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ANAB ACCREDITED ISO/IEC 17025 TESTING LABORATORY

Humidity Testing for Customer

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Project #: 18-179-1525.bis

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Background: Customer uses option #1 (shown below) when shipping domestically, and option #2 when shipping internationally. However, they are looking to simplify the packaging procedure by replacing option #1 with option #3, and option #2 with option #4.

Packaging Options:

Option #1- Metal parts coated with Enviro Armor C-Blue, wrapped in Versil Pak, and then wrapped in poly woven steel wrap.

Option #2- Metal parts coated with Enviro Armor C-Blue, wrapped in Versil Pak, wrapped in poly woven steel wrap, then sealed in Caliburn 10mil film.

Option #3- Metal parts coated with VpCI-368D, and sealed in 10mil VpCI-126 HPUV film.

Option #4- Metal parts coated with VpCI-368D, wrapped in EcoWeave, and then sealed in 10mil VpCI-126 HPUV film.

The goal of this project is to show that Cortec products will protect equally or better while reducing the amount of packaging material

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Samples Received: The following samples were received on 9-6-18 in good condition:

1. Twelve metal samples- chromium-molybdenum steel, H13 (1" x 1" x 2.75")
2. White Caliburn film, 10mils
3. Poly woven steel wrap
4. Daubert Cromwell Versil Pak #302
5. Enviro Armor C-Blue

Method: Humidity Testing, ASTM D1735
Razor Blade Test, CC-004*
*The tests marked are not covered under Cortec Laboratories, Inc. ISO 17025 Scope of Accreditation

Materials: Q-fog Humidity Chamber
VpCI-368D (batch #153118)
VpCI-126 HPUV film (batch #41532)
EcoWeave (batch #22725)
Carbon Steel panels, SAE 1010 (for razor blade testing)
Methanol, ACS grade (lot #071417B)
Kimwipes

Procedure: For humidity testing, the submitted metal parts were first cleaned with methanol, dried with kimwipes, and then packaged according to the options listed above. The parts were then placed in the Q-fog humidity chamber and tested for 1200 hours.

For razor blade testing, standard procedure was followed.

Results: The following results were found:

Razor Blade Test- Carbon Steel Panels

Sample	Panel #1	Panel #2	Panel #3	End Result
White Caliburn film	Fail	Fail	Pass	Fail
Poly Woven Steel Wrap	Fail	Fail	Pass	Fail
EcoWeave	Pass	Pass	Pass	Pass
VpCI-126 HPUV film	Pass	Pass	Pass	Pass
Control	Fail	-	-	Fail

Humidity Testing

Packaging Option	Results after 1200 hours of Humidity Testing
1	No Corrosion
2	No Corrosion
3	No Corrosion
4	No Corrosion

Interpretations: After 1200 hours of humidity testing, none of the submitted metal parts that were packaged using options 1-4 show any signs of corrosion. The razor blade testing, however, shows that both the white Caliburn film and the Poly Woven Steel Wrap do not provide sufficient contact corrosion protection for carbon steel. Cortec's products, EcoWeave and VpCI-126 HPUV film both provide excellent contact corrosion protection.

This testing demonstrates that Cortec's recommended packaging options can provide corrosion protection equal to customers current packaging scheme. Cortec's recommended packaging will reduce the amount of packaging material required.