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Effectiveness of Corrosion Inhibiting Oils

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Project #: 16-283-1325.supplemental.bis

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Background: Customer is interested in a corrosion inhibitor for transmission fluid. Cortec Laboratories has been asked to compare various corrosion inhibitors to use as an additive in this application.

Sample Received: 2 oil samples, received in good condition, labeled “Shell” and “Mopar”
1 sample labeled “Ferrocote,” received in good condition
9 metal parts, received in good condition

Method: Humidity Testing, ASTM D1735
Compatibility Testing, CC-013

Materials: Biocorr ATF, lot 092136
VpCI-277, lot 030017
Carbon Steel panels, 1x2”

Procedure: For humidity testing, the following procedure was followed:

1. One control specimen was tested as well as three specimens for each corrosion inhibitor.
2. Each specimen was coated with the given sample and let sit in ambient conditions overnight.
3. Specimens were placed in ASTM D1735 conditions until failure.
4. VpCI-277 was also tested in humidity conditions, but was only tested with two specimens

For compatibility testing, the following procedure was followed:

1. Metal panels were coated with each corrosion inhibitor
2. Each panel was submerged in one of the oils- two samples were tested for each oil-inhibitor combination
3. Panels were cycled between 40^{o}C (for 16 hours) and 7^{o}C (for 8 hours).
4. Three 24 hours cycles were completed before samples were inspected for gelling, precipitation, or other signs of incompatibility.

Results:

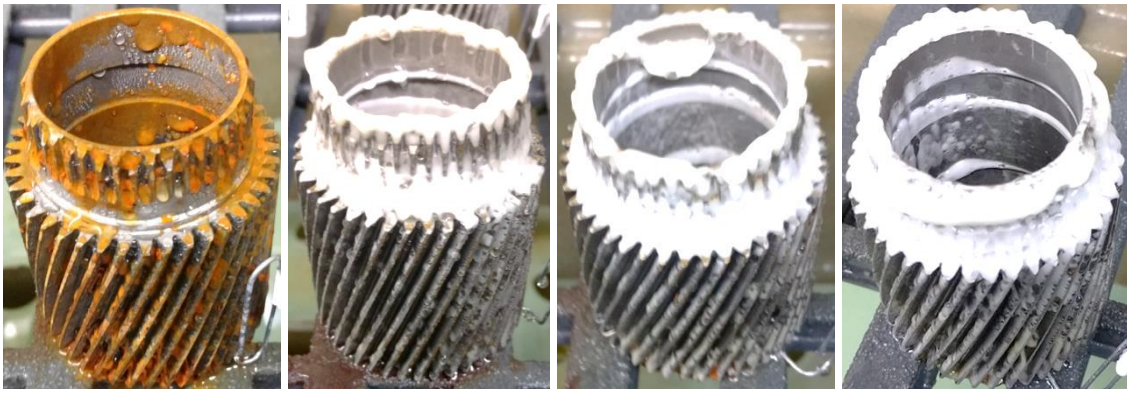
ASTM D1735 Humidity Testing

Product	Hours until failure panel 1	Hours until failure panel 2	Hours until failure panel 3	Average duration (hours)
Ferrocote	71	71	71	71
Biocorr ATF	263	311	311	295
VpCI-277	71	144	-	108
Control	<24	-	-	-

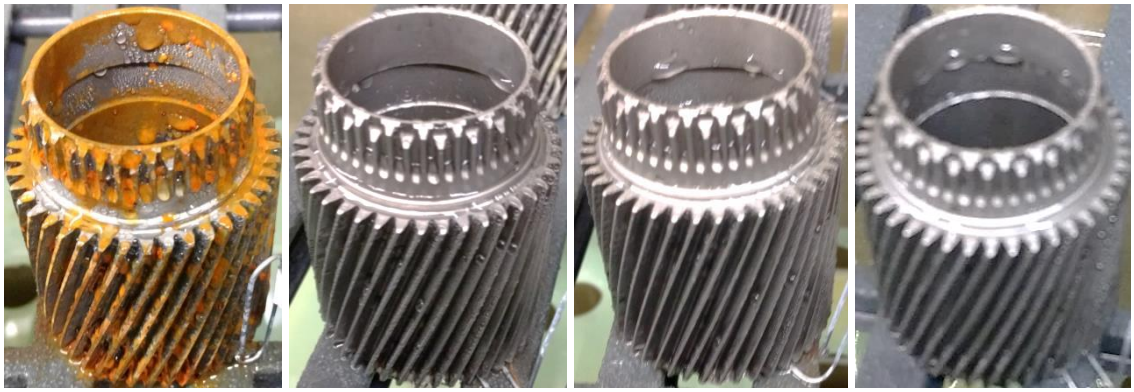
Compatibility Testing

Product\Oil	Shell	Mopar
Ferrocote	Fully Compatible	Fully Compatible
Biocorr ATF	Fully Compatible	Fully Compatible

Photos:



Picture 1: Control sample (left) and Ferrocote rust preventative (three right) at the time where failure was first observed.



Picture 2: Control sample (left) and BioCorr ATF Rust Preventative (three right) at the time where failure was first observed.

Picture 3: Control sample (left) and VpCI-277 (two right) at the time where failure was first observed.

Interpretations: Compatibility testing with BioCorr ATF and the Shell and Mopar oil samples received showed no incompatibilities. Corrosion protection testing in ASTM D1735 conditions shows BioCorr ATF provides the best corrosion protection of the rust preventatives tested. BioCorr ATF protected the submitted metal samples approximately four times longer than the submitted Ferrocote product and three times longer than VpCI-277.