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Unilin BVBA - Division Flooring
Mr Dr. Theo Smet
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Dresden, 16 February 2011
70-em/pe

Test report Order-No. 270380

Customer: Unilin BVBA - Division Flooring
Ooigemstraat 3
8710 Wielsbeke
Belgium

Date of order: 08.12.2010

Order: Performance of tests of laminate floorings according
to EN 13329

Institution: EPH – Laboratory Surface Testing

Engineer in charge: Dipl.-Ing. (FH) M. Peter

Dr.-Ing. R. Emmler
Head of Laboratory Surface Testing

The test report contains 8 pages. Any duplication, even in part, requires written permission of EPH. These test results are exclusively related to the tested material.

1 Task

The Development and Examination Laboratory for Wood Technology Ltd. (EPH) was instructed by Unilin Flooring / Belgium to carry out testing of laminate floor coverings according to EN 13329.

2 Test material

The customer has sent three variants of laminate floor coverings. Receipt at the EPH-laboratory: 17.12.2010. The variants were identified as following:

- Var. 1: Laminate floor covering Quick Step "CLASSIC", LU 32
dimensions 1200 mm x 190 mm x 7 mm
- Var. 2: Laminate floor covering Quick Step "ELIGNA", LU 32
dimensions 1380 mm x 156 mm x 8 mm
- Var. 3: Laminate floor covering Quick Step "LARGO", LU 32
dimensions 2050 mm x 205 mm x 9,5 mm

The test specimens were cut at the EPH-laboratory.

3 Test performance

3.1 Determination of the resistance against abrasion

The test was carried out according to EN 13329 Annex E with a Taber-Abraser-Type 5151. The related test wheels were prepared with sanding paper type S42.

3.2 Determination of the impact resistance

The test was carried out according to EN 13329 Annex F. The test with a small ball was carried out according to EN 438 part 2 with an Erichsen Impact Tester 305. The test with the big ball was carried out according to EN 438 part 2 with equipment according to the standard.

3.3 Determination of the residual indentation

The test was carried out according to EN 433.

3.4 Determination of the surface soundness

The test was carried out according to DIN EN 311.

3.5 Resistance against staining

The test was carried out according to EN 13329 with the indicated test substances of EN 438 part 2.

3.6 Determination of the resistance against cigarette burn

The test was carried out according to EN 438 part 2, 2005, article 30 with the cigarette sort f6.

3.7 Thickness swelling

The test was carried out according to EN 13329 Annex G.

3.8 Determination of the light fastness

The test was carried out according to EN 13329 in a Weather Ometer Ci 3000 (Xenon arc irradiation behind 3 mm thick window glass). The test was carried out until the grade 6 of the blue wool scale according to EN 20105, B02 was reached. The grey scale according ISO 105-A02 was used for the visual inspection.

3.9 Determination of geometric properties

The test was carried out according to EN 13329 Annex A and B.

3.10 Determination of the effect of the simulated movement of a furniture leg

The test was carried out according to EN 424 with equipment according to the standard.

3.11 Determination of the resistance against soft chair rolls

The test was carried out according to EN 425 (25000 cycles) with a machine made by Feingeräte Baumberg.

3.12 Determination of the humidity

The test was carried out according to EN 322.

3.13 Assessment of appearance

The test was carried out according to EN 438.

4 Results

4.1 Determination of the resistance against abrasion

Variant	Number of revolutions until the IP value according to EN 13329 (n = 3)	Abrasion class according to EN 13329
1	4300	AC4
2	4700	AC4
3	6300	AC5

n = number of test specimens

4.2 Resistance against impact

Variant	Impact resistance (small ball) in N according to EN 13329 (n = 5)	Impact resistance (big ball) in mm according to EN 13329 (n = 5)	Impact class according to EN 13329
1	12	1750	IC2
2	14	2000	IC2
3	13	2000	IC2

4.3 Determination of the residual indentation

Variant	Mean value for the residual indentation in mm
1	0
2	0
3	0

4.4 Surface soundness

Variant	Surface soundness in N/mm ²		
	\bar{x} (n = 9)	s	v
1	1,76	0,15	8,5
2	1,90	0,19	10,1
3	2,04	0,24	11,7

x = mean value

s = standard deviation

v = variation coefficient

4.5 Resistance against staining

Variant	Test result according to EN 438-2 in grade with / without covering				
	Aceton	Coffee	Natriumhydroxide (NaOH, 25 %)	Hydrogensuper-oxo-xyde (H ₂ O ₂ , 30 %)	Black shoe cream
1	5/5	5/5	5/5	5/5	5/5
2	5/5	5/5	5/5	5/5	5/5
3	5/5	5/5	5/5	5/5	5/5

Grade 5 = no visible change

4.6 Resistance against cigarette burn

Variant	Results of the visual inspection according to EN 438 part 2 in grade with the cigarette type f6
1	5
2	5
3	5

Grade 5 = no visible change

4.7 Thickness swelling

Variant	Statistic values in % in length direction			Statistic values in % in width direction			Mean value in %
	\bar{x} (n = 3)	s	v	\bar{x} (n = 3)	s	v	
1	12,4	0,6	4,6	12,6	0,1	0,5	12,5
2	10,0	0,3	3,2	10,2	0,3	2,6	10,1
3	8,7	0,1	1,3	9,2	0,1	0,7	8,9

x = mean value

s = standard deviation

v = variation coefficient

4.8 Determination of the light fastness

Variant	Change of colour of the sample in grey scale N° by colour change of blue wool scale 6	Light fastness in the level of the blue wool scale according to the criteria of EN 438 part 2
1	5	>6
2	5	>6
3	5	>6

Grey scale N° 5 = no change of colour

4.9 Geometric properties

Variant	Joint opening in mm		High difference in mm	
	Mean value	max. value	Mean value	max. value
1	0	0	0,01	0,03
2	0	0	0,01	0,02
3	0	0	0,01	0,02

Variant	Thickness t		Length l	Width w		Squareness	Straightness in mm/m
	Δt_{mittel}	$t_{\text{max}} - t_{\text{min}}$	Δl	in mm		q_{max}	
				Δw_{mittel}	$w_{\text{max}} - w_{\text{min}}$		s_{max}
1	0,06	0,17	0	0	0,1	0	0
2	0,02	0,11	0	0,1	0,1	0	0
3	0,12	0,22	0,2	0,1	0	0	0

Variant	Flatness of width f_w		Flatness of length f_L	
	f_w concave in %	f_w convex in %	f_w concave in %	f_w convex in %
1	0,03	0,17	0	0,25
2	0,07	0,02	0	0,14
3	0,05	0,16	0,11	0,10

4.10 Effect of the simulated movement of a furniture leg

Variant	Description of the damages / changes
1	no visible change / damages
2	no visible change / damages
3	no visible change / damages

4.11 Resistance against soft chair rolls

Variant	Description of the damages / changes after 25.000 revolutions
1	no visible change / damages
2	no visible change / damages
3	no visible change / damages

4.12 Humidity

Variant	Humidity in %
1	6,8
2	6,5
3	6,5

4.13 Assessment of the appearance

Variant	Description of the damages according to EN 438-2
1	no visible damages
2	no visible damages
3	no visible damages

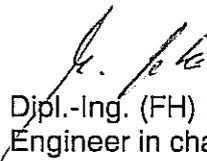
5 Evaluation

The tested products of laminate floor coverings can be evaluated for the several properties according to EN 13329 (table 1 and 2) as following (LU = level of use according DIN EN 13329, table 2):

Variant	Property	Result	General requirements / classification requirements according to EN 13329
1 2 3	Resistance against abrasion	Abrasion class AC4 Abrasion class AC4 Abrasion class AC5	LU 21-23 and 31-32 are fulfilled LU 21-23 and 31-32 are fulfilled LU 21-23 and 31-33 are fulfilled
1 2 3	Resistance against impact	Impact class IC2 Impact class IC2 Impact class IC2	LU 21-23 and 31-32 are fulfilled LU 21-23 and 31-32 are fulfilled LU 21-23 and 31-32 are fulfilled
1 2 3	Residual indentation	0 mm 0 mm 0 mm	General requirements according to table 1 are fulfilled.
1 2 3	Surface soundness	1,76 N/mm ² 1,90 N/mm ² 2,04 N/mm ²	General requirements according to table 1 are fulfilled.
1 2 3	Resistance against staining	Grade 5 Grade 5 Grade 5	LU 21-23 and 31-33 are fulfilled LU 21-23 and 31-33 are fulfilled LU 21-23 and 31-33 are fulfilled
1 2 3	Cigarette burns	Grade 5 Grade 5 Grade 5	LU 21-23 and 31-33 are fulfilled LU 21-23 and 31-33 are fulfilled LU 21-23 and 31-33 are fulfilled
1 2 3	Thickness swelling	12,5 % 10,1 % 8,9 %	LU 21-23 and 31-33 are fulfilled LU 21-23 and 31-33 are fulfilled LU 21-23 and 31-33 are fulfilled
1 2 3	Light fastness	Grade > 6 Grade > 6 Grade > 6	General requirements according to table 1 are fulfilled.
1 2 3	Geometric properties	All results are in the permissible tolerance. All results are in the permissible tolerance. All results are in the permissible tolerance.	General requirements according to table 1 are fulfilled.
1 2 3	Simulated movement of a furniture leg	no visible change / damages no visible change / damages no visible change / damages	LU 21-23 and 31-33 are fulfilled LU 21-23 and 31-33 are fulfilled LU 21-23 and 31-33 are fulfilled
1 2 3	Resistance against soft chair rolls	no visible change / damages no visible change / damages no visible change / damages	LU 21-23 and 31-33 are fulfilled LU 21-23 and 31-33 are fulfilled LU 21-23 and 31-33 are fulfilled
1 2 3	Humidity	6,8 % 6,5 % 6,5 %	General requirements according to table 1 are fulfilled.
1 2 3	Assessment appearance	no visible damages no visible damages no visible damages	General requirements according to table 1 are fulfilled.

The investigated variants of laminate floor coverings meet the requirements according to EN 13329 as following:

Variant	Product / Dimension	Level of use	
		declared	fulfilled
1	Laminate floor covering Quick Step "CLASSIC" dimensions 1200 mm x 190 mm x 7 mm	32	32
2	Laminate floor covering Quick Step "ELIGNA" dimensions 1380 mm x 156 mm x 8 mm	32	32
3	Laminate floor covering Quick Step "LARGO" dimensions 2050 mm x 205 mm x 9,5 mm	32	32



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