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Evaluating Rust Preventive Liquids on Sintered Metal Parts

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Reported by:

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Background: Customer sent in samples of sintered metal rings, along with 3 rust preventive liquids currently used in their process. They would like the effectiveness of these liquids tested and compared to similar Cortec products.

Sample Received: Sintered metal rings (40 pieces total)
~3 ounce sample, Chemetall Protech 1440CA
~3 ounce sample, Oakite Ryconox 20M
~3 ounce sample, HT3-30 oil

Method: ASTM D-1735 Water Fog Cabinet

Materials: Sintered metal rings – 9 pieces
Chemetall Protech 1440CA
Oakite Ryconox 20M
HT3-30
VpCI-325 – Batch #05412
VpCI-329D – Batch #14242
BioCorr – Batch #13013
BioCorr SC – Batch #10623
EcoLine 3220 – Batch #04283
Deionized water

Procedure: The following procedure was used:

- 1) Nine sintered metal rings were selected from forty pieces that were sent from Customer.
- 2) Metal rings were then prepared as follows:
 - a. No preparation (control)
 - b. Dipped in Protech 1440CA (neat)
 - c. Dipped in Oakite Ryconox 20M (neat)
 - d. Dipped in HT3-30 (neat)
 - e. Dipped in VpCI-325
 - f. Dipped in VpCI-329D
 - g. Dipped in BioCorr
 - h. Dipped in BioCorr SC@25%
 - i. BioCorr SC solution was prepared with 75% (by weight) deionized water, 25% BioCorr SC.
 - i. Dipped in EcoLine 3220
- 3) After dipping, all rings were hung to dry for two hours.
- 4) All rings were then placed in ASTM D-1735 Water Fog Cabinet.
- 5) All rings were visually inspected periodically.
- 6) After 168 hours, all rings were removed from ASTM D-1735 Water Fog Cabinet.
- 7) All rings were visually inspected and photographed.

Results: The following results were found:

Rust Preventive Used	Time to Corrosion (Hours)
None (control)	<8
Chemetall Protech P440CA	24
Oakite Ryconox 20M	24
HT3-30	72
VpCI-325	96
VpCI-329D	72
BioCorr	72
BioCorr SC @ 25%	168*
EcoLine 3220	168*

*Corrosion occurred during a weekend, between 104 and 168 hours.

Photos:



Figure 1: Four sintered metal rings, after 168 hours of ASTM D-1735 testing. The three rust preventives currently used by Customer were used in this group.



Figure 2: Five sintered metal rings, after 168 hours in ASTM D-1735 testing. The five Cortec rust preventive options were used in this group.

Interpretations:

After 168 hours of ASTM D-1735 testing, the best corrosion protection was provided by BioCorr SC (used at 25% concentration by weight), and EcoLine 3220. The two rings coated with these products were corrosion free after 106 hours of testing, and corroded slightly upon the next inspection, at 168 hours, after the weekend.

The customer requirement for this test was 72 hours of corrosion protection. This requirement reached or exceeded by all five Cortec products, along with the HT3-30 oil.