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Chemical Sensors

US Industry Study with Forecasts for **2017 & 2022**

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www.freedoniagroup.com



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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A continued rebound in light vehicle production, along with the increasing use of advanced, higher cost UEGO sensors to improve vehicle fuel efficiency and performance, will drive advances.

US demand to rise 4.9% annually through 2017

Chemical sensor demand in the US will increase nearly five percent per year to \$1.9 billion in 2017. A continued rebound in light vehicle production, along with the increasing use of advanced, higher cost universal exhaust gas oxygen (UEGO) sensors to improve vehicle fuel efficiency and performance, will drive advances. Growth will also be supported by healthy increases in medical chemical sensor demand as the aging of the baby boomer generation leads to above average growth in the diagnosis of diabetes and other chronic conditions. More broadly, gains across the entire industry will be supported by lower average prices and improved chemical sensor technology.

Motor vehicle market to offer best opportunities

Changes within the motor vehicle industry will have the greatest impact on chemical sensor demand going forward. The increased use of gasoline direct injection and turbocharged engines by vehicle manufacturers in an effort to comply with federal corporate average fuel economy requirements will necessitate the expanded use of higher cost UEGO sensors that allow engines to achieve both higher performance and better fuel efficiency. The shift in product mix toward the higher cost oxygen sensors, the increased adoption of cabin air quality sensors, and robust increases in nitrogen oxide and ammonia sensor

US Chemical Sensor Demand (\$1.9 billion, 2017)



Motor Vehicles

Other Industrial

Environmental Monitoring

Medical

Other Markets

demand due to a strong rebound in medium and heavy duty truck production will all support strong gains in the motor vehicle and chemical sensors markets.

Growth in chemical sensor demand will also be supported by the aging of the baby boomer generation and by above average increases in new diabetes diagnoses that will continue to drive demand for portable blood glucose monitors in the medical market. Rising medical chemical sensor demand will also reflect the development of new applications and the health care industry's increased reliance on testing and benchmarks as a means of not only improving patient care, but also reining in rising costs.

Optical chemical sensors among fastest growing types

Optical chemical sensor demand will rise at a strong pace. Increased use of demand control ventilation in commercial properties and greater adoption of cabin air quality systems in motor vehicles will drive gains. Acceleration in chemical sensor demand growth in most environmental monitoring applications due to an expanding economy and the ongoing tightening of air and water quality standards will also support advances. However, even faster growth for optical sensors will be limited by declines in automobile emissions testing due to the falling number of vehicles that need to be tested via the tailpipe.

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Sample Text, Table & Chart

ANALYTES

Dissolved Gases

Demand for dissolved gas sensors is forecast to grow through 2017. Healthy growth will reflect infection and treatment monitoring for water monitoring due to increasing pharmaceutical and food and beverage growth, as well as increased spending in the medical market.

**SAMPLE
TEXT**

The main types of dissolved gas sensors are those that measure dissolved oxygen (DO) in solution. These sensors measure the concentration of oxygen in water (not the actual amount of oxygen in the water). In many water quality applications, the DO level must be controlled. For example, in aquaculture, fish will suffocate if the level of dissolved oxygen is too low; similarly, bacteria that decompose sewage will die if the oxygen level is too low in sewage treatment facilities. In industrial applications, boilers, water must be maintained at low DO levels to prevent scale build-up. Besides sensors that measure the partial pressure of oxygen, there are also infrared optical sensors that measure dissolved oxygen in blood by detecting the amount of hemoglobin with oxygen bound to it. This is typically done by shining infrared light through a thin part of the body such as a finger.

From an environmental monitoring standpoint, measuring dissolved gases in natural water provides information on biological pollutants, and a better understanding of the effects of greenhouses. Pro-Oceanus Systems provides a line of advanced dissolved gas sensors including carbon dioxide and gas tension instruments designed for oceanic research applications. Sea-Bird Electronics is one of the largest manufacturers of marine instruments, including dissolved gas sensors.

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TABLE IV-2

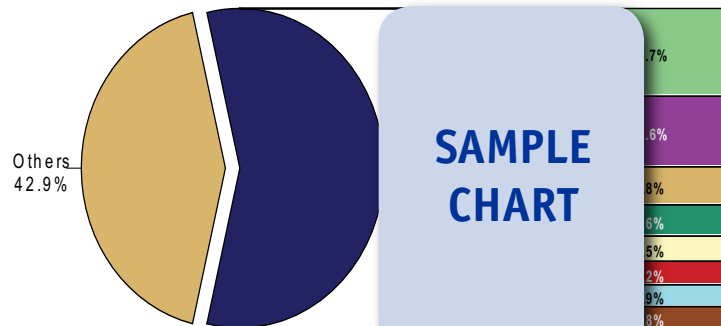
ELECTROCHEMICAL SENSOR DEMAND (million dollars)

Item	2002	2007	2012	2017	2022
Resident Population (mil)	290	305	320	335	350
\$ sensor/capita	1.5	1.6	1.7	1.8	1.9
Electrochemical Sensor Demand	435	488	544	601	658
By Technology:					
Potentiometric	100	110	120	130	140
Amperometric	150	160	170	180	190
Conductometric	100	110	120	130	140
Other Electrochemical	85	108	134	161	188
By Analyte:					
Gas Phase	100	110	120	130	140
Liquid Phase	335	378	424	471	518
By Market:					
Industrial	100	110	120	130	140
Environmental Monitoring	100	110	120	130	140
Medical	100	110	120	130	140
Other Markets	35	58	84	111	148
\$/unit	1.5	1.6	1.7	1.8	1.9
Electrochemical Sensors (mil units)	290	305	320	335	350

**SAMPLE
TABLE**

CHART VII-1

CHEMICAL SENSOR MARKET SHARE, 2012 (\$1.5 billion)



**SAMPLE
CHART**

Sample Profile, Table & Forecast

TABLE VI-2
INDUSTRIAL MARKET FOR CHEMICAL SENSORS
 (million dollars)

Item	2002	2007	2012	2017	2022
Manufacturers' Shipments (bil \$)	37	47	57	67	77
\$ sensor/mil \$ mfg	1.5	1.5	1.5	1.5	1.5
Industrial Chemical Sensor Market	55	70	85	100	115
By Sector:					
Motor Vehicles	10	12	14	16	18
Process Industries	20	25	30	35	40
HVAC & Other Equipment	25	33	41	49	57
By Type:					
Electrochemical	30	38	46	54	62
Other	25	32	39	46	53
% industrial Chemical Sensor Demand	100	100	100	100	100



COMPANY PROFILES

Nova Biomedical Corporation

200 Prospect Street
 Waltham, MA 01981
 781-894-1000
<http://www.novabiomedical.com>

Annual Sales: \$1.2 billion
 Employees: 1,000

Key Products: STAT PROFILE and blood glucose monitors



Nova Biomedical is one of the largest private US manufacturers of in vitro diagnostics, producing clinical whole blood analyzers for the medical industry, chemistry analyzers used in bioprocessing applications, and blood glucose monitoring devices for diabetes care. In addition to its own products, the Company offers contract manufacturing of diagnostic products and medical devices.

The Company competes in the US chemical sensors industry through the design and manufacture of biosensor-based analyzers and blood glucose monitoring systems. Nova Biomedical's analyzers encompass blood chemistry, gas, and electrolyte/chemistry types sold via the STATPROFILE, BIOPROFILE, and NOVA product lines. These systems, which employ biosensor and reagent technologies, incorporate various electrochemical biosensor technologies engineered to rapidly test and measure blood chemistry, blood gases, electrolytes, metabolites, hematology variables, and nutrients. For example, STAT PROFILE clinical blood gas and critical care analyzers from the Company

STUDY COVERAGE

This Freedonia study, **Chemical Sensors**, presents historical data (2002, 2007, 2012) plus forecasts for 2017 and 2022 for demand by product, analyte and market. The study also assesses key market environment factors, examines the US industry structure, evaluates company market share and profiles 39 US industry competitors.

OTHER STUDIES

Advanced Ceramics

This study analyzes the US advanced ceramics industry. It presents historical demand data for 2002, 2007 and 2012, and forecasts for 2017 and 2022 by material (e.g., alumina, titanate, zirconate, ferrite, silicon carbide), class (e.g., monolithic ceramics, ceramic coatings, ceramic matrix composites), process and market (e.g., electronic components, electrical equipment, transportation equipment). The study also considers market environment factors, details industry structure, evaluates company market share and profiles industry players.

#3091 November 2013 \$5200

LEDs & High Efficiency Lighting

This study analyzes the US light-emitting diode (LED) and high efficiency lighting industry. It presents historical demand data for 2002, 2007, and 2012, and forecasts for 2017 and 2022 by product (e.g., LEDs, high efficiency fluorescent lamps, high efficiency HID lamps), market (e.g., building, outdoor lighting, motor vehicle, consumer) and US region. The study also considers market environment factors, details industry structure, evaluates company market share and profiles industry players.

#3068 November 2013 \$5300

World Home Medical Equipment

World demand for home medical equipment will rise 7.0 percent yearly to \$28 billion in 2016. The US will remain the largest market while Brazil, China, India, and Russia will be among the fastest growing. Portable oxygen concentrators, remote patient monitors and home dialysis machines will offer some of the best opportunities. This study analyzes the \$20 billion world home medical equipment industry, with forecasts for 2016 and 2021 by product, world region and for 15 major countries. The study also evaluates company market share and profiles industry players.

#2964 January 2013 \$6300

World Robots

Global robot demand will rise 10.5 percent annually through 2016 to \$20.2 billion. Five countries -- the US, Japan, Germany, China, and South Korea -- will continue to dominate demand, with the US remaining the largest national market. Smaller, less expensive service robots will outpace more sophisticated, high-value industrial and medical robots. This study analyzes the \$12.3 billion world robot industry, with forecasts for 2016 and 2021 by type, market, world region and for 14 countries. The study also evaluates company market share and profiles industry players.

#2950 December 2012 \$6100

Sensors

US sales of sensors are forecast to climb at a 6.1 percent annual rate through 2016 to \$14.9 billion. Process variable sensors will remain the largest category, while chemical property sensors and proximity and positioning sensors will post the fastest growth. Motor vehicles will once again be the leading sensor market as production rebounds from recessionary lows. This study analyzes the \$11.1 billion US sensors industry, with forecasts for 2016 and 2021 by type and market. The study also evaluates company market share and profiles industry competitors.

#2957 October 2012 \$5100

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- Chemicals • Plastics • Life Sciences • Packaging • Building Materials • Security & Electronics • Industrial Components & Equipment • Automotive & Transportation Equipment • Household Goods • Energy/Power Equipment

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