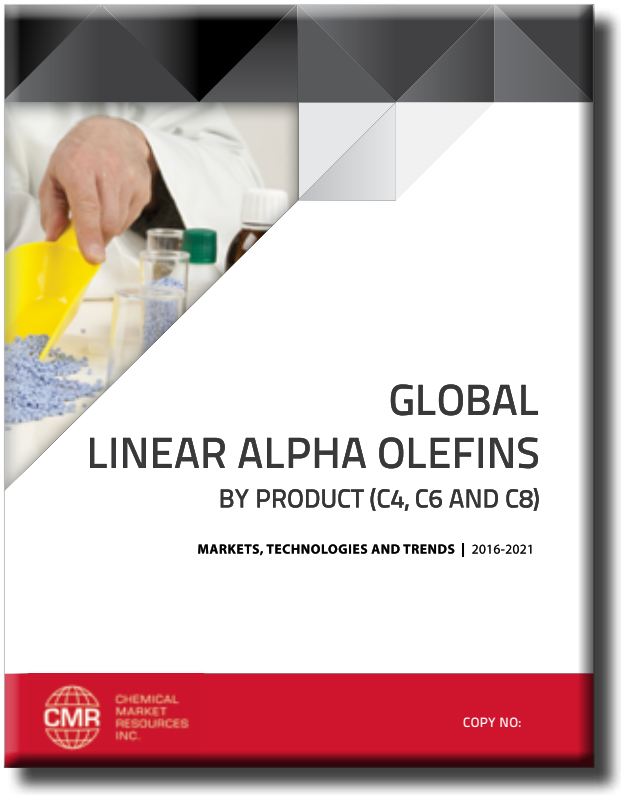
GLOBAL LINEAR ALPHA OLEFINS
BY PRODUCT (C4, C6 AND C8)

CHEMICAL MARKET RESOURCES INC.

MARKETS, TECHNOLOGIES AND TRENDS | 2016-2021



JULY 2017 RELEASE!

- Review of the 1-butene market
- Review of the 1-hexene market
- Review of the 1-octene market
- Key growth drivers for LAO products
- Market forecast for the next five years
- Current global and regional demand
- Current manufacturing technologies
- Latest developments
- Current supply situation
- Forecast supply changes in the next five years
- Drivers and impacts of supply for downstream users
- Current competitive landscape
- Potential new LAO usage
- Drivers and trends for downstream applications

WHO SHOULD BUY THIS REPORT?

- Global linear alpha olefin producers that are expanding capacity
- Global LLDPE producers and users
- Linear alpha olefin import and export service providers

CHEMICAL MARKET RESOURCES
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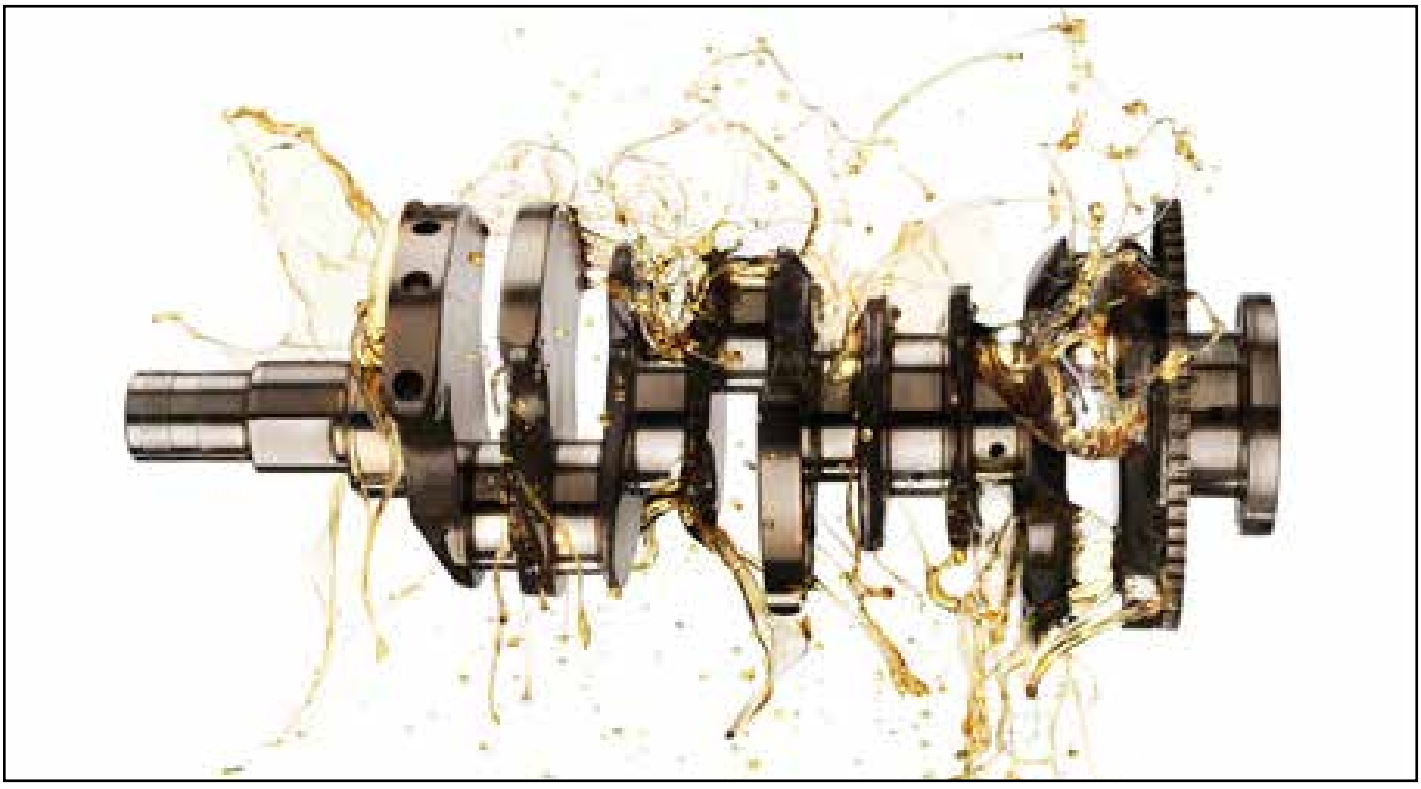
INTRODUCTION

Linear alpha olefins (LAO) or normal alpha olefins (NAO) are olefins or alkenes with a chemical formula CxH2x, distinguished from other mono-olefins with a similar molecular formula by linearity of the hydrocarbon chain and the position of the double bond at the primary or alpha position.

Linear alpha olefins are a range of industrially important alpha-olefins, including 1-butene, 1-hexene, 1-octene, 1-decene, 1-dodecene, 1-tetradecene, 1-hexadecene, 1-octadecene and higher blends of C20-C24, C24-C30 and C20-C30 ranges. This study will focus only on the C4, C6 and C8 carbon length range. The lower carbon numbers, 1-butene, 1-hexene and 1-octene are overwhelmingly used as comonomer in production of polyethylene. High density polyethylene (HDPE) and linear low density polyethylene (LLDPE) use approximately 2-4% and 8-10% of comonomers, respectively.

Another significant use of C4-C8 linear alpha olefins is for production of linear aldehyde via oxo synthesis (hydroformylation) for later production of short-chain fatty acid, a carboxylic acid, by oxidation of an intermediate aldehyde, or linear alcohols for plasticizer application by hydrogenation of the aldehyde.

Most of the current commercial LAO products plants produce a broad range of even-numbered alpha-olefins based on ethylene oligomerization. The low cost of ethylene in North America is driving several investments in the region, both in LAO production and polyethylene production, which will have a major influence on supply and demand dynamics in the coming five years.



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MAJOR OBJECTIVES

- Analysis of current status of the LAO market.
- Detailed analysis of manufacturing technology and current manufacturing cost analysis for LAO products.
- Analysis of current and new technological developments.
- Evaluate the impact of new end-user capacities on demand for global LAO products.
- Provide detailed application analysis and competitive landscape competition for LAO products.
- Detailed regional assessment of the current supply/demand scenario.
- Present market forecasts by region and application for the next five years.
- Develop detailed strategic analysis for LAO markets and identify most attractive applications for entry of LAO products.

TIMELY STRATEGIC ANALYSIS

This is a comprehensive study that will cover all major developments in the industry including changing market dynamics, technology trends, evolving industry structure and strategic alliances, current and expected competitive landscape, a renewed emphasis on the emerging regions and forecasts for the next five years.

To assist companies in developing an in-depth analysis of the current market status and monitoring new developments, Chemical Market Resources, Inc. (CMR), with its extensive experience in olefins and polyolefins markets, presents a comprehensive business/technical strategic analysis that reports in-depth on the competitive landscape of these products/markets. The report will assess the opportunities and the strategies for developing these markets across regions.

This study focuses on global and regional demand dynamics, supplier productions, market share, competition, end-use applications, predominant producers, LAO product manufacturing technologies, manufacturing cost economics, profitability, and current/future industry trends. The study presents strategic recommendations/options for new entrants as well as for existing players. Some of the strategic options include target regions, markets and products. Furthermore, future opportunities and trends are also provided for critical applications for LAO products.

KEY ISSUES ADDRESSED

- Outline of global LAO supply and demand dynamics on a global and regional basis.
- Future drivers impacting LAO markets.
- Current and future technologies used to produce LAO products addressed in this study with a manufacturing cost analysis.
- Market/technology positioning of major LAO producers.
- End-use requirements for LAO products and unmet needs of major LAO producers.
- Impact of future supply and demand dynamics.

APPROACH

The information, data and conclusions of this analysis will be developed from sources in North America, South America, Europe, China, Japan, Rest of Asia, and Middle East & Africa, and are based upon, but not limited to, the following methods:

- Search, review and 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.
- Information from industry experts and CMR proprietary projects related to LAO products.
- Interviews with leading suppliers, technology licensors and major end-users in each market segment.
- Manufacturing cost economics and pricing structures are based on CMR's extensive cost databases and interviews.

PRELIMINARY TABLE OF CONTENTS

PRELIMINARY TABLE OF CONTENTS (CONTINUED)

ABOUT CMR

Chemical Market Resources, Inc (CMR) was established in 1990 to undertake business research and strategic planning for a global clientele base concentrated in the chemical, petrochemical, plastics and allied industries.

CMR is a full service consulting and market research firm with an emphasis on market oriented specialty polyolefins, feedstocks, derivatives and thermo-plastics.

The company employs highly qualified chemical engineers/chemists with advanced degrees and extensive experience in analysing all aspects of chemicals markets and technologies.

With a strong technical background combined with business research experience, CMR is in a unique position to address the analysis of the existing and future business/ technology opportunities.

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