IHS CHEMICAL

Propylene by Olefin Conversion Processes

Process Economics Program Report 267C

August 2017

ihs.com

PEP Report 267C

Propylene by Olefin Conversion Processes

Girish Ballal
Principal Analyst

PEP Report 267C

Propylene by Olefin Conversion Processes

Girish Ballal, Principal Analyst

Abstract

Propylene is second only to ethylene in worldwide production. Steam cracking of various hydrocarbon feeds is the largest source for both ethylene and propylene. The amount of propylene produced from these traditional sources is limited. However, the demand for propylene is increasing at a rate higher than that for ethylene. Hence, there exists a need to produce more propylene than is obtainable from a typical steam cracker. Some of the additional demand can be met from on-purpose, standalone propylene production facilities. Olefins interconversion processes provide another option for converting lighter or heavier olefins generated from a cracker, in order to increase net propylene production.

With the above in perspective, we present in this report a review and technoeconomic analysis of some of the olefins interconversion processes, mostly in a steam cracker environment. The processes analyzed in this report include the Omega™ process by Asahi Kasei to produce propylene from C_4 olefinic raffinate by catalytic conversion, and the metathesis process by LyondellBasell to produce polymer-grade propylene starting from ethylene. This process also produces 1-butene as by-product in addition to propylene. The third process is the olefins conversion process (OCP™) by Total/UOP, which converts C_4 olefinic raffinate to produce propylene by catalytic conversion. The processing capacity for all processes is 110 million lb/year (~50,000 MT/year) of propylene production per year.

The production economics assessment in this report is based on a US Gulf Coast location. However, an iPEP Navigator module (an excel-based computer costing model developed by IHS) is attached with this report to allow a quick calculation of the process economics for three other major regions also—Germany, Japan, and China. For every process, the module also allows production economics to be reported in English or metric units in each region.

The technological and economic assessment of the processes is PEP's independent interpretation of the companies' commercial processes based on information presented in open literature, such as patents or technical articles, and may not reflect in whole or in part the actual plant configuration. We do believe that they are sufficiently representative of the processes and process economics within the range of accuracy necessary for economic evaluations of the conceptual process designs.

Contents

Tables

Figures

IHS Customer Care:

Americas: +1 800 IHS CARE (+1 800 447 2273); CustomerCare@ihs.com
Europe, Middle East, and Africa: +44 (0) 1344 328 300; Customer.Support@ihs.com
Asia and the Pacific Rim: +604 291 3600; SupportAPAC@ihs.com