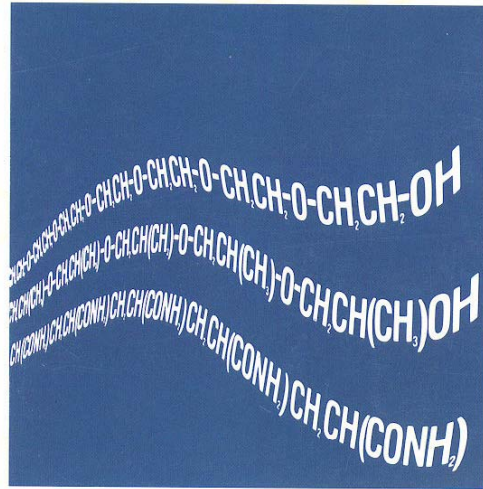


**ALKARIL CHEMICALS**



**SURFACTANTS**

Mississauga, Ontario



Winder, Georgia

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## ALKARIL CHEMICALS

Alkaril Chemicals, over a period of 25 years, has become an increasingly important manufacturer of surface active agents as well as other specialty chemicals for North American industry.

Of the many highly specialized surfactants used today in almost every type of industry, there are indeed very few that Alkaril does not presently manufacture or does not have the capability to do so.

Our modern plants, centrally located in the vicinity of Toronto, Ontario, and Atlanta, Georgia, are equipped with efficient, large scale, high temperature and pressure reactors, ethoxylation and propoxylation facilities, and other modern equipment required in such unit processes as quaternization, amidation, phosphation, esterification, sulfonation, etc.

Besides allocating considerable development resources to refinement and optimization of production techniques which have resulted in unique processing technology, we at Alkaril pay special attention to the changing technological requirements of the industries we serve.

Our greatly expanded R & D and technical service laboratories are modernly equipped and staffed by chemists with many years of experience in diverse segments of the chemical processing industry. In addition, we have efficient pilot plant facilities available to produce specialty products for your experimental needs.

We are proud of the quality of the products described in this brochure. Most are available from stock on shortest notice. However, we will gladly manufacture other homologues to minimum order.

New uses for specialty surfactants are constantly being discovered. Many old problems may be solved with new surfactants. Let us help you to solve such problems.

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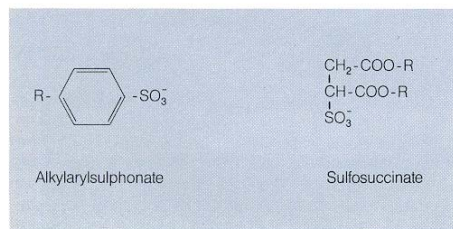
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## INTRODUCTION

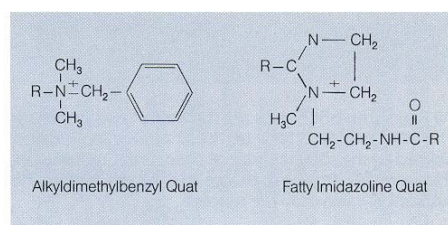
Surfactants are chemical compounds which, at very low concentrations, modify the properties at liquid-gas, liquid-liquid, and liquid-solid interfaces by markedly reducing interfacial (surface) tension. Depending upon their behaviour at such interfaces surfactants can exhibit, in varying degrees, properties which allow them to be used as wetting agents, detergents, emulsifiers, dispersants, foaming agents, solubilizers, etc. A surfactant is characterized by a molecular structure which can be more or less clearly divided into two distinct portions; one being hydrophilic or water loving and the other, hydrophobic (lipophilic) or water hating (oil loving). The hydrophobic portion of a surfactant usually consists of one or more, non-polar, aliphatic and/or aromatic, carbon chains, the hydrophilic portion usually consists of one or more charged functional groups and/or polar chains containing numerous hydratable groupings. The combination of these distinct hydrophilic and hydrophobic parts within a single molecule is responsible for the interfacial tension reduction and other unique properties peculiar to this class of chemical substances.

Based upon the hydrophile used, surface active agents can be divided into four general classes.

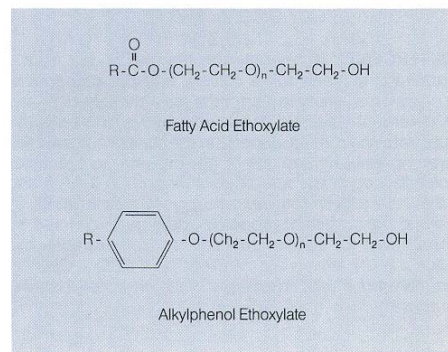
**ANIONIC SURFACTANTS** carry a negative charge on the surfactants' hydrophilic portion, usually in the form of a carboxylate, phosphate, sulfate or sulphonate radical.



**CATIONIC SURFACTANTS** carry a positive charge on the surfactants' hydrophilic portion, usually on a nitrogen atom in the form of quaternary ammonium compound, an amine salt or an imidazoline salt.

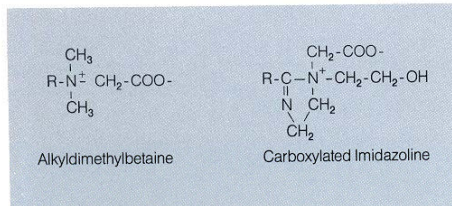


**NONIONIC SURFACTANTS** carry no charge; the hydrophilic portion usually contains numerous polar ether linkages derived from the polymerization of ethylene oxide and/or propylene oxide with the hydrophobe.



## INTRODUCTION CONTINUED

**AMPHOTERIC SURFACTANTS** contain both anionic and cationic radicals and depending upon the pH, may carry either a positive or negative charge or be electrically neutral.



All four surfactant classes are commonly used in industry. The class employed for a particular application is usually defined by the specific surfactant properties required and the chemical nature, e.g. charge, pH, stability, of the other substances involved in the process.

Surfactants have unlimited applications. They are most frequently employed as: detergents, wetting agents, emulsifiers, dispersants, foaming agents, foam stabilizers, softeners, lubricants, solubilizers, corrosion inhibitors, antistatic agents and leveling agents. Their detergency, wetting and emulsification properties are of such prime importance, that they warrant further discussion.

**DETERGENCY** is basically the removal of soil from a substrate, immersed in a solvent and the subsequent suspension or emulsification of the soil in the solvent phase. A detergent must aid the solvent in wetting both the substrate and the soil, disperse in the solvent any solid soil present, emulsify any fats or oils present, and promote solubilization of the soluble soil. Alkasurf LA-7, LA-9 and NP-9 have proven to be excellent general detergents. By varying the surfactant properties, detergents can also be formulated for special applications: for example, the Alkamide 2:1 amides are excellent hard surface cleaners and Alkasurf IPAM is an excellent detergent for dry cleaning purposes.

**WETTING AGENTS** basically reduce the surface tension of water or any other liquid, such that it can more easily come in contact with a solid surface. They are used

extensively in processes where solid materials are treated with aqueous solutions. In such applications, the wetting agent ensures that the entire surface of the solid is in contact with the aqueous phase. In other applications, wetting agents are used to spread thin liquid films over solid surfaces. Alkasurf SS-0-75, LA-7, NP-6 and NP-8 are a few of the most effective wetting agents.

**EMULSIFICATION** is, in general terms, the formation of a stable dispersion of one liquid phase within another. An emulsifier facilitates the breaking of the phase to be emulsified into microscopic droplets, disperses these droplets within the continuous phase and prevents the dispersed droplets from coalescing.

Surfactants, with regards to their emulsifying properties, can be divided into three groups: those with low HLB values (2 to 8), those with moderate HLB values (8 to 14) and those with high HLB values (14 to 18). Emulsifiers are generally blends of two or more surfactants; for water in oil emulsifiers, blends of low and moderate HLB surfactants are generally used; for oil in water emulsifiers blends of moderate and high HLB surfactants are generally used. Many of our products, individually or in blends, can function as emulsifiers; those commonly used are:

LOW HLB	Alkamuls 400 DO, SMO, STO, STS, SMS, GMO, and GMS Alkasurf NP-1, NP-4, LA-3, 0-5 and CO-5
MODERATE HLB	Alkamuls 400 MO, 600 MO, PSMO-5, PSTS-20, and PSTO-20 Alkasurf NP-6 to NP-11, LA-EP16, IPAM, CA, 0-7, and 0-9
HIGH HLB	Alkamuls PSMO-20, PSMO-30 and PSMI-20 Alkasurf NP-15 to NP-40 and LA-15

To facilitate the selection of the proper Alkaril surfactant for your application, a table which shows the major uses for each surfactant type, has been included. Further information concerning applications is given under the individual surfactants in our product list. If you require additional information, please contact our nearest sales office.

## PROPERTIES AND APPLICATIONS

PRODUCT CLASSES	FUNCTIONS											INDUSTRIES																								
	RELEASE AGENTS	EMULSIFIERS	DETERGENTS	LUBRICANTS	SOFTENERS	WETTING AGENTS	LEVELLING AGENTS	DISPERSANTS	CORROSION INHIBITORS	SOLUBILIZERS	COUPLING AGENTS	FOAMING AGENTS	FOAM STABILIZERS	DISINFECTANTS	DETERGENT	TEXTILE	COSMETIC	TOILETRY	PAINT	PHARMACEUTICAL	ASPHALT	METAL WORKING	LEATHER	RUBBER & PLASTIC	PULP & PAPER	POLYMER	AGRICULTURAL	CARPET	PETROLEUM	MINING	FOOD	COATING	FLEXIBLE PUR FOAM	RIGID PUR FOAM		
Alcohol Alkoxylates Agricultural surfactants Alkanolamides (1:1)		•	•											•	•																					•
Alkanolamides (2:1) Alkanolamide Ethoxylates Alkylaryl Sulphonates		•	•	•										•	•	•						•	•													
Alkylphenol Ethoxylates Amine Ethoxylates Amine Oxides		•	•											•	•																					•
Amphoterics Benzyl Quats Block Co-Polymers		•	•											•	•	•																			•	•
Fatty Acid Ethoxylates Glycerol Esters Higher Alcohol Ethoxylates		•	•	•											•	•							•	•											•	
Imidazolines Imidazoline Quats Lower Alcohol Ethoxylates		•	•	•										•	•							•	•													
Phosphate Esters Polyethylene Glycols Polypropylene Glycols		•	•	•										•	•																					
Silicone Alkoxylates Sorbitan Esters Sorbitan Ester Ethoxylates	•	•	•	•	•									•	•	•						•	•												•	•
Sulfosuccinates Sulfosuccinate (SS-0-75) Sulfosuccinamates			•											•	•	•																				•

The chemical and physical properties of our major product lines are given in the following tables. These tables are not intended to be all inclusive. For information on any products not included herein, enquire with our nearest sales office.

## ALKAMIDE-1:1ALKANOLAMIDES

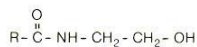
This Alkamide series of alkanolamides are reaction products of either monoethanolamine or diethanolamine or isopropanolamine with a fatty acid ester of varying chain length.

The Alkamides are used as foam stabilizers, foam boosters and thickeners in a variety of formulations that include liquid detergents, hair shampoos, bubble baths, rug shampoos, general purpose cleaners and textile scouring agents.

Products	Properties and Applications	Type
<b>Alkamide CDO</b>		coconut - DEA
<b>Alkamide CDM</b>	Coconut superamides for foam stabilizing and thickening of liquid detergent and toiletry preparations. Performance and odour improve with increased amide content.	coconut - DEA
<b>Alkamide CDE</b>		coconut - DEA
<b>Alkamide CL 63</b>	Enriched coconut diethanolamide foam stabilizer and thickener.	coconut - lauric DEA
<b>Alkamide L9DE</b>		lauric-DEA
<b>Alkamide L7DE</b>	Foam stabilizer, superfatting and thickening agent for liquid detergent, shampoo and bubble bath preparations.	lauric-myristic- DEA
<b>Alkamide L7DE-BT</b>		modified lauramide- DEA
<b>Alkamide LS0</b>	Liquified forms of Alkamide L7DE for ease of handling when formulating cosmetic preparations.	
<b>Alkamide SDO</b>	Superfatting agent, a particularly effective thickener for low active shampoo and bubble bath preparations.	soya - DEA
<b>Alkamide CME</b>		coconut - MEA
<b>Alkamide L7ME</b>	Foam stabilizers, their solid form is conducive to non-tacky spray dried powdered detergent formulations. Excellent foam boosters at elevated temperatures. Improved detergency over the corresponding diethanolamides in liquid detergent compositions. Excellent low odour foam boosters when appropriately solubilized in shampoo formulations. The handling disadvantage of the solid form can be overcome when co-solubilized in sodium xylene sulfonate solutions.	lauric - MEA
<b>Alkamide LIPA</b>		lauric - MIPA
<b>Alkamide RDO</b>	Lubricant, antiblocking and mold release agent.	ricinoleic - DEA
<b>Alkamide HTME</b>	Opacifier, thickener for shampoo, bubble bath, cream rinse and other water based systems.	stearic - MEA
<b>Alkamide HTDE</b>	Thickener, emulsifier for vegetable oil, mineral oil and microcrystalline wax.	stearic - DEA

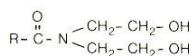


They are commonly referred to as "Super" or 1:1 alkanolamides and may be represented by the following structures:

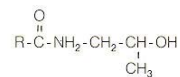


Monoethanolamide

Where R represents the Fatty Radical



Diethanolamide



Monoisopropanolamide

Where R represents the Fatty Radical

Appearance	Melting Point °C	Density g/ml 25°C	Free Acid as % Lauric	pH 1% DW	% Amide	% Total Titrable Amine	Solubility at Room Temperature									
							Water		Mineral Oil		Mineral Spirits		Aromatic Solvent		Perchloroethylene	
							1%	10%	1%	10%	1%	10%	1%	10%	1%	10%
amber liquid	—	1.0	0.5 Max.	8-11	82	7.0 Max.	D	S	D	D	S	S	D	S	S	S
amber liquid	—	1.0	0.5 Max.	8-11	87	7.0 Max.	D	D	D	D	S	S	S	S	S	S
yellow liquid	—	1.0	0.5 Max.	8-11	92	5.0 Max.	D	D	D	D	S	S	S	S	S	S
amber liquid	—	1.0	0.5 Max.	8-11	92	7.0 Max.	D	D	D	D	S	S	S	S	S	S
white, waxy solid	51	—	0.5 Max.	8-11	92	7.0 Max.	D	D	D	D	S	D	S	S	S	S
white paste	34	—	0.5 Max.	8-11	92	7.0 Max.	D	D	D	D	S	S	S	S	S	S
straw liquid	—	1.0	0.5 Max.	8-11	—	6.0-8.0	D	S	I	I	D	D	D	S	S	S
amber liquid	—	1.0	0.5 Max.	8-11	87	7.0 Max.	D	D	D	D	S	S	S	S	S	S
amber liquid	—	1.0	0.5 Max.	8-11	80	12.0 Max.	D	D	S	S	S	S	D	D	D	S
white, waxy solid	56	—	0.5 Max.	8-11	95	3.0 Max.	I	I	I	I	I	I	D	D	I	D
white, waxy solid	60	—	0.5 Max.	8-11	95	2.0 Max.	I	I	D	D	D	D	D	D	D	D
light yellow solid	63-68	—	3.0 Max.	8-11	95	3.0 Max.	D	D	D	D	D	D	I	I	D	D
amber liquid	—	1.0	0.5 Max.	8-11	—	22.5-24.5	D	D	D	D	D	I	D	I	D	I
cream solid	85-90	—	1.0 Max.	8-11	90	1.5 Max.	I	I	I	I	I	I	I	I	I	I
cream solid	50-55	—	1.0 Max.	8-11	90	5.0 Max.	D	D	D	D	S	S	S	S	S	S

Solubility: S = Soluble  
D = Dispersible  
I = Insoluble

## ALKAMIDE-2:1 ALKANOLAMIDES

This Alkamide series of alkanolamides is based on reacting diethanolamine with varying ratios of fatty acids and modified to suit a variety of industrial and institutional cleaner formulations.

These Alkamides are detergents recommended for use in compounding built liquid formulations of varying inorganic salt content and alkalinity that include hard surface cleaners, floor cleaners and wax strippers.

Products	Properties and Applications	Type
<b>Alkamide 1509</b>	Detergent base for the manufacture of floor cleaners and all purpose cleaners.	capric
<b>Alkamide 2104</b>		coconut
<b>Alkamide 2106</b>	Detergent base developed to solubilise high alkaline salt content floor cleaners and liquid hard surface cleaners.	coconut
<b>Alkamide 2110</b>	Detergent base to solubilise high silicate concentrations in products such as liquid steam cleaners and wax strippers.	coconut
<b>Alkamide 2112</b>	Detergent base for applications similar to ALKAMIDE 2110 but will produce lower foam levels.	formulated
<b>Alkamide 2122</b>	Dispersant, air entraining agent, lubricant used in processing prestressed concrete, concrete block, pipe, and brick.	formulated
<b>Alkamide 2124</b>	Combined with alkanolamine alcohol sulphates to produce low odour, viscous shampoo concentrates for the beauty trade.	lauric
<b>Alkamide 2204</b>	Detergent Bases designed for all purpose cleaners and industrial and household floor cleaners and wax strippers where high viscosity is required. Alkamide 2204A is processed from higher quality fatty acids and is more readily dispersible in aqueous systems.	coconut
<b>Alkamide 2204A</b>		coconut

These alkanolamides are also used to produce viscous non-rusting soap-synthetic floor cleaners, burnishing compounds, metal working lubricants and are frequently used in combination with nonionic ethoxylates to produce powdered carwash compounds.

The Alkamide selection will depend on various factors including the viscosity required and the degree of salt tolerance.

% Active	Appearance	% Free Acid as Lauric	pH 1% DW	% Total Titratable Amine as DEA	Density g/ml 25°C	Solubility at Room Temperature									
						Water		Mineral Oil		Mineral Spirits		Aromatic Solvent		Perchloroethylene	
						1%	10%	1%	10%	1%	10%	1%	10%	1%	10%
100	amber liquid	10.0 max.	9-10	28-36	1.0	S	S	D	D	D	D	S	S	S	S
100	amber liquid	8-9	8-11	20-24	1.0	S	S	D	D	D	D	D	S	S	S
100	amber liquid	22-24	8-11	17-20	1.0	S	S	D	D	D	D	S	S	S	S
100	amber liquid	14-15	8-11	29-33	1.0	S	S	D	D	D	D	D	S	S	S
100	amber liquid	28-32	8-11	30 Min	1.0	S	S	D	D	D	D	S	S	S	S
100	amber liquid	18-22	8-11	8-10	1.0	S	S	D	D	D	D	S	S	S	S
100	straw solid	7.0 Max.	8-11	20-24	1.0	S	S	D	D	D	D	D	S	S	S
100	amber liquid	18-21	8-11	27-31	1.0	S	S	D	D	D	D	D	S	S	S
100	amber liquid	18-22	8-11	27-31	1.0	S	S	D	D	D	D	S	S	S	S

Solubility: S = Soluble  
D = Dispersible  
I = Insoluble

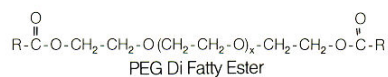
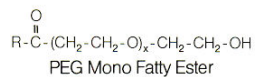
## ALKAMULS- PEG MONO AND PEG DI FATTY ACID ESTERS

Alkamuls Mono and Di Fatty Acid Esters are specialty esters of various fatty acids and polyethylene glycols and are designated by the general chemical structure outlined below. The numbers following the trade name designate the average molecular weight of the polyethylene glycol used. The letters following these numbers designate the fatty acid (hydrophobe) used.

These mono ester emulsifiers vary from oil soluble to water soluble and are used in many different applications that range from cutting oils, solvent cleaners, degreasers and pesticide formulations. They are used in the tanning and textile processes as lubricant-softeners.

The Di Fatty Acid Esters are generally more oil soluble and lower foaming than their mono ester counterparts. For these reasons they are generally used as emulsifiers for oils especially in cases where foam can create problems.

Products	Properties and Applications	HLB
<b>Alkamuls 400-MO</b>	This moderately water soluble surfactant is used in the textile industry as a dyeing assistant and in the leather industry as an emulsifier for neats-foot oil fat liquors.	11.0
<b>Alkamuls 600-MO</b>	This water soluble surfactant is used as a co-emulsifier with Alkasurf 0-7 in various industrial applications.	13.0
<b>Alkamuls EGMS</b>	Opacifying and pearlescing agent for liquid cosmetic and detergent compounds.	2.9
<b>Alkamuls 200-MS</b>	Emulsifiers for fats and oils. It provides softening and lubricating properties to textiles and leather.	8.0
<b>Alkamuls 400-MS</b>	Functions as a self emulsifying lubricant and softener in textile compositions designed for synthetic fibres.	11.2
<b>Alkamuls 200-ML</b>	Emulsifier, coupling agent and solubilizer in metal working fluids, industrial lubricants and textile lubricants.	9.8
<b>Alkamuls 400-ML</b>	Emulsifier and co-emulsifier for various cosmetic and toiletry preparations. Defoamer and levelling agent for latex paints. Dispersant for pigment and dye systems.	12.8
<b>Alkamuls 400-DS</b>	Alkamuls 400-DS is an oil soluble wax-like emulsifier and thickener used in cosmetic and industrial emulsions.	7.8
<b>Alkamuls 600-DS</b>	The PEG-Distearates are generally used as lubricants and softeners in textile applications, and as opacifiers and emulsifiers in cosmetic preparations.	10.6
<b>Alkamuls 400-DO</b>		7.2
<b>Alkamuls 600-DO</b>		10.0
<b>Alkamuls 400-DL</b>	These lipophilic members are used as emulsifiers and solubilizers for mineral oils, fats and solvents; as emulsifiers for kerosene and agricultural chemical sprays; as emulsifiers in metal working fluids, industrial lubricants and textile lubricants; and as viscosity control additives in amphoteric toiletry preparations.	10.0
<b>Alkamuls 600-DL</b>		11.5
<b>Alkamuls 400-GDL</b>		10.5
<b>Alkamuls 600-DT</b>		10.0
<b>Alkamuls 6000-DS</b>	Hydrophilic emulsifier and thickener used in textile printing, pigment manufacturing and cosmetics.	18.4



Where R represents Fatty Radical

Hydrophobe	Appearance	Sap Value	Density g/ml 25°C	Solubility at Room Temperature									
				Water		Mineral Oil		Mineral Spirits		Aromatic Solvent		Perchloroethylene	
				1%	10%	1%	10%	1%	10%	1%	10%	1%	10%
oleic	yellow liquid	77-87	1.02	D	D	D	D	D	D	S	S	S	S
oleic	yellow liquid	57-67	1.04	S	S	D	D	D	D	S	S	S	S
stearic	white solid	174-184	—	I	I	D	D	D	D	D	D	D	D
stearic	white solid	120-130	—	D	D	D	D	D	D	D	D	D	D
stearic	white solid	80-90	—	D	D	D	D	D	D	S	S	S	S
lauric	yellow liquid	142-152	1.00	D	D	D	D	D	D	D	D	D	D
lauric	yellow liquid to paste	91-101	1.03	D	D	D	D	D	D	S	S	D	S
stearic	cream solid	115-130	—	D	D	S	S	S	S	S	S	S	S
stearic	cream solid	96-106	—	D	D	D	D	S	S	S	S	S	S
oleic	amber liquid	105-115	0.98	D	D	S	S	S	S	S	S	S	S
oleic	amber liquid	92-100	1.02	D	D	D	D	S	S	S	S	S	S
lauric	yellow liquid to paste	132-142	1.00	D	D	S	S	S	S	S	S	S	S
lauric	yellow liquid to paste	106-116	1.03	D	D	D	D	D	D	S	S	S	S
lauric	amber liquid	125-135	1.00	D	D	D	I	I	I	I	I	I	I
tallow	amber liquid	90-105	0.98	D	D	D	D	S	S	S	S	S	S
stearic	cream solid	14-20	—	S	S	D	D	D	D	D	D	D	D

Solubility: S = Soluble  
D = Dispersible  
I = Insoluble

## ALKAMULS - SORBITAN ESTERS

The Alkamuls Sorbitan Esters are lipophilic emulsifiers and coupling agents.

With exception of the water dispersible Alkamuls SML, these esters function as the primary ingredient in lubricants and softeners for leather and textile fibres.

The Alkamuls Sorbitan Esters are frequently used alone or in combination with the corresponding ethoxylated sorbitan esters for the preparation of both W/O and O/W emulsions. These esters are used in cosmetics, household products, emulsifiable concentrates and industrial oils.

Products	Properties and Applications	HLB
<b>Alkamuls SML</b>	Sorbitan monolaurate is a water dispersible emulsifier for oils and fats in cosmetic and industrial oil products. It is also used to retard starch crystallization in jellies. Used as a lubricant antistat process aid in PVC resin manufacture.	8.6
<b>Alkamuls SMO</b>	Sorbitan mono oleate is a versatile oil soluble emulsifier and coupling agent for medicants and for petroleum oils, fats and waxes in the industrial, cosmetic and textile industries. It also functions as a textile and leather lubricant and softener. SMO improves pigment dispersions in lipsticks, eyeliners, mascara and other coloured cosmetics. Oil based ointments include SMO to impart a smooth feel to the skin and to reduce greasiness.	4.3
<b>Alkamuls SMS</b>	Sorbitan monostearate is used to prepare silicone defoamer emulsions for various industrial applications; paraffin wax emulsions for processing paper coatings and industrial oil emulsions. SMS serves as a textile process lubricant and as an internal lubricant for PVC film.	4.7
<b>Alkamuls STO</b>	Sorbitan trioleate is used to compound textile and leather softener finishes.	1.8
<b>Alkamuls STS</b>	Sorbitan tristearate is an extremely hydrophobic emulsifier and finds application as a fibre-to-metal lubricant for synthetic and cotton fibres	2.1

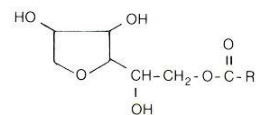
## ALKAMULS - GLYCEROL ESTERS

The Alkamuls Glycerol Esters are mixtures of mono and diesters of lauric, oleic and stearic fatty acids.

They are widely used in the textile, leather and cosmetic industries as lubricants, softeners and co-emulsifiers and as lubricant and mold release additives for industrial applications.

Products	Properties and Applications	HLB
<b>Alkamuls GMO-45LG</b>	Frequently used in mold release agents as a rust prevention additive for compounded oils and as lubricant component in synthetic fibre spin finishes. GMO is used as a lubricant-antistat aid in processing PVC film	3
<b>Alkamuls GDO</b>		2.6
<b>Alkamuls GTO</b>	Glycerol trioleate in an emulsified form produces an excellent lubricant for textiles, leather and metals. The sulfated form is a useful textile and leather softener.	0.8
<b>Alkamuls GMS-45</b>	Glycerol monostearate is an emulsifier, common to hand creams, lotions and other cosmetic formulations. GMS-45 also serves as a textile lubricant-softener.	3

A typical sorbitan monoester conforms generally to the following chemical structure:

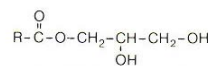


Where R represents the Fatty Radical

Hydrophobe	Appearance	Sap Value	Hydroxyl Value	Density g/ml 25°C	Solubility at Room Temperature										
					Water		Mineral Oil		Mineral Spirits		Aromatic Solvent		Perchloroethylene		
					1%	10%	1%	10%	1%	10%	1%	10%	1%	10%	
mono-laurate	amber liquid	160-170	320-350	1.0	D	D	S	S	S	S	S	S	S	S	I
mono-oleate	amber liquid	145-160	193-210	1.0	I	I	S	S	S	S	S	S	S	S	S
mono-stearate	cream flake	147-157	235-260	1.0	I	I	I	I	I	I	S	S	S	S	S
tri-oleate	amber liquid	170-190	55-70	1.0	I	I	S	S	S	S	S	S	S	S	S
tri-stearate	cream flake	176-188	66-80	1.0	I	I	I	I	I	I	S	S	S	S	S

Solubility: S = Soluble  
D = Dispersible  
I = Insoluble

A typical glycerol monoester conforms generally to the following chemical structure:



Where R represents the Fatty Radical

Hydrophobe	Appearance	Ester Conc.	Free Glycerine	Density g/ml 25°C	Solubility at Room Temperature										
					Water		Mineral Oil		Mineral Spirits		Aromatic Solvent		Perchloroethylene		
					1%	10%	1%	10%	1%	10%	1%	10%	1%	10%	
mono-oleate	amber liquid to paste	40% min. Mono-Ester	1% max.	0.98	I	I	D	D	D	D	S	S	S	S	S
di-oleate	amber liquid		2% max.	0.94	I	I	S	D	S	D	S	S	S	S	S
tri-oleate	amber liquid	85% min. Tri-Ester	1% max.	0.95	I	I	S	S	S	S	S	S	S	S	S
mono-stearate	off-white flake	40% min. Mono-Ester	4-7%	-	I	I	I	I	I	I	I	I	I	I	I

Solubility: S = Soluble  
D = Dispersible  
I = Insoluble

## ALKAMULS PS-SORBITAN ESTER ETHOXYLATES

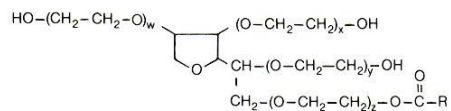
The Alkamuls Polyoxethylene Sorbitan Esters are emulsifiers and coupling agents. They are frequently used in combination with the lipophilic Alkamuls Sorbitan Esters from which they are derived. The numeral in the product name designates the molar quantity of ethylene oxide.

The Alkamuls Polyoxethylene Sorbitan Esters are O/W emulsifiers and function as co-emulsifiers for petroleum oils, fats and solvents; as emulsifiers in cosmetics, household products, industrial lubricants, fibre to metal textile lubricants and softeners for fibre and yarn; as solubilizers for oils and fragrances.

Products	Properties and Applications	HLB
<b>Alkamuls PSML-4</b>	Alkamuls PSML-4 is used in PVC emulsion polymerisation processing.	13.3
<b>Alkamuls PSML-20</b>	This multipurpose o/w emulsifier is used extensively to solubilize vitamin oils, essential oils, balsam and tar preparations in cosmetics and pharmaceuticals and to solubilize fragrances in cosmetics. Alkamuls PSML-20 is widely used as a viscosity modifier in non-irritating shampoos. Used extensively in textiles as a nylon spin finish; as a processing rinse aid in rayon finishing and as an emulsifier for dye carriers.	16.7
<b>Alkamuls PSMO-5</b>	In the textile industry, top quality fibre lubricants and softeners are prepared from Alkamuls PSMO-5 emulsified oils. Quality cutting oils are produced with 10% PSMO-5 in the oil phase.	10.0
<b>Alkamuls PSMO-20</b>	Functions as an emulsifier for aliphatic alcohols in tobacco sucker control concentrates. It is a versatile O/W emulsifier and functions as a co-emulsifier with sorbitan esters for petroleum oils, fats, solvents and waxes. It performs similar functions to that of Alkamuls PSML-20.	15.0
<b>Alkamuls PSMS-4</b>	In pharmaceuticals, the waxy PSMS-4 is used in suppositories. It is a useful fibre-to-metal lubricant for all fibres and yarns.	9.6
<b>Alkamuls PSMS-20</b>	Used as an o/w emulsifier for mineral oils, fats and waxes. This emulsifier is used in the preparation of paraffin wax emulsions for textiles and paper coatings. It is a useful fibre-to-metal textile lubricant.	15.0
<b>Alkamuls PSTO-20</b>	O/W emulsifier for petroleum oils, fats and waxes. It is an excellent textile and leather lubricant. It is an effective emulsifier for oils and fats used in textile finishes and fibreglass lubricants.	11.0
<b>Alkamuls PSTS-20</b>	The pronounced lubricating and softening property of Alkamuls PSTS-20 makes it useful in textile processing and in compounding textile finishes. It is used to emulsify petroleum oils and vegetable oils.	10.5



A typical sorbitan monoester ethoxylate conforms generally to the following chemical structure:



Where R represents the fatty radical

Hydrophobe	Appearance	Sap Value	Hydroxyl Value	Density g/ml 25°C	Solubility at Room Temperature										
					Water		Mineral Oil		Mineral Spirits		Aromatic Solvent		Perchloroethylene		
					1%	10%	1%	10%	1%	10%	1%	10%	1%	10%	
mono-laurate	yellow liquid	100-115	215-255	1.0	D	D	D	D	D	D	D	D	D	I	I
mono-laurate	yellow liquid	40-50	96-108	1.1	S	S	I	I	I	I	S	S	I	I	
mono-oleate	yellow liquid to paste	96-104	134-150	1.0	D	D	D	D	D	D	S	S	I	I	
mono-oleate	yellow liquid	45-55	65-80	1.1	S	S	D	D	D	I	S	D	D	D	
mono-stearate	cream solid	98-113	170-200	1.1	D	D	D	D	I	I	D	D	I	I	
mono-stearate	yellow liquid to paste	45-55	81-96	1.1	D	D	S	D	S	D	S	D	D	D	
tri-oleate	yellow liquid	80-95	39-52	1.0	D	D	S	D	S	D	D	D	D	D	
tri-stearate	cream solid	88-98	44-60	1.0	D	D	S	S	S	S	D	D	D	D	

Solubility: S = Soluble  
D = Dispersible  
I = Insoluble

## ALKAMOX - AMINE OXIDES

The Alkamox line of amine oxides is derived from high molecular weight tertiary amines through a hydrogen peroxide oxidation process. Alkamox LO, lauryl dimethyl amine oxide, Alkamox CAPO, coco amido propyl dimethyl amine oxide and Alkamox ODM, oleyl dimethyl amine oxide represent the major products within this class.

The amine oxides are useful in shaving creams, lotions and fine fabric laundry formulations. The Alkamox Amine Oxides are of interest in other applications that include petroleum fuel additives, plating bath additives, antistats for textile finishing, emulsion polymerisation initiators and pigment dispersants.

Products	Properties and Applications	Appearance
<b>Alkamox ODM</b>	Substantive to skin and hair thereby providing antistat emolliency and conditioning features to shampoo formulations.	clear liquid
<b>Alkamox L20</b>	Excellent foamers, wetters and foam stabilizers for rug shampoos, fine laundry detergents, dishwashing detergents, shampoos, bubble baths, cleaner formulations and antistatic textile softeners. Its antistatic properties together with its natural detergency and emolliency properties make it an alternative to alkanolamides in certain applications. It also finds acceptance in other areas: notably, as a foam stabilizer in foam rubber, in electroplating paper coatings and as a pour point depressant for mineral oils.	clear liquid
<b>Alkamox LO</b>		clear liquid
<b>Alkamox CAPO</b>	Exhibits stronger foam stabilization characteristics than Alkamox LO, consequently it is particularly suited to hair shampoo formulations. Applications are otherwise similar to Alkamox LO.	clear liquid

## ALKAMINOX - AMINE ETHOXYLATES

The Alkaminox trade name is followed by a letter and a numeral; the letter designates the alkyl fatty group; the numeral designates the approximate number of moles of ethylene oxide in the adduct.

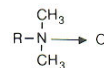
Because of their strong cationic character, the Alkaminox Ethoxylated Amines exhibit unique properties when

compared to nonionic ethoxylated surfactants. Because many surfaces such as metal, glass, plastics and some organic compounds have a negative surface charge, Alkaminox surfactants are attracted to that surface and form a tightly bound film. This surface absorption allows Alkaminox to be widely used as follows:

Products	Properties and Applications	HLB
<b>Alkaminox T-2</b>	T-2 is a useful emulsifier for paraffin wax emulsions. Used as a co-emulsifier with Alkaminox T-5 in solvent cleaners for the electroplating industry.	4.0
<b>Alkaminox T-5</b>	In metal cleaning operations, the emulsifying, corrosion resistant and non-foaming properties of Alkaminox T-5 make it useful for formulating non-aqueous solvent cleaners and biphasic emulsion cleaners.	9.0
<b>Alkaminox T-12, 90%</b>		12.5
<b>Alkaminox T-15</b>	Excellent levelling agents for the dyeing of nylon with anionic dyes. Alkaminox T-15 effectively controls the rate of strike and dye migration and it facilitates rapid dyeing at elevated temperatures.	14.2
<b>Alkaminox T-25</b>		16.0
<b>Alkaminox T-30, 90%</b>	Used in the textile industry to formulate levelling and migrating agents for acid, milling and metal complex dyes on nylon and wool.	16.6
<b>Alkaminox T-50</b>		17.5
<b>Alkaminox SO-5</b>	Similar applications to Alkaminox T-5 with the advantage of being a liquid product.	9.2

These notably mild, high sudsing products provide foam stability comparable to such stabilizers as the alkanolamides in liquid detergent and liquid toiletrie preparations. In shampoo and bath products, the Alkamox Amine Oxides are mild to the skin, impart lubricity and emolliency, have antistatic and conditioning effects on the hair, are resistant to hard water precipitation and have good lime soap dispersing properties.

The general chemical structure for the Alkamox Amine Oxides are outlined below:



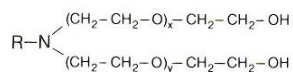
Where R represents the fatty radical

% Amine Oxide	Free Amine % Max	Free Peroxide % Max	Density g/ml 25°C	Solubility at Room Temperature											
				Water		Mineral Oil		Mineral Spirits		Aromatic Solvent		Perchloroethylene			
				1%	10%	1%	10%	1%	10%	1%	10%	1%	10%		
50	1.5	0.5	1.0	S	S	D	D	I	I	I	I	I	I	I	I
29-31	1.5	0.5	1.0	S	S	D	D	I	I	I	I	I	I	I	I
29-31	1.5	0.3	1.0	S	S	D	D	I	I	I	I	I	I	I	I
29-31	1.5	0.3	1.0	S	S	D	D	I	I	I	I	I	I	S	I

Solubility: S = Soluble  
D = Dispersible  
I = Insoluble

- corrosion inhibitor in the metal and petroleum industries
- softener and antistat in textile processing because they exhaust on to textile fibres,
- textile scouring, desizing and dyeing assistant
- coating of asphalt aggregates
- dispersing of pigments in oil
- wetting agent in hair dyes.

The general chemical structure of the Alkaminox Ethoxylated Amines is outlined below:



Where R represents the fatty radical

Fatty Radical	Appearance	Colour Gardner max.	Neutra- lization Equivalent	Density g/ml 25°C	Tertiary Amine % min.	Solubility at Room Temperature									
						Water		Mineral Oil		Mineral Spirits		Aromatic Solvent		Perchloroethylene	
						1%	10%	1%	10%	1%	10%	1%	10%	1%	10%
tallow	liquid-paste	14	345-355	0.92	95	D	D	S	S	S	S	S	S	S	S
tallow	liquid-paste	14	470-495	0.97	98	D	D	D	D	D	D	D	D	S	S
tallow	amber liquid	14	994-1061	0.98	98	S	S	I	I	I	I	I	I	S	S
tallow	paste	12	895-955	1.03	98	S	S	I	I	I	I	D	D	D	D
tallow	solid	12	1300-1450	-	98	S	S	I	I	I	I	D	D	D	D
tallow	amber liquid	12	1666-1888	1.06	98	S	S	I	I	I	I	I	I	S	S
tallow	yellow solid	12	2350-2550	-	98	S	S	I	I	I	I	I	I	I	I
soya	liquid	14	470-495	0.98	98	D	D	D	D	D	D	D	D	S	S

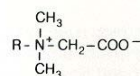
Solubility: S = Soluble  
D = Dispersible  
I = Insoluble

## ALKATERIC - AMPHOTERICS

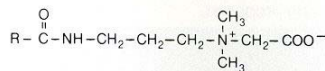
The members of the Alkateric series represent a range of amphoteric products and consist of:

- Betaines: Oleyl (OB), Coco (CB) and Palmitic (PB)
- Amido-Betaines: Coco (CAB) and Lauric (LAB)
- Imidazoline Derivative: Coco (2CIB)
- N-Substituted Amino Acid Derivatives: Tallow (A2P-TS), Lauric (A2P-LPS) and Coco (AP-C).

Each of these classes of amphoteric is represented by the following general chemical structures, where R is the fatty radical.

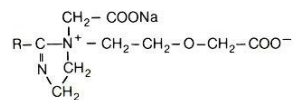
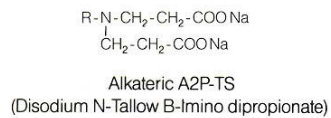
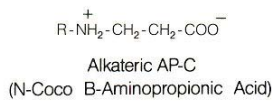


Alkateric CB  
(Coco Betaine)



Alkateric CAB  
(Coco Amido Betaine)

Products	Properties and Applications	Appearance
<b>Alkateric OB</b>		amber gel
<b>Alkateric CB</b>	Extremely mild additives which are substantive to skin and hair. They find application as conditioners, antistats and emollients in a variety of personal care products. With lauryl sulphates, they act as solubilizers, viscosity builders and foam boosters. They are stable under acidic and alkaline conditions.	clear liquid
<b>Alkateric PB</b>		clear, yellow liquid
<b>Alkateric CAB-A</b>		clear liquid
<b>Alkateric CAB-O</b>	Applications are similar to Alkateric OB and CB, however, they provide relatively more conditioning, foaming and viscosity building properties to shampoo formulations. LAB maximizes foam level and viscosity response.	clear liquid
<b>Alkateric LAB</b>		clear liquid
<b>Alkateric 2CIB</b>	Alkateric 2CIB exhibits excellent foam characteristics in both hard and soft water and is completely compatible with anionic, nonionic and cationic surfactants. The mildness to skin, eye and mucous membranes make it an essential component for non-irritating shampoo formulations.  The compatibility with soap, the excellent wetting properties, the stability over a wide pH range, the hard water stability and the excellent lime soap dispersing properties make Alkateric 2CIB a suitable emulsifier for industrial cleaner and heavy duty liquid detergent formulations.	clear, amber liquid
<b>Alkateric A2P-TS</b>	This group of amphoteric, N-substituted amino acid derivatives, is stable in extreme pH conditions and tolerant of high levels of inorganic salts. These properties are well suited to alkaline cleaning compound formulations.	yellow liquid
<b>Alkateric A2P-LPS</b>	They are high foamers with the tallow derivative having particularly stable foam characteristics. Alkateric A2P-LPS being a strong wetter and weak emulsifier finds application in fire fighting compounds for water immiscible liquids.	pale yellow liquid
<b>Alkateric AP-C</b>		clear liquid



Alkateric 2CIB  
(Di Carboxylic Coco Imidazoline Derivative - Sodium Salt)

% Solids	NaCl % Max.	pH as is	Density g/ml 25°C	Solubility at Room Temperature										
				Water		Mineral Oil		Mineral Spirits		Aromatic Solvent		Perchloroethylene		
				1%	10%	1%	10%	1%	10%	1%	10%	1%	10%	
49-51	13	5-8	1.1	S	S	I	I	I	I	I	I	I	I	I
34-36	6.5	6-9	1.04	S	S	I	I	I	I	I	I	I	I	I
20-25	—	6-8	1.00	S	S	I	I	I	I	I	I	I	I	I
34-36	5.5	7-8	1.05	S	S	I	I	I	I	I	I	I	I	I
30-32	5.5	7-8	1.05	S	S	I	I	I	I	I	I	I	I	I
33-37	6	7-9	1.04	S	S	I	I	I	I	I	I	I	I	I
49.5-50.5	17	8-9.5	1.18	S	S	I	I	I	I	I	I	I	I	I
29-31	—	13-14	1.04	S	S	I	I	I	I	I	I	I	I	I
29-31	—	7-8	1.04	S	S	S	D	D	D	I	I	I	I	I
42-44	—	5-6	0.99	S	S	I	I	I	I	I	I	I	I	I

Solubility: S = Soluble  
D = Dispersible  
I = Insoluble

## ALKAZINE - IMIDAZOLINES

Alkazine Fatty Imidazolines are specialty cationic emulsifiers having the general chemical formula listed below. The letter following the Alkaril trade name designates the hydrophobe.

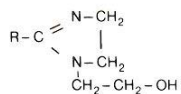
In general, the Alkazines function as oil soluble emulsifying agents producing cationic O/W emulsions. Once the Alkazines are neutralised below pH 8.5 with either a suitable fatty acid or a mineral acid, the Alkazines become more hydrophilic and form clear stable solutions; prior to neutralization, the Alkazines are only water dispersable. Alkazine salts are good emulsifiers for semi-polar or polar solvents such as toluene, pine oil or triglycerides.

The tertiary nitrogen atom in the Alkazine ring allows formation of quaternary ammonium compounds through interaction with alkyl halides. These derived quaternaries have stronger cationic characteristics than the imidazoline salts.

The Alkazine salts are excellent antistats, having a strong affinity for negatively charged surfaces. They show a strong tendency to displace water from wet metal substrates and play an important role in the so-called water displacing solvents. The Alkazines function as, corrosion inhibitors in mineral acid toilet bowl cleaners and acid pickling systems.

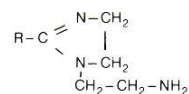
Products	Properties and Applications	Hydrophobe
<b>Alkazine C</b>	Alkazine C increases the lubricity of water soluble cutting oils and synthetic coolants. Alkazine C is an effective antistat and is used to treat woollen rugs, synthetic rugs, and plastic substrates to eliminate static charge accumulation. In the petroleum industry, Alkazine C is used in oil well acidifying and secondary recovery where its anticorrosion property and fungicidal action are important. It can also be used as an antifungal agent in the treatment of wood and is suggested as a slime control additive in paperboard.	coconut
<b>Alkazine O</b>	Alkazine O is the most popular member of the series and functions as an emulsifier for both carnauba wax and light mineral oil in car wax emulsions. It is an effective wetting agent, emulsifier and an extremely effective corrosion inhibitor in toilet bowl cleaners prepared from hydrochloric acid. It is used for the flocculation of negatively charged particles in pigment flushing in the manufacture of paints and finds applications in emulsion cleaners and in agricultural emulsions. Also used to increase the lubricity of synthetic coolant formulations.	oleic
<b>Alkazine TO</b>	Alkazine TO is used as an emulsifier for the production of cationic bitumen emulsions. Alkazine TO can be used as an economical replacement for Alkazine O in many applications.	tall oil
<b>Alkazine TO-A</b>	Aggregate wetting agent and emulsifier in cationic asphalt emulsions.	tall oil

Alkazine C, Alkazine O, Alkazine TO and Alkazine TO. are hydroxyethyl imidazolines represented by the following structure:



Where R represents the Fatty Radical

Alkazine TO-A is an amino ethyl imidazoline represented by the following structure:



Where R represents the Fatty Radical

Appearance	Imidazoline Content	Neutralisation Equivalent	Density g/ml 25°C	Solubility at Room Temperature										
				Water		Mineral Oil		Mineral Spirits		Aromatic Solvent		Perchloroethylene		
				1%	10%	1%	10%	1%	10%	1%	10%	1%	10%	
brown paste	85% min.	265-295	0.96	D	D	I	I	I	I	I	I	I	I	I
amber liquid	85% min.	335-365	0.94	D	D	S	S	S	S	S	S	S	S	S
amber liquid	80% min.	355-385	0.94	I	I	D	D	S	S	S	S	S	S	S
amber liquid	70% min.	240-300	0.93	D	D	S	S	S	S	S	S	S	S	S

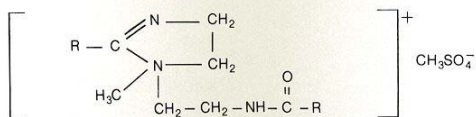
Solubility: S = Soluble  
D = Dispersible  
I = Insoluble

## ALKAQUAT - QUATERNARY COMPOUNDS

The following Alkaquat series of products consists of:

- Imidazoline Quats such as Alkaquats O, T and ST.
- Alkyl Benzyl Dimethyl Quats such as Alkaquats DMB-ST and DMB-451.
- Dialkyl Dimethyl Methosulfate Quats such as Alkaquat DHTS.
- Complex and compounded quats such as Alkaquats DAET and DAPT.
- Alkoxylated Di-fatty Quats such as Alkaquat DAET and DAPT.

The Fatty Imidazonline Quaternary type fabric softener bases are represented by the following general chemical structure.

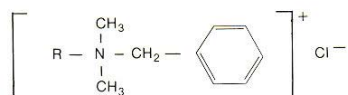


Where R represents the Fatty Radical

Products	Properties and Applications	Derivative of:
<b>Alkaquat O</b>	Antistat, Fabric Softener. A readily water dispersible low odour, fabric softener base suited to compounding concentrates above 20% active for commercial and institutional use. Used with conventional nonionic ethoxylates to formulate clear fine fabric laundry detergents with built-in antistat and softener for all kinds of textile fibres.	oleic
<b>Alkaquat T</b>	ALKAQUAT T is a popular chemical compound used to produce liquid fabric softener preparations for the consumer market. Its substantivity to the many fibres makes this powerful antistat/softener extremely effective at low concentrations. Its physical form makes compounding relatively easy.	tallow
<b>Alkaquat ST</b>	Antistat and fabric softener. This high melting waxy form is applicable to impregnating woven and non-woven substrates for the manufacture of dryer sheet softener and antistat products.	stearic
<b>Alkaquat DMB-ST, 25%</b>	Strongly cationic and imparts antistatic properties to wool, cotton and other cellulosic fibres. Being an excellent conditioner, softener and antistatic agent for human hair, it has been widely used in hair rinses for many years. It also finds application as a softener for textiles and paper products.	stearic
<b>Alkaquat DMB-451, 50%</b>	Disinfectant, sanitizer, germicide. This benzyl quat is usually compounded to produce alkaline germicidal cleaning preparations for use in food plants, breweries, hospitals and institutions. DMB-451 is used directly to control algae in swimming pools and external water cooling systems. It is also used as a dye retardant in the textile industry.	40% C12 50% C14 10% C16
<b>Alkaquat DMB-451, 80%</b>		40% C12 50% C14 10% C16
<b>Alkaquat DHTS</b>	Its high melting point makes this softener concentrate suitable for use in the manufacture of dryer sheet softeners. (See also Alkaquat ST above).	hydrogenated tallow
<b>Alkaquat DAET</b>	This complex di-tallow quaternary exhibits a wide dispersion stability range along with good softening and antistat properties. It is particularly suitable for use in low concentrate household softeners.	tallow
<b>Alkaquat DAPT</b>	This complex di-tallow quaternary exhibits a wide dispersion stability range along with good softening and antistat properties. It is particularly suitable for use in either high concentrate household or commercial laundry softeners.	tallow

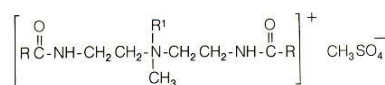


The Alkyl Benzyl Dimethyl compounds are represented by the following general structure.



Where R represents the fatty radical

The Alkoxyated Di-fatty Quaternary compounds are represented by the following general structure.



Where R represents the fatty radical and R<sup>1</sup> is either polyethoxyethanol or polypropoxypropanol

Appearance	% Active	pH as is	Density g/ml 25°C	Solubility at Room Temperature										
				Water		Mineral Oil		Mineral Spirits		Aromatic Solvent		Perchloroethylene		
				1%	10%	1%	10%	1%	10%	1%	10%	1%	10%	
amber liquid	74.0-76.0	6.0-6.8	0.95	D	D	S	S	S	S	S	S	S	S	S
yellow liquid	74.0-76.0	6.0-6.8	0.95	D	D	S	S	D	D	S	D	S	S	S
yellow solid	74.0-76.0	6.0-6.8 <sup>(1)</sup>	—	D	D	S	S	D	D	S	S	S	S	S
white paste	24.0-26.0	3.0-5.0 <sup>(2)</sup>	0.95	D	D	I	I	I	I	I	I	I	I	I
clear liquid	50.0-51.0	7.0-9.0	0.96	S	S	I	I	I	I	I	I	I	I	I
clear liquid	80.0-81.0	6.5-9.5 <sup>(3)</sup>	0.93	S	S	D	I	D	I	S	S	S	S	S
almost white solid	88.0-90.0	5.5-7.5 <sup>(4)</sup>	—	D	D	D	D	D	D	S	S	S	S	S
yellow paste	89.0-91.0	4.0-7.0 <sup>(4)</sup>	0.99	D	D	S	S	S	S	S	S	S	S	S
amber liquid to paste	89.0-91.0	4.0-7.0 <sup>(4)</sup>	0.96	D	D	S	S	S	S	S	S	S	S	S

pH: (1) 10% in Isopropanol  
 (2) 0.5% in Distilled Water  
 (3) 10% in Distilled Water  
 (4) 5% in Distilled Water  
 (5) 10% in 1:1 Ethano/Distilled Water

Solubility: S = Soluble  
 D = Dispersible  
 I = Insoluble

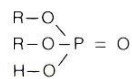
## ALKAPHOS - PHOSPHATE ESTERS

This class of surfactants combines numerous important properties such as efficient oil emulsification, good detergency for cotton and synthetics, effective wetting properties, excellent rinsability and dispersing properties.

They are stable to extremes of acidity and alkalinity; soluble in aromatic and chlorinated solvents; help sequester iron and other metal ions and have low toxicity and good rust inhibition properties.

Products	Properties and Applications	Hydrophobe
<b>Alkaphos L3-64A</b>	Oil soluble emulsifier and wetting agent. Extremely effective antistat-detergent in dry cleaning charge soaps and is an excellent non-corrosive lubricant for industrial coolant formulations. Useful textile yarn lubricant.	aliphatic
<b>Alkaphos R6-33A</b>	Oil soluble emulsifiers and wetting agents. Effective anti-soil redeposition agents. Lubricants for textile fibres.	aromatic
<b>Alkaphos R6-33S</b>		aromatic
<b>Alkaphos B6-56A</b>	Water dispersible emulsifier. The wetting, antistatic and non-corrosive properties makes it applicable in textile operations such as scouring, kier boiling, peroxide bleaching and as an antistatic lubricant for yarns. It is also used in dry cleaning charge soap formulations; solvent degreasers and as a lubricant in industrial coolant formulations.	mixed base
<b>Alkaphos R6-36A</b>		aromatic
<b>Alkaphos L6-15S</b>	Oil soluble, high foaming, emulsifiers and detergents with excellent wetting properties.	aliphatic
<b>Alkaphos R9-07A</b>		aromatic
<b>Alkaphos R9-47A</b>	Versatile detergent for compounding heavy duty liquid detergents and dry cleaning detergents. A useful dedusting agent for alkaline powder cleaners. In textiles, its low rewetting property finds applications in the water repellent treatment of cottons.	aromatic
<b>Alkaphos R6-15A</b>	Low foaming hydrotrope. Effective at solubilizing low foaming nonionic surfactants in liquid alkaline cleaners.	aromatic
<b>Alkaphos L4-27A</b>	High foaming detergent particularly suited to solubilizing nonionic surfactants in cleaners containing moderate concentrations of caustic and electrolytes.	aliphatic
<b>Alkaphos L3-15A</b>	Moderate foaming detergent for cleaners containing moderate concentrations of caustic and electrolytes.	aliphatic
<b>Alkaphos L6-36A</b>	This excellent emulsifier and wetting agent coupled with its powerful solubilization characteristics makes it particularly suited to compounding highly alkaline and high electrolyte content liquid cleaning preparations.	aliphatic
<b>Alkaphos L6-36S</b>	This neutral potassium salt of a hydrotropic phosphate ester is used to effectively solubilize low foam nonionic surfactants without contributing to additional foam height. Used in industrial cleaners to solubilize normal concentrations of alkaline salts.	aliphatic
<b>Alkaphos R5-09A</b>	Combination of excellent coupling properties, low foaming and high caustic and electrolyte tolerances make these products particularly suited to highly alkaline, highly electrolytic low foaming cleaning preparations.	aromatic
<b>Alkaphos R5-09S</b>		aromatic

The Alkaphos phosphate esters are a series of unique anionic surfactants and are represented by the following general chemical structure.



The following structure typifies a di-ester but the commercial products generally contain a mixture of mono and di-esters.

Where R is the hydrophobe

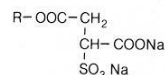
Appearance	Form	% Active	mg KOH/g to pH 5.0-5.5	mg KOH/g to pH 9.0-9.5	Density g/ml 25°C	Solubility at Room Temperature										
						Water		Mineral Oil		Mineral Spirits		Aromatic Solvent		Perchloro- ethylene		
						1%	10%	1%	10%	1%	10%	1%	10%	1%	10%	
yellow liquid	acid	100	95-110	190-210	1.03	D	D	S	S	S	S	S	S	S	S	S
pale yellow liquid	acid	100	47-72	77-92	1.08	D	D	I	I	D	D	S	S	S	S	S
pale yellow liquid	sodium salt	88 min.	0	25-30	1.11	S	S	I	I	S	S	S	S	S	S	S
yellow liquid	acid	100	85-100	170-190	1.06	D	D	D	D	S	S	S	S	S	S	S
pale yellow liquid	acid	100	90-110	190-210	1.12	I	I	I	I	D	D	S	S	S	S	S
yellow liquid	potassium salt	90	0	15-25	1.10	S	S	D	D	I	I	D	D	D	D	D
amber liquid	acid	100	62-82	120-140	1.12	S	S	I	I	I	I	S	S	S	S	S
yellow liquid	acid	100	75-90	150-170	1.09	S	S	D	D	D	D	S	S	S	S	S
pale yellow liquid	acid	100	105-125	190-210	1.23	S	S	I	I	I	I	I	I	S	S	S
pale yellow liquid	acid	100	136-156	278-298	1.11	S	S	I	I	D	D	D	D	D	D	D
pale yellow liquid	acid	100	110-130	185-205	1.05	S	S	D	D	S	S	S	S	S	S	S
yellow liquid	acid	80	110-125	220-240	1.10	S	S	D	D	I	I	D	D	D	D	D
yellow liquid	potassium salt	41-43	0	0-10	1.04	S	S	I	I	I	I	I	I	I	I	I
amber liquid	acid	100	195-225	380-410	1.31	S	S	I	I	D	D	D	D	D	D	D
pale yellow liquid	potassium salt	50 min.	0	5-15	1.27	S	S	I	I	I	I	I	I	I	I	I

Solubility: S = Soluble  
D = Dispersible  
I = Insoluble

## ALKASURF - SULFOSUCCINATES AND SULFOSUCCINAMATES

This series is a related group of anionic sulfosuccinates and sulfosuccinamates and can be classified as follows:

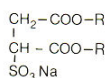
- The mono-ester sulfosuccinates represented by the following general chemical structure include Alkasurf SS-L7DE, SS-LHE, SS-OA-HE, SS-L9ME and SS-DA4-HE.



Where R represents an alkanolamide or ethoxylated alcohol radical.

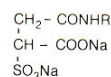
Products	Properties and Applications	Description
<b>Alkasurf SS-L7DE</b>		sodium sulfosuccinate ester of lauric diethanolamide
<b>Alkasurf SS-LHE</b>	Mild water soluble detergents that possess both anionic and nonionic characteristics and will tolerate small amounts of cationic surfactants without interference. These alkylolamide sulfosuccinates combine foam stabilization with high foaming properties. Used alone or in combination with alcohol sulphates, they produce a low level of skin and eye irritation for shampoo, bubble bath and liquid detergent preparations.	Sodium lauryl Sulfosuccinate
<b>Alkasurf SS-OA-HE</b>		Sodium oleylamido-PEG-2 sulfosuccinate
<b>Alkasurf SS-L9ME</b>	Widely used in high foaming rug shampoos because of its detergency, copious lather and formation of an extra dry residue. When used in combination with sodium lauryl sulphate, it converts the normally tacky hygroscopic residue to a dry, friable, easy to vacuum residue.	sodium sulfosuccinate ester of lauric monoethanolamide
<b>Alkasurf SS-DA4-HE</b>		ethoxylated alcohol sulfosuccinate
<b>Alkasurf SS-IB-45</b>		sodium di-isobutyl sulfosuccinate
<b>Alkasurf SS-MA-80</b>	Form low critical micelle concentrations, resist hard water salts and function effectively in emulsion polymerization systems.	sodium dihexyl sulfosuccinate
<b>Alkasurf SS-NO</b>		sodium N-alkyl sulfosuccinamate
<b>Alkasurf SS-0-40</b>	Dilution of Alkasurf SS-0-75.	sodium dioctyl sulfosuccinate
<b>Alkasurf SS-0-60PG</b>		sodium dioctyl sulfosuccinate
<b>Alkasurf SS-0-70PG</b>	Same as Alkasurf SS-0-75 but have improved cold temperature stability properties.	sodium dioctyl sulfosuccinate
<b>Alkasurf SS-0-75</b>	A most effective, traditional wetting agent used in a wide variety of industrial applications. In the textile industry it is used to improve dyestuff dispersability and to speed up wetting and penetrating times in resin treatment operations. It is recommended for dry cleaning charge soap systems, paint pigment dispersions and for dewatering lead/zinc concentrates.	sodium dioctyl sulfosuccinate
<b>Alkasurf SS-TA</b>	A particularly effective foaming agent for non-carboxylated SBR latices where stable, uniform cell structure is necessary in applications such as foam carpet underlay and foam for foam-backed carpet. It is also recommended in the emulsification of waxes for oil and wax polishes.	sodium N-octadecyl sulfosuccinamate

2. The di-ester sulfosuccinates represented by the following general chemical structure include Alkasurf SS-IB-45, SS-MA-80, SS-O-40, SS-O-60, SS-O-70 and SS-O-75.



Where R represents the alkyl radical

3. The sulfosuccinamates include Alkasurf SS-NO and Alkasurf SS-TA and are represented by the following general chemical structure:



Where R represents a long chain alkyl radical

Appearance	Concentration %	pH as is	Density g/ml 25°C	Solubility at Room Temperature											
				Water		Mineral Oil		Mineral Spirits		Aromatic Solvent		Perchloroethylene			
				1%	10%	1%	10%	1%	10%	1%	10%	1%	10%		
pale yellow liquid	39-41	5.0-7.5	1.1	S	S	D	D	I	I	I	I	I	I	I	I
white paste	39-41	5.0-7.0	1.0	S	S	I	I	I	I	I	I	I	I	I	I
amber liquid	39-41	6.0-8.0	1.0	S	S	I	I	I	I	I	I	I	I	I	I
white paste	40 min.	6.0-7.0 <sup>(1)</sup>	1.0	S	S	I	I	I	I	I	I	I	I	I	I
yellow liquid	29-31	5.0-6.0	1.1	S	S	D	D	D	D	D	D	D	D	D	D
clear liquid	44-46	5.0-7.0	1.1	D	D	D	D	S	S	S	S	S	S	S	S
clear liquid	79-81	5.0-7.0	1.1	D	D	D	D	S	S	S	S	S	S	S	S
amber liquid	33-37	5.0-7.0	1.0	S	S	I	I	I	I	I	I	I	I	I	I
colourless liquid	39-41	5.0-7.0	1.0	S	D	I	I	I	I	I	I	I	I	I	I
colourless liquid	59-61	5.0-7.0	1.1	S	I	I	I	S	S	S	S	S	S	S	S
pale yellow liquid	69-71	5.0-7.0	1.1	S	I	I	I	S	S	S	S	S	S	S	S
colourless liquid	75 min.	5.0-6.0 <sup>(3)</sup>	1.1	D	D	D	D	S	S	S	S	S	S	S	S
cream paste	34-36	8.0-10.0 <sup>(2)</sup>	1.0	D	D	I	I	I	I	I	I	I	I	I	I

pH: (1) 1% in Distilled Water  
 (2) 5% in Distilled Water  
 (3) 10% in Distilled Water

Solubility: S = Soluble  
 D = Dispersible  
 I = Insoluble

## ALKASURF CO-CASTOR OIL ETHOXYLATES

The Alkasurf CO series represent a range of ethoxylated castor oils. These ethoxylated triglycerides vary from lipophilic to hydrophilic in character and are designated by a number that approximates the average number of moles of E.O. per mole of castor oil.

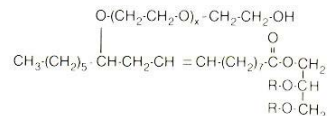
The lipophilic members are soluble in chlorinated and aromatic solvents and are used as emulsifiers for waxes and oils.

The higher ethoxylates are frequently used as water soluble emulsifiers for oils, solvents and waxes. They are also used as lubricants in fat liquor baths found in the leather industry.

Products	Properties and Applications	HLB
<b>Alkasurf CO-10</b>	In latex paints, it is used as pigment dispersant and simultaneously improves gloss and cold temperature stability. In textiles, it is used as emulsifier in low foam dye carriers.	7.2
<b>Alkasurf CO-15</b>	In textiles, this water dispersable emulsifier is used in synthetic fibre lubricants and as a vat dyeing assistant. Also used as a component of cutting oils and hydraulic fluids.	8.6
<b>Alkasurf CO-20</b>		10.3
<b>Alkasurf CO-25</b>	Water soluble emulsifiers for animal and vegetable fats and oils, fatty acids, waxes and solvents. They are excellent pigment dispersants. In leather processing, they are used for degreasing and as emulsifiers/lubricants in fat liquor baths. In textiles, they are used as emulsifiers in softener and dye carrier compositions and as emulsifiers/antistats in synthetic fibre lubricants.	11.0
<b>Alkasurf CO-30</b>		11.7
<b>Alkasurf CO-36</b>		12.7
<b>Alkasurf CO-40</b>	Water soluble emulsifiers, emollients and lubricants. Slightly more hydrophilic than CO-30 but properties and applications are essentially similar.	13.0

The most important applications are found in the textile industry where they are used as lubricants and antistats in textile fibre processing, emulsifiers for dye carrier and emulsifiers for hydrophobic glycerides in blended fibre lubricants.

These products are represented by the following structure:



Where R also represent fatty radical

Appearance	Colour Gardner	Cloud Point °C	SAP Value	Density g/ml 25°C	Solubility at Room Temperature									
					Water		Mineral Oil		Mineral Spirits		Aromatic Solvent		Perchloroethylene	
					1%	10%	1%	10%	1%	10%	1%	10%	1%	10%
liquid	4	45-49 <sup>(1)</sup>	121-126	1.00	D	D	I	I	D	D	D	D	D	D
liquid	4	56-60 <sup>(1)</sup>	104-109	1.02	D	D	I	I	D	I	S	D	S	D
liquid	4	65-69 <sup>(1)</sup>	91-96	1.02	S	S	I	I	I	I	S	S	S	S
liquid	4	46-50 <sup>(3)</sup>	81-86	1.03	S	S	I	I	I	I	S	S	S	S
liquid	4	48-61 <sup>(3)</sup>	73-78	1.04	S	S	D	D	I	I	S	S	S	S
liquid	4	56-67 <sup>(3)</sup>	63-73	1.05	S	S	D	D	I	I	S	S	S	S
paste	4	60-70 <sup>(3)</sup>	55-65	1.05	S	S	D	D	I	I	S	S	S	S

Cloud Point: (1) 10% in 25% Butyl Carbitol  
 (2) 1% in Distilled Water  
 (3) 1% in 5% Sodium Chloride

Solubility: S = Soluble  
 D = Dispersible  
 I = Insoluble

## ALKAMIDOX - ALKANOLAMIDE ETHOXYLATES

The Alkamidox Ethoxylated Alkanolamides are ethoxylates of coconut monoethanolamides. The digit in the product name designates the molar quantity of the ethylene oxide per mole of monoethanolamide.

These products combine the properties of the alkanolamides and the poloxyethylene nonionics. As the amount of ethylene oxide is increased, the properties change from the typical alkanolamide to a more predominant ethoxylate character.

Products	Properties and Applications	Fatty Radical
<b>Alkamidox C-2</b>	Alkamidox C-2 is readily dispersible in water and overcomes the difficult to disperse property of coconut monoethanolamide from which it is produced. It contributes much of the excellent thickening and foam stabilizing property of the monoethanolamide to formulated detergents and cosmetics. It is dispersible in aromatic, chlorinated and aliphatic solvents as well as in petroleum solvents and mineral oil.	coconut
<b>Alkamidox C-5</b>	Alkamidox C-5 is a water soluble emulsifier, foam stabilizer and thickener stable to hot alkaline conditions; consequently, it is used in strongly alkaline industrial cleaners where foam stabilization is a requirement. It is recommended for car wash and wax wash formulas, where it contributes foam stability and a residual wax-like finish to the car. Its bland attribute suggests use in liquid dish detergents and cosmetic applications.	coconut

## ALKASURF-SULPHONATES

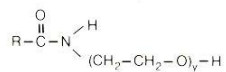
The Alkasurf Sulphonates are derivatives of Alkasurf LA Acid, a linear alkyl benzene sulphonic acid.

Products	Properties and Applications	Description
<b>Alkasurf IPAM</b>	The isopropylamine derivative is an oil soluble emulsifier frequently used to formulate solvent degreasers, emulsion cleaners and dry cleaning charge soaps. Added to fuel oil, it solubilizes trace water thereby eliminating corrosive water deposits	isopropyl-amine DBS
<b>Alkasurf T</b>	The triethanolamine derivative is a high sudsing, completely water soluble intermediate suited to bubble bath and concentrated shampoo compositions.	triethanol-amine DBS
<b>Alkasurf CA</b>	The calcium derivative is completely biodegradable and is used extensively as an emulsifier in combination with ethoxylated nonionics in self-dispersing liquids. In the textile industry it is used as a dispersant in the polyester yarn dyeing process. Emulsifier for agricultural chemicals.	calcium DBS



Most applications for the Alkamidox type compound are based on their stability to strong alkalis – a distinct advantage over fatty alkanolamides.

These products conform generally to the following chemical structure:



Where R represents the Fatty Radical

Appearance	pH 5% DW	Congealling Temperature °C	Density g/ml 25°C	Solubility at Room Temperature									
				Water		Mineral Oil		Mineral Spirits		Aromatic Solvent		Perchloro- ethylene	
				1%	10%	1%	10%	1%	10%	1%	10%	1%	10%
tan paste	10.0-11.5	19-21	—	D	D	I	I	I	I	S	S	S	S
yellow liquid	10.0-11.5	13-15	1.0	S	S	I	I	I	I	S	S	S	S

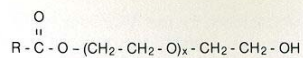
Appearance	% Active	pH	Density g/ml 25°C	Solubility at Room Temperature									
				Water		Mineral Oil		Mineral Spirits		Aromatic Solvent		Perchloro- ethylene	
				1%	10%	1%	10%	1%	10%	1%	10%	1%	10%
yellow liquid	90-93	5.0-6.5 <sup>(1)</sup>	1.06	D	D	S	S	S	S	S	S	S	S
yellow liquid	56-58	6.0-7.0 <sup>(2)</sup>	1.08	S	S	I	I	I	I	D	D	I	I
amber liquid	59-61	6.0-8.0 <sup>(3)</sup>	1.00	D	D	S	S	S	S	S	S	S	S

pH: (1) 10% in Methanol  
(2) 10% in Distilled Water  
(3) 5% in Distilled Water

Solubility: S = Soluble  
D = Dispersible  
I = Insoluble

## ALKASURF - FATTY ACID ETHOXYLATES

The Alkasurf Fatty Acid Ethoxylates are nonionic surfactants having a wide range of detergent and emulsifying properties and are designated by the following general chemical structure.



Where R represents the fatty radical

Products	Properties and Applications	HLB
<b>Alkasurf O75-7</b>		10.0
<b>Alkasurf O-9</b>		11.0
<b>Alkasurf O75-9</b>	These moderately water soluble emulsifiers are used primarily in textile products as dyeing assistants and in particular as textile fibre additives based on their outstanding lubricant and antistat properties. They also find use in the leather industry as an emulsifier in fat liquors.	11.0
<b>Alkasurf P-7</b>		10.2
<b>Alkasurf PEL-9</b>		12.6
<b>Alkasurf O-14</b>	This water soluble surfactant is used as a co-emulsifier with O-7 and O-9 various industrial applications.	13.0
<b>Alkasurf S-1</b>	Opacifying and pearlescing agent for liquid cosmetic and detergent compounds.	2.9
<b>Alkasurf S-8</b>		11.2
<b>Alkasurf S-9</b>	Functions as a self emulsifying lubricant and softener in textile compositions designed for synthetic fibres.	11.2
<b>Alkasurf S65-8</b>	Similar to Alkasurf S-8 but suited to applications where slightly higher melting point is required.	11.2
<b>Alkasurf S-40</b>	This strongly hydrophilic surfactant performs as a lubricant and as an emulsifier in the production of concentrated, pourable textile lubricants and softeners based on waxy fatty acid esters. Widely used as an emollient and co-emulsifier in cosmetic creams and lotions.	17.0
<b>Alkasurf L-9</b>		12.8
<b>Alkasurf L-14</b>	Emulsifiers and co-emulsifiers for various cosmetic and toiletry preparations. Defoamers and levelling agents for latex paints. Dispersants for pigment and dye systems.	14.6

Regarding the following list of products, the Alkasurf trade name is followed by a letter which identifies the fatty radical, followed by a digit which designates the molar quantity of the ethylene oxide.

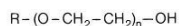
The Alkasurf Fatty Acid Ethoxylates are monoesters and have end uses similar to the Alkasurf Polyethylene Glycol Mono Fatty Acid Esters.

Hydrophobe	Appearance	Sap Value	Density g/ml 25°C	Solubility at Room Temperature									
				Water		Mineral Oil		Mineral Spirits		Aromatic Solvent		Perchloroethylene	
				1%	10%	1%	10%	1%	10%	1%	10%	1%	10%
oleic	amber liquid	95-105	1.0	D	D	D	D	D	D	S	S	S	S
oleic	yellow liquid	75-85	1.02	D	D	D	D	D	D	S	S	S	S
oleic	amber liquid	75-85	1.0	D	D	D	D	D	D	S	S	S	S
palmitic	yellow paste	94-111	0.98	D	D	D	D	D	D	S	S	D	S
pelargonic	clear to hazy liquid	94-104	1.05	D	D	D	D	D	D	S	S	D	S
oleic	yellow liquid	57-67	1.04	S	S	D	D	D	D	S	S	S	S
stearic	white solid	174-184	—	I	I	D	D	D	D	D	D	D	D
stearic	white solid	80-90	—	D	D	D	D	D	D	S	S	S	S
stearic	white solid	80-90	—	D	D	D	D	D	D	S	S	S	S
stearic	white flake	80-95	—	D	D	D	D	D	D	S	S	S	S
stearic	white flake	25-35	—	S	S	I	I	I	I	S	I	I	I
lauric	yellow liquid to paste	91-101	1.03	D	D	D	D	D	D	S	S	D	S
lauric	yellow liquid to paste	67-77	1.05	S	S	D	D	D	D	D	D	D	D

Solubility: S = Soluble  
D = Dispersible  
I = Insoluble

## ALKASURF - ALCOHOL ETHOXYLATES

The Alkasurf Ethoxylated Alcohols are represented by the following formula. The digits following the hyphen in the product name designate the molar quantity of ethylene oxide.



Where R is the fatty alcohol alkyl group and 'n' is the average number of moles combined polyoxyethylene.

This group of Alkasurf biodegradable surfactants represents a wide range of ethoxylates processed from various fatty alcohol hydrophobes. These extremely stable products are excellent detergents, wetting agents and emulsifiers; they are used as dispersants, solubilizers, coupling agents, fibre lubricants, antistats, levelling agents and dyeing assistants.

Products	Properties and Applications	HLB
<b>Alkasurf LA23-3</b>	Detergent-emulsifier, intermediate, dispersant. A detergent intermediate for the manufacture of biodegradable ethoxysulfates for liquid hand dishwashing, shampoo, bubble bath and specialty industrial preparations. Performs well as a wetter and co-emulsifier with Alkasurf LA23-6.5 in prespotting and prelaundry wash treatment formulations.	8.1
<b>Alkasurf LA23-6.5</b>	A general purpose detergent with good wetting properties, designed for household detergent products.	12.0
<b>Alkasurf LAN-1</b>		3.7
<b>Alkasurf LAN-2</b>	Natural C12-C14 fatty alcohol adducts containing 1 mole, 2 mole and 3 mole E.O. per mole of alcohol respectively. Detergent intermediates for the manufacture of biodegradable shampoo grade ethoxysulfates.	5.8
<b>Alkasurf LAN-3</b>		8.0
<b>Alkasurf LAN-23</b>	Water soluble natural C12-C14 fatty alcohol ethoxylate which functions as an emulsifier and solubilizer in cosmetics; as a post ad stabilizer for synthetic latices and as a solvent emulsifier for textile dye carriers.	17.0
<b>Alkasurf LA-3</b>	A detergent intermediate for the manufacture of high foaming biodegradable ethoxysulfates for liquid dishwashing detergent, bubble baths, shampoos, and miscellaneous industrial applications. ALKASURF LA-3 is an excellent W/O emulsifier for mineral oil, kerosene and chlorinated solvents; these mineral oil emulsions find use as textile lubricants.	8.0
<b>Alkasurf LA-7</b>	Water soluble biodegradable surfactant used in a variety of household and institutional cleaner formulations. The strong wetting and emulsifying properties makes it versatile in both aqueous and kerosene based pre-spotter formulations.	12.0
<b>Alkasurf LA-9</b>	Water soluble biodegradable detergent. General purpose nonionic emulsifier suited to many applications, but particularly to heavy duty controlled foaming detergents and heavy duty liquid detergents in which LA-9 retains its high performance over a wide range of temperature.	13.1
<b>Alkasurf LA-9, 85%</b>	Liquid, dilution of Alkasurf LA-9.	13.1
<b>Alkasurf LA-12</b>		14.4
<b>Alkasurf LA-12, 80%</b>	Versatile nonionic emulsifiers similar to LA-9 but they are more hydrophilic. LA-12 has been shown to be effective in the desinization of unbleached sulfite pulp. LA-12, 80% is a liquid, dilution of Alkasurf LA-12.	14.4
<b>Alkasurf LA-15</b>		15.3

The lower POE ratio members are oil soluble detergents, emulsifiers and co-emulsifiers that will readily emulsify a wide range of oils, waxes and solvents. As intermediates, they can be sulfated to produce high foaming anionics for liquid detergent, shampoos and bubble baths.

The higher POE ratio members of this group function as water soluble emulsifiers that have many diverse applications including general purpose cleaners, heavy duty liquid and

powder detergents, metal cleaners, mold release agents and as solvent emulsifiers in textile dye carrier systems.

The Oleyl and Stearyl Alcohol derivatives function mainly as emulsifiers and solubilizers in roll-on deodorants and topical cosmetic applications. The Tallow derivatives are used in the textile industry as detergents and lubricants and as dyeing assistants for wool/synthetic blends.

Hydrophobe	Appearance	Cloud Point °C	Density g/ml 25°C	Solubility at Room Temperature									
				Water		Mineral Oil		Mineral Spirits		Aromatic Solvent		Perchloroethylene	
				1%	10%	1%	10%	1%	10%	1%	10%	1%	10%
C12-C13	liquid		0.93	D	D	S	S	D	D	S	S	S	S
C12-C13	liquid	42-48 <sup>(1)</sup>	0.96	S	S	D	D	D	D	S	S	S	S
C12-C14	liquid	37-39 <sup>(2)</sup>	0.88	I	I	S	S	S	S	S	S	S	S
C12-C14	liquid	50-54 <sup>(2)</sup>	0.90	D	I	S	D	S	D	S	S	S	S
C12-C14	liquid	58-62 <sup>(2)</sup>	0.93	D	D	S	D	S	D	S	S	S	S
C12-C14	white solid	90.5-93.5 <sup>(3)</sup>	—	S	S	I	I	I	I	S	S	S	S
C12-C15	liquid	58-62 <sup>(2)</sup>	0.93	D	D	S	S	D	D	S	S	S	S
C12-C15	liquid	48-52 <sup>(1)</sup>	0.97	S	S	D	D	D	D	S	S	S	S
C12-C15	white paste	75-79 <sup>(1)</sup>	0.98	S	S	D	D	D	D	S	S	S	S
C12-C15	liquid	75-79 <sup>(1)</sup>	0.98	S	S	D	D	S	D	S	S	S	S
C12-C15	white paste	90-100 <sup>(1)</sup>	1.00	S	S	D	D	D	D	S	S	S	S
C12-C15	liquid	90-100 <sup>(1)</sup>	1.00	S	S	I	I	I	D	S	S	I	D
C12-C15	white solid	85-88 <sup>(3)</sup>	—	S	S	I	I	D	D	S	S	S	S

Cloud Point: (1) 1% in Distilled Water  
 (2) 10% in 25% Butyl Carbitol  
 (3) 1% in 5% Sodium Chloride

Solubility: S = Soluble  
 D = Dispersible  
 I = Insoluble

## ALKASURF-ALCOHOL ETHOXYLATES Continued...

Products	Properties and Applications	HLB
<b>Alkasurf TDA-5</b>	This water dispersible surfactant has outstanding wetting, emulsifying, and dispersing properties suited to low temperature textile scouring. This intermediate can be phosphated to produce phosphate esters.	10.5
<b>Alkasurf TDA-6</b>	These extremely stable high quality emulsifiers are used in topical cosmetic applications similar to the Alkasurf OA-10 series. The low unsaturation of the stearyl alcohol ethoxylates offer long shelf life stability and function over a wide pH range.	11.4
<b>Alkasurf TDA-7</b>		12.1
<b>Alkasurf TDA-8.5</b>		12.5
<b>Alkasurf DA-4</b>		10.5
<b>Alkasurf DA-6</b>	Excellent wetting penetrant and low foam characteristics find application in textile industry products. Alkasurf DA-6 finds use as emulsifier in polyethylene emulsions.	12.5
<b>Alkasurf OA-10</b>	Typically used as the high HLB component of an emulsifier pair in topical cosmetic formulations where high quality, blandness and low odour are prerequisites.	12.4
<b>Alkasurf SA-2</b>	These extremely stable high quality emulsifiers are used in topical cosmetic applications similar to Alkasurf OA-10. The low unsaturation of the stearyl alcohol ethoxylates offer long shelf life stability and function over a wide pH range.	4.9
<b>Alkasurf SA-10</b>		12.4
<b>Alkasurf TA-40</b>	This strongly hydrophilic tallow fatty alcohol derivative is economical and more frequently used in the textile industry as detergent and as dyeing assistant for wool/synthetic fibre blends.	17.4

## ALKAMIDE STEDA - BISTEARAMIDE

Alkamide STEDA is a reaction product of ethylene diamine with stearic acid. This amide is a high melting neutral solid flake with very low solubility characteristics. These properties lead to applications as a synthetic wax, lubricant and anti-

foaming agent. Alkamide STEDA is used as a mold release agent for plastics, a lubricant in wire drawing and extrusion processes and as an internal and external lubricant in

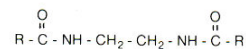
Product	Properties and Applications	Appearance
<b>Alkamide STEDA</b>	De-foamer, lubricant, mold-release agent, antistat.	light tan solid

Hydrophobe	Appearance	Cloud Point °C	Density g/ml 25°C	Solubility at Room Temperature									
				Water		Mineral Oil		Mineral Spirits		Aromatic Solvent		Perchloroethylene	
				1%	10%	1%	10%	1%	10%	1%	10%	1%	10%
C13	liquid	65-68 <sup>(1)</sup>	0.96	D	D	D	S	S	S	S	S	S	S
C13	opaque liquid	69-73 <sup>(1)</sup>	0.98	D	D	S	D	S	I	S	S	S	S
C13	liquid	72-75 <sup>(1)</sup>	0.98	D	S	D	S	S	S	S	S	S	S
C13	liquid	52-56 <sup>(2)</sup>	0.98	S	S	D	S	S	S	S	S	S	S
C10	liquid	60-66 <sup>(4)</sup>	0.95	D	D	D	S	S	S	S	S	S	S
C10	liquid	60-70 <sup>(1)</sup>	1.00	D	S	D	S	S	S	S	S	S	S
oleyl	paste	53-60 <sup>(2)</sup>	—	S	S	D	D	D	D	S	S	D	D
stearyl	white solid	57-61 <sup>(1)</sup>	—	I	I	I	I	I	I	S	S	S	S
stearyl	white solid	60-64 <sup>(2)</sup>	—	S	S	I	I	D	D	S	D	S	D
tallow	white solid	75-79 <sup>(3)</sup>	—	S	S	I	I	I	I	I	I	D	D

Cloud Point: (1) 10% in 25% Butyl Carbitol  
(2) 1% in Distilled Water  
(3) 1% in 10% Sodium Chloride  
(4) 1% in 10% Butyl Carbitol

Solubility: S = Soluble  
D = Dispersible  
I = Insoluble

processing thermoplastic resins. Bisteamide is also used as a defoamer in the pulp and paper industry. Alkamide STEDA is represented by the following structure:



Where R represents stearic radical.

Melting Point °C	Free Acid as % Lauric	% Amide	% Total Amine	Solubility at Room Temperature									
				Water		Mineral Oil		Mineral Spirits		Aromatic Solvent		Perchloroethylene	
				1%	10%	1%	10%	1%	10%	1%	10%	1%	10%
141-145	4.0 max	95	1.0 max.	I	I	I	I	I	I	I	I	I	I

## ALKASURF NP - NONYL PHENOL ETHOXYLATES

The Alkasurf NP Ethoxylates have physical and chemical properties similar to the Alkasurf Ethoxylated Alcohols and Alkasurf Ethoxylated Octyl Phenols. The numeral in the product name designates the approximate molar quantity of ethylene oxide.

In addition to being oil soluble emulsifiers the low POE ratio members are intermediates which can be sulfated to produce high foaming anionic surfactants.

Products	Properties and Applications	
<b>Alkasurf NP-1</b>	Oil soluble emulsifier and dispersing agent for petroleum oils. Co-emulsifier and retardant in hair color preparations. Used as a defoamer in combination with water soluble ethoxylates.	4.6
<b>Alkasurf NP-4</b>		9.0
<b>Alkasurf NP-5</b>	Oil soluble detergents and emulsifiers. Emulsifiers for a wide range of fats, oils and waxes. Intermediates for sulfation to produce high foaming anionic detergents and for phosphorylation to produce lubricants and antistatic agents.	10.0
<b>Alkasurf NP-6</b>		11.0
<b>Alkasurf NP-8</b>	Water soluble, versatile detergents, wetting agents and emulsifiers. In the textile industry for the processing of wool, cotton and synthetics, they are used in all phases of production that include scouring, warp sizing, carbonizing, and bleaching. Applicable to formulating many household and industrial cleaning compounds and antimicrobials such as detergent sanitizers. As emulsifiers, they cover a wide range of medium polarity oils and solvents and find use in agricultural chemical preparations.	12.0
<b>Alkasurf NP-9</b>		13.4
<b>Alkasurf NP-10</b>		13.5
<b>Alkasurf NP-11</b>	Water soluble surfactants compatible with iodophors, quaternaries and phenolics. They function as detergents, detergent additives, solubilizers and dispersants. Can be used in similar applications to ALKASURF NP-9 while being more soluble at elevated temperatures.	13.8
<b>Alkasurf NP-12</b>		13.9
<b>Alkasurf NP-15</b>	The increased solubility at elevated temperatures makes these surfactants with good wetting and penetrating properties effective in highly electrolyte formulations such as bottle washing compounds, metal cleaners and heavy duty alkaline cleaners.	15.0
<b>Alkasurf NP-15 80%</b>		15.0
<b>Alkasurf NP-20</b>	High temperature textile scouring agent. Effective in high concentrations of electrolytes. Co-emulsifier for oils, fats, waxes and solvents. Acts as de-emulsifier for petroleum oil emulsions.	16.0
<b>Alkasurf NP-30</b>		17.1
<b>Alkasurf NP-30 70%</b>	Recommended as solubilizers and co-emulsifiers for highly polar substances. Applications are similar to ALKASURF NP-20	17.1
<b>Alkasurf NP-35 70%</b>		17.4
<b>Alkasurf NP-40</b>		17.7
<b>Alkasurf NP-40 70%</b>	Highly water soluble emulsifiers and stabilizers used in applications where maximum water solubility is required at normal and elevated temperatures. Used widely in emulsion polymerisation of synthetic latices for latex paint, floor finishes, paper coatings and textile finishes.	17.7
<b>Alkasurf NP-50 70%</b>		18.0
<b>Alkasurf NP-100</b>		18.0



Alkasurf NP Ethoxylates are extremely stable to strong acidic and alkaline conditions thereby, making them useful emulsifying, wetting and dispersing agents in a wide variety of formulated products.

Appearance	% Active Min.	Cloud Point 1% D.W. °C	Density g/ml 25°C	pH 5% DW	Solubility at Room Temperature										
					Water		Mineral Oil		Mineral Spirits		Aromatic Solvent		Perchloroethylene		
					1%	10%	1%	10%	1%	10%	1%	10%	1%	10%	
liquid	99	—	0.99	6-8	I	I	D	S	S	S	S	S	S	S	S
liquid	99	56-61 <sup>(1)</sup>	1.03	6-8	I	I	S	S	S	S	S	S	S	S	S
liquid	99	62-66 <sup>(1)</sup>	1.04	6-8	I	I	S	S	S	S	S	S	S	S	S
liquid	99	68-72 <sup>(1)</sup>	1.04	6-8	D	I	I	I	S	S	S	S	S	S	S
liquid	99	25-30	1.05	6-8	S	D	I	I	D	S	S	S	S	S	S
liquid	99	52-56	1.05	6-8	S	S	I	I	D	I	S	S	S	S	S
liquid	99	62-66	1.06	6-8	S	S	I	I	I	I	S	S	S	S	S
liquid	99	70-74	1.06	6-8	S	S	I	I	I	I	S	S	S	S	S
liquid	99	81-85	1.06	6-8	S	S	I	I	I	I	S	S	S	S	S
liquid to paste	99	60-64 <sup>(2)</sup>	1.07	6-8	S	S	I	I	I	I	D	D	S	D	
liquid	79-81	60-64 <sup>(2)</sup>	1.07	6-8	S	S	I	I	I	I	I	I	D	D	
white solid	99	70-72 <sup>(2)</sup>	1.08	6-8	S	S	I	I	I	I	I	I	I	I	I
white solid	99	74-78 <sup>(2)</sup>		6-8	S	S	I	I	I	I	I	I	I	I	I
liquid	69-71	74-78 <sup>(2)</sup>	1.09	6-8	S	S	I	I	I	I	I	I	I	I	I
liquid	69-71	75-77 <sup>(2)</sup>	1.09	6-8	S	S	I	I	I	I	I	I	I	I	I
white solid	99	75-77 <sup>(2)</sup>		6-8	S	S	I	I	I	I	I	I	I	I	I
liquid	69-71	75-77 <sup>(2)</sup>	1.09	6-8	S	S	I	I	I	I	I	I	I	I	I
liquid	69-71	75-77 <sup>(2)</sup>	1.09	6-8	S	S	I	I	I	I	I	I	I	I	I
white solid	99	75-77 <sup>(2)</sup>	—	6-8	S	S	I	I	I	I	I	I	I	I	I

Cloud Point: (1) 10% in 25% Butyl Carbitol  
(2) 1% in 10% Sodium Chloride

Solubility: S = Soluble  
D = Dispersible  
I = Insoluble

## ALKASURF OP-OCTYL PHENOL ETHOXYLATES

The Alkasurf OP series have physical and chemical properties similar to both the Alkasurf Ethoxylated Alcohols and the Alkasurf Ethoxylated Nonyl Phenols. The numeral in the product name designates the approximate molar quantity of ethylene oxide.

Products	Properties and Applications	HLB
<b>Alkasurf OP-1</b>	Oil soluble emulsifier and dispersing agent for petroleum oils. Co-emulsifier and retardant in hair color preparations.	3.6
<b>Alkasurf OP-5</b>	Useful emulsifiers to improve the detergency, dispersability and wetting action of non polar hydrocarbon solvents and oils. Find use in solvent emulsion cleaners and dry cleaning charge soaps. Effectively used as agrichemical and floor finish emulsifiers.	10.4
<b>Alkasurf OP-6</b>		11.4
<b>Alkasurf OP-8</b>	Water dispersable surfactant with applications similar to OP-10 but producing a lower foam level. Used in metal cleaners, acid cleaners, floor cleaners, and controlled foam powdered laundry detergents. Effective emulsifier for pesticide formulations such as wettable powders and emulsifiable concentrates.	12.5
<b>Alkasurf OP-10</b>	High performance, water soluble surfactant used to improve the detergency and wetting properties of household and industrial cleaning formulations. This excellent hard surface detergent, stable to strong acid and alkalis makes it versatile for laundry compounds, metal cleaners, acid cleaners, detergent sanitizers, floor cleaner and liquid hand dishwashing detergents.	13.5
<b>Alkasurf OP-12</b>	Being slightly more water soluble than OP-10, Alkasurf OP-12 is an effective multipurpose surfactant. It is particularly suited to alkyl benzene sulphonate liquid detergents, quaternary sanitizers and all purpose cleaners where it functions as a detergent, solubilizer-coupler-hydrotrope and foam stabilizer for the system. Also used as a wetting agent for caustic soda and mineral acid cleaners.	14.5
<b>Alkasurf OP-30</b>	Primary emulsifiers for vinyl acetate and acrylate emulsion polymerisation. These highly water soluble surfactants offer higher foaming characteristics than the lower ethoxylates in the series, making them useful in speciality applications.	17.5
<b>Alkasurf OP-30-70%</b>		17.5
<b>Alkasurf OP-40</b>		18.0
<b>Alkasurf OP-40-70%</b>		18.7
<b>Alkasurf OP-70-50%</b>		18.7

Appearance	% Active min.	Cloud Point °C	Density g/ml 25°C	pH 5% D.W.	Solubility at Room Temperature									
					Water		Mineral Oil		Mineral Spirits		Aromatic Solvent		Perchloroethylene	
					1%	10%	1%	10%	1%	10%	1%	10%	1%	10%
liquid	99		99	6-8	I	I	S	S	S	S	S	S	S	S
liquid	99	64-68 <sup>(1)</sup>	1.04	6-8	I	I	D	I	S	S	S	S	S	S
liquid	99	67-70 <sup>(1)</sup>	1.04	6-8	I	I	I	I	S	S	S	S	S	S
liquid	99	22-28 <sup>(2)</sup>	1.05	6-8	S	S	I	I	D	I	S	S	S	S
liquid	99	63-69 <sup>(2)</sup>	1.07	6-8	S	D	I	I	I	I	S	S	S	S
liquid	99	85-92 <sup>(2)</sup>	1.07	6-8	S	S	I	I	I	I	S	S	S	S
white solid	99	74-76 <sup>(3)</sup>	—	6-8	S	S	I	I	I	I	I	I	I	I
liquid	69-71	74-76 <sup>(3)</sup>	1.09	6-8	S	S	I	I	I	I	I	I	I	I
white solid	99	75-77 <sup>(3)</sup>	—	6-8	S	S	I	I	I	I	I	I	I	I
liquid	69-71	75-77 <sup>(3)</sup>	1.10	6-8	S	S	I	I	I	I	I	I	I	I
liquid	49-51	75-77 <sup>(3)</sup>	1.08	6-8	S	S	I	I	I	I	I	I	I	I

Cloud Point (1) 10% in 25% Butyl Carbitol  
(2) 1% in Distilled Water  
(3) 1% in 10% Sodium Chloride Solution

Solubility: S = Soluble  
D = Dispersible  
I = Insoluble

## ALKASURF LA-EP AND BA-PE – ALCOHOL ALKOXYLATES

A series of biodegradable nonionic surfactants based on a linear alcohol hydrophobe and incorporating a modified polyoxyethylene hydrophile. These products offer one advantage of being more fluid when compared to the corresponding linear fatty alcohol ethoxylates. Generally, they tend not to gel when added to water.

Products	Properties and Applications	HLB
<b>Alkasurf LA-EP15</b>	A low foaming biodegradable surfactant recommended for use in automatic dishwasher formulations, metal cleaners, and household and for industrial formulations where low foam coupled with good detergency and rinse properties are desirable.	11.9
<b>Alkasurf LA-EP16</b>	Detergent wetting agent, emulsifier and dispersant used in various industrial and household cleaning products. A unique liquid product i.e. non gelling in aqueous dilutions, instantly soluble in cold water in all proportions.	13.0
<b>Alkasurf LA-EP25</b>		7
<b>Alkasurf LA-EP25LF</b>		7
<b>Alkasurf LA-EP35</b>	Water soluble liquid biodegradable nonionic surfactants offering low foaming characteristics combined with excellent wetting. These products find application in industrial and household cleaning products especially machine dishwashing compounds and dishwasher rinse aids. LA-EP25LF is a lower foam version of LA-EP25 and is designed for systems with inherent foam problems.	9
<b>Alkasurf LA-EP38</b>		9
<b>Alkasurf LA-EP45</b>		10
<b>Alkasurf LA-EP59</b>	A liquid biodegradable nonionic surfactant which is readily soluble in cold water in all proportions. Applicable to formulating all purpose cleaners, heavy duty liquid and granular cleaners and detergent sanitizers. LA-EP59 is especially useful in car wash formulations both liquid and powder.	10.0
<b>Alkasurf LA-EP65</b>	A water soluble liquid biodegradable nonionic surfactant which is readily soluble in cold water in all proportions. Applications similar to LA-EP59 but offering increased water solubility at higher use temperatures.	11.5
<b>Alkasurf LA-EP73</b>	A water soluble liquid biodegradable nonionic surfactant with applications similar to Alkasurf LA-EP59 but offering increased water solubility at higher use temperatures and salt levels.	14.0
<b>Alkasurf BA-PE70</b>	Moderate foaming, water soluble emulsifiers for chlorinated solvents and as a component in emulsifier systems for herbicide and insecticide concentrates.	16.1
<b>Alkasurf BA-PE80</b>	BA-PE80 is a particularly useful surfactant in applications at elevated temperatures. Used in the manufacture of particular iodophors and germicidal cleaners.	26.1

Appearance	% Active Min.	Cloud Point 1% D.W. °C	Density g/ml 25°C	pH 5% D.W.	Solubility at Room Temperature									
					Water		Mineral Oil		Mineral Spirits		Aromatic Solvent		Perchloroethylene	
					1%	10%	1%	10%	1%	10%	1%	10%	1%	10%
liquid	99	25-30	1.0	5-8	S	S	I	I	I	I	D	I	S	S
liquid	99	56-63	1.0	5-8	S	S	D	D	D	D	S	S	S	D
liquid	99	24-27	0.97	5-8	S	S	I	I	S	S	S	S	S	S
liquid	99	24-27	0.95	3-4	S	S	I	I	S	S	S	S	S	S
liquid	99	34-37	0.97	5-8	S	S	I	I	S	S	S	S	S	S
liquid	99	38-41	0.97	5-8	S	D	I	I	S	S	S	S	S	S
liquid	99	42-45	0.99	5-8	S	S	I	I	S	S	S	S	S	S
liquid	99	56-60	1.01	5.8	S	S	I	I	S	S	S	S	S	S
liquid	99	64-67	1.01	5-8	S	S	I	I	S	D	S	S	S	S
liquid	99	71-75	1.01	5-8	S	S	I	I	S	D	S	S	S	S
soft solid	99	67-73 <sup>(2)</sup>	1.04	4-7	S	S	I	I	I	I	S	S	S	S
white solid	99	75-80 <sup>(2)</sup>	1.05	4-7	S	S	I	I	I	I	S	S	S	S

Cloud Point: (2) 1% in 5% Sodium Chloride Solution

Solubility: S = Soluble  
D = Dispersible  
I = Insoluble

## ALKATRONIC - PGP AND EGE – BLOCK CO-POLYMERS

The Alkatronic PGP-Series consists of a line of block co-polymers which are composed of a lipophilic polyoxypropylene group "blocked" by two hydrophilic polyoxyethylene groups.

The Alkatronic EGE-Series also consist of a line of block co-polymers but contrary to the PGP Series they are composed of a hydrophilic polyoxyethylene group "blocked" by two lipophilic polyoxypropylene groups.

They are identified by a hyphenated numeral following the trade name in which the first number X 100 represents the approximate molecular weight of the hydrophobe and

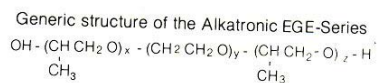
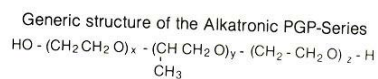
the second number X 10 represents the approximate % of ethylene oxide.

The following properties will vary in direct relationship to the P.O./E.O. content:

- appearance: from mobile liquid to flaked solid.
- solubility: from barely water soluble to a cloud point of > 100°C.
- foaming: from defoamer to low foamer to foamer
- detergency: best in the 40% E.O. range
- emulsification: improves as molecular weight increases.
- wetting: increases with growing P.O. content.

Products	Properties and Applications	Appearance
<b>Alkatronic PGP 10-1</b>	Low foaming surfactant, used as oil demulsifier and viscosity control.	liquid
<b>Alkatronic PGP 10-5</b>	Low foaming surfactants used in dishwasher rinse aids and as oil demulsifiers.	liquid
<b>Alkatronic PGP 12-2</b>		liquid
<b>Alkatronic PGP 18-1</b>	Low foaming surfactant providing foam control in many industrial applications.	liquid
<b>Alkatronic PGP 18-2</b>	Used in dishwasher rinse aids and wetting agent in many industrial processes.	liquid
<b>Alkatronic PGP 18-2D</b>	Modified Alkatronic PGP 18-2 to provide lower foam characteristics.	liquid
<b>Alkatronic PGP 18-2LF</b>		liquid
<b>Alkatronic PGP 18-4</b>	Used in detergent formulations, as an emulsifier and dispersing agent.	paste
<b>Alkatronic PGP 18-8</b>	Useful as lime soap dispersant, wetting agent and latex stabilizer.	flake
<b>Alkatronic PGP 33-1</b>	Provides foam control in many industrial products and processes such as antifreeze and dry cleaning detergents.	paste
<b>Alkatronic PGP 33-8</b>	Useful as dispersant, gelling agent and viscosity control agent.	flake
<b>Alkatronic EGE 25-2</b>	Used in automatic dishwashing compounds and rinse aid formulations.	liquid
<b>Alkatronic EGE 31-1</b>	Its powerful wetting, spreading and lower foaming properties makes it a valuable component of windshield washer antifreeze formulations.	liquid

The Alkatronic PGP-Series of nonionic surfactants are used as defoamers, demulsifiers, detergents, dispersants, dedusters, emulsifiers, wetting agents, dye levellers, gelling agents, and foam control agents in a wide variety of industrial and consumer products where their specific properties are desirable.

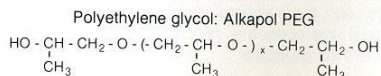
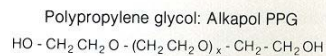


Cloud Point 1% D.W. °C	pH 5% D.W.	Density g/ml, 25°C	Solubility at Room Temperature									
			Water		Mineral Oil		Mineral Spirits		Aromatic Solvent		Perchloro- ethylene	
			1%	10%	1%	10%	1%	10%	1%	10%	1%	10%
40	5.0-7.5	1.02	S	S	I	I	S	I	I	I	D	D
71	5.0-7.5	1.06	S	S	I	I	D	I	S	S	S	S
38	5.0-7.5	1.03	S	S	I	I	D	I	I	I	D	D
24	5.0-7.5	1.01	S	I	I	I	D	I	I	I	S	S
32	5.0-7.5	1.03	S	S	I	I	D	I	I	I	S	I
32	5.0-7.5	1.04	S	S	I	I	D	I	I	I	S	I
28	5.0-7.5	1.03	S	S	I	I	D	I	I	I	S	I
62	5.0-7.5	1.05	S	S	I	I	D	I	I	I	S	I
>100	5.0-7.5	1.06	S	S	I	I	I	I	I	I	I	I
85	5.0-7.5	1.04	S	S	I	I	I	I	I	I	S	S
>100	5.0-7.5	1.04	S	S	I	I	I	I	I	I	I	I
30	5.0-7.5	1.04	S	S	S	D	S	D	S	S	S	S
25	5.0-7.5	1.02	S	I	I	I	S	S	S	S	S	S

Solubility: S = Soluble  
D = Dispersibility  
I = Insoluble

## ALKAPOL PEG AND PPG POLYETHYLENE AND POLYPROPYLENE GLYCOLS

Alkapol polyethylene and polypropylene glycols consist of a series of polymers designated by a number which approximates the average molecular weight. They are represented by the following structure:



Products	Properties and Applications	Appearance
<b>Alkapol PEG-200</b>	Intermediates for processing nonionic surfactants. In pharmaceuticals, they are used as binders and lubricants for compressed tablets, they increase strength and toughness of gelatin capsule film. As plasticizers in starch pastes and polyethylene sheet. In paper, their low volatility makes PEG-200 or PEG-300 useful softeners.	liquid
<b>Alkapol PEG-300</b>	As humectants and solvents for dyes in conventional stamp pads inks.	liquid
<b>Alkapol PEG-400</b>	It behaves as a coupling agent in cosmetic lotions. Generally its properties and applications are similar to Alkapol PEG-200.	liquid
<b>Alkapol PEG-600</b>	Intermediate for processing nonionic surfactants. Used as a binder and lubricant for compressed tablets in the pharmaceutical industry. It is used as a color stabilizer for fuel oils.	liquid
<b>Alkapol PEG-3350</b>	Mold release agent for foam rubber articles and antistat agent for rubber products. Binder for tablets in pharmaceuticals.	flake
<b>Alkapol PEG-6000</b>	Binding agent in abrasive formulations. Mold release agent for rubber articles. Chemical intermediate.	flake
<b>Alkapol PEG-8000</b>	Base for water soluble sticks. Spreader and binder in aqueous shoe polish formulations. Lubricant and binder aid for ceramic extrusion.	flake
<b>Alkapol PPG-425</b>	Intermediate for nonionic surfactants, component in hydraulic fluids, solvent or co-solvent for various cosmetic, pharmaceutical and other industrial formulations.	liquid
<b>Alkapol PPG-1200</b>	Intermediate for nonionic surfactants, antifoam agent in emulsions, component in hydraulic fluids and greases.	liquid
<b>Alkapol PPG-2000</b>	Antifoam agents in various industrial applications, additives for tire lubricants, carriers or co-solvents in cosmetic preparations.	liquid
<b>Alkapol PPG-4000</b>		liquid



Alkapol polyethylene glycols are widely used in cosmetics, pharmaceuticals, paper coatings, adhesives, and other products where blandness, water solubility, and lubricity are required. The Alkapols are particularly useful as water soluble lubricants for rubber molds, for textile processing and for metal-forming operations.

Alkapol polypropylene glycols are used as antifoam agents and solvents or co-solvents in cosmetics, pharmaceuticals, and hydraulic fluids. As compared to the Alkapol PEG products of similar molecular weight, the polypropylene glycols have lower pour points and lower water solubility and are thus more compatible with natural oils and waxes.

Molecular Weight	pH 5% DW	Density g/ml 25°C	Solubility at Room Temperature										
			Water		Mineral Oil		Mineral Spirits		Aromatic Solvent		Perchloroethylene		
			1%	10%	1%	10%	1%	10%	1%	10%	1%	10%	
190-210	5-8	1.13	S	S	I	I	I	I	I	I	I	I	I
285-315	5-8	1.13	S	S	I	I	I	I	I	I	I	I	I
380-420	5-8	1.13	S	S	I	I	I	I	I	I	I	I	I
570-630	5-8	1.13	S	S	I	I	I	I	I	I	I	I	I
3000-3700	5-8		S	S	I	I	I	I	I	I	I	I	I
5400-6600	5-8		S	S	I	I	I	I	I	I	I	I	I
7000-9000	5-8		S	S	I	I	I	I	I	I	I	I	I
400-450	6-8 <sup>(1)</sup>	1.01	S	S	I	I	I	I	I	I	S	S	S
1150-1250	6-8 <sup>(1)</sup>	1.01	I	I	I	I	I	I	I	I	S	S	S
1900-2100	6-8 <sup>(1)</sup>	1.01	I	I	I	I	S	I	I	S	S	S	S
3900-4100	6-8 <sup>(1)</sup>	1.01	I	I	I	I	S	I	I	I	S	S	S

pH: (1) 5% in 10:1 Methanol:Water

Solubility: S = Soluble  
D = Dispersible  
I = Insoluble

## ALKAMULS AG-AGRICULTURAL SURFACTANTS

The Alkamuls AG Series is comprised of a wide range of agricultural emulsifiers and adjuvants, which are designed for use with herbicides, insecticides and fungicides marketed as emulsifiable concentrates, invert concentrates, wettable powders, flowables and aqueous concentrates.

Emulsifier requirements are critically dependant on the pesticide system and the area of application; therefore, we generally custom formulate our emulsifiers for specific toxicant – solvent systems and end uses. Our extensive line of captive emulsifying agents coupled with our extensive emulsification and pesticide technology allows us to design the optimum emulsifier for your specific pesticide system.

Products	Properties and Applications
<b>Alkamuls AG-100 and AG-200 Series</b>	Emulsifier matched pairs for stable toxicants especially organo phosphate insecticides and non-saponifiable herbicides.
<b>Alkamuls AG-300 and AG-400 Series</b>	Emulsifiers for phenoxy ester herbicides.
<b>Alkamuls AG-700 Series</b>	Emulsifiers for easily degraded toxicants.
<b>Alkasurf NP-6, 8, 9, 10, 12, OP-6, 8, 10, 12 LA-7, 9, 11, 16</b>	Adjuvants for addition to toxicant concentrates.
<b>Alkamuls AG-821 and AG-826</b>	Premium emulsifiers and adjuvants for 83/17 crop oil/surfactant concentrates.
<b>Alkamuls AG-824 and AG-827</b>	Emulsifiers and adjuvants for 83/17 crop oil/surfactant concentrates.
<b>Alkamuls AG-825</b>	Used as emulsifier and adjuvant for 98/2 crop oil/surfactant blends.
<b>Alkamuls AG-823</b>	Used as emulsifier and adjuvant for vegetable oil/surfactant concentrates.
<b>Alkamuls AG-900, AG-902, AG-906, AG-913, AG-914, AG-915</b>	Spreading and wetting agents for aqueous pesticide systems.
<b>Alkamuls AG-903</b>	Foaming adjuvant with wetting, spreading and sticking properties.
<b>Alkamuls AG-901, AG-904, AG-918</b>	Spreading and sticking agents.
<b>Alkamuls AG-923</b>	Used as a soil wetting agent.

Our extensive line of adjuvants includes activators, stickers, foamers, defoamers, dispersants, spreaders, wetters, suspending aids and compatibility agents. Our major blended adjuvants are listed; but many of our standard products and their blends also have excellent adjuvant properties. We will gladly suggest adjuvants for your specific needs.

Residues of these surfactants are exempt from tolerance requirements under EPA Regulation 40 CFR:180:1001 (d); the materials are exempt from the requirement of a tolerance when used in accordance with good agriculture practice as inert (or occasionally active) ingredients in pesticide formulations applied to growing crops only.

Type	Appearance	% Water	% Active	pH 5% DW
calcium sulfonate-nonionic ethoxylate blends	liquids to flowable pastes	less than 1		adjusted as required
amine sulfonate-nonionic ethoxylate blends	liquids to flowable pastes	less than 0.5		adjusted as required
nonionic ethoxylate blends	liquids	less than 0.5		adjusted as required
nonionic ethoxylates	liquids to solids		100	6.0-8.0
ethoxylated ester nonionic blends	clear amber liquids		91	7.5-8.5
nonionic ethoxylates	liquids			6.0-8.0
nonionic ethoxylate	clear liquid			6.0-8.0
nonionic ethoxylate	clear liquid		100	6.0-8.0
nonionic ethoxylate blends	clear liquids		92	7.0-7.5
anionic-nonionic blend	clear liquid		38	6.0-8.0
anionic-nonionic blends	liquids to pastes			6.0-8.0
nonionic ethoxylate	clear liquid		87	6.0-8.0

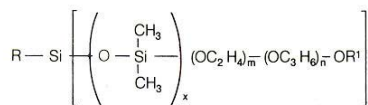
## ALKASIL - SILICONE SURFACTANTS

Alkasil silicone surfactants are nonionic silicone polyalkoxylate block copolymers. Based on the type of linkage between a hydrophobic silicone backbone and the polyalkoxylate side chain these copolymers may be classified into two distinct groups:

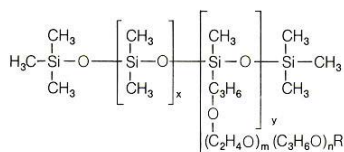
- a) Hydrolyzable
- b) Nonhydrolyzable

Hydrolyzable copolymers are characterized by attachment of polyalkoxylate groups to the silicone backbone through hydrolyzable silicon-oxygen-carbon bonds (Si-O-C). In nonhydrolyzable copolymers this bridging is achieved through chemically more stable silicon-carbon (Si-C) linkages.

Products	Properties and Applications	Appearance
<b>Alkasil NE 58-50</b>	A nonhydrolyzable silicone surfactant with wide applications in production of rigid polyurethane foams. Also used in cosmetics, toiletries, textiles, coatings and as a release agent.	colorless-light amber liquid
<b>Alkasil NEP 73-70</b>	A nonhydrolyzable silicone surfactant with applications similar to ALKASIL NE 58-50, but, of lower viscosity and freezing point for handling and storage convenience.	colorless-light amber liquid
<b>Alkasil NEP 153-275</b>	Nonhydrolyzable silicone surfactant with applications in coatings, textiles, cosmetics and toiletries.	colorless-light amber liquid
<b>Alkasil NEP 46-170</b>	High potency nonhydrolyzable silicone surfactant for use in production of HR molded flexible polyurethane foams.	colorless-light amber liquid
<b>Alkasil NEP 43-205</b>	Nonhydrolyzable silicone surfactant specially designed for use in HR molded flexible polyurethane foams.	colorless-light amber liquid
<b>Alkasil NE 222-72</b>	Nonhydrolyzable silicone surfactant particularly effective as fiber finish additive.	colorless-light amber liquid
<b>Alkasil NEP 185-398</b>	Nonhydrolyzable silicone surfactant specially designed for coating paper and paperboard.	colorless-light amber liquid
<b>Alkasil HEP 150-170</b>	Lower potency hydrolyzable silicone surfactant for flexible polyurethane foam. Provides excellent processing latitude.	colorless-light yellow liquid
<b>Alkasil HEP 182-280</b>	High potency hydrolyzable silicone surfactant for flexible polyurethane foam. It offers an excellent balance of potency and processing latitude.	colorless-light yellow liquid
<b>Alkasil HEP 148-330</b>	Hydrolyzable silicone surfactant with applications in cosmetics, toiletries, textiles, coatings and as a release agent.	colorless-light yellow liquid



Where R and R<sup>1</sup> represent  
lower alkyl radicals



Where R represents hydrogen  
or a lower alkyl radical

% Active	Viscosity 25°C, Cps	Specific Gravity 25°C, g/ml	Cloud Point 1% D.W. °C	pH 5% DW	Solubility at Room Temperature								
					Water		Alcohol		Aromatic Solvent		Chlori- nated Solvents		
					1%	10%	1%	10%	1%	10%	1%	10%	
100	650 ± 100	1.06	58 ± 3	6-8	S	S	S	S	S	S	S	S	S
100	450 ± 100	1.05	60 ± 5	6-8	S	S	S	S	S	S	S	S	S
100	1000 ± 100	1.04	42 ± 2	6-8	S	S	S	S	S	S	S	S	S
100	230 ± 50	1.00	—	6-8	I	I	S	S	S	S	S	S	S
100	300 ± 50	1.00	—	6-8	I	I	S	S	S	S	S	S	S
100	300 ± 50	1.02	—	6-8	PS	PS	S	S	PS	S	S	S	S
100	3100 ± 100	1.03	45 ± 2	6-8	S	S	S	S	S	S	S	S	S
100	1100 ± 100	1.03	42 ± 2	6.5-8	S	S	S	S	S	S	S	S	S
100	1300 ± 100	1.03	42 ± 2	6.5-8	S	S	S	S	S	S	S	S	S
100	1000 ± 100	1.06	47 ± 2	6.5-8	S	S	S	S	PS	I	PS	I	I

Solubility: S = Soluble  
I = Insoluble  
PS = Partially Soluble



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