Bleaching powder (or) Chloride of lime, $CaOCl_2$ (or) Ca(OCl) Cl.

- It is a mixture of $CaCl_2$ and $Ca(OCl)_2$ (calcium hypochlorite)
- It is also called calcium chloro hypochlorite or calcium oxychloride.

Manufacture :

- It is manufactured in Bachmann's plant.
- Cl_2 gas is passed into dry slaked lime

  $Ca(OH)_2 + Cl_2 \rightarrow CaOCl_2 + H_2O$
- The plant is a vertical cast iron tower
- It has two inlets, one for hot air just above the base, second inlet is for Cl_2 just above the 1st inlet.
- Hopper is arranged at the top for sending slaked lime.
- Exit is arranged just blow the hopper for the escape of unused Cl_2 and air.
- Horizontal shelves with rotating rakes are arranged at regular heights.
- Dry slaked lime moves downwards with the help of rotating rakes and Cl_2 moves up.
- $CaOCl_2$ is formed based on the "principle of counter currents".
- Principle of counter currents means reactants will react by moving.
- Hot air drives away unreacted chlorine.

Physical properties :

- Yellowish white powder with smell of chlorine
- Most of it is soluble in water but a small amount of insoluble lime.
- **Chemical properties :**
- Reactions of bleaching powder are
  i) with insufficient and excess dilute acid
  ii) auto oxidation
  iii) catalytic decomposition
  iv) with cold and hot water
  v) oxidation of lead salts and ethyl alcohol

  (i) A. with insufficient dilute acid : It first forms HOCl and finally releases O_2.

  $CaOCl_2 + H_2SO_4 \rightarrow CaSO_4 + CaCl_2 + 2HCl + O_2$

  It is good oxidising agent at is liberates nascent oxygen.

  B. with excess of dilute acid :

  $CaOCl_2 + H_2SO_4 \rightarrow CaSO_4 + H_2O + Cl_2$

  $CaOCl_2 + CO_2 \rightarrow CaCO_3 + Cl_2$

  The released Cl_2 is called available chlorine.

  A good sample releases 35 – 38% available Cl_2. Theoretically the amount of Cl_2 in $CaOCl_2$ is 56%.

(ii) Autoxidation (Reaction in air)

On long standing in air, it decomposes

$$6CaOCl_2 \rightarrow 5CaCl_2 + Ca(ClO_3)_2$$

Because of this auto oxidation , it looses its available chlorine and bleaching property is affected.

(iii) Catalytic decomposition :

$$2CaOCl_2 \xrightarrow{CoCl_2} 2CaCl_2 + O_2$$

Cobalt choride is the catalyst

(iv) A. With cold water : $CaOCl_2 \rightarrow Ca^{2+} + Cl^- + ClO^-$

B. with hot water : It undergoes auto oxidation giving Cl^- and ClO_3^- ; $3OCl^- \rightarrow ClO_3^- + 2Cl^-$.

Oxidising property :

A. Lead salts $\rightarrow PbO_2$

B. $C_2H_5OH \xrightarrow[(O)]{CaOCl_2} CH_3CHO$

C. $C_2H_5OH \xrightarrow[(O)]{CaOCl_2} CHCl_3$

Uses :

- Oxidsing agent, chlorinating agent
- Bleaching agent for cotton and paper pulp
- Disinfectant, germicide and sterilizes water
- In the preparation of chloroform.