

OMEGA technology

Enhancing propylene production with
using olefinic C4/C5 cuts



Overview

OMEGA utilizes a unique high selectivity catalyst to maximize propylene yield

The OMEGA process unit produces propylene by catalytic cracking of olefinic C4/C5 feeds. It can be integrated with either steam crackers or FCC/DCC units and can also be added as a revamp to an existing steam cracker.

The production of propylene from these feeds through OMEGA increases the overall propylene to ethylene ratio of a project and requires a lower specific energy consumption than steam cracking alone.

Developed and commercialized by Asahi Kasei Corporation the process is exclusively licensed by TechnipFMC.

Commercial operation

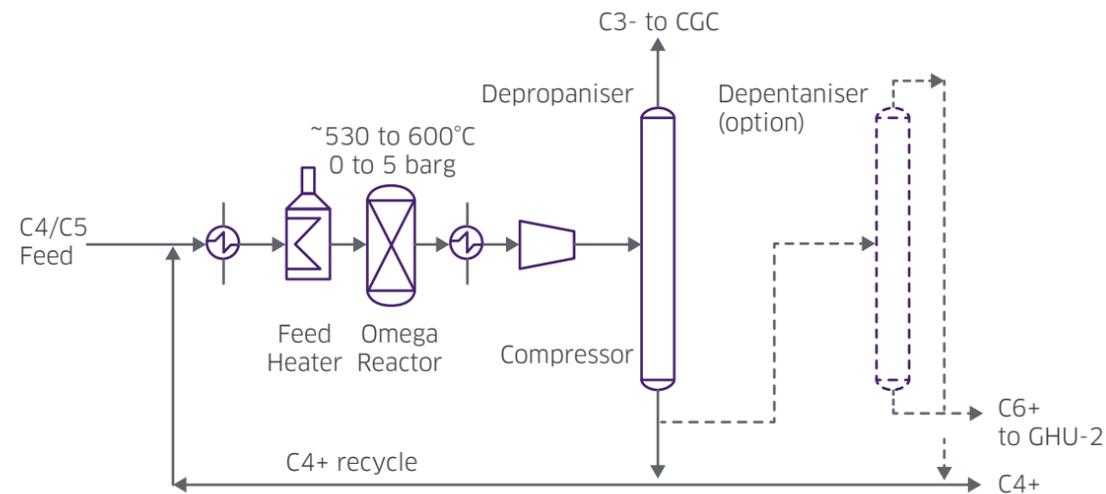
The first OMEGA commercial unit is located at the Mizushima Works of developer Asahi Kasei Corporation in Japan. It was started in 2006 with a capacity of 50 kta propylene using a C4 raffinate feedstock from a 450 kta steam cracker.

The unit has demonstrated stable operation, with the same catalyst in use for more than 6 years.

◀ Mizushima OMEGA
Asahi Kasei



How the OMEGA process works



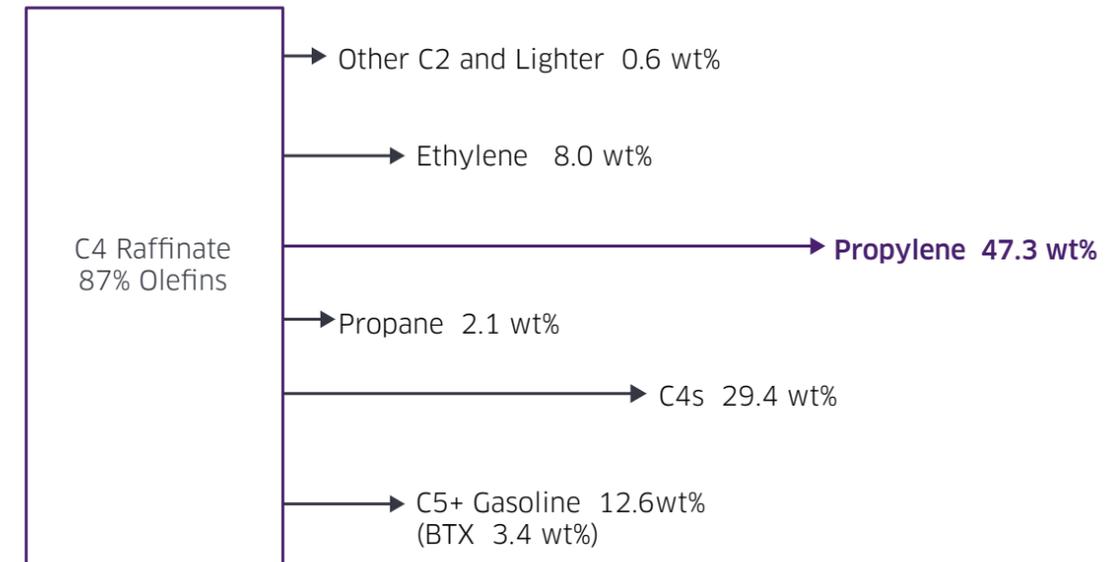
A schematic of the OMEGA process

The process uses a pair of single stage, adiabatic, fixed bed swing reactors with one reactor in operation while the other is regenerated. The reaction favors low pressures (0 to 5 barg) and high temperatures (530 to 600°C).

The reactor effluent is separated into a C3 and lighter stream that passes to a steam cracker unit for recovery of the ethylene and propylene components.

A portion of the C4 and heavier stream is recycled to the reactor, to maximize the propylene yield. The remainder can pass to the steam cracker furnaces or be exported. In addition, a Depentaniser column can be incorporated into the flow scheme to maximize the recovery of aromatics.

OMEGA feedstocks and typical product yields



The OMEGA process can convert a wide range of olefinic steam cracker and FCC/DCC unit streams without consuming ethylene product.

In a steam cracker unit, this is typically selectively hydrogenated C4 and C5 streams or raffinate streams from butadiene extraction or butene-1 production. C4 and lighter gasoline streams from an FCC/DCC unit can also be used as feedstocks.

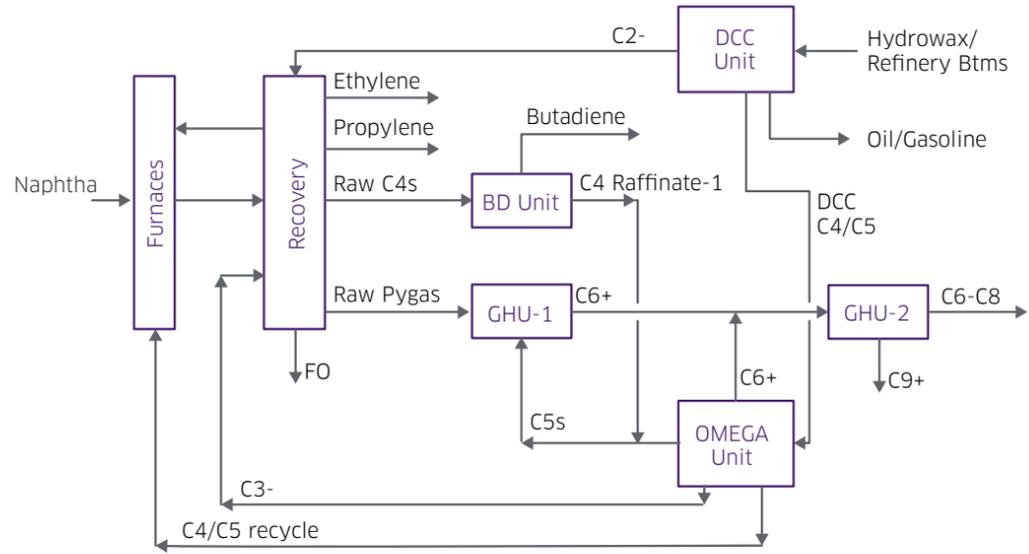
The ultimate yield of products from OMEGA using a C4 raffinate-1 stream after butadiene extraction is shown above.

OMEGA catalyst

Developed and supplied by Asahi Kasei, the catalyst is a proprietary alumina silicate zeolite type, based on ZSM-5. It has a high propylene selectivity and low coke formation. It is also highly resistant to regeneration deactivation and coking deactivation.



OMEGA integration



Integration of OMEGA with a steam cracker or FCC/DCC unit

The OMEGA unit can be integrated with a steam cracker as a grassroots project. It can also be part of a revamp using a C4/C5 cut from a steam cracker alone or integrated with a Deep Catalytic Cracking (DCC) or Fluid Catalytic Cracking (FCC) unit.

Olefins-rich FCC/DCC streams can feed the OMEGA unit independently, or can be combined with steam cracker feedstock.

The raw C4 stream from a steam cracker can be selectively hydrogenated or the butadiene

can be extracted. If the raw pygas stream from a steam cracker unit passes to a gasoline hydrogenation unit, then a C5 stream from the first stage can also feed the OMEGA unit.

The production of propylene from C4/C5 feed streams in the OMEGA process increases the overall propylene to ethylene ratio and has a lower specific energy consumption than steam cracking alone. To evaluate the economics for a specific project, a feasibility study is recommended.

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