

Surface Chemistry

General Catalog



AkzoNobel

Tomorrow's Answers Today



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An introduction



Our personalized service reaches the far corners of the globe

Surface Chemistry Worldwide Operations

Manufacturing

Chattanooga, USA
Houston, USA
Ft Worth, USA
Itupeva, Brazil
Mons, Belgium
Morris, USA
Saskatoon, Canada
Salisbury, USA
Singapore
Stenungsund, Sweden
Stockvik, Sweden
Yokkaichi, Japan
Osaka, Japan
Shanghai/Zhangjiagang, China

R&D Centers

Bridgewater, USA
Croton River, USA
Chattanooga, USA
Houston, USA
Ft Worth, USA
Mexico City, Mexico
Deventer, The Netherlands
Itupeva, Brazil
Mumbai, India
Singapore
Osaka, Japan
Shanghai, China
Stenungsund, Sweden

Headquarters

Chicago, USA
Bridgewater, USA
Stenungsund, Sweden
Sempach, Switzerland
Shanghai, China
Singapore



Global reach, local focus. Look to AkzoNobel Surface Chemistry LLC for all of your applications. Whether you are making coatings, or purifying minerals, we have the ingredients, and the know how to efficiently solve your most extreme problems.



This catalog contains information about specialty chemicals offered by AkzoNobel Surface Chemistry. Among these are the cationic product family, consisting of: fatty amines, amine salts, quaternary ammonium compounds, amine oxides and amides. AkzoNobel Surface Chemistry also carries anionic and nonionic surfactants including: naphthalene and alpha olefin sulfonates, alkyl and alkyl ether sulfates, alcohol and phenol-derived alkoxyates, polyols, phosphate esters, sulfosuccinates and alkanolamides. A portfolio of polymeric products is also available, and include polyacrylic acid homopolymers, sodium polyacrylates, sodium polymethacrylates, specialty copolymers, and modified starch products. Also in this portfolio are the dithiocarbamate products that perform as microbiocides, and metal precipitants. This family of surface active agents and polymers is used in hundreds of commercial applications.

Our product portfolio, with the acquisition of the Alco division of ICI, has expanded to include nitrogen-based cationic, anionic and nonionic surfactants as well as polymeric products. We now offer the formulator and chemical investigator a robust portfolio of surface-active agents and intermediates from which to choose. Our chemical technology expertise, efficient manufacturing facilities, research and development support and commitment to providing quality products help fulfill our promise to deliver **Tomorrow's Answers Today™**.

This catalog lists our product range, specifications, typical properties and applications that are summarized in the next two pages. Minimum order quantities may be required for some of the chemicals in this catalog. Should you require additional information or wish to inquire about the availability of related products, please contact our Customer Service or Technical Service personnel at 1-800-906-9977, email: csusaakzonobel.com or via our website at <http://surface.akzonobel.com>. We will be pleased to help you.

Recommended products

Many applications are made possible using the cationic, anionic, nonionic and polymer products presented in this catalog. Their versatility is illustrated by the following list of industrial and detergent applications with examples of AkzoNobel products to be used.

Application	Nitrogen Derivatives	Anionics	Nonionics	Polymers
Agricultural Chemicals inert ingredients (under Title 40 CFR 180.1001), adjuvants, emulsifiers, anticaking, dispersing	Ethomeen, Arquad, Ethoquad, Armeen Armac chemicals	Petro chemicals		
Antistatic Agents textiles, polymers, electronics, paper, electrostatic spraying	Arquad, Ethoquad, Ethomeen, Armac chemicals	Phospholan chemicals		Versa TL®
Bitumen Chemicals	Arquad, Duomeen, Duoquad chemicals			
Corrosion Inhibitors acid, metal working, petroleum, water treatment	Armeen, Arquad, Ethomeen, Duomeen, Armohib® chemicals	Phospholan chemicals	Amadol chemicals	Metaflex™
Demulsifiers paper, pharmaceuticals, petroleum	Arquad, Ethomeen, Propomeen chemicals			Floc Aid™
Detergents fabric softeners, thickeners, cleaners	Arquad, Ethoquad, Aromox, Armosoft chemicals	Witcolate, Witconate, Phospholan chemicals	Witconol, Ethylan chemicals	Alcogum®, Alcosperse®, Alcoguard®
Dishwashing Liquids	Aromox chemicals	Witcolate, Witconate chemicals	Witconol, Ethylan, Amadol chemicals	Alcosperse®, Alcoguard®
Dispersing Agents pigments, paints, inks	Arquad, Armeen, Armac, Duomeen, Duomac, Triameen chemicals	Petro, Phospholan, Lankropol chemicals	Witconol, Ethylan chemicals	Alcosperse®, Alcogum®, Alcoquest®
Emulsifiers oil, wax polish, leather treatment, solvent cleaners, silicones, triglycerides	Arquad, Ethomeen, Duoquad, Ethoquad, Ethomid chemicals	Phospholan chemicals	Witconol, Ethylan, Amadol chemicals	
Foaming Agents	Arquad, Aromox chemicals	Witconic, Witcolate, Witconate, Petro, Phospholan chemicals		
Fuel Additives detergency, demulsifiers static reduction corrosion inhibitors	Armeen, Ethomeen, Arquad, Duomeen chemicals	Witbreak Beraid	Amadol	

Many applications are made possible using surfactants and polymers. Their versatility can be illustrated by the following list of industrial, cleaning, agricultural and oilfield applications with examples of AkzoNobel products used.

Application	Nitrogen Derivatives	Anionics	Nonionics	Polymers
Lubricant Additives friction modifiers, corrosion inhibitors, grease thickeners, engine oil and driveline applications	Duomeen, Armeen, Ethomeen, Armolube chemicals			
Metal Working cutting fluids, metal cleaning lubricants	Armeen, Ethomeen, Duomeen chemicals	Phospholan chemicals		
Mineral Processing anticaking agents, flotation agents, flocculating aids	Armeen, Armac, Lilamin®, Armoflo® chemicals	Petro chemicals		
Organoclays	Arquad chemicals			
Paper Manufacture deinking, printing aids, coatings, absorbency, softening/debonding/pulping	Armid, Ethofat, Ethomeen chemicals	Lankropol, Petro, Phospholan chemicals		Alcogum®, Alcosperse®
Petroleum Production thickened fracturing fluids, diesel oil emulsions, antisludging agents, corrosion inhibition/water demulsifiers, paraffin control	Ethoquad, Aromox, Armac, Duomeen, Arquad, Duomac, Armeen chemicals	Petro, Witconate chemicals, Witconate chemicals		Aquatreat® Metaflex™ Floc Aid™
Petroleum Refining corrosion inhibition/lubricants	Armeen, Ethomeen, Aromox, Armid Duomeen, Arquad chemicals			
Pigment Producing Additives filler dispersants stabilizer intermediates mold release agents	Duomeen, Triameen, Arquad, Ethomeen, Armeen, Armid, Arneel chemicals	Petro, Witconate chemicals		Alcosperse® Alcogum®
Sugar Refining Additives	Arquad chemicals			Aquatreat®
Textile Auxiliaries dyeing assistants lubricants/scrooping, scouring	Arquad, Armeen, Ethomeen, Ethoquad, Ethomid chemicals	Petro chemicals, Witconic, Witconate, Witcolate, Phospholan, Lankropol, Emcol chemicals	Amadol chemicals Witconol chemicals	Alcoquest®
Vehicle Cleaning Formulations	Arquad, Ethomeen chemicals	Witcolate, Witconate, Petro chemicals	Witconol chemicals	Alcosperse®
Water Treatment Chemicals filming amines, flocculants, corrosion inhibitors	Armeen, Armac, Arquad, Duomeen chemicals			Alcosperse, Aquatreat, Floc Aid, Narlex®, Alcoclear, Alcoflow, Aquamet, Versa TL®, Versaflex®, Metaflex™

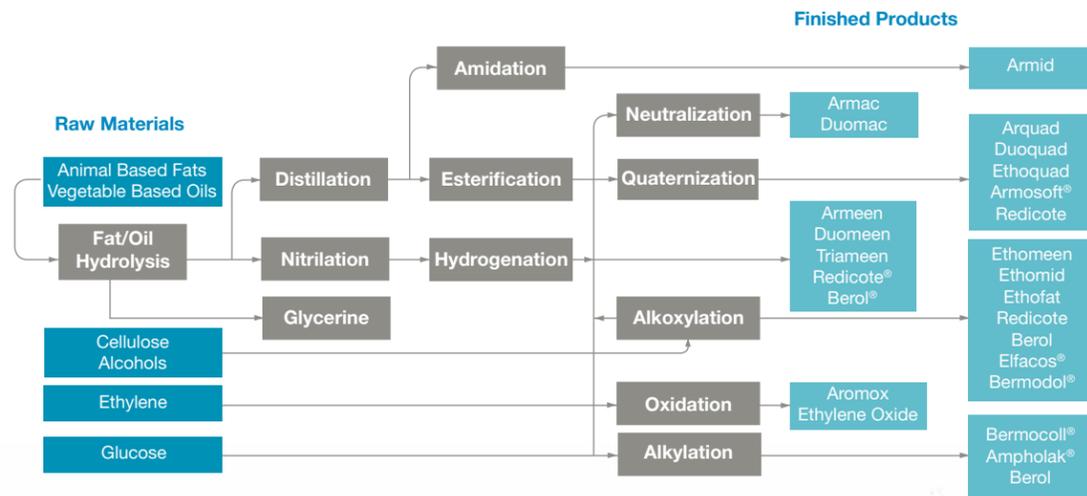
Applications

AkzoNobel Surface Chemistry offers a full range of surfactant and polymer products for a multitude of applications.

Production Technologies	Product Lines	Functions	Applications
Alkoxylation	Alkanolamides	Adhesion	Agro
Alkylation	Alkoxyates	Adjuvancy	Anti Stats
Amidation	Alkyl Glucosides	Aggregating	Asphalt
Amine Derivatization	Amides	Antiagglomeration	Cleaning
Blending	Biologically active compounds (BAC)	Antimicrobial	Conditioning
Bulk Sulphonation	Cellulose Derivatives	Barrier Properties	Fabric Care
Carbon Disulfide	Customized dissolvable films	Biocide	Leather
Carboxylation	Dithiocarbamates	Cleaning	Mining
Condensation	Esteramines	Compatibilizer	Oilfield
Distillation	Esters	Conditioning	Petroleum Additives
Emulsion Polymerization	Fatty Amines	Controlled Release	Petroleum Production
Esterification	Hydrophobic Polymers	Delivery Systems	Textile
Extrusion	Modified polysaccharides	Demulsification	Viscose
Glucosidation	Nitriles	Detergency	Water Treatment
Hydrogenation	Phosphate Esters	Dispersing	
Neutralization	Polyacetates	Emulsification/	
Nitrilation	Polyacrylates	Emulsion Stabilization	
Organic Synthesis	Polycarboxylates	Film Former	
Phosphorylation	Polycationics	Flocculant	
Plant Fractionation	Polymer Esters	Foaming/Defoaming	
Polymer Modifications	Polyurethanes	Gelling Aid	
Quaternatization	Quaternaries	Hydrophilisation	
Solution Polymerization	Sorbitan Esters	Hydrophobation	
Solvent Polymerization	Starch, cellulose, etc.	Hydrotrope	
Spray Drying	Sulphates	Metal Precipitant	
Sulphation	Sulphonated polystyrene	Rheology Modifier	
Sulphonation	Sulphonates	Scale Inhibitor	
	Sulphosuccinates	Surface tension reduction	
	Xanthan Derivatives	Suspension Aid	
		Wetting	

Fatty amine chemistry overview

Figure 1. AkzoNobel surface chemistry process overview



Fatty amine chemistry overview

The solubility of our fatty amines will super-charge your solvents

The range of derivatives is sufficiently extensive to meet the needs of almost all cationic surfactant users

- as chemical intermediates
- as essential processing aids, and
- as functional ingredients in many formulations.

Figure 1 at the left gives an overview of the interconnecting process steps to produce these derivatives. Our major trademarks are given for the finished products.

Many applications are made possible using fattyalkyl amine surfactants because of one or more of the three functions described in this section. Their versatility can be illustrated by the list on the following pages of industrial, detergent, agricultural and oilfield applications with examples of AkzoNobel Surface Chemistry products and uses.

Table 1. Approximate alkyl percent distribution for fattyalkyl amines*

Alkyl Composition	Dodecyl-	Hexadecyl-	Octadecyl-	Oleyl	Coco	Soya	Tallow	Hydrogenated Tallow	Hydrogenated Rapeseed
Saturated									
C8					6				
C10	0.5				7				
C12	99		0.5	51	0.5				
C14	0.5	0.5	1.5	19	1.0	3	3.5	0.5	
C15							0.5	0.5	
C16		97	2.5	4	9	16	29	31	3.5
C17				0.5			1	1	
C18		2.5	96.5	8-14	2	15	20	61	38
C20			0.5						8
C22									50
Unsaturated									
C14'				0.5			0.5		
C16'				4		1.0	2		
C18'			0.5	70-74	6	49.5	44	3	
C18''				5		13			

* Composition is that of base acids from which amines were derived.

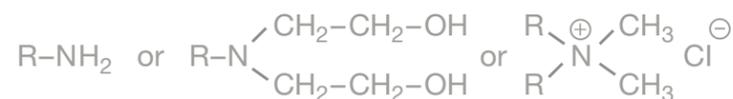
This review describes the chemistry of fatty amines and related nitrogen derivatives offered by AkzoNobel Surface Chemistry. These products are produced at three plants in North America. This output, when combined with the production of our European, Brazilian and Japanese plants, makes AkzoNobel Surface Chemistry the world's leading supplier of fatty amines and their derivatives. The combined research programs of our group are extensive and ensure that AkzoNobel Surface Chemistry will maintain its foremost position in fatty amine technology.

The basic building blocks of the products are the primary, secondary and tertiary amines and diamines described in this brochure.

These are based on alkyl groups ranging from C8 to C22, with C12 to C18 most predominant. In most cases, the products are derived from natural feedstocks. Table 1 displays the alkyl percent distributions for the various fattyalkyl groups used in the manufacture of our products.

By protonation, alkylation or ethoxylation, the product group is extended in order to form a range of surfactants offering a wide spectrum of melting point, solubility and cationic activity.

Functional properties of fatty amines and derivatives



The molecular structure of fatty amines and derivatives is characterized by one or more C₈ to C₂₂ aliphatic alkyl groups, R, with one or more amine or quaternary ammonium functionalities. Because of the number of carbon atoms in the alkyl group, this group is strongly **hydrophobic**, that is, it is repelled by water. On the other hand, the nitrogen atom is **hydrophilic** or water loving, particularly when it is protonated, alkoxyated or quaternized. Substances which contain groups in the same molecule with such opposite functions are referred to as **amphiphilic**. When dissolved or dispersed in water or non-aqueous solvents, one portion of the molecule is strongly repelled by its surrounding solvent. Because of this repelling force, these molecules tend to orient themselves at surfaces and interfaces, or form micelles (aggregates of oriented molecules), as shown in **Figure 2**. Such orientation/aggregation phenomena are called surface activity and materials that exhibit it are **surface active agents**, often referred to as **surfactants**.

Surfactants are classified by the nature of their hydrophilic moiety, which carries a negative ionic charge in anionic surfactants, or a positive ionic charge in cationic surfactants.

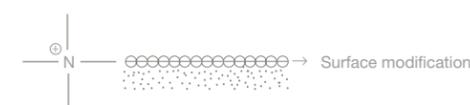
The hydrophilic moiety in non-ionic surfactants is usually a neutral polyoxyalkylene group. In cationic surfactants the positive charge may be derived from several chemical functional groups, such as sulphoxonium, oxonium, phosphonium, iodonium, etc. Commercially, however, it is usually associated with a nitrogen atom contained in an amine or quaternary ammonium group. The cationic nature of fatty amines and derivatives has given rise to a wide variety of uses in many applications.

These functions may be recognized as being derived from three basic properties:

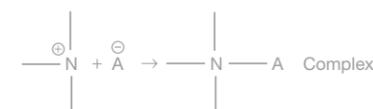
A. Surface Activity



B. Substantivity



C. Reactivity



A. The **surface active properties** of many fatty amines and derivatives relate to the amphiphilic molecular structure, which leads to orientation at interfaces (see figure 2). As a result, interfacial tension is affected and a number of surfactant functions can be seen:

- emulsification
- foaming
- wetting
- thickening

B. The term **substantivity** refers to the adsorptive properties of cationic surfactants and related nitrogen derivatives. Adsorption, particularly onto solid surfaces, results from the attraction between the positive charge on the nitrogen atom and the negative charge characteristic of most surfaces. Consequently, substantivity leads to surface modification and to the following functions:

- softening
- corrosion inhibition
- adhesion
- anti-static properties
- lubrication
- hydrophobation

C. **Reactive** properties of cationic surfactants can be identified in several uses, in particular when complexes are formed with anionic species on a molecular level, governed by stoichiometry. Frequently, such complexes show very low solubility in water, so that the following functions can be found in such areas as water treatment, sugar refining, and the production of organo clays:

- flocculation
- ion exchange
- decolorization

Selection criteria for fatty amines and derivatives



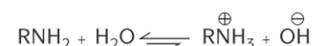
The following properties of fatty amines and derivatives may be used as guideposts in their selection in a variety of applications.

Solubility

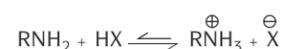
Solubility of surfactants is a primary criterion for their selection. Tables 1, 2 and 3 in the Appendices summarize the solubility behavior in various solvents for fatty amines and their ethoxylated and quaternary derivatives, respectively.

A. Solubility in water

Alkylamines of C₈-C₂₂ chain length are only slightly protonated at neutral pH and thus are insoluble in water:



In acidic media, protonation is proportional to the strength of the protonating acid and the resulting amine salt is much more soluble:



In general, one protonated amino group is sufficiently hydrophilic to solubilize an alkyl chain containing up to twelve methylene groups. Solubilization of an octadecyl (C₁₈) alkyl group requires two protonated amino groups as provided in Duomeen® T at low pH, for example. The increased aqueous solubility associated with protonation comes with a considerable increase in positive charge. This is also achievable by alkylation of the nitrogen atom, forming quaternary ammonium compounds. Monoalkyl trimethyl ammonium chlorides are soluble in water up to a concentration range of 30% (for C₁₈) to 40% (for C₁₂). Above this concentration level, the surfactant forms a liquid crystalline phase.

For dialkyl dimethyl ammonium chlorides, literature states that this solubility limit is found at much lower levels, as low as 0.001% for di(hydrogenated tallowalkyl) ammonium chloride, Arquad® 2HT. This quaternary salt, however, can form stable dispersions as a result of molecular aggregation into vesicles. These consist of bilayers spaced by aqueous layers arranged in concentric circles. Water solubility also is increased by the introduction of neutral hydrophilic groups such as polyoxyethylene groups, in which case there is no increase in charge on the nitrogen atoms. Ethoxylation of

aliphatic amines yields the Ethomeen® series. Solubility of Ethomeen compounds is dependent upon the degree of ethoxylation (see Table 2 in Appendices). Ethomeen C/12, for example, contains two oxyethylene units per molecule and is insoluble in water, whereas Ethomeen C/25 contains fifteen oxyethylene units per molecule and is water soluble.

Factors which affect water solubility are summarized in Table 2.

Table 2. Factors affecting water solubility

Water solubility increases:	
a. influence of alkyl chain moiety	by decrease in chain length (or molecular mass) by increase in unsaturation
b. influence of nitrogen moiety	by increase in number of functional groups by increase in degree of ethoxylation by formation of salts by quaternization
c. influence of medium	by decreasing pH

Figure 2. Orientation of surfactant in several systems



ORIENTATION IN WATER



ORIENTATION IN NON-POLAR SOLVENT



ORIENTATION AT AIR/WATER INTERFACE



ORIENTATION AT AIR/OIL INTERFACE

Selection criteria for fatty amines and derivatives



Emulsify, solubilize, liquefy, build foam, or remove foam with our nitrogen derivatives

B. Solubility in non-aqueous media

Fatty amines and derivatives generally show appreciable solubilities in polar organic solvents such as methanol, ethanol and isopropanol, and in non-polar solvents. In hydrocarbons, solubility depends on the alkyl chain length, on the degree of unsaturation and on the cationic character of the nitrogen moiety.

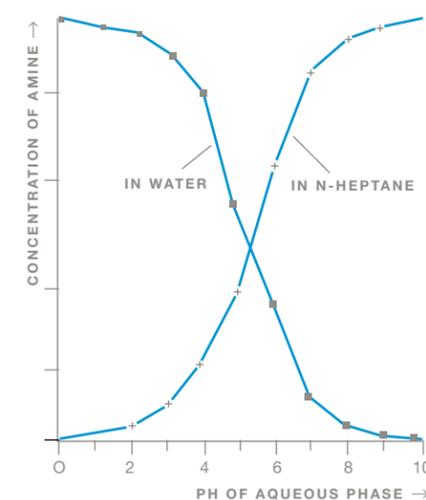
C. Solubility in two-phase systems

When a surfactant is dissolved in a two-phase system consisting of water and, for example, a hydrocarbon such as n-heptane, it distributes itself in the two phases. The relative solubility is dependent on the nature of the surfactant and on the nature of the system, and can be expressed by the so-called partition coefficient. The effect of pH on partitioning may be dramatic as in the case of amines that can be protonated and consequently have a preference for the aqueous phase at low pH. This is illustrated in **Figure 3**, showing the partition of **Armeen® C** (a primary amine) between n-heptane and water as a function of the pH of the aqueous phase.

Hydrophile-Lipophile Balance

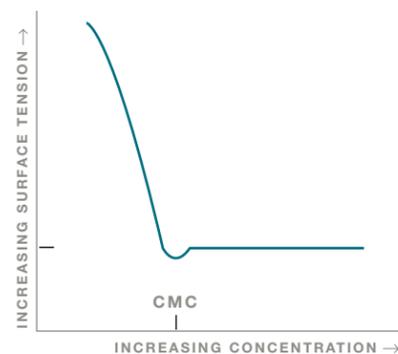
The orientation of surfactant molecules at a water/solvent interface, as shown in **Figure 2**, leads to important performance properties of the surfactant such as emulsification. A classification of surfactants that can help in selecting an appropriate emulsifier is the **Hydrophile-Lipophile Balance (HLB) value**. The HLB value indicates where the relative hydrophilicity of a particular surfactant lies. Higher HLB values correspond to stronger hydrophilic character of the surfactant. AkzoNobel Surface Chemistry uses the Davies scale of 0-40 to classify its surfactants. These values are found in the product description section of this catalog.

Figure 3. Partition of Armeen C [cocoamine] in n-heptane/water.



Emulsions may be classified as oil in water, in which hydrophobic material is dispersed in water, or as water in oil, in which water is dispersed in hydrophobic material. Formation of oil in water (O/W) emulsions is favored by emulsifiers having a high HLB value. Thus, ethoxylated amines such as **Ethomeen C/15** and **Ethomeen C/25** are used in applications where O/W emulsions are desired. In similar applications but at high pH, the corresponding **Ethoquad®** ethoxylated quaternary salt might be preferred, due to increased solubility derived from the quaternized amine group. For water in oil (W/O) emulsions, low HLB surfactants are more effective. Lower ethoxylates of higher molecular weight alkylamines would be considered for such applications, including **Ethomeen S/12** and **Ethomeen T/12**.

Figure 4.
Surface tension
as a function
of surfactant
concentration



Surface tension

Surfactants exhibit both adsorption phenomena and the ability to form micelles. Due to adsorption at the air/water interface, a decrease of surface tension is observed with increasing surfactant concentration (see **Figure 4**). At a rather distinct surfactant concentration, the Critical Micelle Concentration (CMC), the formation of micelles starts and thereafter the free surfactant concentration remains constant, as does the surface tension, γ_c .

Table 3 shows typical values of the surface tension for representative fatty amine derivatives.

Other surfactant characteristics

In order to select the appropriate fatty amine or derivative, the determination of the following surface active properties can be helpful:

- foaming characteristics (e.g., according to Ross-Miles)
- Krafft point
- Cloud point

Other physical and chemical properties

During processing, properties such as melting point, boiling point and flash point are important. Some properties are affected by the degree of unsaturation; for example, the melting point increases with increasing removal of double bonds (by hydrogenation) in the alkyl chain. Solubility is also influenced. Unsaturation may play a role in applications where chemical reactivity has an influence.

Table 3. Typical Surface Tension Values*

Surfactant	γ_c Dynes/cm (water, 20°C)
Armeen 12D (at pH 4, neutralized with HCl)	27
Aromox C/12-W	31
Arquad 16-50	34
Ethomeen S/12	32
Ethomeen T/15	33
Ethomeen C/25	41
Ethoquad 18/25	50

*According to Du Noüy, 25°C, 0.1% DIN 53 914

Nitrogen derivatives

Get a positive performance with our cationic surfactants



The nitrogen atom is a flexible building block. We can modify it even more than we show in this catalog.

Nitrogen Derivatives

Representative examples of nitrogen derivatives offered by AkzoNobel

Chemical Type	Trade Name	Formula
Primary Amines	Armeen	$R-NH_2$
Secondary Amines	Armeen	$\begin{matrix} R \\ \diagdown \\ NH \\ \diagup \\ R \end{matrix}$
Tertiary Amines	Armeen	$R-N\begin{matrix} \diagup \\ CH_3 \\ \diagdown \\ CH_3 \end{matrix}$ $\begin{matrix} R \\ \diagdown \\ N-CH_3 \\ \diagup \\ R \end{matrix}$ $\begin{matrix} R \\ \diagdown \\ N-R \\ \diagup \\ R \end{matrix}$
Diamines	Duomeen	$R-NH-CH_2-CH_2-CH_2-NH_2$
Quaternary Ammonium Salts	Arquad	$\begin{matrix} CH_3 \\ \\ R-N^+-CH_3 \\ \\ CH_3 \end{matrix} Cl^-$ $\begin{matrix} CH_3 \\ \\ R-N^+-CH_2-C_6H_5 \\ \\ R \end{matrix} Cl^-$ $\begin{matrix} CH_3 \\ \\ R-N^+-CH_3 \\ \\ R \end{matrix} Cl^-$ $\begin{matrix} R \\ \\ R-N^+-CH_3 \\ \\ R \end{matrix} Cl^-$ $\begin{matrix} CH_3 \\ \\ R-N^+-CH_2-C_6H_5 \\ \\ CH_3 \end{matrix} Cl^-$ $\begin{matrix} O \\ \\ R-C-OCH_2CH_2-N^+(CH_3)R' \\ \\ R-C-OCH_2CH_2-N^+(CH_3)R' \\ \\ O \end{matrix} X^-$
Ethoxylated Quaternary Salts	Ethoquad	$\begin{matrix} (CH_2-CH_2O)_xH \\ \\ R-N^+-CH_3 \\ \\ (CH_2-CH_2O)_yH \end{matrix} Cl^-$
Ethoxylated Amines	Ethomeen	$R-N\begin{matrix} \diagup \\ (CH_2-CH_2O)_xH \\ \diagdown \\ (CH_2-CH_2O)_yH \end{matrix}$
Ethoxylated Diamines	Ethoduomeen	$R-N-CH_2-CH_2-CH_2-N\begin{matrix} \diagup \\ (CH_2-CH_2O)_yH \\ \diagdown \\ (CH_2-CH_2O)_xH \end{matrix}$
Amine Acetates	Armac	$R-NH_3^+ CH_3COO^-$
Diamine Diacetates	Duomac	$R-NH_2-CH_2-CH_2-CH_2-NH_3^+ 2X^-$ $X^- = CH_3COO^-$
Amine Oxides	Aromox	$\begin{matrix} CH_3 \\ \\ R-N^+ \rightarrow O \\ \\ CH_3 \end{matrix}$ $\begin{matrix} (CH_2-CH_2O)_xH \\ \\ R-N^+ \rightarrow O \\ \\ (CH_2-CH_2O)_yH \end{matrix}$
Aliphatic Amides	Armid	$\begin{matrix} O \\ \\ R-C-NH_2 \end{matrix}$
Ethoxylated Amides	Ethomid	$\begin{matrix} O \\ \\ R-C-NH-(CH_2-CH_2O)_xH \end{matrix}$

Amines

Primary Amines

RNH ₂			Specifications			Typical Properties						
Product	Common Name*	TSCA Number	Primary Amine, %	Amine Number	Gardner Color	Moisture %	**Equivalent Weight	Melting Point, °C	Primary Amine, %	Amine Number	Iodine Value	HLB Davis Scale
			Min.	Min.	Max.	Max.						
Armeen 12D***	Dodecylamine	124-22-1	98	297	1	0.5	186	24	99.5	303	0.5	10.7
Armeen 18D	Octadecylamine	124-30-1	98	204	1	0.5	270	55	99	208	2	8
Armeen C	Cocoalkylamines	61788-46-3	97	272	3	0.5	204	16	98	275	9	10.3
Armeen CD	Cocoalkylamines	61788-46-3	98	275	1	0.5	200	16	100	281	9	10.3
Armeen E	Erucylamine	125328-46-3	94	172	n/a	0.5	326	48	97	174	63	7.1
Armeen HR	Hydrogenated rapeseedalkylamines	125328-43-0	93	178	12	1	31.5	48	95	181	6	6
Armeen HT	Hydrogenated tallowalkylamines	61788-45-2	97	207	3	0.5	271	55	98	207	3	8.2
Armeen HTD	Hydrogenated tallowalkylamines	61788-45-2	98	209	1	0.5	263	55	100	213	3	8.2
Armeen O	Oleylamine	112-90-3	97	205	3	0.5	266	24	98	211	70	8
Armeen OD	Oleylamine	112-90-3	98	207	1	0.5	265	23	99	212	70	8
Armeen OL	Oleylamine	112-90-3	95	202	4	0.5	273	20	97	206	70	8
Armeen OLD	Oleylamine	112-90-3	98	207	1	0.5	265	19	99	212	70	8
Armeen R	Rapeseedalkylamines	26398-95-8	95	180	12	1	312	18	198	182	75	6
Armeen S	Soyaalkylamines	61790-18-9	97	206	4	0.5	273	29	97	206	70	8
Armeen SD	Soyaalkylamines	61790-18-9	98	208	2	0.5	264	29	100	213	70	8
Armeen T	Tallowalkylamines	61790-33-8	97	208	3	0.5	267	40	98	210	46	8.2
Armeen TD	Tallowalkylamines	61790-33-8	98	210	1	0.5	262	40	100	214	46	8.2

Secondary Amines

R ₂ NH			Specifications****			Typical Properties						
Product	Common Name*	TSCA Number	Apparent Secondary Amine, %	Primary Amine, %	Amine Number	Gardner Color	**Equivalent Weight	Melting Point, °C	Secondary Amine, %	Amine Number	Iodine Value	HLB Davis Scale
			MIN.	MAX.	MAX.	MAX.						
Armeen 2C	Dicocoalkylamines	61789-76-2	93	6	155	2	401	43	94	145	8	4.2
Armeen 2HT	Ditallowalkylamines	61789-79-5	90	5	116	2	510	62	91	112	3	1

key

- * Common name may be different from the name listed by TSCA.
 ** Equivalent Weight = 56,110 / Amine Number.
 *** D = Distilled
 **** All secondary amines meet moisture specifications of 0.5% max

Some products may be subject to minimum order quantities.

Amines

Tertiary Amines – Monoalkyl-dimethylamines*

RN(CH ₃) ₂			Specifications			Typical Properties					
Product	Common Name*	TSCA Number	Tertiary Amine, %	Amine Number	Gardner Color	**Equivalent Weight	Melting Point, °C	Amine Number	Tertiary Amine, %	HLB Davis Scale	
			Min.	Min.	Max.	Max.					
Armeen DM12D***	Dodecyl-dimethylamine	112-18-5	95	250	1	219	-19	258	98	9.8	
Armeen DM18D	Octadecyl-dimethylamine	124-28-7	95	180	1	303	20	185	98	7.1	
Armeen DMCD	Cocoalkyl-dimethylamines	61788-93-0	95	234	1	236	-22	239	98	9.4	
Armeen DMHTD	Hydrogenated tallowalkyl-dimethylamines	61788-95-2	95	184	2	292	18	192	98	7.3	
Armeen DMOD	Oleyl-dimethylamine	28061-69-0	95	183	1	295	-10	190	98	7.1	
Armeen DMSD	Soyaalkyl-dimethylamines	61788-91-8	95	183	2	297	-10	189	98	7.3	
Armeen DMTD	Tallowalkyl-dimethylamine	68814-69-7	95	184	1	292	9	190	98	7.3	

Tertiary Amines – Dialkyl-methylamines*

R ₂ NCH ₃			Specifications			Typical Properties					
Product	Common Name*	TSCA Number	Tertiary Amine, %	Amine Number	Gardner Color	**Equivalent Weight	Melting Point, °C	Amine Number	Tertiary Amine, %	HLB Davis Scale	
			Min.	Min.	Max.	Max.					
Armeen M2C	Dicocoalkyl-methylamines	61788-62-3	97	137	2	395	-2	142	99	3.7	
Armeen M2HT	Dihydrogenated tallowalkyl-methylamines	61788-63-4	97	105	1	524	38	107	99	1	
Armeen MHTL8	2-Ethylhexyl, hydrogenated tallowalkyl-methylamines	TSCA Listed	98	141	1	385	n/a	143	98	4	

Tertiary Amines – Trialkylamines*

RN ₃			Specifications			Typical Properties					
Product	Common Name*	TSCA Number	Tertiary Amine, %	Amine Number	Gardner Color	**Equivalent Weight	Melting Point, °C	Amine Number	Tertiary Amine, %	HLB Davis Scale	
			Min.	Min.	Max.	Max.					
Armeen 312	Tridodecylamine	102-87-4	95	102	1	540	-9	104	96	<1	
Armeen 316	Trihexadecylamine	67701-00-2	98	82	3	668	38	84	99	<1	
Armeen 380	Tri(octyl/decyl)amine	68814-95-9	95	148	2	385			96	<1	

key

- * Common name may be different from the name listed by TSCA. *** D = Distilled
 ** Equivalent Weight = 56,110 / Amine Number. **** All secondary amines meet moisture specifications of 0.5% max

See Ethoxylated amines for additional tertiary amines. Some products may be subject to minimum order quantities.

Amines

Polyamines – Diamines*

$$\begin{array}{c} \text{CH}_3 \\ | \\ \text{RN-CH}_2\text{CH}_2\text{N}(\text{CH}_3)_2 \\ \text{Diamines} \end{array}$$

Product	Common Name*	TSCA Number	Specifications		Typical Properties					
			Amine Number	Gardner Color	Iodine Value	Moisture %	**Equivalent Weight	Appearance @ 25°C	Amine Number	HLB Davis Scale
			Min.	Max.	Min.	Max.				
Duomeen C	N-coco-1,3-diaminopropane	61791-63-7	409	3		1	133	Liquid	422	17.5
Duomeen CD	N-coco-1,3-diaminopropane	61791-63-7	409	2		1	130	Liquid	432	17.5
Duomeen O	N-oleyl-1,3-diaminopropane	7173-62-8	320	5	60	1	163	Liquid	344	15.2
Duomeen OL	N-oleyl-1,3-diaminopropane	7173-62-8	320	5	70	1	163	Liquid	344	15.2
Duomeen T	N-tallow-1,3-diaminopropane	61791-55-7	334	7	32	1	161	Paste	348	15.6
Duomeen TTM	N,N,N'-trimethyl-N'-tallow-1,3-diaminopropane	68783-25-5	271	6		1	199	Liquid	282	14.2
Duomeen S	N-soya-1,3-diaminopropane	61791-67-1	303	6	68	1	160	Paste	320	15.6

Polyamines – Higher Amines*

$$\text{RNH}(\text{CH}_2\text{CH}_2\text{CH}_2\text{NH})_n\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$$

 Triamines: n = 1
 Tetramines: n = 2

Product	Common Name*	TSCA Number	Specifications		Typical Properties				
			Amine Number	Gardner Color	Iodine Value	Moisture %	**Equivalent Weight	Melting Point, °C	HLB Davis Scale
			Min.	Max.	Min.	Max.			
Tetrameen T	N-tallowalkyl tripropylene triamines	68911-79-5	475	6	25	0.5	114	37	-
Triameen T	N-tallowalkyl dipropylene triamines	61791-57-9	413	8		0.5	133	34	32.4
Triameen Y12D	N-(3-Aminopropyl)-N-dodecylalkyl trimethylene diamines, distilled	2372-82-9	335	2		2	100		
Triameen YT	N-(3-Aminopropyl)-N-tallowalkyl trimethylene diamines	85632-63-9	390	12				20	32.4

key

* Common name may be different from the name listed by TSCA.

Some products may be subject to minimum order quantities.

Amines

Ethoxylated Amines*

$$\text{R-N} \begin{array}{l} (\text{CH}_2\text{CH}_2\text{O})_x\text{H} \\ (\text{CH}_2\text{CH}_2\text{O})_y\text{H} \end{array}$$

 $X + Y = 2, 5, 10, 15, 50$

Product	Common Name***	TSCA Number	Specifications**		Typical Properties					
			Equivalent Weight		Gardner Color	Primary Plus	Amine Number	Appearance @ 25°C	HLB Davis Scale	
			Min.	Max.	Max.	Secondary Amine %				
Ethomeen 18/12	Ethoxylated (2) octadecylamine	10213-78-2	350	374	2	3	155	Solid	9.8	
Ethomeen 18/15	Ethoxylated (5) octadecylamine	26635-92-7	480	505	8	2	114	Solid	10.9	
Ethomeen 18/25	Ethoxylated (15) octadecylamine	26635-92-7	900	960	8	1	60	Liquid to Paste	14.4	
Ethomeen 18/60	Ethoxylated (50) octadecylamine	26635-92-7	2370	2570	10	0.5	23	Paste to Solid	26.6	
Ethomeen C/12	Ethoxylated (2) cocoalkylamines	61791-31-9	280	300	4	3	193	Liquid	12.2	
Ethomeen C/15	Ethoxylated (5) cocoalkylamines	61791-14-8	410	435	7	2	133	Liquid	13.3	
Ethomeen C/25	Ethoxylated (15) cocoalkylamines	61791-14-8	830	890	10	1	65	Liquid	16.8	
Ethomeen O/12	Ethoxylated (2) oleylamines	13127-82-7	343	363	8	3	160	Liquid	9.7	
Ethomeen S/12	Ethoxylated (2) soyaalkylamines	73246-96-5	342	362	6	3	159	Liquid	10	
Ethomeen S/15	Ethoxylated (5) soyaalkylamines	61791-24-0	470	495	10	2	116	Liquid	11.1	
Ethomeen S/25	Ethoxylated (15) soyaalkylamines	61791-24-0	895	955	10	1	61	Liquid	14.7	
Ethomeen T/12	Ethoxylated (2) tallowalkylamines	61791-44-4	340	360	6	3	160	Paste	10.1	
Ethomeen T/15	Ethoxylated (5) tallowalkylamines	61791-26-2	470	495	7	2	116	Liquid to Paste	11.2	
Ethomeen T/20	Ethoxylated (10) tallowalkylamines	61791-26-2	690	752	12	0.4	78	Liquid	13	
Ethomeen T/25	Ethoxylated (15) tallowalkylamines	61791-26-2	890	950	8	1	61	Liquid to Paste	14.7	
Ethomeen T/30	Ethoxylated (20) tallowalkylamines	61791-26-2	1250	1300	12	1	44	Liquid	17	

key

* Base amines can be offered as propoxylated derivatives.

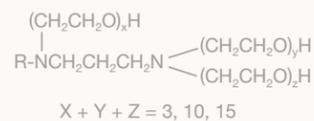
** The ethoxylated amines and diamines all meet moisture specifications of 1.0% max.

*** Common name may be different from name listed by TSCA.

Some products may be subject to minimum order quantities.

Amines

Ethoxylated Diamines



Product	Common Name*	TSCA Number	Specifications***		Typical Properties			
			Equivalent Weight**		Primary Plus Secondary Amine %	Amine Number	Appearance @ 25°C	HLB Davis Scale
	Min.	Max.	Max.					
Ethoduomeen T/13	Ethoxylated (3) N-tallow-1,3-diaminopropane	61790-85-0	220	250	2	239	Liquid	19
Ethoduomeen T/13N	Ethoxylated (3) N-tallow-1,3-diaminopropane	Proprietary blend	265	272	2	209	Liquid	
Ethoduomeen T/20	Ethoxylated (10) N-tallow-1,3-diaminopropane	61790-85-0	375	405	2	144	Liquid	23.7
Ethoduomeen T/25	Ethoxylated (15) N-tallow-1,3-diaminopropane	61790-85-0	485	515	2	112	Liquid	24.5

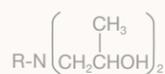
key

* Common name may be different from the name listed by TSCA.

** Equivalent Weight = 56,110 / Amine Number.

*** All ethoxylated diamines meet moisture specifications of 0.5% max

Propoxylated Amines*



Product	Common Name*	TSCA Number	Specifications		Typical Properties				
			Equivalent Weight		Gardner Color	Tertiary Amine %	Amine Number	Appearance @ 25°C	HLB Davis Scale
	Min.	Max.	Max.						
Propomeen O/12	N-oley-1,1'-iminobis-2-propanol	65086-71-7	371	391	6	97	147	Clear Liquid	8.9
Propomeen T/12	N-tallowalkyl-1,1'-iminobis-2-propanol	68951-72-4	368	388	6	97	148	Clear Liquid	9.2

key

* All propoxylated amines meet moisture specifications of 1.0% max.

Some products may be subject to minimum order quantities.

Amine Salts

Amine Acetates and Diamine Salts*

Product	Common Name**	TSCA Number	Specifications		Typical Properties				
			Neutralization Equivalent		Gardner Color	Amine Number	Appearance @ 25°C	HLB Davis Scale	
			Min.	Max.	Max.	Min.	Max.		
	$\text{RNH}_2 \cdot \text{CH}_3\text{CO}_2\text{H}$ Amine Salts								
	$\text{RNHCH}_2\text{CH}_2\text{CH}_2\text{NH}_2 \cdot 2\text{R}'\text{CO}_2\text{H}$ Diamine Salts								
Armac HT	Hydrogenated tallowalkyl amine acetates	61790-59-8	95	102	10	165	-	Flake***	6.8
Duomeen TDO	N-tallow-1,3-diaminopropane ditallates	61791-53-5	98	104	10	120	130	Liquid to Paste	6.4
Duomeen TDO-IHF^(a)	N-tallow-1,3-diaminopropane ditallates	Mixture	98	104	10	94	107	Viscous Liquid	6.4

key

* Other salt combinations are available

** Common name may be different from the name listed by TSCA.

*** Only flaked forms available.

(a) 80% in mineral spirits

Some products may be subject to minimum order quantities.

Quaternary Ammonium Salts

Alkyltrimethyl Ammonium Chlorides*

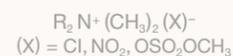


Product	Common Name**	TSCA Number	Specifications			Typical Properties				
			Quarternary Salt %***		Free Amine Plus Amine Salt %	pH	Gardner Color	PMCC Flash Point, °C	Appearance @ 25°C	HLB Davis Scale
			Min.	Max.	Max.		Max.			
Arquad 12-37W	Dodecyl-	112-00-5	35	39	1	6.5-9	2	Non-Flammable	Liquid	23.3
Arquad 12-50	Dodecyl-	112-00-5	49	52	2	6 - 9	1	19	Liquid	23.3
Arquad 16-29	Hexadecyl-	112-02-7	27	30	2	6 - 9	3	Non-Flammable	Liquid	21.2
Arquad 16-50	Hexadecyl-	112-02-7	49	52	2	6 - 9	3	17	Liquid	21.2
Arquad 18-50	Octadecyl-	112-03-8	49	52	2	6 - 8	3	18****	Liquid	20.5
Arquad C-33W	Cocoalkyl-	61789-18-2	32	35	2	6 - 9	4	Non-Flammable	Liquid	22.9
Arquad C-50	Cocoalkyl-	61789-18-2	49	52	2	6 - 9	4	20	Liquid	22.9
Arquad S-50	Soyaalkyl-	61790-41-8	49	52	2	6 - 9	5	16	Liquid	20.8
Arquad S-60 PG	Soyaalkyl-(a)	61790-41-8	58	62	2	6 - 9	5	Non-Flammable	Liquid	20.8
Arquad T-27W	Tallowalkyl-	8030-78-2	26	29	2	6 - 9	3	Non-Flammable	Liquid	20.8
Arquad T-50	Tallowalkyl-	8030-78-2	49	52	2	6 - 9	4	16	Liquid	20.8

key

- * Can be prepared in other solvents.
 ** Common name may be different from the name listed by TSCA.
 *** In many cases, activity (concentration) can be changed to suit your needs.
 **** Setaflash
 (a) Propylene glycol solvent

Dialkyldimethyl Ammonium Chlorides*



Product	Common Name**	TSCA Number	Specifications*			Typical Properties				
			Quarternary Salt %***		Free Amine Plus Amine Salt %	pH	Gardner Color	PMCC Flash Point, °C	Appearance @ 25°C	HLB Davis Scale
			Min.	Max.	Max.		Max.			
Arquad 2C-70 Nitrite	Dicocoalkyl-(b)	71487-01-9	68	72	-	6 - 8.5	14	23	Liquid	17.3
Arquad 2C-75	Dicocoalkyl-	61789-77-3	74	77	1.5	6 - 9	3	23	Liquid	17.3
Arquad 2HT-75	Di(hydrogenated tallowalkyl)-	61789-80-8	74	77	1.5	6 - 9	2	25	Paste	13.2
Arquad 2HT-75 PG	Di(hydrogenated tallowalkyl)-(a)	61789-80-8	74	77	1.5	6 - 9	3	107	Paste	13.2
Arquad HTL8-MS	2-Ethylhexyl hydrogenated tallowalkyl-(c)	EPA Listed	81.5	84.5	4	6 - 8	5	Non-Flammable	Liquid	17.5

key

- * Can be prepared in other solvents.
 ** Common name may be different from the name listed by TSCA.
 *** In many cases, activity (concentration) can be changed to suit your needs.
 (a) Propylene glycol solvent (b) Nitrite (c) Methyl Sulfate Anion

Some products may be subject to minimum order quantities.

Quaternary Ammonium Salts

Trialkylmethyl

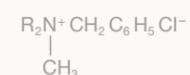


Product	Common Name*	TSCA Number	Specifications			Typical Properties				
			Quarternary Salt %***		Free Amine Plus Amine Salt %	pH	Gardner Color	PMCC Flash Point, °C	Appearance @ 25°C	HLB Davis Scale
			Min.	Max.	Max.		Max.			
Arquad 316(W)	Trihexadecylmethyl ammonium chloride [in water (W)]	52467-63-7	86	90	2	6 - 9	4	Non-Flammable	Solid	7.6

key

- * Common name may be different from the name listed by TSCA.
 ** In many cases activity (concentration) can be changed to suit your needs

Benzylalkyl*



Product	Common Name**	TSCA Number	Specifications*			Typical Properties				
			Quarternary Salt %***		Free Amine Plus Amine Salt %	pH	Gardner Color	PMCC Flash Point, °C	Appearance @ 25°C	HLB Davis Scale
			Min.	Max.	Max.		Max.			
Arquad DMCB-80E	Benzyl dimethyl-cocoalkyl-	61789-71-7	79	82	1.5	6 - 8	4	27	Liquid	20.1
Arquad DMHTB-80E	Benzyl dimethyl-(hydrogenated tallowalkyl)-	61789-72-8	80	84	2	6 - 9	4	23	Solid	18
Arquad M2HTB	Benzyl methyl-di(hydrogenated tallowalkyl)-	61789-73-9	82	84	2	6 - 9	3	23	Solid	10.4

key

- * Prepared in aqueous ethanol. Can be prepared in other solvents.
 ** Common name may be different from the name listed by TSCA.
 *** In many cases activity (concentration) can be changed to suit your needs

Some products may be subject to minimum order quantities.

Quaternary Ammonium Salts

Ethoxylated Quaternary Salts – Monoalkyl Ethoxylates

$$\text{RN}^+(\text{CH}_2\text{CH}_2\text{OH})_2 \text{Cl}^-$$

$$\text{CH}_3$$

Product	Common Name*	TSCA Number	Specifications		Typical Properties				
			Quarternary Salt %***	Free Amine Plus Amine Salt %	pH	Gardner Color	Flash Point, °C	Appearance @ 25°C	HLB Davis Scale
			Min.	Max.		Max.			
Ethoquad 18/12	Octadecylmethyl [ethoxylated (2)]-	3010-24-0	70	2	7 - 9	7	22**	Paste	23.4
Ethoquad 18/25	Octadecylmethyl [ethoxylated (15)]-	28724-32-5	95	2	7 - 9	11	149	Liquid	28
Ethoquad C/12-75	Cocoalkylmethyl [ethoxylated (2)]-	70750-47-9	74	2	7 - 9	9	21	Liquid	25.8
Ethoquad C/12 Nitrate	Cocoalkylmethyl [ethoxylated (2)]- ammonium nitrate	71487-00-8	59	-	6.5-7.5	8	20	Liquid	25.8
Ethoquad C/25	Cocoalkylmethyl [ethoxylated (15)]-	61791-10-4	95	2	7 - 9	11	127	Liquid	30.4
Ethoquad O/12 PG	Oleilmethyl [ethoxylated (2)]-	18448-65-2	65	2	6 - 8	5	104	Liquid	23.4
Ethoquad T/13-27W	Tris(2-hydroxyethyl) tallowalkyl ammonium acetates	91080-64-7	27	1.5	6 - 8	5	63	Liquid	26
Ethoquad T/25	Tallowalkylmethyl [ethoxylated (15)]-	64755-05-1	95	-	7 - 9	12	93	Liquid	28.3

key

- * Common name may be different from the name listed by TSCA.
 ** Setaf flash
 *** In many cases, activity (concentration) can be changed to suit your needs.
 (PG) Propylene glycol

Alkyl Diammonium Petamethyl Chlorides

$$\text{R}-\text{N}^+(\text{CH}_2\text{CH}_2\text{CH}_2\text{N}^+(\text{CH}_3)_3 \text{2Cl}^-$$

$$\text{CH}_3$$

Product	Common Name*	TSCA Number	Specifications*		Typical Properties				
			Quarternary Salt %***	Free Amine Plus Amine Salt %	pH	Gardner Color	PMCC Flash Point, °C	Appearance @ 25°C	
			Min.	Max.	Max.		Max.		
Duoquad T-50 E**	N,N,N',N',N'-pentamethyl-N-tallow-1,3-propane diammonium dichloride	68607-29-4	48	52	2	6 - 9	7	15	Liquid

key

- * Common name may be different from the name listed by TSCA.
 ** Prepared in aqueous ethanol. Can also be prepared in other solvents.
 *** In many cases, activity (concentration) can be changed to suit your needs.

Some products may be subject to minimum order quantities.

Amine Oxides / Amides

Amine Oxides

$$\text{R}-\text{N}(\text{CH}_2\text{CH}_2\text{OH})_2 \rightarrow \text{O}$$

$$\text{R}-\text{N}(\text{CH}_3)_2 \rightarrow \text{O}$$

Product	Common Name*	TSCA Number	Specifications		Typical Properties				
			Amine Oxide, %	Amine %	Gardner Color	Peroxide %	Flash-Point, °C	HLB @ PH3 Davis Scale	
			Min.	Max.	Max.	Max.			
Aromox 14DW 970	Tetradecyldimethyl-amine oxides	3332-27-2	24	0.5	2	0.1	>100	28	
Aromox APA-TW	Tallowalkylamidopropyl dimethylamine oxides	68647-77-8	50	5	N/A	0.4	>100	N/A	
Aromox C/12	Bis(2-hydroxyethyl)-cocoalkylamine oxides	61791-47-7	49	2.5	6	0.34	22	24.7	
Aromox C/12W	Bis(2-hydroxyethyl)-cocoalkylamine oxides	61791-47-7	30	1	6	0.34	>100	24.7	
Aromox DMC	Dimethylcoco-alkylamine oxides	61788-90-7	39	1.5		0.34	21	22	
Aromox T/12 DPM**	Dimethyl tallowalkylamine oxides	68390-99-8	24	1.5	2	0.34	20	19.8	
Aromox T/12 HFP***	Dimethyl tallowalkylamine oxides	68390-99-8	24	1.5	2	0.34	20	19.8	

key

- * Common name may be different from the name listed by TSCA.
 ** Prepared in diethylene glycol.
 *** Prepared in propylene glycol.

Amides

$$\text{RCONH}_2$$

Product	Common Name*	TSCA Number	Specifications		Typical Properties				
			Amide, %	Free Fatty Acid, %	Gardner Color	Iodine value	Melting Point, °C	Physical Form	HLB Davis Scale
			Min.	Min.	Max.				
Armid HT	Hydrogenated tallowalkylamides	61790-31-6	90	5	7	3	98	Flakes	<1
Armid O	Oleamide	301-02-0	90	3.5	7	85	71	Flakes	<1

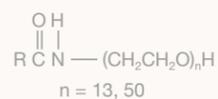
key

- * Common name may be different from the name listed by TSCA.

Some products may be subject to minimum order quantities.

Ethoxylated Amides / Nitriles / Corrosion Inhibitors

Ethoxylated Amides



Product	Common Name*	TSCA Number	Specifications		Typical Properties			
			Gardner Color	Free Amide, %	Moles EO	Hydroxyl Value	Appearance @ 25°C	HLB Davis Scale
			Max.	Max.				
Ethomid HP/60	Ethoxylated (50) hydrogenated palmalkylamides	544-30-1	8	N/A	50	50	Solid	18
Ethomid HT/23	Ethoxylated (13) hydrogenated tallowalkylamides	68155-24-8	9	15	13	105	Solid	13.5

key

* Common name may be different from the name listed by TSCA.

Nitriles

Product	Common Name*	TSCA Number	Specifications*			Typical Properties	
			Acid Value	Gardner Color	Iodine Value	Melting Point, °C	Flash Point, °C
			Max.	Max.	Min.		
Arneel OM	Oleonitrile	112-91-4	1.2	3	85	5	>149

key

* Common name may be different from the name listed by TSCA.

Corrosion Inhibitors

Product	Common Name*	Use	TSCA Number	Specifications*		Moisture	Typical Properties		
				Neutralization Equivalent			Appearance @ 25°C	Viscosity CPS	Pour Point, °C
				Min.	Max.	Max. %			
Armohib 28	Proprietary Blend	Inhibit hydrochloric and hydrofluoric acids		750	800	4.5	Liquid		11
Armohib 31	Proprietary Blend	Inhibit sulfuric, sulfamic phosphoric, citric acids				2	Liquid		0
Armohib 209	Tall Oil Imidazoline	Intermediate	68442-97-7	208	222	0.2	Liquid	200	<0
Armohib 210	Tall Oil Amido Amine	Intermediate	61790-69-0	187	200	1	Solid		32

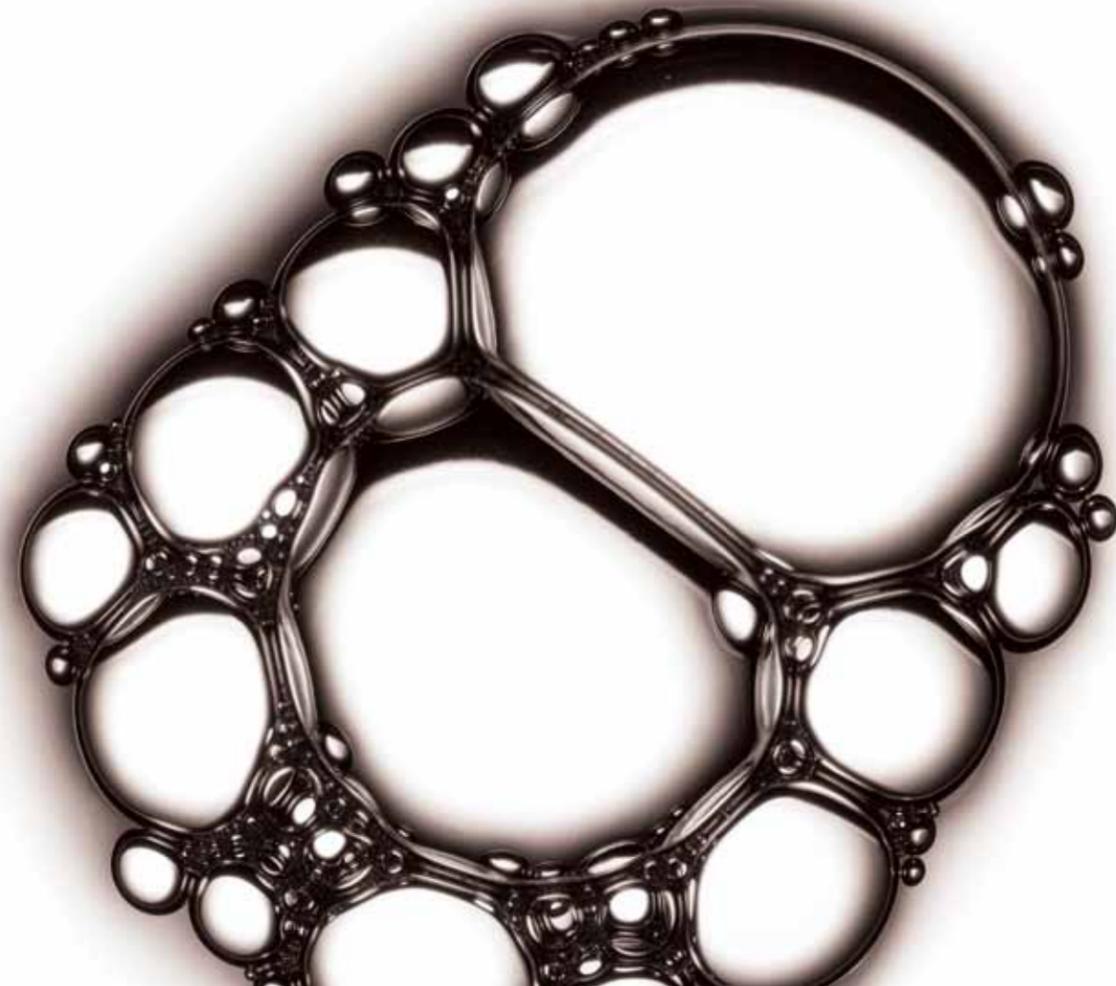
key

* Common name may be different from the name listed by TSCA.

Some products may be subject to minimum order quantities.

Anionic surfactants

Energize your detergency formulation with our anionic surfactants



Anionic Surfactants

Super foamy, super cleaning, anionic surfactants work well in harsh to mild environments

Anionic surfactants can be structurally described as an organic hydrophobe (water-insoluble) that contains one or more negatively charged substituents (anions). AkzoNobel Surface Chemistry offers anionic surfactants having sulfonate, sulfonic acid, sulfate, phosphate or carboxylic acid groups, which bear the negative (anionic) charge.

Figure 1 shows the variety of hydrophobes we use to make our anionic surfactant products. The hydrophobes are reacted with an appropriate reactant to form the anionic surfactant species listed in the right-hand column.

Below are listed the trademarks we use to identify the anionic surfactants we market.

Trademark	Surfactant Type
Emcol®	Ethoxylated Carboxylic Acid (terminated)
Lankropol™	Sulfosuccinates
Petro®	Alkyl Naphthalene Sulfonates
Phospholan™	Phosphate Esters
Witcolate™	Alkyl Sulfates; Alkyl Ether/Alkylaryl Ether Sulfates
Witconate™	Alkylaryl and μ - Olefin Sulfonates (Air/SO ₃)
Witconic™	Sulfonic Acids

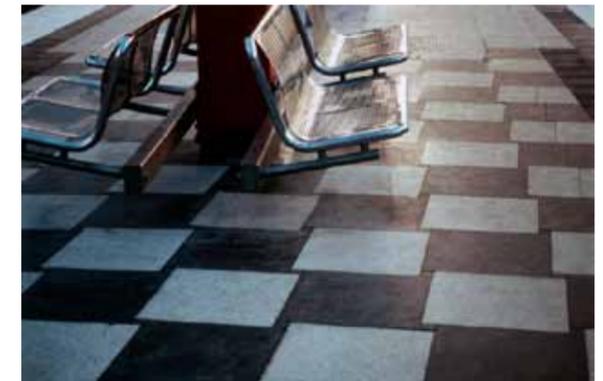
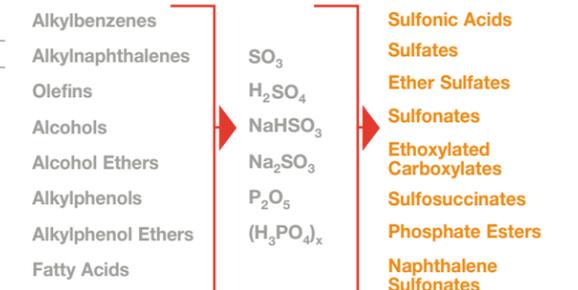


Figure 1. Anionic Process Chemicals



Anionic Surfactants



Anionic surfactants are important for their dispersing and detergency properties in aqueous media.

Anionic surfactants are important for their dispersing and detergency properties in aqueous media. By choosing the appropriate hydrophobe and anion combination, the formulator can achieve the desired surfactant effect for their formulations.

Listed below are the examples of the types of properties that can be optimized with anionic surfactants from AkzoNobel Surface Chemistry:

- Water solubility
- pH stability
- Thermal stability
- Cloud point
- Detergency
- Dispersancy
- Hard water tolerance

Recommendations of the surfactant type for various applications are found in the introduction on pages 6-7. Advice for specific products for individual requirements can be obtained by contacting our Technical Service at 1-877-565-8432.



Alkyl Naphthalene Sulfonates

Petro® alkyl naphthalene sulfonates are regarded as surface-active hydrotropes. They exhibit characteristics such as wetting, foaming, detergency and surface tension reduction. They have excellent rinseability, acid and base stability, hard-water tolerance and high-temperature stability. These versatile surfactants are used in a variety of applications including carpet cleaners, transportation cleaners, rinse aids, metal cleaners, rust removers and hard surface cleaners.

Alkyl Naphthalene Sulfonates



Product	Description	Appearance	Typical Activity, %	Functionality							Markets			
				Anticaking	Coupling	Detergency	Dispersion	Foaming	Hydrotroping	Wetting	HI & I	Laundry Detergents	Food Processing Cleaners	Transportation Cleaners
Petro 11 Liquid	Sodium Alkyl Naphthalene Sulfonate	Liquid	50	•	•		•	M	•	•		•	•	
Petro 11 Powder	Sodium Alkyl Naphthalene Sulfonate	Powder	95	•	•		•	M	•	•		•	•	
Petro 22 Liquid	Sodium Alkyl Naphthalene Sulfonate	Liquid	50				•	L	•	•		•	•	
Petro 22 Powder	Sodium Alkyl Naphthalene Sulfonate	Powder	95				•	L	•	•		•	•	
Petro AA Liquid	Sodium Alkyl Naphthalene Sulfonate	Liquid	50	•	•		•	M	•	•		•	•	
Petro AA Powder	Sodium Alkyl Naphthalene Sulfonate	Powder	95	•	•		•	M	•	•		•	•	
Petro AG Special Liquid	Sodium Alkyl Naphthalene Sulfonate	Liquid	50	•			•		•	•		•	•	
Petro AG Special Powder	Sodium Alkyl Naphthalene Sulfonate	Powder	95	•			•		•	•		•	•	
Petro AGS	Sodium Alkyl Naphthalene Sulfonate	Liquid	50	•			•		•	•		•	•	
Petro BA Liquid	Sodium Alkyl Naphthalene Sulfonate	Liquid	50	•	•		•	M	•	•		•	•	
Petro BA Powder	Sodium Alkyl Naphthalene Sulfonate	Powder	95	•	•		•	M	•	•		•	•	
Petro BAF Liquid	Sodium Alkyl Naphthalene Sulfonate	Liquid	50			•		H	•	•	•	•	•	
Petro BAF Powder	Sodium Alkyl Naphthalene Sulfonate	Powder	95			•		H	•	•	•	•	•	
Petro BP Powder	Sodium Alkyl Naphthalene Sulfonate	Powder	95								•		•	
Petro D-425 Liquid	Sodium Naphthalene Sulfonate Condensate	Liquid	43				•				•			
Petro D-425 Powder	Sodium Naphthalene Sulfonate Condensate	Powder	88				•				•			
Petro Dispersant 98	Sodium Naphthalene Sulfonate	Powder	95	•	•		•		•					
Petro LBA Liquid	Sodium Alkyl Naphthalene Sulfonate	Liquid	50	•	•		•	M	•	•	•	•	•	
Petro LBAF Liquid	Sodium Alkyl Naphthalene Sulfonate	Liquid	50			•		H	•	•	•		•	
Petro LULF Liquid	Sodium Alkyl Naphthalene Sulfonate	Liquid	50		•		•		•	•	•		•	
Petro P Liquid	Sodium Alkyl Naphthalene Sulfonate	Liquid	50			•		M/H	•					
Petro P Powder	Sodium Alkyl Naphthalene Sulfonate	Powder	95			•		M/H	•					
Petro UDET 950 Powder	Sodium Alkyl Naphthalene Sulfonate	Powder	95			•		H	•	•	•	•		
Petro ULF Liquid	Sodium Alkyl Naphthalene Sulfonate	Liquid	50		•		•	L	•	•	•			

key

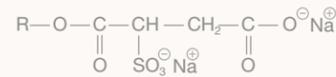
- (H) High
- (M) Moderate
- (L) Low

Sulfosuccinates / Carboxylated Ethoxylates

Lankropol® sulfosuccinates are well-known as mild anionics and are used where mildness and foaming are key considerations in formulating liquid hand soaps and light duty liquids.

Emcol® carboxylated ethoxylates are mild surfactants suitable for personal care cleansing applications with good emulsification and hydrotrope properties.

Sulfosuccinates



Product	Description	Appearance	Typical Activity, %	Moisture % Max	Color, Max	pH	Functionality							Markets			
							Conditioning & Emolliency	Coupling	Dispersion	Detergency & Cleaning	Emulsifier O/W	Foaming	Wetting	Electrolyte Tolerant	Emulsion Polymerization	Textile	
Lankropol 4500	Sodium Dioctyl Sulfosuccinate	Clear-slightly hazy liquid	70	21.5	35 (A)	6*	•	•	•	•	•	•	•	•	•	•	•
Lankropol K-8300	Disodium Oleamido MIPA-Sulfosuccinate	Clear amber liquid	38	62.5	9 (G)	6.5-7.5**				•	•	•	•	•	•	•	•

key

- * 1% aq solution
- ** 5% aq solution
- (A) APHA color
- (G) Gardner color

Carboxylated Ethoxylates



Product	Description	Appearance	Typical Activity, %	Moisture % Max	Color, Max	pH	Functionality							Markets			
							Conditioning & Emolliency	Coupling	Corrosion	Dispersion	Detergency & Cleaning	Emulsifier O/W	Foaming	Wetting	Electrolyte Tolerant	Emulsion Polymerization	Textile
Emcol CNP-110	Carboxylated Nonylphenol + 9 EO	Liquid	80	9-11	3 (G)	1.5-3.5*	•		•		•	•					•

key

- (G) Gardner color

Nonionic surfactants

Our nonionic surfactants are the secret to making cars beautiful both inside and out



Nonionic Surfactants

Nonionic surfactants by definition contain no functionality that has a formal charge. Surface activity derives from a balance of hydrophobic and hydrophilic structures contained in the surfactant molecule. Altering the balance toward more hydrophobic or more hydrophilic influences the surfactant's functional properties to achieve a desired effect.

Our nonionic surfactant offerings use hydrophobic structures represented by fatty alcohols/acids/esters, alkyl-substituted phenols and blocks of polypropylene oxide.

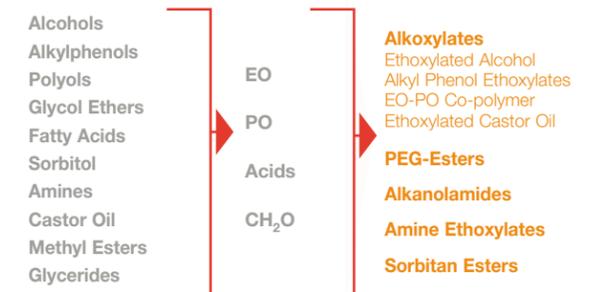
Hydrophilic character is imparted using ethylene oxide and its polymers, alkanolamines and sugar polyols. **Figure 1** illustrates the process chemistries we employ.

Below are listed the trademarks we use to identify the nonionic surfactants we market.

Trademark	Surfactant Type
Amadol®	Alkanolamides
Armotan®	Sorbitan Ester Ethoxylates
Emulpon™	Castor Oil Ethoxylates
Ethofat®	Fatty Acid Ethoxylates
Ethylan™	Linear and Branched Alcohol Alkoxylates
Witconol™	Alkyl Phenol Alkoxylates; Block Copolymers; PEG Esters

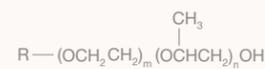


Figure 1. Nonionic Process Chemicals



Nonionics

Alkoxyated Alcohols



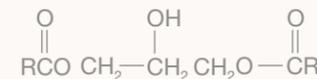
Product	Description	Appearance	Typical Activity, %	Moisture %, Max	pH	Color, Max	Cloud PT. °F	HLB	Functionality										Markets		
									Coupling	Corrosion Inhibitor	Defoamer	Dispersion	Detergency & Cleaning	Emulsifier O/W	Foaming	Viscosity Modifier	Wetting	Lubrication	Emulsion Polymerization	Personal Care	Textile
Ethylan 1005 SA	C10 Alcohol (5 EO) Ethoxylate	Liquid	99	1	5-8*	200(A)	117-127	11.6			*	*	*	*	L	*		*	*		
Ethylan 1008 SA	C10 Alcohol (8 EO) Ethoxylate	Clear-hazy liquid	99	1	5-8*	100(A)	140-154	14				*	*	*		*		*	*		
Ethylan 1206	C10-12 Alcohol Ethoxylate/ Propoxylate	Liquid	99	0.5	6-8 (a)	6 (G)	88-92	9.5					*	*	L	*		*	*		
Ethylan 324	Dipropylene Glycol EO/PO Copolymer	Paste	99	1	6-8 (b)			8	*				*								
Ethylan 4061	Butanol EO/PO Copolymer in PG	Light liquid	70	0.5	6-8				*				*								
Ethylan DA-4	Isodecyl Alcohol (4 EO) Ethoxylate	Clear-hazy liquid	100	0.5	5-7 (a)	100 (A)	65-75	10.5	*				*			*		*	*		
Ethylan HB4	Phenol (4 EO) Ethoxylate	Liquid	100	0.5	6-8*		151-154***			*	*	*	W/O			*		*	*		*
Ethylan LA-230	C12-15 Alcohol (23 EO) Ethoxylate	Solid	100	0.1	5-7*	200 (A)		17			*	*	*		*						
Ethylan NS-500LQ	Butanol Ethoxylate/ Propoxylate	Hazy liquid	99	0.2	6.5-7.5 (a)	3 (G)	113-131		*		*	*	*		*	*					
Ethylan SN-120	C10-12 Alcohol (10 EO) Ethoxylate	Light liquid	100	0.2	6-8*	1 (G)	185-197	14.3	*		*	*			*						
Ethylan SN-90	C10-12 Alcohol (7 EO) Ethoxylate	Light liquid	100	0.5	6-8*	1 (G)	58.3-60	12.9	*		*	*			*						
Ethylan TD-100	Tridecyl Alcohol (10 EO) Ethoxylate	Clear liquid	100	0.2	6.5-7.5**			13.7			*	*	*	*	*	*	*	*	*		*
Ethylan TD-120	Tridecyl Alcohol (12 EO) Ethoxylate	Liquid	100	0.2	6-8**			14.4	*		*	*	*	*	*	*	*	*	*		*
Ethylan TD-1407	Tridecyl Alcohol (14 EO) Ethoxylate	Clear liquid	75	24-25	6.5-8.5**			15			*	*			*						
Ethylan TD-60	Tridecyl Alcohol (6 EO) Ethoxylate	Pale yellow liquid	100	0.5	6-8*	200 (A)	90-104	11.4	*		*	*	*	L	*		*	*		*	*

key
 * 1% aq
 ** 5% aq
 *** 10% aq
 (a) 5% in 25% IPA
 (b) 5% in 75% IPA
 (A) APHA
 (G) Gardner
 (L) Low Foam
 (W/O) Water-in-oil

Some products may be subject to minimum order quantities.

Nonionics

Polyol Esters

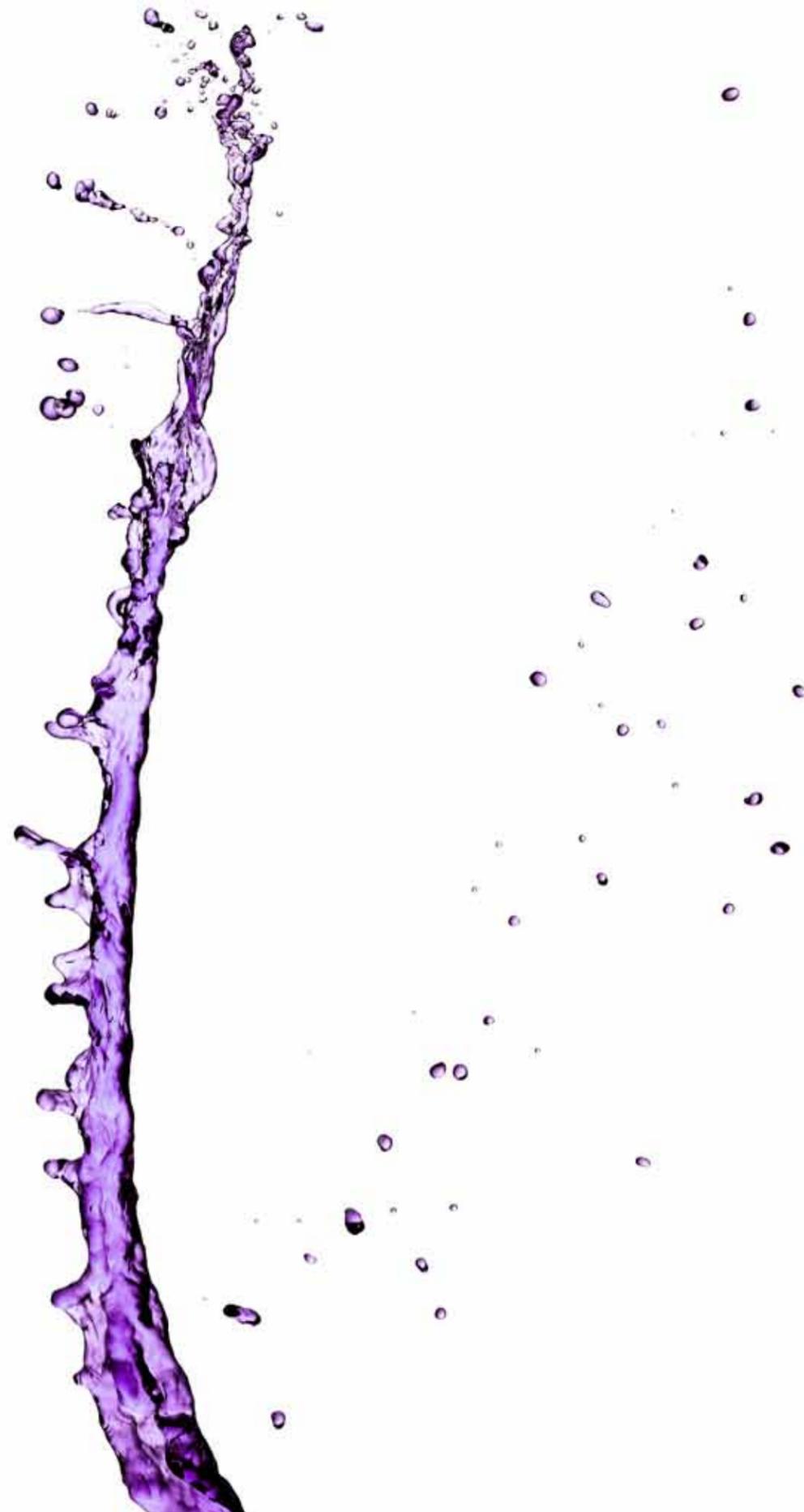


Product	Description	Appearance	Typical Activity, %	Moisture %, Max	pH	Color, Max	Cloud PT. °F	HLB	Functionality										Markets		
									Defoamer	Dispersion	Detergency & Cleaning	Emulsifier O/W	Foaming	Wetting	Lubrication	Textile	Metal Working	Paper	Ink		
Armotan AL-69-66	Sorbitol Tallate (30 EO) Ethoxylate	Liquid	100	0.5							*	*	*	*	*	*	*	*	*	*	*
Emulpon CO-100	Castor Oil (10 EO) Ethoxylate	Liquid	99	0.5	6-7 (a)	6 (G)		6.3					*					*			
Emulpon CO-200	Castor Oil (20 EO) Ethoxylate	Liquid	99	0.5	6-7 (a)	6 (G)		10.2					*					*			
Emulpon CO-360	Castor Oil (36 EO) Ethoxylate	Paste	99	0.2	6.5-7.5 (a)		166-176	13.5					*					*			
Emulpon CO-550	Castor Oil (50 EO) Ethoxylate	Paste	99	0.5	6 - 9		138-142	14.4					*					*			
Ethofat 242/25	Tall Oil Fatty Acid (15 EO) Ethoxylate	Liquid	99	3	6	12 (G)		12.2					*	*	*	*	*	*	*	*	*
Witconol 14	Polyglycerol Oleate	Liquid	100	0.2	8-9.5*	10 (G)		6.0			*	*	*	*	*	*	*	*	*	*	*
Witconol H-31A	PEG 400 Monooleate	Clear amber liquid	100	0.5	3-4*	3 (G)		12.5			*	*	*	*	*	*	*	*	*	*	*

key
 * 3%aq
 (a) 5% in 25% IPA
 (G) Gardner

Some products may be subject to minimum order quantities.

Our polymer products provide formulation flexibility



AkzoNobel Surface Chemistry is a global leader in the synthesis of water soluble polymers designed to meet the unique requirements of our customers. We have developed a diverse portfolio of specialty additives to provide cost-effective solutions to individual customer needs.

Our product lines are designed to deliver high performance within a broad range of process water treatment applications including:

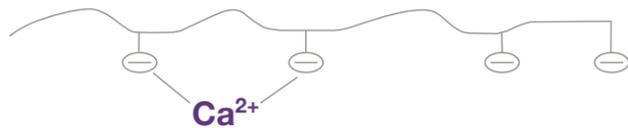
- Mineral deposit control
- Corrosion inhibition
- Microbiological control
- Metals removal
- Oil-in-water separation
- Flocculation
- Solids dispersion
- Reverse osmosis

Water Treatment Product Lines

Aquatreat®	Water Soluble Homopolymers / Copolymers
Alcoclear™	Cationic Polymers
Alcodrill®	Specialty Copolymers
Alcoflow®	Homopolymers and Specialty Copolymers
Floc Aid™	Amphiphilic Copolymers
Narlex®	Water Soluble Polymers
Aquadtrat®	Industrial Biocides
Aquamet®	Metals Removal Products
N-Sight™	Natural Clarification Polymers
Versa-TL®	Specialty Sulfonated Polymers
Versaflex®	High Performance Polymers

Performance polymers for scale and mineral deposit control

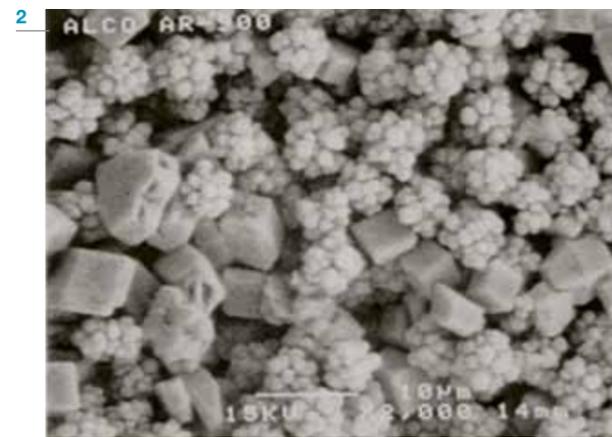
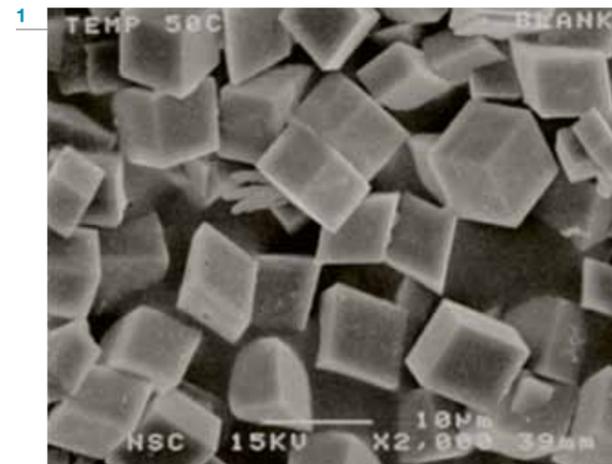
Polymer coordinates Ca²⁺ and Mg²⁺ to prevent the formation of insoluble salts



Aquatreat[®], Versaflex[®], Narlex[®], and Versa TL[®] polymers demonstrate an exceptional ability to control scale and deposits in a wide range of industrial water treatment applications including cooling towers, boilers, pulp digesters, and reverse osmosis. These high performance polymers modify the crystal structure of the scale, and increase the dispersion of the modified scale, as well as coordinates with calcium and magnesium, thus keeping the scale from depositing.

Scale Modification

1. Scale is caused by the ability for these ions to agglomerate and pack onto surfaces. Minerals with no treatment will form crystals that pack tightly together
2. Minerals treated with polyacrylic acid are more spherical and cannot pack and deposit as well.
3. Minerals treated with maleic copolymers form into fibrous structures that will not pack and are brittle which inhibits crystal growth and scale formation.



Aquatreat[®] product line

The Aquatreat[®] product line offers unique polymer compositions including acrylic, maleic, non-ionic, and sulfonated monomers which are combined with proprietary polymerization technologies to achieve unequaled performance for scale and deposit control.

Polymers for Scale and Deposit Control

Product	Typical Solids (%)	Typical pH	Typical Mw	Chemistry	Function
Aquatreat AR 4	25	2.1	250000	Polyacrylic acid	Boiler water dispersant, sludge conditioner
Aquatreat AR 6	25	2.3	500000	Polyacrylic acid	Boiler water dispersant, sludge conditioner
Aquatreat AR 260	50	3.2	2000	Polyacrylic acid	Sugar evaporator scale control
Aquatreat AR 602A	50	2.8	4500	Polyacrylic acid	General purpose anti-scalant, dispersant
Aquatreat AR 900A	50	2.9	2600	Polyacrylic acid	General purpose anti-scalant, dispersant
Aquatreat AR 921A	50	2.6	3000	Polyacrylic acid	Calcium sulfate fouling, high TDS waters
Aquatreat AR 935 ⁽²⁾	35	3.5	2500	Polyacrylic acid	Inhibitor for RO/distillation (NSF Std 60)
Aquatreat AR 963C	63	2.6	2200	Polyacrylic acid	Scale inhibition, dispersant
Aquatreat AR 7H	13.5	2.3	1200000	Polyacrylic acid	Particle size regulator in suspension/solution polymerizations
Aquatreat AR 490	40	8.2	2600	Sodium Polyacrylate	General purpose anti-scalant, dispersant
Aquatreat AR 602N ⁽¹⁾	45	7.5	4500	Sodium Polyacrylate	General purpose anti-scalant, dispersant
Aquatreat AR 636 ⁽²⁾	45	7.5	4500	Sodium Polyacrylate	Inhibitor for RO/distillation (NSF Std 60)
Aquatreat AR 900 ⁽¹⁾	33	5.5	2600	Sodium Polyacrylate	General purpose anti-scalant, dispersant
Aquatreat AR 940 ⁽¹⁾	40	8.3	2600	Sodium Polyacrylate	General purpose anti-scalant, dispersant
Aquatreat AR 232 ⁽¹⁾	30	8.5	9500	Sodium Polymethacrylate	Boiler water dispersant, sludge conditioner
Aquatreat AR 235	30	10	16000	Sodium Polymethacrylate	Desludging agent, cooling towers, boilers, heat exchangers
Aquatreat AR 241	40	7.0	6500	Sodium Polymethacrylate	Boiler water dispersant, sludge conditioner
Aquatreat AR 476	50	<2.0	<1000	Polymaleic	Effective in stressed systems for mineral scale control
Aquatreat AR 540 ^(1,2)	44	4.3	10000	Sulfonated copolymer	Phosphate/Zinc/Iron control and cleaning
Aquatreat AR 545	44	4.4	5000	2A2MP (3) copolymer	Phosphate/Zinc/Iron control and cleaning
Aquatreat AR 546	37	4.8	9900 min	2A2MP (3) copolymer	Meets 21 CFR 173.310 and 21CFR 176.170
Aquatreat AR 801	40	3.5	<1000	Polymaleic	Effective in stressed systems for mineral scale control
Aquatreat AR 476	50	<2.0	<1000	Polymaleic	Effective in stressed systems for mineral scale control
Aquatreat AR 978	42	5.0	4500	Maleic copolymer	Barium sulfate, functions @ low pH
Aquatreat AR 980 ⁽¹⁾	41	6.4	2800	Maleic copolymer	Severe scaling conditions

key

- (1) Available in dry form
- (2) Meets NSF Standard 60
- (3) 2-acrylamido-2methylpropane sulfonic acid, sodium salt

Some products may be subject to minimum order quantities.

Performance polymers for scale and mineral deposit control



Versaflex® Polymers

Versaflex® polymers were developed to provide unique performance in extreme service conditions. Versaflex products maintain stability and functionality in today's most severe water conditions.

Polymers for Scale and Deposit Control

Product	Typical Solids (%)	Typical pH	Typical Mw	Chemistry	Function
Versaflex ONE	40	4.5	3800	Sulfonated copolymer	High LSI conditions Meets NSF Standard 60
Versaflex Si	42	5.5	7200	Sulfonated copolymer	Advanced silica/silicate control Meets NSF Standard 60

Versa-TL® Sulfonated Copolymers

Versa-TL® sulfonated copolymers deliver unmatched functionality and thermal stability for control of iron in boiler applications.

Polymers for Scale and Deposit Control

Product	Typical Solids (%)	Typical pH	Typical Mw	Chemistry	Function
Versa-TL 3 ⁽¹⁾	95	7.0	20000	Sulfonated styrene /	Iron control in systems up to 1000 psi
Versa-TL 4	25	7.0	20000	maleic acid copolymer	Iron control in systems up to 1000 psi

key

(1) Available in liquid form at 40% actives

Some products may be subject to minimum order quantities.

Performance additives for microbial control



Performance Additives for Microbial Control

The Aquatreat® dithiocarbamates offer microbial control efficacy for a broad range of bacteria, fungi, and algae. Armohib B-101® is also an efficient microbiocide for oilfield applications. The product line is designed for use in specific industrial applications such as pulp and paper mills, sugar processing, cooling towers, air washers, and oil production/storage.

Industrial Biocides

Product	Chemistry	Function
Single Component		
Aquatreat DN 30	Disodium ethylene-bis-dithiocarbamate	Cooling towers, evaporative condensers, air washers, drilling fluids, petroleum recovery, paper mills, beet sugar, cane sugar
Aquatreat SDM	Sodium dimethyldithiocarbamate	Cooling towers, evaporative condensers, air washers, drilling fluids, petroleum recovery, paper mills, beet sugar, cane sugar, sap stain control
Aquatreat KM	Potassium dimethyldithiocarbamate	Cooling towers, evaporative condensers, drilling fluids, petroleum recovery, paper mills, industrial reverse osmosis, waste water
Armohib B-101	N-cocoalkyl-1,3-diaminopropane diacetate	Petroleum well completions, workover, stimulation fluids, petroleum transportation, storage and surface equipment
Dual Component		
Aquatreat DNM 9	Sodium dimethyldithiocarbamate Disodium ethylene-bis-dithiocarbamate	Cooling towers, evaporative condensers, air washers, drilling fluids. petroleum recovery, paper mills, beet sugar, cane sugar
Aquatreat DNM 30	Sodium dimethyldithiocarbamate Disodium ethylene-bis-dithiocarbamate	Cooling towers, air washers, drilling fluids. petroleum recovery, fracturing fluids, work-over and completion fluids, flue gas, hydrocarbon fluids, paper mills, beet sugar, cane sugar
Aquatreat DNM 360	Sodium dimethyldithiocarbamate Disodium ethylene-bis-dithiocarbamate	Cooling towers, evaporative condensers, air washers, drilling fluids. petroleum recovery, paper mills, beet sugar, cane sugar

AQUATREAT® Industrial Biocides are EPA Registered and comply with appropriate FDA regulations

Some products may be subject to minimum order quantities.

Wastewater treatment polymers

Wastewater Treatment Additives for Metals Removal

Aquamet® specialty additives are designed to provide cost-effective removal of heavy metals from aqueous waste streams. AkzoNobel is one of only a few companies in the world to manufacture these unique products. An important factor in metal precipitation and waste treatment is disposal of sludge. The Aquamet products generally produce a sludge that weighs less per unit of metal precipitated, and is lower in volume than common alternative treatments such as hydroxide and sulfide precipitation. In addition, the precipitated sludge may be further processed to reclaim the metals from it.

These products will have a nearly stoichiometric reaction with solubilized heavy metals, while the reaction of chelated metals with the Aquamet line is not stoichiometric, but predictable.

Additives for Metals Removal

Product	Typical Solids (%)	Typical pH	Specific Gravity	Density (lbs/gal)	Chemistry	Function
Aquamet E	25	12	1.09	9.10	Na diethyldithiocarbamate	Direct precipitation of chelated metals, chromate reduction, easily dewatered high solids sludge
Aquamet M	40	12.6	1.16	9.67	Na dimethyldithiocarbamate	
Aquamet T	25	13.2	1.2	9.80	Na trithiocarbonate	Precipitates chelated metals, heavy metal removal, very low volume high density sludge

Wastewater Treatment Polymers for Water Clarification Processes

N-SIGHT™ natural clarification polymers are starch-based, natural chemistries designed for superior efficacy in water and wastewater treatment applications. These unique polymers function as coagulants to improve influent water clarification processes. They promote improved performance as emulsion breakers versus conventional synthetic polymers. As flocculants, N-SIGHT polymers improve the efficiency of wastewater clarification processes and improve the effectiveness of sludge thickening processes. N-SIGHT™ polymers have low toxicity and are biodegradable, offering formulators “green” chemistries for their applications.

Alcoclear® and Floc AID™ products are synthetic polymers and copolymers designed for specialty application in liquid-solids separation and emulsion breaking applications.

Flocculation and Emulsion Breaking Polymers

Product	Chemistry	Function
Natural Products		
N-Sight C1	Modified Starch – Cationic	Flocculation, emulsion breaking
N-Sight A1	Modified Starch – Anionic	Flocculation
N-Sight H1	Modified Starch – Hydrophobic	Flocculation, emulsion breaking
Synthetic Products		
Alcoclear CCP II	Polycationic	Flocculation, emulsion breaking
Floc AID 19	Polyamphiphilic	Flocculation, emulsion breaking
Floc AID 34	Polyamphiphilic	Flocculation, emulsion breaking

Some products may be subject to minimum order quantities.

Desalination



Desalination and Reverse Osmosis Scale Control

Long recognized as a leader in process water and cleaning applications, AkzoNobel Surface Chemistry is pleased to offer a range of proven products for scale control in membrane applications. The VERSAFLEX® RO products are designed to provide outstanding performance for severe service and general purpose applications in control of CaCO₃, CaSO₄, BaSO₄, calcium phosphate, heavy metals, silica, and silicates.

Polymers for Scale and Deposit Control

Product	Typical Solids (%)	Typical pH	Dose (as product)	Function
Calcium Carbonate scale				
Versaflex RO 9110 ⁽³⁾	35	3-4	2-4 ppm	Controls scale in waters with LSI ⁽¹⁾ of up to approximately 2.8, Prevents calcium sulfate scaling
Versaflex RO 7110 ⁽³⁾	40	4-5	2-4 ppm	LSI of up to approximately 2.8
Calcium Sulfate scale				
Versaflex RO 9110 ⁽³⁾	35	3-4	2-4 ppm	Controls scale in waters with SI = 5.9 to 6.1 Induction time of up to 150 minutes Delays precipitation up to 2X as long as competitive products Prevents calcium carbonate scaling
Barium Sulfate scale ⁽²⁾				
Versaflex RO 6310	44	6.0	50-100 ppm	Sulfonated maleic copolymer for barium sulfate scale inhibition. Not effective for carbonate scales
Versaflex RO 7310	35	2.8	50-100 ppm	Patent pending multifunctional copolymer; compatible with methanol and other solvents, blends well with other products
Versaflex RO 6320	42	5.0	25-50 ppm	Severe scaling conditions including barium sulfate. Not compatible in very high salinity brines
Versaflex RO 7110 ⁽³⁾	40	4-5	2-4 ppm	LSI of up to approximately 2.8
Calcium Phosphate scale and Heavy Metal Control				
Versaflex RO 5410 ⁽³⁾			1:1 for PO ₄ 2:1 for Fe	Silt and Iron Inhibitor / Dispersant Effective Inhibition of PO ₄ based scales
Silica scale				
Versaflex RO 7510 ⁽³⁾	42	5.5	5-20 ppm	Controls silica at ≥ 300 ppm Recommendations based on standard boiler and cooling water conditions. Reverse Osmosis performance not yet verified

key (1) LSI = Langelier Saturation Index <http://www.surfactants.akzonobel.com/lsi.cfm>

(2) These products have been tested in high brine (oilfield) applications and show good efficiency

(3) ANSI/NSF Standard 60 certification for use as drinking water chemical additives in Reverse Osmosis Antiscalants and Distillation Antiscalants

Some products may be subject to minimum order quantities.

Oilfield applications

Performance Polymers for Oilfield Applications

Alcoclear™, Alcodrill® and Alcoflow® specialty polymers are designed specifically to meet the needs of the oilfield market. All products are sold as aqueous solutions, but can also be made available as spray-dried powders or granules.

Floc AID™ Polymers

Medium molecular weight polymers designed to adsorb at the oil/water interface, to reduce interfacial tension, and improve oil coalescence. Polymers function as both demulsifier components and water clarification agents.

Versa-TL® Sulfonated Polymers

This unique range of sulfonated-styrene homopolymers and maleic acid-containing copolymers yield superior calcium and salt tolerance, and provide extreme high temperature stability for superior performance as drilling mud deflocculants. The highest molecular weight variants of this chemistry exhibit fluid loss control properties.



Some products may be subject to minimum order quantities.

Polymers for Oilfield Applications

Product	Typical Solids (%)	Typical pH	Typical Mw	Chemistry	Function
Alcoclear CCPII	6.2	4.5	1,000,000	polycationic	Oil-in-water, water-in-oil clarification
Alcodrill HPD L	45	6.5	3,500	sulfonated polycarboxylate	High temperature stable deflocculants for contaminated and seawater drilling muds
Alcodrill HPD S	>95	n/a			
Alcodrill SPD L	40	8.0	3,000	polycarboxylate	High temperature stable deflocculants for freshwater drilling muds
Alcodrill SPD S	>95				
Alcoflow 100	50	2.5	3,000	polycarboxylate	Superior carbonate inhibitor, ultra brine stable in acid form, high solids
Alcoflow 250	40	3.5	800	polycarboxylate	Premium barium sulfate inhibitor, ultra brine stable, high charge density
Alcoflow 260	44	4.3	7,500	sulfonated copolymer	Multi-scale inhibitor, Ca scales, designed for high pH brines
Alcoflow 270	40	4.5	5,000	sulfonated multi-polymer	Multi-scale inhibitor, all scales, excellent brine tolerance
Alcoflow 275	50	<2	<1,000	polymaleic	Effective in stressed systems for mineral scale control
Alcoflow 750	35	2.8	n/a	acrylic terpolymer	Methanol soluble scale inhibitor, superior barium sulfate inhibition, biodegradable
Alcoflow 920	35	8.0	n/a	sulfonated polycarboxylate	Halite inhibitor, high brine tolerance, enhanced thermal stability
Floc AID 19	27.5	4.0	100,000	polyamphiphile	Ultra-stable aqueous demulsifier, non-ionically modified amphiphile
Floc AID 34	27.5	4.8	100,000	polyamphiphile	Ultra-stable aqueous demulsifier, amphiphile
Versa-TL 3	>95	7.0	20,000	sulfonated styrene / maleic acid copolymer	Ultra-high temperature stable deflocculants for contaminated and high density salt muds
Versa-TL 4	25				

(n/a) not available

Some products may be subject to minimum order quantities.

Fabric and cleaning applications

Our product line offers a broad array of polymers that provide benefit in the formulation, production, and performance of cleaning and care products around the globe. Our scientists are continually seeking new ways to improve the performance and cost structure of laundry, dish wash, and hard surface cleaning formulations in consumer and industrial and institutional environments.

Alcosperse® polymers find application in liquid and powdered dishwasher detergents, laundry detergents and hard surface cleaners. The polymers perform as co-builders in helping the detergents work more effectively by removing hardness ions. They also serve as anti-redeposition agents, compatibility aids, and process assists in the manufacture of powdered laundry formulations.

Fabric and Cleaning Polymers for Anti-redeposition, Anti-encrustation, Scale inhibition, and Process aids

Product	Typical Solids (%)	Typical pH	Typical Mw	Chemistry	Function
Alcosperse 125	30	8.5	10000	sodium polymethacrylate	General purpose dispersant
Alcosperse 149⁽¹⁾	40	8.2	2500	sodium polyacrylate	General purpose mineral dispersant, optimum clay dispersancy, anti-redeposition agent
Alcosperse 149C⁽¹⁾	43	7.8	2500	sodium polyacrylate	General purpose mineral dispersant
Alcosperse 175^(1,2)	40	8.0	20000	polycarboxylate	Process aid, anti-redeposition agent in stressed water conditions, improved Ca ²⁺ binding
Alcosperse 240⁽¹⁾	44	4.2	10000	sulfonated copolymer	Superior dispersing properties in stressed systems, compatible in nonionic surfactants, reduces filming in automatic dishwash formulations
Alcosperse 408⁽¹⁾	43	5.5	2700	acrylate/maleate copolymer	Anti-encrustation aid, sequestrant, process aid in stressed water conditions
Alcosperse 409	50	2.8	2600	polyacrylic acid	General purpose dispersant, anti-scalant
Alcosperse 410	47	5.2	3000	acrylic copolymer	Anti-encrustation aid in higher pH systems
Alcosperse 415	49	4.1	5000	acrylate/maleate copolymer	Anti-encrustation aid, CaCO ₃ scale inhibitor
Alcosperse 420⁽¹⁾	41	4.0	1500	acrylic copolymer	Anti-encrustation aid, CaCO ₃ scale inhibitor
Alcosperse 459 N^(1,2)	48	7.0	5000	sodium polyacrylate	Anti-redeposition in powdered formulations
Alcosperse 465⁽¹⁾	46.5	3.5	6000	sodium polyacrylate	Chlorine stable scale inhibitor/dispersant
Alcosperse 602N^(1,2)	45	7.5	5000	sodium polyacrylate	General purpose dispersant, sequestrant, anti-redeposition agent, process aid
Alcosperse 725⁽¹⁾	35	7.5	2500	hydrophobically modified copolymer	Anti-redeposition agent for hydrophobic particles, excellent surfactant compatibility
Alcosperse 729⁽¹⁾	32	7.8	7000	sulfonated copolymer	Highest Ca ²⁺ tolerance polymer in product line
Alcosperse 747⁽¹⁾	40	7.5	3000	hydrophobically modified copolymer	Excellent surfactant compatibility, anti-redeposition agent for liquid laundry formulations
Alcosperse 765	33	13.0	n/a	specialty polyether	Designed for systems with high calcium / iron content

key

(1) Available in dry form

(2) Available in acid form

Some products may be subject to minimum order quantities.



Alcoguard® polymers offer extreme scale control in zero phosphate formulations, these products keep film from forming on hard as well as soft surfaces. Other applications include opacifiers, and fabric stiffening aids.

Fabric and Cleaning Polymers for Anti-Filming, Anti-Spotting, Ironing / Starch Aids, Scale Inhibition, and Opacifiers

Product	Typical Solids (%)	Typical pH	Typical Mw	Chemistry	Function
Alcoguard 1000	30	10	5000	Proprietary copolymer	Medium starch stiffness ironing aid
Alcoguard 1200	30	10.5	n/a	Polymer / humectant system	Soil guard / soil release Wrinkle reduction
Alcoguard 1300	30	5.0	90000	Functionalized crosslinker urea/polymer blend	Heavy starch stiffness ironing aid
Alcoguard 4000⁽¹⁾	41	7.0	12000	Sulfonated acrylic Copolymer	Anti-filming, anti-spotting in automatic dish wash, Ca ²⁺ scale inhibition
Alcoguard 4400	45	4.5	9000	Non-sulfonated copolymer	Anti-filming, anti-spotting in automatic dish wash, Ca ²⁺ scale inhibition
Alcoguard 4160⁽¹⁾	40	4.5	3800	Sulfonated acrylic copolymer	Ca ²⁺ scale inhibition in zero phosphate auto dish wash
Alcoguard 7100	38	7.0	n/a	Styrene acrylic copolymer	Opacifier for chlorine bleach / alkaline low surfactant systems

key

(1) Available in dry form

Some products may be subject to minimum order quantities.

Fabric and textile applications

Versa-TL® sulfonated polystyrene homopolymers and sulfonated styrene / maleic acid copolymers impart anti-static properties to a range of products. These polymers also provide rub-off resistance to actives and a high level of stain protection. The dispersant properties of the SPS/SSMA chemistry can be used to prevent or reduce the buildup of mineral deposits on kitchen and bathroom fixture and to improve the soil removability of household cleaners.

Polymers for Anti-Stat and Film Former Applications

Product	Typical Solids (%)	Typical pH	Typical Mw	Chemistry	Function
Versa-TL 3	91	6.0	20000	Sulfonated styrene / maleic acid copolymer, Na salt	Excellent dispersant for stressed conditions, anti-static agent
Versa-TL 4	25	7.0	20000	Sulfonated styrene / maleic acid copolymer, Na salt	Excellent dispersant for stressed conditions, anti-static agent
Versa-TL 70	100	n/a	75000	Sulfonated polystyrene, sodium salt	Film former, anti-stat agent
Versa-TL 71	30	<2.0	75000	Sulfonated polystyrene	Film former, anti-stat agent
Versa-TL 73	30	5.0	75000	Sulfonated polystyrene, sodium salt	Film former, anti-stat agent
Versa-TL 125	30	4.0	200000	Sulfonated polystyrene, NH ₄ salt	Film former, anti-stat agent
Versa-TL 130	30	6.0	200000	Sulfonated polystyrene	Anti-static agent
Versa-TL 501	25	7.0	1000000	Sulfonated polystyrene	Anti-static agent
Versa-TL 502	95	n/a	1000000	Sulfonated polystyrene	Anti-static agent

Alcocap® natural polymers allow conversion of liquids to powders. These powders can be used for fragrance encapsulation, or for viscous liquids, by conversion of these hard to handle liquids into flowable powders.

Fabric & Cleaning Encapsulating Agents

Product	Typical Solids (%)	Typical pH	Color	Chemistry	Function
Alcocap 100	~ 95	~ 3.0	Off-white	Modified natural polymer	High loading encapsulating agent Forms stable oil-in-water emulsions Formulation compatibilizer
Alcocap 200	~ 95	~ 3.0	Off-white	Modified natural polymer	High loading encapsulating agent Forms stable oil-in-water emulsions Formulation compatibilizer
Alcocap 300	~ 95	~ 3.0	Off-white	Modified natural polymer	High loading encapsulating agent Forms stable oil-in-water emulsions Formulation compatibilizer

Some products may be subject to minimum order quantities.



Performance Polymers for Textile Processing

Alcoquest® polymers can be formulated into textile scours, rinse aids, dye bath dispersants, water softeners and lubricants. Data listed are typical properties. Specifications for individual products are available upon request.

Polymers for Textile Processing

Product	Typical Solids (%)	Typical pH	Typical Mw	Chemistry	Function
Alcoquest 149 ⁽¹⁾	40	8.2	2500	sodium polyacrylate	General purpose mineral dispersant, sequestrant, anti-redeposition agent
Alcoquest 149C	43	7.8	2500	sodium polyacrylate	General purpose mineral dispersant
Alcoquest 175 ^(1,2)	40	6.5	20000	polycarboxylate	Process aid, anti-redeposition agent in stressed water conditions
Alcoquest 240 ⁽¹⁾	44	4.2	10000	sulfonated copolymer	Sequestrant, superior dispersing properties in stressed systems, compatible in nonionic surfactants
Alcoquest 408 ⁽¹⁾	43	5.5	2700	acrylate/maleate copolymer	Encrustation aid, sequestrant, process aid in stressed water conditions
Alcoquest 409	50	2.8	2600	acrylate copolymer	General purpose mineral and clay dispersant
Alcoquest 602N ^(1,2)	45	7.5	4500	sodium polyacrylate	General purpose dispersant, sequestrant, anti-redeposition agent, process aid
Alcoquest 725	35	7.5	2500	hydrophobically modified copolymer	Anti-redeposition agent for hydrophobic particles, excellent surfactant compatibility
Alcoquest 747 ⁽¹⁾	40	8.5	10000	hydrophobically modified copolymer	Textile scour, excellent surfactant compatibility, anti-redeposition agent for hydrophobic particles

key ⁽¹⁾ Available in dry form
⁽²⁾ Available in acid form

Some products may be subject to minimum order quantities.

Rheology modification and viscosity control



Fabric and Home Care

Alcogum® rheology modifiers for cleaning applications are designed to thicken, stabilize, or change the flow properties of aqueous formulated products over a broad pH range. The extensive line of polymeric rheology modifiers provides the opportunity to customize in-process flow characteristics, as well as the final formulation properties. In cleaning formulations, Alcogum rheology modifiers can increase contact time to the surface, allowing for improved and more efficient cleaning. Alcogum polymers may also be utilized to suspend insoluble cleaning additives in alkaline and acidic liquid formulations.

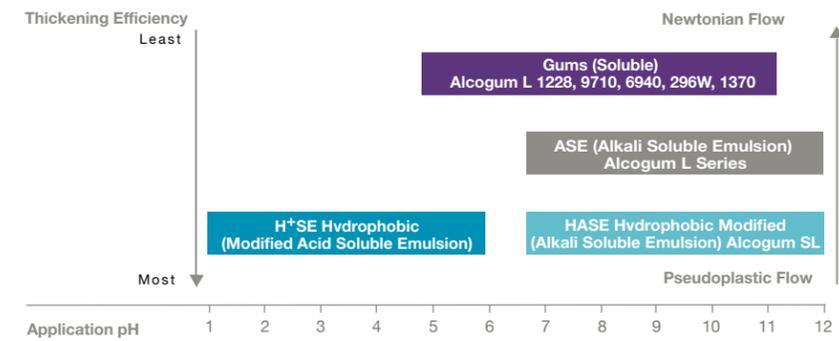
Fabric and Cleaning Rheology Modifiers / Viscosity Control / Thickeners

Product	Typical Solids (%)	Typical pH	Typical Mw	Chemistry	Function
Alcoguard 5800	30	3.0	500000	HASE rheology modifier	Rheology modifier for surfactant systems
Alcogum L 12	28.5	3.0	High	ASE rheology modifier	Rheology modifier for bath / tile, HSC, I&I
Alcogum L 15	30	2.7	High	ASE rheology modifier	Rheology modifier for HSC, I&I
Alcogum L 520	20	8.5	High	HH+SE rheology modifier	Rheology modifier for I&I, fabric softeners, ADW gels, bowl cleaners, LDL
Alcogum SL 70	30	3.0	High	HASE rheology modifier	Rheology modifier for bath / tile, HSC, I&I
Alcogum SL 78	30	3.0	High	HASE rheology modifier	Rheology modifier for HSC, I&I, easier to formulate than SL70, SL117
Alcogum SL 117	30	3.0	High	HASE rheology modifier	Rheology modifier for bath / tile, HSC, I&I

key ADW - Automatic dishwashing detergent
 HCS - Hard surface cleaning
 I&I - Industrial and institutional cleaning

Some products may be subject to minimum order quantities.

Alcogum Rheology Modifier Selection



Alcogum® Rheology Modifiers for Construction Compounding Polymer Processing and Pigment and Paint Formulations

Synthetic rheology modifiers are employed in a wide number of applications to impart controlled performance to aqueous coating formulations that are applied under extreme shear conditions to relatively porous substrates. The products are designed for use as thickeners, or rheology modifiers in numerous application areas including paper and paperboard coating, adhesive and textile compounding, paint formulation, detergent and cleaning compositions, construction compounds, latex coatings, pigment mining, and particulate suspension. Commonly referred to as alkali swellable (or soluble) emulsions (ASE), the technology has been expanded over the years to include hydrophobically modified ASE products (HASE).

The flexibility in polymer design afforded by synthetic rheology modifiers provides a means to address increasingly stringent performance requirements. They typically impart a pseudoplastic (shear-thinning) type of rheology response to mastic adhesive formulations that allows the applicator to apply the formulations with a minimum degree of shear energy while maintaining the proper structure of the applied compound for optimized adhesion and workability. The products are supplied as low viscosity emulsions that allow for exact metering in automated systems.

The Alcogum rheology modifiers are medium to relatively high viscosity, water soluble, sodium polyacrylate polymers supplied at an alkaline pH. Alcogum rheology modifiers provide a mechanism for reproducible viscosity build in latex-containing, high solids, pigmented formulations. The Alcogum products are suitable for use in formulations applied via spray, trowel, roller, brush, and squeeze bottle (for example wood glues). Product selection is based on a customer's desired rheology, efficiency, open time, etc. The rheology imparted to a formulation containing Alcogum products is very much a function of the overall formulation and formulation components. AkzoNobel Surface Chemistry has the in-house capability to evaluate and characterize the rheological profile of most application formulations to identify the optimum product recommendation.



Rheology modification and viscosity control

Alcogum® Rheology Modifiers

Product	Typical Solids (%)	Typical pH	As-is viscosity (cPs)	Chemistry	Function
Alcogum 1370	14.5	10	40,000	Sodium polyacrylate	Adhesive formulations, textile processing
Alcogum 296W	16.0	9.5	25,000	Sodium polyacrylate	Caulks, sealants, adhesive formulations,
Alcogum 6940	12.0	12.0	22,500	Sodium polyacrylate	Adhesive formulations, textile processing, carpet manufacturing
Alcogum 9710	12.5	12.0	20,000	Sodium polyacrylate	Adhesive formulations, latex coatings
Alcogum AN 10	10.0	10.0	70,000	Sodium polyacrylate	Carpet and rug manufacturing, latex coatings
Alcogum HPT	13.0	10.0	<12,000	Sodium polyacrylate	Carpet manufacturing, latex coatings
Alcogum VEP I	14.0	8.5	10,000	Sodium polyacrylate	Carpet manufacturing, latex coatings



Some products may be subject to minimum order quantities.

Rheology modifiers for various applications

Alcogum® L Series Rheology Modifiers are ASE (alkali soluble emulsion) acrylate-based emulsion copolymers typically supplied at 20-40% active solids in water. The processes employed in manufacture of Alcogum L-Series products allow fine control of the polymer structure and molecular weight for optimized performance in a broad range of application areas including paper and paperboard coating, adhesive and textile compounding, paint formulation, detergent and cleaning compositions, construction compounding, latex coatings, pigment mining, and particulate suspension. Alcogum L-Series technology also includes a unique line of hydrophobically modified alkali soluble emulsion products typically referred to as HASE thickeners. These products provide precise control of low and high shear viscosity in aqueous formulations.

Alcogum L 520 is designed to provide novel performance in cationic systems. This product also demonstrates the unique ability to provide efficient viscosity build to both alkaline and acidic systems containing a high concentration of nonionic, cationic, and/or anionic surfactants.

Rheology Modifiers

Product	Typical Solids (%)	Typical pH	Thickening Efficiency (cPs)	Chemistry	Function
Alcogum L 11	28	2.7	28,000 (1)	ASE	Mastic adhesive formulations, general purpose thickener
Alcogum L 12	28.5	3.0	29,000 (2)	ASE	High efficiency mastic thickener
Alcogum L 15	30	2.7	12,500 (1)	ASE	General purpose thickener, cleaning compounds
Alcogum L 29	30	2.8	400 (3)	ASE	Low, low shear rheology modifier, water retention aid
Alcogum L 31	40	2.6	18,000 (1)	ASE	General purpose thickener, pigment stabilizer
Alcogum L 46	35	2.6	4,000 (4)	HASE	Pigment stabilizer
Alcogum L 52	30	2.8	4,500 (6)	ASE	Mastic adhesive formulations
Alcogum L 62	28	2.8	32,500 (5)	ASE	Tape joint compound formulations
Alcogum L 68	30	2.8	5,000 (5)	HASE	Mastic adhesive formulations
Alcogum L 72	30	2.8	n/a	HASE	High efficiency thickener for mastic adhesives
Alcogum L 77	28	2.6	27,500 (1)	HASE	High efficiency general purpose thickener
Alcogum L 520	20	8.5	1,500 (7)	HH+SE	Thickener for acidic systems, surfactant thickening
Alcogum SL 70	30	3.0	27,000 (4)	HASE	Highest efficiency, hard surface cleaners, oven cleaners
Alcogum SL 78	30	3.0	41,000 (2)	HASE	Efficient general purpose, blends easily into formulations
Alcogum SL 117	30	3.0	19,500 (4)	HASE	Curtain coating applications, spray coatings
Alcogum SL 920	30	3.0	17,500 (4)	HASE	High efficiency rheology modifier, surfactant synergy

Rheology Modifiers for Paint Applications

Product	Typical Solids (%)	Typical pH	Thickening Efficiency (CPS)	Chemistry	Function
Alcogum L 340	30	4.5	n/a	HASE	Builds high, low shear and low, high shear viscosity, for interior flat and semi-gloss
Alcogum L 344	30	5.0	6,000 (2)	HASE	Efficient Krebs Unit build, excellent scrub values, interior flat, Sheen and satin paints
Alcogum L 350	30	2.8	20,000 (2)	HASE	Highest shear viscosity generator, builds high low shear viscosity, superior high shear in-can structure

key (1) 2.5% polymer, NaOH neutralized to pH 9, 10 rpm, sp#6 (4) 1% polymer, NH4OH neutralized to pH 9, 10 rpm sp#6 (6) 1% polymer, NaOH neutralized to pH 9, 10 rpm, sp# 6
 (2) 2% polymer, NH4OH neutralized to pH 9, 10 rpm, sp#6 (5) 2.5% polymer, NH4OH neutralized, to pH 9, 10 rpm, sp#6 (7) 5% polymer in glycolic acid, 10 rpm, sp# 2
 (3) 5% polymer, NaOH neutralized to pH 9, 10 rpm, sp#6

Some products may be subject to minimum order quantities.

Mineral clay and pigment dispersion



The ALCOSPERSE® line of acrylate-based polymers provides optimum dispersion performance to high solids mineral clay and pigment slurries.

Polymers for Mineral Clay and Pigment Dispersions

Product	Typical Solids (%)	Typical pH	Typical Mw	Chemistry	Function
Alcosperse 125	30	8.5	10000	sodium polymethacrylate	Pigment dispersant for paints
Alcosperse 149 ⁽¹⁾	40	8.2	2500	sodium polyacrylate	General purpose mineral dispersant, optimum clay dispersancy
Alcosperse 149C ⁽¹⁾	43	7.8	2500	sodium polyacrylate	General purpose mineral dispersant
Alcosperse 240 ⁽¹⁾	44	4.2	10000	sulfonated copolymer	Superior dispersing properties in stressed systems
Alcosperse 409	50	2.8	2600	polyacrylic acid	General purpose dispersant, anti-scalant
Alcosperse 602N ^(1,2)	45	7.5	4000	sodium polyacrylate	General purpose dispersant, sequestrant, anti-redeposition agent, process aid
Alcosperse 725 ⁽¹⁾	35	7.5	2500	hydrophobically modified copolymer	Dispersing hydrophobic pigments/clays
Alcosperse 747 ⁽¹⁾	40	7.5	3000	hydrophobically modified copolymer	Dispersing hydrophobic pigments/clays, carbon black
Narlex LD 42	50	7.0	n/a	Specialty copolymer	Effective dispersants for clay, pigments, particulates; Non-foaming, non-surface active agents perform optimally above pH 6.5
Narlex LD 45	50	7.0	n/a	Specialty copolymer	

key (1) Available in dry form

(2) Available in acid form

Some products may be subject to minimum order quantities.

Appendices

Solubility data for fatty alkyl amines

Solubilities are in grams amine per 100 g/solvent.

No. of Carbon Atoms in Amines

Benzene

	Temperature				
	10.0°C	20.0°C	30.0°C	40.0°C	50.0°C
10	395	∞	∞	∞	∞
12	72	277	∞	∞	∞
14	26.4	83	302	∞	∞
16	10.0	30.7	98	388	∞
18	4.2	14.8	52	173	1000

Cyclohexane

	Temperature				
	10.0°C	20.0°C	30.0°C	40.0°C	50.0°C
10	318	∞	∞	∞	∞
12	57	230	∞	∞	∞
14	19.9	68	268	∞	∞
16	7.4	26.6	86	360	∞
18	2.8	13.2	42.9	144	940

Tetrachloromethane

	Temperature					
	-20.0°C	0.0°C	20.0°C	30.0°C	40.0°C	50.0°C
10	10.5	57	∞	∞	∞	∞
12	5.5	19.8	148	∞	∞	∞
14	2.3	7.7	56	235	∞	∞
16	0.5	3.2	21.2	73	335	∞
18	<0.1	0.6	7.7	27.9	120	835

Trichloromethane

	Temperature						
	-40.0°C	-20.0°C	0.0°C	20.0°C	30.0°C	40.0°C	50.0°C
10	17.7	43.0	148	∞	∞	∞	∞
12	9.2	20.0	56	315	∞	∞	∞
14	4.5	11.2	29.5	110	308	∞	∞
16	2.4	6.6	17.0	56	117	378	∞
18	1.2	3.3	9.4	31.9	63	149	845

Ethyl Ether

	Temperature					
	-40.0°C	-20.0°C	0.0°C	20.0°C	30.0°C	34.5°C
10	1.4	12.1	86	∞	∞	∞
12	0.2	3.4	22.6	275	∞	∞
14		0.2	5.8	71	273	705
16			0.2	18.5	72	135
18				4.4	22.7	46.8

Ethyl Acetate

	Temperature					
	-20.0°C	0.0°C	20.0°C	30.0°C	40.0°C	50.0°C
10	14.8	69	∞	∞	∞	∞
12	4.7	18.6	211	∞	∞	∞
14	1.7	7.8	57	233	∞	∞
16	0.3	3.2	19.7	63	295	∞
18		0.9	9.5	27.0	100	845

Butyl Acetate

	Temperature					
	-20.0°C	0.0°C	20.0°C	30.0°C	40.0°C	50.0°C
10	13.3	69	∞	∞	∞	∞
12	4.4	23.0	221	∞	∞	∞
14	1.4	9.7	62	233	∞	∞
16	0.2	3.5	23.9	64	295	∞
18		1.0	11.4	30.4	100	845

No. of Carbon Atoms in Amines

Acetone

	Temperature					
	-20.0°C	0.0°C	20.0°C	30.0°C	40.0°C	50.0°C
10	6.6	54	∞	∞	∞	∞
12	0.3	8.1	266	∞	∞	∞
14		0.1	15.5	228	∞	∞
16			<0.1	4.7	445	∞
18				<0.1	3.7	17.0

2-Butanone

	Temperature					
	-20.0°C	0.0°C	20.0°C	30.0°C	40.0°C	50.0°C
10	13.3	69	∞	∞	∞	∞
12	4.4	23.0	221	∞	∞	∞
14	1.4	9.7	62	233	∞	∞
16	0.2	3.5	23.9	64	295	∞
18		1.0	11.4	30.4	100	845

Methanol

	Temperature						
	-40.0°C	-20.0°C	0.0°C	20.0°C	30.0°C	40.0°C	50.0°C
10	31.0	172	550	∞	∞	∞	∞
12	4.8	29.7	196	930	∞	∞	∞
14	0.2	2.8	62	292	770	∞	∞
16		0.2	6.1	116	256	785	∞
18			0.6	15.6	95	256	1440

Ethanol

	Temperature						
	-40.0°C	-20.0°C	0.0°C	20.0°C	30.0°C	40.0°C	50.0°C
10	8.5	91	350	∞	∞	∞	∞
12	2.0	14.1	115	660	∞	∞	∞
14		1.5	30.2	218	660	∞	∞
16			3.0	83	239	770	∞
18			0.1	7.2	75	280	1630

Isopropanol

	Temperature						
	-40.0°C	-20.0°C	0.0°C	20.0°C	30.0°C	40.0°C	50.0°C
10	11.1	49.0	228	∞	∞	∞	∞
12	4.7	15.0	75	492	∞	∞	∞
14	0.6	3.7	25.1	154	458	∞	∞
16		0.4	7.3	68	169	580	∞
18			0.5	30.0	86	228	1330

n-Butanol

	Temperature						
	-40.0°C	-20.0°C	0.0°C	20.0°C	30.0°C	40.0°C	50.0°C
10	9.5	30.8	182	∞	∞	∞	∞
12	2.4	8.5	57	430	∞	∞	∞
14	0.2	2.4	16.5	130	405	∞	∞
16		<0.1	3.9	55	148	515	∞
18			0.4	22.7	75	208	1240

Acetonitrile

	Temperature					
	-20.0°C	0.0°C	20.0°C	30.0°C	40.0°C	50.0°C
10	2.8	12.7	∞	∞	∞	∞
12		0.2	27.7	∞	∞	∞
14			1.8	14.9	∞	∞
16			0.2	1.3	14.8	∞
18				0.3	1.9	10.5

Solubility data for quaternary ammonium compounds at 25°C

The solubility generally decreases in a given solvent with increasing chain length of alkyl substituents, and most quaternary ammonium salts are soluble in hot ethyl acetate.

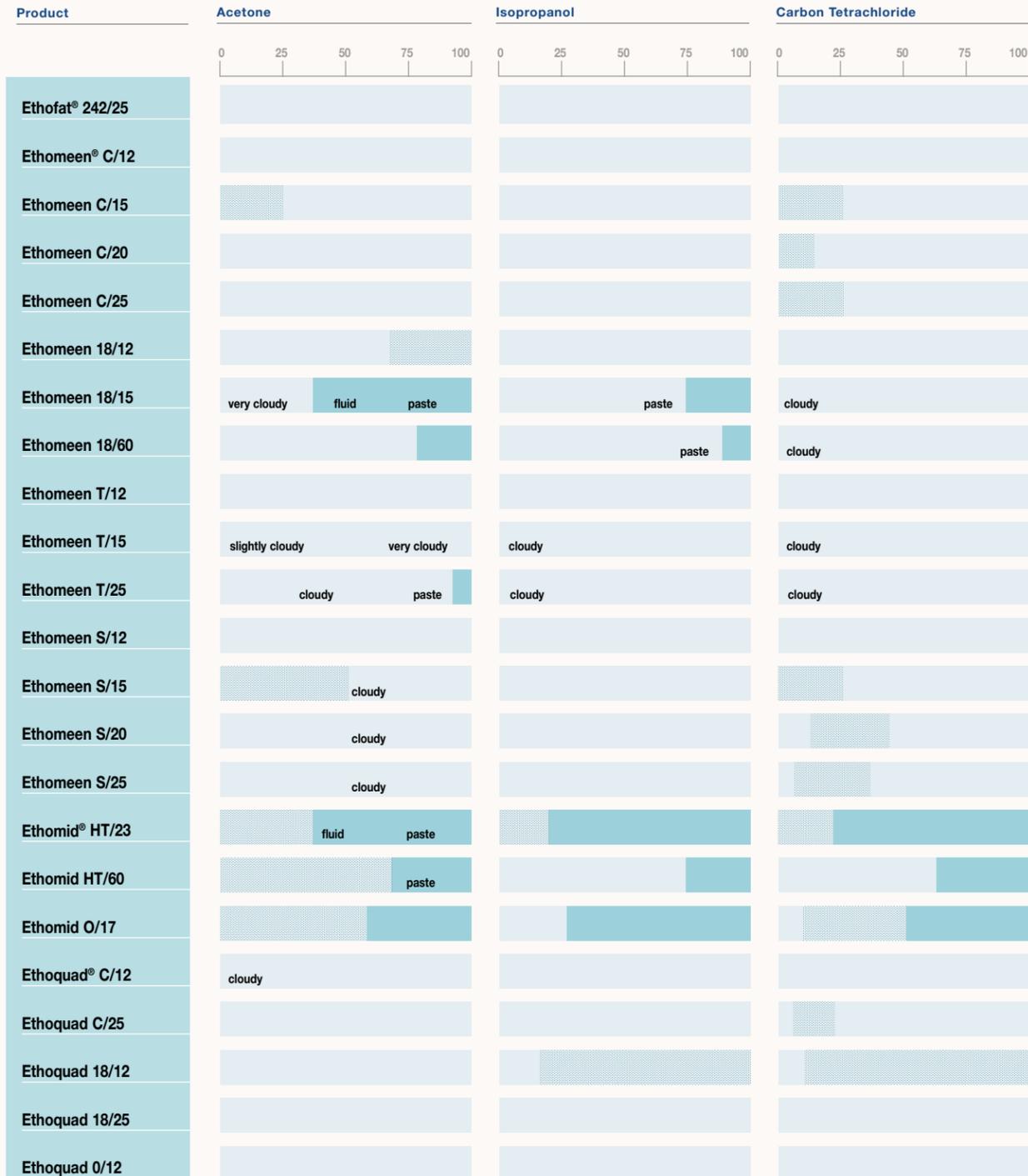
Quaternary Ammonium Salt	Water	Methanol/ Ethanol/ Isopropanol	Acetone	Benzene	n-Hexane/ Cyclohexane	Chloroform	Carbon Tetrachloride	Hexylene Glycol	Mineral Oil
<i>Arquad</i> Alkyltrimethyl	XX	XX	NA	O	O	XX	XX	NA	NA
<i>Arquad</i> Dialkyldimethyl	D	XX	X	XX	NA	XX	XX	NA	NA
<i>Arquad</i> Benzylalkyl	XX	XX	XX	X	NA	NA	NA	NA	NA
<i>Duoquad</i> Alkyl Diquaternary	XX	XX	NA	O	O	XX	XX	NA	NA
<i>Ethoquad</i> Ethoxylated Quaternary	XX	XX	XX	XX	NA	NA	XX	XX	O
<i>Propoquad</i> Propoxylated Quaternary	XX	XX	XX	XX	NA	NA	XX	XX	NA

key

- XX Very Soluble (≥5% by weight)
- X Slightly Soluble (between 1 and 5% by weight)
- D Dispersible
- O Insoluble (<0.5% by weight)

Solubility characteristics of ethoxylated products

At room temperatures (g/100 g solution at 25°C/77°F).



Trademarked products not listed in catalog

This catalog provides information on those products which have a broad range of Functional Applications. However, AkzoNobel Surface Chemistry markets many more that are directed toward specific applications or markets. To facilitate obtaining information on these products, their trademarks are listed below alphabetically with their main application area identified. For more information on any products using these trademarks, please contact Customer or Technical Service.

Trademark	Responsible Marketing Function
Adsee®	Agro Applications
AG™	Cleaning and Fabric Care
Alcocap®	Cleaning and Fabric Care
Amaze®	Personal Care
Amphomer®	Personal Care
Ardefoam™	Functional Applications
Armacflot®	Mining Applications
Armix™	Agro Applications
Armocare®	Personal Care
Armoflo™	Mining Applications
Armogloss®	Cleaning and Fabric Care
Armolube®	Cleaning and Fabric Care
Armosoft®	Fabric Care
Armul™	Agro Applications
Balab®	Functional Applications
Balance®	Personal Care
Beraid®	Fuel Additives
Berol Spin®	Viscose
Berol Visco™	Viscose
Berol®	Cleaning and Fabric Care
Celquat®	Personal Care
Dermacryl®	Personal Care
Dry-Flo®	Personal Care
Duomac®	Mining Applications
Dynamx®	Personal Care
Elfacos®	Personal Care
Elfan®	Personal Care
Emphos™	Agro Applications
Ethopropomeen™	Agro Applications

Trademark	Responsible Marketing Function
Feverfew®	Personal Care
Flexan®	Personal Care
Flo Mo®	Agro Applications
Hydrovance®	Personal Care
Kling®	Asphalt Applications
Lasar™	Agro Applications
Lilamin™	Mining Applications
Morwet®	Agro Applications
Natrasorb®	Personal Care
Naviance®	Personal Care
PC™	Oilfield Applications
Perma-Tac®	Asphalt Applications
Propoduomeen™	Asphalt Applications
Purity®	Personal Care
Redicote®	Asphalt Applications
Rediset™	Asphalt Applications
Resyn®	Personal Care
Sponto®	Agro Applications
Structure®	Personal Care
Structurecote®	Personal Care
Vulnopol®	Functional Applications
Wetfix®	Asphalt Applications
Witbreak™	Oilfield Applications
Witcamine™	Oilfield Applications
Witcodet™	Cleaning and Fabric Care
Witcomul™	Oilfield Applications
Witcor™	Oilfield Applications
Witflow™	Functional Applications

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