

Acetic Anhydride Production From Acetone

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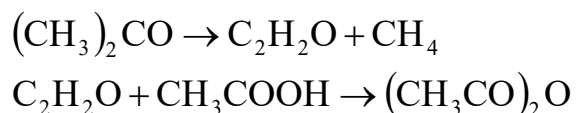
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Background:

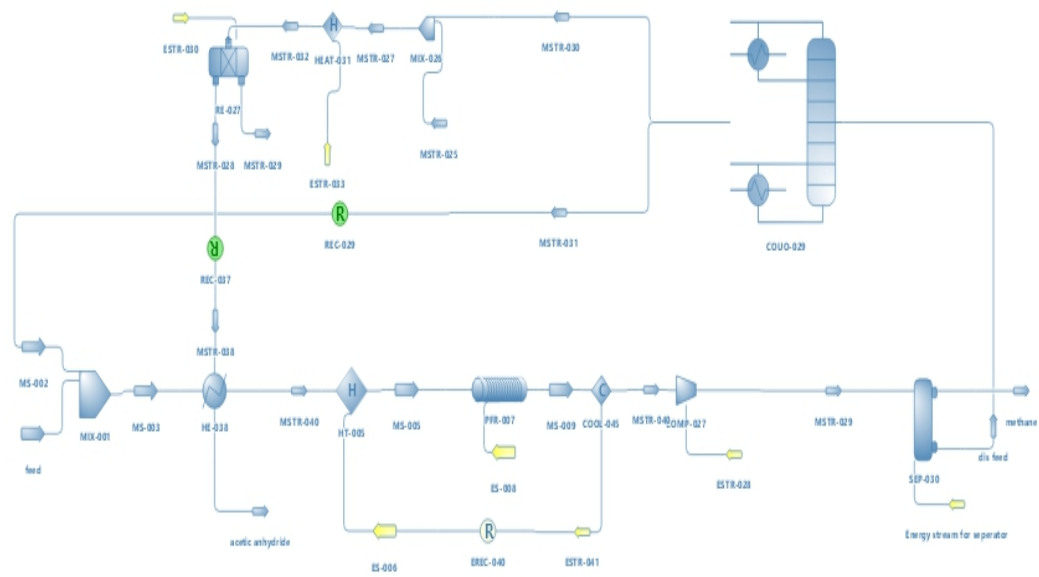
Acetic Anhydride is commonly abbreviated as Ac_2O , it has a chemical formula $(\text{CH}_3\text{CO})_2\text{O}$. It is widely used as a reagent in organic synthesis. It has a nonplanar structure. It was first synthesized in 1852 by heating benzoyl chloride and potassium acetate. Its largest use is preparation of cellulose acetate from cellulose, which is a component of photographic film, it is also applied in the manufacture of cigarette films. It is used in the manufacture of modified starches. Melting point is -73.1°C and boiling point is 139.8°C . This formation of acetic anhydride takes place in 2 steps. First acetone is cracked to produce ketene and methane, then ketene reacts with acetic acid to produce acetic anhydride. The organic compound acetone, or propanone, is the simplest and smallest ketone containing a carbonyl group bounded to two methyl groups. Acetone is a highly volatile, easily flammable and colorless liquid with characteristic pungent odor.

Description:

Here the simulation is performed to produce 2800 kg/hr of acetone. The reaction is carried out in two steps.



The process flowsheet for the production of acetic anhydride using acetone, followed by a cooling, compression, separating, distillation, step. The heat exchanger "HE-038" is used to heat the cold feed at the same time decreasing the temperature of the hot product stream.

Flowsheet:

Results:

From the results it is clear that the design gives 98.53wt% pure acetic anhydride is produced at an annual production rate of 24000 tons/year (1year=8,000 operating hours).