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Methyl Chloride from Methanol and Hydrochloric Acid: A Petrochemical Reactor Design Study

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Abstract: *Mefhyl Chloride continues to maintain an important role as a petrochemical intermediate in a variety of synthesis processes. Originally used principally as an anaesthetic, refrigerant and in the synthesis of dyes, it has now entered such fields as fire extinguishers and the production of methyl siloxanes and quaternary compounds. The principal route to methyl chloride production is the hydrochlorination of methanol. The chlorination of methane or methane rich gases is also used where market considerations justify the separation of chloroform, methylene chloride and carbon tetrachloride which are also formed by this process route. In the methanol-based process, 35% aqueous hydrochloric acid is contacted with methanol by bubbling both vapours through an aqueous solution of zinc chloride catalyst at 140-160˚C. Water formed during the reaction has a dilution effect on the acid, part of which is recycled to the reactor, thus leaving large volumes of dilute acid for disposal. The disposal of this acid has been a problem until recent times when development in the chlorine cycle facilitated uses in (i) pickling of steel and (ii) oxidation to chlorine by the Deacon process. To date, there has been little data published on the kinetics of the methanol-HC1 reaction to facilitate the systematic design of the reactor for this process. The reaction involves the simultaneous processes of inter-phase mass transfer and chemical reaction, and hence the efficient dispersion of the reactant vapours is essential. The present study was undertaken to explore the kinetics in the above vapour-liquid reaction system and develop a rational approach to the design of an industrial scale reactor.*

Keywords: *Petrochemical, reactor design, Mefhyl Chloride, Methanol, Hydrochloric Acid*