

Establishing the Vapour Inhibition Ability Vapro VBCI 849 Using German Test Method TL 8135-002

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Abstract

Controlling vapour pressure of VCI Products is the state-of-the-art of VCI manufacturers as different VCI carriers are used to meet each unique application due to the wide applications of VCI products. Establishing the Vapour Corrosion Inhibition Ability of VCI product is of paramount importance to all manufacturers.

In view of the above a reliable test method is essential. The German TL 8135-002 Test Method has been adopted to ascertain the Vapour Inhibition Ability (VIA) Properties.

Introduction

Vapro 849 VBCI Powder is an organic environmentally friendly Vapour Corrosion Inhibitor.

Different VCI carriers such as anti-corrosion powder, anti-corrosion tablet, polyurethane foam, Tyvek pouches, Tyvek sachets, polyethylene film, kraft papers, oils, solvents, water, etc. are used in the production Vapro VBCI Products. The German test method TL 8135-002 is used to determine the corrosion protection effect of VCI auxiliary packing materials such as VCI foam emitter, VCI pouch, VCI

powder, VCI papers, oils, powders, and films on a defined test object of constructional steel.

A test sample with a high degree of sensitivity to corrosion through condensation water is packed together with a VCI auxiliary packing material in a vessel, which is then tightly closed. Condensation is then forced on the surface of the test sample. By means of a blank trial that is, a trial structure of the same type, but without VCI auxiliary packing material – it is determined whether the conditions of the

trial are sufficient to cause corrosion to appear on the unprotected test sample.

Test object

4 pieces of unalloyed, solid construction steel.

Test Sample

0.5 gram of Vapro VBCI 849

Test solution

10 ml freshly prepared glycerine/water mixture with a density of 1.076 g/cm³ at (23±2) °C, which is intended to produce approximately 90% Relative Humidity in the jar.

Test Equipment and Material

For each test, 4 test sets are necessary. A test set consists of the following parts

- (1) Test Jars, 1 L, wide-necked.
- (2) Rubber stopper, 54 mm AE , with longitudinal through hole
- (3) unalloyed, solid construction steel test objects
- (4) Vapro VBCI 849
- (5) 10 millilitres freshly prepared glycerine/water mixture with a density of 1.076 g/cm³ at (23± 2) °C (glycerine/water mass ratio about 1:2)
- (5) Ethanol

Procedure of the test

Four test objects were polished with 320 grit abrasive paper to remove all the grit and rust. Rinsed with ethanol and dried them. Polished test object was inserted into the rubber stopper. Please see below picture figure A.

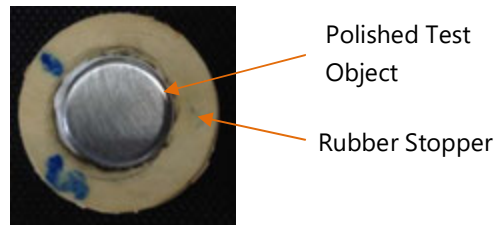


Figure A

Then rubber stopper was inserted to the test jar cover. 0.5 gram of Vapro VBCI 849 was placed in the jar. Then the test jar was closed with jar cover. Please see below picture figure B.

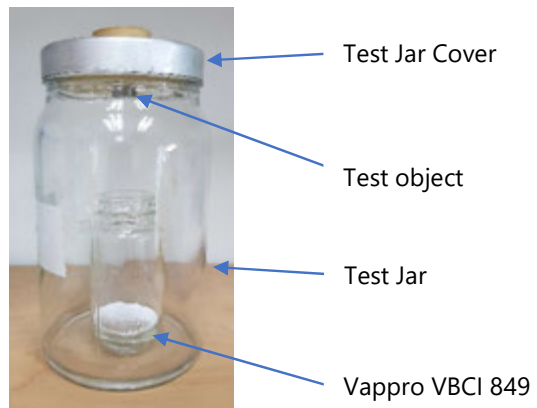


Figure B

For the blank sample, test jar was sealed without inserting the Vapro VBCI 849. It had no VCI chemicals and it is only used as a control/ yardstick for the experiment. Please see below picture figure C.



Blank Sample
without VCI
protection

Figure C

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 the test solution, glycerine/water mixture, was poured into each jar immediately after opening, and the jars were immediately closed again. Please see below picture figure D.



After adding
10 ml of
glycerine/water
mixture

Figure D

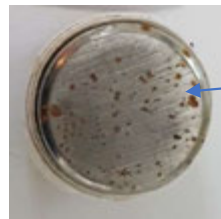
After an additional 2 hours \pm 10 minutes, the test jars were stored for a period of 2

hours \pm 10 minutes in the heating chamber at temperature 40°C to create 90% Relative Humidity in test jars.

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

Test Result

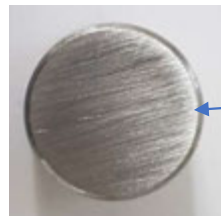
The sanded surface of the test object from the blank sample was badly rusted. Please see below picture figure E.



Blank Sample
badly rusted

Figure E

No sign of corrosion was found on three test objects protected with Vapro VBCI 849. Please see below picture figure F.



No corrosion

Figure F

Blank Sample (Without Vapro 849 VBCI Powder)	Protected samples with Vapro VBCI 849.
	
Badly Rusted	No visible corrosion was found on all three test objects

The

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

Evaluation of the test objects



Stark gerostet

Keine korrosionsschützende Wirkung



Wenig gerostet

Geringe korrosionsschützende Wirkung



Mäßig gerostet

Mittlere korrosionsschützende Wirkung



Wenig gerostet

Gute korrosionsschützende Wirkung

Corrosion protection effect

None (Grade 0)

Slight (Grade 1)

Middle (Grade 2)

Good (Grade 3)

Conclusion:

Based on above the test result, Vapro VBCI 849 passed the Grade 3 German test method TL 8135-0002 and proven to have good Vapour Inhibition Ability (VIA) Properties.

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