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Fluoropolymers

US Industry Study with Forecasts for **2013 & 2018**

Study #2496 | May 2009 | \$4600 | 217 pages

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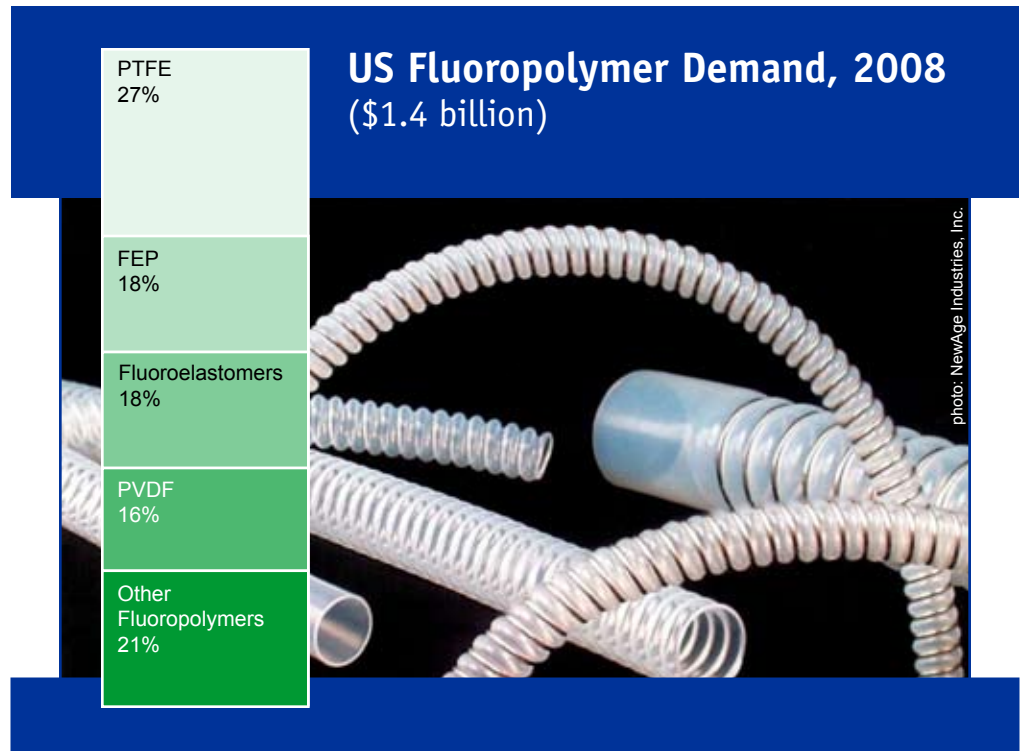
Demand will be driven by a turnaround in key markets, the increasing need for high-performance materials in chemical processing, and rising demand in emerging, fast-growing markets.

US demand to grow 4.5% annually through 2013

US demand for fluoropolymers will rise 4.5 percent per year to \$1.7 billion in 2013. Gains will represent an acceleration from the pace of the 2003-2008 period, during which the fluoropolymer market was hampered by weakness in the manufacturing sector. Going forward, fluoropolymer demand will be driven by a turnaround in key markets such as motor vehicles and wire and cable, and the increasing need for high-performance materials in chemical processing applications. Rising demand in emerging, fast-growing markets such as advanced batteries, fuel cells and photovoltaic modules will also support fluoropolymer market gains. Fluoropolymer volume demand will rise 3.6 percent per year to 172 million pounds in 2013.

Fluoroelastomers, smaller-volume types to lead gains

Polytetrafluoroethylene (PTFE), the first commercial fluoropolymer, will continue to account for the largest portion of demand in 2013. Advances for PTFE will be driven by growing opportunities in applications such as chemical processing and industrial filtration. However, the most rapid gains will be seen in fluoroelastomers, fueled by a strong rebound in motor vehicle production from a low 2008 base. Demand for fluorinated ethylene propylene (FEP) and polyvinylidene fluoride (PVDF) resins will rise at a more moderate pace, limited by a drop in



nonresidential construction activity. Nonetheless, volume gains for these resins will exceed three percent per year, outpacing growth in real manufacturing activity over the same period.

Robust gains will also be found in smaller-volume fluoropolymer products, which include a number of high value materials used in emerging markets. Double-digit growth in solar energy products will fuel gains for polyvinyl fluoride (PVF) films used in the production of photovoltaic modules. Demand for perfluorosulfonic acid polymers (such as DuPont's NAFION) will be driven by the rapid rise in fuel cell production. Additionally, a strong pharmaceutical market will bolster demand for polychlorotrifluo-

roethylene (PCTFE) polymers, which are used in drug packaging films.

Film, additives to be fastest growing applications

Among fluoropolymer applications, coatings and liners and mechanical components were the largest uses in 2008, comprising three-quarters of total demand. However, faster gains are expected for fluoropolymer film, which is used in a number of high-value electronics and industrial applications; and for fluoropolymer additives, which impart enhanced thermal stability and nonstick properties to products such as plastics, elastomers, lubricants, and coatings.

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Sample Text, Table & Chart

PRODUCTS

PTFE

SAMPLE TEXT

especially in advanced batteries and fuel cells. Despite growth, gains will be limited to a significant extent by limited opportunities for penetration into new applications from other fluoropolymers. However, value added growing global demand (driving price increases in the and a shift in the product mix toward more expensive resins. PTFE is used primarily in coatings and molded parts in products ranging from aerospace equipment to consumer kitchen products.

PTFE is a completely fluorinated version of polyethylene which offers a number of performance benefits including chemical inertness, heat resistance and temperature stability as well as low conductivity and a low coefficient of friction. Because of this wide range of properties, PTFE is often used in extreme applications where other polymers would be ineffective. For example, PTFE's chemical inertness makes it useful for fittings and equipment for chemical and food processing industries. The superior electrical resistance of PTFE is beneficial for semiconductor and wire and cable applications. It is also used in various forms in coatings, thin tapes and powders. However, the major limitation of PTFE is that it is difficult to process. It is not amenable to melt-processing techniques; therefore, it must be shaped by procedures such as compression molding and machining, which limit its utility. In fact, the drive behind the development of tetrafluoroethylene-based copolymers such as FEP, PFA and ETFE was to produce a material with properties approaching those of PTFE, but with the ability to be processed by traditional extrusion, blow molding, thermoforming and injection molding methods.

35

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TABLE IV-4

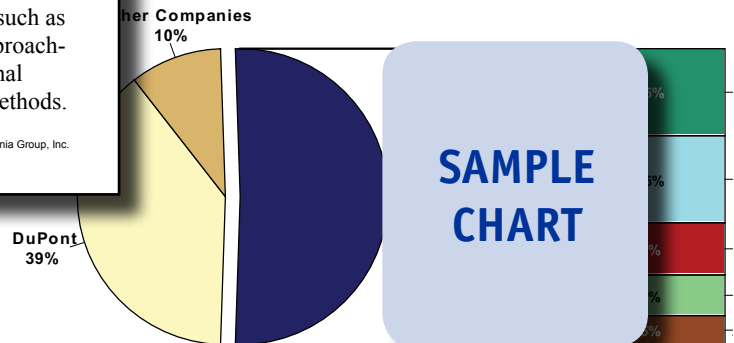
FILM APPLICATIONS FOR FLUOROPOLYMERS
(million dollars)

Item	1998	2003	2008	2013	2018
Manufacturers' Shipments (bil 2000\$) 3%					20
lb fluoropolymer/mil \$ mfg					5
Film Fluoropolymer Demand (mil lb) \$/lb	1				00
Film Fluoropolymer Demand					40
PTFE					58
PVDF					32
Other Fluoropolymers					50
% film					5
Fluoropolymer Demand	9				190

SAMPLE TABLE

CHART VI-1

FLUOROPOLYMER MARKET SHARE, 2008
(\$1.4 billion)



SAMPLE CHART

Sample Profile, Table & Forecast

COMPANY PROFILES

Westlake Plastics Company

West Lenni Road
 Lenni, PA 19052
 610-459-7000
<http://www.westlakeplastics.com>

Annual Revenue
 Employment

Key Products: High performance thermoplastics and films

We manufacture high-performance thermoplastics for the medical, automotive, semiconductor, aerospace and chemical processing markets. The privately held company operates through seven business groups: Chemical Resistance, Engineering, Film, High Performance, Medical, Compression Molded and Static Control. Westlake Plastics conducts operations at two US facilities in Lenni, Pennsylvania and Placentia, California.

The Company competes in the US fluoropolymer industry through the Chemical Resistance group, which makes plastic materials that can withstand acids and caustics; the Compression Molded group, which produces compression molded plastic materials; and the Film group, which manufactures plastic films. Plastic materials from these three groups are available in rod, sheet and film formats, and are composed of a broad range of resins, including such fluoropolymer resins as HALAR (Solvay SA -- Belgium) ethylene chlorotrifluoroethylene (ECTFE) and KYNAR (Arkema SA -- France) polyvinylidene (PVDF).

Among the fluoropolymer-based products produced by Westlake Plastics are products made from HALAR ECTFE for semiconductor

TABLE V-3
INDUSTRIAL EQUIPMENT MARKETS FOR FLUOROPOLYMERS
 (million dollars)

Item	1998	2003	2008	2013	2018
Machinery Shipments (bil 2000\$)	200	210	220	230	240
lb fluoropolymer/mil \$ machinery	1.0	1.1	1.2	1.3	1.4
Indust Equip Fluoropolymers (mil lb)	10	11	12	13	14
\$/lb	100	110	120	130	140
Industrial Equipment Fluoropolymers					
By Segment:					
Chemical/Pharmaceutical Equip					
Semiconductor Equipment					
Other Industrial Equipment					
By Type:					
PTFE					
PVDF					
Fluoroelastomers					
FEP					
Other Fluoropolymers					
% industrial equipment Fluoropolymer Demand	7.7	7.8	7.9	8.0	8.1

**SAMPLE
TABLE**

“Demand for fluoropolymers in the industrial equipment market is forecast to rise at a 4.0 percent annual rate to \$535 million in 2013, with market volume totaling 59 million pounds. Gains will represent a slight uptick from the pace of the 2003-2008 period, despite a slowdown in the overall production of machinery. Fluoropolymer demand will benefit from tightening performance requirements in industrial processes, as many applications are requiring more advanced materials able to withstand harsher operating conditions while providing a long service life.”
 --Section V, pg. 102

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OTHER STUDIES

Foamed Plastics

This study analyzes the US foamed plastics industry. It presents historical demand data for the years 1998, 2003 and 2008, and forecasts for 2013 and 2018 by product (e.g., foamed urethanes, foamed polystyrene, foamed vinyl, foamed engineered plastics, foamed HDPE and LDPE, foamed ABS) and market (e.g., construction, packaging, household products, motor vehicles). The study also considers market environment factors, details industry structure, evaluates company market share and profiles industry players.

#2532 07/2009..... \$4700

Reinforced Plastics

US demand for reinforced plastics will reach 3.6 billion pounds in 2013. Glass fibers will remain the dominant reinforcement material while carbon fiber and nanomaterial reinforcements grow faster. Reinforced thermosets will remain the largest resin type, with growth slightly outpaced by thermoplastics. This study analyzes the 3.2 billion pound US reinforced plastics industry, with forecasts for 2013 and 2018 by reinforcement, resin and market. It also evaluates market share and profiles industry players.

#2489 05/2009..... \$4600

Engineering Plastics

US engineering plastic demand will rise 3.1% yearly through 2012, driven by the ongoing replacement of metal parts with high-performance plastic. ABS, polycarbonate and nylon will stay the largest volume types, with polycarbonate leading gains based on opportunities in motor vehicles, medical products and construction. This study analyzes the 4.7 billion pound US engineering plastic industry, with forecasts for 2012 and 2017 by resin and market. It also evaluates company market share and profiles industry players.

#2404 10/2008..... \$4600

Silicones

US silicone demand will rise 4.2% annually through 2012. Silicone fluids will lead gains based on their tendency to boost the performance of cosmetics and toiletries. The relatively small medical market will outpace all others. Silicone conditioning agents and emollients will be the fastest growing applications. This study analyzes the \$3.2 billion US silicone industry, with forecasts for 2012 and 2017 by product, market and application. It also evaluates company market share and profiles major players.

#2385 07/2008..... \$4500

Nanocomposites

US nanocomposites demand will grow 21% annually through 2011 as nanomaterial and composite prices decline. Higher-priced resins, such as engineering plastics used in applications where cost is not a critical factor, will lead gains. Packaging and motor vehicles will remain two key early markets. This study analyzes the \$860 million US nanocomposites industry, with forecasts for 2011, 2016 and 2025 presented by product, market and nanomaterial. It also details market share and profiles major firms.

#2303 02/2008..... \$4500

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