

IsoA™ ISOMERIZING/ AROMATIZING TECHNOLOGY

Convert C5-C7+ Paraffinic Feed Into High-Octane, Low-Sulfur Gasoline Blend Stock.

IsoA technology isomerizes and aromatizes low-octane, C5-C7+ paraffinic feed (such as light, straight-run naphtha, raffinate, and NG condensate liquids) and converts it in a fixed-bed reactor to an upgraded, high-octane, gasoline blend stock. With a primarily C6/C7 feed, the upgraded stream typically has a 20+ unit increase in octane, a reduction in RVP and a 90% reduction in the sulfur content compared to the feed.

IsoA At-A-Glance:

- › Target application is to upgrade low-octane light naphtha, topped oil, raffinate oil, NG condensate—ideally C5 to C7+ paraffinic naphtha— sold as steam-cracker feed into high-octane, low- sulfur gasoline blend stock
- › Fixed-bed reactor with product fractionation separates the upgraded naphtha from LPG
- › Proprietary metal-modified, nano-sized Zeolite catalyst
- › Catalyst life is expected to be > 3 years
- › Co-feed of olefin containing LPG or RGP is an option to increase the Octane boost, improve yields and eliminate/minimize heat input
- › Co-locating a DTL™ plant (highly exothermic reaction) with IsoA plant (endothermic reaction) allows both energy integration and CAPEX reduction due to common fractionation equipment
- › Proven in commercial operation

Key Benefits

- › Enables a 20+ point increase in octane number and a 90% reduction in sulfur content of the low-octane, C5-C7 paraffinic feeds
- › Typically yields ~ 70-85 wt% blend stock
- › Typical product RON is between 80-89 points
- › Decrease in RVP dependent on the feed composition; increase in the dry point temperature by 20 to 30° C
- › Removes sulfur without adversely impacting octane (with 150ppm in feed can achieve <10 ppm, sulfur removal >90% efficiency)

Facility Construction

- › KES-led project management lump sum turnkey EPC and engineered equipment services can deliver a modular plant that can be operating in two years.

Superior Outcomes

- › IsoA can provide an uplift of \$8/BBL that leads to an additional \$29.2 MM/year USD for a 10,000 BPD unit.

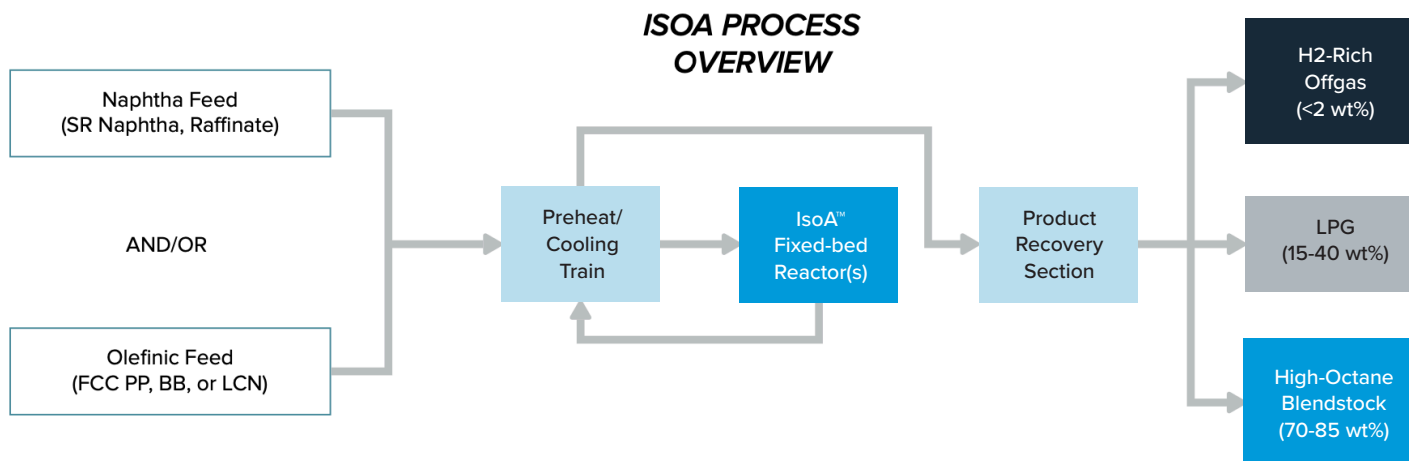


How It Works

IsoA technology works via a low-CAPEX, low-pressure process that has a small footprint and utilizes standard refinery equipment, such as fixed-bed reactors, absorption and separation columns. The heterogeneous catalyst is sulfur tolerant and eliminates the hydrotreating process required for conventional isomerization processes. No recycle gas is required, so maintenance and energy intensive hydrogen compression required by the conventional isomerization process is also eliminated. The process can be further optimized with a boost in octane, an increase in yield, and a reduction in operating cost by co-feeding olefin containing feeds.

The product exiting the reactor is cooled and stabilized for blending into the gasoline pool.

IsoA™ Process Flow Diagram



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