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Feb 6, 2013

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Project No. G100861285

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Subject: Corrosion UL 2703 section 19.2

Dear Jeremy Turner,

The UL 2703 section 19.2 corrosion test has been completed on your submitted Daetwyler Clean Energy 500402495 Samples. The Daetwyler Clean Energy 500402495 Samples were coated with ArmorGalv, which is a zinc thermal diffusion coating per ASTM A1059 – class 25. Samples were submitted to Intertek for analysis consisted of the following: One Bolt and one zinc plated reference specimen.

Reference specimens, 4 in by 12 in (102 mm by 305 mm) of commercial zinc coated sheet steel were to be used for comparison. The selected specimens were representative of the minimum acceptable amount of zinc coating under requirements for G90 coating designation as determined in accordance with the Standard Test Method for Weight of Coating on Zinc-Coated (Galvanized) Iron or Steel Articles, ASTM A90-81(1991).

The purpose of this testing was to expose the sample to a corrosive environment.

The following instrumentation was used in the corrosion test:

Quad Gas Exposure Chamber (Auto Technology, Cleveland OH)
300L SO2 cabinet
Serial no: Porter B-125-20
Last calibration: May 2012
Next calibration: May 2013
Asset No 1138

The corrosion test was run from Oct 16, 2012 through Oct 27, 2012 for a total of eleven days. Each day an amount of carbon dioxide equivalent to 1.0% of the volume of the chamber (A 300 L chamber was filled with 3.0 L of CO2) plus an amount of sulfur dioxide equivalent to 1.0% of the volume of the chamber (A 300 L chamber was filled with 3.0 L of SO2) were introduced into the chamber from commercial gas cylinders. Prior to each introduction of gas the chamber was opened and purged of the previous day's gas. The chamber was kept at 35C +/- 2C.

The sample and the control were both scribed to remove the coating. Both were placed into the chamber.

Observations noted during testing follow:

Sulfur dioxide, carbon dioxide test

Day 1: Start
Day 2: Threads show corrosion
Day 3: No changes
Day 4: No changes
Day 5: No changes
Day 6: No changes
Day 7: No changes
Day 8: Corrosion on control
Day 9: Corrosion on control
Day 10: Corrosion on control
Day 11: Corrosion on control

Pictures of the corrosion after the eleventh day and test completion are below.

Both the sample and control were washed in DI water to remove oxide reside. The sample bolt was compared to the control plate (both sides and scribed area).

The control had very little corrosion on the upper side and no corrosion in the scribed area. The lower side of the control had corrosion on approximately 50% of its surface. Both sides of the control together have approximately 25% corrosion.

The sample bolt had approximately 2% corrosion on its head area. The scribed area showed no corrosion.

The results of an evaluation of the coating system of sample bolt Daetwyler Clean Energy 500402495 demonstrated that it provides protection at least equivalent to that provided by the zinc coating as described (ASTM G90) in 10.2(a).

This specimen passed the criteria for UL 2703 section 19.2

If there are any questions regarding the results contained in this report, or any of the other services offered by Intertek, please do not hesitate to contact the undersigned.

Please note; this Letter Report does not represent authorization for the use of any Intertek certification marks.

Completed by:	Mark Crawford	Reviewed by:	Bryan Bowman
Title:	Chemist	Title:	Chemist
Signature:		Signature	
Date	Feb 6, 2013	Date:	Feb 6, 2013