



# Improve Propylene Yields From Straight Run Naptha Cracking with KBR Catalytic Olefins Technology (K-COT™)

- This novel technology utilizes proprietary catalysts operating in fluid bed reactors
- Catalyst is selected to maximize propylene production based on the feed material
- KBR's know-how and extended experience in fluid bed reactor design ensures optimal operation

## A PARADIGM SHIFT FOR OLEFINS PRODUCTION

KBR Catalytic Olefins Technology (K-COT™) is a commercially proven technology for converting low-value olefinic, paraffinic or mixed streams into high-value propylene and ethylene. K-COT is an engineering process and service that builds on KBR's experience in developing catalytic olefins technology for various feed types, and combines the know-how into one technology offering. This technology can be implemented as a stand-alone olefin production unit or be readily integrated into a refinery or petrochemical complex to enhance profitability, operational flexibility and to meet market-driven product demand.

## AN ALTERNATIVE TO STEAM CRACKING

When implemented in place of a standard steam cracker unit for paraffinic feeds (e.g. naphtha), K-COT delivers higher propylene-to-ethylene ratio and higher olefins yield. K-COT delivers 1:1 propylene-to-ethylene ratio, compared to 1:2 ratio delivered by steam crackers. In addition, K-COT delivers 10-25% more ethylene and propylene than steam cracking.

K-COT operates at milder temperatures than cracking furnaces, produces very little coke and uses commonly available straight-run naphtha feed.

K-COT offers a lower total installed cost and a production cost per metric ton of ethylene up to \$70 less than thermal cracking.

## UPGRADE LOW-VALUE STREAMS

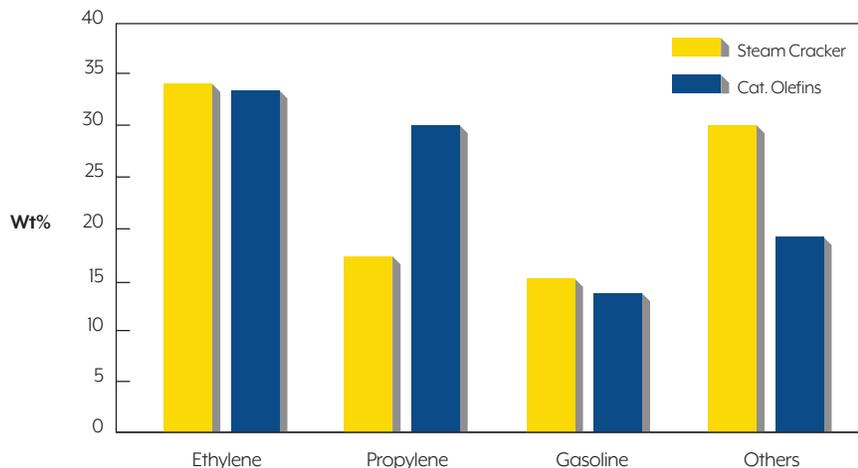
K-COT can be used to produce propylene from a variety of C<sub>4</sub>-C<sub>10</sub> feeds, including non-traditional sources.

The technology effectively upgrades a variety of processes and feeds, including olefin-rich streams such as:

- Mixed C<sub>4</sub>s from refineries and conventional steam crackers, amylenes, TAME raffinate and mixed C<sub>5</sub>s
- Cracked naphtha from FCCs, steam crackers, cokers and visbreakers
- Oxygenates, such as methanol and ethanol
- Fischer-Tropsch (FT) and Methanol-to-Olefins (MTO)/Methanol-to-Propylene (MTP) by-products
- Other low-value olefinic streams

## IMPROVED YIELDS

When applied to straight-run naphtha, K-COT achieves a higher yield of olefins, particularly propylene, with P/E ratio approaching 1:1. The figure below shows a comparison of yields from K-COT with those from traditional steam cracking.



Typical yields comparison for different naphtha cracking technologies

## COMMERCIALIZATION

The commercial demonstration catalytic olefins unit designed for naphtha feed is located at the SK facility in Ulsan, South Korea. This unit achieved design feed rate as scheduled in late October 2010, and demonstrated good performance across a range of naphtha feed types and process conditions during its period of operation, meeting the companies' expectations for the plant.

KBR has licensed several other units around the world.

K-COT increases propylene yields, reduces energy consumption and improves economics by up to \$70/ton when compared to steam cracking

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[technology@kbr.com](mailto:technology@kbr.com)

