

# Nor-Par a.s

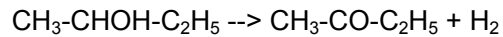
Methyl-Ethyl Ketone Manufacture, 15,000 metric tons per year

# MEK Process. Dehydrogenation of sec-Butanol

## DESCRIPTION:

The flowsheet shows a technology to make 15,000 MTPY of methyl ethyl ketone (MEK) by sec-butanol (SBA) dehydrogenation. It is a design study.

Fresh SBA is pumped onto the top of a scrubber (1), where residual MEK is removed from a byproduct hydrogen stream. Then SBA is vaporized and superheated before it enters the reactor system (6), where sec-butanol is dehydrogenated in a vapor phase reaction over a solid catalyst:



The reaction is highly endothermic and it is typically carried out in several reactors connected in parallel or in series.

According to literature (Kirk-Othmer), conversion of 90 % can be achieved fairly easily.

The reactor effluent is condensed, and hydrogen is flashed off. Crude MEK enters the distillation column (7), where MEK-H<sub>2</sub>O azeotrope goes to the top. The product is dehydrated on a rock salt bed, and the MEK-rich phase is condensed and recycled to the azeo column. Dried mixture of unconverted SBA and MEK is then distilled into 99.5 wt. % MEK product and SBA, the latter being recycled to the process feed stream.

Example in the Training Book explains handling multiple recycles, a reactor model, non-ideal VL equilibria, controllers, and modeling special operations, like rocksalt bed unit.