

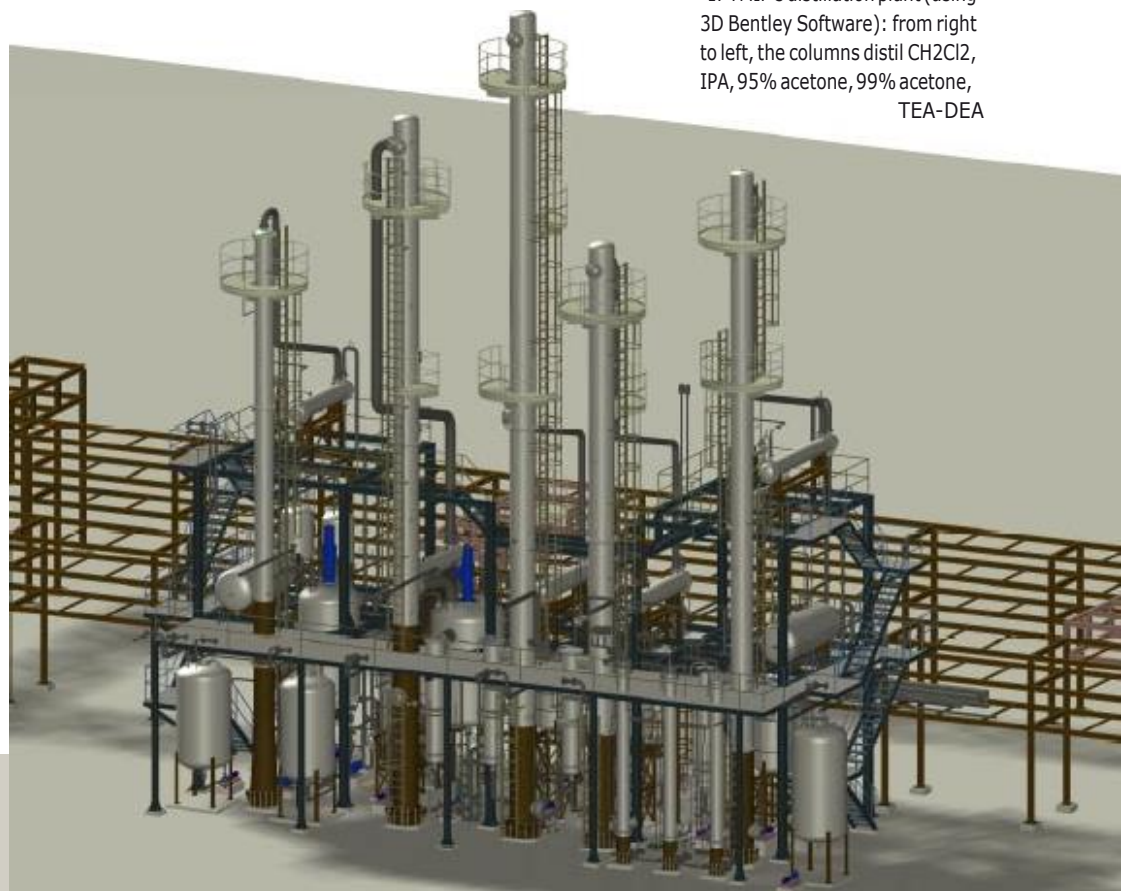


TMIP plants and solvents recovery by distillation

1. TMIP's distillation plant (using 3D Bentley Software): from right to left, the columns distil CH₂Cl₂, IPA, 95% acetone, 99% acetone, TEA-DEA

TMIP manufactures a wide range of distillation plants.

Presentation of solvent mixture distillation in pharmaceutical company who produce synthesis antibiotics and other active ingredients.



Recover Ring Solvents with Continuous Distillation



Over the years, TMIP has specialized in the recovery of solvents from the pharmaceutical industry by normal, extractive and azeotropic continuous distillation, to create products with a purity level greater than 99% from somewhat complex solvent blends. The mixtures suitable for distillation normally come from pharmaceutical companies who produce various types of synthetic antibiotics and other active ingredients.

When residues necessitate thermal oxidation for treatment, TMIP has developed incinerator technology involving relatively user-friendly plants that keep emissions within legal limits.

In particular, it has developed continuous distillation plants to recover complex mixtures from the following solvents: methylene chloride, isopropyl alcohol, acetone, TEA, DEA, ethyl alcohol, ethyl acetate and dimethylformamide.

comparing technology

In developing the distillations, in addition to using calculation programs such as ASPEN, laboratory distillations were performed on packing-type columns to verify the feasibility of distillation. A brief outline of the characteristics of the different distillation plants it makes follows.

distillation of Methylene chloride

An extractive distillation process is used to distil CH₂Cl₂.

Problems encountered and resolved have included: the elimination of the solvent's bad odor at a high temperature at the base of the column, elimination of the methanol from methylene chloride. Where additional dehydration is required, CMG has developed a dehydration molecular sieve technology with regeneration using hot nitrogen.

distillation of Pah

The problems encountered and resolved in distilling PAH have been: the almost total elimination of MIBK from the distilled product, using variations on the centrifuge method. Progress is being made to replace MIBK and at the same time laboratory studies are examining the possibility of separating it for distillation.

acetone distillation

A two-stage distillation process is used for acetone, the first extractive, whereby the methanol is separated from the acetone with the other solvents, and the second is classic distillation.



An important detail is that the first distillation stage, normally done continuously, may also be done as batch distillation to increase the plant flexibility.

recovering TEA

Recovering TEA is rather complex, it is a batch type process and entails the following stages:

- HCl is added to the initial solution which has a pH of approximately 13 in order to salify the amine until a pH 2.5 - 3 is obtained; the organic and aqueous stages are separated. The organic stage constituting a mixture of solvents can be sent for thermal oxidation, or an additional recovery of solvents present (PAH, acetone, MIBK). The acid aqueous stage, containing salified amine, is stored for subsequent stages;
- the aqueous stage is distilled to remove the solvents mixable in water to obtain a solvent-free purified aqueous stage;
- the aqueous stage is neutralized with a solution

of 20% NaOH to a pH of 12 to release the salified amine;

- the stages are separated and this time the organic stage, constituted practically of amine, water and traces of other solvents, is recovered for the final distillation while the aqueous stage is transferred to the water treatment plant;
- the organic stage is distilled, the first fractions are sent to thermal oxidation and the amine recovered is reused.

ethanol distillation

Anhydrous or azeotropic ethanol may be recovered depending on client needs. Anhydration can be done using molecular sieves in the steam stage or liquid stage, see distillation of methylene chloride, or by extractive distillation.

As the majority of the ethyl alcohol to be recovered comes from the production of blood products, the proteins in the solution are coagulated and then removed. This improves the quality of the product

and minimizes the problem of cleaning the plants.
