

AMERICAN SOCIETY OF METALS

ONE WESTERN AVENUE

NEW YORK 17, N. Y.

METALLIC LEAD PRODUCTS DIVISION

February 28, 1947

To Members of the Metallic Lead Products Division:

For your information, we are enclosing a copy of a reprint of an article on the performance of lead in contact with wet and dry chlorine, appearing in the Corrosion Forum Section of "Chemical Engineering," January, 1947. This is the third in a series of articles, the first two of which were covered by Chemical Bulletins Nos. 2 and 9.

Additional copies of this reprint are available upon request.

Very truly yours,

Robert L. Ziegfeld
Robert L. Ziegfeld
Assistant Secretary

Wet and Dry Chlorine vs. Materials of Chemical Plant Construction

LEAD

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Lead is recommended as a material for handling moist chlorine up to 210 deg. F. with slight corrosion, and the chemical when dry has very little effect on lead. Small amounts of chlorine, such as are used in water treatment, have no effect on lead. For handling hydrochloric acid, the use of lead is not generally recommended, but at normal temperatures there is only slight corrosion in concentrations up to 50 percent, and at 212 deg. F. concentrations as high as 20 percent have been used. Then, when chlorine with some moisture present results in the formation of small amounts of dilute hydrochloric acid, there is a possibility of slight corrosion depending in amount upon other conditions.

Chlorine is a gas at room temperature and is inert to most metals when cool and dry, but the dry gas when heated attacks all metals to a certain extent. Hydrochloric and hypochlorous acids, formed in the presence of moisture, attack most metals except platinum, silver, lead, and certain special alloys. A protective layer of lead chloride forms over the lead and further corrosion is resisted while the

film remains intact. This protective film permits leads run with moist chlorine up to 210 deg. F. with only slight corrosion.

Lead pipe is used to introduce chlorine gas or liquid into a bath of caustic in a caustic tank in the manufacture of sodium hypochlorite. Pure lead tolerates great satisfactory length of service without undue expense. In general, at room temperature, corrosion of lead by wet or dry chlorine, either liquid or gaseous, is sufficiently moderate to recommend its use from an economic standpoint.

In nine years time, there has been apparently no attack on lead-lined sulfur tanks of 40 and 50-ft. dia. where a solution containing 1.9 g. per l. of chlorine, with other corrosives, is handled. This solution is at approximately 125 deg. F. and is saturated with sulphur dioxide.

Relatively rapid corrosion takes place if lead contains a trace of chloride or is immersed in a relatively strong solution of a chloride and is subsequently exposed to the air. This is the result of a catalytic action in which the chloride acts as an intermediary with the formation of sodium carbonate and lead chloride which is subsequently attacked by the moisture and carbon dioxide in the air to form lead carbonate and sodium chloride.

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