



OFI Technologie & Innovation GmbH
Firmensitz: 1030 Wien, Arsenal, Franz-Grill-Straße 5
t: +43 1 798 16 01 - 0 | office@ofi.at | www.ofi.at

Test Report

Test Report No.	419 777	Date: 22 Sept. 2016 Ref. Gril / Uhl
Client	Lengheim Consulting und Entwicklung Ges.m.b.H c/o Mr Hubert Lengheim Bahnstrasse 16 A-2213 Bockfliess	
Test items	Coated steel plates, with KaWaTech membrane-forming coating	
Test specifications	Determination of coating thickness, surface resistivity and volume resistivity	
Contract	Order of 26 August 2016	
Date of sampling	—	
Location of sampling	Samples provided by OFI's client.	
Receipt of samples	8 Sept. 2016	



1 SCOPE OF WORK

In accordance with the contract, the plates submitted were tested with regard to coating thickness, surface resistivity and volume resistivity.

2 SCOPE OF APPLICATION

The results given in this Test Report have been obtained under the specific conditions of the individual tests. As a rule, they are not the only criteria for assessing the product in question and its suitability for a specific purpose of application.

The original of this Test Report has been drawn up in German. The German version shall be the authentic one and prevail over the English one in all matters of interpretation and construction. The English version shall be deemed to be only a translation for information purposes.

3 SAMPLE MATERIAL

OFI's client provided the following samples for the purpose of testing:

- 3.1 3 coated plates, each sized approx. (500 x 300) mm, according to information by OFI's client, they had been coated with KaWaTech.

The photograph below documents one sample as delivered.

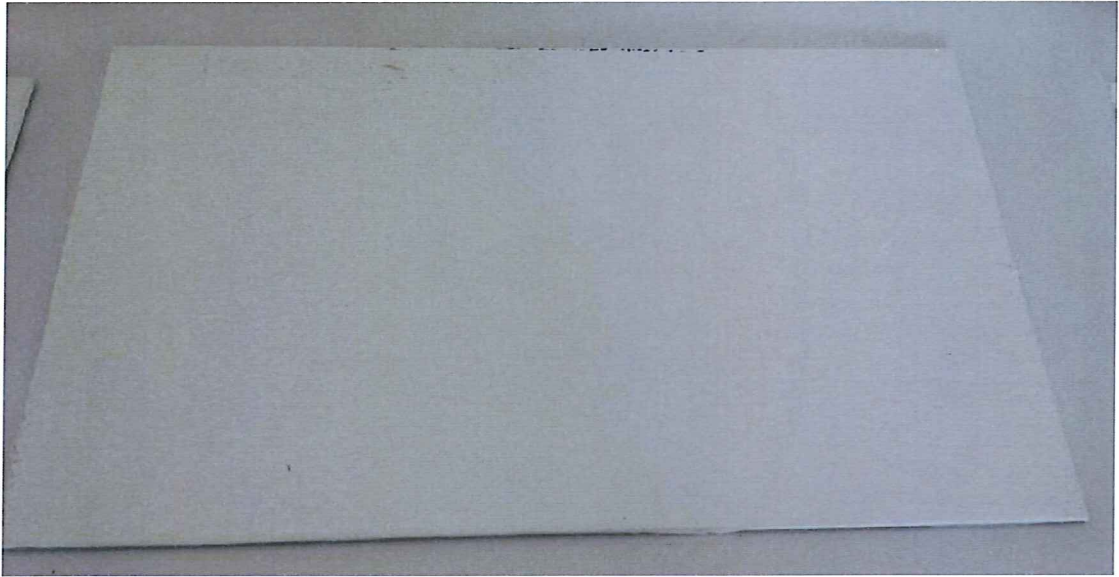


Figure 1: Coated plate (Sample 3.1) as delivered

4 TESTS

Testing took place from 15 to 22 September 2016.

The tests were carried out in the technical departments in charge, within the scope of competence of the authorised signatories, in accordance with OFI's QM manual.

4.1 Coating thickness

The coating thickness of the steel plates was determined in accordance with EN ISO 2178: Non-magnetic coatings on magnetic substrates – Measurement of coating thickness – Magnetic method; German edition 04/1995. The measuring instrument used was a Type 456 Elcometer (Equipment No. 3 099), with a dual FNF probe that can measure both ferrous and non-ferrous metals, with automated substrate detection. In our tests, the magnetic inductive principle was applied. The zero value was calibrated by means of the instrument standard (calibration foil 253 μm). On each sample, 30 different spots were measured. The results of the coating thickness measurements (mean, standard deviation, minimum, maximum, measuring spots) are given in Table 1.

4.2 Volume resistivity

The tests were performed on the basis of method A of ÖNORM EN 1081: Resilient floor coverings – Determination of the electrical resistance; German edition 03/1998. For this purpose, a mass >300 N was applied to a 3-point electrode, and the measurements were carried out with a LEM Norma Unilap ISO X apparatus (Equipment No. 991) at (23 ± 3) °C and $(50 \pm 10)\%$ relative humidity. The tests were performed with a direct voltage of 100 V. The results obtained are given in Table 2.

4.3 Surface resistivity

The surface resistivity of the sample plates was tested on the basis of EN 61340-4-1: Electrostatics – Part 4-1: Standard test methods for specific applications – Electrical resistance of floor coverings and installed floors; German edition 02/2005. Surface resistivity was measured with two cylindrical metal electrodes ($d = 65$ mm), and at the contact surface, an elastomeric connector was used. The distance between electrodes was (300 ± 10) mm, and a mass of (2.5 ± 0.25) kg was applied. The tests were carried out with a Norma Unilap ISO X apparatus (Equipment No. 991), using a direct voltage of 100 V at (23 ± 3) °C and $(50 \pm 10)\%$ relative humidity. The results obtained are given in Table 3.

5 RESULTS

Table 1

Coating thickness tests in accordance with EN ISO 2178; results in μm	
Plate	Mean / standard deviation / min / max / number of readings
Plate 1	187.5 / 24.3 / 147 / 237 / 30
Plate 2	167.7 / 22.6 / 123 / 221 / 30
Plate 3	163.5 / 15.1 / 120 / 184 / 30

Table 2

Results of volume resistivity tests; in ohm [Ω]	
Plate	Mean / standard deviation / min / max / number of readings
Plate 1	2.17×10^8 / 0.3×10^8 / 1.8×10^8 / 2.6×10^8 / 6
Plate 2	1.36×10^8 / 0.2×10^8 / 1.1×10^8 / 1.8×10^8 / 6
Plate 3	1.82×10^8 / 0.2×10^8 / 1.3×10^8 / 2.0×10^8 / 6

Table 3

Results of surface conductivity tests, in ohm [Ω]	
Plate	Mean / standard deviation / min / max / number of readings
Plate 1	9.29×10^8 / 0.7×10^8 / 8.5×10^8 / 10.4×10^8 / 6
Plate 2	7.04×10^8 / 0.5×10^8 / 6.5×10^8 / 7.6×10^8 / 6
Plate 3	7.11×10^8 / 0.7×10^8 / 6.4×10^8 / 8.5×10^8 / 6

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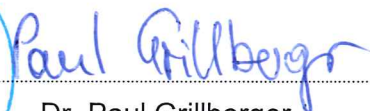
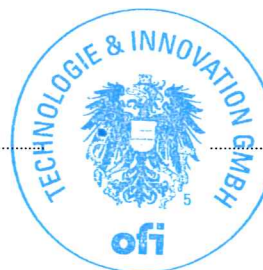
comprises 6 sheets with 3 table(s), 1 figure, 0 appendixes.

Head of Technical Competence Center

Director in charge
Materials Technology



Dr. Volker Uhl



Dr. Paul Grillberger

The test results given relate only to the samples tested.

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All tests applied are subject to a quality assurance programme in accordance with EN ISO/IEC 17025:2005.