

LEAD INDUSTRY ASSOCIATION

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NEW YORK 17, N. Y.

METALLIC LEAD PRODUCTS DIVISION

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To Members of the Metallic Lead Products Divisions

Attached is a reprint from the Corrosion Forum Section of CHEMICAL ENGINEERING, November, 1950, evaluating the services of lead as a construction material in bleaching operations in the paper industry.

This is the second of three sections which cover stock handling, bleaching and acid pulping. The first section, stock handling, was published in the September, 1950, issue of CHEMICAL ENGINEERING and was sent to members as Chemical Bulletin No. 36.

Very truly yours,

Robert L. Geyer
Secretary



Construction Materials in the Paper Industry

Part II—Bleaching

Part II of a presentation in which materials of construction are evaluated for various services in the paper industry. Part I appeared in the September issue and dealt with stock handling. Parts III and IV will deal with acid pulping and alkaline pulping, respectively.

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Lead

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The bleaching of wood pulp (groundwood, sulphite, soda or sulphate) has for its object the production of a whiter and brighter stock. It improves the natural color of the pulp and also brightens pulps containing metallic compounds such as iron tannates. In addition, bleaching may also involve the purification of cellulose fiber by chemically removing ligninous material as well as other residues in the pulp.

Groundwood is generally bleached by applying dilute solutions of calcium or sodium hypochlorite to the pulp, or by adding small quantities of zinc hydrosulphite either continuously by means of a dry feeder or batchwise or as an aqueous suspension from a closed mixing tank.

Sulphite and soda pulps have for many years been bleached almost exclusively with a solution of calcium hypochlorite. This was prepared by mixing bleaching powder with water and drawing off the clear, supernatant liquid. Within recent years this practice has given way to the use of liquid chlorine and milk of lime. Recent advances in the technique of bleaching make use of direct chlorination of the pulp slink with hypochlorite and other chemical treatment.

The equipment now in use for carrying out the bleaching operation

varies considerably. In the bleaching of all chemical pulps, lead is used to handle chlorine gas under approximately atmospheric conditions of temperature and pressure, particularly in the bleach liquor make-up tanks where a perforated lead coil in the bottom of the tank is used to get gas distribution.

Lead is recommended as a material for handling moist chlorine up to 230 deg. F.

A continuous pulp bleaching operation using sulphurous acid in two antimonial lead-lined tanks has been put into use in a West Coast mill. One tank is used for 24 hr. and then cut out while the other is used for the next 24 hr. Antimonial lead valves and pipe serve to convey the bleaching solution, a water solution of sulphur dioxide at room temperature.

First developed to procure a brighter paper from Western groundwood, zinc hydrosulphite is now a standard bleach for newspaper, specialty papers, cheap magazine and catalog papers and various boards. In kraft manufacture it is used as a brightening agent but not as a substitute for the complete bleaching process.

Chemically, zinc hydrosulphite is $ZnSO_3 \cdot xH_2O$, a white, anhydrous powder. A saturated solution contains 17 percent hydrosulphite. It has a powerful bleaching action, far exceeding that of sulphur dioxide or bisulphites.

Bleaching action at ordinary temperatures is usually completed in less than 5 min. It is non-polluting and only slightly corrosive on the skin but does attack most metals with the exception of lead.

Zinc hydrosulphite is manufactured from liquid sulphur dioxide and zinc dust in lead-lined tanks using cooling coils made of lead. Bleaching operations employed liquid zinc hydrosulphite use lead pipe lines for conveying the chemical to the point of use.

While the bleaching of groundwood by the zinc hydrosulphite method is not widespread, lead is excellent for handling the stock after the zinc has been added. In one process now in use, the zinc hydrosulphite powder is added to the pulp at a predetermined rate, passed through a pump to get thorough mixing, delivered to a chest or tank and allowed to stand until bleaching is completed. Because the pulp and zinc hydrosulphite mixture is acid (pH 4.5) from the presence of sulphur dioxide and other sulphur compounds, the use of lead is definitely warranted. Lead also has the important advantage at this point of not discoloring the pulp.

Recently hydrogen peroxide has been used for bleaching certain wood pulps. Lead can be used to handle this chemical at practically all normal bleaching concentrations with little or no corrosion.