See Gurtler Report #1865

File

FILE COPY

O T T A W A April 16th, 1945.

R E P O R T

of the

ORE DRESSING AND METALLURGICAL LABORATORIES.

Investigation No. 1839.

Corrosion Protection Afforded to Steel by a Typical Organic Silicon Oxide Polymer.

Copy No. 10.)

Bureau of Mines
Division of Metallic Minerals
Physical Metallurgy Research Laboratories

CANADA
DEPARTMENT OF MINES AND RESOURCES
Mines and Geology Branch

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Background:

On February 26, 1945, a letter was written to Cmdr. (E) G. Taylor, of the British Admiralty Technical Mission, Ottawa, Ontario, supplying information given by the manufacturers on the properties of the new organic silicon oxide polymers. In this letter it was stated that the corrosion resistance properties and the cost of these materials would be investigated by these Laboratories at an early date.

On March 6, 1945, Commander Taylor wrote (letter, File No. 11-1-1-1) asking to be informed of the results of this investigation.

File C929

Corrosion-Resistance Properties:

Procedure -

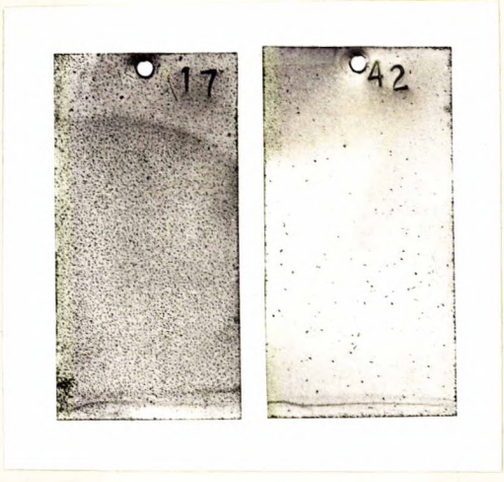
Two panels of mild steel were sandblasted on both sides. One of them was washed thoroughly with Baker's "C.P." petroleum ether having a boiling range of 35° to 60° C. Then both panels were treated on one side with Dow Corning Fluid No. 500 (viscosity of 50 centistokes at 25° C.) and kept in a humidity cabinet, at 48° C. and 95 to 100 per cent relative humidity, for 6 days.

Results -

At the end of the 6-day test both samples were corroded on both sides. The panel which had been treated with the petroleum ether was corroded much less than the other. In the case of each panel the side which had been treated with the Fluid No. 500 was corroded about as much as the untreated side.

Photographs of the corroded panels are shown in Figure 1.

Figure 1.



a b

PANELS TREATED WITH DOW CORNING FLUID NO. 500 AND THEN TESTED FOR SIX DAYS IN THE HUMIDITY CABINET AT 48° C. AND 95 TO 100 PER CENT RELATIVE HUMIDITY.

a. This panel was sandblasted before treatment with the fluid.

b. This panel was sandblasted and washed thoroughly with petroleum ether before treatment with the fluid.

(Approximately 1/2 actual size).

Cost Data:

Dow Corning Fluid No. 500 (viscosity of 50 centistokes at 25° C.) costs $5.70 per pound, in 50-gallon drums.

Conclusions:

The present investigation has brought out the following points:

1. Dow Corning Fluid No. 500 seems neither to promote nor to prevent the corrosion of steel. This is true whether or not the steel surface has been cleaned with organic solvent prior to the application of the Fluid.

2. The cost of the Fluid is extremely high. However, it should be pointed out that these organic silicon oxide polymers have been developed only quite recently. When extensive industrial use has been found for them they will be manufactured in much larger quantities and consequently the cost of manufacture and the cost to the consumer should be greatly reduced.

Recommendation:

In spite of the many desirable properties listed in the letter of February 26, the Dow Corning Fluid No. 500 probably is much too expensive at the present time to be used in buffer cylinders. However, it is suggested that this fluid be kept in mind in view of the fact that the price probably will decrease substantially.

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