

MTBE Process with H₂SO₄ Catalyst

DESCRIPTION:

MTBE is made commercially by catalytic reaction between methanol and i-butylene. A widely used catalyst is an acidic ion exchange resin. This flowsheet shows the alternate route, where sulfuric acid is used as catalyst. The flowsheet was made according to published data. (Al-Jarallah, A.M., and Lee, A.K.K., "Economics of new MTBE design", Hydrocarbon Processing July 1988.)

The process is to make approximately 100,000 metric tons per year of the MTBE product.

A mixture of fresh and recycled methanol is mixed with a C4 stream and a mixture of fresh and recycled sulfuric acid, and reacted at elevated temperature and pressure in two sets of multistage, intercooled reactors in liquid phase. Most of H₂SO₄ is then separated in the settler and recycled to reaction. Sour organic phase is then neutralized with alkali and washed with water. Methanol is recovered from the aqueous phase by stripping with live steam and recycled to the process. The wash water recycle is purged to avoid Na₂SO₄ build-up. Washed organic phase is distilled to separate the MTBE product from spent butanes.

The Training Book explains the importance of Convergence Parameters in converging big, multi-recycled flowsheets. Calculations of WAR Environmental Report have been demonstrated. This feature allows the user to assess the environmental impact of waste streams.