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MA 39 - VFA 2011-0731.01

Vienna, 10. October 2011

Test Report

(translation)

concerning

film-forming coating on rendering and plastering mortar

Client: Allfüll Consulting & Handels GesmbH

Date of commission: 16. March 2011

Test material: Film-forming coating, Art.Nr. VP 3898A,
Charge: LB 3941 2011 04 18

Test program:
1. Testing for identification
2. Tests on rendering and plastering mortar
2.1. Water absorption and water penetration
2.2. Water vapour permeability
2.3. Thermal conductivity
2.4. Determination of bond strength

In any case of doubt the original report MA 39 – VFA 2011-0731.01 in german language is binding.

This report comprises 6 pages
and 1 attachment (3 pages).

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1 General

The client, Allfüll Consulting & Handels GesmbH, commissioned MA 39 -VFA to carry out tests of a film-forming coating on facades-exterior plasters.

The film-forming coating is applied according to the specification to the protection and the preservation of external parts and is removable as a film.

2 Tests and results

2.1 Testing for identification

The dry substance at 105 °C and an infrared-spectrum were determined for identification on the test sample of the film-forming coating.

The dry substance at 105 °C is 50,91% by mass.

The measured infrared-spectrum is attached for possible comparison purposes in the attachment, page 1.

2.2 Tests on rendering and plastering mortar

2.2.1 Preparation of test specimens

The following plastering mortars were used for the preparation of the test specimens:

rough plaster for renovation: water absorption and water penetration,
renovation mortar N: water vapour permeability,
renovation mortar L: thermal conductivity,
mortar for base area: determination of bond strength.

The test specimens were prepared in the period from 11. April 2011 to 14. April 2011.

The dry mortar was in each case strewn in as much water (water temperature 20 °C) and mixed to give an appropriate consistency of the fresh mortar. The mixing process took place in a laboratory mixer or free-fall mixer.

The consistence was determined according to ÖNORM EN 1015-3, the air content according to ÖNORM EN 1015-7 and the fresh-mortar density in the measuring cylinder with 1 dm^3 content.

Table 1: fresh mortar data

	rough plaster	plastering mortar N	plastering mortar L	mortar for base area
Water portion	640 cm³	650 cm³	20,5 l	530 cm³
	32,0 M-%	32,5 M-%	113,9 M-%	26,5 M-%
Consistence (ABM)	169 mm	173 mm	180 mm	172 mm
Fresh-mortar density	1,239 kg/dm³	1,094 kg/dm³	0,871 kg/dm³	1,403 kg/dm³
Air content	30 %	29 %	27 %	26 %

The test specimens were stored until coated in accordance with ÖNORM EN 1015-11, Tab. 1.

The test specimens were coated by the client on 17. May 2011. The following amounts of the film-forming coating were applied.

Table 2: application quantities

test specimens	wet	air-dry
slices, Ø 180 mm	1885 g/m²	1216 g/m²
slices, Ø 90 mm	695 g/m²	377 g/m²
plates, 50x50 cm²	353 g/m²	212 g/m²

2.2.2 Water absorption and water penetration

The water absorption was tested in accordance with ÖNORM EN 1015-18 on disc-shaped test specimens. The water penetration was determined immediately afterwards in accordance with point 6.3.7 of WTA Guideline 2-9-04 / D. The tests were carried out comparatively on coated and uncoated test specimens.

Table 3:

	coated	uncoated
water absorption, kg/m²	0,31	2,63
water absorption coefficient W_{24}, kg/(m²h^{0,5})	0,063	0,536
water penetration, mm	0 - 3	5

Due to the coating with the film-forming paint, a significant reduction of the water absorption and the water penetration can be detected.

The film-forming coating is manually peelable after the tests. The coating has no apparently visible changes, e.g. cracks, embrittlement, peeling off, blistering, discolouration.

2.2.3 Water vapour permeability

The coefficient of water vapour permeability (μ-value) was tested in accordance with ÖNORM EN 1015-19. The tests were carried out comparatively on coated and uncoated test specimens.

Table 4:

	coated	uncoated
water vapour diffusion coefficient μ	22,8	8,3
water vapour diffusion equivalents air-layer-thickness s_d, m	0,56	0,20

The film-forming coating slightly increases the coefficient of water vapour permeability (μ-value) of a renovation mortar. The requirements for renovation mortar for the water vapour diffusion coefficient μ are in accordance with WTA Guideline 2-9-04 / D or ÖNORM B 3345 <12 or ≤ 12 and according to EN 998-1 ≤ 15.

2.2.4 Thermal conductivity

The determination of the thermal conductivity of coated test specimens of plastering mortars, plates, was carried out according to ÖNORM EN 12664.

Table 5:

thickness of test specimens	52,0 mm
density, dry hardened mortar	0,465 kg/dm³
thermal conductivity measured value λ (dry)	0,110 W/mK

The requirement for renovation mortar L for the thermal conductivity λ_{10tr} is according to ÖNORM B 3345 ≤ 0,20 W/mK.

2.2.5 Bond strength

The tests of the bond strength were made on the coated test specimens of plastering mortars in connection after the following pretreatments or storage conditions:

1. storage in room conditions (basic test),
2. freeze-thaw exposure, 25 cycles,
3. UV-radiation, 7 days and temperature, about 60 °C,
4. driving rain, coated and uncoated, 7 days, each over 6 hours.

For the tests of the bond strength the film-forming coating was cut to the plastering mortar on an area of 50 mm x 50 mm or a diameter of 50 mm (at least 3 samples per pretreatment or storage condition). Adhesive tension anchors were then sticked on using a two-component adhesive. After the hardening time of the adhesive, the adhesion tests were carried out with a mobile adhesive tensile tester, measuring range: max. 6 kN (Fig., see attachment, pages 2 and 3).

Table 6: bond strength

pretreatment	bond strength N/mm²	form of rupture	visible changes on the film-forming coating
room condition (basic test)	0,82 0,75 0,61 mean value: 0,73	100% adhesive failure of the film-forming coating from the plastering mortar, with low residue from the plastering mortar	manually removable, no visible changes
freeze-thaw exposure, 25 cycles	0,86 0,83 0,68 mean value: 0,79	100% adhesive failure of the film-forming coating from the plastering mortar, with low residue from the plastering mortar	manually removable, no visible changes, e.g. cracks, embrittlement, peeling off, blistering, discolouration
UV-radiation, temperature (about 60 °C)	0,78 0,74 0,68 mean value: 0,73	100% adhesive failure of the film-forming coating from the plastering mortar, with low residue from the plastering mortar	manually not removable, coat film is slightly embrittled and yellowed, no other visible changes, e.g. cracks, peeling off, blistering
driving rain, coated	0,29 0,17 0,19 mean value: 0,22	100% adhesive failure of the film-forming coating from the plastering mortar, with low residue from the plastering mortar	manually removable, no visible changes, e.g. cracks, embrittlement, peeling off, blistering, discolouration
driving rain, uncoated	0,15 0,10 0,10 mean value: 0,12	100% adhesive failure of the film-forming coating from the plastering mortar, with low residue from the plastering mortar	manually removable, no visible changes, e.g. cracks, embrittlement, peeling off, blistering, discolouration

In the case of the pretreatments or storage conditions, no deviations have occurred in the results of the bond strength of the film-forming coating on the plastering mortar.

3 Summary

In the course of the tests carried out of the film-forming coating, which is applied for the protection and preservation of external parts, no effects were found that affect the tested properties of rendering and plastering mortar

- water absorption and water penetration,
- water vapour permeability,
- thermal conductivity

essentially adversely.

After external pretreatments by freeze-thaw exposure, UV-radiation and driving rain, the film-forming coating has an unchanged adhesion (bond strength) to the plastering mortar compared to the basic tests.

A rendering and plastering mortar coated with the film-forming coating essentially remains permeable to water vapour. The coefficient of water vapour permeability (μ-value) of a renovation mortar is slightly increased.

The coating with the film-forming paint causes a significant reduction of the water absorption and the water penetration, whereby, in case of external pretreatments (stresses or influences), e.g. moisture, freeze-thaw exposure, driving rain, the protection of rendering and plastering mortars is increased.

The Case Manager:

Ing. Walter Klaffl

Prüf-, Überwachungs- und Zertifizierungsstelle Magistratsabteilung 39 Stadt Wien 5

The Head of Laboratory
authorised to sign:

Dipl.-Ing. Andreas Tichy
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The Head of the Research Centre,
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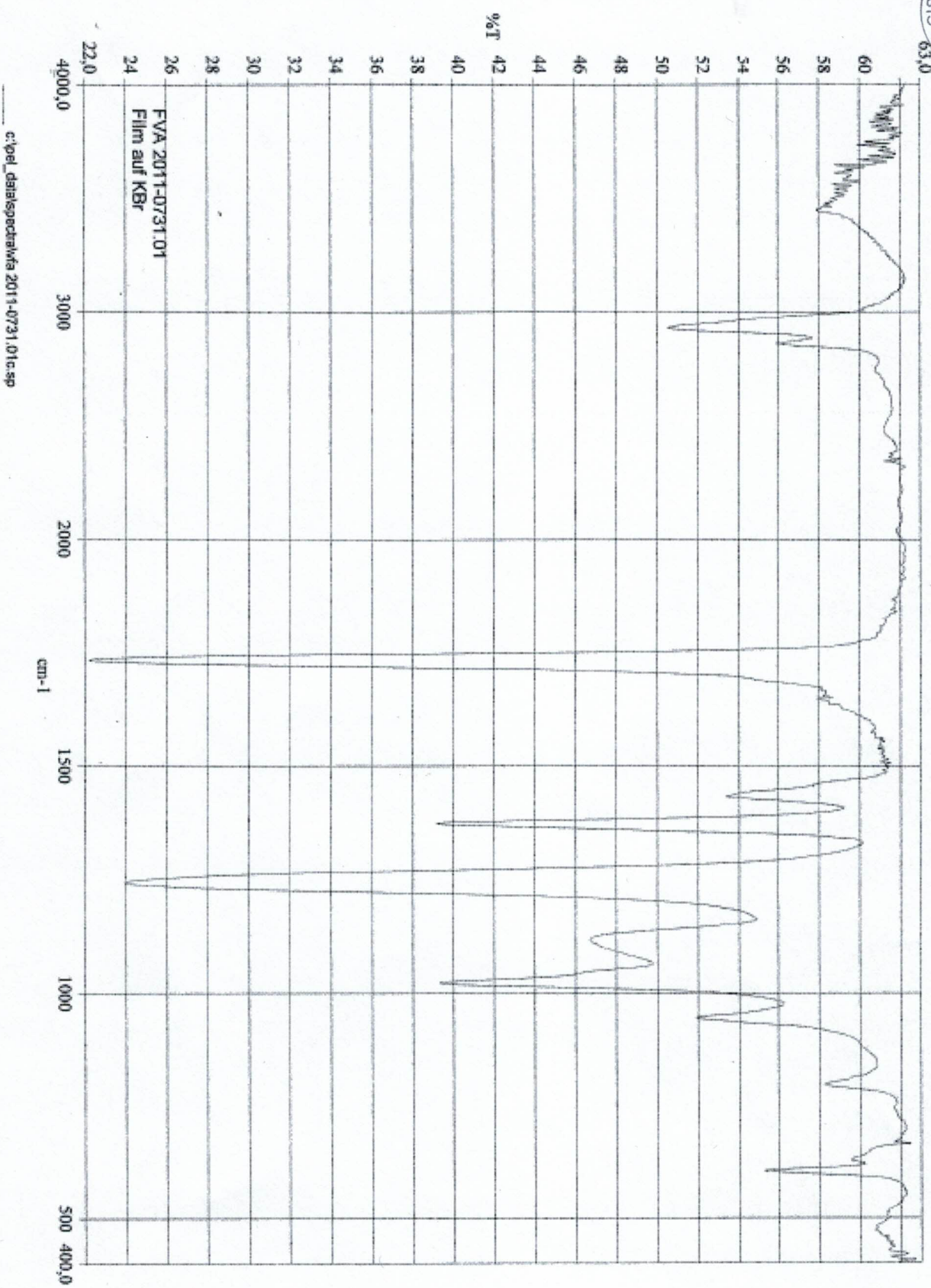
Dipl.-Ing. Georg Pommer
(Senatsrat)



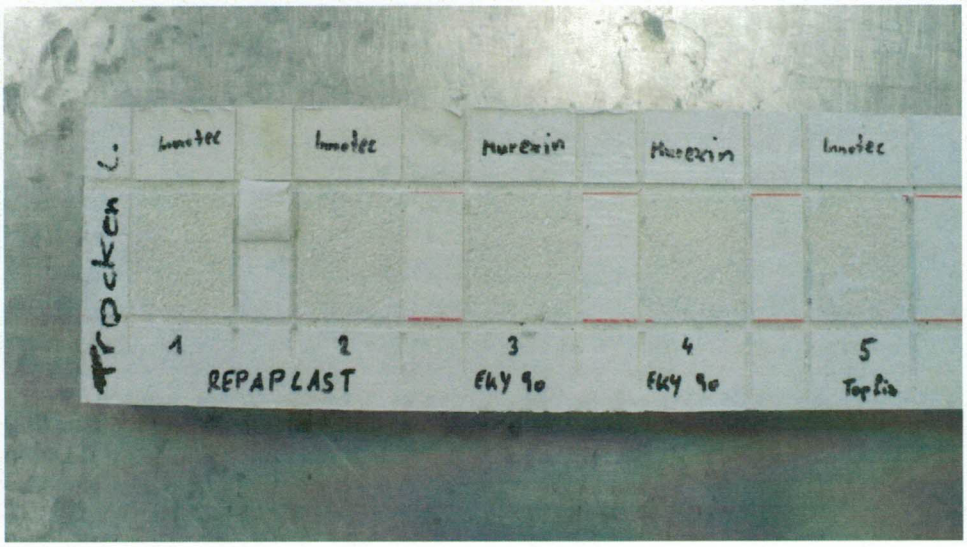


Fig. 1:

room conditions, basic test

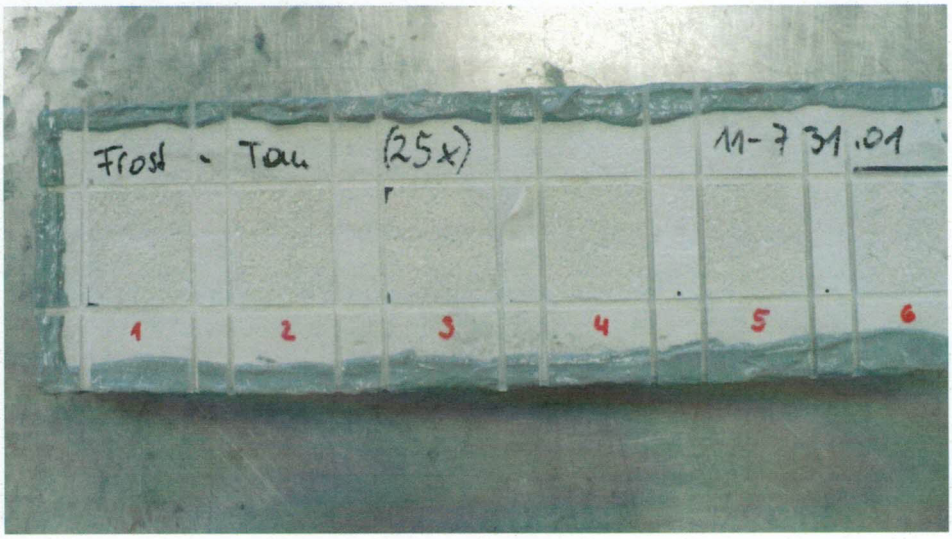


Fig. 2:

freeze-thaw exposure

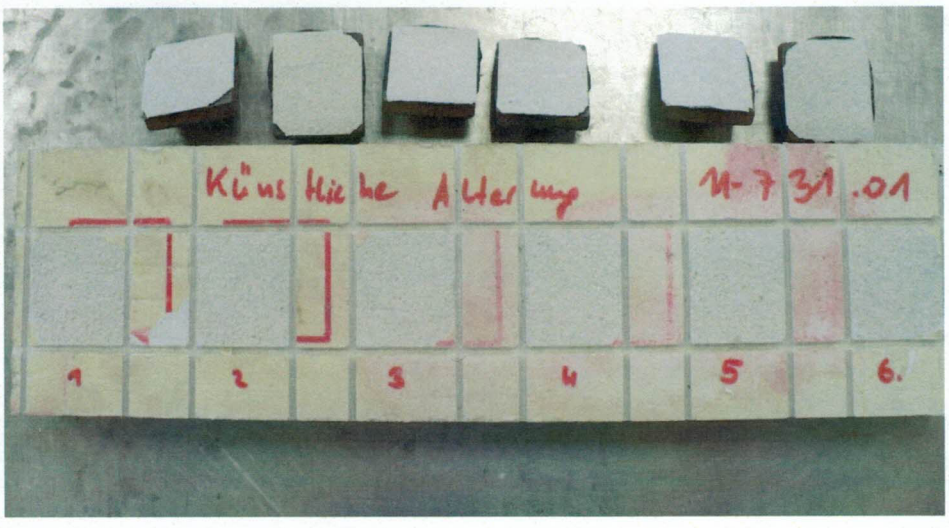


Fig. 3:

UV-radiation, temperature

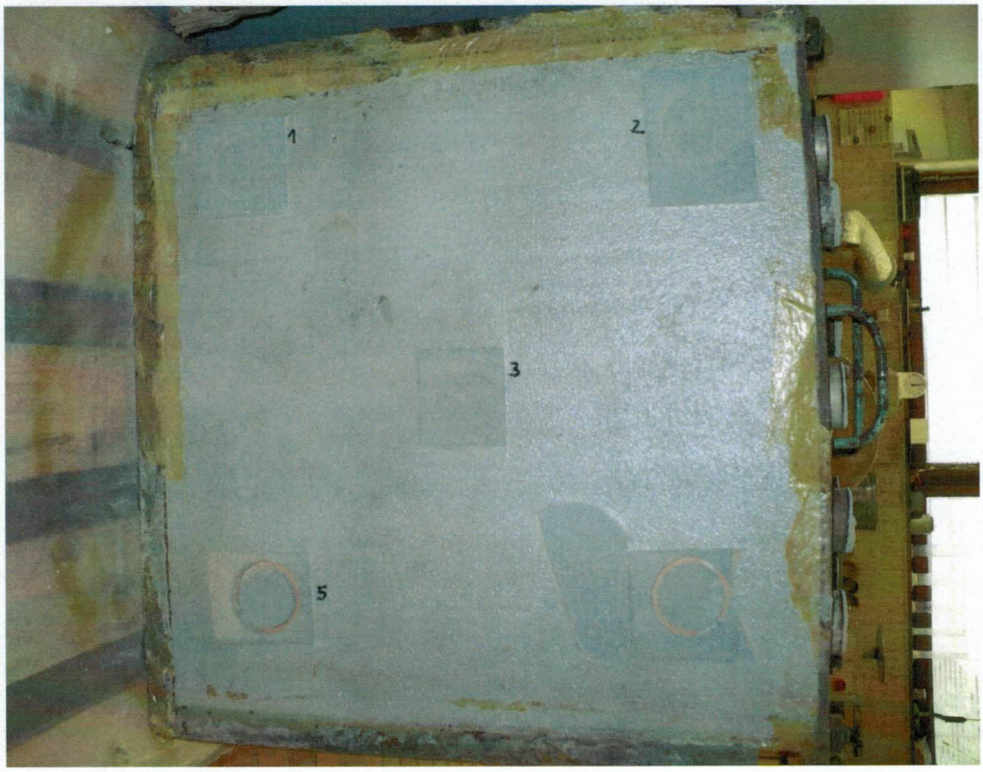


Fig. 4:

driving rain