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VIA Testing on MIL Spec VCI Papers

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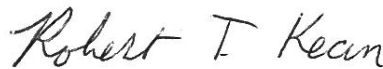
Project #: 16-244-2935

Results reported by:



Sen Kang
Senior Corrosion Engineer

Approved by:



Robert T. Kean
Laboratory Director



Background: Cortec Laboratories is testing vapor phase protection of MIL Spec VCI paper manufactured by Daubert Cromwell.

Method: VIA Test, CC-027
*Military VIA Test before and after exhaustion (Test method 4031 listed in MIL-STD-3010C required by MIL-PRF-3420H)

*Cortec Laboratories, Inc. is not accredited for the test(s) marked.

Materials: Glycerol (lot #Q10A018)
Methanol, ACS grade (lot #041715D)
VIA test kit
MIL Spec VCI Paper (Heavy-duty nitrate-free VCI paper meets U.S. Mil. Spec. MIL-PRF-3420) purchased from Uline (Model No. S-15432, size 36" x 200 yards). Rec'd 08/31/2016. The paper is manufactured by Daubert Cromwell. Package and paper labels are shown below:



Procedure: All tests performed by Cortec Laboratories were performed according to standard procedure. VIA Test according to CC-027 was performed on as-received MIL Spec VCI paper. Military VIA test (Test method 4031 listed in MIL-STD-3010C) was performed on MIL Spec VCI paper as received and after 12 days exhaustion.

Results:

VIA test on as-received MIL Spec VCI paper, CC-027

Sample	Control	Plug #1	Plug #2	Plug #3	End Result
MIL Spec VCI Paper (as-received)	Grade 0	Grade 1	Grade 1	Grade 3	Fail

Results relate only to the items tested

VIA test on as-received MIL Spec VCI paper, CC-027



Control

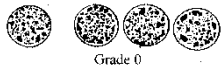
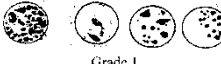
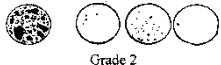
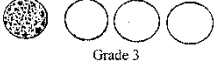
1

2

3

VIA Test (CC-027) Grading

All three plugs must be grade 2 or better to pass the test

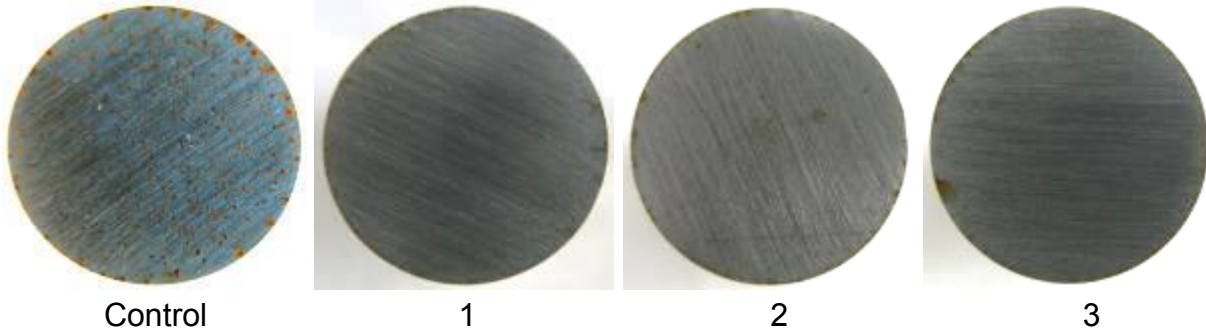
Grade 0:	Blind test No corrosion inhibiting effect	
Grade 1:	Blind test Minute corrosion inhibiting effect	
Grade 2:	Blind test Medium corrosion inhibiting effect	
Grade 3:	Blind test Good corrosion inhibiting effect	

Military VIA test on MIL Spec VCI paper, MIL-STD-3010C

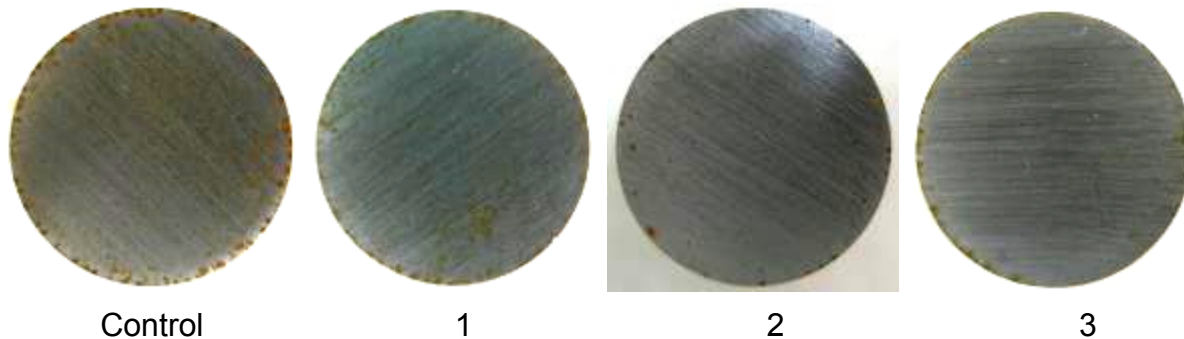
Sample	Control	Plug #1	Plug #2	Plug #3
MIL Spec VCI Paper (as-received)	Rating 4	Rating 4	Rating 4	Rating 4
MIL Spec VCI Paper (12 days exhaustion)	Rating 4	Rating 4	Rating 4	Rating 4

Results relate only to the items tested

Military VIA test on as-received paper, MIL-STD-3010C



Military VIA test following exhaustion, MIL-STD-3010C



Test surface evaluation of Military VIA test (MIL-STD-3010C)

Each test surface shall be examined under 10X magnification. A rating shall be attributed to each surface based on the number of corrosion spots found: 0 = no spots, 1 = 1 spot, 2 = 2 spots, 3 = 3 spots, 4 = 4 or more spots.

Performance requirement on Vapor inhibitor ability (VIA) from Mil. Spec. MIL-PRF-3420H

No more than a total of 3 corrosion spots on 3 plugs. No corrosion spot greater than 300 microns in diameter.

Interpretations: According to VIA test (CC-027), the as-received MIL Spec VCI paper showed partial corrosion protection but is insufficient to pass VIA test.

According to Military VIA test (Test method 4031 in MIL-STD-3010C), the MIL Spec VCI paper does not provide sufficient vapor phase protection before and after exhaustion. Multiple visible corrosion spots (more than 4) are identified on all tested metal plugs.