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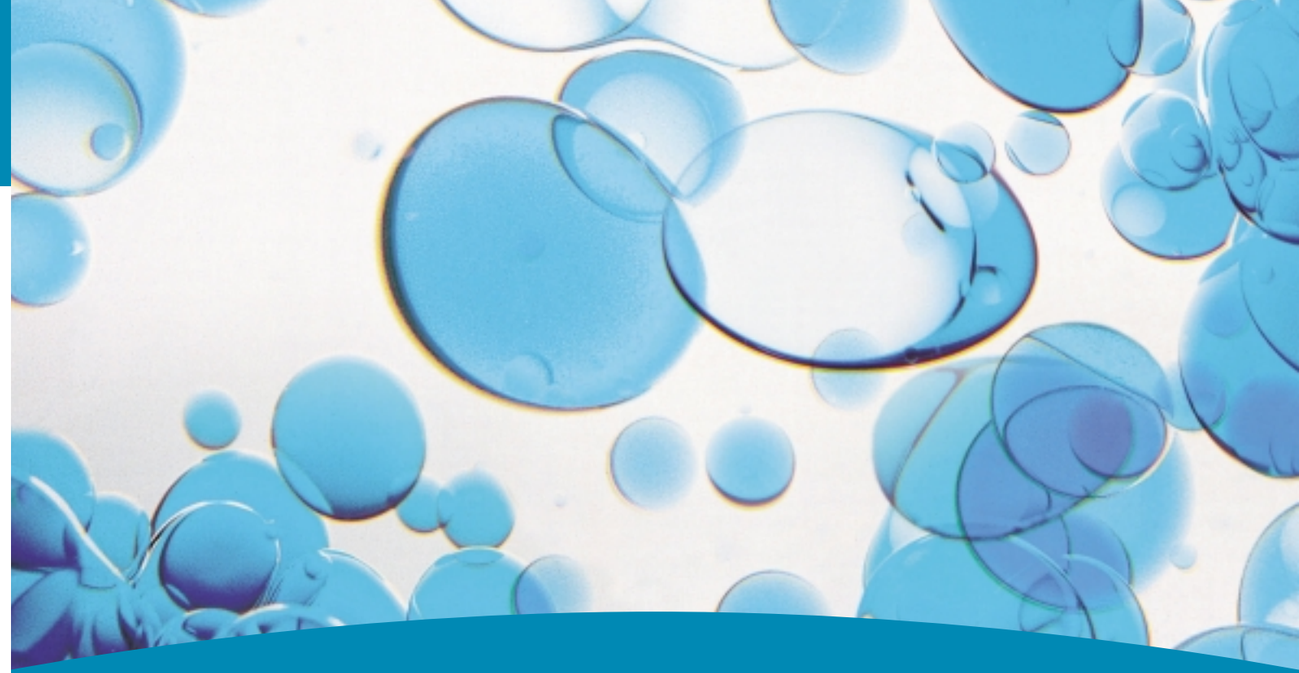
ETHOCA



Household
Institutional
& Industrial
Cleaners

ETHOCA

Introduction

ETHOCA IS A LEADER IN THE PRODUCTION OF SAFE, EFFECTIVE, ENVIRONMENTALLY FRIENDLY, WATER BASED CLEANERS FOR HOUSEHOLD, INDUSTRIAL AND INSTITUTIONAL APPLICATIONS. WITH RESEARCH LABORATORIES AND MANUFACTURING SITES AROUND THE WORLD, ETHOCA STANDS READY TO HELP YOU ACHIEVE YOUR ENVIRONMENTAL, COST AND PERFORMANCE GOALS THROUGH OUR FOCUS ON QUALITY, SERVICE AND PRODUCT DEVELOPMENT.

THIS PRODUCT GUIDE WILL FAMILIARIZE YOU WITH ETHOCA CLEANING PRODUCTS AND THEIR APPLICATIONS.

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Ethoxylated Alcohols

ETHOCA offers a range of ethoxylated alcohols for cleaning applications. Narrow range ethoxylated alcohols are the foundation of our product line.



Ethoxylation

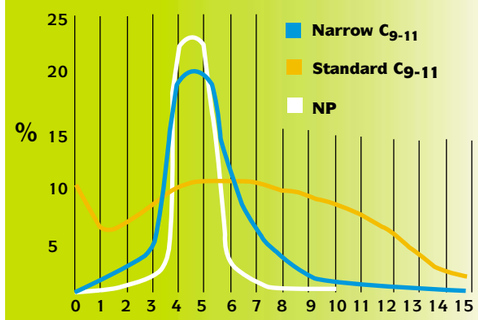
Ethoxylation can be achieved by the reaction of an alcohol with ethylene oxide. The ethoxylation distribution can be influenced by the catalyst (Cat) and by the choice of the alkyl group (R) of the alcohol.

A narrow range ethoxylated alcohol, also called peaked ethoxylated alcohol, has an ethoxylation distribution curve that is narrower than the equivalent standard alcohol ethoxylate and contains considerably lower free alcohol. This gives the nonionic surfactant focused properties and a very low odor especially when derived from the short chain alcohol.

When phenol or alkyl phenol is ethoxylated the ethoxylation distribution is narrow compared to the broad distribution obtained with fatty alcohols such as $C_{9\text{-}11}$ alcohol. By using a special catalyst, a narrow distribution similar to that observed with phenols can be achieved for fatty alcohols.

Generally, lower degrees of ethoxylation give higher amounts of free alcohol in the product.

Ethoxylation Distribution Comparisons



Alcohol Ethoxylates Narrow Range

Product Name	Chemical Description	Cloud pt (°C)	Appearance @ 25°C	% Active	Properties	Main Applications
ETHONOL 904	Narrow Range $C_{9\text{-}11}$ Alcohol with 4EO	58[a]	Liquid	100	Degreaser Low Foaming	Waterbased Degreasing Vehicle & Engine Cleaners Hard Surface & All Purpose Cleaners
ETHONOL 905	Narrow Range $C_{9\text{-}11}$ Alcohol with 5.5EO	26[b] and 58[b]	Liquid	100	Degreaser Low Foaming Dispersions Two Cloud Points*	Waterbased Degreasing Vehicle & Engine Cleaners Hard Surface & All Purpose Cleaners Liquid Detergents (including textiles)
ETHONOL 804	Narrow Range Ethoxylated Alcohol	52[a]	Liquid	100	Extremely Low Foaming Defoaming Wetting	Low Foam Cleaners (e.g. Metal Cleaners & CIP) Waterbased Alkaline Cleaners Automatic Dishwashing Hard Surface Cleaners

Cloud Point (C°) of:
[a]5g product 25ml 25% butyl diglycol solution
[b]1% product in water

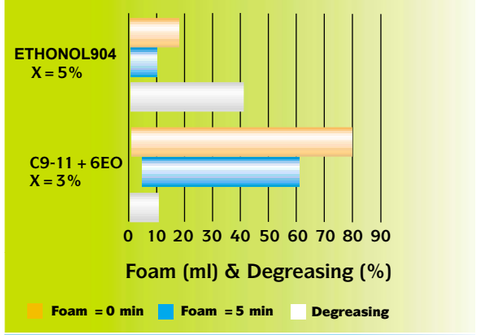
*This product shows two distinct cloud points across a temperature gradient in water.

Efficiency

Use of a short chain alcohol ethoxylate with a narrow distribution of ethoxylation results in faster soil penetration, improved cleaning and lower foam properties.

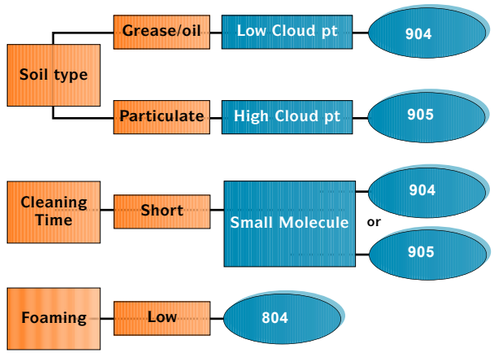
Comparison ofEhonol 904with a standard alcohol ethoxylate, for example $C_{9\text{-}11}$ alcohol + 6 EO, shows reduced foam and improved degreasing.

ETHONOLvs. Standard Ethoxylated Alcohol Product



Formula:
8% Nonionic + 7% TKPP + X% SXS 10g/l Dilution

How to choose the Right Nonionic Surfactant



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ETHOCA offers Hydrotropic co-surfactants that can be selected for either low foam or high foam cleaning applications.

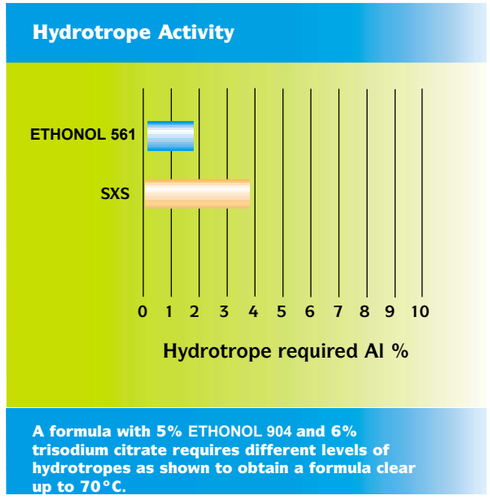
Hydrotropic Co-surfactants

Hydrotropes

A hydrotrope is a substance that increases the solubility of an ingredient that is slightly soluble in water. In cleaning formulations the nonionic surfactant can be insoluble in the presence of electrolytes, such as chelates and builders. Therefore, the addition of a hydrotrope is required to develop a shelf stable cleaning formulation.

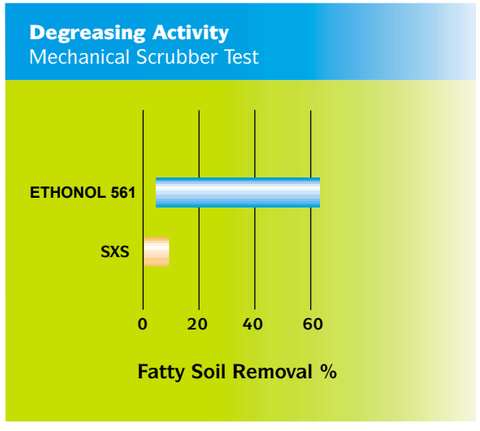
Many surfactants can serve as hydrotropes while at the same time bringing additional functions such as corrosion protection, boosted cleaning, low foaming, etc. Choosing the right hydrotropic co-surfactant is critical to the development of extremely effective water-based cleaning formulations.

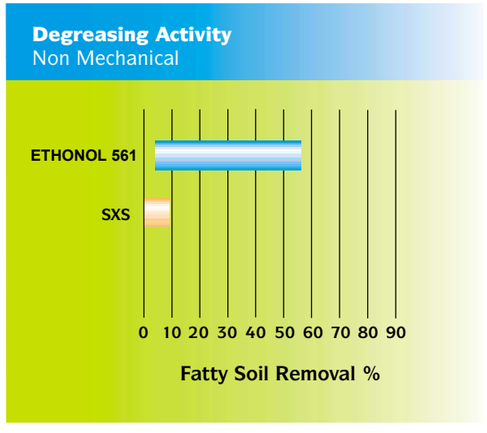
As shown graphically, the amount of hydrotrope needed to obtain a formulation that is clear up to 70°C depends upon the choice of hydrotrope.



A formula with 5% ETHONOL 904 and 6% trisodium citrate requires different levels of hydrotropes as shown to obtain a formula clear up to 70°C.

Dilution of these formulations [1:50 with hard water (200 ppm WHO)] results in differentiated cleaning performances under both mechanical and non-mechanical conditions. Selection of ETHONOL 561as the hydrotrope results in a boost of cleaning compared to the formula using SXS





Hydrophilic Quaternary Ammonium Compounds

Product Name	Chemical Description	Appearance @ 25°C	% Active	Properties	Main Applications
ETHONOCAL 561	Proprietary Cationic	Liquid	100	Hydrotrope Dispersing Medium Foaming	Waterbased Degreasing (Acid or Alkaline) Vehicle Cleaners & All Purpose Cleaners (Inert listed)

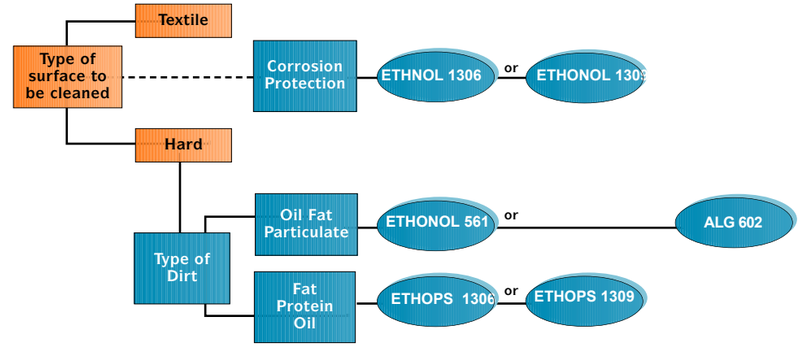
Alkylpolyglucosides

ALG 802	Alkyl Polyglucoside	Liquid	65	Low Foaming Hydrotrope Dispersing Good Wetting Demulsification	Low Foam Cleaners (e.g. Metal Cleaners & CIP) Waterbased High Alkaline Cleaners High Caustic Cleaners
ALG 602	Alkyl Polyglucoside	Liquid	75	Low Foaming Hydrotrope Dispersing Good Wetting	Low Foam Cleaners (e.g. Metal Cleaners & CIP) Waterbased High Alkaline Cleaners High Caustic & Concentrated Cleaners

Phosphate Esters

ETHOPS 1306	Phosphate Ester	Liquid	43	Medium Foaming Hydrotrope Solubilizer Protein Removal Corrosion Protection	Liquid Alkaline Cleaners Liquid Detergents Hard Surface Cleaners Metal Cleaning
ETHOPS 1309	Phosphate Ester	Liquid	65	Low Foaming Hydrotrope Solubilizer Protein Removal Corrosion Protection	Liquid Alkaline Cleaners Metal Cleaning Hard Surface Cleaners

Choice of Hydrotropic Co-surfactants for Liquid Cleaners

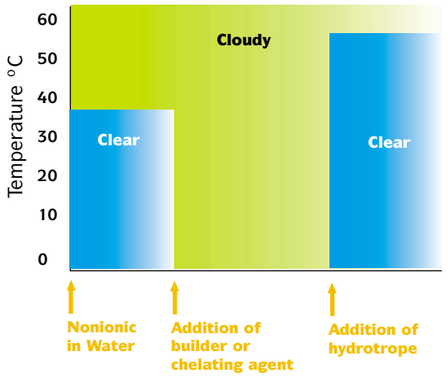


The most important factor in designing the right cleaner is to identify the main soil component and select surfactants that are optimal for these soils. Important elements to keep in mind are the cloud point of your nonionic, cloud point of your final formula, CMC, CST of your surface and surfactant compatibility.

Cloud Point - Nonionic Surfactants

The cloud point for a nonionic surfactant is the temperature at which the surfactant becomes insoluble in water. The solution will become heterogeneous and phase separation will occur upon further increase in temperature.

The optimal performance of a nonionic surfactant is obtained just below the cloud point temperature. As the temperature approaches the cloud point, the surfactant becomes increasingly insoluble and readily penetrates the oil phase. A higher percentage of surfactant molecules interact with the grease and higher cleaning efficiency is obtained.



Surfactant Type	Base Surfactant			Hydrotropic Co-surfactant			
	Nonionic			APG		Anionic	
Product Name	ETHONOL904	ETHONOL 906	ETHONOL 804	ALG 802	ALG 602	ETHOPS1306	ETHOPS1309
Soil Type:							
Grease/Oil	****	***	***	**	**	***	***
Particle	**	****	**	**	**	**	*
Protein/Fat	**	**	**	**	***	****	****
Protein/Fat[1]	*	*	**	***	***	**	**
Grease/Particle	***	**	**	*	**	**	***
Mixed[2]	**	**	**	***	***	**	**
Features:							
Low Foam	***	***	****	****	****	**	****
Hydrotrope Effect	–	–	–	*	****	***	***
Temporary Corrosion Protection (Residual)	**No**	**No**	**No**	**No**	**No**	**Yes**	**Yes**
Acid Stable	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**No**	**No**
Hydrogen Peroxide Stable[3]	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Caustic Compatible	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**No**	**Yes**
Suitable for Concentrated Formulations	**No**	**No**	**No**	**Yes**	**Yes**	**No**	**Yes**
Soluble in High Caustic	**No**	**No**	**No**	**Yes**	**Yes**	**No**	**No**
Self Spliting (Degreasing Formulations)	–	–	–	–	–	–	–
Elemental Phosphorous Content (%)	**0**	**0**	**0**	**0**	**0**	**5**	**6**

Key

**** optimal surfactant
*** good surfactant
** acceptable surfactant
* poorest surfactant

[1] In a caustic base formula.

[2] A mixed soil of protein, oil/fat and particulate.

[3] When formulated with a stabilized hydrogen peroxide system.

Clarity Interval

Addition of builders and/or chelating agents to a formulation reduces the cloud point of the nonionic surfactant. Addition of a hydrotrope improves the solubility on the nonionic thereby increasing the cloud point of the formulation. The clarity interval is the temperature range over which the formulation is stable and clear.

Final Formula Cloud Point

The cloud point of the final formulation is extremely important when removing soils heavy in greases and oils.

Particulate-based soils require dispersion, so the cloud point of the formulation is not as critical. For particulate-based soils the most important characteristics of the surfactant is its ability to disperse soil and prevent re-deposition.

