University of Baja California
INSTITUTE OF ENGINEERING

RLCYM-015/2014-01
April 29, 2014

Test Report

Evaluation of Corrosion Protection Performance on CorRem VCI Film

Test Method: German Test Method TL 8135-0002. Testing of Anti-Corrosive Effect of VCI Auxiliary Packaging Materials

Test performed for:
CorRem Corporation

Test performed by:

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Purpose:

To evaluate the corrosion protection performance of the CorRem VCI Film for protection of mild carbon steel.

Test Method:

The method used for testing was the German Test Method TL 8135-0002. Testing of Anti-Corrosive Effect of VCI Auxiliary Packaging Materials (Appendix A)

Principle of the Method:

The mild carbon steel specimens, which are sensitive to corrode when are exposed high humidity environments, were packed with and without strips of VCI film in a jar tightly closed containing a mixture of water – glycerine. The test determines whether corrosion occurs or not in the presence of the VCI film and, the protection degree (Figure 1).

Requirement of TL 8135-0002 for the corrosion protection effect:

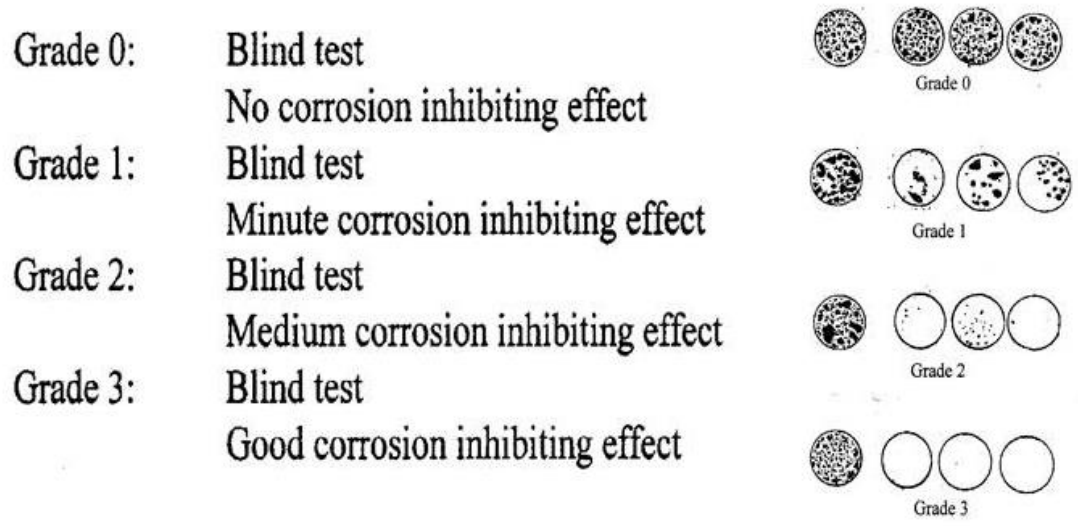


Figure 1.

Test coupons

Four cylinders fabricated with mild carbon steel.

Test Sample:

2.5 cm x 15 cm strips (6) of CorRem VCI Film

Test Solution:

10 ml freshly prepared glycerine/water mixture with a density of 1.076 g/cm^3 at (23±2) °C, which is intended to produce approximately 90% Relative Humidity in the jar.

Test Equipment and Material:

One blank and three VCI test sets are necessary for each sample. A test set consists of the following parts:

(1) Test Jar, 1 L, wide-necked.
(2) Rubber stopper #7, with longitudinal through hole and tubular aluminum support.
(3) Test cylindrical samples of mild carbon steel 27 mm diameter
(4) 10 milliliters freshly prepared glycerin/water mixture with a density of 1.076 g/cm^3 at (23± 2) °C (glycerin/water mass ratio about 1:2)
(5) Mineral spirits or ethanol

Procedure of the test:

The four cylindrical steel coupons were polished to 360 grit finish to eliminate rust, washed with water and degreased with mineral spirits vapor and dried.
Each steel coupon was fixed in the rubber stopper and the set inserted to the test jar cover with two strips of 2.5 cm x 15 cm of the CorRem VCI Film attached to the three test samples. For the blank (Control) the set was similar but without VCI film strips. (Figure 2)

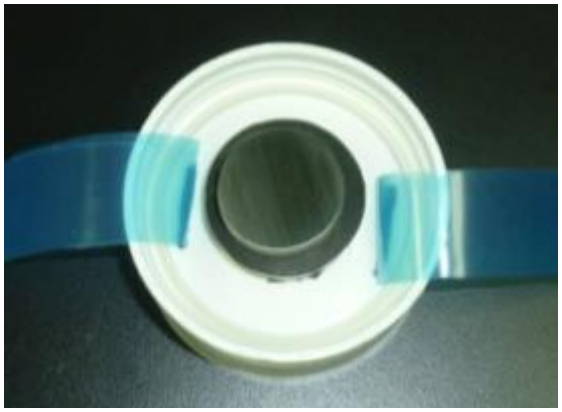


Figure 2. Detail steel coupons and CorRemVCI film strips mounting.

The four test sets were stored for a period of (20±0.5) hours at a room temperature. At the end of the storage period, the jar covers were removed from the test jars, the freshly prepared 10 ml of test solution, glycerine/water mixture, was poured into the each jar immediately after opening, and the jars were immediately closed again. (Figure 3)

Figure 2. Jars set for corrosion testing: Blank (left), VCI Film (right)

After an additional 2 hours ± 10 minutes, the test jars were stored for a period of 2 hours ± 10 minutes in the heating chamber at temperature 40°C to create 90% Relative Humidity in the both test jars.

On conclusion of storage in the heating chamber, the test coupons were disassembled from test jars and dried with warm air. Then inspected any sign of corrosion on the sanded surface of the steel coupons from the four jars.

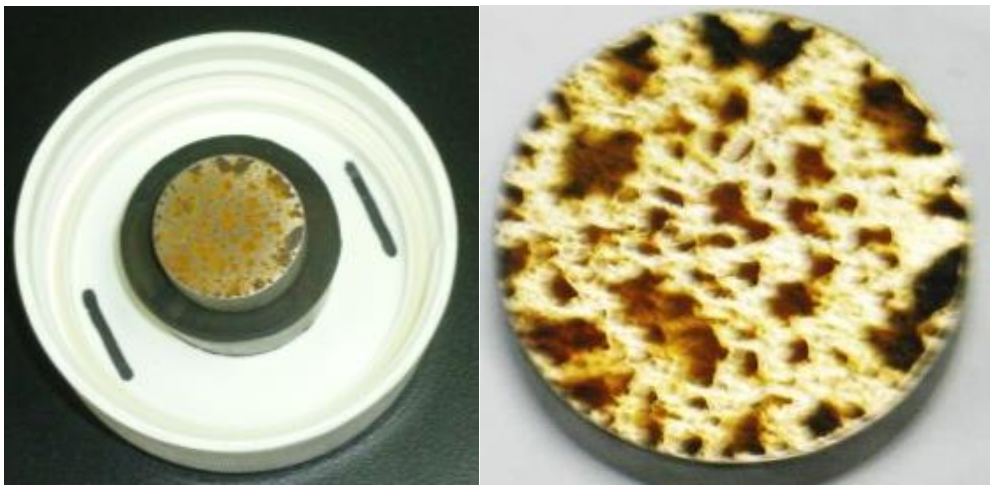
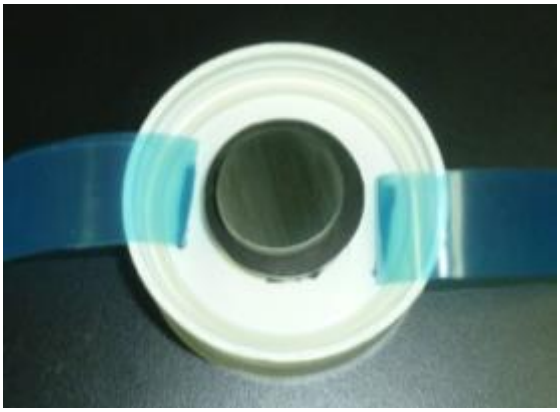


Figure 4. No corrosion protection effect (Blank)



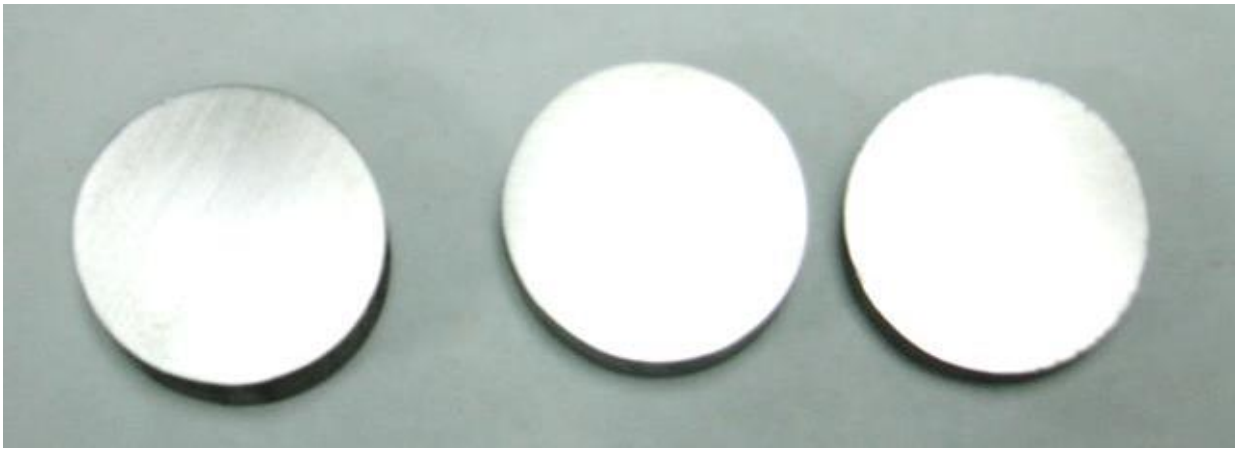


Figure 5. Performance of the CorRem VCI Film: GOOD corrosion inhibiting properties

Rated: Grade 3

Final Result:

GRADE 3: GOOD

Conclusion:

The CorRem VCI Film samples tested in this experiment shows excellent corrosion inhibiting properties on the test coupons. Based on this test results, CorRem VCI Film is highly recommended for the protection of carbon steel even when subjected to high humidity conditions, according to the German Test Method TL 8135-0002.

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