Refiners worldwide are reporting significantly enhanced refinery economics after working with Criterion Catalysts & Technologies to optimise the performance of their fluidised catalytic cracking (FCC) pretreatment units.

Criterion offers a range of industry-leading FCC pretreatment catalysts (Figure 1), and works closely with refiners to design catalyst systems that match their specific performance goals.

CATALYST SYSTEM DESIGN

We recognise that installing industry-leading catalysts will not, on its own, deliver maximum value; the design of the overall catalyst system is also critical. It is essential that this takes into account site-specific constraints such as hydrogen availability, FCC unit capabilities and feedstock options, as well as the refiner’s operational objectives in terms of, for instance, cycle life, product slate and emission targets.

For this, we follow a highly diagnostic process in which we listen to customers to gain a thorough understanding of their situation. This enables us to devise a value-adding catalyst system designed to lie within those constraints and leverage the most value from their assets.

For feedstocks with a high content of metals contaminants, we typically recommend a top layer of high-performance demetallisation catalyst from our SENTRY portfolio. This reduces metals slip to the more active catalyst loaded in the rest of the reactor, which is less tolerant to metal, and reduces the metals in the FCC feed. The rest of the reactor can then be loaded with a high activity catalyst system featuring products from our portfolio of FCC pretreat catalysts seen in Figure 1.

**HIGH-PERFORMANCE CATALYST SYSTEMS TAILORED TO MEET REFINERS’ OPERATING OBJECTIVES**

**UNLOCKING THE MAXIMUM VALUE FROM AN FCC PRETREATMENT UNIT REQUIRES LEADING-EDGE CATALYSTS COMBINED WITH AN INNATE UNDERSTANDING OF THE REFINERY’S VALUE DRIVERS AND THE PROCESS REQUIREMENTS UP- AND DOWNSTREAM OF THE UNIT.**
ABOUT THE CATALYSTS

Criterion’s range of FCC pretreatment catalysts includes products from both the ASCENT and CENTERA technology platforms.

The ASCENT platform increases catalyst performance through an enhanced catalyst surface preparation. ASCENT catalysts share the features of high activity coupled with high physical strength and improved regeneration properties and can be provided in either an oxidic or presulphided form. These catalysts display outstanding stability due to ASCENT’s innovative pore structure design and its ability to handle feeds with high levels of contaminant metals, such as deep cut heavy vacuum gas oils and deasphalted oils.

DN-3551, a nickel molybdenum catalyst, is part of the ASCENT family and is designed to achieve a high level of FCC feed pretreatment to improve profitability and help the downstream FCC unit meet tighter specifications. It is an ideal catalyst for high-severity FCC pretreatment operation, providing high contaminant metals (nickel, vanadium and silicon) tolerance while maximising the denitritication, desulphurisation, and aromatic saturation reactions that are critical in FCC feed quality upgrading.

The CENTERA family of products has been shown to provide significant increases in activity and stability in numerous refining applications including ultra low sulphur diesel production and hydrocracker pretreat, as well as FCC pretreat.

CENTERA DN-3651 is Criterion’s newest FCC pretreat product. It is especially suited for high quality FCC feed production in units processing difficult feed in moderate-to-high operating pressure regimes, where nitrogen removal and hydrogenation reactions are valued to improve FCC conversion levels.

CENTERA DN-3651, like ASCENT DN-3551, can be used as the primary active catalyst in a pretreat system, or together with other products in our portfolio.

VALUE DELIVERED

Criterion’s FCC pretreatment catalysts are selected by operators worldwide for their ability to provide

- Excellent FCC conversion for enhanced refinery economics
- Exceptional catalyst strength for increased recovery during regeneration
- High feedstock flexibility.

Moreover, we work with these refiners to ensure that the catalysts are employed in an operating regime that meets their overall performance goals and business and technical drivers.

SUCCESS STORY

The operator of a large integrated refinery in Texas, USA, increased the quality of its FCC feed and extended the cycle life of its two FCC pretreatment units after installing Criterion’s DN-3551 and DN-2551 catalysts.

In addition, after meeting its clean fuels mandate, the refiner’s next project with Criterion was to optimise the units’ operating strategies. To help meet stringent gasoline sulphur specifications, the refiner had installed post-FCC gasoline hydrotreating technology. This changed the refinery’s clean fuels system significantly and unlocked additional flexibility, as it meant that it could relax the FCC feed sulphur targets.

A clean fuels team examined the interactions of the units in the clean fuels system and developed a strategy to optimise system operations. As a result, with some operating changes, the refiner was able to determine the operating modes that would provide the best economics. This success was detailed in a joint industry publication focused on the value of collaboration.

TECHNOLOGY LEADERSHIP

Criterion has established an enviable reputation as a leading innovator in FCC pretreatment catalyst technology over many years. Our ASCENT technology enhanced this position when it was introduced in 2006 by providing better performance and run-length stability along with unsurpassed metals handling capacity. Since then, ASCENT catalysts have been selected globally in over 50 applications for the treatment of vacuum gas oils.

Contact us

For more information about how we can help you to enhance operational performance, meet increasingly stringent environmental regulations and increase revenues, visit us at www.criterioncatalysts.com.