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DOCUMENT DESCRIPTION: Memo RE Rust and Corrosion - 85% Magnesium vs. 'Kaylo'

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THE MAGNESIA INSULATION MANUFACTURERS ASSOCIATION
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February 3, 1953

M.I.M.A. Release 53-6

TO: Mr. Alvin M. Emret, Jr.

SUBJECT: Rust and Corrosion - 85% Magnesia vs. "Kaylo"

FROM: Mr. Harry A. Kieselbach

Mr. Muehleck has requested that the following report of tests described by the writer at our meeting on January 22nd be furnished you in triplicate.

Please bear in mind that these tests were of the "kitchen laboratory" type and can serve only as indicators. They are subject to check by properly controlled tests simulating actual service conditions.

Purpose of Tests

(1) To check reported claims by Kaylo salesman that:
(a) 85% Magnesia accelerates rusting of iron pipe.
(b) Kaylo inhibits rusting.

(2) To determine whether 85% Magnesia will cause corrosion (electrolysis) in the absence of oxygen.

(3) Do. Kaylo.

(4) To determine whether 85% Magnesia made with wax and asphalt emulsions exhibits less chemical activity than the untreated product.

Materials used in Tests

Standard 85% Magnesia Block (J-M)
Kaylo Block.
Small cube of "W.R." Magnesia (J-M)
Canadian Asbestos Shorts (J-M) (for voltage readings only)

RUSTING

Test No. 1.

Iron filings were sprinkled on lumps of 85% Magnesia, Kaylo and "W.R." Magnesia which had been allowed to soak, submerged, in open dishes of tap water for 24 hours.

Duration of test - 20 days. (Tap water was used to make up for evaporation).

Results -- All samples showed about the same amount of rusting.

Test No. 2.

Thin strips of iron (from F/C bands) were placed in open test tubes containing:

(a) Tap water.
(b) Tap water in which 85% Magnesia had been allowed to soak.
(c) Do. Kaylo.
(d) Boiled tap water (to remove air) in rubber stoppered test tube.

Results -- Very little difference in the quantity of sediment in "a", "b" and "c". A few specks in "d".

Note: This test was conducted at an average temperature of about 80 deg. F. The test tubes were suspended at an angle of about 60 deg. and about two inches above a 1½" steam heating return line to induce slight convection currents in the liquids in the test tubes. The return line was warm about 50% of the time during the day and about 25% during the night.

ELECTROLYSIS (AIR EXCLUDED)

Test No. 1.

Strips of iron were bolted to strips of sheet brass and placed in rubber-stoppered test tubes containing:

(a) Tap water in which 85% Magnesia had been allowed to soak.
(b) Do. Kaylo.
(c) Do. "W.R." Magnesia.

USAA 820129

Test tubes were supported in the manner described for "Rusting" tests for a period of about two months.

Results — Kaylo showed the greatest corrosion deposit at bottom of test tube. Magnesia showed about 1/3 that of Kaylo. "W.R."Magnesia showed about 1/10 that of 85% Magnesia.

These results indicate that with an improvement in the "W.R." process corrosion might be completely eliminated. They also indicate the reason for the activity of the manufacturers of Kaylo insulation in research on water-repellency.

ELECTROLYSIS AND OXIDATION

The purpose of this test was to determine whether these materials would form electrolytes when immersed in water and to obtain an approximation of the voltages developed between an iron pipe and a brass valve or fitting exposed to such materials under water. (The composition of the brass or bronze used in the manufacture of valves is probably different from the sheet brass used in this test and might show somewhat different results.)

Strips of iron and brass, connected electrically, were suspended in open jars containing tap water and:

(a) Lumps of 85% Magnesia
(b) Lumps of Kaylo.
(c) Canadian Asbestos Shorts

The jars were placed on top of an insulated house heating steam boiler and maintained at an average temperature of about 95 deg.F. The liquid level in the jars varied due to evaporation and the contents were allowed to dry completely three times during the test.

Voltage Readings, Brass to Iron (Meter 20,000 ohms per volt)

(a) 0.52 Volts average.
(b) 0.48 " "
(c) 0.38 " "

Current Readings, Brass to Iron (Meter 4,166 ohms)

(a) 600 microamperes average - about 300 ua/sq. in. of iron.
(b) 500 microamperes average - about 250 ua/sq. in. of iron.
(c) Not measured.

USAA 620130

The Iron Strips Showed Rust Deposits as follows:

(a) Very little. Located at level of average water-line.
(b) Entire surface heavily covered.
(c) About 50% of surface. Extending down from water-line.

Sediment

As the test proceeded a deposit of rust settled over the contents of the Magnesia jar and a dark green deposit formed in the Kaylo jar immediately under the iron electrode.

General

On the basis of these crude tests, the writer believes it safe to assume that Kaylo will not cause less rust or corrosion (electrolysis) than 85% Magnesia on piping submerged under water. In fact, the opposite may be the case.

It appears that accurate laboratory tests, simulating actual service conditions, could be used to advantage in overcoming the claims made by this competitor.

Very truly yours,

H. A. Kieselbach

HAK/bh