US outlook for
Injection Molded Plastics
with forecasts to 2005 and 2010

New study finds:

- Injection molded plastics demand in the US is projected to increase 3.5 percent annually to 16.1 billion pounds in 2005, valued at $9.8 billion (resin content only)

- Polypropylene will provide the best opportunities, due to advantages of low cost, stiffness, chemical inertness and heat resistance, as well as the availability of high-clarity grades

- The nine largest molders in 2000 together accounted for 33 percent of the total US market
Injection Molded Plastics, a new study from The Freedonia Group, provides you with an in-depth analysis of major trends in the industry and the outlook for product segments and major markets -- critical information to help you with strategic planning.

This brochure gives you an indication of the scope, depth and value of Freedonia’s new study, Injection Molded Plastics. Ordering information is included on the back page of the brochure.

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Injection molded plastics demand in the US is projected to increase 3.5 percent annually to 16.1 billion pounds in 2005, valued at $9.8 billion (resin content only).

Thermoplastic resins will retain their dominance and grow at a significantly faster pace than thermosets, based on processing, design and recyclability advantages.

Polypropylene will provide the best opportunities, due to advantages of low cost, stiffness, chemical inertness and heat resistance, as well as the availability of high-clarity grades. Above-average growth is also anticipated for engineered resins such as nylon, polycarbonate and thermoplastic polyester.

Packaging and consumer markets, which together accounted for 62 percent of demand in 2000, will remain healthy and present the best opportunities through 2005.

The nine largest molders in 2000 together accounted for 33 percent of the total US market. The leading producers include Textron, Visteon, Lear, Newell Rubbermaid, Delphi Automotive, Guide Corporation, Nypro, Magna International (Canada) and Owens-Illinois, with six of these companies focusing on the automotive original equipment market.

* Excluded from the scope of this study are molding processes such as reaction injection molding (RIM) and hybrid methods (e.g., injection extrusion and injection blow molding).
### Study Highlights

#### Gross Domestic Product (bil 1996$)

<table>
<thead>
<tr>
<th>Year</th>
<th>1995</th>
<th>2000</th>
<th>2005</th>
<th>2010</th>
<th>00/95</th>
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<td>2.7</td>
<td>2.7</td>
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#### lbs/000$ GDP

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<th>2005</th>
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#### Injection Molded Plastics Demand

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<th>2010</th>
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<td>4230</td>
<td>5465</td>
<td>6870</td>
</tr>
<tr>
<td>Polystyrene</td>
<td>2143</td>
<td>2435</td>
<td>2750</td>
<td>3095</td>
</tr>
<tr>
<td>Other Thermoplastics</td>
<td>3418</td>
<td>3980</td>
<td>4550</td>
<td>5140</td>
</tr>
<tr>
<td>Thermosets</td>
<td>382</td>
<td>395</td>
<td>410</td>
<td>425</td>
</tr>
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#### % Annual Growth

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<tr>
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<td>2.9</td>
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</table>

### Summary Table

**US (TOPIC) Products Market by Application**

(million dollars)

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<thead>
<tr>
<th>Item</th>
<th>1995</th>
<th>2000</th>
<th>2005</th>
<th>2010</th>
<th>00/95</th>
<th>05/00</th>
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</thead>
<tbody>
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<td>7544</td>
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<td>12100</td>
<td>4.1</td>
<td>2.7</td>
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<tr>
<td>lbs/000$ GDP</td>
<td>1.45</td>
<td>1.47</td>
<td>1.52</td>
<td>1.55</td>
<td>--</td>
<td>--</td>
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<tr>
<td>Injection Molded Plastics Demand</td>
<td>10930</td>
<td>13530</td>
<td>16050</td>
<td>18800</td>
<td>4.4</td>
<td>3.5</td>
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<tr>
<td>Thermoplastics:</td>
<td>10548</td>
<td>13135</td>
<td>15640</td>
<td>18375</td>
<td>4.5</td>
<td>3.6</td>
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<tr>
<td>Polypropylene</td>
<td>2900</td>
<td>4230</td>
<td>5465</td>
<td>6870</td>
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<td>5.3</td>
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<tr>
<td>High Density Polyethylene</td>
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<td>2875</td>
<td>3270</td>
<td>3.6</td>
<td>2.9</td>
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<tr>
<td>Polystyrene</td>
<td>2143</td>
<td>2435</td>
<td>2750</td>
<td>3095</td>
<td>2.6</td>
<td>2.5</td>
</tr>
<tr>
<td>Other Thermoplastics</td>
<td>3418</td>
<td>3980</td>
<td>4550</td>
<td>5140</td>
<td>3.1</td>
<td>2.7</td>
</tr>
<tr>
<td>Thermosets</td>
<td>382</td>
<td>395</td>
<td>410</td>
<td>425</td>
<td>0.7</td>
<td>0.7</td>
</tr>
<tr>
<td>$/lb</td>
<td>0.50</td>
<td>0.55</td>
<td>0.61</td>
<td>0.67</td>
<td>1.9</td>
<td>2.1</td>
</tr>
<tr>
<td>Injection Molded Plastics (mil $)*</td>
<td>5500</td>
<td>7450</td>
<td>9750</td>
<td>12550</td>
<td>6.3</td>
<td>5.5</td>
</tr>
</tbody>
</table>

* resin content only

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Order form on last page
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Injection Molded Plastics #1473 Freedonia Industry Study
The Market Environment Section discusses factors influencing injection molded plastics demand, including consumer spending trends and the outlook for plastics.

This information provides you with an understanding and an analysis of the climate in which the injection molded plastics industry operates.

**Pricing Trends**

Prices for injection molded plastics are largely determined by patterns of the US economy, as well as resin pricing movement. Inflation as a whole is expected to remain moderate through 2005, although it will be slightly higher than the 1995-2000 period. As measured by the GDP deflator, inflation is forecast to advance 2.1 percent annually through 2005. This rate of inflation should not significantly affect real (inflation-adjusted) growth in the injection molded plastics industry.

Pricing is a critical factor for injection molded plastics due to the commodity-like nature of the majority of resins used. Intense competition makes it difficult for suppliers to pass along raw material price increases if supply and demand conditions do not so warrant. Producers have a limited ability to raise prices above the general level in the marketplace, and the presence of at least a handful of competitors in most market segments puts downward pressure on general pricing levels. Furthermore, the ability of processors to substitute materials (e.g., high impact polystyrene, polycarbonate and acrylonitrile-butadiene-styrene can all be used in equipment housings) limits the effect of price changes brought about by supply and demand imbalances.

Prices of injection molded plastics averaged $0.55 per pound in 2000, with polypropylene, high density polyethylene and polystyrene the most widely used resins. Prices are projected to increase two percent annually to $0.61 per pound in 2005, with growth driven by increased demand for improved resin grades and formulations to maintain and expand market applications. Polypropylene prices declined over the 1995-2000 period due to improved production technologies and adequate capacity. However, prices are expected to increase through 2005 due to the sharp increase in the cost of crude oil, from which propylene feedstock is
The Resins Section provides demand for historical years and forecasts growth to 2005 and 2010.

This information helps you:

- Analyze your company's growth potential in the industry.
- Outline your strategic plans for five and ten years out.
- Establish sales goals.

**Thermoset Resins - Urea**

Injection molded urea demand is projected to increase 2.1 percent per annum to over 70 million pounds in 2005. The electrical and electronics market, which accounted for over 90 percent of demand in 2000, will remain the leading use for urea, based on the resin's attributes of dimensional stability, insulating properties, hardness, corrosion resistance, and low cost. However, urea tends to absorb moisture, which is a drawback in aqueous environments. For molding compound applications, fillers are added to increase the resin's dimensional stability, strength and moldability.

Electrical and electronic markets for injection molded urea are expected to increase 1.6 percent annually to nearly 65 million pounds in 2005. While demand for injection molded urea will expand as a result of continued use in electrical receptacles, connectors, knobs, handles, control housings, motor components and circuit breakers, further growth will be limited by competition from improved...
Markets

The Markets Section analyzes trends and considers the threats and opportunities in each of the major markets for injection molded plastics.

The information presented will help you:

- Focus your sales and marketing efforts on high growth areas.
- Propose new areas for development.

Motor Vehicle Markets for Injection Molded Plastics by Resin
(million pounds)

<table>
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<td>Motor Vehicle Production (000 units)</td>
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<td>11975</td>
<td>13755</td>
<td>14900</td>
<td>15975</td>
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<tr>
<td>Gals/vehicle</td>
<td>89</td>
<td>100</td>
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<td>Inj Molded Motor Vehicle Markets</td>
<td>874</td>
<td>1202</td>
<td>1450</td>
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<td>420</td>
<td>500</td>
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<td>ABS/SAN</td>
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<td>295</td>
<td>350</td>
<td>380</td>
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<td>Phenolics</td>
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Research & Development

Research and development activities are essential to the continuing enhancements occurring in injection molded plastics technologies and products. Research efforts are typically centered around material, machinery and mold improvements. Significant research efforts are also aimed at greater automation, increased process control and improved automatic inspection. Technological advances can result in lower production costs.

Material improvements range from the development of materials with enhanced properties to those with other types of enhanced features. For example, Dow Chemical, a leading producer of polycarbonate resins for the injection molding of compact discs and digital versatile discs, is also developing prototype grades of a new injection molding resin for optical media. Known as polycyclohexylethylene (PCHE), this material exhibits optical clarity and purity along with low water absorption and density, which are critical properties for next-generation, high-density media formats. The resin is also expected to be used to implement an anti-piracy program to prevent unauthorized replication. The molding of PCHE will not require changes in processing equipment. In 2001, Basell Polyolefins introduced CLYRELL high-clarity polypropylene resins in the US. The resins are designed for injection molding applications such as clear food and non-food packaging, housewares, medical waste bins, vacuum cleaner housings and other appliance uses. CLYRELL resins provide the strength characteristics of impact polypropylene copolymers, yet exhibit the clarity of random copolymers.

Another material-related development involves the incorporation of anti-bacterial compounds into products such as toothbrushes and cosmetic brushes in order to combat various bacteria. The compounds can be added to both the bristles and handles. For injection molding of the handle, the compound is added to the resin prior to molding. The resulting product is then self-sterilizing. Other material
The Profiles Section analyzes 41 companies active in the U.S. injection molded plastics market. These profiles represent a sampling or cross-section of the types of companies involved in the industry.

Divisions, subsidiaries, joint ventures, etc., are discussed under appropriate parent companies.

Sources for profiles included:

- Information provided by key staff members in the respective companies
- Annual reports
- 10-K reports
- Security analysts reports
- Corporate product literature

Nypro Incorporated
101 Union Street
Clinton, MA 01510
978-365-9721
http://www.nypro.com

Nypro is a privately-owned custom injection molder which focuses primarily on the consumer/industrial, electronics, telecommunications, health care, and automotive markets. In 2000, Nypro had sales of $591 million, of which North American sales totaled approximately $390 million. Nypro employed approximately 7,000 in 2000. (Sales and employment as reported by company.)

The Company, one of the leading US producers of injection molded plastics, operates 900 injection molding machines at 26 plants located in twelve countries. Most of Nypro’s injection molding machines are in the 20- to 350-ton clamping force range. In addition to injection molding, Nypro is integrated through the assembly, labeling and packaging of products made from the Company’s injection molded parts. Nypro’s production facilities in the US include injection molding facilities located in Massachusetts, Georgia, Alabama, North Carolina, Illinois, Colorado, Iowa, Oregon, Kentucky, Texas and California. These facilities operate under geographic names and have a variety of capabilities.

Nypro Clinton (Clinton, Massachusetts), the Company’s largest production site, has seven manufacturing divisions. Nypro Clinton manufactures injection molded components for the industrial, health care, consumer, electronics and telecommunications markets. In addition, the facility provides assembly, robotics and other secondary operations. Also on-site is NyproMold, a precision mold manufacturing unit. Furthermore, the Nypro Clinton facility houses the Company’s Advanced Technology Center and worldwide engineering team, and is often utilized as the
Alcoa Inc.
Cordant Technologies Inc.
Southern Plastics Inc.
Applied Tech Products
Apollo Packaging Inc.
Cascade Die Mold Inc.
Fast Plastics SA de CV
Modern Plastic Technics Inc.
Nadel Industries Inc.
SKM-Applied Technology Partners
Sussex Technology Inc.
Tri-Molded Plastics Inc.
UPT Plastics Inc.
Beach Mold & Tool Inc.
Berry Plastics Corporation
Cardinal Packaging Inc.
Pescor Plastics Inc.
Blackhawk Automotive Plastics Inc.
Nescor Plastics Corporation
Worthington Custom Plastics Inc.
Carlisle Companies Inc.
Paramount Plastics Inc.
Collins & Aikman Corporation
Becker Group LLC
Courtesay Corporation
Creative Packaging Corporation
Crown Cork & Seal Company Inc.
Risdon-AMS
Zeller Plastik Inc.
Delphi Automotive Systems Corporation
Specialty Electronics Inc.
Donnelly Corporation
Guardian Industries Corporation
Guide Corporation
Illinois Tool Works Inc.
Johnson Controls Inc.
TrimQuest LLC
Key Plastics LLC
Lacks Industries Inc.
Plastic-Plate Inc.
Landis Plastics Inc.
LDM Technologies Inc.
Lear Corporation
Bing-Lear Manufacturing Group
Letica Corporation
Mack Group Inc.

Magna International Inc.
Conix Group
Decoma International Inc.
Decomex Inc.
Intier Automotive Inc.
Nascote Industries
McKechnie plc
Meridian Automotive Systems Inc.
Cambridge Industries Inc.
Moll Industries Inc.
Brasolme Industria e Comercio Limitada
Newell Rubbermaid Inc.
Sanford North America
North America Packaging Corporation
Nypro Inc.
Owens-Illinois Inc.
Phillips Plastics Corporation
Plastech Engineered Products Inc.
TrimQuest LLC
Siegel-Robert Inc.
Textron Inc.
Advantage Molding & Decorating Inc.
M&C Advanced Processes Inc.
Plastar Industria e Comercio Limitada
Rego Mold & Tool Company Inc.
Synova Plastics LLC
Trend Technologies Inc.
Tupperware Corporation
Tyco International Limited
A&E Products Group LP
Plastics Inc.
United Plastics Group Inc.
Hanson Group Limited
Kiehl Engineering Company Inc.
OR Plastics Inc.
SPM
Supreme Plastics Inc.
Venture Holdings Company LLC
Atlantic Automotive Components LLC
Peguform GmbH
Visteon Corporation
Atlantic Automotive Components LLC
Wollin Products Inc.
Custom Moulders Limited
Plastic Engineered Components Inc.
Freedonia does not just collect and reprint data; Freedonia develops data. Our analysts thoroughly investigate an industry by extensively interviewing key industry participants and analyzing information from sources such as associations, government and trade literature. Once this research is complete, Freedonia establishes one set of forecasts. All writing, editing and forecasting is done in-house to assure quality and consistency. In cases where data does not exist, Freedonia develops the data based on input/output ratios, bills of materials and flow charts. The following chart summarizes Freedonia’s methodology:
The Freedonia Group, Inc. is a leading international industry study/database company.

Since 1985, Freedonia has published over 1,600 titles covering areas such as chemicals, coatings and adhesives, building materials, plastics, industrial components and equipment, health care, packaging, household goods, security, and many other industries.

Freedonia has produced a wide variety of titles, including:

- Rigid Bulk Packaging
- Plastic Processing Machinery
- Caps & Closures
- Plastic Containers

Because Freedonia is a reliable information source, our forecasts are cited in numerous publications such as *The Wall Street Journal, Chemical Week, Plastics News* and *Purchasing*.

---

**In-house operations**
Because all of our staff work at the same location, interaction between analysts and departments provides a strong system of checks and balances.

**Consistency**
Our Economics Group develops indicators that are used by all analysts. Therefore, every Freedonia study is based on a consistent set of economic assumptions (GDP, durable goods expenditures, plastic packaging shipments, etc.)

**Reliable forecasts**
Because all of our forecasts consider the environment in which a product or industry is operating, as well as threats and opportunities to the market, Freedonia forecasts are reliable indicators of future performance.

**One-on-one interviews**
All studies are produced by conducting interviews with key industry participants and end-users.

**Proprietary electronic database**
Freedonia’s analysts can tap into an extensive in-house electronic database containing corporate literature (including private company information), trade publications, government reports and many other sources of information.

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Freedonia's clients include major US and international companies in the manufacturing, services, consulting and financial sectors.

Typical purchasers of Freedonia studies:

- Key Executives
- Corporate Planners
- Market Researchers
- Financial Analysts
- Information Centers
- New Product Developers
- Merger & Acquisition Specialists

Since 1985 we have provided research to customers ranging in size from global conglomerates to one person consulting firms. More than 90% of the industrial companies in the Fortune 500 use Freedonia research to help with their strategic planning.

Some of Freedonia’s customers in the injection molded plastics market include: Alcoa Incorporated, Delphi Automotive, Owens-Illinois Incorporated and Textron Incorporated.
**Rigid Bulk Packaging**
Sales of rigid bulk packaging in the US will grow nearly 5% annually through 2005. Gains will be driven by a shift towards higher value reusable products and from the need to comply with more stringent regulatory controls for hazardous waste. Shipping drums will remain the largest type, although pails will nearly overtake drums by 2005. This study analyzes the $5 billion US rigid bulk packaging industry to 2005 and 2010 by material, product and market. It also evaluates market share and profiles key firms.

#1449. . . . . . . . . 8/01. . . . . . . . . . $3,700

**Foamed Plastics**
Demand for foamed plastics in the US will reach 7.8 billion pounds in 2005. Opportunities in insulation and cushioning will support demand for foamed urethane, while foamed polystyrene demand will be driven by advantages in packaging and insulation. Construction will remain the leading market based on heightened energy efficiency standards. This study analyzes the $13.7 billion US foamed plastics industry to 2005 and 2010 by type and market. It also evaluates market share and profiles key companies.

#1436. . . . . . . . . 6/01. . . . . . . . . . $3,700

**Plastics Processing Machinery**
US demand for plastics processing machinery will reach $2.8 billion in 2005, driven by further inroads plastics make against competitive materials. Growth will also result from more advanced machine designs which will benefit higher-end equipment as plastics processors seek to improve efficiency and quality. This study analyzes the US plastics processing machinery industry to 2005 and 2010 by type, including plastics demand by resin, process and market. It also presents market share data and profiles key firms.

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**Caps & Closures**
US cap and closure demand will grow 5.3% annually to 2005, driven by a shift in the mix toward value-added configurations such as dispensing and child-resistant closures. Also supporting unit gains will be the development of novel closure applications like aseptic liquid food packaging, as well as rising use of dual closure packaging configurations. This study analyzes the $3.8 billion US cap and closure industry to 2005 and 2010 by material, product and market. It also details market share and profiles key companies.

#1392. . . . . . . . . 4/01. . . . . . . . . . $3,700

**Sterile Packaging**
US demand for sterile packaging will grow 5.4% annually to 2005. Stimulants include an aging population, more stringent infection control standards and the convenience of sterile packaging configurations. Blister packs and clamshells will grow the fastest, while thermoformed trays provide the best opportunities based on surgical and diagnostic test kits. This study analyzes the $1.3 billion US sterile packaging industry to 2005 and 2010 by product and market. It also evaluates market share and profiles key firms.

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**Paper Versus Plastic in Packaging**
Demand for competitive paper and plastic packaging in the US will reach 86 billion pounds in 2004. Advances will be stimulated by steady growth in the foodservice sector and improvements in barrier properties and strength. Plastic will continue to encroach on paper’s market share. This study analyzes the 77 billion pound US competitive paper and plastic packaging industry to 2004 and 2009. It provides data and forecasts by material, type and end-use, presents market share data and profiles leading companies.

#1357. . . . . . . . . 1/01. . . . . . . . . . $3,700

**Plastic Containers**
Plastic container demand in the US will grow over 4% annually. Three-fourths of all plastic containers by weight are bottles, which will also log the best growth driven by markets such as drugs, soft drinks and beer. High density polyethylene (HDPE) will remain the most widely used resin, while polyethylene terephthalate (PET) grows the fastest. This study analyzes the $10 billion US plastic container industry to 2004 and 2009 by resin, type and market. It also details market shares and profiles key firms.

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