**Overview** The CD/Isotame process combines skeletal isomerization and etherification steps to maximize the production of TAME from refinery and steam cracker C₅ streams. The CD/Isotame process is one of a family of process technologies developed and commercialized by Catalytic Distillation Technologies (CDTECH) for license to the petroleum refining and petrochemical industries. CDTECH is a partnership between ABB Lummus Global Inc. and Chemical Research & Licensing, a CRI company.

**TAME Synthesis-General** TAME is formed by the catalytic etherification of reactive isoamylenes with methanol. Skeletal isomerization increases TAME production from an olefinic C₅ stream by converting normal amylenes to isoamylenes.

The optimum process configuration is presented below. This scheme provides the minimum capital cost at about 80% C₅ olefin reduction. The olefinic C₅ stream is fed to a selective hydrogenation step where dienes are converted to olefins. Removal of dienes reduces color and gum formation in the TAME product. In addition, unreactive 3MB1 is converted to reactive isoamylene via hydroisomerization, thus increasing the TAME yield. The primary TAME product is made in the first CD Tame unit where greater than 90% conversion of isoamylene is achieved.

Raffinate 1 from the first CD Tame unit is fed to a skeletal isomerization unit (ISOMPLUS®) where normal pentenes are converted to isoamylenes at high yield and selectivity. The vapor phase reaction takes place over a robust catalyst with long cycles between regenerations.

The isomerate is then fed to a second CD Tame unit where additional TAME is produced at greater than 95% conversion of isoamylenes. Even higher conversion of normal pentenes to TAME can be achieved by an optional raffinate 2 recycle to the skeletal isomerization unit. A purge stream serves to remove the saturated C₅s from the recycle stream.

A common methanol recovery unit serves both CD Tame units.

**CD/Isotame Block Flow Diagram**

![CD/Isotame Block Flow Diagram](image-url)
Advantages

CDIsotame offers:
Selective hydrogenation of diolefins at minimum capital cost
High conversion of isoamylenses (>95%) 
High conversion of normal pentenes (>70 %)
High selectivity of isomerization (>90 %)
Isomerization of 3MB1 to reactive isoamylene
Improved C5 raffinate as gasoline feedstock due to reduced:
- Color
- Gum formation
- Olefin content
Increased TAME production
Increased gasoline pool octane
Decreased gasoline pool RVP
Low capital and operating cost
Superior economics and performance over C5 alkylation
High quality TAME product without objectionable odor or color

Typical Overall Material Balance

Feeds	 LB/HR
C5s (Pentenes 50 wt. %)	102,133
Methanol	17,700
Hydrogen	29

Products	
C5 Raffinate	55,006
TAME product	63,410
Light ends (C4−)	1,446

TAME Product Composition (excluding C6+)

<table>
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<tr>
<th></th>
<th>Wt.%</th>
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<tbody>
<tr>
<td>C5s</td>
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<tr>
<td>Methanol</td>
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<td>TAA</td>
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