Evaluating Rust Preventives

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Project #: 11-xxx-xxxx

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Date: May 24, 2011
Sample Received: Six scrap metal pieces
Chemetall Permatreat 438
CRC 3-36 liquid

Method: ASTM D-1735 Water Fog (100°F, ~95% relative humidity)

Materials: Six scrap metal pieces
Chemetall Permatreat 438
CRC 3-36
BioCorr
VpCI-418LM
Plain polyethylene (PE) bags

Procedure: The following procedure was used:

1) Prior to testing, all parts were cleaned with methanol.
2) After cleaning, parts were prepared as follows:
   a. Control (no further preparation)
   b. Dipped in Chemetall Permatreat 438 (neat)
   c. Dipped in CRC 3-36 (neat)
   d. Dipped in BioCorr
   e. Dipped in VpCI-418LM (10% concentration)
   f. Dipped in VpCI-418LM (15% concentration)
3) After dipping, all parts were allowed to air dry overnight.
4) All parts were then packaged in plain PE Ziploc bags.
5) After packaging, all parts were placed in ASTM D-1735 water fog cabinet.
6) All parts were visually inspected periodically.
7) After 400 hours, all parts were removed from ASTM D-1735 water fog cabinet.
8) All parts were unpackaged, visually inspected and photographed.

Results: The following results were found:

<table>
<thead>
<tr>
<th>Rust Preventive</th>
<th>Time to Corrosion (Hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>None (control)</td>
<td>&lt;24</td>
</tr>
<tr>
<td>Chemetall 438</td>
<td>120</td>
</tr>
<tr>
<td>CRC 3-36</td>
<td>336</td>
</tr>
<tr>
<td>BioCorr</td>
<td>400</td>
</tr>
<tr>
<td>VpCI-418LM (10%)</td>
<td>120</td>
</tr>
<tr>
<td>VpCI-418LM (15%)</td>
<td>192</td>
</tr>
</tbody>
</table>
Photos:
Interpretations: Of all the products tested, BioCorr provided the best corrosion protection. Of the cleaners tested, VpCI-418LM at 15% provided the best protection, while VpCI-418LM at 10% provided the same protection as Chemetall Permatreat 438.