



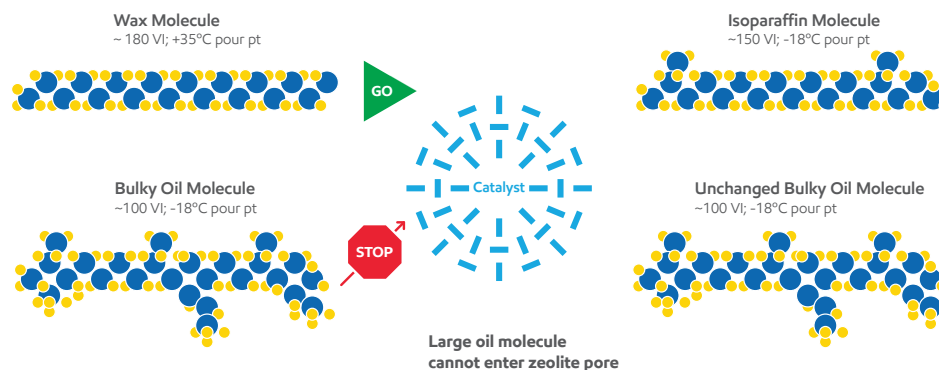
Higher performance. Higher yields.

Capture more value with our lubes base stock technology.

Energy lives here™

ExxonMobil's MSDW™, MAXSAT™ and MWI™ catalyst technologies produce high quality, high performing lubes base stocks. These technologies incorporate proprietary ExxonMobil catalysts and deliver outstanding activity, yield, selectivity, run length and durability. Our MSDW catalyst has demonstrated this for nearly 20 years. Our MAXSAT and MWI catalysts also deliver benefit-rich performance.

Selective catalytic dewaxing



Performance evolution

The need for improved lube base stock quality and performance has been largely influenced by two significant trends in the automotive and transportation industry. The first is the quest for higher fuel economy and lower

overall emissions. The second is the emergence in the mid-1990s of more advanced hydroprocessing routes to the production of lubricant base stocks to help deliver improved performance in engine oil applications.

Key benefits



High performance

- Increased yields
- Improved selectivity
- Higher activity
- Long life



Low risk

- Proven performance
- Simple fixed-bed operation
- Tolerant to feed upsets



Exceptional product quality

- API Group II, II+, III, and III+ classification
- Outstanding low-temperature performance
- High oxidation stability
- Low and high vis grades

Catalytic dewaxing technology

At the heart of the process is a system of proprietary shape-selective catalysts containing zeolites and small amounts of noble metals. They are specifically designed to isomerize n-paraffins and saturate aromatics with maximum selectivity to lubes and minimal cracking to fuels. These catalysts display superior activity and unsurpassed tolerance to nitrogen, sulfur, and aromatic contaminants in the feed. Even degradation in feed quality, which might irreversibly poison other catalysts, will require only a temporary increase in operating temperature with minimal impact on aging and virtually no impact on product yield.

Increase profits and add flexibility

To put the true value of the yield advantage of the MSDW[™] catalyst system in context, consider this: for an average MSDW unit, at current product prices, a difference of 1% in yield of base stock product is worth between \$2 million and \$4 million per year over

Value of 1% yield:

- 10,000 BPD unit (average size)
 - At recent prices*
 - \$2-4 million/year vs. ULSD
 - \$7-8 million/year vs. revenues
- * Group-II \$1,350/MT
Group-III \$1,700/MT
ULSD \$1,000/MT

producing diesel fuel, or about \$7 million to \$8 million per year in revenues. Maximizing base stock product yield is obviously important. But when you operate an MSDW unit, even the by-product is valuable. This is because the majority of the conversion product from the MSDW catalyst system is diesel fuel with essentially no sulfur, an excellent cetane number, and outstanding low temperature properties. This product is often blended with other distillates to actually increase the quality of the diesel pool, or supplement sources of arctic-grade diesel.

Continued technology advancement

In today's world, standing still corresponds to stepping backward. At ExxonMobil we have active R&D to continue to boost yield, further improve tolerance to heteroatom contaminants, and broaden the range of acceptable feedstocks. We are now on our third generation of the MSDW catalyst system, with better activity, selectivity, and polar tolerance than the original catalyst we used in our first deployment in 1997.

MSDW, MAXSAT[™] and MWI[™] services include:

- Initial non-confidential consultations
- Development of licensing proposal
- Basic engineering package, including basic design specification and operating guide
- Engineering support during FEED and EPC stages
- Technology transfer, training, catalyst loading and start-up support
- Performance estimates for catalyst refills

	Activity	Yield	Tolerance S/N
1st Gen	Base	Base	Base
2nd Gen	+	++	+
3rd Gen	++	++	++

About us

ExxonMobil helps refiners and petrochemical manufacturers increase capacity, lower costs, improve margins, reduce emissions and operate safe, reliable and efficient facilities. Along with a commitment to helping to implement best practices and to achieve better results, we provide cutting-edge proprietary catalysts and license advantaged process technologies for refining, gas and chemical needs.

Our MSDW[™], MAXSAT[™] and MWI[™] catalyst technologies produce high quality, high performing lube base stocks.

Collaborate with us today.
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