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Evaluating Compatibility of Cortec Fluids with Coolant Used by Customer

To: Customer

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Project #: 13-242-1825

Reported by: 

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Background: Customer uses multiple fluids in their machining process. They would like the effectiveness of their rust preventive tested. Additionally, they would like Cortec to evaluate VpCI products, and their compatibility with the coolant currently used in their process. The goal is to improve rust prevention after manufacturing.

Sample Received: Four liquid samples, all in 3 ounce plastic jars, labeled as followed:

1) "M1 Coolant 9%"
2) "M2 Coolant 9%"
3) "Com 150 RI CONCTD"
4) "TMC 2050 CONCTD"

Method: ASTM D-1735 Water Fog
Standard Compatibility Test (CC-013)

Materials: Four liquid samples, as listed above.
BioCorr, batch #13013
EcoLine 3690, batch #17422
1010 cold rolled carbon steel panels
Laboratory grade methanol

Procedure: The following procedure was used:

1) The following solutions were made for compatibility testing:
    a. 95% EcoLine 3690, 5% "M1 Coolant 9%"
    b. 99% EcoLine 3690, 1% "M1 Coolant 9%"
    c. 95% EcoLine 3690, 5% "M2 Coolant 9%"
    d. 99% EcoLine 3690, 1% "M2 Coolant 9%"
    e. 95% BioCorr, 5% "M1 Coolant 9%"
    f. 99% BioCorr, 1% "M1 Coolant 9%
    g. 95% BioCorr, 5% "M2 Coolant 9%"
    h. 99% BioCorr, 1% "M2 Coolant 9%"
    i. All solutions were mixed by volume.
2) Standard compatibility testing was run according to its work instruction.
3) After the completion of compatibility testing, 6 carbon steel panels were cleaned with methanol.
4) After cleaning, these panels were coated as follows:
    a. No coating (control)
    b. Dipped in ComGuard 150 (used at 15% dilution, as recommended on data sheet).
    c. Dipped in solution from step 1e.
    d. Dipped in solution from step 1f.
    e. Dipped in solution from step 1g.
    f. Dipped in solution from step 1h.

5) After dipping, all panels were hung to dry for 2 hours.
6) All panels were then placed in ASTM D-1735 water fog cabinet.
7) All panels were visually inspected periodically.
8) After 600 hours, all panels were removed from ASTM D-1735 water fog cabinet.
9) All panels were visually inspected.

Results: The following results were found:

Standard Compatibility Test

	16 Hours	24	40	48	64	72
95% EcoLine 3690/5% M1	NC	NC	NC	NC	NC	NC
99% EcoLine 3690/1% M1	NC	NC	NC	NC	NC	NC
95% EcoLine 3690/5% M2	NC	NC	NC	NC	NC	NC
99% EcoLine 3690/1% M2	NC	NC	NC	NC	NC	NC
95% BioCorr /5% M1	FC	FC	FC	FC	FC	FC
99% BioCorr /1% M1	FC	FC	FC	FC	FC	FC
95% BioCorr /5% M2	FC	FC	FC	FC	FC	FC
99% BioCorr/1% M2	FC	FC	FC	FC	FC	FC

ASTM D-1735 Water Fog

Coating	Time to Corrosion (Hours)
None (Control)	<8
ComGuard 150	264
95% BioCorr /5% M1	480
99% BioCorr /1% M1	504
95% BioCorr /5% M2	480
99% BioCorr/1% M2	600

Interpretations: The original request in this test was to evaluate the compatibility of EcoLine 3690 with the TMC 2050 coolant. Compatibility testing showed that these two products are not compatible. After these results were found, BioCorr was tested, and found to be compatible. In order to simulate potential interaction between BioCorr and TMC 2050, panels were coated with the mixtures used in compatibility testing. The BioCorr/TMC 2050 solutions all provided better corrosion protection than the ComGuard 150 currently used by customer. However, interactions between these two fluids should be minimized; BioCorr is most effective when applied directly to metal surfaces.