File

DEPARTMENT OF MINES AND RESOURCES

BUREAU OF MINES

CANADA

Ottawa, October 7, 1946.

R E P O R T

of the

ORE DRESSING AND METALLURGICAL LABORATORIES.

Investigation No. 2109.

Effect of Concentration and Mixing of Anti-Corrosion Oils to Specification C-27-587.

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(Copy No. 6.)

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Background:

A letter dated July 31, 1946, File 1034A-1-15(SAISO), was received from Squadron Leader N. S. Spence for Wing Commander L. H. Kottmeier, for A.O.C., R. C. A. F. Maintenance Command, Department of National Defence, Air Service, Ottawa, Canada, requesting that the following two samples of oil be investigated in accordance with the requirements of Specification C-27-587:

(a) Shell Anti-Corrosion Oil,
(b) Intava Anti-Corrosion Concentrate.

It was further requested that (1) equal portions of both samples be mixed and the mixture tested to the requirements of Paragraph 2(h), (m) and (n) of the specification, and (2) if one or both concentrates failed in the normal test, the tests should be repeated using a 1:1 mixture of concentrate and diluent instead of the usual 1:3 mixture.

The two samples were furnished by the R. C. A. F.

Investigation:

The following tests were performed on the two samples by the Fuel Research Laboratories of the Bureau of Mines, Ottawa:

TABLE I.

	Specification	Shell	Intava
Separation after 24 hours at 210° F.	None.	None.	None.
Pour Point, ° F.	20 (max.)	10	15
Viscosity, seconds Saybolt Universal at 100° F.	-	1,667	1,752
" " " 210° F. (after elimination of volatile content)	100-125	121	125
Flash Point, ° F. (Cleveland open cup)	350 (min.)	495	500
Precipitation No.	0.1 (max.)	0.02	0.07
Carbon Residue (% by wt.), Conradson	2.5 (max.)	1.4	1.5
Corrosion (copper strip 2 hours at 212° F.)	Negative.	Negative.	Negative.
Ash, % by wt.	1.0 (max.)	0.43	0.86
Viscosity Index	95 (min.)	99	99
Volatile Content, % by wt. (24 hours at 221° F.)	5 (max.)	0.65	0.8
Effect of compound on the colour-indicating property of cobalt-chloride-impregnated Silica-Gel.	Pass (no adverse effect).	Pass.	Pass.

The following tests were performed on the two samples in the Physical Metallurgy Research Laboratories of the Bureau of Mines:

(Investigation, cont'd) -

I. Normal Tests.

The two oils were tested according to Specification C-27-587, Paragraph 2 (m) and (n). The results are given in Table II.

TABLE II.

	Shell	Intava
Protection (Par. 2m)	Passed.	Failed. (See Figs. 1a and 1b)
Hydrobromic Acid Neutralization (Par. 2n)	Passed.	Failed. (See Figs. 2a and 2b)

II. Tests on Effect of Mixing Different Protective Oil Concentrates Together.

The two oils were mixed in equal proportions and the mixture was added to diluent in the proportion of 1:3. This mixture was tested according to Specification C-27-587, Paragraph 2 (m) and (n), except that the protection test ran for only one-third of the normal time. The results are given in Table III.

TABLE III.

	50-50 Mixture of Shell and Intava Concentrates
Protection (Par. 2m)	Failed. (See Figs. 3a and 3b)
Hydrobromic Acid Neutralization (Par. 2n)	Failed. (See Figs. 4a and 4b)

III. Tests on Effect of Concentration of Protective Oil Concentrate.

The Intava concentrate (which failed in the normal tests) was mixed 1 to 1 with the diluent instead of the usual 1 to 3. This mixture was tested according to Specification C-27-587, Paragraphs 2 (m) and (n), except that the protection test ran for only one-third of the normal time. The

(Investigation, cont'd) -

results are given in Table IV.

TABLE IV.

	50-50 Mixture of Intava Concentrate and Diluent
Protection (Par. 2m)	Failed. (See Figs. 5a and 5b)
Hydrobromic Acid Neutralization (Par. 2n)	Failed. (See Figs. 6a and 6b)

Note: The diluent used in all cases was the one described in P.M. Lab. Report 7970, dated September 20, 1946.

Conclusions:

From the above data it was concluded that:

1. Both Shell and Intava concentrates comply with all the specification tests performed by the Division of Fuels.

2. The shell concentrate passed the protection and hydrobromic acid neutralization tests as required in the specification.

3. The Intava concentrate did not pass the protection and hydrobromic acid neutralization tests in the specification.

4. The 50-50 mixture of Shell and Intava concentrates when mixed 1:3 with diluent did not pass the protection and hydrobromic acid neutralization tests in the specification.

5. The 50-50 mixture of Intava concentrate and diluent did not pass the protection and hydrobromic acid neutralization tests in the specification.

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(Figures 1 to 6 follow, on Pages 5 to 7.)

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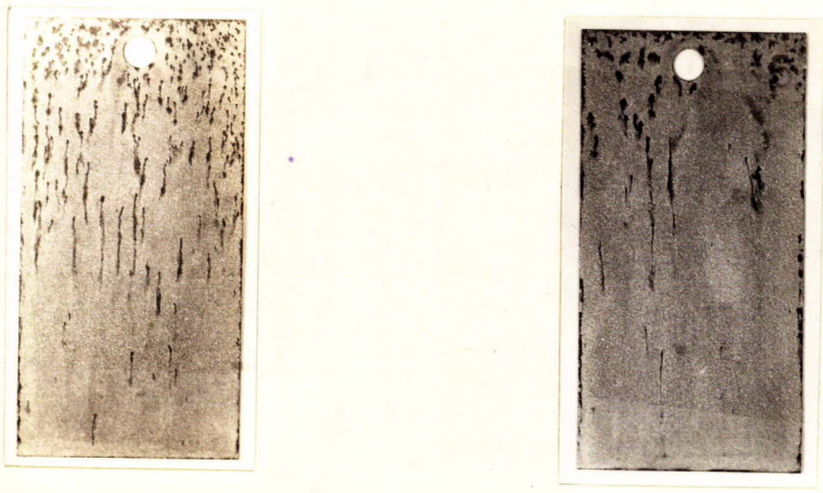
Figure 1.



(a) (b)

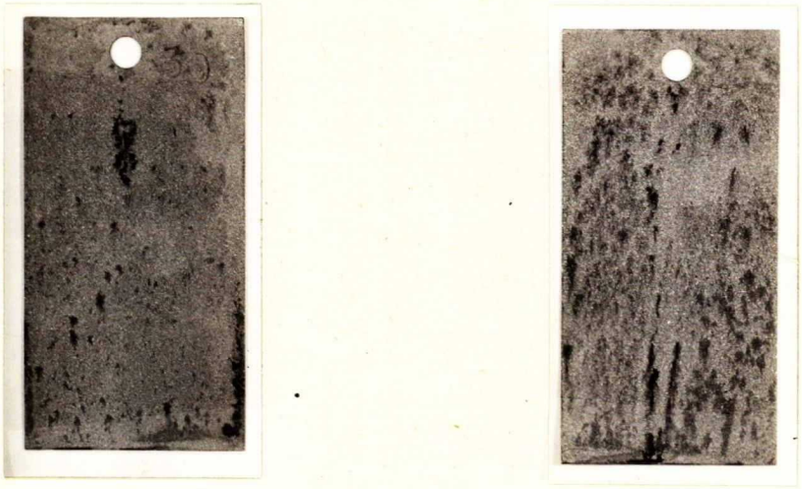
STEEL PANELS COATED WITH A NORMAL MIXTURE OF INTAVA CONCENTRATE AND DILUENT, AFTER REMOVAL FROM HUMIDITY CABINET (PROTECTION TEST).

Figure 2.

(a) (b)

STEEL PANELS COATED WITH A NORMAL MIXTURE OF INTAVA CONCENTRATE AND DILUENT, AFTER REMOVAL FROM HUMIDITY CABINET (HYDROBROMIC ACID NEUTRALIZATION TEST).

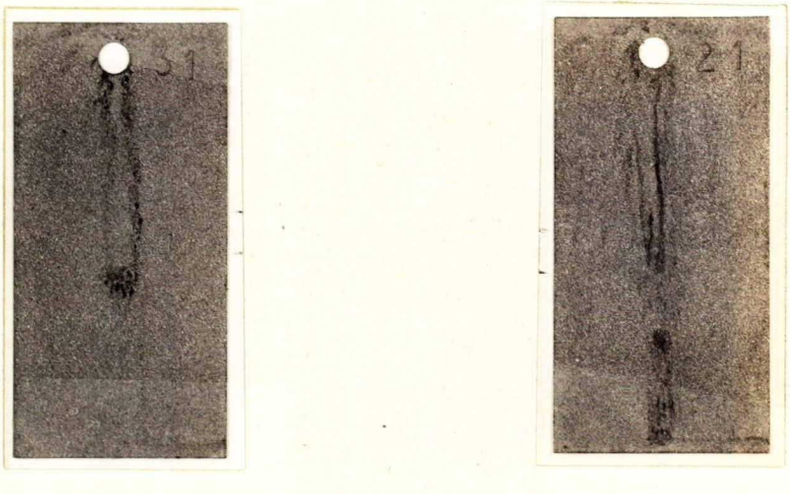
Figure 3.



(a) (b)

STEEL PANELS COATED WITH 50-50 MIXTURE OF SHELL AND INTAVA CONCENTRATES (1 PART) + DILUENT (3 PARTS), AFTER REMOVAL FROM HUMIDITY CABINET (PROTECTION TEST).

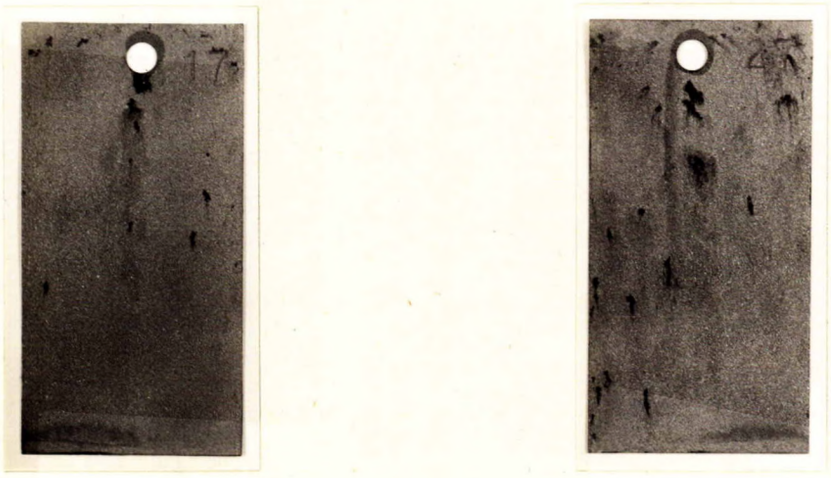
Figure 4.



(a) (b)

STEEL PANELS COATED WITH 50-50 MIXTURE OF SHELL AND INTAVA CONCENTRATES (1 PART) + DILUENT (3 PARTS), AFTER REMOVAL FROM HUMIDITY CABINET (HYDROBROMIC ACID NEUTRALIZATION TEST).

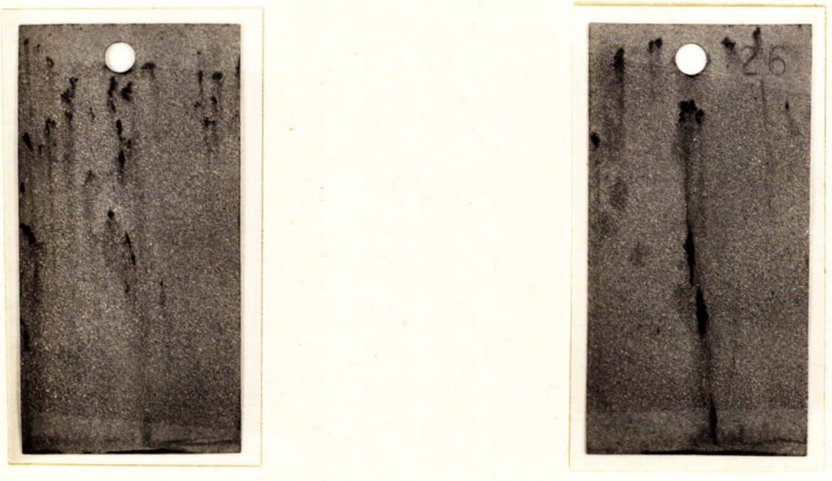
Figure 5.



(a) (b)

STEEL PANELS COATED WITH 50-50 MIXTURE OF INTAVA AND DILUENT, AFTER REMOVAL FROM HUMIDITY CABINET (PROTECTION TEST).

Figure 6.



(a) (b)

STEEL PANELS COATED WITH 50-50 MIXTURE OF INTAVA AND DILUENT, AFTER REMOVAL FROM HUMIDITY CABINET (HYDROBROMIC ACID NEUTRALIZATION TEST).

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