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Amines

US Industry Study with Forecasts for **2012 & 2017**

Study #2446 | December 2008 | \$4600 | 206 pages

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The Freedonia Group

767 Beta Drive

Cleveland, OH • 44143-2326 • USA

Toll Free US Tel: 800.927.5900 or +1 440.684.9600

Fax: +1 440.646.0484

E-mail: info@freedoniagroup.com

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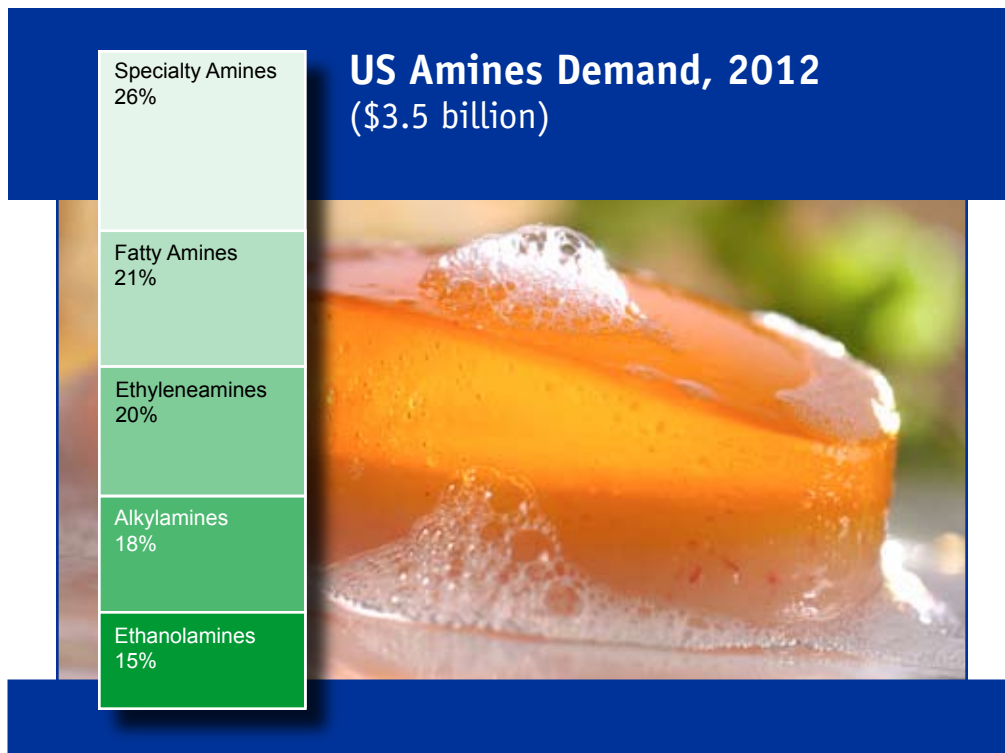
The personal care products market, as well as other smaller markets such as pharmaceuticals and monoethanolamine for wood preservation chemicals, will see above-average gains.

US demand to rise 3.0% annually through 2012

US demand for amines is forecast to advance 3.0 percent annually through 2012, valued at \$3.5 billion. Gains will decelerate from the pace of the 2002-2007 period, when demand benefitted from growth in the large cleaning products and agricultural chemicals markets. Maturity in a number of major markets will also work to restrain volume growth. On the brighter side, the personal care products market and other smaller markets will see above-average gains, as new applications continue to post rapid growth.

Ethanolamines to offer best growth opportunities

Accounting for 30 percent of volume demand and projected to grow at an annual pace of 3.6 percent through 2012, ethanolamines represent both the largest and fastest-growing product segment in the US amines market. Diethanolamine will remain the most commercially significant of the ethanolamines, providing strong support as it continues to benefit from use in popular glyphosate herbicides. Demand for monoethanolamine -- which rapidly gained popularity in the wood treatment market as chromated copper arsenate was phased out in favor of alkaline copper quaternary and copper azole -- will expand at a healthy rate through 2012 despite decelerating significantly from the 1997-2007 pace. Additionally, growth in triethanolamine demand will be



aided by new uses in fabric softeners and personal care products.

Specialty amines demand will be boosted by an improving outlook for plastics processing, as well as the replacement of other amines in such applications as natural gas treatment. Fatty amines are most commonly used in personal care products and will continue to benefit from their benign environmental profile and gentleness on the skin. Alkylamines will advance at a below-average pace, restrained by market maturity combined with sluggish gains for the major final products that employ these amines. Market maturity -- particularly in the lubricants market -- will also limit gains for ethyleneamines, which represent the smallest-volume product segment.

Personal care products market grow the fastest

Among the various markets in which amines are used, cleaning products and agricultural chemicals are the largest and will account for the leading share of gains through 2012. However, more rapid growth will be achieved in the personal care products market, driven by higher amine loadings and by the popularity of high-end cosmetics and soaps that employ fatty and specialty amines. Overall advances will be limited by sluggishness in the petroleum market and outright declines in the textiles and fibers market resulting from declining acrylic fiber production.

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Sample Text, Table & Chart

PRODUCTS

Ethyleneamines

Demand for ethyleneamines totaled 310 million pounds counting for more than twelve percent of US amines demand terms. In dollar terms, demand totaled \$560 million, or 20 percent overall demand. The largest applications for ethyleneamines are as lubricant additives, chelating agents, wet-strength resins in paper products, epoxy curing agents, surfactants and oilfield chemicals. Ethylenediamine, the most commercially significant analog, is used in chelating agents, while the main use for the other analogs is in lubricants.

Ethyleneamines are produced by reacting ammonia with ethylene dichloride, ethylene oxide or monoethanolamine, although only the process using ethylene dichloride yields the higher homologs such as triethylenetetramine and tetraethylenepentamine.

Supply & Demand

Demand for ethyleneamines is projected to increase 3 percent annually through 2012, reaching 310 million pounds valued at \$690 million. The primary uses for ethyleneamines are as lubricant additives, chelating agents, and paper wet-strength resins. Ethylenediamine and the higher ethyleneamine homologs will see solid growth in a variety of applications as additives and chelating agents. Diethylenetriamine will benefit from performance advantages which make it highly sought after in the electronics and lubricants markets. Maturity in triethylenetetramine's major markets will ensure that it remains a low-volume product.

Production of ethyleneamines is projected to increase 3 percent per year to 470 million pounds in 2012 driven by growth in gains in domestic demand. Exports of ethyleneamines account for 30 percent of production. More than half of these exports are shipped to Asia, as the young industrial economies of that region --

79

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**SAMPLE
TEXT**

TABLE III-3

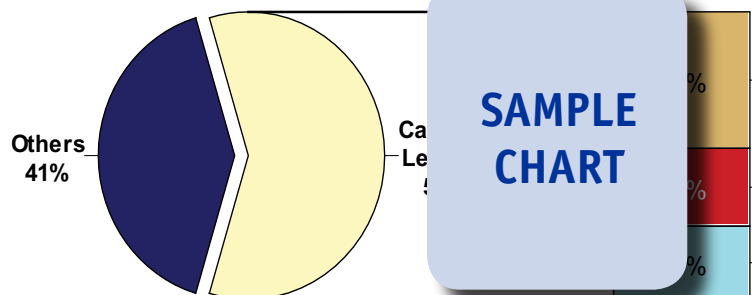
ETHANOLAMINES DEMAND BY TYPE

Item	1997	2002	2007	2012	2017
Ethanolamines Demand (mil lbs)	560	578	597	617	638
Diethanolamine	100	105	110	115	120
Monoethanolamine	200	205	210	215	220
Triethanolamine	260	268	277	287	298
\$/lb	1.10	1.18	1.25	1.32	1.40
Ethanolamines Demand (mil \$)	616	682	747	814	893
Diethanolamine	110	125	137	149	164
Monoethanolamine	220	246	263	280	308
Triethanolamine	286	311	347	385	421
% ethanolamines	12.9	13.2	13.5	13.8	14.1
Amines Demand (mil \$)	1620	1900	2340	2840	3470

**SAMPLE
TABLE**

CHART V-2

US AMINES CAPACITY SHARE BY COMPANY, 2007
 (4.2 billion pounds)



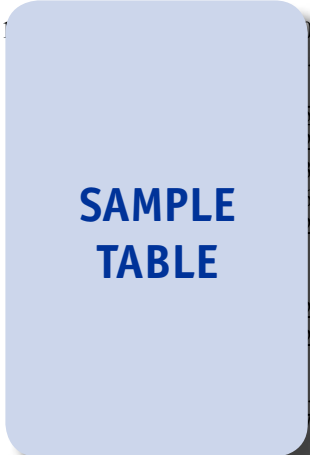
**SAMPLE
CHART**

Sample Profile, Table & Forecast

TABLE IV-3
CLEANING PRODUCTS MARKET: AMINES DEMAND
 (million pounds)

Item	1997	2002	2007	2012	2017
Cleaning Product Shpts (mil 2000\$)					
lbs amines/000\$ cleaning product					
Amines Demand					
Fatty Amines					
Ethanolamines					
Specialty Amines					
Ethyleneamines					
Alkylamines					
\$/lb					
Amines Demand (mil \$)					
% cleaning products					
Total Amines Demand (mil \$)					

*Excludes amount used in the production of other amines.



COMPANY PROFILES

Albemarle Corporation
 330 South Fourth Street
 Richmond, VA 23219
 804-788-6000
<http://www.albemarle.com>

Sales: \$7
 US Sales
 Employe

Key Pro



Alb... fine chemicals that
 enhance... es through three seg-
 ments: F... chemicals.

The Company is active in the US amines industry through the Fine Chemicals segment, which generated 2007 sales of \$537 million. Among the segment's activities is the manufacture of various functional chemicals for use in the pharmaceutical, agricultural chemical, water treatment, oilfield, paint, paper, ceramic, glass and other industries. These chemicals include tertiary amines. Specific tertiary amines from Albemarle comprise ADMA alkyl dimethylamine and DAMA dialkylmethylamine chemicals. The Company makes ADMA and DAMA tertiary amines, among other products, at its plant in Magnolia, Arkansas.

ADMA and DAMA tertiary amines are intended for use in the production of quaternary ammonium compounds for biocides, oilfield chemicals, amine oxides and betaines for surfactants. These are single-cut, carbon chain amines in the C8 to C18 range. Among the Company's ADMA chemicals are ADMA 8 octyldimethylamine, ADMA 10

“Demand for amines in the cleaning products market is projected to increase 3.2 percent annually to 741 million pounds in 2012. Ethanolamines, which accounted for 38 percent of the market in 2007, will provide the best opportunities for growth. Specialty amines demand will advance in line with the market average through 2012. Fatty amines are widely used in cleaning product applications, and market growth will be restrained to some extent by a deceleration in fatty amine demand going forward.”
 --Section IV, pg. 97

OTHER STUDIES

Printing Inks

This study analyzes the US printing inks industry. It presents historical demand data for (1998, 2003, 2008) and forecasts to 2013 and 2018 by printing ink raw material (e.g., resins, oils, solvents, colorants, waxes, surfactants), type (e.g., lithographic, flexographic, gravure, digital, letterpress) and market (e.g., packaging, commercial printing, publishing). The study also considers market environment factors, details industry structure, evaluates company market share and profiles industry competitors.

#2462 02/2009..... \$4700

Industrial Gases

This study analyzes the US industrial gas industry. It presents historical demand data for 1997, 2002 and 2007, and forecasts for 2012 and 2017 by type (e.g., nitrogen, oxygen, hydrogen, carbon dioxide, argon, helium, acetylene), delivery method and market (e.g., petroleum and natural gas, metal processing, chemical processing, electronics, food and beverage processing, medical). The study also considers market environment factors, details industry structure, evaluates company market share and profiles industry players.

#2427 02/2009..... \$4700

Industrial & Institutional Cleaning Chemicals

US demand for I&I cleaning chemicals will grow 3.4% yearly through 2012. Food safety concerns will boost demand in key food-related markets. Products which are effective, easy to use and safer for the environment have the best prospects. Formulations using biodegradable components will do well yet remain a smaller segment. This study analyzes the \$8.6 billion US I&I chemical industry, with forecasts for 2012 and 2017 by market, product and raw material. It also evaluates market share and profiles industry players.

#2396 08/2008..... \$4700

Enzymes

US demand for enzymes will grow 6% annually through 2012. Advances will be led by continued rapid expansion in the fuel ethanol segment of the starch processing enzyme market, as well as strong growth in the large pharmaceutical and smaller biocatalyst and pulp and paper markets. Animal feed will also contribute to gains. This study analyzes the \$1.9 billion US enzyme industry, with forecasts for 2012 and 2017 by market and product. It also evaluates market share and profiles industry competitors.

#2351 06/2008..... \$4600

World Industrial Gases

Global industrial gas demand will rise 6.9% yearly through 2011. The developing regions of Asia/Pacific, Latin America, Eastern Europe and Africa/Mideast will continue growing at above average rates. Metals production and fabrication will remain the largest market, while the medical/health care market grows the fastest. This study analyzes the \$26.4 billion world industrial gas industry, with forecasts for 2011 and 2016 by type, market, world region and for 15 countries. It also evaluates market share and profiles major players.

#2318 04/2008..... \$5500

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