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HIGH-TEMPERATURE PLASTICS IV, 1997

A fourth edition



The Materials Group of Kline & Company is pleased to announce the completion of its fourth comprehensive report on *HIGH-TEMPERATURE PLASTICS*. The market for such polymers is very dynamic and being driven by changing needs such as the following:

- Changing process technologies and component integration in the electrical/electronics (E/E) market
- Replacement of metals and select low-end polymers in industrial applications
- Demands for improved fuel efficiencies, lower emissions, longer life, and lower maintenance in the automotive market
- More stringent sterilization and reuse methods in medical components
- Consolidation and global marketing strategies at the supplier level

The 475 page report, *HIGH-TEMPERATURE PLASTICS IV, 1997*, will provide subscribers with a sound foundation from which to build successful business plans while taking into consideration such issues as:

- Competition among different polymers
- Growth opportunities within market segments
- Changes in supply structure
- Impacts of globalization
- Changing performance/cost needs

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BACKGROUND

High-temperature plastics is the most specialized and rapidly growing segment of the plastics market. These polymers, with heat-deflection temperatures exceeding 200°C, have experienced dramatic growth in demand from \$800 million globally in 1984 to \$3.1 billion in 1997, as depicted in Figure 1.

The high-temperature plastics market comprises over ten polymers, as follows:

- Fluoropolymers
- High-performance polyamides (HPPAs)
- Liquid crystal polymers (LCPs)
- Polyamideimides (PAIs)
- Polybenzimidazoles (PBIs)
- Polyetherimides (PEIs)
- Polyimides (PIs)
- Polyketones

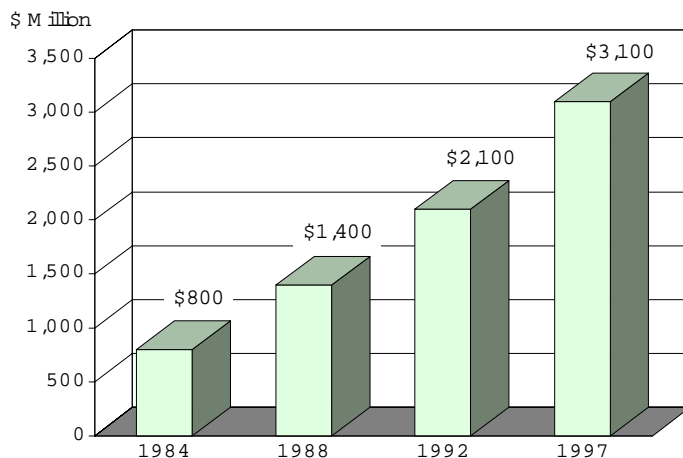
- Polyphenylene sulfides (PPSs)
- Polysulfone derivatives
- Polycyclohexane dimethyl terephthalates (PCTs)
- Syndiotactic polystyrene (SPs)

For some of these polymers, growth in demand has been extraordinary over the past five years, with consumption increasing at rates greater than 10% a year. For example, HPPAs have grown at well over 30% a year since 1992 as applications in metal replacement, as well as displacement of other engineering plastics, have occurred. Polymers such as PI and LCP have grown at nearly 15% a year as electronic and automotive usage increases.

However, it is not only the excellent temperature capabilities of these polymers that has caused their high

Figure 1

HISTORICAL WESTERN WORLD DEMAND FOR HIGH-TEMPERATURE PLASTICS



growth. In many applications their chemical, wear-resistance, and other properties are more important.

Despite their high average price compared to other engineering plastics, demand for these polymers has been growing dramatically in performance applications, including electrical, automotive, and industrial. E/E currently accounts for 40% of the market for high-temperature plastics, as shown in Figure 2. In the coming ten years, Kline projects that such trends as electronic component integration, surface mount technology (SMT), and growth in electronic usage will drive future demand. In the automotive market, demands for improved fuel efficiency, lower emissions, and longer maintenance cycles will be favorable for usage of high-temperature plastics.

In addition to its rapid growth, the market for high-temperature plastics has been transforming in terms of product competition. One of the most noteworthy product developments was the introduction of QUESTRA, a syndiotactic polystyrene (SP), by Dow Chemical in 1995. This polymer is the first introduction of a new high-temperature thermoplastic in over ten years and represents a challenge to

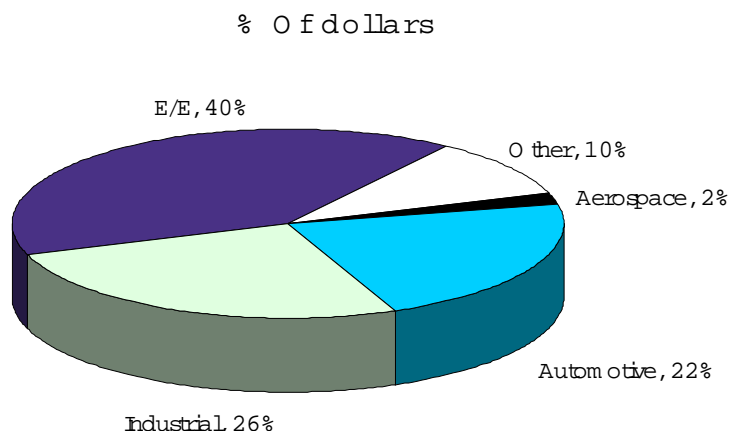
high-priced polymers in certain applications.

In addition, lower-priced LCPs and alloys of PEI have experienced favorable responses in the market. For example, lower-priced LCPs have been introduced by both Ticona and Eastman for the E/E market. Blends of PEI with polycarbonate (PC) are offered by GE Plastics for consumer, automotive, and medical applications.

As a result of these numerous product and supplier developments, the Materials Group of Kline & Company has conducted its fourth analysis of the high-temperature plastics market, with the primary objectives of:

Figure 2

ESTIMATED WESTERN WORLD DEMAND FOR HIGH-TEMPERATURE PLASTICS BY END USE, 1997



- Reassessing the current (1997) and forecast global market (United States, Western Europe, and Japan) for these specialty polymers through 2007
- Evaluating and predicting the market impact that new products will have on the high-temperature plastics market, including expected market demand and interpolymer competition
- Analyzing the current and expected future competitive position of the leading global suppliers

THE REPORT

As shown in the table of contents at the beginning of this prospectus, *HIGH-TEMPERATURE PLASTICS IV, 1997* includes an analysis of the major end-use applications, leading suppliers, product

forms, and an outlook to 2007 for over ten separate polymers. The 475 page study is based on over 100 in-depth interviews with leading consumers, polymer suppliers, and other trade factors in North America, Western Europe, and Japan.

WHY SHOULD YOU SUBSCRIBE?

HIGH-TEMPERATURE PLASTICS IV, 1997 will help polymer suppliers focus their efforts to capitalize on emerging opportunities and counteract potential threatening changes and technologies. By subscribing to this report, you will be able to make informed decisions concerning such issues as those shown in Table 1.

SUBSCRIBER PRIVILEGES

Each subscriber will receive three copies of the report as well as access to the following Kline services:

- A one-day, postsurvey meeting to assist subscribers by providing additional insights, identifying specific business opportunities, or summarizing key business characteristics and trends
- Access to original interview reports (except information that was provided on a confidential basis) and other data in our files
- Telephone consultation privileges with the Kline team of high-temperature polymer experts

HOW TO SUBSCRIBE

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complete the enclosed subscription agreement form and forward it to any of our offices. To obtain further information or more details regarding this study, or the qualifications of The Kline Group, please contact us at any of our worldwide locations listed on the back cover.

KLINE'S CREDENTIALS

Kline & Company, established in 1959, is recognized around the world for its expertise in conducting global market research, strategic business planning, and acquisition analysis. The Materials Group of Kline completes roughly 20 proprietary projects and one to three multiclient studies each year. In 1985, the group conducted its first multiclient analysis of the high-temperature plastics market. Due to subscriber requests, this very successful analysis was repeated in 1989 and 1993. Our new report draws upon the historical demand, pricing, and supply data accumulated for these reports in

order to make accurate assessments of implications for the next decade.

In addition to our multiclient report expertise, Kline completes approximately 200 proprietary engagements each year. Many of these have focused on business issues in high-temperature plastics. Of the over 20 proprietary assignments in high-temperature plastics conducted since our last multiclient analysis, many have focused on the following issues:

- **Competitive analysis of a high-temperature plastics product**
- **Cost economics for the production of high-temperature plastics**
- **Commercial opportunities for a new high-temperature polymer**
- **Marketing and distribution strategy for a high-temperature polymer producer**

Table 1

Issue	Objective
Product development	To improve positioning of existing products and developing new products to take advantage of changing consumer needs, competitive polymer developments, and expected market growth.
Production planning	To make the necessary capital investment in capacity and/or technology to enable your company to position itself to take advantage of future product requirements.
Strategic positioning	To optimize your company's product line and/or acquire or divest business units to meet long-term strategic goals for sales and profits.

HIGH-TEMPERATURE PLASTICS IV, 1997

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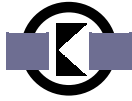
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