

LEAD INDUSTRIES ASSOCIATION

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SUBJECT: NEW CORROSION-RESISTANT PLASTIC PIPE

TRADE NAME: KraliteMANUFACTURER: U.S. Rubber Company

PROPERTIES:

Kralite is a blend of synthetic rubber and resins available in two varieties. One is extruded or compression molded, followed by curing. At temperatures ranging from 150° to 180° F this material becomes rubbery. The other variety is injection molded and is thermoplastic. It softens in the same temperature range as above.

This material is resistant to attack by sulfuric acid in concentrations up to 50%. Corrosion resistance, it is believed, is essentially unaltered by increasing temperature. However, since both forms of this material become rubbery or soften at elevated temperatures, their corrosion resistance is a secondary consideration.

Coefficient of linear expansion is approximately 3×10^{-6} in./in./°F or over twice that of lead.

Kralite weighs approximately 0.32 lbs. per ft.

FORMS AVAILABLE:

Kralite production is still in the process of refinement and availability at present is somewhat limited. From four to six weeks are required for delivery of 100 ft. of 1-in. pipe. Eventually it will be supplied in rigid and semi-rigid forms in sizes ranging from $\frac{1}{2}$ to 2 in. outside diameter. In pipe form it may be bent to various radii and threaded for fittings. It can be furnished in 10 ft. lengths only.

COST:

One hundred feet of Kralite pipe in 10 ft. lengths 0.957 in. I.D. x 1.315 in. O.D. x 0.179 in. wall, designed for operation at normal temperatures with 50% sulfuric acid costs \$30.00.

For comparison the cost of a similar quantity of standard lead pipe recommended for the same use is quoted. One hundred feet (continuous if desired) of lead pipe class 50 (A or B) conforming to federal specification WW-P-325,



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1 in. I.D. x 1.428 in. O.D. x 0.214 in. wall thickness; nominal weight 4 lb./ft., costs about \$90.00.

Price is based on September 21 issue of American Metal Market which quotes lead pipe at 22½¢ per lb.

Neither quotation includes costs of installation.

CONCLUSIONS:

While Kralite will most likely find its place in industry as a corrosive handling material it is unlikely that it will offer serious competition to lead.

The basic costs are very nearly the same. Installation costs are in favor of lead since it can be fabricated in one continuous length. Kralite is available in 10 ft. lengths only which have to be joined by threaded fittings. The danger of leakage at pipe fittings is always present but because of the comparative structural weakness of Kralite this shortcoming is especially significant. Another factor favoring the cost of lead installation is the high salvage value of lead. Practically none of the original cost can be recovered in a Kralite installation.

Since its form restricts its use primarily to piping, the behavior of Kralite at elevated temperatures, which are well within the practical range for lead, is sufficient to discourage its use as a substitute for lead piping. Softening characteristics of Kralite indicate that at temperatures around 150° F it may be necessary to provide continuous support to prevent sagging. At lower temperatures, since the material is lighter than lead, support other than overhead straps may not be needed. Manufacturers have not had enough actual field experience to be able to predict accurately what may happen to their material under different industrial service conditions.

Kralite is limited to handling H₂SO₄ concentrations up to 50%. Lead is commonly used with H₂SO₄ concentrations up to 96%. Lead is used with 85% acid at temperatures as high as 250° F, well above the softening range of Kralite. A comparatively large coefficient of expansion has long been a property of lead that could not be ignored by the design engineer; Kralite expands over twice as much as lead under the same conditions, making the problem of expansion that much more difficult.

Due to the possibility of plumbism, the use of lead piping has been restricted in the manufacture of foodstuffs and beverages. Here Kralite may fit in very well.

INFORMATION SOURCES:

1. U.S. Rubber Co., Mech. Goods Div., 191 Hudson St., New York, N. Y.
 - a. Interview
 - b. Correspondence
 - c. Quotation