ExxonMobil

Cutting-edge catalysts for ethylbenzene production

ExxonMobil zeolite catalysts: Producing the majority of the world's ethylbenzene

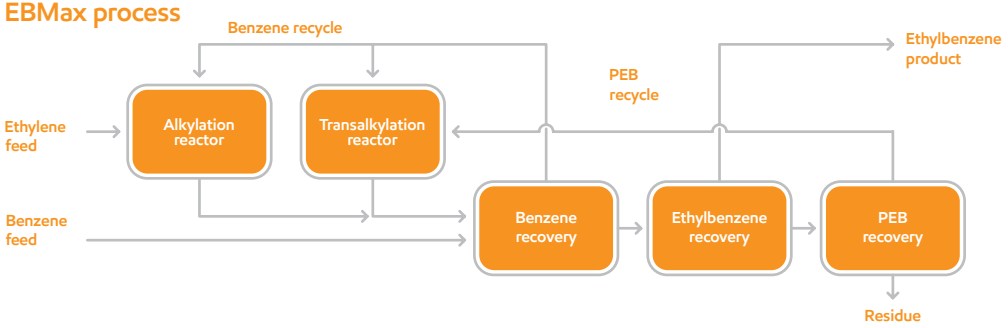
Energy lives here™

ExxonMobil's zeolite catalysts are the heart of the Badger® EBMax℠ process. Originally developed by Mobil Oil, the MCM-22 family of zeolite catalysts revolutionized the production of ethylbenzene (EB).

With their high activity and selectivity to EB, ExxonMobil catalysts enable a simple, liquid phase process that dramatically lowers operating temperatures and thereby reduces equipment sizes and energy consumption – all while still improving the ethylbenzene product quality.

Today, TechnipFMC Badger Process Technology and ExxonMobil continue to build upon a 35+ year relationship to deliver an optimized, cost-efficient, easy-to-operate technology to enable our customers' success for the production of EB in the styrenics value chain.

EBMax process



Alkylation reactor

An alkylation reactor uses ExxonMobil catalyst to convert benzene and ethylene to ethylbenzene (EB) in the liquid phase.

A small fraction of the EB is further alkylated to polyethylbenzenes (PEB), which is recovered in distillation and converted back to EB in the transalkylation reactor.

Transalkylation reactor

A transalkylation reactor uses ExxonMobil catalyst to convert the small amount of PEB with benzene in the liquid phase. The effluent is sent to distillation to recover the additional EB production.

Purification

A simple distillation train recovers unreacted benzene, produces EB product, and recycles PEB to transalkylation.

Key benefits

Low variable operating cost

- Superior yields
- Low B/E and B/PEB ratios minimize recycle and energy consumption
- High energy efficiency
- Low consumption of HP Steam

Low initial capital investment

- High selectivity to EB reduces distillation column sizes
- High activity catalyst enables a smaller reactor volume and catalyst quantity

Ease of expansion

- High catalyst activity enables increased capacity

High reliability

- High purity ethylbenzene
- Minimial production downtime
- Stable yields throughout the catalyst life
- Long, stable catalyst life necessitates fewer replacements

Ethylbenzene technology leadership

ExxonMobil continues to be one of the leading EB catalyst suppliers in the world. Since 2001, almost two-thirds of all new and replacement EB capacity was licensed by Badger and use ExxonMobil catalysts.

As of 2017, ExxonMobil catalysts are deployed to some 35 EBMax customers and have enabled new grassroot units, revamps of older technology and expansions of ethylbenzene capacity, including many of the world's largest units.

ExxonMobil catalysts account for more than 56% of the world's ethylbenzene production, in excess of 20 million metric tons per year, in the Badger EBMax and Badger Vapor Phase processes.

Support from initial consultation throughout the life of the operation:

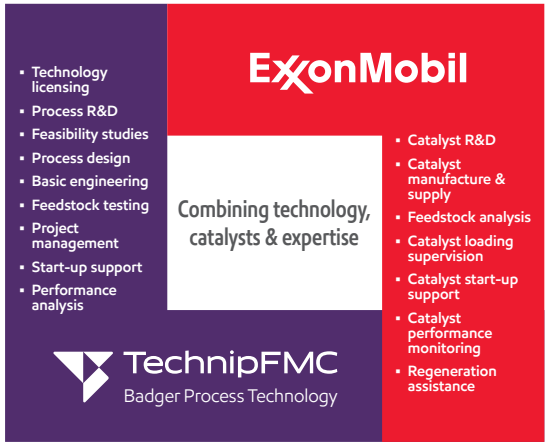
- Initial discussions to confirm client objectives and tailor the solution
- Feedstock testing and support services
- Detailed yield estimate
- Feasibility study
- Commercial proposal
- Process design package
- Catalyst loading and start-up support
- Technology training
- Technology improvements
- Performance monitoring and technical assistance throughout the life of the catalyst
- Worldwide catalyst manufacturing to enable security of supply

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.

TechnipFMC Badger Process Technology and ExxonMobil technology enable low cost access to the styrenics value chain.

Benzene Alkylation Production



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