



## Report

Order-No.: A1400621/0  
Customer: Dr. Pfisterer, Iris, BSL BIOSERVICE, Scientific Laboratories GmbH  
Company: CBMM Europe BV  
Address: WTC H-Tower  
Zuidplein 96  
1077 XV Amsterdam, The Netherlands  
Author: Schmitz, Elisabeth, BTS-OSS-PPS-SL, Leverkusen  
Adam, Michael, BTS-OSS-PPS-SL, Leverkusen  
CC: Hertenberg, Deetje, BSL BIOSERVICE, Planegg  
Konrad, Ute, Fa. Knoell, Leverkusen  
Subject: **Corrosion testing for classification according to UNECE  
"Manual of Tests and Criteria" 5<sup>th</sup> Edition**  
Inspection interval: May 2014

05/27/2014

Elisabeth Schmitz

Bayer Technology  
Services GmbH  
BTS-OSS-PPS LAB  
B407  
51368 Leverkusen  
Deutschland

Tel: +49 214 3042347  
Fax:  
elisabeth.schmitz  
@bayer.com  
www.bayer.com

Managing Director:  
Dr. Dirk Van Meirvenne

Registered Office:  
Leverkusen  
Local Court Cologne  
HRB 49896

## Test Item:

Ammonium Niobium Oxalate, solid, Lot AD74663

## Introduction:

For the classification of "Ammonium Niobium Oxalate" according to UNECE "Manual of Tests and Criteria", Part III, Section 37 a corrosion test was executed. One sample of steel with material no. 1.0037 (St37.2) and of aluminum with material no. 3.4365 (AW7075) was either full immersed or half immersed as well as placed in the vapor phase for 168 hours at 55 °C. The substance "Ammonium Niobium Oxalate" was delivered by BSL BIOSERVICE.

## Criteria:

In case either the corrosion rate is  $\geq 6.25$  mm/a or local corrosion occurred after 168 hours with the deepest intrusion  $\geq 120\mu\text{m}$ , the proved substance has to be considered as dangerous good acc. class 8, group III.

## Result of the immersion test:

For the carbon steel material no. 1.0037 corrosion rates from 0.7 to 1.3 mm/a and non-uniform corrosion were found.

For the aluminum material no. 3.4365 corrosion rates from 0.7 to 0.2 mm/a and non-uniform corrosion were found and also localized corrosion on the half and the full immersed coupons (pitting corrosion et al., for detailed information see table 1). Based on these findings a metallographic inspection was done.

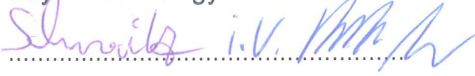
## Result of the metallographic inspection

For the metallographic inspection of the aluminum coupon 7075-1 a polished cross section was made. The real plate surface shows pitting corrosion to a maximum depth of 172  $\mu\text{m}$ . Additionally at the cutting edge selective attack to a depth of 400  $\mu\text{m}$  was found, see picture 1 and 2.

**Result:**

With corrosion rates up to 1.3 mm/a on steel as well as 0.7 mm/a and **localized corrosion with depth >120 µm on aluminum**, according to UNECE 37.4.1 Ammonium Niobium Oxalate has to be considered as corrosive.

Bayer Technology Services GmbH

 i.v. M.H.

Operation Support & Safety

Asset Life Cycle Management

Table 1: Result of the corrosion test according to UNECE, Section 37.4

**Substance:** Ammonium Niobium Oxalate, Lot AD74663  
**Testing period:** 05/06/2014 to 05/13/2014  
**Comment:** The metals were tested in different vessels;  
condensing water to be seen at the vessel cover.

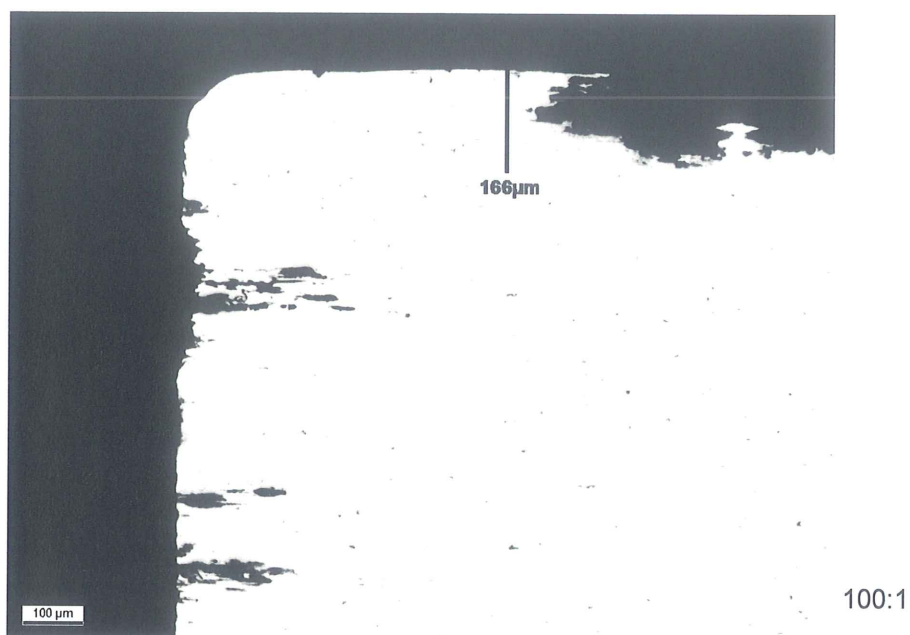
| <b>Component:</b>        | <b>Art:</b> |
|--------------------------|-------------|
| Ammonium Niobium Oxalate | Main        |

**Test method:** Non-agitated immersion test in laboratory  
**Test vessel:** Glas double jacket flask  
**Temperature (°C):** 55  
**Test duration (hours):** 168  
**Test coupon:** Base metal

| Type of metal       | Probe no.. | Immersed in | CR<br>(mm/a) | Type of corrosion       | Location     |
|---------------------|------------|-------------|--------------|-------------------------|--------------|
| Steel W.-Nr. 1.0037 | 37.2-1     | full        | 0.73         | non-uniform corrosion   |              |
|                     | 37.2-2     | half        | 1.02         | non-uniform corrosion   |              |
|                     | 37.2-3     | vapor phase | 1.26         | non-uniform corrosion   |              |
| Aluminium 3.4365    | 7075-1     | full        | 0.67         | pitting corrosion       |              |
|                     |            |             |              | selective corrosion     | cutting edge |
|                     |            |             |              | non-uniform corrosion   |              |
|                     | 7075-2     | half        | 0.32         | intergranular corrosion |              |
|                     |            |             |              | pitting corrosion       | liquid phase |
|                     |            |             |              | intergranular corrosion | liquid phase |
|                     | 7075-3     | vapor phase | 0.16         | non-uniform corrosion   | liquid phase |
|                     |            |             |              | uniform corrosion       | vapor phase  |
|                     |            |             |              | uniform corrosion       |              |

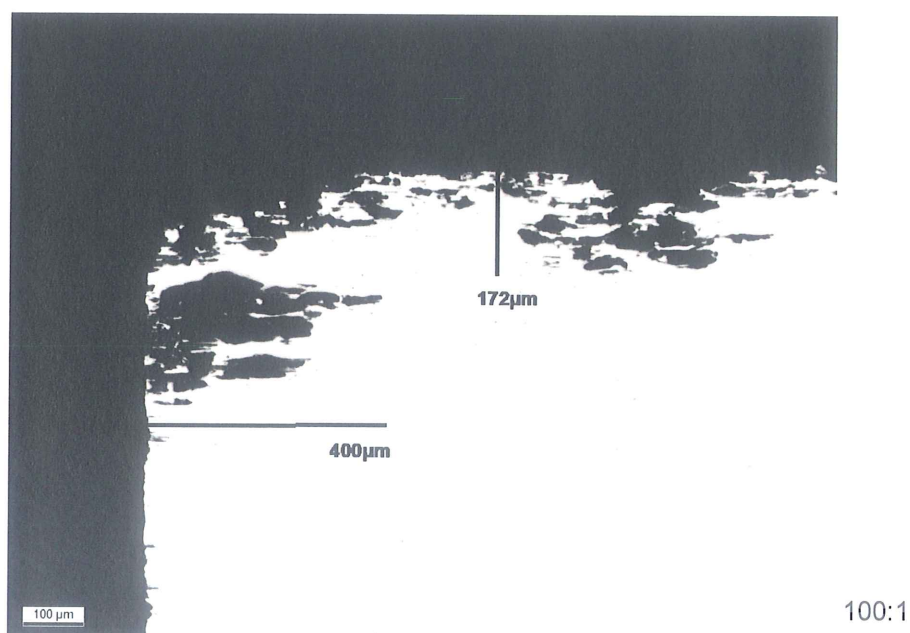
CR (mm/a) = Corrosion Rate

Laboratory No.: B1400124



A1400621\_1\_005

Pic. 1 Corrosion coupon 7075-1 polished cross section, pitting corrosion (166 μm]



A1400621\_1\_006

Pic. 2 Corrosion coupon 7075-1 polished cross section, pitting corrosion (172 μm] and selective corrosion (400 μm).