



Report VN721 134029.1

Test Report

Applicant

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Reference

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Application

Testing and Classification according to draft EN ISO 10582:2016, as well as determination of steady state thermal resistance, electrostatic behavior, vertical and horizontal resistance, resistance to stains and abrasion resistance.

Test material

"floors@work"

Material used in testing was anonymized for laboratory purposes. A detailed sample list is contained in the report.

Issuing and Signatures

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Authorised for Institute
Ing. Hannes Vittek

A handwritten signature in blue ink, appearing to read "Vitte", positioned above a horizontal dotted line.

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1 Order

1.1 Chronology

Date	Received	Order
04.10.2017	11.10.2017	Testing and Classification according to draft EN ISO 10582:2016, as well as determination of steady state thermal resistance, electrostatic behavior, vertical and horizontal resistance, resistance to stains and abrasion resistance.

1.2 Samples

Nr.	Received	Sample Identification
1	11.10.2017	"work 55" (457 x 457 mm)
2	11.10.2017	"work 80" (457 x 457 mm)
3	11.10.2017	"work 80" (1219 x 228 mm)
4	17.11.2017	"work 55" (457 x 457 mm)

(Unless otherwise stated samples are provided by the customer.)

2 Findings

2.1 Description of the specimens / Information given by the applicant

The collection **“floors@work”** consists of heterogeneous PVC floor coverings in same construction and material composition, but with varying wear layer thicknesses and dimensions; nominal values can be seen in following table.

Article name	Total thickness	Wear layer thickness	Dimensions [mm]	
			Tiles	Planks
„work 55“	2,5 mm	0,55 mm	457 x 457	457 x 76
			457 x 305	914 x 102
			600 x 600	914 x 152
„work 80“	2,5 mm	0,80 mm	610 x 305	914 x 228
			914 x 457	1219 x 183
				1219 x 228

2.2 Tests performed

2.2.1 Preliminary note

The determination of side length, edge straightness and squareness of tiles according to EN ISO 24342 was not carried out in the representational report; the classification is based on the assumption that the tolerances according to the draft EN ISO 10582:2016 are met (this is guaranteed by the manufacturer for each format).

2.2.2 Summary of results and classifications/judgements

Sample		“work 55”	“work 80”
General requirements			
Side length, squareness and straightness, ISO 24342		see 2.2.1	
Overall thickness, EN ISO 24346			
- Nominal value	[mm]	2,50	2,50
- Average value	[mm]	2,43	2,58
- Maximum individual value	[mm]	2,46	2,61
- Minimum individual value	[mm]	2,41	2,54
Total mass per unit area, ISO 23997			
- Nominal value	[g/m ²]	4080	4080
- Average value	[g/m ²]	3810	3720
Dimensional stability, ISO 23999			
- Average dimensional stability, length direction	[%]	-0,20	-0,25
- Average dimensional stability, cross direction	[%]	0,05	-0,10
- Curling after expose to heat	[mm]	0	0
Flexibility, ISO 24344 Method A		Only applicable for sheet floorings	
Residual indentation after static loading, EN 24343-1			
- Indentation after static loading of 15 seconds	[mm]	0,05	0,09
- Residual indentation	[mm]	0,03	0,04
Effect of castor chair, ISO 4918			
- after 5 000 cycles		no damage	1)
- after 25 000 cycles			
Colour fastness to artificial light, EN ISO 105-B02			
- Numerical rating ²⁾		> 7	
Flatness of tiles/planks with a locking system on the edges and self-supporting; prEN ISO 10582:2016, Annex B		Not applicable	
Openings between tiles/planks with a locking system on the edges; prEN ISO 10582:2016, Annex C		Not applicable	
Height difference between tiles/planks with a locking system on the edges; prEN ISO 10582:2016, Annex C		Not applicable	
Requirements for classification			
Identification, prEN ISO 10582:2016			
- Minimum wear layer binder content	[%]	≥ 80	≥ 80
- Type		Type I	
Thickness of wear layer, ISO 24340			
- Nominal value	[mm]	0,55	0,80
- Average value	[mm]	0,47	0,77
Seam strength, EN 684		Not applicable	
Locking strength; prEN ISO 10582:2016, Annex D		Not applicable	
Classification, prEN ISO 10582:2016 / EN ISO 10874		33/42	34/43
	[Class]		

Sample		“work 55”	“work 80”
Additional properties			
Static electrical propensity, EN 1815			
- Average value	[kV]	³⁾	-0,9
- Classification according to EN 14041		antistatic ²⁾	
Electrical resistance, EN 1081			
- Horizontal resistance (Method C)	[Ω]	³⁾	> 1,0 x 10 ¹²
- Vertical resistance (Method A)	[Ω]	³⁾	> 1,0 x 10 ¹²
Resistance to staining, EN 423			
- sodium hydroxide solution 25%	[after 2 h]	Index 0 ⁴⁾	
- citric acid 10%	[after 2 h]	Index 0 ⁴⁾	
- coffee	[after 2 h]	Index 0 ⁴⁾	
- acetone	[after 2 h]	Index 0 ⁴⁾	
Thermal resistance, ISO 8302 / EN 12667			
- Thermal resistance R (average value)	[m ² .K/W]	0,02 ⁵⁾	0,02 ⁵⁾
Wear resistance, EN 660-2			
- Average loss of volume, Fv	[mm ³ /100 cycles]	2,9 ⁶⁾	
- Wear group (according to EN 649)		P ⁶⁾	

Notes

- 1) Due to the obtained results for “work 55”, it can be assumed that “work 80” will show similar results.
- 2) As the construction of the wear layer is always the same, varying only in wear layer thickness, the thinnest (0,20 / 0,30 mm) and the thickest wear layer (0,55 / 0,80 mm) were tested in one light colour, as well as in one dark colour; all results are >7.
- 3) Due to the obtained results for “work 80”, it can be assumed that “work 55” will show similar results.
- 4) As the construction of the wear layer is always the same, varying only in wear layer thickness, the thinnest (0,20 / 0,30 mm) and the thickest wear layer (0,55 / 0,80 mm) were tested in one light colour, as well as in one dark colour; all results are index 0.
- 5) Calculated
- 6) As the construction of the wear layer is always the same, varying only in wear layer thickness, the thickest wear layer (0,80 mm) was tested. The obtained value can be used for the different thicknesses as well.

2.2.3 Determination of overall thickness of resilient floor coverings

Test conditions

According to EN ISO 24346

Test area: 0,5 cm²

Test pressure: 80 kPa

Number of tests: 5

Deviation from standard: 5 individual measurements

Test results

Tested sample: 1

Overall thickness [mm]					
Test 1	Test 2	Test 3	Test 4	Test 5	Mean value
2,42	2,41	2,46	2,42	2,43	2,43
	(min)	(max)			

Tested sample: 2

Overall thickness [mm]					
Test 1	Test 2	Test 3	Test 4	Test 5	Mean value
2,61	2,54	2,55	2,60	2,58	2,58
(max)	(min)				

2.2.4 Determination of the wear layer thickness of resilient floor coverings

Test conditions

According to EN ISO 24340

Number of measurements: 15

Test results

Tested sample: 1

Thickness of wear layer [mm]		
Mean value	Coefficient of variation [%]	Cl _{abs} (95%) [mm]
0,47	5,7	± 0,02

Tested sample: 3

Thickness of wear layer [mm]		
Mean value	Coefficient of variation [%]	Cl _{abs} (95%) [mm]
0,77	4,4	± 0,02

2.2.5 Determination of mass per unit area of resilient floor coverings

Test conditions

According to EN ISO 23997
 Test atmosphere: 23 °C/50 % rel. humidity
 Number of samples: 5
 Size of samples: 200 x 200 mm

Test results

Tested sample: 1

Mean mass per unit area	3810	g/m²
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Tested sample: 3

Mean mass per unit area	3720	g/m²
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2.2.6 Determination of dimension stability and curling after exposure to heat

Test conditions

According to EN ISO 23999
 Number of tests: 3

Test results

Tested sample: 1

Specimen	Measuring section	Dimensional change [%]	
		Length direction	Cross direction
1	1	-0,23	0,09 (max)
	2	-0,13	0,08
2	1	-0,23 (max)	0,01
	2	-0,18	0,01
3	1	-0,20	0,01
	2	-0,13	0,02

Dimension stability (average)	length direction	-0,20	%
	cross direction	0,05	%
Curling before exposure to heat		0	mm
Curling after exposure to heat		0	mm

Tested sample: 2

Specimen	Measuring section	Dimensional change [%]	
		Length direction	Cross direction
1	1	-0,28	-0,07
	2	-0,23	-0,18 (max)
2	1	-0,19	-0,09
	2	-0,37 (max)	-0,13
3	1	-0,28	-0,08
	2	-0,26	-0,09

Dimension stability (average)	length direction	-0,25	%
	cross direction	-0,10	%
Curling before exposure to heat		0	mm
Curling after exposure to heat		0	mm

2.2.7 Determination of residual indentation after static loading

Test conditions

According to: EN ISO 24343-1

Test results

Tested sample: 1

Mean value of indentations after static loading of 15 seconds	0,05 mm
Mean value of indentations after static loading of 150 minutes	0,09 mm
Mean value of residual indentation	0,03 mm

Tested sample: 3

Mean value of indentations after static loading of 15 seconds	0,09 mm
Mean value of indentations after static loading of 150 minutes	0,16 mm
Mean value of residual indentation	0,04 mm

2.2.8 Determination of effect of castor chair

Test conditions

According to ISO 4918

Number of cycles: 5.000 and 25.000

Mounting of specimen: double sided adhesive tape

Wheels: single swivel castor, type W according to EN 12529

Test results

Tested sample: 1

Test durations	Description of surface-changes
5.000 cycles	no damage / change
25.000 cycles	no damage / change

Classification

The tested floor covering can be classified **suitable for castor chairs**.

2.2.9 Determination of colour-fastness to artificial light

Test conditions

According to EN ISO 105-B02

Test equipment: Xenotest 150 S+

Exposure method: 2

Kind of motion: Clocking

Effective humidity: 40%

Max. temperature of the black-panel-thermometer: 48°C

Test results

Tested sample: 1

Colour: light grey

Numerical rating of light-fastness: > 7

Tested sample: 3

Colour: brown

Numerical rating of light-fastness: > 7

Note: Light-fastness will be evaluated by a comparative scale, which consists of eight blue woolen fabrics, which are dyed graduated regarding their light-fastness and which will be treated under the same conditions as the specimen. It is given in figures, mark 1 thus represents very low and mark 8 very high light-fastness.

2.2.10 Assessment of static electrical propensity – walking test

Test conditions

According to EN 1815

Testing atmosphere: 23 °C ± 1 °C / 25 % ± 3 % rel. humidity

Base plate: > 10⁹ Ω rubber mat on metal plate

Sole-material: rubber

Test results

Tested sample: 1

Body-Voltage [kV]			
Test 1	Test 2	Test 3	Mean value
-0,8	-0,9	-0,9	-0,9

Classification

By walking over this floor covering no disturbing electric charges will occur, even not by disadvantageous room – climates.

This floor covering can be classified as antistatic according to EN 14041.

2.2.11 Determination of horizontal resistance of resilient floor coverings

Test conditions

According to: EN 1081, method C

Testing climate: 23 ± 2 °C, 50 ± 5 % rel. humidity

Measuring voltage: 500 V

Measuring distance: 100 mm

Deviation from standard: Tests were carried out on unlayered specimens, in combination with an isolating base plate.

Test results

Tested sample: 1

	Horizontal resistance
Measurement 1	> 1,0 x 10 ¹² Ω
Measurement 2	> 1,0 x 10 ¹² Ω
Measurement 3	> 1,0 x 10 ¹² Ω
Median	> 1,0 x 10¹² Ω

2.2.12 Determination of vertical resistance of resilient floor coverings

Test conditions

According to: EN 1081, method A
 Testing climate: 23 ± 2 °C, 50 ± 5 % relative humidity
 Measuring voltage: 500 V

Test results

Tested sample: 1

	Vertical resistance
Maximum value	$> 1,0 \times 10^{12} \Omega$
Minimum value	$> 1,0 \times 10^{12} \Omega$
Median	$> 1,0 \times 10^{12} \Omega$

2.2.13 Determination of staining and resistance to chemicals

Test conditions

According to: EN ISO 26987
 Cleaning agent: none
 Abrasive: none

Test results

Tested sample: 1
 Colour of sample: light grey

Stain substance	Duration of influence	Kind of cleaning	Index of visible change
Coffee	2 h	dabbing with cotton fabric	0
Citric Acid, 10%	2 h	dabbing with cotton fabric	0
Sodium hydroxid, 25%	2 h	dabbing with cotton fabric	0
Acetone	2 h	dabbing with cotton fabric	0

Tested sample: 3
 Colour of sample: brown

Stain substance	Duration of influence	Kind of cleaning	Index of visible change
Coffee	2 h	dabbing with cotton fabric	0
Citric Acid, 10%	2 h	dabbing with cotton fabric	0
Sodium hydroxid, 25%	2 h	dabbing with cotton fabric	0
Acetone	2 h	dabbing with cotton fabric	0

Explanation:

- 0 = not changed
- 1 = slightly changed
- 2 = moderately changed
- 3 = greatly changed

2.2.14 Determination of density of wear layer of resilient floor coverings

Test conditions

According to: EN ISO 23996
 Determination method: Method A (weighing in water)
 Number of specimen: 3

Test results

Sample tested: 3

Density [g/cm ³]			
Specimen 1	Specimen 2	Specimen 3	Mean value
1,297	1,298	1,299	1,298

2.2.15 Determination of wear resistance of resilient floor coverings (Frick-Taber-Test)

Test conditions

According to ÖNORM EN 660-2
 Construction: heterogeneous
 Thickness: 2,58 mm
 Thickness of wear layer: 0,77 mm
 Density: 1,298 g/cm³
 Number of cycles: 5000
 Number of specimen: 3

Test results

Tested sample: 3

	specimen 1	specimen 2	specimen 3
Weight loss after 1000 cycles [mg]	93,8	35,6	37,7
Weight loss after 2000 cycles [mg]	135,7	77,8	77,9
Weight loss after 3000 cycles [mg]	153,3	114,6	109,6
Weight loss after 4000 cycles [mg]	178,0	151,2	124,6
Weight loss after 5000 cycles [mg]	210,7	189,4	163,8
Total weight loss F_{tot} [mg]	213,2	195,0	156,6

	average loss of mass F _m [mg/100 cycles]	average loss of volume F _v [mm ³ /100 cycles]
Specimen 1	4,3	3,3
Specimen 2	3,9	3,0
Specimen 3	3,1	2,4
Mean value	3,8	2,9

3 Remarks

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