



Report IS721 123971.1
Test Report



Applicant

ZÜMRÜT SUNİ DERİ SANAYİ VE TİCARET
LİMİTED ŞİRKETİ
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Reference

Application

See page 2.

Test material

„Z Floor“

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

Issuing and Signatures

Number of pages contained: 17
Original Issue / Vienna 29.03.2017 / da2

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1 Order

1.1 Chronology

Date	Received	Order
03.11.2016	04.01.2017	See below

The following tests were commissioned:

- Overall thickness, ISO 24346
- Total mass per unit area, ISO 23997
- Dimensional stability, ISO 23999
- Flexibility, ISO 24344, method A
- Residual indentation after static loading, EN 24343-1
- Castor chair, ISO 4918
- Colour fastness to artificial light, EN ISO 105-B02
- Thickness of wear layer, ISO 24340
- Seam strength, EN 684
- Electrical resistance, EN 1081
- Static electrical propensity, EN 1815
- Wear resistance, EN 660-2
- Coefficient of friction, EN 13893
- Anti-slip properties, DIN 51130

1.2 Samples

Nr.	Received	Sample Identification
1	04.01.2017	„Z Floor; 2,0 / 0,30 mm”
2	04.01.2017	„Z Floor; 2,0 / 0,70 mm”

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

2 Summary of results

Tested characteristics	„Z-Floor“	
	„2,0 / 0,30 mm“	„2,0 / 0,70 mm“
Overall thickness, ISO 24346		
- Nominal value [mm]	2,00	2,00
- Average value [mm]	1,75	1,80
- Maximum individual value [mm]	1,76	1,82
- Minimum individual value [mm]	1,74	1,78
Thickness of wear layer, ISO 24340		
- Nominal value [mm]	0,30	0,70
- Average value [mm]	0,18	0,27
Total mass per unit area, ISO 23997		
- Nominal value [g/m ²]	3450	3450
- Average value [g/m ²]	3460	3390
Dimensional stability, ISO 23999		
- Average dimensional stability, length direction [%]	-2,00	-1,75
- Average dimensional stability, cross direction [%]	0,10	0,20
- Curling after expose to heat [mm]	1,5	3,0
Determination of flexibility, ISO 24344 Method A		
Maximum mandrel when tears/damages arise		
- length direction [mm]	< 10	< 10
- cross direction [mm]	< 10	< 10
Residual indentation after static loading, EN 24343-1		
- Residual indentation [mm]	0,03	0,05
Castor chair, ISO 4918		
- Judgement	suitable for castor chairs	
Colour fastness to artificial light, EN ISO 105-B02		
- Numerical rating	1)	> 7
Seam strength, EN 684		
- Average value [N/50mm]	160	420
- Minimum individual value [N/50mm]	132	333

Tested characteristics	„Z-Floor“	
	„2,0 / 0,30 mm“	„2,0 / 0,70 mm“
Electrical resistance, EN 1081 - method A		
- Vertical Resistance, Average value [Ω]	> 2,9 x 10 ¹⁰	> 2,9 x 10 ¹⁰
Electrical resistance, EN 1081 - method C		
- Horizontal Resistance, Average value [Ω]	> 2,9 x 10 ¹⁰	> 2,9 x 10 ¹⁰
Static electrical propensity, EN 1815		
- Average value [kV]	2)	+ 1,9
- Judgement, EN 14041	2)	antistatic
Wear resistance, EN 660-2		
- Average loss of volume Fv [mm ³ /100cycles]	3)	2,1
- Wear group (according to EN 649:2011)	3)	P
Coefficient of friction, EN 13893		
- length direction [μ]	3)	0,75
- cross direction [μ]	3)	0,75
- Judgement, EN 14041	4)	Class DS
Anti-slip property, DIN 51130		
- Corrected average total acceptance angle	3)	6°
- Classification class of anti-slip properties	5)	R 9

- 1) As the construction and composition are identical (according to the statement of the producer), it can be assumed, that also the colour fastness to artificial light would be the same as for “2,0 / 0,70 mm” product.
- 2) As the construction and composition are identical (according to the statement of the producer), it can be assumed, that also the electrical propensity would be the same as for “2,0 / 0,70 mm” product.
- 3) It was assumed, that both samples are identical, only varying in thickness of wear layer. But in fact, the samples are slightly different in surface structure, which may have an influence on the tested parameters; so we cannot state the same values as for the tested sample.
- 4) Taking note ³⁾ into consideration, the values for dynamic coefficient of friction can be slightly different, but it can be stated, that with high probability class DS can also be reached.
- 5) Taking note ³⁾ into consideration and also the fact, that 6° is the minimum value for R9, no classification can be made; this sample have also to be tested.

3 Findings / Tests performed

3.1 Description of sample

Description according to EN 12466*

Test results

Tested sample: 1, 2

Material (of wear layer):	PVC (according to the specification by the applicant)
Construction:	heterogeneous
Constitution of wearlayer:	transparent wear layer
Type of floor covering:	smooth floor covering
Structure of wearlayer:	Sample 1: grained surface; Sample 2: smooth surface
Colouring:	scattered
Dimensions:	rolls

The tested sample is a heterogeneous PVC floor covering according to EN ISO 10582.

3.2 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
1,74	1,75	1,75	1,76	1,76	1,75
(min)				(max)	

Tested sample: 2

Overall thickness [mm]					
Test 1	Test 2	Test 3	Test 4	Test 5	Mean value
1,80	1,78	1,82	1,80	1,79	1,80
	(min)	(max)			

3.3 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

Mean value	Thickness of wear layer [mm]	
	Coefficient of variation [%]	CI _{abs} (95%) [mm]
0,18	2,9	± 0,01

Tested sample: 2

Mean value	Thickness of wear layer [mm]	
	Coefficient of variation [%]	CI _{abs} (95%) [mm]
0,27	3,7	± 0,01

3.4 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	3460 g/m ²
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Tested sample: 2

Mean mass per unit area	3390 g/m ²
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3.5 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	-1,96	0,05
	2	-2,05	0,12
2	1	-1,99	0,09
	2	-2,09 (max)	0,12 (max)
3	1	-1,89	0,04
	2	-1,92	0,07

Dimension stability (average)	length direction	-2,00 %
	cross direction	0,10 %
Curling before exposure to heat		0,0 mm
Curling after exposure to heat		1,5 mm

Tested sample: 2

Specimen	Measuring section	Dimensional change [%]	
		Length direction	Cross direction
1	1	-1,99	0,11
	2	-1,94	0,20
2	1	-1,86	0,14
	2	-1,93 (max)	0,29 (max)
3	1	-1,48	0,13
	2	-1,45	0,23

Dimension stability (average)	length direction	-1,75 %
	cross direction	0,20 %
Curling before exposure to heat		0,0 mm
Curling after exposure to heat		3,0 mm

3.6 Determination of flexibility of resilient floor coverings

Test conditions

Testing according: EN ISO 24344
Used Method: Method A (Flexibility)

Test results

Tested sample: 1	Wearing surface to the mandrel	
	Length direction	Cross direction
Mandrel diameter at which no breaks / cracks were observed	10 mm	10 mm
Mandrel diameter at which breaks / cracks were observed	--	--
	Backing to the mandrel	
	Length direction	Cross direction
Mandrel diameter at which no breaks / cracks were observed	10 mm	10 mm
Mandrel diameter at which breaks / cracks were observed	-- mm	-- mm

Note:

Changes of both longitudinal edges of a width of 10 mm remained out of consideration.

Tested sample: 2	Wearing surface to the mandrel	
	Length direction	Cross direction
Mandrel diameter at which no breaks / cracks were observed	10 mm	10 mm
Mandrel diameter at which breaks / cracks were observed	--	--
	Backing to the mandrel	
	Length direction	Cross direction
Mandrel diameter at which no breaks / cracks were observed	10 mm	10 mm
Mandrel diameter at which breaks / cracks were observed	-- mm	-- mm

Note:

Changes of both longitudinal edges of a width of 10 mm remained out of consideration.

3.7 Determination of residual indentation after static loading

Test conditions

According to: EN ISO 24343-1

Kind of sample: in whole thickness solid

Test results

Tested sample:	Sample 1	Sample 2
Mean value of indentations after static loading of 15 seconds: (~0,01 mm)	0,17 mm	0,10 mm
Mean value of indentations after static loading of 150 minutes: (~0,01 mm)	0,24 mm	0,16 mm
Mean value of residual indentation: (~0,01 mm)	0,03 mm	0,05 mm

3.8 Determination of the castor chair-suitability

Test conditions

According to ISO 4918

Number of cycles: 5000 and 25000 turns

Mounting of specimen: double sided adhesive tape

Wheels: single-swivel castor chair

Test results

Tested sample: 1

Test durations	Description of surface-changes
5 000 cycles	no change of surface
25 000 cycles	no change of surface

Classification

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

Tested sample: 2

Test durations	Description of surface-changes
5 000 cycles	no change of surface
25 000 cycles	no change of surface

Classification

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

3.9 Determination of colour-fastness to artificial light

Test conditions

According to EN ISO 105-B02
 Test equipment: Xenotest 150 S+
 Exposure method: Methode 2
 Kind of motion: Clocking
 Effective humidity: 40 %
 Max. Temperature of the black-panel-thermometer: 48 °C

Test results

Tested sample: 2

Numerical rating of light-fastness: > 7

Note: Light-fastness will be evaluated by a comparative scale, which consists of eight blue woollen fabrics, which are dyed gradated 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.

3.10 Determination of seam strength of resilient floor coverings

Test conditions

According to EN 684
 Description of the welding procedure: Seam was made by the applicant by thermal welding.

Test results

Tested sample: 1	Seam strength		Failure in welding seam
specimen 1	220	N / 50 mm	yes
specimen 2	156	N / 50 mm	yes
specimen 3	132	N / 50 mm	yes
specimen 4	138	N / 50 mm	yes
specimen 5	138	N / 50 mm	yes
Mean Value	160	N / 50 mm	
Minimum	132	N / 50 mm	

Tested sample: 2	Seam strength		Failure in welding seam
specimen 1	333	N / 50 mm	yes
specimen 2	474	N / 50 mm	yes
specimen 3	453	N / 50 mm	yes
specimen 4	429	N / 50 mm	yes
specimen 5	396	N / 50 mm	yes
Mean Value	420	N / 50 mm	
Minimum	333	N / 50 mm	

3.11 Determination of vertical resistance of resilient floor coverings

Test conditions

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

Test results

Tested sample: 1

	Vertical resistance R_1
Median	$> 2,9 \times 10^{10}$ Ohm
Maximum value	$> 2,9 \times 10^{10}$ Ohm
Minimum value	$> 2,9 \times 10^{10}$ Ohm

Tested sample: 2

	Vertical resistance R_1
Median	$> 2,9 \times 10^{10}$ Ohm
Maximum value	$> 2,9 \times 10^{10}$ Ohm
Minimum value	$> 2,9 \times 10^{10}$ Ohm

3.12 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 R_3
Measurement 1	$> 2,9 \times 10^{10}$ Ohm
Measurement 2	$> 2,9 \times 10^{10}$ Ohm
Measurement 3	$> 2,9 \times 10^{10}$ Ohm
Median	$> 2,9 \times 10^{10}$ Ohm

Tested sample: 2

	Horizontal resistance R_3
Measurement 1	$> 2,9 \times 10^{10}$ Ohm
Measurement 2	$> 2,9 \times 10^{10}$ Ohm
Measurement 3	$> 2,9 \times 10^{10}$ Ohm
Median	$> 2,9 \times 10^{10}$ Ohm

3.13 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

Deviation from standard: The test was carried out only with rubber-soles, because the PVC-soles are internationally not available at this time.

Test results

Tested sample: 2

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

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 EN 14041.

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

Test conditions

According to ÖNORM EN 660-2

Type: PVC floor covering

Construction: heterogeneous

Thickness: 1,8 mm

Thickness of wear layer: 0,28 mm

Density: 1,37 g/cm³ (according to the information given by the applicant)

Number of cycles: 5000

Number of specimen: 3

Test results

Tested sample: 2

	specimen 1	specimen 2	specimen 3
Weight loss after 1000 cycles [mg]	30,8	28,1	30,7
Weight loss after 2000 cycles [mg]	37,7	56,5	40,2
Weight loss after 3000 cycles [mg]	48,5	58,0	84,2
Weight loss after 4000 cycles [mg]	82,0	106,5	116,2
Weight loss after 5000 cycles [mg]	95,1	126,7	138,7
Total weight loss F_{tot} [mg]	119,8	144,3	160,1

	average loss of mass F _m [mg/100 cycles]	average loss of volume F _v [mm ³ /100 cycles]
Specimen 1	2,4	1,7
Specimen 2	2,9	2,1
Specimen 3	3,2	2,3
Mean value	2,8	2,1

3.15 Measurement of dynamic coefficient of friction

Test conditions

According to EN 13893

Test apparatus: GMG 200 SC

Sliders: Group consisting of two leather- and one rubber-slider (dry measurement)

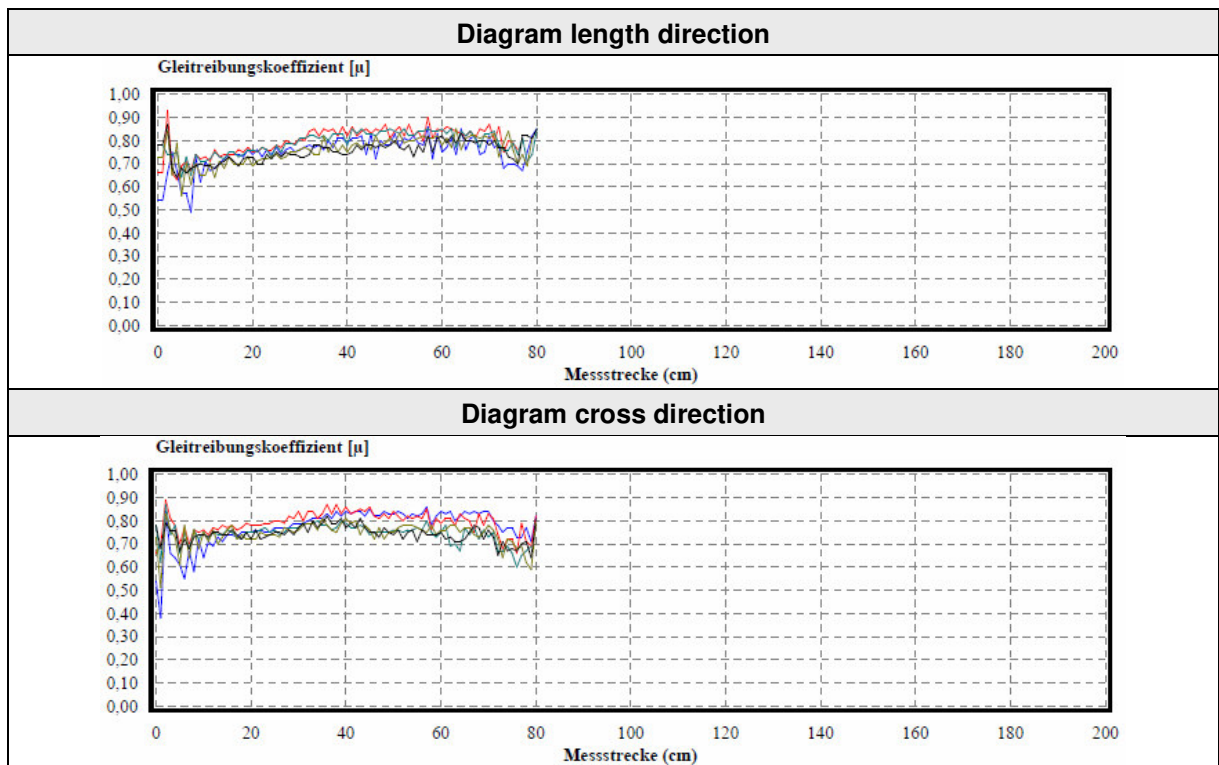
Number of measurements: 5 each, evaluation is taken only from measurements 3 - 5

Test climate: 20 ± 2°C/ 65 ± 5% relative air humidity

Test results

Tested sample: 2

Dynamic coefficient of friction [μ]		
Measurement	length direction	cross direction
1	0,75	0,77
2	0,79	0,80
3	0,78	0,75
4	0,74	0,75
5	0,73	0,75
Mean value	0,75	0,75



Evaluation

The tested sample can be classified into **technical class DS** according to EN 14041.

3.16 Determination of the anti-slip properties for working areas with increased slip hazard; walking method, ramp test

Test conditions

According to: DIN 51130
 Surface condition: smooth
 Displacement area: not tested

Test results

Tested sample: 1

Corrected average total acceptance angle:	6,0 °
Volume of displacement area:	not tested

Classification

Classification class of anti-slip properties:	R 9
Classification class of displacement area:	--

Remarks to the classification classes

In conformity to DIN 51130 the classifications were made according the following tables.

Corrected average total acceptance angle	Classification class of anti-slip properties	Minimum volume of displacement area	Classification class of displacement area
6° to 10°	R 9	4 cm ³ /dm ²	V 4
above 10° to 19°	R 10	6 cm ³ /dm ²	V 6
above 19° to 27°	R 11	8 cm ³ /dm ²	V 8
above 27° to 35°	R 12	10 cm ³ /dm ²	V 10
above 35°	R 13		

4 Remarks

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