Narrow Range Ethoxylates

Highly targeted performance for more effective cleaning

Nouryon

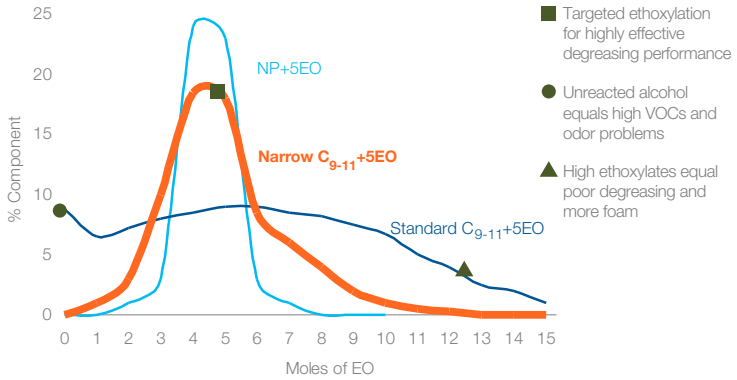
Nonionic surfactants for degreasing – highly targeted performance, effective at very low concentrations, excellent low temperature handling.

Choose from our unique portfolio to provide the best cost performance solution for your customers. Efficient and sustainable cleaning formulations begin with these products!

Makes your life easier

A narrow range ethoxylated alcohol, also called “a peaked ethoxylate”, has a distribution curve that is narrower than the equivalent standard alcohol ethoxylate with a considerably lower content of unreacted alcohol and lower foam than standard ethoxylates.

Comparison of our narrow range ethoxylate with standard range ethoxylate and NPE



For a standard alcohol ethoxylate with 4-5 EO:

- Only about half of the product contributes to the cleaning.
- Unreacted alcohol acts like a “greasy” soil.
- Higher ethoxylates are less active as degreasers. The higher cloud point means that cleaning at a low temperature is a challenge and they can also give foaming problems.

For a narrow range alcohol ethoxylate with 4-5 EO:

- Most of the product is centered at the exact EO level required for effective cleaning.
- Very little unreacted alcohol thus almost no “greasy” soil in the product.
- Low levels of higher ethoxylates mean lower foaming and less need for defoamers.

Narrow range ethoxylates have targeted properties to improve degreasing performance at lower use concentration, while eliminating the need for hazardous solvents. At the same time they are compatible with most commonly used surfactants and builders.

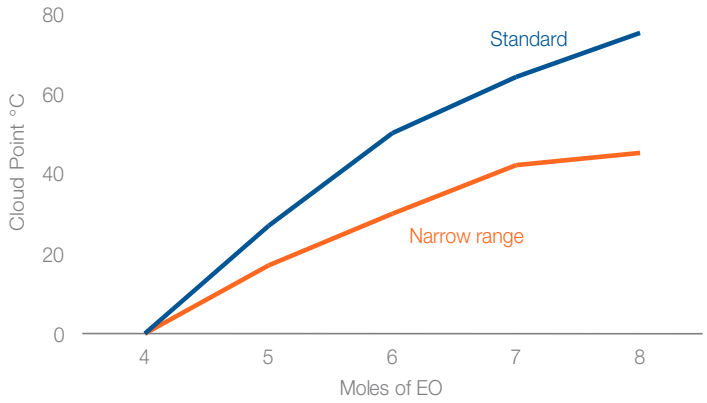
They also have very low odor, even if based on a short chain alcohol. This opens up many applications where short chain alcohol ethoxylates have previously been excluded and enables the formulator to prepare highly effective low VOC cleaners.

The lower free alcohol content and higher proportion of the target ethoxylate make formulating easier and more cost effective than with standard alcohol ethoxylates. This offers the possibility to optimize raw material purchase, reduce inventories, and simplify production.

Effective cleaning at lower temperature

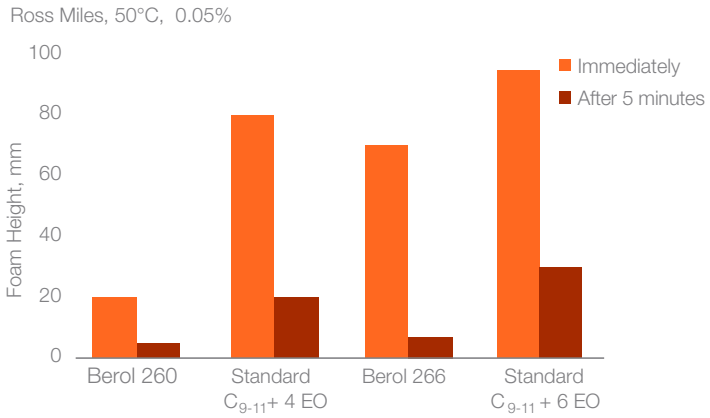
A narrow range ethoxylate has a lower cloud point than a standard ethoxylate with the same degree of ethoxylation. This makes the narrow range ethoxylate more effective when both are used at the same temperature and gives it superior performance in low temperature cleaning.

Cloud point at 1% in water for standard and narrow range C9-11 alcohol ethoxylates



The lower level of highly ethoxylated components offers less initial foaming and more rapid foam collapse for improved rinsability.

More rapid foam collapse for improved rinsability



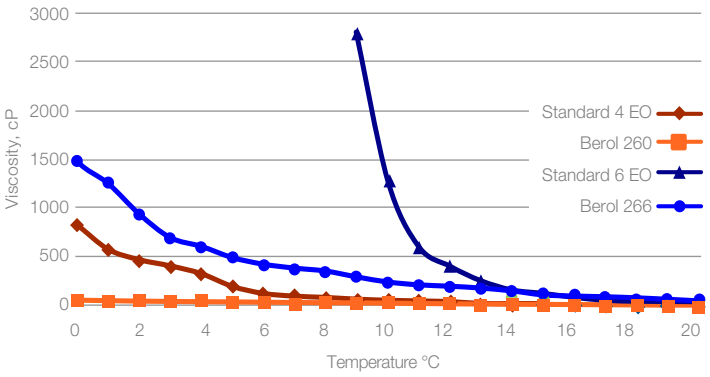
Better material handling

A lower viscosity (pour point) than a standard range ethoxylate means better low temperature handling.

Appearance at 0°C

Highly viscous	Clear liquid	Thick paste	Slightly viscous
Standard C_{9-11} + 4 EO	Berol 260	Standard C_{9-11} + 6 EO	Berol 266

Viscosity-temperature profile



Summary of properties of narrow range ethoxylates

	Linear/ branched hydrophobe	CMC g/l	Wetting Draves, 25°C, 0.1%, sec	Foaming Ross Miles 50°C, 0.05%, 0 - 5 min, mm	HLB	Cloud point, °C
Berol 260 – C9-11 + 4 EO	linear	0.04	11	20 – 5	10.5	56-60 (BDG)
Berol 266 – C9-11 + 5.5 EO	linear	0.03	15	70 – 7	12.1	24-29 (water) and, 54-59 (water)
Berol 840 – C8 + 4 EO	branched	4.5	90	5 – 0	11.5	49-54 (BDG)
Ethylan 1003 – C10 + 3.5 EO	branched	1	4	5 – 0	9.8	31-34 (BDG)
Ethylan 1005 – C10 + 5 EO	branched	1	4	5 – 0	11.6	47-53 (BDG)

Note: Cloud point is measured in water or 25% butyl diglycol (BDG)

Product	Key features	Applications
Berol 260	Excellent fatty soil removal in water based cleaning products especially when it is combined with performance boosting co-surfactants	**Degreasing** Engine cleaning All purpose cleaning Microemulsions Vehicle cleaning
Berol 266	Two cloud points in water, effective cleaning at high and low temperature Cleaning products often contain two nonionic surfactants with different cloud points, Berol 266 can often replace both cost effectively	**Multi purpose** All purpose cleaning Microemulsions Vehicle cleaning Detergents for textiles
Berol 840	Low foaming nonionic surfactant with defoaming properties on protein foam	**Low foam cleaning** CIP Machine dishwashing Carpet cleaning Metal cleaning Rinse aid for machine dishwashing
Ethylan 1003	Excellent emulsifying and wetting properties Low foaming surfactant with defoaming properties Very good aquatic toxicity	**Cold degreasing and low foam cleaning** Microemulsions and emulsions Cleaning in Place (CIP) Machine dishwashing Rinse aid for machine dishwashing
Ethylan 1005	Excellent wetting and fatty soil removal in water based cleaning products Low foaming nonionic Very good aquatic toxicity	**Degreasing and low foam cleaning** Engine cleaning All purpose cleaning Vehicle cleaning Microemulsions Machine dishwashing Rinse aid for machine dishwashing

The exceptional functionalities of narrow range ethoxylates provide cutting-edge solutions for a wide range of applications. All formulations are expressed in percent of product by weight as supplied.

Water-based multi-purpose hard surface cleaning

Alkaline degreaser	**Alkaline degreaser**
5.0% Berol 260	5.0% Berol 260
3.5% Berol R648 NG	4.0% Berol R648 NG
10% Dissolvine 100-S or GL-47-S	10% Dissolvine 100-S or GL-47-S
0.5% sodium hydroxide	2.0% sodium metasilicate
Balance water	Balance water
Use conc: 1:20 - 1:60	Use conc: 1:20 - 1:60

Household cleaning – floor, kitchen, bathroom

All purpose cleaner	**All purpose cleaner**
2.0% Berol 266	2.5% Berol 260
1.0% Berol R648 NG	2.0% Berol R648 NG
0.4% Dissolvine 100-S or GL-47-S	2.5% Dissolvine 100-S or GL-47-S
Balance water	2% triethanolamine
Ready to use (trigger spray)	Balance water
	Use conc: 1:20 - 1:50

Industrial cleaning – metal degreasing, engine cleaning, vehicle cleaning

Heavy duty degreaser	**Acidic formulations**
5.0% Berol 260	1-3% Berol 260 or Ethylan 1005
5.0% Berol R648 NG	1-3% Berol R648 NG
2.0% sodium hydroxide	5-40% citric acid, phosphoric acid, hydrochloric acid or
8-10% Dissolvine 100-S or GL-47-S	5-15% sulfamic acid
Balance water	Balance water