

# Polyolefin Elastomers/Plastomers (POE/POP)

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**Susan L. Bell**, Director of Polymer Processes

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### Abstract

Polyolefin elastomers (POE) and polyolefin plastomers (POP) are relatively new type of thermoplastic elastomer (TPE) developed in the 1990s. POE/POP are families of homogeneous ethylene-based or propylene-based random copolymer produced from single-site catalysts that bridged the performance gap between conventional polyolefins such as polyethylene and conventional elastomers like ethylene propylene diene monomer (EPDM). The density of POP is typically in the range of density of 0.886 to 0.912 g/cm<sup>3</sup>. Copolymer resins with lower density are called POE. Ethylene-based POE/POP have 65–91% ethylene and 9–35% linear alpha-olefin (LAO). LAO such as butene-1, hexene-1, or octene-1 are used. Propylene-based POE typically have 70–90% propylene, 10–30% ethylene or butene. Most of these copolymers are produced by solution processes.

POE/POP have garnered attention because of their low density, chemical resistance, processing advantages, good resilience without permanent deformation, applications in plastic recycling, and relatively low cost. Demand for POE/POP has grown at a significant rate. C2 POE/POP's unique properties make them desirable for flexible packaging, molded and extruded products, and elastomeric foamed compound. Production of C2 POPs and POEs, which used to be in the hands of limited number of producers such as Dow ExxonMobil and Mitsui Elastomers, has recently seen an increasing number of new suppliers such as LG Chem, Borealis, Sadara, and SK/Sabic. Propylene-based (C3) POE is a niche product that is used as an impact modifier for automotive related application. Demand for C3 POE is expected to grow as it finds more use in new applications such as in plastic recycling

This report will present an updated review of the single-site catalysts and process technologies used to produce C2 POE, C2 POP, and C3 POE. Process economic evaluation of these elastomers and plastomers will be presented.

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## IHS Markit Customer Care:

CustomerCare@ihsmarkit.com

Americas: +1 800 IHS CARE (+1 800 447 2273)

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