

INTRODUCTION:

Chlorine is the eleventh most abundant element in the lithosphere. It is highly reactive and hence rarely found in the free state. It exists mainly in the form of chlorides. In seawater it is present as 2.9 wt% NaCl and 0.3 wt% MgCl₂. In salt deposits formed by evaporation of seawater, chlorine is present in large quantities as rock salt (NaCl) and Sylrite (KCl), together with bischofite (MgCl₂ · 6 H₂O), Carnallite (KCl · MgCl₂ · 6 H₂O), Tachhydrite (CaCl₂ · 2MgCl₂ · 12 H₂O) and others. Occasionally it is also found as heavy metal chlorides, usually in the form of double salts such as atacamite (CuCl₂ · 3Cu(OH)₂). Plants and animals always contain chlorine in the form of chlorides or free HCl.

Cl₂ is formed by oxidation of HCl or chlorides by compounds such as Manganese dioxide, permanganates, dichromate, chlorates or bleaching powder. Oxygen from the atmosphere acts as an oxidizing agent in the presence of catalysts.

Initially chlorine was prepared by oxidation of HCl using manganese dioxide for bleaching purposes in textile industries. This process was developed by WELDON but the yield obtained was very less and was about 35%. Later DEACON developed a process based on oxidation of HCl gas by atmospheric oxygen in the presence of copper salt (CuCl₂) and the yield was 65% of the theoretical value.

In 1800 A.D CRUICKSHANK first prepared chlorine electrochemically. In this process a diaphragm cell or a mercury cell is used. Currently 95% of world's production of Cl₂ is done by using this chlor-alkali process. Today world's capacity of production of chlorine is more than 80 x 10⁶ tones/ annum.

CHLORINE IN INDIA:

The birth of chlorine industries in India has been recent and dates back to the 1920's. The plants were set up mainly to meet the requirement of the pulp and bleaching industries. However, with the start of the caustic soda industries, the chlorine was available in plenty and it was even necessary to dispose it off. The main plants in India that manufactures chlorine by the electrolysis of brine are: -

1. D.C.M Chemicals
2. Tata Chemicals
3. National rayon corporation
4. Travancore Cochin Chemicals
5. Mettur Chemicals

Almost all of the above plants were set up with a short span of years, with the result that there was a marked increases in the chlorine production. But soon, with the Government of India following a policy of planned development, it was possible to find channels where chlorine could be effectively utilized. With the setting up of organic chemical industries for the manufacture of such diverse products as PVC, DDT, BHC, etc, the demand of chlorine has gone up.