National Lime Association

LIME

The Versatile Chemical

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PULP AND PAPER

Lime is an important commodity for the pulp and paper industry, although the shift from acidic to alkaline processes has affected its use.

Sulfate Process

By far the largest application of lime in pulp manufacture is as a causticizing agent in sulfate (Kraft) plants. Here, the waste sodium carbonate solution recovered and reacted with high calcium lime to generate caustic soda for reuse in the process ($Na_2CO_3 + CaO + H_2O \rightarrow CACO_3 + 2NaOH$). Most large sulfate plants recover about 90-98 percent of the lime by dewatering the waste calcium carbonate mud resulting from the causticization reaction, then calcining it in rotary kilns. A chain section in the kiln dries and pelletizes the sludge before calcining. "Make-up" lime is purchased from commercial lime plants.

Sulfite Process

Sulfite plants formerly consumed considerable quantities of quicklime in the preparation of calcium bisulfite, an acid cooking liquor, which in turn is used to digest or dissolve the non-cellulosic constituents of the wood chips (paper and pulp stock). In this process lime is reacted with sulfur dioxide to produce the bisulfite liquor. This process is on the wane due to waste disposal problems.

Bleaching

In all pulp manufacturing processes, including the soda pulp process, lime is used in the preparation of calcium hypochlorite bleach liquor through the interaction of lime and chlorine. Calcium hypochlorite, which is the oldest known and lowest cost bleach, is used extensively to bleach the pulp to the desired degree of whiteness.

Miscellaneous

Lime is used in the treatment of pulp and paper mill liquid wastes as a coagulant in color removal, a filtration conditioner and to a lesser extent as a neutralizing agent. It is also used in the recovery of valuable by-products from pulp and paper mill wastes. It is used commercially to recover alcohol, calcium lignosulfonate, and yeast.