

### Overview

The CDAlkyPlus process combines isobutylene as the only olefin source with isobutane to produce a high quality alkylate product for motor fuel blending. In combination with an isobutane dehydrogenation process CDAlkyPlus offers an effective route to monetize NGL butanes by upgrading them to an easily transportable gasoline blendstock.

The patented CDAlkyPlus process is a low temperature sulfuric acid-catalyzed alkylation process coupled with a simple olefin pretreatment step. This combination provides significant benefits over direct alkylation of isobutylene as well as other isobutylene upgrading processes such as iso-octene production.

Compared to direct alkylation of isobutylene with conventional alkylation processes, the CDAlkyPlus process provides a superior quality product with lower acid consumption and utility costs. In addition, the CDAlkyPlus flow scheme simplifies the alkylation process and improves environmental performance by eliminating waste caustic streams.

Because isobutane and isobutylene are incorporated together to produce a high value alkylate product, the CDAlkyPlus process produces two times the volume of gasoline blend stock compared with iso-octene production.

The CDAlkyPlus process is ideal for use downstream of an isobutane dehydrogenation process. The whole dehydrogenation unit product, a roughly 50/50 blend of isobutane and isobutylene, is fed directly to the CDAlkyPlus process. This technology also provides a unique opportunity for revamping an existing dehydrogenation unit-based MTBE plant to produce alkylate. Much of the existing MTBE equipment can be used in the CDAlkyPlus flow sheet reducing capital requirements. For these retrofit cases, the isobutane recycle around the dehydrogenation unit is essentially eliminated. This means the normal butane capacity of the complex can be doubled without expanding the existing dehydrogenation unit.

### Advantages *Compared to direct alkylation of isobutylene:*

- Lower acid consumption
- Compressor horsepower requirements reduced by 50%
- Lower utilities
- No caustic waste streams

- Higher octane alkylate product
- Lower vapor pressure product

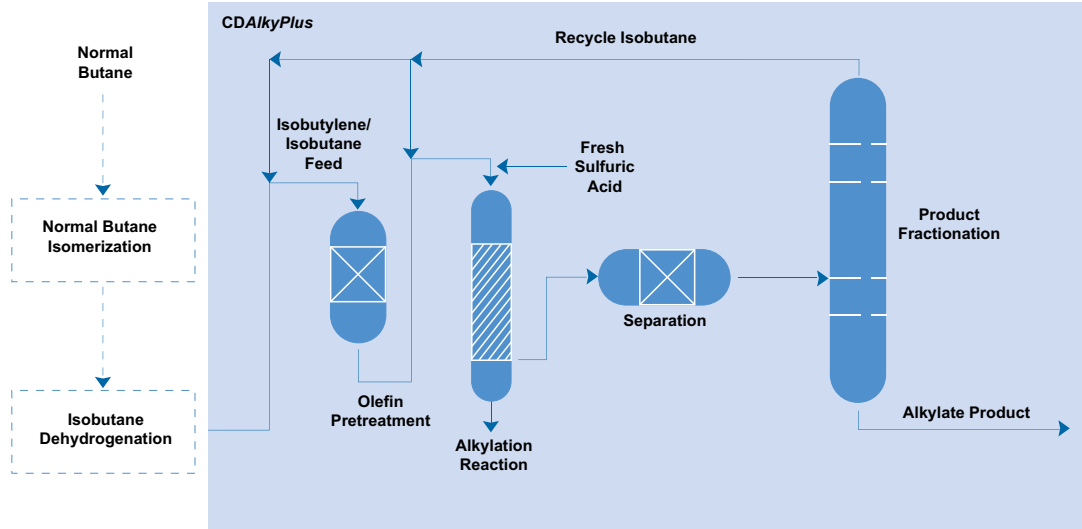
### *Compared to iso-octene production alternative:*

- Twice the product volume

### Performance Characteristics

Example Material Balance		CDAlkyPlus Alkylate Quality	
<b>Feeds</b>	KTA		
Isobutylene	495	Research Octane (RON)	94
Isobutane	530	Motor Octane (MON)	92
<b>Product</b>		RVP (kPa)	<40
Alkylate	1,025	<b>Distillation Profile (°C)</b>	
		T50	111
		T90	190
		EP	196
		Sulfur (ppm)	<8

## Process Flow Diagram



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