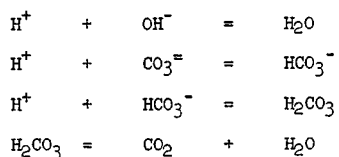


B. Limestone and Dolomite Systems:--Limestones and dolomites are naturally occurring carbonate minerals. The ratio of Ca to Mg varies. Stones with a high Ca content are classed as limestones, CaCO_3 . A dolomite has a composition by weight of 54.3 percent CaCO_3 and 45.7 percent MgCO_3 . Limestones and dolomites from different beds have different physical and to some extent, chemical properties.

The chemical equilibrium involved in limestone neutralization include the following:



The pH of limestone in distilled CO_2 -free water varies between 8 and 9. However, due to equilibria between acid mine water constituents and also due to CO_2 content of the treated water, the pH of the resulting solution is between 6 to 7.5. With rigorous aeration, pH values as high as 8 have been reported.(45)

1. Early Work--The first reported application of limestone to acid mine drainage treatment was at the Calumet Mine, Westmoreland County, Pennsylvania, in the year 1916. The process was described by Tracy, 1921.(44) Calcium carbonate limestone was mixed in powder form with an acid mine drainage and the precipitate was thickened by sedimentation and finally dried on a steam drum. The object of the process was to prepare water for industrial purposes and iron oxide for gas purification and for use as a pigment. The process of acid mine drainage in a tank filled with marl was reported by Mason, 1922 (45), and Travers, 1928b (46) was granted Patents relating to the use of porous limestone for the treatment of acid mine drainage. In this process, the bulk of the acidity was removed by limestone and the neutralization was completed by lime.