



Hoekstra Trading LLC

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## PROCESS OPERATIONS

# Independent Catalyst Testing

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The rapid expansion of hydrotreating catalyst for ULSD production has opened a market for independent catalyst testing, such as for the testing of different brands of Type II, CoMo-based catalyst. Cost-sharing of catalyst testing among refiners is a cost-effective method for providing complete test data and catalyst ratings. More importantly, results are available for immediate delivery. A 12-day test duration with full analytical work-up using standardized protocols provides the opportunity to test different generations of competitive catalysts side-by-side, thus simplifying catalyst selection.

### Simplify Catalyst Selection

Within each brand of catalysts, there are many different formulations and options, including:

- CoMo vs NiMo
- Fresh or regenerated
- Refurbished
- High pressure or low pressure
- Performance or value
- Single bed or stacked bed
- Cylindrical or quadrilobe
- High density or low density, etc.

With 20 or more brands of diesel hydrotreating (DHT) catalyst currently on the market, over 100 different options can easily be generated, thus complicating the selection process. Moreover, there are many performance claims

surrounding these options. Some of these claims are strong and others are weak, but they are usually based on the suppliers own data.

Efforts by refiners to consolidate vendor-supplied data results in information lacking a common frame of reference and no methodology for validating the supplier's claims. Sorting through performance and product claims from catalyst suppliers can be challenging for independent refiners with "tight" resources. To be sure, many of these supplier claims are backed up by very good data. However, the lack of a common frame of reference adds up to a bewildering array of choices for refinery engineers.

### Competitive Analysis

Analysis of every catalyst suppliers' product information is necessary to initiate an objective selection process. There are dozens of reports available at any given time from the suppliers that contain product data of catalysts that are being considered for commercial use. These reports combined with catalyst testing results are included in a competitive product analysis for refiners. For example, combining information on commercially available CoMo-based catalysts with cross-vendor testing on a common test track can optimize the selection process.

Recent independent testing conducted at the CEPRI Solutions, LTD labs in Thessaloniki, Greece of different generations of Type II CoMo catalyst yielded some surprising results.<sup>1</sup> These results provided new

insights that changed the refiner's view of the catalyst at the processing objectives and operating conditions specific to their facility's configuration. This first-year test program was launched in May 2009 when Hoekstra Trading ([www.hoekstratrading.com](http://www.hoekstratrading.com)) sent out "questionnaires" to 15 different independent refiners. The request described the plan to test DHT catalyst samples supplied by the refiner.

Initially, a few of these refiners contacted were very interested and submitted samples that were tested in the summer 2009 pilot plant run. Consequently, finding refiners that were willing to pay for this type of service and detailed report (\$50,000 for independent refiners and \$75,000 for refiners with capacities over 1.0 million bpd) showed there was interest in independent catalyst testing. Another winter 2009 pilot plant run of catalyst samples submitted by additional refiners validated there was potential growth in the market for independent catalyst testing on a common test track. These pilot plant tests typically involve 12-day runs of up to eight different catalysts with full analytical work-up.

**Editor's Note:** The Chemical Process Engineering Research Institute (CEPRI) in Thessaloniki, Greece includes several pilot plants for testing hydrotreating catalysts. Additional information can be obtained by contacting George Hoekstra at Hoekstra Trading LLC ([George.hoekstra@hoekstrading.com](mailto:George.hoekstra@hoekstrading.com) or +1 630 330-8159). ■