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OTTAWA December 5, 1945.

REPORT

of the

ORE DRESSING AND METALLURGICAL LABORATORIES.

Investigation No. 1975.

Cathodic Protection of Foundrinier Wire Screening in Groundwood Stock by Magnesium Alloy AZ63X.

(Copy No. 6.)

Division of Metallic Minerals

Physical Metallurgy ()Research Laboratories

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DEPARTMENT OF MINES AND RESOURCES lines and Geology Branch

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#### Background:

A letter, dated November 13, 1945, requesting assistance on the problem of corrosion of fourdrinier wire was received from Dr. R. D. Duncan, Director of Research, Canadian International Paper Company, Gatineau, Quebec, also copies of letters sent to Mr. S. A. McCatty, Dominion Magnesium Limited, Haley, Ontario. Samples of the wire screening and groundwood stock were also submitted.

It was decided to investigate the usefulness of magnesium alloy No. AZ63X for cathodic protection of the fourdrinier wire screening used on equipment to thicken groundwood stock.

# Tests Performed:

#### A. - pH Determination.

The pH of the groundwood stock was found to be 4.5 when determined by Accutint papers.

## B. - Conductivity.

The conductivity of the groundwood stock supplied was found to be equivalent to that of 150 parts per million of sodium chloride. The determination was made on a Barnstead Purity Meter.

# C. - Potential Between AZ63X Alloy and Fourdrinier Screen.

The potential between AZ63X alloy and the new fourdrinier wire screen supplied, both cleaned of all oxide, was found to be 1.3 volts in the sample of groundwood pulp solution. The determination was made with no current passing.

### D. - Total Immersion Corrosion Test.

Two samples of screen with AZ63X magnesium alloy anodes attached were placed in the groundwood stock supplied. Some agitation was obtained by mechanical moving of the specimens. The area of one screen was five times the surface area of the magnesium anode. The area of the other screen was fifteen times the surface area of the magnesium anode. The temperature was controlled in a thermostatted room at 95  $\pm 2^{\circ}$  F.

After four days the samples were removed and photographed (see Figure 1). The anodes were then removed from the screen and the screen and anodes were cleaned. A slight gain in weight was found in both samples of screen, due to adherence of small particles of groundwood. The loss in weight in the magnesium is given in Table I as average inches penetration per day.

(Continued on next page)

- Page 3 -

(Tests Performed, cont'd) -

1

### TABLE I.

	Avei	rage Penetration Per Day, inches
Magnesium anode from fourdrinier screen 5X area of anode.	-	0.00071
Magnesium anode from fourdrinier screen 15X area of anode	-	0.00079

## Figure 1.



FOURDRINIER SCREEN WITH AZ63X MAGNESIUM ALLOY ANODES ATTACHED, AFTER FOUR DAYS IN GROUNDWOOD STOCK.

Specimens not cleaned.

(Approximately actual size).

Conclusions:

1. From the results of the above tests it is expected that AZ63X Alloy magnesium anodes will protect the fourdrinier screen from corrosion in the groundwood stock.

2. From the results in Table I, it appears that the method of protection should prove quite economical.

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