AlkyClean® Solid Acid Catalyst Alkylation Technology

Overview

AlkyClean is the only commercially proven solid acid alkylation technology with the following advantages:

- Total installed cost on par with current liquid acid processes
- Proven, robust catalyst and process system
- No liquid acids or chlorides in the system
- No product treatment or disposal of hazardous materials
- Elimination of exotic alloy due to the lack of corrosive acids

Location: Shandong Wonfull Petrochemical Group Co, PRC
Capacity: 2,700 BPD of Alkylate production
Unit Startup: Smoothly and safely started up in August 2015
Performance test: Completed Dec 2015. All guarantees met.
Catalyst: Albemarle’s zeolite-based AlkyStar™
Process Scheme: Lummus Technology

Innovative Process & Catalyst Design

A simplified and innovative process scheme:

- Simple & scalable fixed-bed reactors w/o moving parts
- Eliminate need for product treatment
- Multiple fixed bed reactors are used for continuous alkylate production

A Robust technology with a solid acid catalyst, AlkyStar tailored to optimize process performance:

- Individual reactors cycle between on-line alkylation and low temperature regeneration
- A successful commercially demonstrated catalyst regeneration scheme with the full recovery of catalyst activity after each HTR cycle.
- Eliminates acid soluble oil by-product, therefore, improves the alkylate yield. No by-products disposal.
- Alkylate quality is on par with any available alkylation technologies.
- Eliminates safety concerns associated with liquid acid hazards.
Albemarle's AlkyStar catalyst is designed and tailored for the AlkyClean process:
- Uses of well proven zeolite catalyst system
- Low catalyst noble metal
- Optimized strength, type and number of zeolite's acid sites to enhance hydrogen transfer reactions
- Optimized particle size and porosity to overcome any diffusion limitations and heavy species formation
- Tolerant to changes in feedstock composition and process upsets (water spikes, butadiene, sulfur components or oxygenates)

Safety and Environment
- Eliminates safety risks and emissions associated with liquid acid hazards
- Lower maintenance and monitoring requirements
- Eliminates costs associated with mitigation (acid dump and water spray systems), disposal of acids or chlorides, and vapor suppression additives
- Carbon steel construction material results in lower costs
- Eliminate risks associated with corrosion failures
- Reduces environmental footprint

Implementation
AlkyClean is economically attractive for HF revamp:
- Reuse of fractionation section
- Reduced safety risks and environmental footprint

Peace of Mind
AlkyClean is ready to be implemented, whether for:
- HF replacement
- Grassroot alkylation units
- Improved tier III solutions
- Production of high premium high-octane fuel (HOF)
- Increasing margins for processing opportunity feedstocks