

**Test Report
No. 2601/17**

**Testing of corrosion protection effect of one VCI-film
in accordance with TL 8135-0043**

Client: RUST-X
DLF Corporate Greens, 1019, Tower-1, Sec-74A, Gurgaon
122004-Haryana
INDIA

Date of order: 24 May 2017

Customer reference: -

Test samples: Samples of VCI film,
product name: "RUST-X VCI FILM"

Received on: 14 July 2017

Date of testing: 17 – 18 July 2017

Test reference: TL 8135-0043

Official in Charge: B. Eng. S. Karg

Text pages: 2

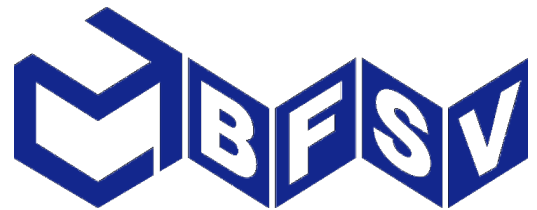
Figures: 2

Appendices: 2

Date of issue: 19 July 2017

This test report may only be reproduced in its entirety and without any additions. Use of results by third party, publication or duplication in extracts is subjected to our written consent. The test results relate exclusively to the samples tested. Only the paper version is binding.





1 Content of the order

The BFSV Hamburg Institute of Packaging GmbH was authorized to test a VCI film in accordance with TL 8135-0043 „ Anticorrosive film”, Edition 3, September 2002, Appendix A „Testing of corrosion protection effect of VCI-packaging accessories”.

Requirement: It is necessary to meet at least the corrosion protection effect of grade 2 (middle corrosion protection effect).

2 Test samples

Appr. 2 m² of VCI-film were delivered to BFSV Institute of Packaging. The product name is: “RUST-X VCI FILM”

3 Testing

The VCI film was tested according to TL 8135-0043, Appendix A. A description of the testing is listed in appendix 1.

4 Summarizing result

Table 1: Summarizing test result

VCI film	Corrosion protection effect	Grade	Requirement for TL 8135-0043
“RUST-X VCI FILM”	Good	3	fulfilled

The detailed results including a comparison of the corrosion symptoms with the requirements of TL 8135-0043 (Appendix A) are listed in appendix 2.

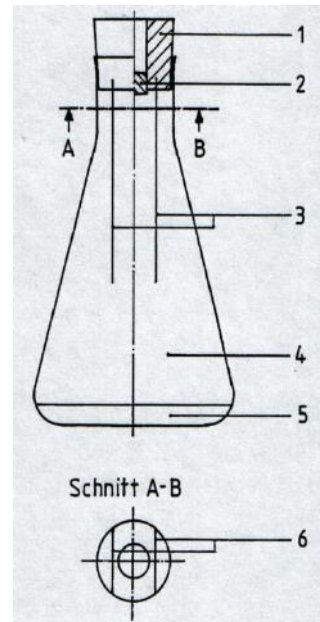
Official in Charge



B. Eng. S. Karg

Equipment and materials:

1. Rubber bung: upper diameter 53 mm, lower diameter 45 mm, hole 15 mm.
2. Test object: Unalloyed, killed structured steel according to DIN EN 10025 (Material-No. 1.0038); length 12 mm, diameter 16 mm.
3. VCI-sample 25 mm x 150 mm (2 stripes).
4. Erlenmeyer flask, 1 Liter wide mouth according to DIN 12385
 - 3 glass jar with VCI-film
 - 1 glass jar without VCI-film (control)
5. Glycerine-water solution, $\rho = 1,076 \text{ g/cm}^3$ and $23 \text{ }^\circ\text{C}$
6. Two slits on the rubber bung (5 mm) for film-samples

**Brief description:**

- Plugs shall be abraded with water to a uniform finish surface (320 grit)
- Cleaning with distilled water and ethanol
- Fixing of two stripes of VCI-film (one on each slit on the rubber bung)
- After a period of 20 h, which serves as the build-up phase for the VCI active substances, a mixture of water and glycerine is poured in.
- After another period of 2 h the glass containers are heated from room temperature to $40 \text{ }^\circ\text{C}$ in a fan oven for another 2 hours
Moisture condenses on the surface of the test objects, resulting in corrosion on the control sample without VCI.
The test objects in the containers with VCI should display little or no corrosion.
- After finishing the test, the plugs must be dried in the heating cabinet

Evaluation:

The corrosion symptoms are documented and the protective effect is assessed by comparison with the control sample.

Requirements of TL 8135-0043 (Appendix A) for the corrosion protection effect:

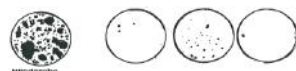
Evaluation of the test objects



Keine korrosionsschützende Wirkung



Geringe korrosionsschützende Wirkung



Mittlere korrosionsschützende Wirkung



Gute korrosionsschützende Wirkung

Corrosion protection effect



None (Grade 0)

Slight (Grade 1)

Middle (Grade 2)

Good (Grade 3)

Table 2: Detailed test results

Rust-X VCI film "RUST-X VCI FILM"	Test objects	
	Control sample (without VCI)	Protected samples with VCI film
Evaluation		
Corrosion protection effect		3 3 3 Grade 3 Good corrosion protection effect

