Ethoca chemical



service reaches the far corners of the World

Ethoca

Worldwide Operations

Manufacturing

Shanghai/Shandong, China

R&D Centers

Shanghai, China

Headquarters
Houston, USA
Shanghai, China



Applications

Production Technologies	Product Lines	Functions	Applications
Alkoxylation	Alkanolamides	Adhesion	Agro
Alkylation	Alkoxylates	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	Compatabilizer	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.	Hydrotroping	
Spray Drying	Sulphates	Metal Precipitant	
Sulphation	Sulphonated polystyrene	Rheology Modifier	
Sulphonation	Sulphonates	Scale Inhibitor	
Sulphosuccinates	Surface tension reduction		
Xanthan Derivatives	Suspension Aid		
Wetting			

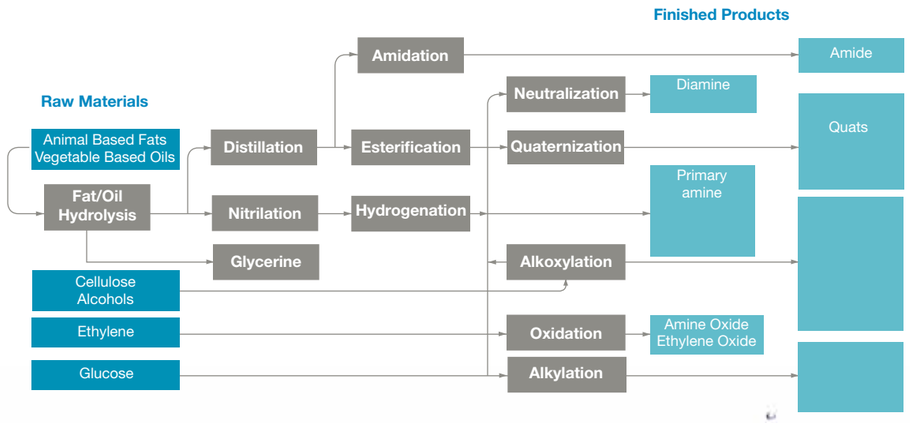


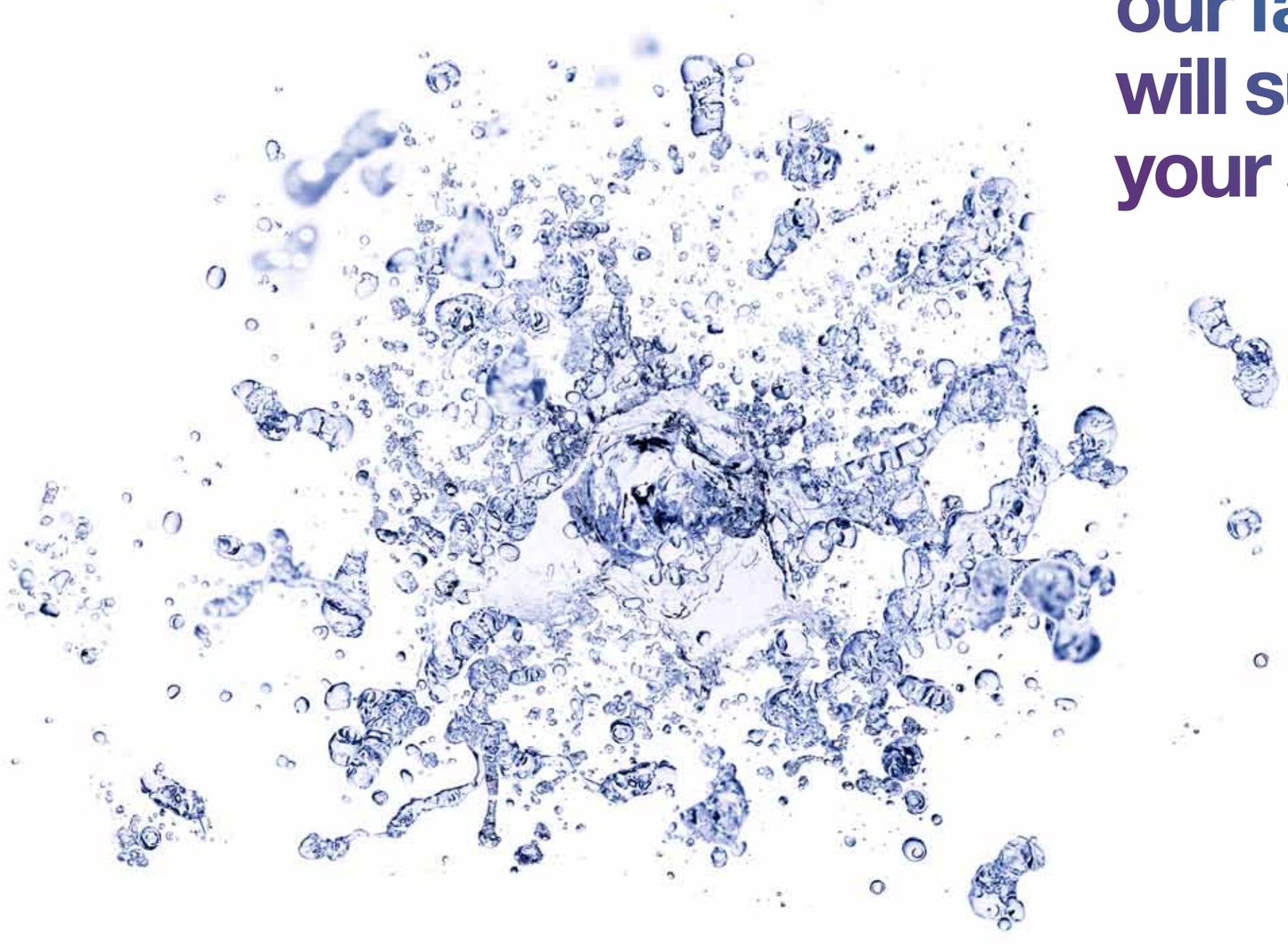
2

Fatty Amine Chemistry Overview

Fatty amine chemistry overview

Figure 1. Process overview





Fatty amine chemistry overview

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

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.

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.

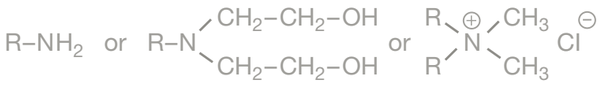
Figure 1 at the left gives an overview of the interconnecting process steps to produce these derivatives. Our major trademarks are given for the finished products.

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 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			

Functional properties of fatty amines and derivatives



The molecular structure of fatty amines and derivatives is characterized by one or more C_8 to C_{22} 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, alkoxylated 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.

Figure 2. Orientation of surfactant in several systems

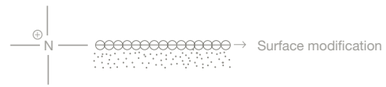


These functions may be recognized as being derived from three basic properties:

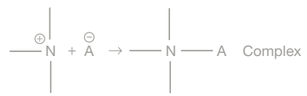
A. Surface Activity



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





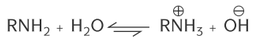
The following properties of fatty amines and derivatives may be used as guideposts in their selection in a variety of applications.

Solubility

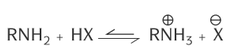
Solubility of surfactants is a primary criterion for their selection. Tables 1, 2 and 3 in the Appendices summarize the solubility behavior in various solvents for fatty amines and their ethoxylated and quaternary derivatives, respectively.

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	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

Selection criteria for fatty amines and derivatives



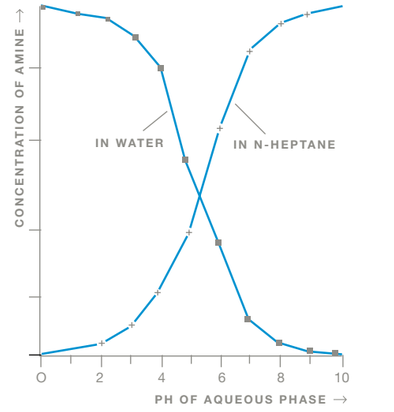


Emulsify, solubalize, liquefy, build foam, or remove foam with our nitrogen derivatives

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.

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



C. Solubility in two-phase systems

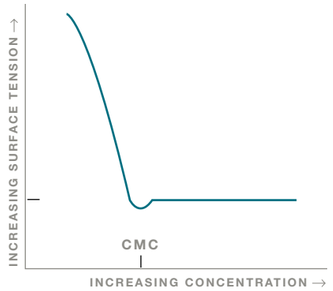
When a surfactant is dissolved in a two-phase system consisting of water and, for example, a hydrocarbon such as n-heptane, it distributes itself in the two phases. The relative solubility is dependent on the nature of the surfactant and on the nature of the system, and can be expressed by the so-called 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 **Parmeen® C** (a primary amine) between n-heptane and water as afunction 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.uses the Davies scale of 0-40 to classify its surfactants. These values are found in theproduct description section of this catalog.

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 **Pethomeen C/15** and **Pethomeen C/15** are used in applications where O/W emulsions are desired. In similar applications but at high pH, the corresponding **Pethoquad®** ethoxylated quaternary salt might be preferred, due to increased solubility derivedfrom the quaternized amine group. For water in oil (W/O) emulsions, low HLB surfactants are more effective. Lower ethoxylates of higher molecularweight alkylamines would be considered for such applications, including **Pethomeen S/02** and **Pthomeen T/02**.

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)
Parmeen 12D (at pH 4, neutralized with HCl)	27
Pethomeen S/02	32

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

Nitrogen derivatives

our cationic surfactants



Nitrogen Derivatives

Chemical Type	Trade Name	Formula
Primary Amines	**Parr**meen	$R-NH_2$
Secondary Amines	Parmeen	$\begin{matrix} R \\ R \end{matrix}\!\!>\!NH$
Tertiary Amines	Parmeen	$R-N(CH_3)_2$ $\quad R_2N-CH_3$ $\quad R_2N-R$
Diamines	Pduomeen	$R-NH-CH_2-CH_2-CH_2-NH_2$
Quaternary Ammonium Salts	Prquad	$R-\overset{\oplus}{N}(CH_3)_2-CH_3\ Cl^{\ominus}$ $\quad R-\overset{\oplus}{N}(CH_3)_2-CH_2-C_6H_5\ Cl^{\ominus}$ $\quad R-\overset{\oplus}{N}(CH_3)(R)-CH_3\ Cl^{\ominus}$ $\quad R-\overset{\oplus}{N}(R)_2-CH_3\ Cl^{\ominus}$ $\quad R-\overset{\oplus}{N}(CH_3)_2-CH_2-C_6H_5\ Cl^{\ominus}$ $\quad R-C(=O)-OCH_2CH_2-\overset{\oplus}{N}(CH_3)(R')-CH_2CH_2-O-C(=O)-R\ X^{\ominus}$
Ethoxylated Quaternary Salts	Pethoquad	$R-\overset{\oplus}{N}(CH_3)[(CH_2-CH_2O)_xH][(CH_2-CH_2O)_yH]\ Cl^{\ominus}$
Ethoxylated Amines	Pethomeen	$R-N[(CH_2-CH_2O)_xH][(CH_2-CH_2O)_yH]$
Ethoxylated Diamines	Pethoduomeen	$R-N(-(CH_2-CH_2O)_xH)-CH_2-CH_2-CH_2-N[(CH_2-CH_2O)_yH][(CH_2-CH_2O)_zH]$
Amine Acetates	Parmac	$R-\overset{\oplus}{N}H_3\ \ CH_3COO^{\ominus}$
Diamine Diacetates	Pduomac	$R-\overset{\oplus}{N}H_2-CH_2-CH_2-CH_2-\overset{\oplus}{N}H_3\ \ 2X^{\ominus}$ $X^{\ominus} = CH_3COO^{\ominus}$
Amine Oxides	Paromox	$R-\overset{\oplus}{N}(CH_3)_2\rightarrow O$ $\quad R-\overset{\oplus}{N}[(CH_2-CH_2O)_xH][(CH_2-CH_2O)_yH]\rightarrow O$
Aliphatic Amides	Parmid	$R-C(=O)-NH_2$
Ethoxylated Amides	Ethomid	$R-C(=O)-NH-(CH_2-CH_2O)_xH$

Amines

Primary Amines

RNH_2

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

Secondary Amines

R_2NH

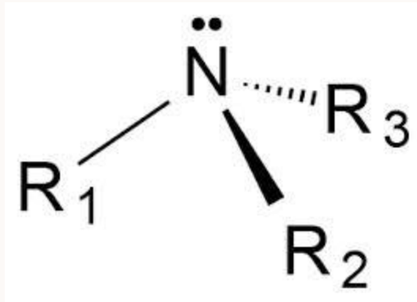
Product	Common Name*	TSCA Number	Specifications**** Apparent Secondary Amine, % MIN.	Specifications**** Primary Amine, % MAX.	Typical Properties Amine Number MAX.	Typical Properties Gardner Color MAX.	Typical Properties **Equivalent Weight	Typical Properties Melting Point,°C	Typical Properties Secondary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

key

. ** 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 — Dialkyl-methylamines*

R_2NCH_3

Product	Common Name*	TSCA Number	Specifications Tertiary Amine, % Min.	Specifications Amine Number Min.	Typical Properties Gardner Color	Typical Properties **Equivalent Weight	Typical Properties Melting Point,°C	Typical Properties Amine Number Max.	Typical Properties Tertiary Amine, % Max.	HLB Davis Scale
Parmeen M2C	Dicocoalkyl-methylamines	61788-62-3	97	137	2	395	-2	142	99	3.7
Parmeen M2HT	Dihydrogenated tallowalkyl-methylamines	61788-63-4	97	105	1	524	38	107	99	1

Tertiary Amines — Trialkylamines*

RN_3

Product	Common Name*	TSCA Number	Specifications Tertiary Amine, % Min.	Specifications Amine Number Min.	Typical Properties Gardner Color Max.	Typical Properties **Equivalent Weight Max.	Typical Properties Melting Point,°C	Typical Properties Amine Number	Typical Properties Tertiary Amine, %	HLB Davis Scale
Parmeen 32	Tridodecylamine	102-87-4	95	102	1	540	-9	104	96	<1
Parmeen 31	Trihexadecylamine	67701-00-2	98	82	3	668	38	84	99	<1
Parmeen 38	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.
** Equivalent Weight = 56,110 / Amine Number.
*** D = Distilled
**** 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*

CH_3
$RN\text{-}CH_2CH_2N(CH_3)_2$
Diamines

Product	Common Name*	TSCA Number	Specifications: Amine Number Min.	Specifications: Amine Number Max.	Specifications: Gardner Color Max.	Specifications: Iodine Value Min.	Specifications: Moisture % Max.	Typical Properties: **Equivalent Weight	Typical Properties: Appearance @ 25°C	Typical Properties: Amine Number	Typical Properties: HLB Davis Scale
Pduomeen C	N-coco-1,3 diaminopropane	61791-63-7	409	3	-	1	133	Liquid	422	17.5
Pduomeen CD	N-coco-1,3-diaminopropane	61791-63-7	409	2	-	1	130	Liquid	432	17.5
Pduomeen O	N-oleyl-1,3-diaminopropane	7173-62-8	320	5	60	1	163	Liquid	344	15.2
Pduomeen OL	N-oleyl-1,3-diaminopropane	7173-62-8	320	5	70	1	163	Liquid	344	15.2
Pduomeen T	N-tallow-1,3-diaminopropane	61791-55-7	334	7	32	1	161	Paste	348	15.6

Polyamines — Higher Amines*

$RNH(CH_2CH_2CH_2NH)_nCH_2CH_2CH_2NH_2$
Triamines: n = 1
Tetramines: n = 2

Product	Common Name*	TSCA Number	Specifications: Amine Number Min.	Specifications: Amine Number Max.	Specifications: Gardner Color Max.	Specifications: Iodine Value Min.	Specifications: Moisture % Max.	Typical Properties: **Equivalent Weight	Typical Properties: Melting Point,°C	Typical Properties: HLB Davis Scale
Ptetrameen T	N-tallowalkyl tripropylene triamines	68911-79-5	475	6	25	0.5	114	37	–	
Ptriameen T	N-tallowalkyl dipropylene triamines	61791-57-9	413	8		0.5	133	34	32.4	

Some products may be subject to minimum order quantities.

Amines

Ethoxylated Amines*

$R\text{-}N\langle(CH_2CH_2O)_xH$
$\quad\quad\quad\quad\quad\quad\quad\quad\langle(CH_2CH_2O)_yH$

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

Product	Common Name***	TSCA Number	Specifications**: Equivalent Weight Min.	Specifications**: Equivalent Weight Max.	Typical Properties: Gardner Color Max.	Typical Properties: Primary Plus Secondary Amine %	Typical Properties: Amine Number	Typical Properties: Appearance @ 25°C	Typical Properties: HLB Davis Scale
Pethomeen 18/02	Ethoxylated (2) octadecylamine	10213-78-2	350	374	2	3	155	Solid	9.8
Pethomeen 18/05	Ethoxylated (5) octadecylamine	26635-92-7	480	505	8	2	114	Solid	10.9
Pethomeen 18/15	Ethoxylated (15) octadecylamine	26635-92-7	900	960	8	1	60	Liquid to Paste	14.4
Pethomeen 18/50	Ethoxylated (50) octadecylamine	26635-92-7	2370	2570	10	0.5	23	Paste to Solid	26.6
Pethomeen C/02	Ethoxylated (2) cocoalkylamines	61791-31-9	280	300	4	3	193	Liquid	12.2
Pethomeen C/05	Ethoxylated (5) cocoalkylamines	61791-14-8	410	435	7	2	133	Liquid	13.3
Pethomeen C/15	Ethoxylated (15) cocoalkylamines	61791-14-8	830	890	10	1	65	Liquid	16.8
Pethomeen O/02	Ethoxylated (2) oleylamines	13127-82-7	343	363	8	3	160	Liquid	9.7
Pethomeen S/02	Ethoxylated (2) soyaalkylamines	73246-96-5	342	362	6	3	159	Liquid	10
Pethomeen S/05	Ethoxylated (5) soyaalkylamines	61791-24-0	470	495	10	2	116	Liquid	11.1
Pethomeen S/15	Ethoxylated (15) soyaalkylamines	61791-24-0	895	955	10	1	61	Liquid	14.7
Pethomeen T/02	Ethoxylated (2) tallowalkylamines	61791-44-4	340	360	6	3	160	Paste	10.1
Pethomeen T/05	Ethoxylated (5) tallowalkylamines	61791-26-2	470	495	7	2	116	Liquid to Paste	11.2
Pethomeen T/10	Ethoxylated (10) tallowalkylamines	61791-26-2	690	752	12	0.4	78	Liquid	13
Pethomeen T/15	Ethoxylated (15) tallowalkylamines	61791-26-2	890	950	8	1	61	Liquid to Paste	14.7
Pethomeen T/20	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.

Some products may be subject to minimum order quantities.

Quaternary Ammonium Salts

Alkyltrimethyl Ammonium Chlorides*

$RN^+(CH_3)_3\ Cl^-$

Product	Common Name**	TSCA Number	Specifications: Quarternary Salt %*** Min.	Specifications: Quarternary Salt %*** Max.	Specifications: Free Amine Plus Amine Salt % Max.	Specifications: pH	Typical Properties: Gardner Color Max.	Typical Properties: PMCC Flash Point, °C	Typical Properties: Appearance @ 25°C	Typical Properties: HLB Davis Scale
Pquad 12-	Dodecyl–	112-00-5	35	39	1	6.5-9	2	Non-Flammable	Liquid	23.3
Prquad 12-50	Dodecyl–	112-00-5	49	52	2	6 - 9	1	19	Liquid	23.3
Prquad 16-30	Hexadecyl–	112-02-7	27	30	2	6 - 9	3	Non-Flammable	Liquid	21.2
Prquad 16-50	Hexadecyl–	112-02-7	49	52	2	6 - 9	3	17	Liquid	21.2
Prquad 18-50	Octadecyl–	112-03-8	49	52	2	6 - 8	3	18****	Liquid	20.5
Prquad C-33W	Cocoalkyl–	61789-18-2	32	35	2	6 - 9	4	Flammable	Liquid	22.9
Prquad C-50	Cocoalkyl–	61789-18-2	49	52	2	6 - 9	4	20	Liquid	22.9
Prquad S-50	Soyaalkyl–	61790-41-8	49	52	2	6 - 9	5	16	Liquid	20.8
Prquad S-60 PG	Soyaalkyl–(a)	61790-41-8	58	62	2	6 - 9	5	Non-Flammable	Liquid	20.8
Prquad T-26	Tallowalkyl–	8030-78-2	26	29	2	6 - 9	3	Non-Flammable	Liquid	20.8
Prquad 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 fromthe name listed by TSCA.
*** In many cases, activity (concentration) can be changed to suit your needs.
**** Setaflash
(a) Propylene glycol solvent

Dialkyldimethyl Ammonium Chlorides*

$R_2N^+(CH_3)_2\ (X)^-$
$(X) = Cl, NO_2, OSO_2OCH_3$

Product	Common Name**	TSCA Number	Specifications*: Quarternary Salt %*** Min.	Specifications*: Quarternary Salt %*** Max.	Specifications*: Free Amine Plus Amine Salt % Max.	Specifications*: pH	Typical Properties: Gardner Color Max.	Typical Properties: PMCC Flash Point, °C	Typical Properties: Appearance @ 25°C	Typical Properties: HLB Davis Scale
Prquad 2C-70 Nitrite	Dicocoalkyl–(b)	71487-01-9	68	72	–	6 - 8.5	14	23	Liquid	17.3
Prquad 2C-75	Dicocoalkyl–	61789-77-3	74	77	1.5	6 - 9	3	23	Liquid	17.3
Prquad 2HT-75	Di(hydrogenated tallowalkyl)–	61789-80-8	74	77	1.5	6 - 9	2	25	Paste	13.2
Prquad 2HT-75 PG	Di(hydrogenated tallowalkyl)	61789-80-8	74	77	1.5	6 - 9	3	107	Paste	13.2

Quaternary Ammonium Salts

Trialkylmethyl

$R_3\ N^+\ CH_3\ Cl^-$

Product	Common Name*	TSCA Number	Specifications: Quarternary Salt %*** Min.	Specifications: Quarternary Salt %*** Max.	Specifications: Free Amine Plus Amine Salt % Max.	Specifications: pH	Typical Properties: Gardner Color Max.	Typical Properties: PMCC Flash Point, °C	Typical Properties: Appearance @ 25°C	Typical Properties: HLB Davis Scale
Parquad 31	Trihexadecylmethyl ammonium chloride	52467-63-7	86	90	2	6 - 9	4	-Solid7.6		

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*

$R_2N^+CH_2C_6H_5Cl^-$
$\quad\quad\quad





Amides

$RCONH_2$

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.				
Parmid HT	Hydrogenated tallowalkylamides	61790-31-6	90	5	7	3	98	Flakes	<1
Parmid 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.