

4. Choline Chloride Plant

The purpose of the Choline Chloride Plant is to react together imported hydrochloric acid with TMA from methylamines plant and imported EO to produce Choline Chloride. The current capacity of the plant is approximately 14000 tpa.

The Choline Chloride plant was built in 1974.

4.1. Process Description

The reaction to form choline chloride is in two stages, each performed in a dedicated reactor, followed by a stripping section to concentrate the product to the correct strength for external sale by removing excess water.

The neutralisation reaction is the first stage of the choline chloride process. Aqueous 36% w/w hydrochloric acid (HCl) is reacted with liquid Trimethylamine (TMA) to produce aqueous Trimethylamine hydrochloride solution (TMA - HCl):

The reaction is not catalysed, and is instantaneous and highly exothermic, being the neutralisation of a strong acid by a strong base. The end-point of the neutralisation is indicated by the solution reaching a pH of 6.8.

The ethoxylation reaction is the second stage of the choline chloride process. It involves reacting aqueous Trimethylamine hydrochloride (TMA-HCl) solution with liquid EO to produce an aqueous solution of choline chloride:

The reaction is uncatalysed and highly exothermic but not instantaneous, so reaction temperature is controlled to maintain the correct reaction conditions. When the supply of EO to the reaction mixture ceases the mixture takes some time to come to equilibrium and a steady pH. Complete ethoxylation is indicated when the crude choline chloride solution reaches a steady value of pH 11.

The stripping column removes excess water the Choline Chloride bring a solutions at 75% in water.