



Beratung - Schadensfallaufklärung - Qualitätssicherung - Forschung - Prüfung

- **Prüflabor für Korrosion, Korrosionsschutz und Korrosionsanalytik**
- Institut im Verbund der Technischen Akademie Wuppertal e. V.
- Institut an der TU Bergakademie Freiberg

☎ 0351 871 7100
Fax 0351 871 7150

Institut für Korrosionsschutz Dresden GmbH • Gostritzer Str. 65 • 01217 Dresden

Investigation Report

UB400/042/17

Customer: VCI active pack Europe
Piç Diputació 3
43550 ULLDECONA-TARRAGONA (ESPAÑA)

Day of order: 14.03.2017


Receipt of specimens: 09.03.2017


Period of testing: 03.04.2017 - 22.05.2017

Order: Verification of the conformance of the VCI film VCI active pack Europe with the german guideline TRGS 615

Laboratory numbers of order: LA4/140/17/174063

Number of pages: 3

Head of laboratory: 
Dipl.-Chem. Antje Schöne

Head of department: 
Dr. Jürgen Triebert

Dresden, 24.05.2017

1 Conceptual formulation

The customer entrusted the Institut für Korrosionsschutz Dresden GmbH (IKS) with the investigation and verification of the conformance of the VCI film VCI active pack Europe with the German guideline TRGS 615:2007. For this purpose the customer delivered the sample:

- **Blue VCI film VCI active pack Europe, delivery 09.03.2017.**

2 Test methods

For the verification of the conformance of the VCI film with the German guideline TRGS 615:2007 the total contents of nitrite and secondary amines in the material are determined quantitatively.

The nitrite concentration in the VCI film is determined quantitatively by anion chromatography (according to DIN EN ISO 10304-1:2009-07) after a triple ultrasonic extraction of the film with deionized water.

The concentration of secondary amines in the film is determined quantitatively by cation chromatography (IKS procedure) after a triple ultrasonic extraction of the material with deionized water and by gas chromatography / mass spectrometry.

3 Results

The following test results were determined for the VCI film:

Parameter	Dimension	Blue VCI film VCI active pack Europe, delivery 09.03.2017
Nitrite (calculated as NaNO ₂)	wt-% NaNO ₂	< 0,001
<i>Secondary amines</i>		
Diethanolamine	wt-%	0,005
Morpholine	wt-%	< 0,005
Dicyclohexylamine	wt-%	< 0,01
Piperazine	wt-%	< 0,01
<i>Primary and tertiary amines</i>		
Triethanolamine	wt-%	0,020

4 Conclusion

The analysed VCI material:

- **Blue VCI film VCI active pack Europe, delivery 09.03.2017**

contains:

1. No Nitrite, a nitrite concentration (calculated as NaNO_2) smaller than 0,001 wt-% was detected
2. The secondary amine diethanolamine, which can react to N-nitroso-diethanolamine; the detected concentration is 0,005 Ma-% diethanolamine; the presence of a compound between diethanolamine and another component, for example a salt, in the VCI film is probable.

Therefore the sample material complies the requirements of the German TRGS 615:2007.

The TRGS 615, chapter 4.2 (1) and (6) prescribes the duty for monitoring of N-nitrosamines for VCI materials, containing secondary amines in a concentration higher than 0,02 wt-%. The analysed VCI film contains 0,005 Ma-% diethanolamine. For that reason no monitoring is necessary.