordic Swan.
**Better material handling**
Narrow range ethoxylates have much lower viscosity at reduced temperatures. Lower viscosity (pourpoint) means easier handling and processing in cooler climates. Lower viscosity also provides faster dissolution rates for the product upon formulation. NRE products also generates less foam than standard process ethoxylates, thus a more vigorous agitation can be employed. Comparative foaming test using a Ross-Miles foam analyzer illustrates this.

**Appearance at 0°C**

**Viscosity at 0°C/32°F - Standard vs. narrow range process**

<table>
<thead>
<tr>
<th>Process</th>
<th>Standard process</th>
<th>Narrow range process</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viscosity</td>
<td>Highly viscous</td>
<td>Slightly viscous</td>
</tr>
<tr>
<td>Appearance</td>
<td>Thick paste</td>
<td>Clear mobile liquid</td>
</tr>
</tbody>
</table>

**Summary of typical properties of vegetable based narrow range ethoxylates**

<table>
<thead>
<tr>
<th></th>
<th>CMC g/l</th>
<th>Wetting Draves, 25°C, 0.1%, sec</th>
<th>Foaming Ross Miles 50°C, 0.05%, 0-5min, mm</th>
<th>HLB</th>
<th>Cloudpoint,°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Berol 360</td>
<td>0.04</td>
<td>11</td>
<td>26 - 2</td>
<td>10.5</td>
<td>55-59 (BDG)</td>
</tr>
<tr>
<td>Berol 366</td>
<td>0.03</td>
<td>15</td>
<td>59 - 5</td>
<td>12.1</td>
<td>24-29 (water) and 54-59 (water)</td>
</tr>
</tbody>
</table>

**Suggested framework formulations**

**I&I alkaline degreaser**
- 5.0% Berol 360
- 3.5% Berol R648 NG or PO
- 10% Dissolvine 100-S or GL-47-S
- 0.5% NaOH
- Balance Water
- Use conc.: 1:20-1:60

**Household all purpose cleaner**
- 2.0% Berol 366
- 1.0% Berol R648 NG or PO
- 0.4% Dissolvine 10-S or GL-47-S
- Balance Water
- Ready to use (trigger spray)

For more information and sample formulations contact us at cleaning@nouryon.com.