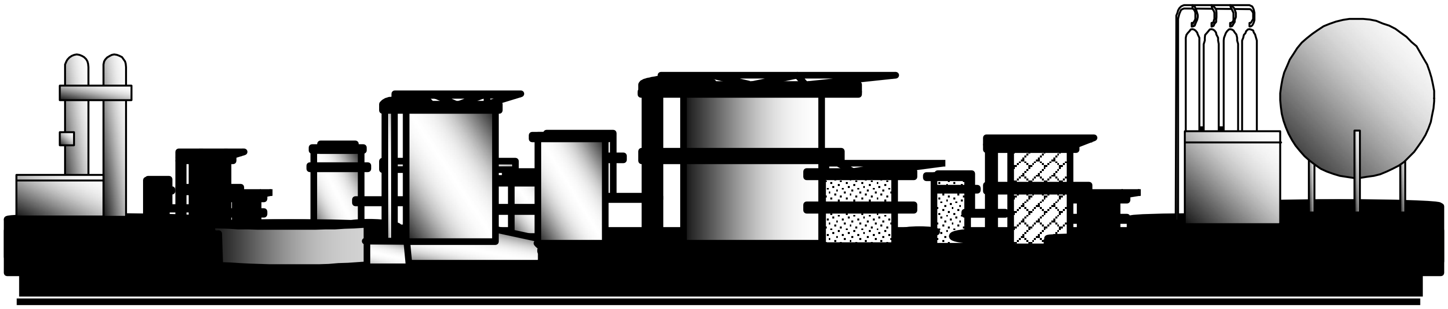

ELASTOMERIC POLYOLEFINS

(TPOs, TPVs and Plastomers/Elastomers)
North America, Europe, and Japan
Markets, Technologies and Trends 1999-2004

PR 225

Prospectus For
An In-Depth Market/End-Use Economics Study

Completed December 1999

- *Global Demand and Supply*
- *TPO/TPV - Producers/Profiles*
- *TPO/TPV - Technologies*
- *TPO/TPV - End Uses*
- *Soft TPOs*
- *Major Suppliers to the TPO/TPV Industry*
- *Impact of Metallocene-Catalyzed Plastomers/Elastomers*
- *Attribute Analysis - Major End-Use Requirements*
- *Market/Technology Position of Major TPO/TPV Producers*
- *Manufacturing Cost Analysis - Modular Approach*
- *Growth Drivers*

CMR

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INDUSTRY OVERVIEW

The thermoplastic polyolefin elastomers industry has largely evolved during the last ten to fifteen years. The industry has enjoyed very high growth rates in all segments of the end-use markets. Automotive applications have accounted for the majority of the total base-load volume for TPOs. TPOs have largely replaced all other materials used in bumper fascias, exterior and interior trims, hence the future growth rates of TPOs in automotive applications will be relatively low as compared to previous years.

However, soft TPOs, *i.e.* TPOs having flexural modulus ranging between 1,500 to 50,000 psi, will continue to enjoy high growth rates in applications such as roofing membranes, soft touch grips, specialty films and some newer applications. CMR believes that manufacturers of TPOs that have largely focused on the automotive end-use application should consider diversifying their product line in order to accommodate newer soft TPO applications – thus enjoying the very high growth rate levels of the past.

New generation polyolefins have also made significant in-roads in the thermoplastic polyolefin elastomer markets. Increasing use of metallocene catalyzed plastomers and elastomers in TPOs applications is expected because these materials (1) process more easily than conventional EP(D)M/EPM, (2) provide better low temperature impact properties, (3) provide better colorability, (4) are available in pellet form, (5) disperse more easily within the polypropylene matrix hence lowering production costs, and (6) are lower in cost.

As polyolefins producers continue to develop new lower-density, ethylene-based products and softer propylene-based products, they must look to the markets currently being served by EP(D)M/EPM as candidates for their new materials. EP(D)M/EPM, used in TPOs, are well suited to the end-use markets that they serve, but TPO manufacturers are constantly on the lookout for materials providing better cost/performance ratio. If plastomers/elastomers can match the properties of EP(D)M/EPM in certain TPO applications, then plastomer/elastomer producers can compete in that market segment while maintaining premium pricing on their new generation polyolefins since EP(D)M/EPM are relatively more expensive than plastomers and elastomers.

Any company considering jumping into producing and selling thermoplastic polyolefin elastomers must realize it would be entering a relatively small industry that is largely dominated by compounders rather than material suppliers. New entrants into the world of TPOs will find that compounding and formulation knowledge are the key to success in this industry rather than good raw material position or advanced reactor and process technologies. Meanwhile, current players need to stay on top of changing market conditions.

BENCHMARK STUDY

To assist companies in understanding the current market status and help them monitor the rapid developments within the industry, Chemical Market Resources, Inc. (CMR), presents **ELASTOMERIC POLYOLEFINS 1999-2004. (TPOs, TPVs and Plastomers/Elastomers) North America, Europe and Japan,** part of the **Markets, Technologies and Trends Series.** CMR has extensive experience in automotive-related markets. This study represents a comprehensive report with focus on business/technical strategic analysis and includes an in-depth analysis of the intermaterial competition of these products/markets. The overall report will help in assessing opportunities and strategies for further development of TPO/TPV markets.

HISTORY

The technology for manufacturing thermoplastic polyolefin elastomers (TPOs) was developed in the late 1970's by Exxon, Uniroyal and DuPont. This technology mainly evolved as an extension of modification of polypropylene resins for use in applications that required flexibility and impact strength properties.

Thermoplastic polyolefin elastomers are defined as a blend of thermoplastic (polypropylene) and elastomeric (ethylene-propylene rubber EPR) phases where the elastomeric content is more than 20% by weight. TPOs have flexural modulus ranging from 1,500 to 300,000 psi. TPOs are easily processed into end-use parts by the traditional processing methods such as extrusion, injection molding, blow molding and others.

TPOs can be broadly classified into three categories: (1) physical blends, (2) thermoplastic vulcanizates (includes melt Processable rubber) and (3) reactor-made TPOs. Thermoplastic polyolefin elastomers having flexural modulus ranging from 1,500 to 50,000 psi are classified as "Soft TPOs". Soft TPOs are a sub-category in each of the previous three categories.

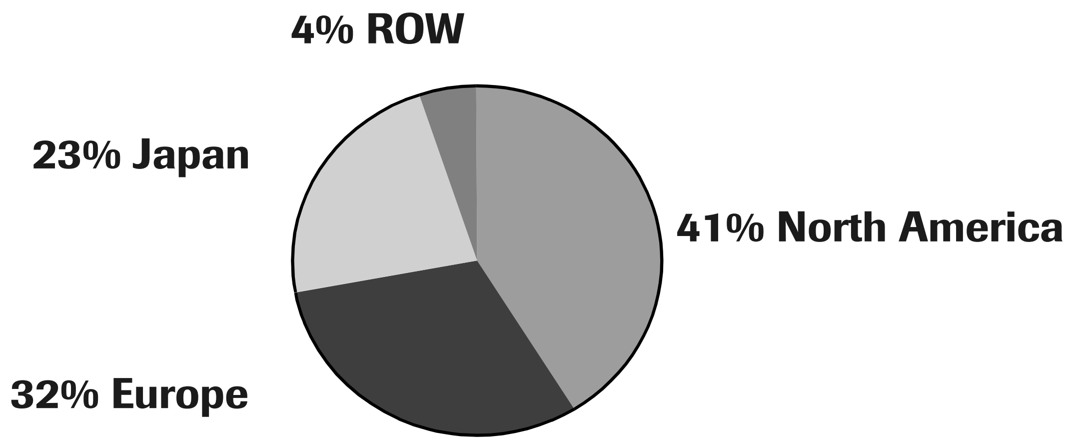
The major end-use markets for TPOs include 1) automotive, 2) molded goods, 3) roofing membranes, 4) wire and cable, 5) hoses and tubing, 6) medical, 7) specialty films and 8) grips. In recent years, TPOs have gained increasing acceptance over other competing materials because of the global trend towards homogenization of material's usage in automotive interior and exterior applications.

The total global demand for TPOs in 1999 was 1,060 million pounds. North America constituted about 41% of the global demand, Europe 32%, Japan 23% and rest of the world about 4%. The North American demand for TPOs is projected to grow at the rate of 7.6% annually for the next five years. The European and Japanese demand for TPOs over the next five years is projected to increase at the rate of 6.2% and 4.6% respectively. Exhibit 1 presents the worldwide demand for TPOs.

Metallocene-catalyzed plastomers/elastomers are currently being used in a majority of physical and vulcanizates formulations. Metallocene-based TPO formulations offer a variety of advantages including: (1) impact strength, (2) toughness, (3) colorability, (4) dispersibility and (5) lower cost. Exhibit 2 presents the worldwide demand for TPOs by type.

Exhibit 1

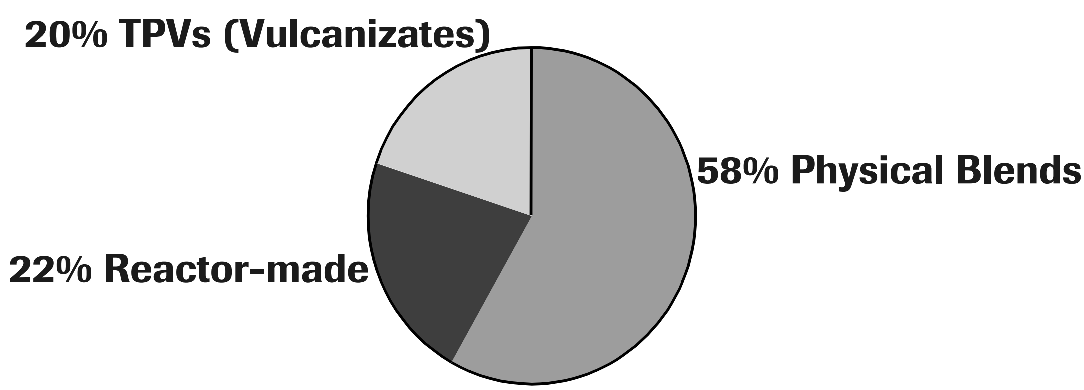
WORLDWIDE DEMAND FOR TPOs



1999 Worldwide Demand = 1,060 MM Lbs.

Exhibit 2

WORLDWIDE DEMAND FOR TPOs BY TYPE



1999 Worldwide Demand = 1,060 MM Lbs.

MAJOR OBJECTIVES

Assist polyolefin resin suppliers in positioning and evaluating their market and technology development programs

Assist TPO/TPV compounders in assessing the attractiveness of various end-use markets

Analyze the impact of metallocene-catalyzed plastomers/elastomers in TPO/TPV formulations as blending materials

Develop detailed attribute and value-based analysis for major TPO/TPV end-use applications

KEY ISSUES ADDRESSED

In-depth analysis of the global TPO/TPV markets

Soft TPOs – A new breed of product with great market potential

Impact of metallocene-catalyzed plastomers/elastomers on various end-use markets of TPO/TPV

Current & future technologies for producing TPO/TPV

Manufacturing cost analysis (physical blends – conventional and metallocene, TPV, reactor-made)

Global market/technology positioning of major TPO/TPV suppliers

Role of compounders in the TPO industry

Opportunity analysis for mergers and acquisitions in the North American marketplace

The future of physical blends, TPVs and reactor-made TPOs

End use requirements for polyolefin resins and unmet needs of major end-users

APPROACH

The information, data and conclusions of this analysis were developed from sources in North America, Europe and Japan, and were based upon, but not limited to, the following methods:

Interviews with industry experts, leading suppliers of TPOs/TPVs, and major end-users in each market segment

A search, review and an interpretation of information from government sources, trade and industry groups, published articles and product promotional information

A thorough search of relevant patent technology and process details from producers

A review and update of information from non-proprietary CMR projects related to TPOs/TPVs

A review and update of other multiclient studies completed by CMR

A review and update of the manufacturing cost economics based on our extensive cost databases and interviews

An analysis of the intermaterial competition based on "indifference analysis", a technique used by CMR and well accepted by our major clients.

TIMING, SUBSCRIPTION & ORDERING INFORMATION

This study was completed in December 1999 and is available for immediate delivery. The price of the study is U.S. $8,000 for two copies of the report. Additional copies are available for $250 each. To subscribe, simply sign the attached order form and mail or fax to CMR. This study is part of the Polyolefins M T & T series. For further information call us at 281-557-3320.

ABOUT OUR COMPANY

CHEMICAL MARKET RESOURCES, INC. was founded in 1990 to focus in the areas of marketing research and strategic planning. Our global clientele is concentrated within the chemical, petrochemical, plastics and related industries. Prior to joining CMR our associates held supervisory positions in chemical and allied industries. Our teams of professionals have strong technical backgrounds combined with hands-on business experience. Compilations of data, strategic analyses, writing and editing are entirely conducted in our state of the art facilities in-house to assure quality control at each stage of development. Our strength is in closely interacting with our clients to maximize effectiveness. We provide in-depth analyses with actionable statements in a cost-effective and timely fashion. Following are highlights of just some of our work in polyolefins.

Multiclient Studies

Polypropylene Fibers: North America, Europe and Japan 1998-2003 - Markets, Technologies and Trends - Completed April 1999

Tie Layer Resins - North America, Europe and Japan 1997-2002 - Markets Technologies & Trends - Completed June 1998

Polyolefin Foams - North America, Europe and Japan 1996-2001 - Markets Technologies & Trends - Completed December 1996

High EVA Copolymers - North America, Europe and Japan 1996-2001 - Markets, Technologies & Trends - Completed June 1998

New generation Polyolefins vs. SB Copolymers - North America, Europe and Japan 1995 - 2000 - Markets, Technologies & Trends - Completed January 1995

Polypropylene Films - North America, Europe and Japan 1996-2001 - Markets Technologies & Trends - Completed December 1996

Periodicals

New Generation Polyolefins - Bimonthly Global Review of Technologies & Trends. On-going service, published six times a year. Qualifying companies can call for a complimentary copy!

Proprietary Studies

We have positioned numerous polyolefin products in the markets in North and Latin America, Europe, and Asia Pacific. We have conducted studies for most of the major polyolefin suppliers and end users - Call us for a list of proprietary studies.

Conferences

We conduct a highly successful Annual Conference FlexPO that covers intermaterial competition among flexible polymers including fPVC, polyolefins, TPEs and rubbers. FlexPO 2000 will be held August 23rd through the 25th in the San Luis Hotel, Resort and Conference Center in Galveston (Houston), Texas.

ORDER FORM

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