CORTEC Laboratories, Inc.

4119 White Bear Parkway, St. Paul, MN 55110 USA
Phone: (651) 429-1100, Fax: (651) 429-1122
Toll Free: (800) 4-CORTEC, E-mail: info@cortecvci.com
cortecvci.com • cortexlaboratories.com

Evaluating Corrosion Inhibiting Properties of Rust-X Packaging Products Used by Continental Engines

To: Bob Boyle

For: PK Mathew
Cortec Corrosion Solutions India Pvt Ltd

Ankit Jain
Continental Engines

From: Cortec Laboratories, Inc.
4119 White Bear Parkway
St. Paul, MN 55110

cc: Boris Miksic
Cliff Cracauer
Robert Kean
Jay Zhang

Project #: 17-118-1125

Results reported by:

Anne Carlson
R&D Engineer

Approved by:

Eric Uutala
Technical Service Engineer

Background: Continental Engines in Gurgaon, India is currently assessing their preservation method used for shipping. This preservation process includes an oil based rust preventative made by Rust-X, along with Rust-X paper or film for further protection. Cortec Laboratories has been asked to evaluate both the paper and film for their corrosion inhibiting properties and compare them to Cortec VpCI paper and film products.

Sample Received: -1 blue film bag (unlabeled, but made by Rust-X), approximately 75 microns
-1 sheet of Rust-X paper, received in good condition

Method: VIA Test, CC-027
FTIR Analysis, CC-006
Razor Blade Test, CC-004*

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

Materials: Polyethylene film, used as a control
VIA Test kit
Paragon 1000 FTIR
Razor Blade test kit

Procedure: All tests were followed according to their standard procedures.

Results:

VIA Test Results

Sample	Plug 1	Plug 2	Plug 3	Overall
Rust-X Paper	3	1	2	Fail
Rust-X Film	1	0	1	Fail
VpCI-126 Film (75µ)**	2	2	2	Pass
VpCI-146 Paper**	3	2	2	Pass
Control	0	-	-	Fail

Carbon Steel Razor Blade Test Results

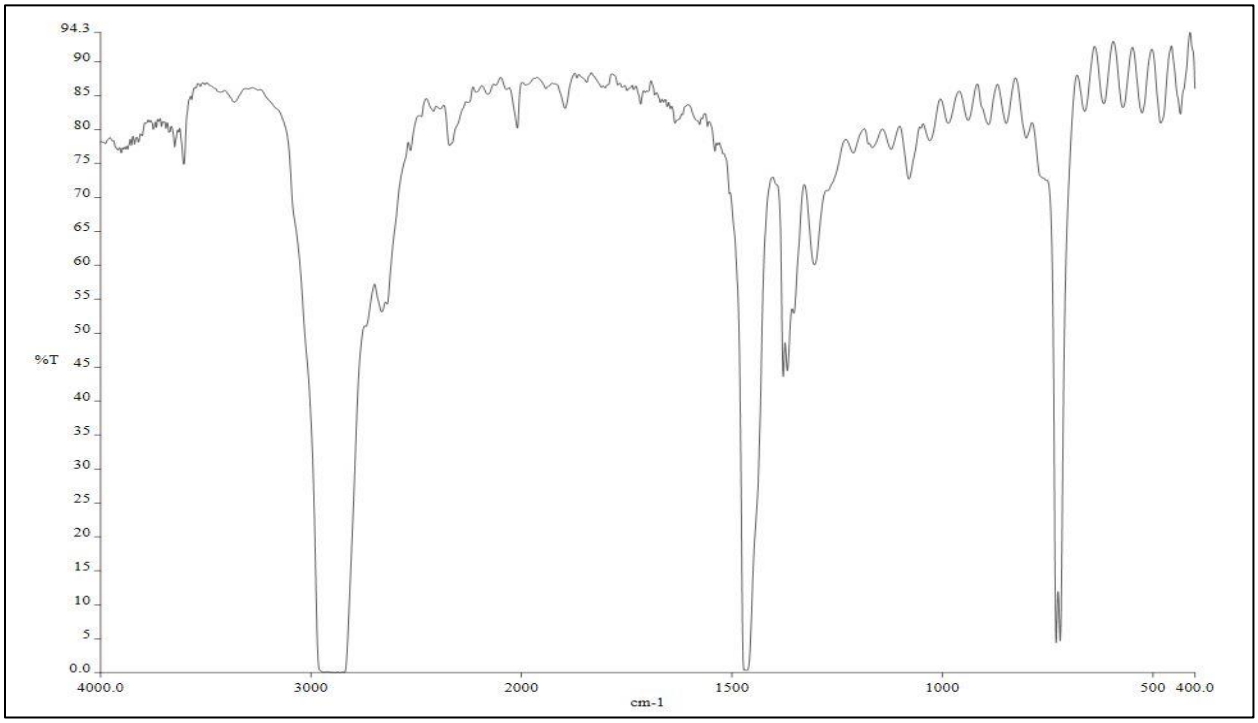
Sample	Plug 1	Plug 2	Plug 3	Overall
Rust-X Paper	Fail	Pass	Pass	Pass
Rust-X Film	Fail	Fail	Fail	Fail
VpCI-126 Film (75µ)**	Pass	Pass	Pass	Pass
VpCI-146 Paper**	Pass	Pass	Pass	Pass
Control	Fail	-	-	Fail

Copper Razor Blade Test Results

Sample	Plug 1	Plug 2	Plug 3	Overall
Rust-X Paper	Fail	Pass	Fail	Fail
Rust-X Film	Fail	Fail	Fail	Fail
VpCI-126 Film (75µ)**	Pass	Pass	Pass	Pass
VpCI-146 Paper**	Pass	Pass	Pass	Pass
Control	Fail	-	-	Fail

**VpCI-126 results are from test 16-226-1125, and VpCI-146 results are from test 16-241-1125

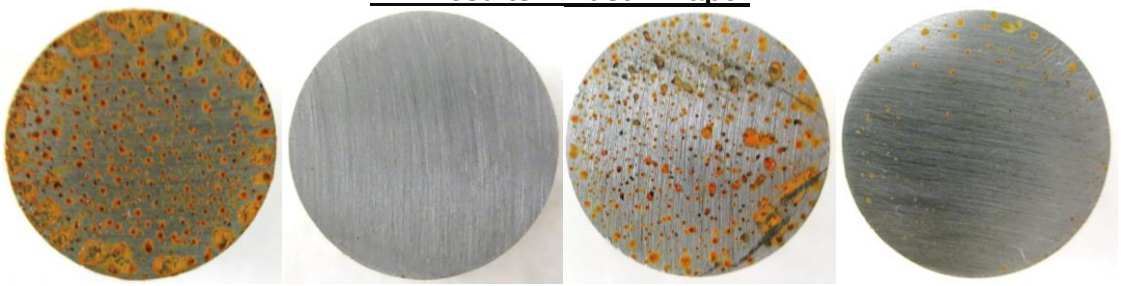
FTIR Results – Rust-X Film



Results relate only to the items tested

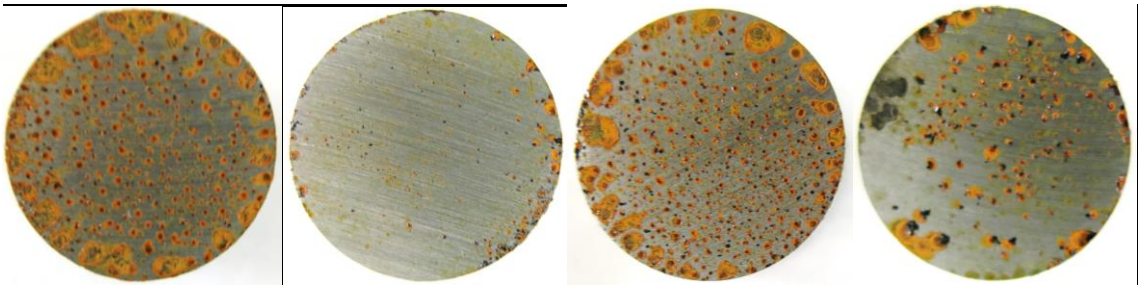
Photos:

VIA Results – Rust-X Paper



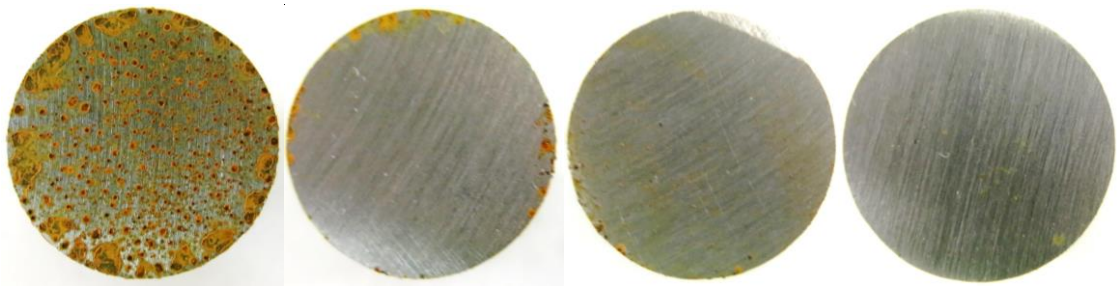
Control Plug 1 Plug 2 Plug 3

VIA Results – Rust-X Film



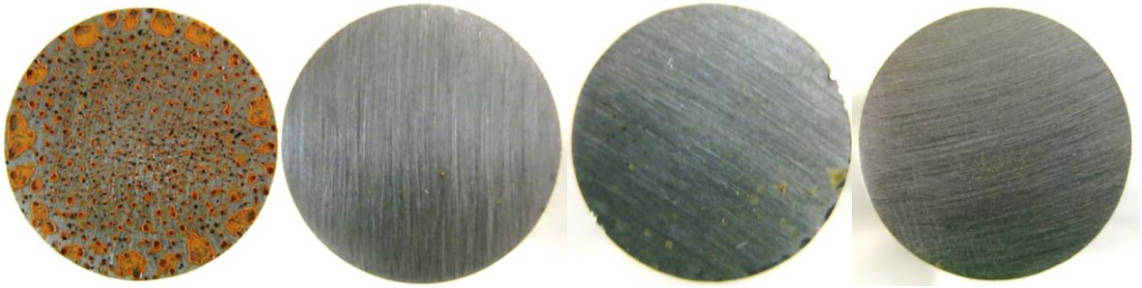
Control Plug 1 Plug 2 Plug 3

VIA Results – VpCI 126 (75µ)



Control Plug 1 Plug 2 Plug 3

VIA Results- VpCI 146

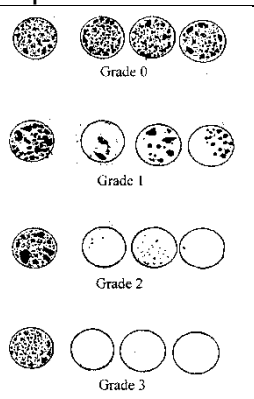


Control Plug 1 Plug 2 Plug 3

VIA Test 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



Interpretations: Neither Rust-X paper nor Rust-X film provide sufficient multi-metal corrosion protection, according to results of this test. The film does not protect steel or copper, according to all tests performed. The paper does provide sufficient contact protection for steel, according to Razor Blade test results, but it does not provide contact protection for copper. Further, it does not provide adequate vapor phase protection for steel, according to VIA test results.

According to FTIR results, Rust-X film does not appear to contain any active corrosion inhibitor chemistry. The main component detected is desiccant, which can provide some protection by decreasing the humidity. However, it won't provide any protection once the desiccant is saturated.

Conversely, VpCI-126 film and VpCI-146 both provide multi-metal corrosion protection for both steel and copper.