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Evaluating Corrosion Protection Systems for Customer

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Background: Customer sent a large bag of steel retainers to Cortec for testing. They would like various corrosion protection systems evaluated.

Sample Received: 5000 steel retainers

Method: ASTM D-1748 Humidity Cabinet (120°F, 95% relative humidity)

Materials:
5000 steel retainers
VpCI-126 Blue Film (3"x 5" Ziploc)
Non-VCI PE film bags (3"x 5" Ziploc)
Rust Veto 4240 RP
VpCI-416
VpCI-133 foam square
EcoAir VpCI-337

Procedure: The following procedure was used:

1) Steel retainers were received in two packs:
    a. The first pack contained 4000 untreated pieces.
    b. The second pack contained 1000 pieces treated with Rust Veto 4240 RP.
2) The first pack of parts were separated into groups of 1000 and treated as follows:
    a. Packed in VpCI-126 film bag with VpCI-133 foam square.
    b. Washed with VpCI-416, air dried, and then packed in VpCI-126 film bag.
        i. VpCI-416 was used at 10% concentration in deionized water.
    c. Packed in VpCI-126 film bag, which was then fogged with a one second spray of EcoAir VpCI-337.
    d. Packed in non-VCI PE film bag (no other rust preventive used).
3) The pack of 1000 pieces, already treated with Rust Veto 4240, were packed in a non-VCI PE film bag.
4) After packaging, all bags were placed in ASTM D-1748 humidity cabinet.
5) Bags were visually inspected periodically.
6) After 840 hours, all bags were removed from ASTM D-1748 humidity cabinet.
7) Retainers were visually inspected and photographed.

Results: The following results were found:

Packaging System	Hours to Corrosion
Non-VCI PE only	240
Non-VCI PE + Rust Veto	144
VpCI-126 + VpCI-130	696
VpCI-126 + VpCI-337	DNF*
VpCI-126 + VpCI-416	DNF*

DNF – Did not fail during 840 hours of testing.

Photos:

Figure 1: Untreated retainers after 840 hours of ASTM D-1748 testing.

Figure 2: Rust Veto treated parts, after 840 hours in ASTM D-1748 testing.

Figure 3: VpCI-126/133 retainers after 840 hours of ASTM D-1748 testing.

Figure 4: VpCI-126/337 treated retainers after 840 hours of ASTM D-1748 testing.

Figure 5: VpCI-126/416 parts after 840 hours of ASTM D-1748 testing.

Interpretations: ASTM D-1748 accelerated corrosion testing showed good results for Cortec protection systems. The systems utilizing VpCI-337 and VpCI-416 did not show any signs of corrosion after 840 hours of testing. The system utilizing VpCI-133 did show corrosion, but this bag was also completely filled with water within the first few days of testing. Even with a complete water immersion, the parts stayed corrosion free for nearly a month.

Conversely, the parts coated with Rust Veto 4240 were actually the first to start corroding, even before the untreated parts.