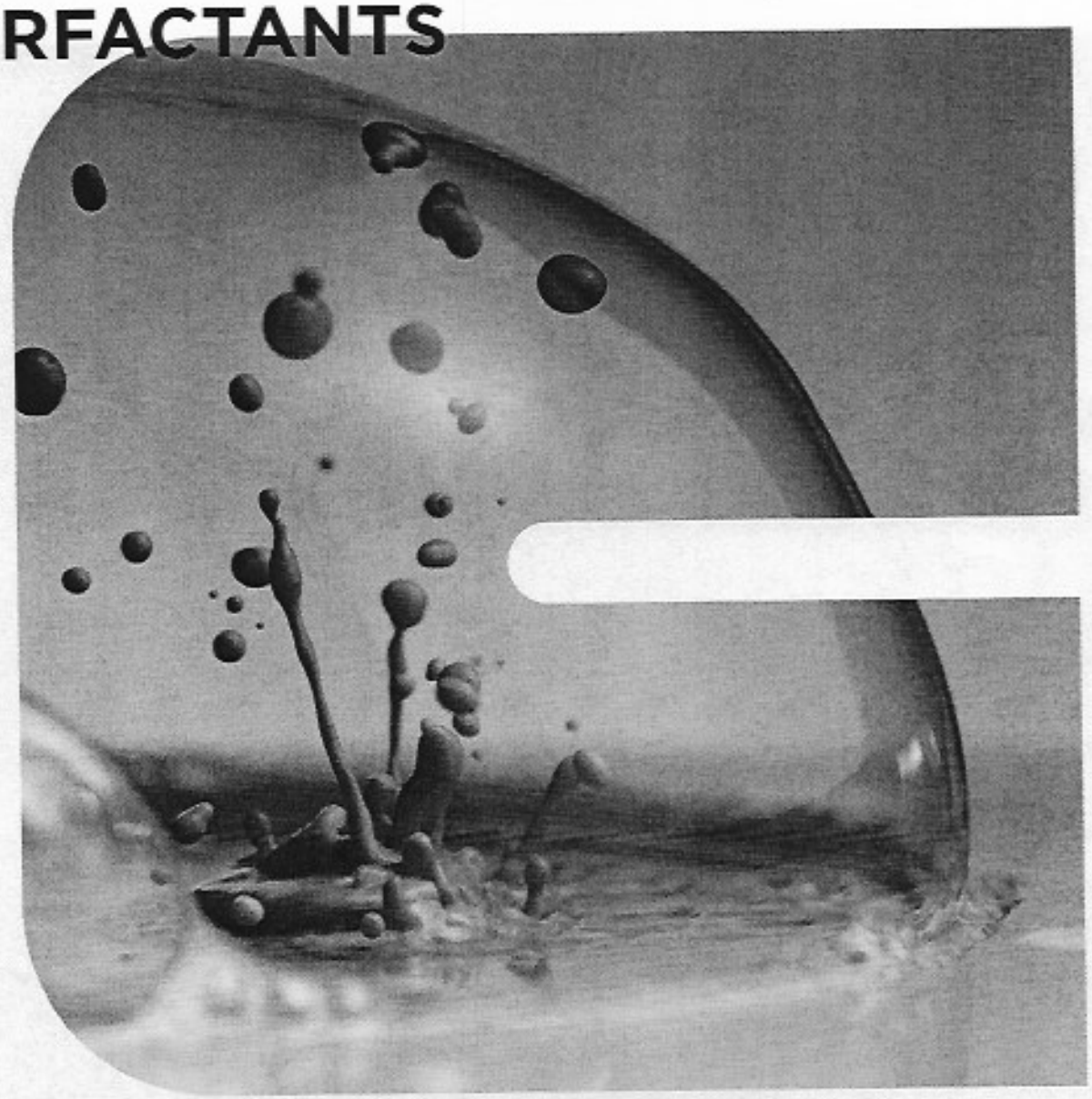
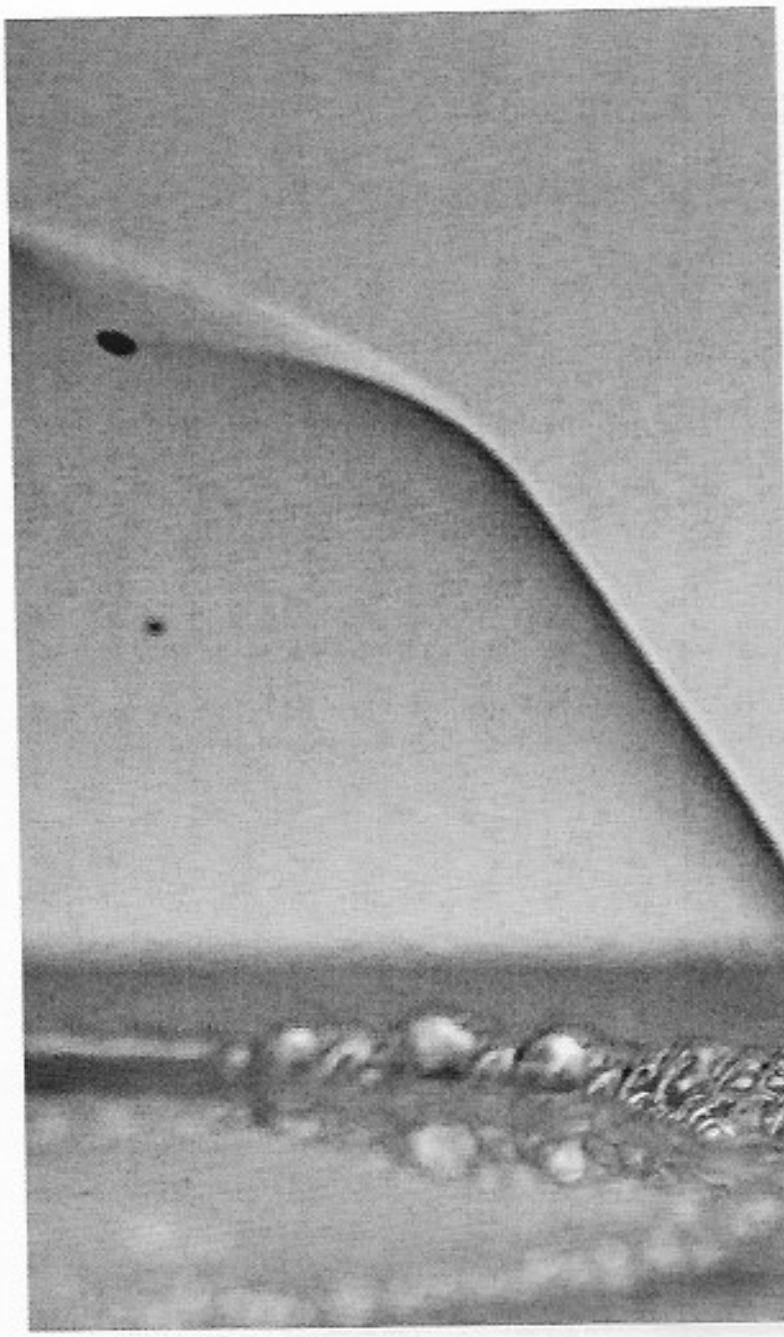
CLARIANT

Process aids and intermediates for the chemical industry

SURFACTANTS



what is precious to you?



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ANIONIC SURFACTANTS 15

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Product Range

PERFORMANCE OF SURFACTANTS

Surface active agents, or short Surfactants, are usually organic compounds that are amphiphilic, meaning they contain both hydrophobic and hydrophilic groups and are therefore soluble in both organic solvents and water. They reduce the surface tension of a liquid by adsorbing at the liquid-gas interface, allowing easier spreading, and lower the interfacial tension between two liquids, e.g. between oil and water, by adsorbing at the liquid-liquid interface. Surfactants are used as emulsifiers, wetting agents, dispersants and stabilizers for different chemical and industrial applications.

THE SELECTION OF SURFACTANTS DESCRIBED IN THIS BROCHURE IS OFFERED FOR THE FOLLOWING APPLICATION AREAS:

- Air entraining agents for the construction industry
- Antifoaming agents
- Auxiliaries for the sugar industry
- Dispersing agents for pigments
- Emulsifiers for bitumen emulsions
- Emulsifiers for emulsion polymerization
- Emulsifiers for micro- and macro emulsions of fats, hydrocarbons and silicon oils
- Emulsifiers for polyolefin wax emulsions
- Wetting agents for adhesives
- Wetting agents for coatings, e.g. in building, construction, textile and paper
- Wetting agents for electroplating processes
- Wetting agents for emulsions, dispersions, polymers, resins
- Wetting agents for hard surfaces like ceramics, wood, plastics and metals

SURFACTANT CLASSES

NONIONIC SURFACTANTS	ANIONIC SURFACTANT
Synthetic alcohol ethoxylates	Sulfonates
Natural alcohol ethoxylates	Sulfate esters
Tributyl phenol ethoxylates	Phosphate esters
Nonyl phenol ethoxylates	Sulfosuccinic acid derivatives
Ethylene oxide-propylene oxide block polymers	Ether carboxylates
Alcohol-EO/PO addition products	Fatty acid derivatives
Fatty acid ethoxylates	Other anionic surfactants
Fatty amine ethoxylates	
Castor oil ethoxylates	
Tristyrylphenol ethoxylates	
Other nonionic surfactants	

TRIDECYL ALCOHOL ETHOXYLATES

Tridecyl alcohol is a branched oxoalcohol used for the ethoxylation of the Genapol X range. Tridecyl alcohol ethoxylated are widely used for industrial applications. A few examples are given in the following table.

TRADE NAME	CHEMICAL DESCRIPTION	ACTIVE CONTENT	APPEARANCE (20 °C)	CLOUD POINT (°C)	HLB VALUE	APPLICATION
Tridecyl alcohol ethoxylates						
Genapol® X 050	Tridecyl alcohol ethoxylate with 5 EO	About 100 %	Liquid	59 – 62 [2]	About 10	Emulsifiers for waxes, olefins, silicone oils, wetting agents
Genapol® X 060	Tridecyl alcohol ethoxylate with 6 EO	About 100 %	Liquid	64 – 66 [2]	About 11	
Genapol® X 080	Tridecyl alcohol ethoxylate with 8 EO	About 100 %	Liquid	> 45 [1] 74 – 76 [2]	About 13	
Genapol® X 089	Tridecyl alcohol ethoxylate with 8 EO	About 90 %	Liquid	> 45 [1] 74 – 76 [2]	About 13	
Genapol® X 150	Tridecyl alcohol ethoxylate with 15 EO	About 100 %	Waxy	–	About 15	Emulsifiers for emulsion polymerization, wax emulsions, pigment dispersions
Genapol® X 407	Tridecyl alcohol ethoxylate with 40 EO	About 70 %	Liquid	–	About 18	
Genapol® X 1003	Tridecyl alcohol ethoxylate with 100 EO	About 35 %	Liquid	–	About 19	
Genapol® X 1005	Tridecyl alcohol ethoxylate with 100 EO	About 50 %	Viscous liquid	–	About 19	
Customized formulations of tridecyl alcohol ethoxylates						
Emulsogen X 4050	Tridecyl alcohol ethoxylate with 40 moles EO	About 50%	Liquid	Below 0°C	About 18	Emulsion polymerization
Genapol® 1879	Tridecyl alcohol ethoxylate	About 40%	Liquid	About 18°C	About 15	
Genapol® 3214	Tridecyl alcohol ethoxylate	About 25%	Liquid	About 0°C	About 17	

MISCELLANEOUS SYNTHETIC ALCOHOL ETHOXYLATES

The following list contains ethoxylation products made from a Ziegler alcohol or different oxoalcohols. Ziegler alcohols are synthetic fully saturated alcohols with only even carbon atom numbers. Oxoalcohols contain both even and odd carbon atom numbers. Longer carbon chain lengths of the oxoalcohol ethoxylate lead to an increased viscosity of aqueous solutions and to higher melting points of the ethoxylate. Branching of the alcohol has an adverse effect.

TRADE NAME	CHEMICAL DESCRIPTION	ACTIVE CONTENT	APPEARANCE (20 °C)	CLOUD POINT (°C)	HLB VALUE	APPLICATION
Ziegler alcohol ethoxylate						
Genapol® GS 080	Blend of C_{12} – C_{24} alkyl ethoxylates with 8 EO	About 100 %	Waxy	83 – 85 [2]	About 12	Emulsion polymerization
C12/C15 oxoalcohol ethoxylates						
Genapol® OX 080	C_{12}/C_{15} oxoalcohol ethoxylate with 8 EO	About 100 %	Pasty	75 – 78 [2]	About 13	Emulsifiers and dispersing agents
Genapol® OX 100	C_{12}/C_{15} oxoalcohol ethoxylate with 10 EO	About 100 %	Pasty	62 – 65 [1]	About 14	
C11 oxoalcohol ethoxylates						
Genapol® UD 050	C11 oxoalcohol ethoxylate with 5 EO	About 100 %	Liquid	66 – 69 [2]	About 11	Wetting agents, emulsifiers
Genapol® UD 070	C11 oxoalcohol ethoxylate with 7 EO	About 100 %	Liquid	52 – 55 [1]	About 13	
Genapol® UD 079	C11 oxoalcohol ethoxylate with 7 EO	About 90 %	Liquid	52 – 55 [1]	About 13	
Genapol® UD 110	C11 oxoalcohol ethoxylate with 11 EO	About 100 %	Liquid paste	62 – 65 [2]	About 15	

TRIBUTYLPHENOL ETHOXYLATES

Products from the Sapogenat® range are based on tri-sec.-butyl phenol . This group of alkyl phenol ethoxylates is not regulated by the European Directive 2003/53/EC and are in some cases alternatives to nonylphenol ethoxylates.

TRADE NAME	CHEMICAL DESCRIPTION	ACTIVE CONTENT	APPEARANCE (20 °C)	CLOUD POINT (°C)	HLB VALUE	APPLICATION
Coconut fatty alcohol ethoxylates, saturated						
Sapogenat® T 040	Tributylphenol ethoxylate with 4 EO	About 100 %	Liquid	26 – 29 [2]	About 8	Wetting Agents in construction, paints & coatings, adhesives, and electroplating processes, dispersing agents for pigments, emulsifier and stabilizer for emulsion polymers
Sapogenat® T 060	Tributylphenol ethoxylate with 6 EO	About 100 %	Liquid	53 – 56 [2]	About 10	
Sapogenat® T 080	Tributylphenol ethoxylate with 8 EO	About 100 %	Liquid	60 – 68 [2]	About 11	
Sapogenat® T 110	Tributylphenol ethoxylate with 11 EO	About 100 %	Liquid	42 – 44 [1]	About 13	
Sapogenat® T 130	Tributylphenol ethoxylate with 13 EO	About 100 %	Liquid	62 – 64 [1]	About 14	
Sapogenat® T 180	Tributylphenol ethoxylate with 18 EO	About 100 %	Waxy	61 – 64 [1]	About 15	
Sapogenat® T 300	Tributylphenol ethoxylate with 30 EO	About 100 %	Waxy	–	About 17	
Sapogenat® T 500	Tributylphenol ethoxylate with 50 EO	About 100 %	Waxy	–	About 18	

NONYLPHENOL ETHOXYLATES

Nonylphenol ethoxylates or NPEOs as they are usually abbreviated are regulated by the European Directive 2003/53/EC. Their use is restricted in many applications ranging from detergents to personal care products and industrial applications. In some areas they are still tolerated like in paints & coatings, adhesives and construction where the surfactant is bound within a solid matrix with low risks of leaching into the environment. For these applications NPEOs are still in use.

TRADE NAME	CHEMICAL DESCRIPTION	ACTIVE CONTENT	APPEARANCE (20 °C)	CLOUD POINT (°C)	HLB VALUE	APPLICATION
Arkopal® N 040	Nonylphenol ethoxylate with 4 EO	About 100 %	Liquid	36 – 38 [2]	About 8	Wetting agents in paints & coatings, adhesives, construction, emulsifiers for emulsion polymerization, wax dispersions, bitumen, dispersing agents for pigments
Arkopal® N 060	Nonylphenol ethoxylate with 6 EO	About 100 %	Liquid	61 – 63 [2]	About 11	
Arkopal® N 080	Nonylphenol ethoxylate with 8 EO	About 100 %	Liquid	32 – 34 [1] 76 – 78 [2]	About 12	
Arkopal® N 090	Nonylphenol ethoxylate with 9 EO	About 100 %	Liquid	52 – 54 [1]	About 13	
Arkopal® N 100	Nonylphenol ethoxylate with 10 EO	About 100 %	Liquid	62 – 65 [1]	About 13	
Arkopal® N 130	Nonylphenol ethoxylate with 13 EO	About 100 %	Liquid paste	83 – 86 [1]	About 14	
Arkopal® N 150	Nonylphenol ethoxylate with 15 EO	About 100 %	Pasty	92 – 95 [1] 61 – 63 [2]	About 15	
Arkopal® N 208	Nonylphenol ethoxylate with 20 EO	About 80 %	Liquid	70 – 73 [1]	About 16	
Arkopal® N 238	Nonylphenol ethoxylate with 23 EO	About 80 %	Liquid	73 – 75 [1]	About 16	
Arkopal® N 300	Nonylphenol ethoxylate with 30 EO	About 100 %	Waxy	76 – 78 [1]	About 17	
Arkopal® N 307	Nonylphenol ethoxylate with 30 EO	About 70 %	Liquid	76 – 78 [1]	About 17	
Arkopal® N 308	Nonylphenol ethoxylate with 30 EO	About 80 %	Waxy	76 – 78 [1]	About 17	
Arkopal® N 407	Nonylphenol ethoxylate with 40 EO	About 70 %	Liquid	–	About 18	

ALCOHOL ALKOXYLATES

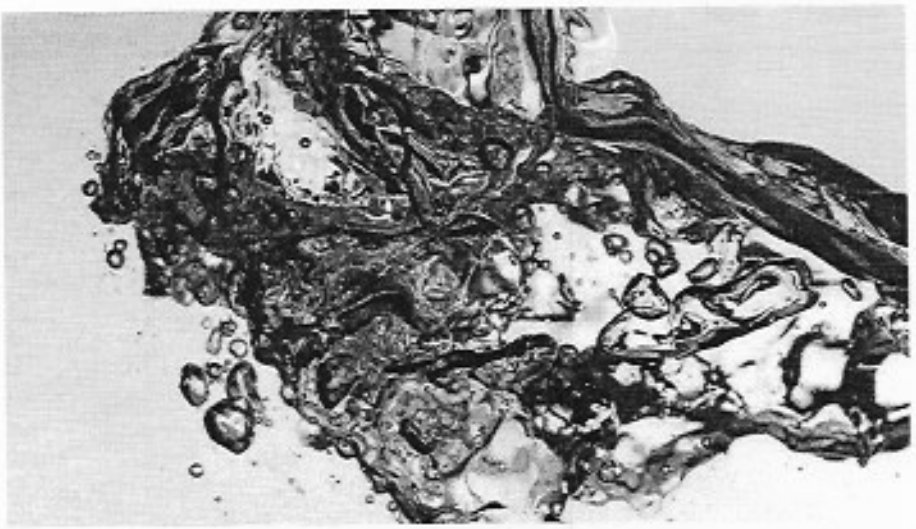
The Genapol EP series are based on alkoxylated alcohols made by blockwise addition of ethylene oxide and propylene oxide to a natural or synthetic fatty alcohol. Alcohol alkoxylates are low foaming surfactants with good wetting properties and are used as cloud point defoamers.

TRADE NAME	CHEMICAL DESCRIPTION	ACTIVE CONTENT	APPEARANCE (20 °C)	CLOUD POINT (°C)	APPLICATION
Genapol® EP 0244	C_{10}/C_{12} fatty alcohol EO-PO addition product	About 100 %	Liquid	35 – 38 [1]	Low foaming wetting agents and detergents, rinse off agents for automatic dish washing
Genapol® EP 2424	C_{12}/C_{14} fatty alcohol EO-PO addition product	About 100 %	Liquid	24,5 – 27,5 [2]	
Genapol® EP 2464	C_{12}/C_{14} fatty alcohol EO-PO addition product	About 100 %	Liquid	43 – 45 [3]	
Genapol® EP 2544	C_{12}/C_{15} oxoalcohol EO-PO addition product	About 100 %	Liquid	31 – 33 [2]	
Genapol® EP 2552	C_{12}/C_{15} oxoalcohol PO-EO addition product	About 100 %	Liquid	39 – 41 [2]	
Genapol® EP 2564	C_{12}/C_{15} oxoalcohol EO-PO addition product	About 100 %	Liquid	27,5 – 31,0 [1] 43 – 45 [2]	
Genapol® EP 2584	C_{12}/C_{15} oxoalcohol EO-PO addition product	About 100 %	Liquid	39 – 42 [1] 47 – 49 [3]	

END CAPPED ALCOHOL ETHOXYLATES

The Genapol BE series is based on end capped fatty alcohol ethoxylates. The end capping with a butyl group reduces the foaming tendency of the ethoxylates and allows the production of low foaming wetting agents and detergents.

TRADE NAME	CHEMICAL DESCRIPTION	ACTIVE CONTENT	APPEARANCE (20 °C)	CLOUD POINT (°C)	APPLICATION
Genapol® BE 2410	C_{12}/C_{14} fatty alcohol ethoxylate with 10 EO, butyl-end capped	About 85 %	Liquid	25 – 28 [1]	Low foaming wetting agents and detergents
Genapol® BE 2805	C_{12}/C_{18} fatty alcohol ethoxylate with 5 EO, butyl-end capped	About 99 %	Liquid	22 – 26 [2]	
Genapol® BE 2810	C_{10}/C_{18} fatty alcohol ethoxylate with 10 EO, butyl-end capped	About 85 %	Liquid	–	



FATTY AMINE ETHOXYLATES

Fatty amine ethoxylate are made by ethoxylation of primary fatty amines and combine the wetting, emulsifying and dispersing properties of nonionic and cationic surfactants. At neutral and acid conditions fatty amine ethoxylates have a positive charge, at alkaline conditions they behave like nonionic surfactants.

Fatty amine ethoxylates are used as emulsifiers and dispersing agents for cationic wax emulsions, as wetting agents in sanitary cleaners and crop protection products like soluble liquids of pesticides and as antistatic agents.

TRADE NAME	CHEMICAL DESCRIPTION	ACTIVE CONTENT	APPEARANCE (20 °C)	APPLICATION
Coconut fatty alkyl amine ethoxylates				
Genamin® C 020	C8/C18 Coconut fatty amine ethoxylate with 2 EO	About 100 %	Liquid	Antistatic agent
Genamin® C 050	C8/C18 Coconut fatty amine ethoxylate with 5 EO	About 100 %	Liquid	Emulsifiers, wetting and dispersing agents
Genamin® C 100	C8/C18 Coconut fatty amine ethoxylate with 10 EO	About 100 %	Liquid	
Genamin® C 150	C8/C18 Coconut fatty amine ethoxylate with 15 EO	About 100 %	Liquid	
Genamin® C 200	C8/C18 Coconut fatty amine ethoxylate with 20 EO	About 100 %	Liquid	
Oleyl amine ethoxylates				
Genamin® O 020 special	Oleyl amine ethoxylate with 2 EO	About 100 %	Liquid	Antistatic agent
Genamin® O 050	Cetyl/oleyl amine ethoxylate with 5 EO	About 100 %	Liquid	Emulsifiers, wetting and dispersing agents
Genamin® O 080	Cetyl/oleyl amine ethoxylate with 8 EO	About 100 %	Liquid	
Genamin® O 200	Cetyl/oleyl amine ethoxylate with 20 EO	About 100 %	Liquid	
Stearyl amine ethoxylates				
Genamin® S 020	Cetyl/stearyl amine ethoxylate with 2 EO	About 100 %	Solid	Antistatic agent
Genamin® S 080	Cetyl/stearyl amine ethoxylate with 8 EO	About 100 %	Liquid	Emulsifiers, wetting and dispersing agents
Genamin® S 100	Cetyl/stearyl amine ethoxylate with 10 EO	About 100 %	Liquid	
Genamin® S 150	Cetyl/stearyl amine ethoxylate with 15 EO	About 100 %	Liquid	
Genamin® S 200	Cetyl/stearyl amine ethoxylate with 20 EO	About 100 %	Liquid	
Genamin® S 250	Cetyl/stearyl amine ethoxylate with 25 EO	About 100 %	Liquid	
Tallow fatty alkyl amine ethoxylates				
Genamin® T 020	Tallow fatty alkyl amine ethoxylate with 2 EO	About 100 %	Liquid	Antistatic agent
Genamin® T 100	Tallow fatty alkyl amine ethoxylate with 10 EO	About 100 %	Liquid	Emulsifiers, wetting and dispersing agents, adjuvants for soluble liquid pesticide formulations
Genamin® T 150	Tallow fatty alkyl amine ethoxylate with 15 EO	About 100 %	Liquid	
Miscellaneous amine ethoxylates				
Genamin® 3920	Capryl amine ethoxylate with 2 EO	About 100 %	Liquid	Corrosion inhibitor for metal working fluids
Genamin® CH 020	Cyclo hexyl amine ethoxylate with 2 EO	About 100 %	Liquid	

Anionic Surfactants

ALKYL AND OLEFIN SULFONATES

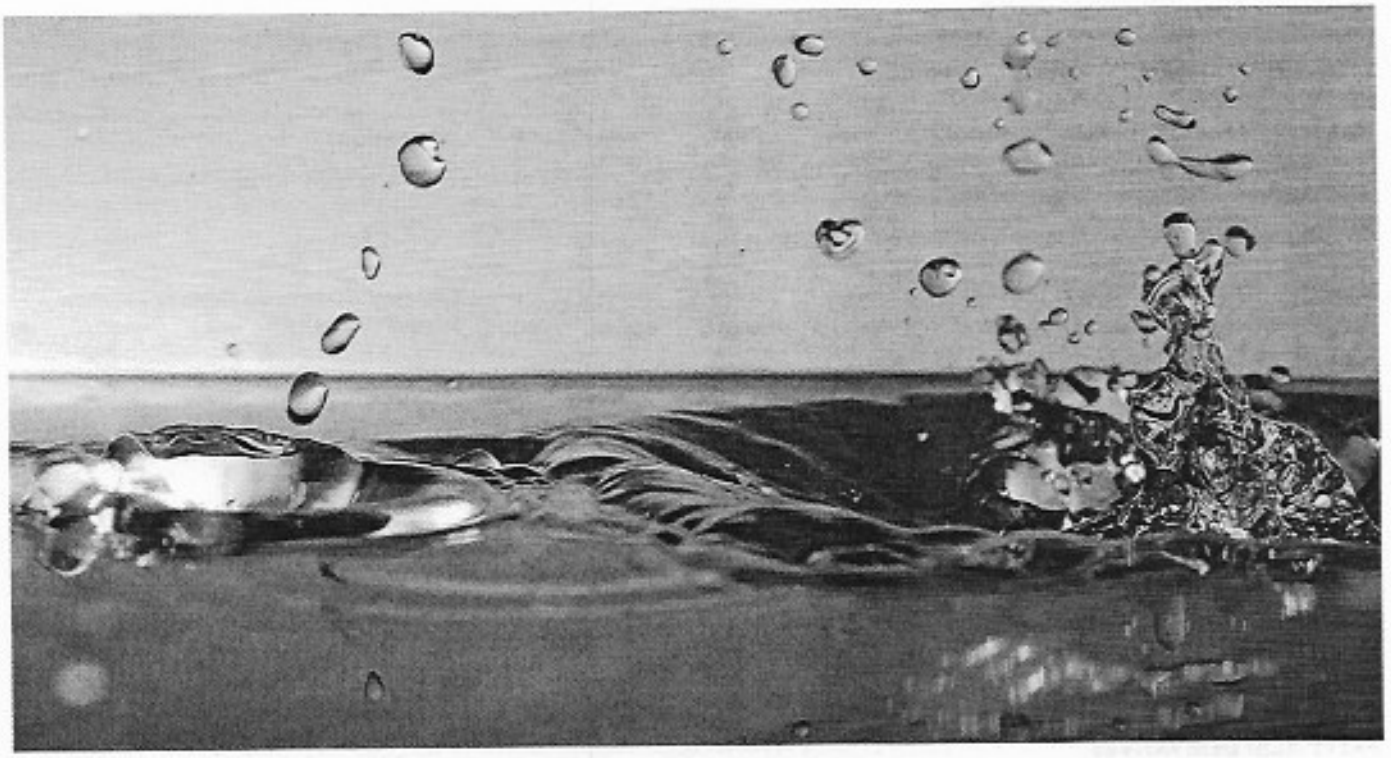
Sulfonation products are anionic surfactants comprising a hydrophobic alkyl chain and an anionic sulfonic acid group. Sulfonates are anionic surfactants which deprotonate at neutral and acid pH values and form micelles at low concentrations. They have strong wetting and emulsifying capabilities. Particularly olefin sulfonates form stable micro-foams used for building and construction to entrap air in render, plasters and concrete. The micro-foam reduces the weight of plasters and improves the temperature stability of concrete. Alkane sulfonate and olefin sulfonates are both used as emulsifiers for emulsion polymerization.

TRADE NAME	CHEMICAL DESCRIPTION	ACTIVE CONTENT	APPEARANCE (20 °C)	APPLICATION
Hostapur® OS Liquid	C_{14}/C_{16} alpha-olefin sulphonates, sodium salt	About 42 %	Liquid	Emulsifier for emulsion polymerization (e.g. E-PVC), wetting agent for hard surface and carpet cleaners, liquid dish washing agents, air entraining agent for concrete
Hostapur® OSB	C_{14}/C_{16} alpha-olefin sulfonate, sodium salt	About 90 %	Powder	Air entraining agent for admixtures
Hostapur® SAS 30	C_{15}/C_{17} Secondary alkane sulfonate, sodium salt	About 30 %	Liquid	Emulsifier for emulsion polymerization, antistatic agent, surfactant for heavy duty liquid detergents
Hostapur® SAS 60	C_{15}/C_{17} Secondary alkane sulfonate, sodium salt	About 60 %	Paste	
Hostapur® SAS 93	C_{15}/C_{17} Secondary alkane sulfonate, sodium salt	About 93 %	Waxy pellets	

SULFATE ESTERS

Sulfate esters are available from sulfonation of fatty alcohols and alcohol ethoxylates. They are strong wetting agents and emulsifiers applied in many fields of the industry including house hold detergents. Sulfate esters are one of the most important surfactant groups in emulsion polymerization due to their ability to form micelles under acid conditions.

TRADE NAME	CHEMICAL DESCRIPTION	ACTIVE CONTENT	APPEARANCE (20 °C)	APPLICATION
Emulsogen APS 100	Allyl polyoxyalkylene sulfate with 4 PO and 10 EO, ammonium salt	About 100 %	Liquid	Emulsifier for emulsion polymerization with a copolymerizable group
Emulsogen® EPA 073	Alkyl polyethylene glycol ethersulfate with 7 EO, sodium salt	About 28 %	Liquid	Emulsifier for emulsion polymerization, dispersing agent for pigment preparations
Emulsogen® EPA 078	Alkyl polyethylene glycol ethersulfate with 7 EO, sodium salt	About 86 %	Liquid paste	Concentrated version of Emulsogen EPA 073
Emulsogen® EPA 1954	C12/C14 alkyl sulfate, sodium salt	About 30 %	Liquid	Emulsifier for emulsion polymerization
Emulsogen® LA 033	C12/C14 alkyl polyethylene glycol ether-sulfate with 3 EO, ammonium salt	About 30 %	Liquid	Emulsifier for emulsion polymerization
Emulsogen® LA 083	C12/C14 alkyl polyethylene glycol ethersulfate with 8 EO, ammonium salt	About 30 %	Liquid	Emulsifier for emulsion polymerization
Emulsogen LCA 213	Alcohol polyethylene glycol ether sulfate, ammonium salt with 21 moles EO	About 30 %	Liquid	Emulsifier for emulsion polymerization
Emulsogen® PF 20 S	Polyalkylene glycol ethersulfate, ammonium salt	About 50 %	Liquid	Emulsion polymerization
Genapol® LRO Liquid	C12/C14 alkyl polyethylene glycol ether ethersulfate with 2 EO, sodium salt	About 27 %	Liquid	Emulsion polymerization, air entraining agents for construction
Genapol® LRO Paste	C12/C14 alkyl polyethylene glycol ethersulfate with 2 EO, sodium salt	About 68 %	Pasty	
Hostapal® BV Conc.	Tributyl phenol polyethylene glycol ethersulfate with 7 EO, sodium salt	About 50 %	Pasty	Emulsifier for emulsion polymerization, dispersing agent for pigments
Hostapal® BV Liquid	Tributyl phenol polyethylene glycol ethersulfate with 7 EO, sodium salt	About 17 %	Liquid	
Zeliquid® LP 2	Lauryl polyethylene glycol ethersulfate with 3 EO, ammonium salt, butoxy ethanol as solvent	About 50 %	Liquid	Air entraining agent for concrete and mortars



ALKYL PHOSPHONIC ACIDS

Alkyl phosphonates consists of amphiphilic molecules with a phosphonic acid group attached to the carbon atom of an alkyl chain. Alkyl phosphonates have a strong affinity to metal surfaces and are used as corrosion inhibitors. Another application of alkyl phosphonates is the hydrotropic effect in surfactant formulations.

TRADE NAME	CHEMICAL DESCRIPTION	ACTIVE CONTENT	APPEARANCE (20 °C)	APPLICATION
Hostaphat® OPS 30	Octane phosphonic acid dissolved in water	About 30 %	Pasty	Hydrotrope for surfactant formulations, corrosion inhibitor
Hostaphat® OPS 75 E	n-Octane phosphonic acid + ethanol/ water	About 75 %	Liquid	Hydrotrope for surfactants formulations, corrosion inhibitor
Hostaphat® OPS 100	n-Octane phosphonic acid	About 100 %	Waxy	Dispersing agent for titanium dioxide in polyolefins and for inorganic pigments in solvent-borne coatings

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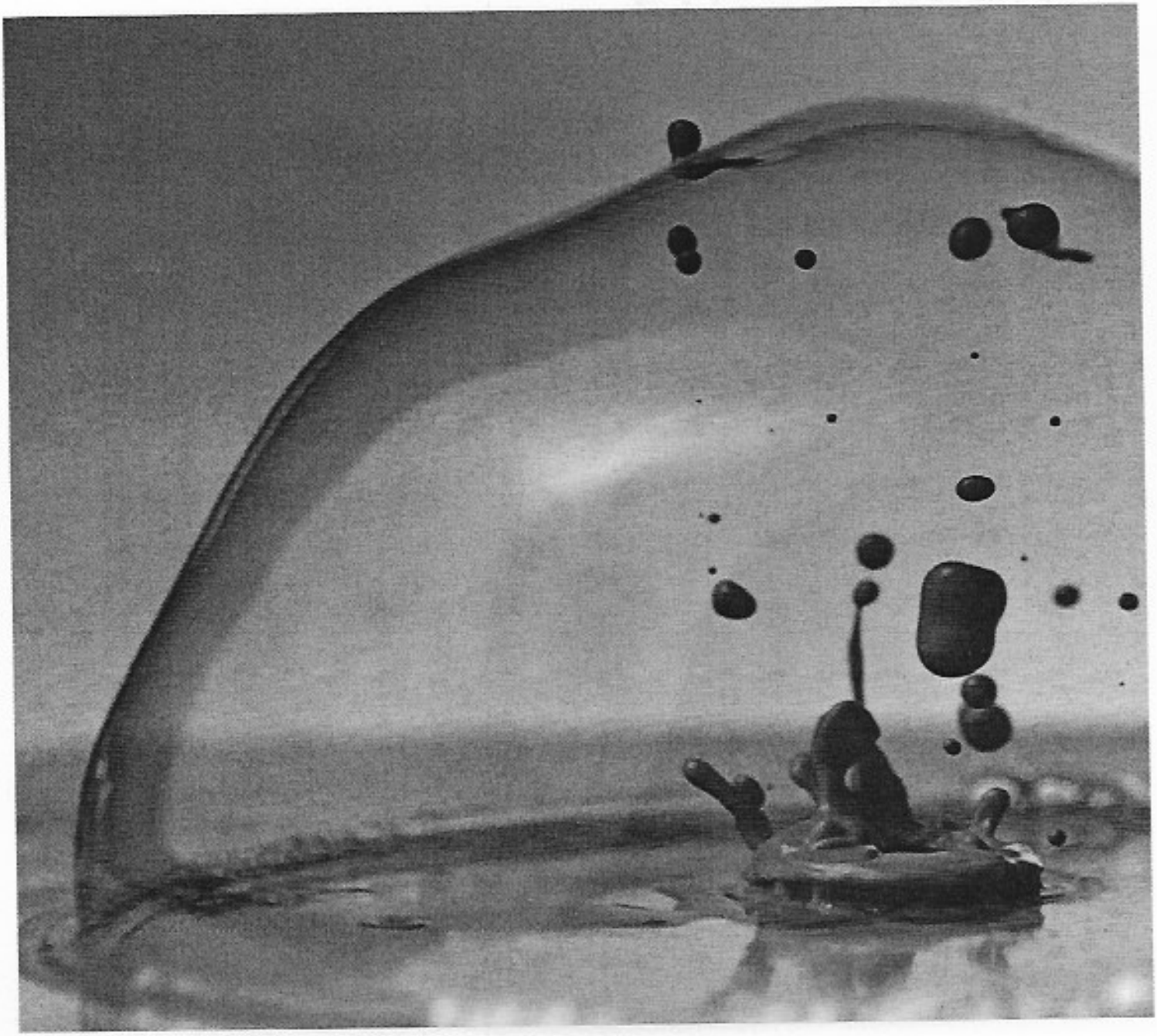
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Nonionic and anionic surfactants for industrial applications



Welcome to Clariant

Clariant is a world leader in colors, surface effects and performance chemicals with annual sales of more than 6 billion CHF in 2013. It is domiciled and headquartered in Muttenz near Basel/Switzerland and operates worldwide on five continents.

Clariant's BU Industrial & Consumer Specialties, one of the world's leading manufacturers of surfactants and polyglycols offers a broad range of nonionic and anionic surfactants used in the chemical industry as well as in the coating and construction industries. Our surfactants range is produced in 14 major sites around the world.

MANUFACTURING AND R&D



PRODUCTION SITES: 14

- Clear Lake (TX, USA)
- Coatzacoalcos (Mexico)
- Daya Bay (China)
- Gendorf (Germany)
- Gebze (Turkey)
- Maracay (Venezuela)
- Mt. Holly (NC, USA)
- Santa Clara (Mexico)
- Shizuoka (Japan)
- Suzano (Brazil)
- Tangerang (Indonesia)
- Tarragona (Spain)
- Zarate (Argentina)
- Zhenjiang (China)

CLARIANT INNOVATION CENTER: 1

- Frankfurt (Germany)

APPLICATION DEVELOPMENT CENTRES: 7

- Gendorf (Germany)
- Mexico City (Mexico)
- Mt. Holly (USA)
- Shanghai (China)
- Shizuoka (Japan)
- Sao Paulo (Brazil)
- Thane (India)

Research, development, production and sales are certified to DIN EN ISO 9001 (Quality Management) and to DIN EN ISO 14001 (Environmental Management).

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Nonionic Surfactants

ALCOHOL ETHOXYLATES

Alcohol ethoxylates are based on synthetic or natural fatty alcohols. Synthetic alcohols used for ethoxylation are available from hydroformylation leading to oxoalcohols or from the oligomerization of ethylene with Ziegler catalysts. Natural fatty alcohols are produced by reduction of fatty acids. Both synthetic and natural alcohol ethoxylates are used as nonionic surfactants in many industries.

OXO ALCOHOL ETHOXYLATES

Oxoalcohol ethoxylates have a linear or branched carbon chain with a narrow to broad carbon chain length distributions. The following Emulsogen EPN and Emulsogen LCN ranges are based on oxoalcohol ethoxylates with a narrow carbon chain length distribution and varying degrees of ethoxylation for the control of the surface activity. The HLB value (hydrophilic – lipophilic balance) is a number (Griffin method) calculated on the basis of the ethylene oxide (EO) content of the hydrophilic polyethylene glycol chain. The longer the polyethylene glycol chain the higher is the HLB value and the more hydrophilic is the surfactant.

TRADE NAME	CHEMICAL DESCRIPTION	ACTIVE CONTENT	APPEARANCE (20 °C)	CLOUD POINT (°C)	HLB VALUE	APPLICATION
Oxoalcohol ethoxylates						
Emulsogen® EPN 118	Oxoalcohol ethoxylate with 11 EO	About 80 %	Liquid	62 – 65 [(1)]	About 15	Emulsion Polymerization
Emulsogen® EPN 217	Oxoalcohol ethoxylate with 21 EO	About 70 %	Liquid	–	About 17	
Emulsogen® EPN 287	Oxoalcohol ethoxylate with 28 EO	About 70 %	Liquid	–	About 18	
Emulsogen® EPN 403	Oxoalcohol ethoxylate with 40 EO	About 30%	Liquid		About 18	
Emulsogen® EPN 407	Oxoalcohol ethoxylate with 40 EO	About 70 %	Liquid	–	About 18	
Branched oxoalcohol ethoxylates						
Emulsogen® LCN 070	Branched oxoalcohol ethoxylate with 7 EO	About 100 %	Liquid	54 – 56 [(1)]	About 13	Wetting agents for hard surfaces, emulsions of waxes, silicones and others
Emulsogen® LCN 068	Branched oxoalcohol ethoxylate with 8 EO	About 80 %	Liquid	62 – 65 [(1)]	About 13	
Emulsogen® LCN 118	Branched oxoalcohol ethoxylate with 11 EO	About 80 %	Liquid	62 – 65 [(1)]	About 15	Wetting and dispersing agents, emulsion polymerization
Emulsogen® LCN 158	Branched oxoalcohol ethoxylate with 15 EO	About 80 %	Liquid	69 – 71 [(1)]	About 16	
Emulsogen® LCN 217	Branched oxoalcohol ethoxylate with 21 EO	About 70 %	Liquid	–	About 17	
Emulsogen® LCN 287	Branched oxoalcohol ethoxylate with 28 EO	About 70 %	Liquid	–	About 18	
Emulsogen® L 4050	Branched oxoalcohol ethoxylate with 40 EO	About 50%	Liquid	–	About 18	
Emulsogen® LCN 407	Branched oxoalcohol ethoxylate with 40 EO	About 70 %	Liquid	–	About 18	

[1] Cloud points relative to the active substance:
[(1)] 1 g in 100 cm3 distilled water
[(2)] 5 g in 25 cm3 25% aqueous BDG
[(3)] 1 g in 100 cm3 10% aqueous NACl solution

NATURAL FATTY ALCOHOL ETHOXYLATES

Natural fatty alcohol ethoxylates are based on linear carbon chains and contain mainly even numbers of carbon atoms ranging from 6 to 20 carbon atoms. Natural fatty alcohols are available saturated or unsaturated with up to 3 double bonds. The degree of ethoxylation as well as the carbon chain length, branching and saturation decide on the surface activity and other physical properties of alcohol ethoxylates.

Selected fractions are ethoxylated for the following product range.

TRADE NAME	CHEMICAL DESCRIPTION	ACTIVE CONTENT	APPEARANCE (20 °C)	CLOUD POINT (°C)	HLB VALUE	APPLICATION
Coconut fatty alcohol ethoxylates, saturated						
Genapol® C 100	C_{12}/C_{18} Saturated fatty alcohol ethoxylate with 10 EO	About 100 %	Pasty	89 – 92 [2]	About 14	Wetting and dispersing agents, emulsifiers
Genapol® C 200	C_{12}/C_{18} Saturated fatty alcohol ethoxylate with 20 EO	About 100 %	Waxy	76 – 78 [2]	About 16	
C12/C14 fatty alcohol ethoxylates						
Emulsogen LA 3065	C_{12}/C_{14} fatty alcohol ethoxylate with 30 EO	About 65%	Liquid	–	About 18	Emusifier for emulsion polymerization
Genapol® LA 070	C_{12}/C_{14} fatty alcohol ethoxylate with 7 EO	About 100%	Liquid	53 – 59 [1]	About 13	
Genapol® LA 080	C_{12}/C_{14} fatty alcohol ethoxylate with 8 EO	About 100%	Pasty	60 – 68 [1]	About 13	
Genapol® LA 160	C_{12}/C_{18} fatty alcohol ethoxylate with 16 EO	About 100%	Waxy	74 – 76 [2]	About 16	
Cetyl/oleyl alcohol ethoxylates, saturated						
Emulsogen® 3896	Cetyl/oleyl alcohol ethoxylate with 20 EO	About 100%	Waxy solid	75 – 75 [2]	About 15	Emusifier for emulsion polymerization
Genapol® O 020	Cetyl/oleyl alcohol ethoxylate with 2 EO	About 100 %	Liquid paste	34 – 38 [2]	About 5	Wetting and dispersing agents, emulsifiers
Genapol® O 080	Cetyl/oleyl alcohol ethoxylate with 8 EO	About 100 %	Liquid paste	>40 [1] 79 – 81 [2]	About 11	
Genapol® O 100	Cetyl/oleyl alcohol ethoxylate with 10 EO	About 100 %	Pasty	>75 [1] 49 – 51 [2]	About 12	
Genapol® O 200	Cetyl/oleyl alcohol ethoxylate with 20 EO	About 100 %	Waxy solid	74 – 76 [2]	About 15	
C16/C18 Fatty alcohol ethoxylates, partially unsaturated						
Genapol® T 200	C_{16}/C_{18} Fatty alcohol ethoxylate with 20 EO	About 100 %	Waxy solid	75 – 77 [2]	About 15	Emulsifiers and dispersing agents, wetting agent for building admixtures
Genapol® T 250	C_{16}/C_{18} Fatty alcohol ethoxylate with 25 EO	About 100 %	Waxy solid	77 – 79 [2]	About 16	
Genapol® T 250 p	C_{16}/C_{18} Fatty alcohol ethoxylate with 25 EO	About 100 %	Powder	77 – 79 [2]	About 16	
Genapol® T 500	C_{16}/C_{18} Fatty alcohol ethoxylate with 50 EO	About 100 %	Waxy solid	–	About 18	
Genapol® T 500 p	C_{16}/C_{18} Fatty alcohol ethoxylate with 50 EO	About 100 %	Powder	–	About 18	
Genapol® T 800	C_{16}/C_{18} Fatty alcohol ethoxylate with 80 EO	About 100 %	Waxy solid	–	About 19	
Genapol® T 800 p	C_{16}/C_{18} Fatty alcohol ethoxylate with 80 EO	About 100 %	Powder	–	About 19	

APEO-FREE ALTERNATIVES TO NONYLPHENOL ETHOXYLATES

Clariant offers a range of alternatives to nonylphenol ethoxylates based on alkyl phenol free surfactants. With these alternatives of a similar HLB value nonylphenol ethoxylate are replaced. The following list gives the closest replacement for APEO-free formulations.

NONYLPHENOL ETHOXYLATE	HLB VALUE	ALTERNATIVES	ALTERNATIVES
Nonylphenol + 4 EO	About 9	Genapol X 050	
Nonylphenol + 6 EO	About 11	Genapol X 060	
Nonylphenol + 8 EO	About 12	Genapol X 080	Emulsogen LCN 070
Nonylphenol + 9 EO	About 13	Genapol X 080	Emulsogen LCN 088
Nonylphenol + 10 EO	About 13		Emulsogen LCN 118
Nonylphenol + 11 EO	About 14		Emulsogen LCN 118
Nonylphenol + 13 EO	About 14	Genapol X 150	Emulsogen LCN 118
Nonylphenol + 15 EO	About 15	Genapol X 150	Emulsogen LCN 158
Nonylphenol + 20 EO	About 16	Genapol X 150	Emulsogen LCN 217
Nonylphenol + 23 EO	About 16		Emulsogen LCN 217
Nonylphenol + 30 EO	About 17		Emulsogen LCN 287
Nonylphenol + 40 EO	About 18	Genapol X 407	Emulsogen LCN 407

ETHYLENE OXIDE-PROPYLENE OXIDE BLOCK COPOLYMERS

The Genapol PF range is based on ethylene oxide – propylene oxide block copolymers (EO/PO block copolymers) with an ABA structure. The A block is hydrophilic and the centered B block is hydrophobic. EO/PO block copolymers are low foaming, offer good wetting and dispersing properties and are used as emulsifiers. Block polymers with low HLB values are used as cloud point defoamers.

TRADE NAME	CHEMICAL DESCRIPTION	ACTIVE CONTENT	APPEARANCE (20 °C)	CLOUD POINT (°C)	HLB VALUE	APPLICATION
Emulsogen® 4084	EO-PO block polymer with 60 % EO	About 100 %	Waxy	26 – 29 [2]	About 12	Emulsion polymerization
Genapol® PF 10	EO-PO block polymer with 10 % EO	About 100 %	Liquid	53 – 56 [2]	About 2	Wetting and foam control agent
Genapol® PF 20	EO-PO block polymer with 20 % EO	About 100 %	Liquid	42 – 44 [1]	About 4	Wetting agent, emulsifier
Genapol® PF 40	EO-PO block polymer with 40 % EO	About 100 %	Liquid	62 – 64 [1]	About 8	Emulsifier, wetting and dispersing Agent
Genapol® PF 80	EO-PO block polymer with 80 % EO	About 100 %	Waxy	61 – 64 [2]	About 16	Emulsifier
Genapol® PF 80 FP	EO-PO block polymer with 80 % EO	About 100 %	Powder	–	About 16	Wetting agent for admixture in construction

TRISTYRYLPHENOL ETHOXYLATE

The Emulsogen TS range is based on tristyrylphenol ethoxylates and offers strong emulsifying and dispersing performance for organic and aromatic solid and liquid substances. Tristyrylphenol is not considered an alkylphenol and the ethoxylates have lower ecotoxicity than nonylphenol ethoxylates.

TRADE NAME	CHEMICAL DESCRIPTION	ACTIVE CONTENT	APPEARANCE (20 °C)	CLOUD POINT (°C)	HLB VALUE	APPLICATION
Emulsogen® TS 100	Tristyrylphenol ethoxylate with 10 EO	About 100 %	Waxy	65 – 69 [2]	About 10	Dispersing agents for crop protection, pigments and biocides
Emulsogen® TS 160	Tristyrylphenol ethoxylate with 16 EO	About 100 %	Liquid	58 – 62 [2]	About 13	
Emulsogen® TS 200	Tristyrylphenol ethoxylate with 20 EO	About 100 %	Waxy	55 – 60 [2]	About 14	
Emulsogen® TS 290	Tristyrylphenol ethoxylate with 29 EO	About 100 %	Waxy	67 – 69 [2]	About 15	
Emulsogen® TS 540	Tristyrylphenol ethoxylate with 54 EO	About 100 %	Waxy	72 – 74 [2]	About 17	
Emulsogen® TS 600	Tristyrylphenol ethoxylate with 60 EO	About 100 %	Waxy	–	About 17	

OTHER ALCOHOL ETHOXYLATES

Other alcohol ethoxylates are based on alcohols with less than 8 carbon atoms. These ethoxylates are used as solvents in formulations.

TRADE NAME	CHEMICAL DESCRIPTION	ACTIVE CONTENT	APPEARANCE (20 °C)	CLOUD POINT (°C)	HLB VALUE	APPLICATION
Genapol® BA 040	Benzyl alcohol ethoxylate with 4 EO	About 100 %	Liquid	–	–	Solvent, paint stripper

FATTY ACID ETHOXYLATES

Fatty acid ethoxylates have similar wetting and emulsifying properties like fatty alcohol ethoxylates. They are sometime used as replacements of fatty acid polyethylene glycol esters made by esterification of fatty acids and polyethylene glycols. They sometimes have specific regulatory and food contact approvals.

TRADE NAME	CHEMICAL DESCRIPTION	ACTIVE CONTENT	APPEARANCE (20 °C)	SAPONIFICATION VALUE	HLB VALUE	APPLICATION
Genagen® C 100	C_{12}/C_{14} Coconut fatty acid ethoxylate with 10 EO	About 100 %	Liquid	84 – 81 mg KOH/g	About 10	Emulsifier with FDA- approval (21 CFR 175.105, 21 CFR 176.170)

CASTOR OIL ETHOXYLATES

The Emulsogen EL range is based on ethoxylated castor oil. Castor oil is the triester of glycerol and ricinoleic acid having a hydroxyl group in the fatty acid carbon chain. By ethoxylation of castor oil emulsifiers and dispersing agents are produced suitable for aqueous emulsions and dispersions of many organic and aromatic solid and liquid substances.

TRADE NAME	CHEMICAL DESCRIPTION	ACTIVE CONTENT	APPEARANCE (20 °C)	SAPONIFICATION VALUE	HLB VALUE	APPLICATION
Emulsogen® EL 200	Castor oil ethoxylate with 20 EO	About 100 %	Liquid	87 – 97 mg KOH/g	About 10	Emulsifiers and dispersing agents
Emulsogen® EL 360	Castor oil ethoxylate with 36 EO	About 100 %	Liquid	64 – 69 mg KOH/g	About 13	
Emulsogen® EL 400	Castor oil ethoxylate with 40 EO	About 100 %	Liquid	60 – 64 mg KOH/g	About 13	
Emulsogen® EL 540	Castor oil ethoxylate with 54 EO	About 100 %	Liquid	49 – 53 mg KOH/g	About 14	

FATTY ACID POLYGLYCEROL ESTERS

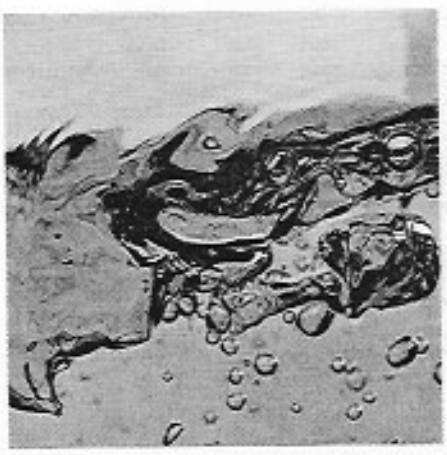
Fatty acid polyglycerol esters are sometimes used as alternatives to fatty acid and fatty alcohol ethoxylates. Their hydrophilic moiety is a polyglycerol chain derived from natural glycerol. Fatty acid polyglycerol esters have emulsifying power for oils, fats and resins in water. By ethoxylation of fatty acid polyglycerol esters the hydrophilicity of the surfactant is increased which improves the water solubility.

TRADE NAME	CHEMICAL DESCRIPTION	ACTIVE CONTENT	APPEARANCE (20 °C)	SAPONIFICATION VALUE	APPLICATION
Hostacerin® DGI	Diglycerol diisostearate	About 100 %	Liquid	160 – 180 mg KOH/g	Emulsifiers for W/O and O/W emulsions
Hostacerin® DGMS	Diglycerol monostearate	About 100 %	Pellets	160 – 180 mg KOH/g	
Hostacerin® DGSB	Diglycerol distearate ethoxylated with 4 EO	About 100 %	Waxy	115 – 135 mg KOH/g	

OTHER ETHOXYLATED FATTY ACID ESTERS

Other ethoxylated fatty acid esters are available and have specific regulatory approvals.

TRADE NAME	CHEMICAL DESCRIPTION	ACTIVE CONTENT	APPEARANCE (20 °C)	SAPONIFICATION VALUE	APPLICATION
Emulsogen® 4156	Ethoxylates sorbitane monolaurate with 20 EO	About 100%	Waxy	44 – 48 mg KOH/g	Emulsifier with FDA-approval (21 CFR 175.105, 21 CFR 178.3400)







SULFOSUCCINIC ACID DERIVATIVES

Sulfosuccinates and Sulfosuccinamates are wetting agents and emulsifiers for industrial applications. They are used as wetting agents in coatings and printing inks, as dispersing agents and as foaming agents in textiles and carpet back sizing.

TRADE NAME	CHEMICAL DESCRIPTION	ACTIVE CONTENT	APPEARANCE (20 °C)	APPLICATION
Emulsogen® SF 8	Diisooctyl sulfosuccinate, sodium salt	About 50 %	Liquid	Wetting agent for printing inks, emulsifier for emulsion polymerization, dispersing agent

PHOSPHATE ESTERS

Phosphate esters are mixtures of mono, di and tri-ester, free alcohol and phosphoric acid. Only the mono and diester have a charged group within the molecule and have surface activity and emulsifying capability. The ration of the mono, di and triester is controlling the ability to form W/O and O/W emulsions.

Phosphate esters are used as antistatic agents, extreme pressure lubricant additives, emulsifiers and dispersing agents. Alkyl phosphates are used for hydrophobic systems like W/O emulsions and inks. Ethoxylated phosphate esters are used as emulsifiers and dispersing agents for O/W emulsions, emulsion polymerization and dispersions. The longer the polyglycol chain of the phosphate ester the stronger is the dispersing and stabilizing effect in the ester.

TRADE NAME	CHEMICAL DESCRIPTION	ACTIVE CONTENT	APPEARANCE (20 °C)	APPLICATION
Phosphate esters of fatty alcohols				
Hostaphat® CC 100	Cetyl phosphoric acid ester, acid form, mono/diester	About 98 %	Waxy	O/W emulsifier (triglycerides, mineral oils) for cosmetic emulsions
Hostaphat® CK 100	Cetyl phosphoric acid ester, potassium salt, mono/diester	About 98 %	Powder	O/W emulsifier (triglycerides, mineral oils) for cosmetic emulsions
Hostaphat® MDAH	Mono-/di-2-ethylhexyl phosphoric acid ester, acid form	About 98 %	Liquid	Dispersing agent for organic pigments in ball point pens
Phosphate esters of ethoxylated fatty alcohols				
Hostaphat® 145	Oleyl polyoxethyl (5 EO) phosphoric acid mono/diester, acid form	About 98 %	Liquid	Emulsifier for emulsion polymerization, water soluble lubricants
Hostaphat® 1306	Isotridecyl polyoxethyl (6 EO) phosphoric acid mono/diester, acid form	About 96 %	Liquid	Emulsifier for emulsion polymerization
Hostaphat® KL 340 D	Lauryl polyethoxy (4 EO) phosphoric acid ester, sodium salt, mono/di/triester	About 90 %	Liquid	O/W and W/O emulsifier
Hostaphat® KW 340 D	Stearyl polyethoxy (4 EO) phosphoric acid ester, sodium salt, mono/di/triester	About 90 %	Liquid	O/W and W/O emulsifier
Hostaphat MTT 080	Tridecyl polyethylen glycol ether phosphoric acid ester (8 EO), acid form, about 80% mono ester	About 98 %	Liquid	Emulsifier for emulsion polymerization

ALKYL ETHER CARBOXYLIC ACIDS

Alkyl ether carboxylic acids are used as emulsifiers, corrosion inhibitors, lime soap dispersing agents, wetting agents and detergents.

TRADE NAME	CHEMICAL DESCRIPTION	ACTIVE CONTENT	APPEARANCE (20 °C)	APPLICATION
Emulsogen® 4617	Blend of ether carboxylic acids	About 88%	Liquid	Emulsifiers with lime soap dispersing properties for metal working fluids
Emulsogen® CIO 050	Ether carboxylic acid with 5 EO	About 88 %	Liquid	
Emulsogen® CLE 070	Ether carboxylic acid with 7 EO	About 92%	Liquid	
Emulsogen® CNO 080	Ether carboxylic acid with 8 EO	About 88 %	Liquid	
Emulsogen® COA 070	Ether carboxylic acid with 7 EO	About 92 %	Liquid	
Emulsogen® COL 020	Ether carboxylic acid with 2 EO	About 92 %	Liquid	
Emulsogen® COL 050	Ether carboxylic acid with 5 EO	About 90 %	Liquid	
Emulsogen® COL 080	Ether carboxylic acid with 8 EO	About 89 %	Liquid	
Emulsogen® COL 100	Ether carboxylic acid with 10 EO	About 91 %	Liquid	
Emulsogen® DTC 070	Ether carboxylic acid with 7 EO	About 90 %	Liquid	Dispersing agent for pigment preparations in decorative cosmetics.

FATTY ACID DERIVATIVES

The anionic fatty acid derivatives from the following table range from glycinates and sarcosides with a terminating carboxylic acid group to isethionates and methyl taurides with a sulfonic acid group. Generally fatty acid derivatives show a better hardwater lather performance than fatty acids. Anionic fatty acid derivatives are used as foaming agents, foam boosters or foam stabilizers. They also function as detergents, emulsifiers and dispersing agents.

TRADE NAME	CHEMICAL DESCRIPTION	ACTIVE CONTENT	APPEARANCE (20 °C)	APPLICATION
Fatty acid sarkosine and sarcosides				
Arkomon® SO	Oleoyl sarkosin	About 85 %	Liquid	Emulsifier, dispersing agent, corrosion inhibitor for metal working fluids
Medialan® LD	Lauroyl sarcoside, Na salt	About 30 %	Liquid	Foaming agent in dental care products
Fatty acid isethionates and methyl taurides				
Arkopon® T 8015	Oleic acid methyl tauride, sodium salt	About 40 %	Waxy paste	Dispersing agent and emulsifier, anionic bitumen emulsions, foaming agent for building products
Hostapon® CT Paste	Coconut fatty acid methyl tauride, Na salt	About 30 %	Waxy paste	Foaming agent, lime soap dispersing agent and cleansing agent in body care products
Hostapon® SCI-65 G	Coconut fatty acid isethionate, Na salt, blend with 20% stearic acid	About 65 %	Granules	Soap bars, antistatic for polymers, air entraining agent for construction, silicone emulsions
Hostapon® SCI-85 G	Coconut fatty acid isethionate, Na salt	About 85 %	Granules	
Hostapon® TPHC	Oleic acid methyl tauride, Na salt	About 60 %	Powder	Dispersing agent and emulsifier, anionic bitumen emulsions, foaming agent for building products
Other fatty acid amides				
Genagen LAA	Sodium amphoacetate	Ca. 31%	Liquid	Cleansing agent, dispersing agent
Hostapon CGN	N-Cocoyl glutamate, sodium salt	Ca. 31%	Liquid	Cleansing agent, dispersing agent
Hostapon SG	Sodium cocoyl glycinate	Ca. 30%	Liquid	Cleansing agent, dispersing agent