

MEG Process via Formaldehyde

PEP Review 2019-08

November 2019



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Abstract

This review examines the technology and economics of producing Monoethylene glycol (MEG) from a C1 raw material, formaldehyde. The evaluation process entails a series of steps involving a brief process review followed by a more detailed parametric information about the technology such as process operation key conditions, process description, material and energy balance, equipment sizes, utilities consumption, and a process flowsheet. Process economics are presented in the latter part of the review.

The technology is basically a two-step process. In the first step, formaldehyde is hydroformylated to produce glycolaldehyde (GA), which is hydrogenated to MEG in the second step. Hydroformylation is carried out in a liquid-phase reaction, catalyzed by a ligand. The catalyst solution is extracted from the reactor product. GA is hydrogenated using Raney nickel as catalyst.

In the end, the economics of MEG production are presented for an integrated plant converting formaldehyde to GA and MEG. The IHS Markit estimates show that the production cost of MEG from this route is 37.44¢/lb, about 3.7¢/lb lower than the production cost of MEG made by the conventional route from ethylene via ethylene oxide. If the price of ethylene escalates faster than the price of methanol, this could become an attractive process for making MEG.

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