

# UOP Light Olefin Solutions for Propylene and Ethylene Production

Whether you have traditional feedstocks such as propane or naphtha, or alternative feedstocks, such as coal, natural gas or petcoke, UOP has the solution to help you make on-purpose propylene and ethylene at low cash cost of production.



## On-Purpose Propylene from Propane

The UOP C<sub>3</sub> Oleflex Process produces polymer grade propylene from a propane feedstock allowing you to participate in the growing propylene market, independent of a steam cracker or FCC unit.



As the leading propane dehydrogenation (PDH) technology in the world, Oleflex provides the lowest cash cost of production and highest return on investment when compared to competing PDH processes via:

- Low feedstock consumption and low energy usage
- Dedicated reactor and CCR regenerator systems
- Highly active and stable catalyst
- High on-stream factor and run lengths of 3+ years
- Ability to change catalyst without stopping propylene production

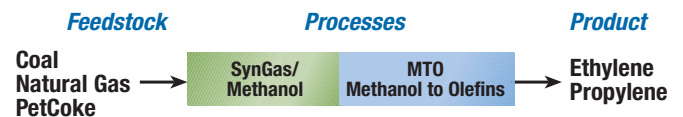


Today there are nine UOP C<sub>3</sub> Oleflex units in operation accounting for 55% of the installed world-wide propylene production capacity from PDH technology. UOP offers almost a century of PDH technology experience.

## On-Purpose Propylene and Ethylene from Cost Advantaged Feedstocks

The UOP Advanced MTO Process, which combines the UOP/Hydro MTO Methanol to Olefins Process with the Total Petrochemicals/UOP Olefin Cracking Process, converts cost advantaged alternative feedstocks such as coal, natural gas and petroleum coke to light olefins. The process offers a number of benefits versus competing MTO processes:

- Highest propylene and ethylene yields with minimum by-product formation
- Lowest catalyst consumption
- Wide range of P/E ratio – between 1.3 to 1.8
- Largest single train light olefin production capacity

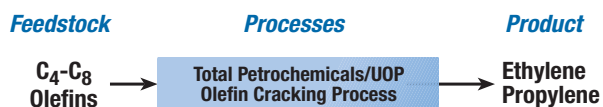


The Advanced MTO process has been fully demonstrated at the semi-commercial scale by Total Petrochemicals in Feluy, Belgium. To date, the site has successfully produced both polypropylene and polyethylene.



## On-Purpose Propylene and Ethylene from By-Products

The Total Petrochemicals/UOP Olefin Cracking Process (OCP) allows you to maximize production and recovery of light olefins from available feedstock sources by converting low-value olefins in mixed by-product streams to propylene and ethylene at high propylene-to-ethylene (P/E) ratios. The OCP technology is capable of processing a wide range of C<sub>4</sub>-C<sub>8</sub> olefins from steam crackers, refinery FCC's/Delayed Cokers and MTO plants.



Key features of the OCP include:

- High selectivity to light olefins at 3.5 to 4.0 P/E ratio
- No loss of ethylene to produce light olefins
- No inert diluent such as steam required

## Increase Naphtha Cracker and Naphtha Reformer Profitability

The UOP MaxEne™ process is an innovative method of increasing the yield of ethylene from naphtha crackers by 30% or reducing the feedstock naphtha requirement to obtain equivalent ethylene production. This new process enables refinery and petrochemical plant integration that will maximize the benefits to both facilities. MaxEne, the latest application of the UOP Sorbex process for adsorptive separation, recovers C<sub>5</sub>-C<sub>11</sub> normal paraffin from naphtha for feed to the naphtha cracker. The remaining naphtha components are a preferred feed for a catalytic reforming unit. The process enables:

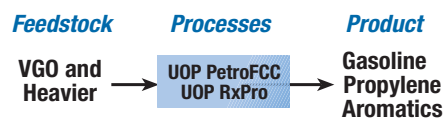
- 30% ethylene yield increase from existing naphtha cracker with no loss in propylene
- 5-6% octane barrel increase from reforming unit to gasoline pool
- 2-3% aromatics yield increase from reforming unit to aromatics complex.



The MaxEne process is currently being commercialized and is expected to be operating in 2012.

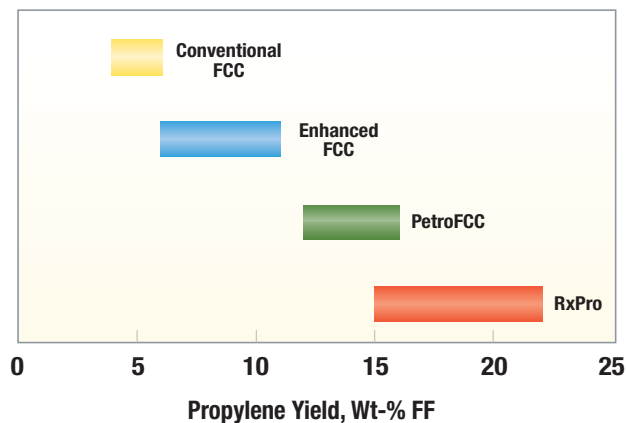
## On-Purpose Propylene from Refinery FCC's

FCC units have long been a source of propylene as a valued by-product of gasoline production. As FCC technology has developed, specialized process designs and catalysts have been developed to increase propylene production. As the leading licensor of FCC technology, UOP has led the way in these developments and offers FCC technologies that span the propylene production range from 8 to 20+ Wt% propylene yield on fresh feed.



The new UOP RxPro™ process is designed for full refinery/petrochemical integration. It provides propylene yields that can exceed 20 Wt% of feed and an aromatic rich naphtha stream for BTX recovery and further upgrading in your aromatic complex. Light cycle oil can also be further upgraded to BTX aromatics using the UOP LCO-X process.

## FCC Propylene Spectrum



## For more information

For more information please contact your UOP representative or visit us online at [www.uop.com](http://www.uop.com).

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