

ALKYLATION vs. DIMERIZATION

A Comparative Overview

Despite recent interest in butylene dimerization technologies, alkylation compares favorably when considered as a replacement for refinery MTBE production. The table below compares the benefits of MTBE production with two options:

- retrofitting the MTBE unit with dimerization technology and adding a downstream saturation unit to treat the dimerization effluent
- expanding the existing alkylation unit that currently alkylates MTBE raffinate

The data for all three columns assume a typical mixed butylene feed from an FCC unit.

	Existing MTBE Unit	Retrofit MTBE Unit for Dimerization	Expand Alkylation Unit
Volume Yield			
(C ₅ + Gasoline from Reacted Olefin)	1.25	0.83	1.78
Octane			
(R+M)/2	110	96	95
Olefin Content			
Gasoline Blendstock	0 LV%	<2 LV%	0 LV%
Distillation Properties			
T ₅₀	130°F	260°F	230°F
T ₉₀	132°F	355°F	275°F

The retrofit dimerization values above assume that a highly selective dimerization catalyst is used to limit the conversion of normal butenes to low octane codimers. The unconverted normal butenes in the dimerization raffinate must be reacted in the existing downstream alkylation unit to form a suitable blendstock for the gasoline pool. The resulting alkylate properties for this raffinate feed stream are not included in the above data.

The dimerization values shown in the table are based on publicly available literature written by leading dimerization technology licensors. Although the alkylation values are supported by commercial experience, STRATCO is not aware of any published data confirming that the above dimerization estimates can be achieved by a refinery dimerization unit.