# Product Information Catalyst Activity Testing

## **Evonik Helps Refiners Make the Right Decision**

### Description

To reduce fresh catalyst acquisition costs, refiners strive to reuse catalyst whenever possible. While catalyst regeneration and reactivation saves money, it's important to know whether or not the regenerated or rejuvenated catalyst will meet the refiner's processing objectives and cycle length requirements.

Typically, refiners rely on regeneration acceptance criteria to make this assessment—focusing only on physical and chemical properties. While these guidelines are valuable and sufficient for many applications, additional catalyst activity testing can be extremely useful both before and after industrial regeneration or reactivation.

By providing reliable and accurate catalyst activity testing, Evonik helps refiners assess the quality and performance of Resale catalyst before they make a purchase.

In 2009, Evonik acquired a catalyst activity testing laboratory in Singapore equipped with 4 individual reactors working in parallel. In 2014, Evonik bought 8 independent activity pilot test units and built a dedicated laboratory center in Little Rock (Arkansas, USA) to extend its ability. Now, Evonik is offering 12 activity testing reactors globally to provide an extensive valuable service to the refining industry. This capability is a powerful complement to our global regeneration, rejuvenation, catalyst products businesses and R&D abilities.

### LHSV required for 10 ppm Sp for Sample Catalyst 1, 2 @ 45 bar, 340°C, 300 NL/L on SRGO



Temperature Required (°C) for 10 ppm Sp for Sample Catalyst @ 41.4 bar, 1.0 LHSV and 214 NL/L on SRGO



#### Performance

The lab located in Singapore (Porocel Catalyst Testing Center, PCTC) is a hydrotreating pilot plant consisting of two independent reactor trains. Each train consists of two paired, fixed bed reactors whereas the lab located in Little Rock (Little Rock Testing Center, LRTC) consists of 8 independent fixed bed reactors. We conduct testing under well-defined conditions (i.e., temperature, pressure, liquid hourly space velocity, and hydrogen-to-feed ratio) and use different feedstocks (SRGO, LCO blend, VGO etc).

We follow standard procedures for catalyst loading, pre-sulphurization and activity testing. We analyze the liquid products for nitrogen and sulphur content in the <10ppm range using a chemi-luminescence analyzer. Then we compare the desulphurization activity of the sample catalyst to a fresh reference catalyst under the same conditions. The test results are reported as relative volume activity (RVA), relative weight activity (RWA), or the temperature needed to achieve a desired sulphur level (usually 10ppm) in the liquid product.

This data can be invaluable in helping the refiner to make the right catalyst choice.

Our technical department works closely with the refiner to plan the activity testing. Some key discussion points during this planning process include:

- Run Length A typical test runs 10-14 days
- Sample size Each reactor sample is >36cc
- Feedstock Refiners may choose to provide their own feedstock
- **Protocols** Refiners may choose to modify test protocols (changes within the capabilities of the test equipment)
- **Confidentiality** Evonik maintains strict confidentiality for all activity testing, test protocols and test results. (Upon completion of the test, a confidential report is sent to the refiner.)



Catalyst selection is often a challenging process. With catalyst activity testing, Evonik eliminates the guesswork by defining catalyst activity before refiners make an investment for regenerated or rejuvenated catalysts.

#### Disclaimer

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