Ethylene Dichloride production

Ethylene dichloride (1,2- Dichloroethane)

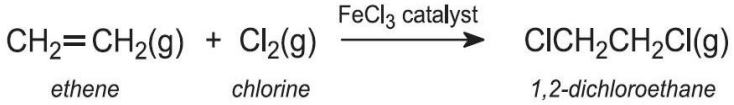
This compound is of interest as it is one of the intermediates for vinyl chloride monomer which polymerizes to polyvinyl chloride (PVC).

1. **Properties:**

Mol. Wt.	98.97
M.P.	-35.3^{o}C
B.P.	83.7^{o}C
Density@ 20^{o}C	1.257
Flash point	15.5^{o}C
Ignition Temperature	412^{o}C
Explosive Limits	Lower= 6.2%
	Upper=15.9%
Maximum toxicity limit	75-100 ppm

2. **End use**
   Vinyl chloride, Antiknock agent, solvent.
3. **Methods of production.**
   3.1.Classification of processes
   - Reaction of chlorine with ethylene in liquid or vapor phase.
   - By-product of direct chlorination of ethane to ethyl chloride.
   - By-product of chlorinated hydrocarbons.

   3.2.Ethylene+ chlorine reaction
   - Chemical reaction



   - Quantitative requirements
     (a) Basis: 1 ton of ethylene dichloride (95% yield)
     Ethylene – 0.30 ton
     Chlorine - 0.75 ton
     Ethylene dibromide catalyst- trace
     Cooling water- 48 tns
     Co-products: HCl, propylene chloride, polychloroethanes
     (b) Plant capacities: 30-150 tons/day
   - **Process description**
     Ethylene is mixes with chlorine and bubbled through a liquid phase reactor. Ethylene dichloride product serves as the reacting medium. Heat

of reaction is controlled by external heat exchange and recycle, or by coil or jacket heat transfer, to hold the reactor at 45-50^{o}C with a pressure of 1.5-2 atm. Traces of ferric chloride or ethylene dibromide as catalyst gives 90-95% yield with little dimer formation. The gaseous products are cooled in two stages to strip the acid gas of ethylene dichloride. The liquid product is alkali washed and fractionated.