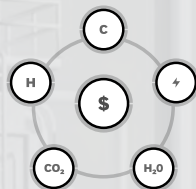


The Journey to Sustained Profitability



ISOALKYTM PROCESS TECHNOLOGY

A NEW ERA FOR ALKYLATION WITH IONIC LIQUID ALKYLATION

EXECUTIVE SUMMARY

Chevron



Honeywell
Uop

EXECUTIVE SUMMARY

Demand for alkylate is as strong as ever with increasingly stringent fuel standards implemented across the globe.

The Refinery of the Future will make fuels that meet these new standards with a greater level of efficiency — making every molecule of feedstock produce the most optimal combination of products, while minimizing emissions.

Whether refineries move into the future producing only fuels or integrate with petrochemical operations, higher octane blendstocks will be increasingly important. For refineries producing fuels, regulations reducing aromatics, benzene and olefins affect gasoline production by driving up octane demand. If the automotive industry continues to develop more fuel-efficient high compression gasoline engines, demand for higher octane fuels will continue to increase. The refining industry will face economic and regulatory pressure to meet this demand.

One way to address this shift is with alkylation technologies that convert relatively inexpensive feeds such as butanes into a high-value gasoline product. The ISOALKY Process is a new and commercially viable alkylation technology that offers a compelling economic solution compared to conventional liquid acid technologies. Its ability to upgrade the gasoline pool helps refiners meet stricter product specifications and add petrochemical production as conditions warrant.

ISOALKY Technology can be used for new alkylation plants and retrofitting existing facilities to improve their performance. The ISOALKY Catalyst exhibits superior performance with a wide range of olefin feeds, compared to conventional acid catalysts. The ionic liquid catalyst has negligible vapor pressure and can be regenerated on-site, resulting in a lower environmental impact versus conventional liquid acids. Capital and operating expenses associated with ISOALKY Technology are comparable to existing technologies.

The ISOALKY Process can be operated with standard refinery protocols for personal, property and environmental protection, eliminating the need for special personal protective equipment, safety systems and training associated with hydrofluoric and sulfuric acids. To provide better investment decisions for the Refinery of the Future, Honeywell UOP developed the Six Efficiencies (E6) methodology which determines the carbon, hydrogen, utilities, emissions, water — treated as a scarce resource — and capital efficiencies. The ISOALKY Process is inherently more efficient than previous generations of alkylation technology, and those efficiencies are highlighted throughout this paper.

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