UOP
A Honeywell Company

UOP HF Alkylation Process with Gravity Circulation

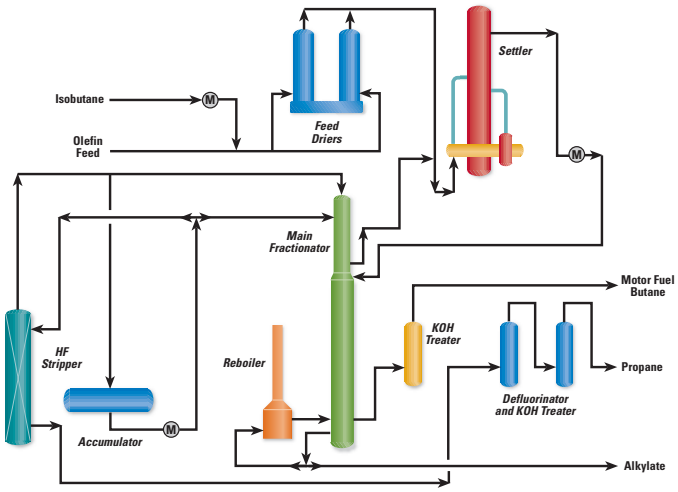
Refining

The new age in alkylation

Developed in the 1940's to supplement the need for aviation fuel during World War II, alkylation is resurfacing today as the choice technology for meeting increased demands for high-octane gasoline blend-stock in a world of ever changing fuel regulations.

UOP, the number one licensor of Hydrofluoric (HF) Alkylation Technology, has more than 275 years combined experience in the safe operation and maintenance of alkylation technology. As of 2007, the company has more than 140 licenses worldwide with a combined daily operating capacity of more than 620,000 barrels of alkylate. UOP offers a level of experience and confidence in alkylation technology unmatched by other alkylation process technology providers.

HF Alkylation Process



A growing market demand

With an increasing demand for low-sulfur, high-octane unleaded fuels, alkylate has emerged as a high-growth lucrative market commodity for the refining industry.

As environmental pressure to eliminate MTBE from gasoline increases, refiners are left with a surplus of isobutene – an exceptional HF alkylation feedstock.

The UOP HF Alkylation Process is a proven solution for the production of alkylate blendstock, which is critical to maintaining gasoline value and quality while satisfying the increasing need to reduce aromatics, benzene and sulfur content. Alkylate is an ideal, low-sulfur blending component for unleaded and reformulated gasoline, because it provides higher octane ratings with lower Reid Vapor Pressure (RVP) and has far less atmospheric reactivity than any other approved blending component. The UOP process allows butane and olefins displaced by environmental regulations to be returned to the gasoline pool.

The strong emphasis on safety

The science behind HF Alkylation has come a long way since the 1940's. In just the last 10 years, several breakthrough companion technologies have been developed that mitigate the risks associated with using hydrofluoric acid as a catalyst, including the Reduced Volatility Alkylation Process (ReVAP™) and the Inventory Managament Process (IMP).

The ReVAP process drastically reduces the volatility of HF acid, improving safety levels by up to 90 percent. IMP, a one-touch mitigation system, allows for rapid transfer of the catalyst inventory to a dedicated receiver vessel in as little as 90 seconds, providing another tremendous improvement in safety.

Unlike sulfuric acid alkylation technologies, the UOP HF Alkylation Process provides for on-site regeneration of its catalyst, mitigating the transportation risks associated with off-site regeneration. This design feature, along with other companion technologies, makes the UOP HF Alkylation Process one of the safest, most reliable alkylation technologies on the market today. The ReVAP process has been permitted for use in California – considered the most environmentally stringent state in the United States.

The bottom line: safety and cost savings

The UOP HF Alkylation Process not only is one of the safest alkylation technologies available on the market today, it is less costly than competing technologies. Capital costs for a grassroots UOP HF alkylation unit are less than the competition, and because the process consumes less catalyst and requires no refrigeration facilities, operating costs are US $1.40 to US $1.90 per barrel less than sulfuric acid alkylation processes.

Two additional companion technologies, Split Olefin Feed Technology (SOFT) and the Hydrisom Process, work to maximize product yield and octane. SOFT expands capacity and increases alkylate quality with minimal capital investment. The company's Hydrisom Process, a selective hydrogenation technology that treats the olefin feed to further improve alkylation unit feed quality, results in an increase in alkylate yield and octane.

Expertise from experience

As a major worldwide licensor of technology, UOP offers an unmatched level of refining and operating experience. Should customers run into an operational challenge, chances are the UOP team of technical specialists already has experienced it – and found a solution.

With more than 180 patents issued in the field of alkylation, the company maintains a strong ongoing commitment to R&D with an expert staff of research chemists, scientists and analytical support personnel dedicated to better understanding and improving the alkylation process and supporting the needs of customers.

Round-the-clock technical service

From the installation of a grassroots unit or companion technology, to responding to questions about operations and maintenance, UOP offers round-the-clock technical support on a worldwide basis. Technical support services include:

- Feasibility studies
- Process studies
- Development of process designs
- On-site expert assistance for unit startup and shutdown
- On-site turnaround inspections and troubleshooting

In addition to its in-house engineering and technical support staff, UOP has access to recognized experts in the fields of material engineering, welding, piping, and safety, along with a host of process design engineers.

Clear-cut operational advantages

- Lowest operating costs of any alkylation technology
- High on-stream factor
- Low annual maintenance
- Ease of operation – 275 years combined experience in installation, operations and maintenance
- Overall safety comparable to sulfuric acid alkylation processes
- Gravity circulation of catalyst (no catalyst circulation pumps required)
- Low catalyst consumption compared to sulfuric acid alkylation processes
- On-site catalyst regeneration, minimizing transportation risks
- Low emissions and minimal waste
- Used commercially since 1942

For more information

For more information, contact your local UOP representative or our Des Plaines sales office:

e-mail: info@uop.com
fax: +1-847-391-2253
phone: +1-847-391-2000

UOP LLC
25 East Algonquin Road
Des Plaines, IL 60017-5017
U.S.A.
www.uop.com

UOP 4523-57 0308

A Honeywell Company