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Dresden, 05/08/2021
70-PPAU

Test Report
Order No. 2721352/A1

Client:	Ecotile Flooring Ltd Unit 15 North Luton Industrial Estate Sedgwick Road Luton, LU4 9DT United Kingdom
Date of order:	24/06/2021
Order:	Measurement of the electrical resistance to groundable point, point-to-point resistance and vertical resistance according to EN 61340-4-1
Contractor:	EPH - Laboratory Surface Testing
Engineer in charge:	Dipl.-Ing. Detlef Kleber

i.V. R. Rüdel

Dipl.-Ing. Andreas Möschner
Head of Laboratory Surface Testing

The test report contains 9 pages. Any duplication of extracts requires the written permission of EPH.
The test results refer exdusively to the material tested.

1 Task

The accredited laboratory Entwicklungs-und Prueflabor Holztechnologie GmbH (EPH) was instructed by Ecotile Flooring Ltd to determine the electrical resistance to a groundable point, the point-to-point resistance and the vertical resistance according to EN 61340-4-1.

This test report is replacing the Test Report Order No. 2721352 dated 16/07/2021 which is invalid.

NOTE: All numerical values within this document are given with a comma as decimal.

2 Test material

For testing, the following floor samples were selected by the client and sent to the contractor with receipt at EPH laboratory on: 06/07/2021 and 30/07/2021.

Variant	Test material	Pieces	Format of the material in mm
1	E500/7/ESD	10 tiles	about 500 x 500
	Grounding tile E500/7/ESD with ESD-point	1 tile	about 500 x 500
2	E500/7/XL/ESD	10 tiles	about 500 x 500
	Grounding tile E500/7/XL/ESD with ESD-point	1 tile	about 500 x 500
	Grounding tape		

3 Test performance and requirements

3.1 Measurement of resistances to groundable point according to EN 61340-4-1

The test specimens were assembled from three pieces and conditioned 3 days at 23 °C ± 2 K / 12 % ± 3 % relative humidity, the test was carried out in the same climate.

Performance of the test: 05/08/2021

The following test devices were used:

- "PRS 801" (fabricate PROSTAT) used measuring range 1 x 100 ... 2 x 10^{13} Ω (measurement uncertainty < 5 %, lower than statistical variance of the measurement values)(OF-27)
- Electrode with a diameter of 65 mm and weight 2,5 kg (OF-129)

- Grounding tile and grounding tape under the tiles (supplied by the client)
- Measuring on insulating underlay R > 10^{14} Ohm
- Two test samples (about 1200 mm x 500 mm) were used
- Measuring voltage: 10 V / 100 V

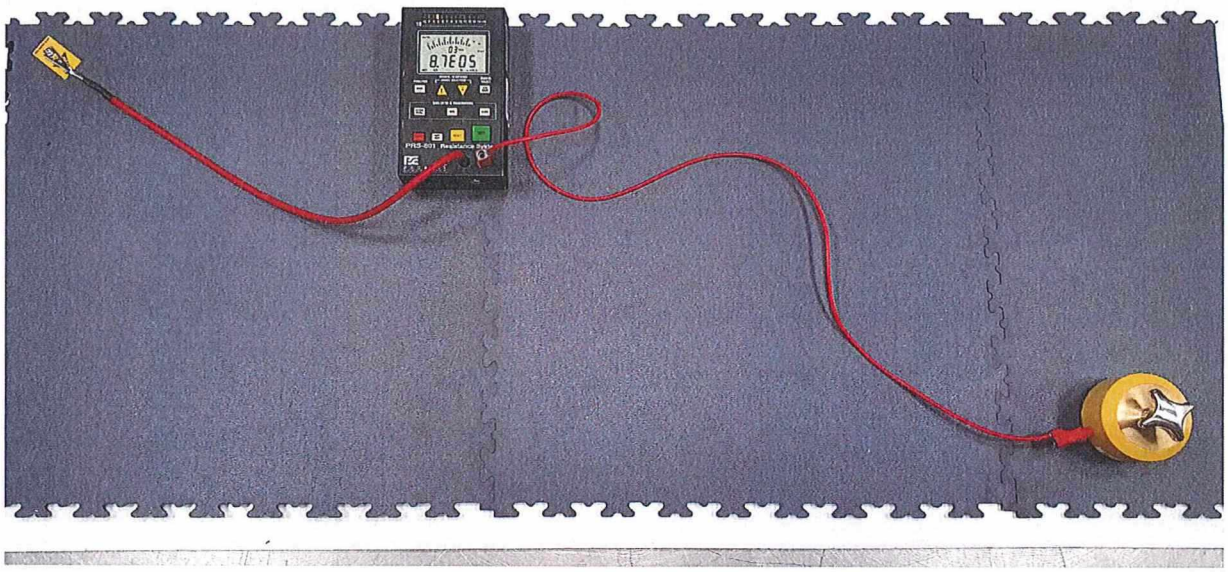


Fig. 1: Resistance to groundable point measured between an electrode, placed on the surface of an specimen (tile) and a groundable point (using Var. 2 as an example)

3.2 Measurement of resistances point to point according to EN 61340-4-1

The test specimens were assembled from three pieces and conditioned 3 days at 23 °C ± 2 K and 12 % ± 3 % relative humidity, the test was carried out in the same climate.

Performance of the test: 05/08/2021

The following test devices were used:

- The same measuring devices as described in 3.1 were used
- Grounding tile and grounding tape under the tiles (supplied by the client)
- The resistance refers to the point to point resistance (e.g. electrode gap according to EN 61340-4-1, d = 300 mm, see picture 2)

- Measuring on insulating underlay R > 10^{14} Ohm
- Two test samples (about 1200 mm x 500 mm) were used
- Measuring voltage: 100 V

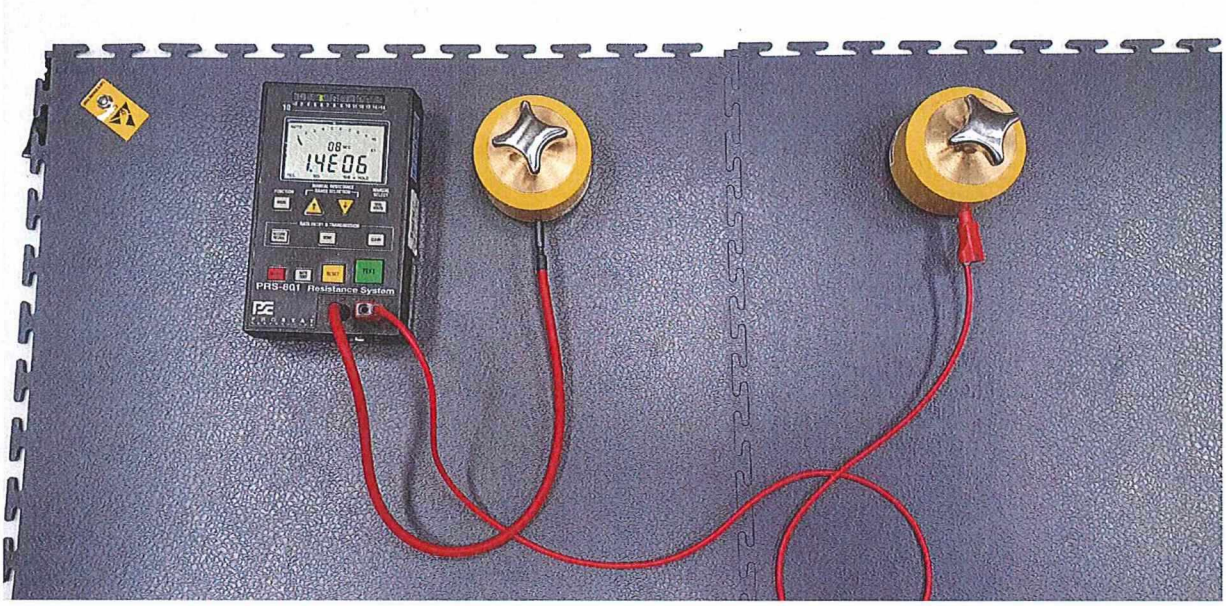


Fig. 2: Surface resistance measured between two electrodes placed at a distance of 300 mm (using Var. 1 as an example)

3.3 Measurement of the vertical resistance according to EN 61340-4-1

The three test pieces were conditioned 3 days at 23 °C ± 2 K / 50 % ± 3 % relative humidity, the test was carried out in the same climate.

Performance of the test: 15/07/2021

The following test devices were used:

- The same measuring devices as described in 3.1 were used
- Measuring on a steel plate on insulating underlay R > 10^{14} Ohm
- Three test samples (about 500 mm x 500 mm) were used
- Measuring voltage: 100 V

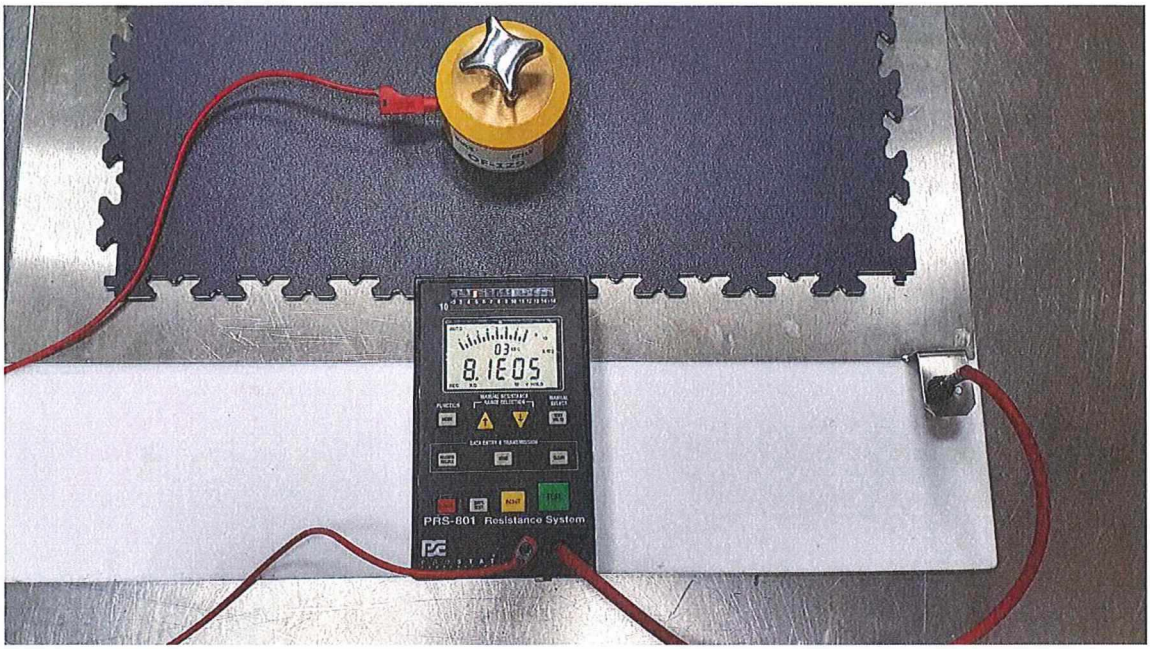


Fig. 3: Vertical resistance measured between electrode and the steel plate

4 Test results

4.1 Results of measurements of resistances to groundable point according to EN 61340-4-1

Results of the variant 1 (E500/7/ESD):

Parameter	Determined resistance in Ω	
	Test sample 1	Test sample 2
1	1,1E+06	9,3E+05
2	1,4E+06	1,6E+06
3	2,1E+06	1,2E+06
4	4,6E+05	2,4E+06
5	1,1E+06	1,1E+06
6	1,2E+06	2,2E+06
geometric mean	**1,3E+06**	

Results of the variant 2 (E500/7/XL/ESD):

Parameter	Determined resistance in Ω	
	Test sample 1	Test sample 2
1	8,7E+05	8,8E+05
2	1,0E+06	1,1E+06
3	9,3E+05	9,2E+05
4	1,0E+06	8,5E+05
5	8,4E+05	1,0E+06
6	9,1E+05	9,4E+05
geometric mean	**9,3E+05**	

4.2 Results of measurements of resistances point to point according to EN 61340-4-1

Results of the variant 1 (E500/7/ESD):

Parameter	Determined resistance in Ω	
	Test sample 1	Test sample 2
1	1,5E+06	5,3E+06
2	1,4E+06	2,0E+06
3	2,0E+06	2,8E+06
4	2,1E+06	1,9E+06
5	1,8E+06	2,5E+06
6	1,7E+06	1,9E+06
geometric mean	**2,1E+06**	

Results of the variant 2 (E500/7/XL/ESD):

Parameter	Determined resistance in Ω	
	Test sample 1	Test sample 2
1	1,5E+06	1,2E+06
2	1,6E+06	1,5E+06
3	1,2E+06	1,4E+06
4	1,6E+06	1,6E+06
5	1,0E+06	1,1E+06
6	1,5E+06	1,5E+06
geometric mean	**1,4E+06**	

4.3 Results of measurements of the vertical resistance according to EN 61340-4-1

Results of the variant 1 (E500/7/ESD):

Parameter	Determined resistance in Ω		
	Test sample 1	Test sample 2	Test sample 3
1	8,5E+05	9,8E+05	7,8E+05
2	8,6E+05	9,5E+05	9,0E+05
3	9,0E+05	5,9E+05	1,0E+06
4	5,6E+05	9,6E+05	1,1E+06
5	9,0E+05	8,9E+05	1,1E+06
6	7,0E+05	9,6E+05	9,0E+05
geometric mean	**8,7E+05**		

Results of the variant 2 (E500/7/XL/ESD):

Parameter	Determined resistance in Ω		
	Test sample 1	Test sample 2	Test sample 3
1	3,9E+05	3,0E+05	7,4E+05
2	4,2E+05	7,7E+05	4,6E+05
3	4,0E+05	4,3E+05	6,6E+05
4	5,9E+05	7,0E+05	8,9E+05
5	8,1E+05	7,4E+05	7,6E+05
6	7,6E+05	6,8E+05	7,6E+05
geometric mean	**6,0E+05**		

5 Evaluation

The following tables show a summary of the measurement results and the declaration according to EN 61340-5-1:2016.

Results of the variant 1 (E500/7/ESD):

Property	**Measurement Result according to EN 61340-4-1:2016**	**Requirement according to EN 61340-5-1:2016**	**Fulfillment of requirements according to EN 61340-5-1:2016*or declaration**
Electrical resistance to groundable point according to EN 61340-4-1	1,3E+06 Ω	R_{gp} < 1,0E+09 Ω	fulfilled
Electrical resistance point to point according to EN 61340-4-1	2,1E+06 Ω	-	Resistance point to point 2,1E+06 Ω
Vertical electrical resistance according to EN 61340-4-1	8,7E+05 Ω	-	Vertical resistance 8,7E+05 Ω

* Statements on conformity assessment/classification were made on the basis of the measurement results obtained. Measurement uncertainties were not included in the assessment (ILAC G8 03/2009 "Guidelines on the Reporting of Compliance with Specification" Section 2.7).

Results of the variant 2 (E500/7/XL/ESD):

Property	Measurement Result according to EN 61340-4-1:2016	Requirement according to EN 61340-5-1:2016	Fulfillment of requirements according to EN 61340-5-1:2016*or declaration
Electrical resistance to groundable point according to EN 61340-4-1	9,3E+05 Ω	R_{gp} < 1,0E+09 Ω	fulfilled
Electrical resistance point to point according to EN 61340-4-1	1,4E+06 Ω	-	Resistance point to point ** 1,4E+06 Ω
Vertical electrical resistance according to EN 61340-4-1	6,0E+05 Ω	-	Vertical resistance 6,0E+05 Ω

* Statements on conformity assessment/classification were made on the basis of the measurement results obtained. Measurement uncertainties were not included in the assessment (ILAC G8 03/2009 "Guidelines on the Reporting of Compliance with Specification" Section 2.7).

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