



**INSTITUT FÜR KORROSIONSSCHUTZ DRESDEN GMBH**

Privatwirtschaftliche Forschungsstelle



*Beratung - Schadensfallaufklärung - Qualitätssicherung - Forschung - Prüfung*

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## Test Report

**UB200/094/13**

Client: VCI2000

Date of order: 06 May 2013


Sample receipt: 13 September 2013

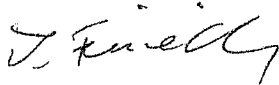
Processing time: 22 May – 06 December 2013

Task: Tests for the VW certification of the VCI film "VCI 2000"

Laboratory job number: LA2/117/13/132065, LA2/234/13/132065

Number of pages: 4

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Dresden, 06 December 2013

## 1 Task

The corrosion protective effect of the corrosion protection film "VCI 2000", 100 µm on steel and iron materials has to be determined according to the guideline "Corrosion and corrosion protection for the test of VCI packings" of the Volkswagen AG Wolfsburg for the purpose of recertification.

## 2 Supplied Packings

- 2.1 corrosion protection film "VCI 2000", 100 µm (date of delivery: 13 September 2013)
- 2.2 VCI-free control film, 100 µm (date of delivery: 13 September 2013)

## 3 Experimental

The following tests were performed with the corrosion protection film mentioned under 2.1:

- K-test (distance check, flask test)
- DISU-test (part of the protective effect which is solely associated with the emission of VCI components)
- KON-test (corrosion protection effect in direct contact)
- DIS-test (corrosion protection effect over distance)

The film mentioned under point 2.2 was used as reference material. The comparability of the reference and the VCI film was checked by measuring the ash contents and their analysis. The results are described under point 4.

The cylindrical specimen for the K-test were made of unalloyed, rimmed construction steel S235JRG2, DIN EN 10025, material number 1.0038, date of delivery: 23rd March 2004, Ø = 16 mm, h = 10 mm. For the other tests sheets (Q-Panels of Q-Lab Deutschland GmbH) made of mild steel DC 03 material-no. 1.0347, charge no. 010913258 were used.

## 4 Test results

### 4.1 Film thickness and ash content

Film	thickness ± standard deviation / µm	Ash content ± standard deviation / wt%
corrosion protection film "VCI 2000", 100 µm (date of delivery: 13 September 2013)	98.0 ± 3.1	0.438 ± 0.004
VCI-free control film, 100 µm (date of delivery: 13 September 2013)	101.8 ± 3.8	0.254 ± 0.003

The thickness values and the ash content of the reference film and the VCI film are similar. Testing with this reference film is permissible.

## 4.2 Corrosion protection effect VCI 2000 film, 100 µm

### K-Test

Test duration: 09 – 10 October 2013  
 Evaluation: VCI-film grades: 2;2;3;2  
 Rating: **moderate anticorrosive effect** Reference grades: 0;0

### KON-Test

Test duration: 24 October - 15 November 2013  
 Number of cycles without failure of VCI samples:  
 VCI: 20 or more RG[C20]: (0;0), (2;2), (0;1), (1;2), (1;0), (0;0)  
 Number of cycles until the reference samples fail:  
 Ref: 1 RG[C1]: (2;2)  
 Protection factor: PF ≥ 20:1  
 PF ≥ 20  
 Rating: **good**

### DIS-Test

Test duration: 24 October - 14 November 2013  
 Number of cycles without failure of VCI samples:  
 VCI: 19 or more RG[C19]: (0;0), (0;0), (0;1)  
 Number of cycles until the reference samples fail:  
 Ref: 4 RG[C4]: (1;1)  
 RG[C3]: (1;2)  
 Protection factor: PF ≥ 19:4  
 PF ≥ 4.75  
 Rating: **good**

*C = Cycle, RG = Rust Grade (Metal sheet front side; Metal sheet back side), PF = Protection Factor*

**DISU-Test**

Test duration: 24 October - 15 November 2013

Number of cycles without failure of VCI samples:  
 VCI: 20 or more      RG[C20]: (0;0), (0;1), (1;2)

Number of cycles until the reference samples fail:  
 Ref: 3                      RG[C3]: (2;1)

Protection factor:      PF ≥ 20:3  
                                  PF ≥ 6.7

Rating:                      **good**

*C = Cycle, RG = Rust Grade (Metal sheet front side; Metal sheet back side), PF = Protection Factor*

**4.3 Summary of the test results**

<b>Test</b>	<b>K-Test</b>	<b>KON-Test</b>	<b>DIS-Test</b>	<b>DISU-Test</b>	<b>KDW-Test<sup>#</sup></b>	<b>Overall score<sup>*</sup></b>
<b>Rating</b>	moderate	good	good	good	Contact: good Distance: good Crevice: good	2.1

<sup>#</sup> KDW test results were taken from UB200-37-09, because it is a recertification

<sup>\*</sup> Average of all test scores, 2 = good, 3 = moderate, 4 = poor, 5 = not remarkable

The corrosion protection effect of the corrosion protection film Grofit VCI 2000, 100 µm (date of delivery 13 September 2013) on steel and iron materials for is moderate to good according to the tests (K, KDW, DISU, KON and DIS) according to the guideline corrosion and corrosion protection for the test of VCI packings of the Volkswagen AG Wolfsburg. A certificate can be granted.