



# TK-575 BRIM™

NiMo Catalyst for Production of ULSD

Haldor Topsøe's R&D team for ULSD research has applied our proprietary BRIM™ Technology to develop a new member of Haldor Topsøe's family of BRIM™ catalysts - TK-575 BRIM™. This catalyst is designed specifically for use in ULSD service, and like our other BRIM™ catalysts it is developed and manufactured with more and stronger Type II and brim reaction sites, resulting in superior performance in ULSD applications.

## Commercial experience with BRIM™ catalysts

Haldor Topsøe's BRIM™ catalysts are recognized as top-tier catalysts for ULSD and FCC P/T service and have been sold to more than 70 high severity hydro-treating units over the past three years. Performance data from the many commercial applications has proven the superior activity of the BRIM™ catalysts compared to previous generation of catalysts. The superior hydrotreating activity along with an excellent stability allow the refiner to process higher feed rates, poorer quality feeds & obtain better quality products with longer operating cycles.

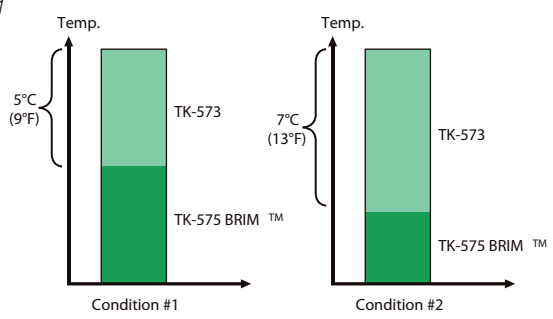
The use of Haldor Topsøe's BRIM™ technology enables us to control the types of reaction sites which are desirable for a specific service and operating pressure. At one extreme it is preferable to use a catalyst with mainly Type II activity sites for the direct desulphurisation routes, and at the other extreme to use catalyst containing mainly brim sites with a high hydrogenation activity.

## TK-575 BRIM™ - New NiMo catalyst for ULSD production

Production of essentially sulphur free diesel in high pressure diesel hydrotreaters is favoured by a catalyst with high hydrogenation activity and for this reason a NiMo catalyst is the preferred choice for this service. Haldor Topsøe's new NiMo TK-575 BRIM™ catalyst, which was commercialised at the end of 2005, further enhances the hydrogenation activity needed in high pressure ULSD services.

Figure 1 shows the results of a test conducted to illustrate the difference in activity between TK-575 BRIM™ and Haldor Topsøe's well-proven TK-573 NiMo ULSD catalyst at two desulphurisation levels. The test shows an improved activity for TK-575 BRIM™ corresponding to 5-7°C (9-13°F) depending on the feedstock type, operating conditions and unit severity. As it is the case for other catalysts using the BRIM™ technology, the activity improvement increases with HDS conversion.

Figure 1



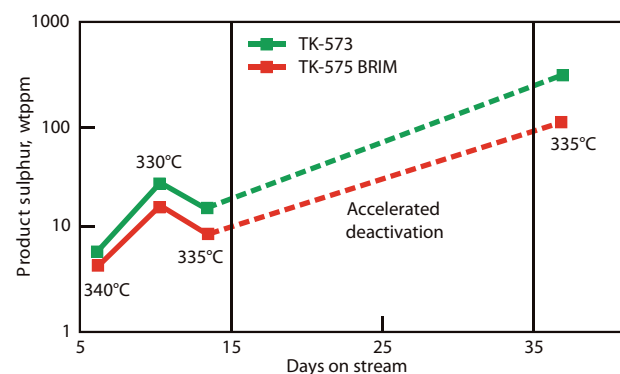
### Operating Conditions

Condition #1	
LHSV, hr <sup>-1</sup>	1.5
H <sub>2</sub> Pressure, bar/psi	60/870
H <sub>2</sub> /oil ratio, Nm <sup>3</sup> /m <sup>3</sup> /SCFB	500/2970
Product S, wtppm	100
Condition#2	
LHSV, hr <sup>-1</sup>	2.0
H <sub>2</sub> Pressure, bar/psi	60/870
H <sub>2</sub> /oil ratio, Nm <sup>3</sup> /m <sup>3</sup> /SCFB	335/1990
Product S, wtppm	10

In addition to the high initial activity, TK-575 BRIM™ is characterised by exhibiting excellent stability. Figure 2 shows the results from an accelerated deactivation pilot plant study in which TK TK-575 BRIM™ is compared to the predecessor TK-573 at 45 bar (650 psi) hydrogen pressure. Initially the temperature was adjusted to insure product sulphur levels in the 10–50 wtppm range.

In the second step, which lasted three weeks, the catalysts were exposed to accelerated deactivation using a heavy feed, high temperature and low H<sub>2</sub> availability.

Figure 2



In the third and final step, the operation was switched back to the initial conditions. As can be seen in Figure 2, both catalysts deactivated during the accelerated deactivation period, but TK-575 BRIM™ maintains a high desulphurisation activity relative to TK-573.

TK-575 BRIM™ is delivered in oxidic form and can be loaded in air using conventional dense and sock loading techniques. Furthermore, the recommended in-situ sulphiding procedure is identical to TK-573.

With the commercialisation of TK-575 BRIM™, Haldor Topsøe continues to provide tier 1 catalysts for the refining industry. For more information please contact your Haldor Topsøe representative.



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