Market Study: Surfactants

(3rd edition)

Ceresana

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Oliver Kutsch, CEO

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- Restructure your product portfolio
- Evaluate current and potential locations
- Plan and develop new marketable products
- Better adapt to needs and requirements of customers
- Deal with future markets

Surfactants can form a foam, facilitate the removal of dirt, and enable the mixture of water and oil. Despite concerns of environmentalists, these surface active chemicals are found in almost every household and are also used in numerous industrial applications. In 2016, a worldwide turnover of USD 31 billion was achieved. For the third time already, Ceresana analyzed the global market: The latest report expects an AAGR of 3.1%.

Surfactants are made from petroleum derivatives but can also be obtained from natural raw materials such as sugar, vegetable oils or vegetable soaps. The types of surfactants mainly differ in opposed polarity and different charges. The study examines anionic, cationic, non-ionic, and other surfactants. Important figures such as demand, import, and export are given both for these main groups and for individual product types. Anionic surfactants are currently the most important group with a global market share of 49%. However, the strongest growth market are non-ionic surfactants. Fatty alcohol ethoxylates (FAEO) dominate this type.

Asia-Pacific is by far the largest consumer of surfactants with a world market share of 38%. There are clear differences in regard to the used product types: While Asia accounted for a market share of 43% of alkylbenzene sulfonates (LAS) in 2016, consumers in Western Europe and North America dominate the market for alkyl sulfates (FAS), alkyl ether sulfates (FAES), and alcohol ethoxy sulfates (AES) with a share of 60%.

Surfactants are used in numerous applications. The best-known applications are cleaners and detergents for households as they help to remove dirt as washing-active substances. Around 55% of the demand in 2016 was registered by this segment. Besides the segments cleaners and detergents, cosmetics, and textiles, surfactants are also used in numerous industrial applications. For paints and plastics, Ceresana expects the highest global increase of 2.1% p.a. until 2024.

While demand for laundry detergent in form of powder developed more weakly in the past years, the market for liquid and highly concentrated detergents accounted for a significant growth. In dishwashing detergents, tablets account for a considerable growth. A decisive factor for the development of the cosmetics industry is the rise of private consumption. The increasing demand for surfactants on the part of the cosmetics industry can be explained by the growing awareness of personal body hygiene and the available income that has been increasing in many countries in the past years. This trend is additionally reinforced by the increasing sales of products with natural and organic ingredients.

The Study in Brief:

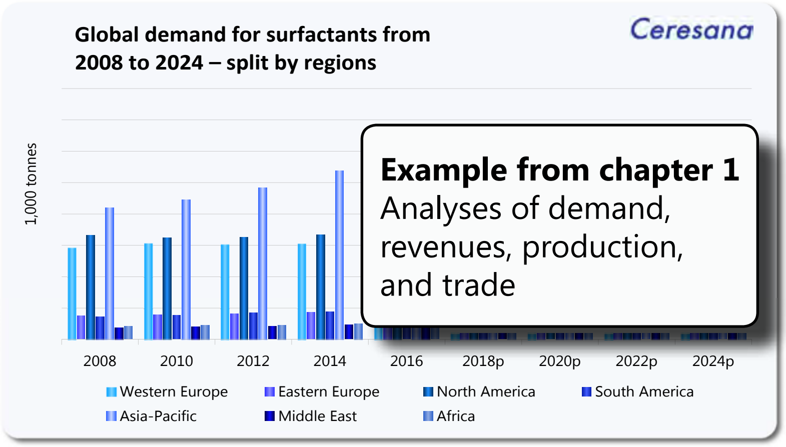
Chapter 1 provides a description and analysis of the global market - including forecasts up to 2024: The development of revenues, production, and demand is analyzed for each world region. The figures are split by anionic, cationic, non-ionic, and other surfactants. In addition, there is a further division into product subsegments.

Chapter 2 examines the market in the 31 major countries in detail: Revenues, demand, production, as well as import and export are evaluated per product types. Demand for surfactants of the individual applications is described in detail.

In Chapter 3, the application areas are examined for Western and Eastern Europe, North and South America, Asia-Pacific, The Middle East, and Africa. Data on the development of demand are analyzed for the applications detergents and cleaners, industrial cleaners, personal care and cosmetics, textiles and leather, paints and plastics, and other applications.

In Chapter 4, demand for individual types is analyzed. Anionic, cationic, non-ionic, and other surfactants are considered separately. Additionally, a further subdivision of the group anionic surfactants into LAS, FAS/ FAES/ AES, and other anionic surfactants is made. The segment non-ionic surfactants is split by FAEO, other ethoxylates, and other non-ionic surfactants.

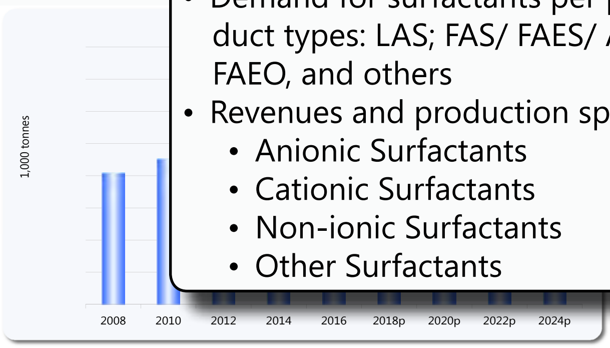
Chapter 5 provides company profiles of the 92 largest manufacturers of surfactants – clearly arranged according to contact details, revenues, profit, product range, production sites, and profile summary. These producers include Royal Dutch Shell plc, General Electric Company, BASF SE, The Procter & Gamble Company, DowDuPont Inc., 3M Company, Akzo Nobel N.V., Evonik Industries AG, and Solvay S.A.


Global demand for surfactants from 2008 to 2024 – split by regions
Ceresana
1,000 tonnes
2008
2010
2012
2014
2016
2018p
2020p
2022p
2024p
Western Europe
Eastern Europe
North America
South America
Asia-Pacific
Middle East
Africa
Example from chapter 1
Analyses of demand, revenues, production, and trade

1.6 Asia-Pacific

1.6.3 Production

In Asia-Pacific, around X million tonnes of surfactants were produced in 2016. We fore-
cast total production vo
tween 2016 and 2024 an
Almost X% of output ori



Chapter 1: Market data for 7 regions and 31 countries:

- Demand for surfactants per product types: LAS; FAS/ FAES/ AES; FAEO, and others
- Revenues and production split by:
  - Anionic Surfactants
  - Cationic Surfactants
  - Non-ionic Surfactants
  - Other Surfactants

Graph: Production of surfactants in Asia-Pacific from 2008 to 2024

in 1,000 tonnes	2008	2010	2012	2014	2016	2018p	2020p	2022p	2024p	2016-2024
Anionic Surfactants	X	X	X	X	X	X	X	X	X	X% p.a.
Cationic Surfactants	X	X	X	X	X	X	X	X	X	X% p.a.
Non-ionic Surfactants	X	X	X	X	X	X	X	X	X	X% p.a.
Other Surfactants	X	X	X	X	X	X	X	X	X	X% p.a.
Total	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X% p.a.**

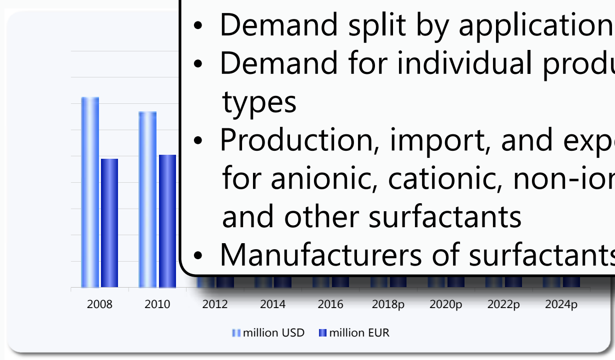
Table: Production of surfactants in Asia-Pacific from 2008 to 2024 – split by surfactant types

2.1.3.1 Demand and Revenues – Germany

Demand for surfactants in Germany amounted to X tonnes in 2016. Demand had risen
by an average of X% p.a.
again at an average grow
Surfactant revenues amo
increase at an average ra

Chapter 2: Extensive market data on 31 countries:

- Total demand
- Revenues
- Demand split by applications
- Demand for individual product types
- Production, import, and export for anionic, cationic, non-ionic, and other surfactants
- Manufacturers of surfactants



Graph: Revenues generated with surfactants in Germany from 2008 to 2024 in billion USD and billion EUR

2.1.3.2 Products and Applications

The most important sales market for surfactants in 2016 was the segment detergents and cleaners. Within the next eight years, demand for surfactants in the segment personal care and cosmetics will experience the most dynamic development at rates of X% p.a.

in 1,000 tonnes	2008	2010	2012	2014	2016	2018p	2020p	2022p	2024p	2016-2024
Detergents and Cleaners	X	X	X	X	X	X	X	X	X	X% p.a.
Industrial Cleaners	X	X	X	X	X	X	X	X	X	X% p.a.
Personal Care and Cosmetics	X	X	X	X	X	X	X	X	X	X% p.a.
Textiles and Leather	X	X	X	X	X	X	X	X	X	X% p.a.
Paints and Plastics	X	X	X	X	X	X	X	X	X	X% p.a.
Other Applications	X	X	X	X	X	X	X	X	X	X% p.a.
Total	**X**	**X**	**X**	**X**	**X**	X	X	X	X	X% p.a.

Table: Demand for surfactants in Germany from 2008 to 2024 - split by applications

in 1,000 tonnes	2008	2010	2012	2014	2016	2018p	2020p	2022p	2024p	2016-2024
LAS	X	X	X	X	X	X	X	X	X	X% p.a.
FAS/ FAES/ AES	X	X	X	X	X	X	X	X	X	X% p.a.
Other anionic	X	X	X	X	X	X	X	X	X	X% p.a.
Anionic Surfactants - Total	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X% p.a.**
Cationic Surfactants - Total	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X% p.a.**
FAEO	X	X	X	X	X	X	X	X	X	X% p.a.
Other Ethoxylates	X	X	X	X	X	X	X	X	X	X% p.a.
Other non-ionic	X	X	X	X	X	X	X	X	X	X% p.a.
Non-ionic Surfactants - Total	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X% p.a.**
Other Surfactants - Total	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X% p.a.**
Total	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X% p.a.**

Table: Demand for surfactants in Germany from 2008 to 2024 – split by surfactant types

Despite low interest rates, a low oil price, and the devaluation of the euro, Germany has only experienced a restrained upswing in the past years caused by, among others, the low global economy. However, the rather restrained demand of the global economy will increase again in 2017. The GDP growth was 1.9% in 2016 and is supposed to increase further by 1.5% in 2017. This economic growth is supported by a high private consumption and a stable labor market. In the scope of its expansive financial policy, the federal government passed an investment package of EUR 10 billion for the period 2016 to 2018. Tax reductions, rising pensions, as well as continuing migratory flows, and the related monetary transfers also provide further impulses for the German economy. Additionally, the number of employees increased in 2016, while the unemployment rate decreased. The purchase power of households is likely to rise further in 2017 and 2018, which can be explained by the growing employment figures and increasing incomes. We forecast an economic growth of 1.8% in 2018.

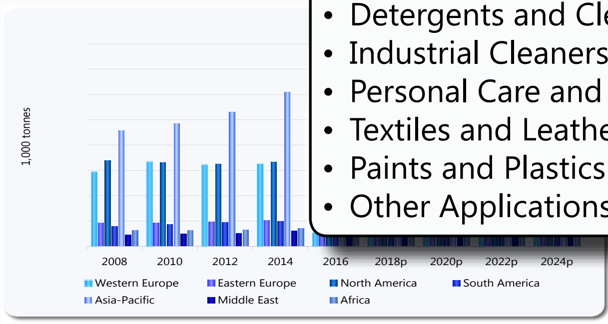
In the segment dishwashing detergents, especially tablets were able to account for a considerable growth in 2016. Due to cost and time saving reasons, dishwashers become more and more popular in Germany. This leads to a further rise in demand for handy dishwashing tablets. Contrary to the trend of increasingly smaller packaging sizes, laundry detergents in large economy packs are especially high in demand. This is mainly due to the cheaper prices of large packs compared to smaller packaging sizes. Furthermore, a special characteristic of German consumers is that they are especially loyal to a brand and only rarely alternate their laundry detergent. In addition, the market in Germany is largely saturated. Further growth is thus only possible in niche areas such as odor intensifiers. A decisive factor for the development of the cosmetics industry of a country is private consumption, which increased constantly in Germany in the past years and will continue to increase in the upcoming years.

3.1.1 Detergents and Cleaners

The global market for household detergents and cleaners includes all-purpose laundry detergents, mild detergents, fabric softeners, detergent additives, multi-purpose and surface cleaners, scouring agents, sanitary cleaners, dishwashing detergents, and bleaching agents as well as care products for wood, leather, and metals. In 2016, almost X million tonnes of surfactants were used for the sales market detergents and cleaners. Thus, demand for surfactants in this applica… since 2008. Given an expected X% p.a. increa… the sector detergents and cleaners will amou…

Chapter 3: Demand per region and country split by applications:

- Detergents and Cleaners
- Industrial Cleaners
- Personal Care and Cosmetics
- Textiles and Further
- Paints and Plastics
- Other Applications



Graph: Global demand for surfactants in the segment detergents and cleaners from 2008 to 2024 – split by regions

The largest consumer market for surfactants are cleaners and detergents: Laundry detergents, fabric softeners, dishwashing detergents, carpet cleaners, industrial cleaners (mainly automotive & building cleaners), and disinfectants in numerous different forms. Linear alkyl benzene sulfonates (LAS), alcohol ethoxylates (APE), and biocidal quats are the most widely used products in this category. However, research is carried out to replace them for environmental reasons. In general, there is a higher request for…

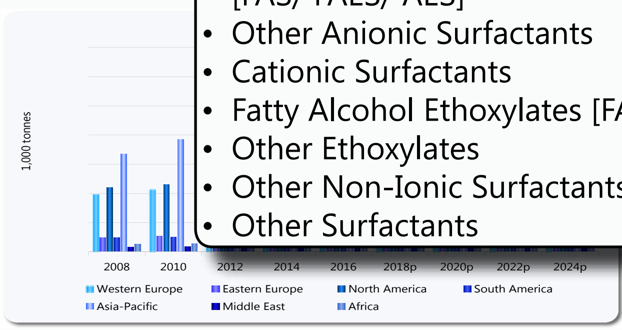
4.3 Non-Ionic Surfactants

4.3.1 World

In 2016, global demand for non-ionic surfactants amounted to X million tonnes. Thus, global demand rose by, on average, X% p.a. in the past eight years. Worldwide, the largest consumer of non-io… global demand for this pro… In the upcoming eight year… in Asia-Pacific. Demand in t… million tonnes in 2024. In t… consumed in 2024. Compar… prox. X% per year.

Chapter 4: Demand split by product types:

- Alkyl Benzene Sulfonates [LAS]
- Alkyl Sulfates / Alkyl Ether Sulfates / Alcohol Ethoxy Sulfates [FAS/ FAES/ AES]
- Other Anionic Surfactants
- Cationic Surfactants
- Fatty Alcohol Ethoxylates [FAEO]
- Other Ethoxylates
- Other Non-Ionic Surfactants
- Other Surfactants



Graph: Global demand for non-ionic surfactants from 2008 to 2024 – split by regions

The heads of non-ionic surfactants are not electrically charged and for example consist of multiple alcohols, ethers or ethoxylates. Non-ionic surfactants act as fat solvents in laundry detergents, domestic cleaning agents, and dishwashing detergents. They are not deactivated by calcium or magnesium, are very soluble, offer good solubility and low temperature properties, and form less foam. Combinations of anionic surfactants and non-ionic surfactants are resistant to hard water in laundry detergents. Fatty acid monoglycerides and esters of fatty acids with sugar serve as emulsifiers in foods and cosmetics. Non-ionic sugar surfactants are gaining importance because they are hardly toxic and usually better biodegradable than most anionic surfactants.

4.3.1.1 Fatty Alcohol Ethoxylates (FAEO)

About X million tonnes of FAEO were processed worldwide in 2016. Fatty alcohol ethoxylates are a group of non-ionic surfactants that are produced from fatty alcohols and ethylene oxides and offer a high detergency and dispersion properties. They are used in body care products, cosmetics, ointments, and liquid and powder detergents, but also for technical emulsifiers and other industrial applications. FAEO do not foam as much as fatty alcohol sulfates. Compared to ester surfactants, they are very resistant to acids and bases.

in 1,000 tonnes	2008	2010	2012	2014	2016	2018p	2020p	2022p	2024p	2016-2024
Western Europe	X	X	X	X	X	X	X	X	X	X% p.a.
Eastern Europe	X	X	X	X	X	X	X	X	X	X% p.a.
North America	X	X	X	X	X	X	X	X	X	X% p.a.
South America	X	X	X	X	X	X	X	X	X	X% p.a.
Asia-Pacific	X	X	X	X	X	X	X	X	X	X% p.a.
Middle East	X	X	X	X	X	X	X	X	X	X% p.a.
Africa	X	X	X	X	X	X	X	X	X	X% p.a.
Total	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	X% p.a.

Table: Global demand for FAEO from 2008 to 2024 – split by regions

ALTANA AG

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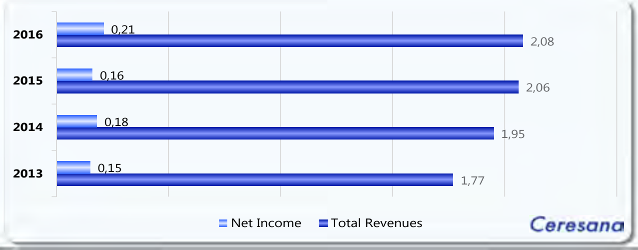
Financial Key Data (in billion EUR)



General Information about the Company

Divisions, Product Range	The company operates in four business divisions: • BYK: Addotoves and measuring instruments for, among others, the varnish, printing ink, and plastics industry • ECKART: Metallic and pearlescent pigments for varnishes, paints, plastics, porous concrete, cosmetics, and the graphics industry. • ELANTAS: Insulation material for the electronics industry • ACTEGA: Coatings, printing inks, sealants, and adhesives for the packaging and printing industry
Production Sites	In 2016, the company operated more than 48 production sites worldwide as well as more than 50 service and research laboratories.
Profile Summary	ALTANA is one of the world's leading producers of pure specialty chemistry. The grou… nish and… ics segm…

Chapter 5: Data and facts on 92 producers, clearly arranged by:

- Financial key data
- Production sites
- Profile summary

The company employs about 6,000 people and holds assets of EUR 3.05 million (12/31/2016). R&D expenditure amounted to about EUR 129 million in the financial year 2016. The company owns 65 consolidated subsidiaries and associated companies spread worldwide.

Split by business segments, 44% of revenues of 2016 were generated in BYK, 22% in ELENTAS , 17% in ECKART Effect Pigments, and 17% in ACTEGA Coatings & Sealants. Regarding the several regions, 39% of revenues of 2016 originated in Europe, 31% in Asia, 28% in America, and 2% in other regions.

In 2016, ALTANA sold the ACTEGA Colorchemie Gruppe. The same year, ALTANA acquired Addcomp Holland BV, a Dutch developer and producer of innovative plastic additive solutions, to strategically expand the business division BYK Additives & Instruments in the segment plastic additives.

Early 2017, ALTANA strengthened its additive business by acquiring PolyAd Services. The US-American developer and producer of additive solutions for the global plastic market will be integrated into the Business Line Kunststoffadditive of BYK Additives & Instruments. Further, the Belgian chemical group Solvay's insulation resin business has been acquired. ALTANA has bought the new metallography technology from the Israeli Landa Gruppe.

In August 2017, ALTANA acquired the technology portfolio of the US-based company NuLabel Technologies, Inc. for the segments Label and Packaging.

Specific Information about Surfactants

ALTANA produces various surfactants in its business segment BYK Additives & Instruments, including:

Silicone surfactants under the brand "BYK" used for aqueous coatings, printing inks, overprint varnishes, adhesives, and sealants such as

- BYK-345: Silicone surfactant for aqueous varnishes as well as printing inks and overprint varnishes with significant reduction of surface tension and thus improvement of substrate wetting. No increase of surface smoothness. Solvent-free version of BYK-346. Complies with the FDA and/or EU food regulations…
- BYK-346: Silicone surfactant… nishes with significant redu… No increase of surface smo… regulations…

Chapter 5: Detailed profiles of the most important producers, such as 3M, Akzo Nobel, BASF, DowDuPont, Evonik, General Electric, Procter & Gamble, Shell und Solvay.

This study is useful for:

- Producers, distributors, and converters of anionic, non-ionic, catonic, and amphoteric surfactants, LAS, FAS, FAES, AES, FAEO, SLS, SLES, phosphate, sulfosuccinate, fatty alcohols
- Companies operating in the fields of: Household cleaners & detergents, industrial cleaners & detergents(all-purpose laundry detergents, mild detergents, fabric softeners, detergent additives, multi-purpose and surface cleaners, scouring agents, sanitary cleaners, dishwashing detergents, bleaching agents, care products for wood, leather, and metals)
- Personal care & cosmetic products (deodorants, tooth paste, foam baths, shower gel, shampoo, conditioner, lotions, hair dyes)
- Textile and leather, paints, plastics, agrochemicals, photo and oil field chemicals, construction materials, food, adhesives, lubricants, metalworking, mining, pulp and paper
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- Plastic Packaging for Cosmetics - Europe
- Rigid Metal Packaging - Europe
- Rigid Plastic Packaging - World