Evaluating Cortec VpCI-146 Paper with Requirements Listed in Performance Specification MIL-PRF-3420G

Background: Cortec Corporation is seeking to have Cortec VpCI-146 listed on qualified product list MIL-PRF-3420G. The process of getting listed, involves Cortec Corporation performing the requirement tests as listed in performance specification MIL-PRF-3420G. Upon attaining results in compliance with what is listed in performance specification MIL-PRF-3420G, Cortec Corporation will submit product to Naval Air Systems Command. Naval Air Systems Command will then repeat testing to confirm results attained by Cortec Corporation.

Purpose: Perform the tests as indicated in performance specification MIL-PRF-3420G and compare results with listed result requirements.

Method: Compatibility with Copper Test (MIL-PRF-3420G, Section 4.6.4)

Vapor inhibitor ability Test (FED-STD-101 Test Method No. 4031, procedure B)

Vapor inhibitor ability after exhaustion Test (FED-STD-101 Test Method No. 4031, procedure B)

Contact Corrosivity Test(FED-STD-101 Test Method No. 3005)

Blocking Resistance Test(FED-STD-101 Test Method No. 3003, procedure A)

Water resistance of markings Test (FED-STD-101 Test Method No. 3027)

Bursting Strength Test(FED-STD-101 Test Method No. 2007)

Tearing Strength Test (ASTM D689)

Compatibility with MIL-PRF-131 barrier material Test (MIL-PRF-3420G, Section 4.6.5)

Long Term Protection Test (MIL-PRF-3420G, Section 4.6.3)

Materials: Cortec VpCI-146 paper

The materials used for the above listed methods, are indicated in each test method standard operating procedure.

Procedure: The above tests were performed according to standard procedures for each.

Results:

Compatibility with Copper

Procedure was done according MIL-PRF-3420G, section 4.6.4.2

Compatibility with Copper test results

Material	Corrosion amount (%)	Performance Requirement
Copper panel wrapped with Cortec VpCI-146 paper	0	No pitting, etching or discoloration of vapor exposed copper surface
Copper panel wrapped with Cortec VpCI-146 paper	0	No pitting, etching or discoloration of vapor exposed copper surface
Copper panel wrapped with Cortec VpCI-146 paper	0	No pitting, etching or discoloration of vapor exposed copper surface

Vapor inhibitor ability

Procedure was done according to FED-STD-101 Test Method No. 4031 procedure B

Vapor inhibitor ability test results

Material	Corrosion observed (%)	Performance Requirement
Cortec VpCI-146	0	No corrosion, etching or pitting of polished surface of steel panel
Cortec VpCI-146	0	No corrosion, etching or pitting of polished surface of steel panel
Cortec VpCI-146	0	No corrosion, etching or pitting of polished surface of steel panel
Control	~ 40	

Vapor inhibitor ability (after exhaustion)

Procedure was done according to Fed-STD-101 Test Method No. 4031 procedure B

Vapor inhibitor ability (after exhaustion) test results

Material	Corrosion observed (%)	Performance Requirement
Cortec VpCI-146	0	No corrosion, etching or pitting of polished surface of steel panel
Cortec VpCI-146	0	No corrosion, etching or pitting of polished surface of steel panel
Cortec VpCI-146	0	No corrosion, etching or pitting of polished surface of steel panel
Control	~ 62	

Contact Corrosivity

Procedure was done according to Fed-STD-101 Test Method No. 3005

Carbon Steel panels used.

Contact Corrosivity test results

Material	Amount of corrosion after 20 hours (%)	Performance Requirement
Cortec VpCI-146	0	No corrosion, etching or pitting of contact area of panel
Cortec VpCI-146	0	No corrosion, etching or pitting of contact area of panel
Cortec VpCI-146	0	No corrosion, etching or pitting of contact area of panel

Blocking Resistance

Procedure was done according to FED-STD-101 Test Method No. 3003 procedure A

Blocking Resistance test results

Material	Qualitative results	Performance Requirement
Cortec VpCI-146	No blocking, delamination or rupture	No delamination, tearing or flaking when the sheets
Cortec VpCI-146	No blocking, delamination or rupture	No delamination, tearing or flaking when the sheets
Cortec VpCI-146	No blocking, delamination or rupture	No delamination, tearing or flaking when the sheets
Cortec VpCI-146	No blocking, delamination or rupture	No delamination, tearing or flaking when the sheets
Cortec VpCI-146	No blocking, delamination or rupture	No delamination, tearing or flaking when the sheets
Cortec VpCI-146	No blocking, delamination or rupture	No delamination, tearing or flaking when the sheets
Cortec VpCI-146	No blocking, delamination or rupture	No delamination, tearing or flaking when the sheets
Cortec VpCI-146	No blocking, delamination or rupture	No delamination, tearing or flaking when the sheets

Water resistance of Markings

Procedure was done according to FED-STD-101 Test Method No. 3027

Water Resistance of Markings test results

Material	Qualitative description of markings after two hours in circulating water bath	Performance Requirement
Cortec VpCI-146	Observed markings are clear and legible	Markings shall be clear and legible
Cortec VpCI-146	Observed markings are clear and legible	Markings shall be clear and legible
Cortec VpCI-146	Observed markings are clear and legible	Markings shall be clear and legible

Bursting Strength

Procedure was done according to FED-STD-101 Test Method No. 2007

Bursting Strength test results

Material	FED-STD-101 Test Method No. 2007; Bursting Strength (psi)	Performance Specification
Cortec VpCI-146 paper	42.28/43.04	40

Note: Printed side up/Printed side down

See Enclosed report

Tearing Strength

Procedure was done according to ASTM D689

Tearing Strength test results

Material	ASTM D689 Tearing Strength (gf)	Performance Requirement (gf)
Cortec VpCI-146 paper	39.0/42.4	40/40

Note: Machine Direction/Cross Direction

See Enclosed report

Compatibility with MIL-PRF-131 Barrier Material

Procedure was done according to MIL-PRF-3420G, section 4.5.6.2

Compatibility with MIL-PRF-131 Barrier Material test results

Material	Deterioration amount on surface of Cortec VpCI-146 paper %	Performance Requirement
Cortec VpCI-146 paper	0	No delamination, swelling, embrittlement, dissolution, effect on the sealability or deterioration of barrier materials
Cortec VpCI-146 paper	0	No delamination, swelling, embrittlement, dissolution, effect on the sealability or deterioration of barrier materials
Cortec VpCI-146 paper	0	No delamination, swelling, embrittlement, dissolution, effect on the sealability or deterioration of barrier materials

Long Term protection test

Procedure done according to MIL-PRF-3420G sections 4.6.3.1 and 4.6.3.2

Long term protection test results

Material	Corrosion amount on four panels after one year (%)	Performance Requirement
Cortec VpCI-146 paper	0	No corrosion of steel panels
Cortec VpCI-146 paper	0	No corrosion of steel panels
Cortec VpCI-146 paper	0	No corrosion of steel panels
Cortec VpCI-146 paper	0	No corrosion of steel panels

Conclusion: Cortec VpCI-146 corrosion inhibiting paper satisfies the testing requirements of Performance Specification MIL-PRF-3420G.

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Estimated Cost of Project: $4,500.00

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