MENDEL UNIVERSITY OF AGRICULTURE AND FORESTRY IN BRNO

CONSTRUCTION-JOINERY
PRODUCTS TEST ROOM

ACCREDITED TESTING LABORATORY No. 1030.1

TEST CERTIFICATE

Certificate No.	**AZL-005-09**
Submitted of tests (address)	**ESCO CZ PRODUCTION spol. s r.o.** **Blatenská 267, 387 31 Radomyšl**
Product name	**2-layer oak floor** **3-layer oak floor**
SKP	20.30.12
Producer	ESCO CZ PRODUCTION spol. s r.o., Blatenská 267, 387 31 Radomyšl Czech Republic
Place of production	ESCO CZ PRODUCTION spol. s r.o., Blatenská 267, 387 31 Radomyšl Czech Republic
Tests carried out by	**Ing. Jiří Zálešák**
Certificate executed by	**Ing. Jiří Zálešák**
Certificate issued on	5 Feb, 2009
Pages	10
Copies / copy No.	3/3

The results of the tests relate to the subject of the tests and do not constitute approval and certificate of the given product.
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ACCREDITED TESTING LABORATORY No. 1030.1, Zlín unit

signature illegible
Prof. Ing. Josef Polášek, Ph.D.
Manager of ATL No. 1030.1

1. GENERAL

1.1 Submitter of tests:
ESCO CZ PRODUCTION spol. s r.o., Blatenská 267, 387 31 Radomyšl

1.2 Purpose of tests:
Examination of physical properties of floor covering (density).

2. INFORMATION ON TAKEOVER OF SAMPLES

2.1 Takeover of samples:
Samples to be tested were delivered to the Accredited Testing Laboratory No. 1030.1 on 5 May, 2008, 29 August, 2008 and 26 November, 2008 by the Submitter of tests.
Samples taken over by employee of the Accredited Testing Laboratory No. 1030.1 Jiří Zálešák.

2.2 Specification of samples:
Individual test samples marked by serial No.

3. DESCRIPTION OF SAMPLES

3.1 Technical and drawing documentation:
Product technical sheet, laying instructions, hard wax oil use instructions, cleaning and maintenance instructions.

3.2 Description of sample pieces:

2-layer oak floor
- wooden floor covering with dimensions of 1,830-1,860 x 189 x 20 mm or 2,200 x 260 x 21 mm fitted with groove and tongue in the entire perimeter plywood as bearing layer, oak wood as contact layer.

3-layer oak floor
- wooden floor covering with dimensions of 1,845 x 180 x 15 mm, 1,860 x 189 x 15 mm or 1,900 230 x 21 mm fitted with groove and tongue in the entire perimeter. Oak wood as contact layer, middle layer – slat centre, floor underlay – veneer.

4. PRODUCT TESTS

4.1 Tests initiated on: 4 February, 2009
Tests finished on: 5 February, 2009

4.2 Tests carried out at: STV test room, Accredited Testing Laboratory No. 1030.1, Zlín, Louky 304

4.3 Test methods and procedures used:
Density according to CSN EN 323 Wooden boards. Density determination.

4.4 Any deviations, amendments or exceptions concerning the test method:
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4.5 Statement on the estimated measurement uncertainty relating to the test result where appropriate; measurement uncertainty information is provided if important for the validity or use of the test results if required by the customer or instructions of if the uncertainty affects the compliance with the set limit:
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4.6 Additional information required by specific methods, customers or groups of customers:
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5. RESULTS OF TESTS

5.1 Density of 3-layer element 15 mm thick

Sample No.	t [mm]	b_1 [mm]	b_2 [mm]	m_w [g]	p [kg.m^2]
I/1	14,71	50,59	52,55	19,23	492
I/2	14,70	50,55	52,88	19,12	486
I/3	14,86	50,71	52,54	20,02	506
I/4	14,83	50,75	52,48	19,88	503
I/5	14,84	50,61	52,53	19,82	502
I/6	14,85	50,68	52,44	20,76	526
Diameter					**503**
Spread					**187,0**
II/1	15,15	50,50	52,37	21,48	536
II/2	14,97	50,53	52,07	22,24	565
II/3	15,07	50,48	52,38	21,90	550
II/4	15,00	50,81	52,21	21,82	548
II/5	14,80	50,46	52,56	20,75	529
II/6	14,86	50,33	52,50	21,86	557
Diameter					**547**
Spread					**174,7**
III/1	14,71	50,71	52,44	19,43	497
III/2	14,79	50,59	52,56	19,47	495
III/3	14,82	50,75	52,55	20,32	514
III/4	14,83	50,67	52,48	20,48	519
III/5	14,85	50,75	52,55	20,23	511
III/6	15,08	50,52	52,74	20,61	538
Diameter					**512**
Spread					**248,0**
IV/1	14,83	50,55	52,84	20,14	508
IV/2	14,99	50,38	52,90	20,30	508
IV/3	14,93	50,23	52,80	20,32	513
IV/4	14,93	50,40	52,20	21,05	536
IV/5	15,14	50,40	52,53	20,84	520
IV/6	14,93	50,53	52,28	21,07	534
Diameter					**520**
Spread					**154,9**
V/1	14,94	50,32	52,52	23,73	601
V/2	15,08	50,37	52,64	21,23	531
V/3	14,83	50,60	52,48	19,65	499
V/4	14,76	50,41	52,66	18,96	484
V/5	14,80	50,49	52,79	19,79	502
V/6	14,82	50,46	52,73	19,99	507
Diameter					**521**
Spread					**1786,9**
VI/1	15,06	50,55	52,81	20,63	513
VI/2	14,97	50,31	52,80	22,66	570
VI/3	14,98	50,46	52,67	22,64	569
VI/4	15,04	50,29	53,15	22,02	548
VI/5	15,07	50,45	52,94	21,93	545
VI/6	14,98	50,40	52,66	20,92	526
Diameter					**545**
Spread					**509,9**

Sample No.	t [mm]	b_1 [mm]	b_2 [mm]	m_w [g]	p [kg.m^{-2}]
VII/1	15,13	50,44	52,23	23,27	584
VII/2	15,09	50,36	52,29	21,36	538
VII/3	15,12	50,35	52,48	21,84	547
VII/4	14,94	50,40	52,50	22,19	561
VII/5	15,01	50,40	52,38	23,60	595
VII/6	15,08	50,37	52,43	20,89	524
Diameter					**558**
Spread					**750,7**
VIII/1	14,83	50,54	52,81	20,76	525
VIII/2	14,78	50,50	52,57	20,02	510
VIII/3	14,87	50,68	52,64	21,63	545
VIII/4	14,80	50,60	52,57	18,87	479
VIII/5	14,80	50,38	52,68	18,95	483
VIII/6	15,14	50,57	52,71	20,68	512
Diameter					**509**
Spread					**628,9**
Total diameter					**527**
Standard deviation between board diameters					**20,4**
Average standard deviation inside boards					**23,6**

5.2 Density of 3-layer element 21 mm thick

Sample No.	t [mm]	b_1 [mm]	b_2 [mm]	m_w [g]	p [kg.m²]
I/1	21,28	49,65	51,84	35,64	651
I/2	21,25	49,66	52,16	36,50	663
I/3	21,23	49,67	51,89	35,55	650
I/4	21,35	49,71	52,75	36,43	651
I/5	21,26	49,70	51,86	35,39	646
I/6	21,25	49,70	52,03	36,82	670
Diameter					**655**
Spread					**87,8**
II/1	21,36	50,52	52,30	26,85	476
II/2	21,23	50,46	51,76	26,83	484
II/3	21,28	50,01	51,80	25,08	455
II/4	21,27	50,53	52,07	25,60	457
II/5	21,31	50,47	52,79	28,19	497
II/6	21,36	50,43	52,93	27,42	481
Diameter					**475**
Spread					**257,2**
III/1	21,27	50,44	52,15	26,37	471
III/2	21,25	50,51	52,53	28,01	497
III/3	21,28	50,58	52,60	27,54	486
III/4	21,23	50,41	51,85	26,85	484
III/5	21,34	50,53	52,21	27,03	480
III/6	21,31	50,55	52,28	28,09	499
Diameter					**486**
Spread					**108,0**
IV/1	21,31	50,50	51,76	27,83	500
IV/2	21,24	50,58	52,12	26,16	467
IV/3	21,26	50,57	52,11	25,74	459
IV/4	21,27	50,43	51,70	26,61	480
IV/5	21,23	50,26	51,90	25,24	456
IV/6	21,30	50,38	51,98	26,54	476
Diameter					**473**
Spread					**254,9**
V/1	21,25	50,41	52,19	26,77	479
V/2	21,37	50,36	52,33	26,69	474
V/3	21,23	50,41	51,90	27,41	493
V/4	21,30	50,43	52,18	26,55	474
V/5	21,35	50,35	51,94	27,23	488
V/6	21,39	50,44	51,80	26,23	469
Diameter					**480**
Spread					**85,5**
VI/1	21,34	50,24	52,50	28,74	511
VI/2	21,32	50,23	52,58	27,03	480
VI/3	21,31	50,30	51,91	28,60	514
VI/4	21,15	50,30	52,00	25,25	456
VI/5	21,26	50,40	51,73	27,61	498
VI/6	21,27	50,29	51,62	27,61	500
Diameter					**493**
Spread					**466,8**

Sample No.	t [mm]	b_1 [mm]	b_2 [mm]	m_w [g]	p [kg.m^{-2}]
VII/1	21,21	50,43	52,44	28,82	514
VII/2	21,30	50,56	51,95	27,23	487
VII/3	21,19	50,52	52,59	29,67	527
VII/4	21,25	50,39	52,11	27,22	488
VII/5	21,23	50,56	52,02	26,32	471
VII/6	21,34	50,13	52,44	28,30	504
Diameter					**499**
Spread					**414,3**
VIII/1	21,23	50,39	51,91	27,04	487
VIII/2	21,24	50,44	52,73	27,47	486
VIII/3	21,20	50,42	52,60	28,79	512
VIII/4	21,26	50,40	52,34	27,67	493
VIII/5	21,20	50,49	52,20	27,61	494
VIII/6	21,24	50,66	52,20	28,11	500
Diameter					**496**
Spread					**92,5**
Total diameter					**507**
Standard deviation between board diameters					**60,5**
Average standard deviation inside boards					**14,9**

5.3 Density of 3-layer element 20 mm thick

Sample No.	t [mm]	b_1 [mm]	b_2 [mm]	m_w [g]	p [kg.m^2]
I/1	20,18	50,97	51,81	32,62	612
I/2	20,20	50,96	51,94	30,72	575
I/3	20,27	51,19	51,94	31,16	578
I/4	20,25	50,86	51,92	31,10	582
I/5	20,17	50,92	52,00	30,97	580
I/6	20,21	50,87	52,01	31,63	591
Diameter					**586**
Spread					**191,40**
II/1	20,18	51,05	52,53	32,01	591
II/2	20,20	51,11	52,29	32,87	590
II/3	20,23	50,96	51,87	31,32	586
II/4	20,21	51,08	52,08	33,81	629
II/5	20,18	51,02	52,10	32,90	613
II/6	20,21	51,05	51,94	32,16	600
Diameter					**602**
Spread					**272,1**
III/1	20,21	50,73	51,85	30,40	572
III/2	20,23	50,81	51,87	31,09	583
III/3	20,26	50,82	51,85	31,18	584
III/4	20,24	51,13	52,53	30,77	566
III/5	20,22	51,18	52,28	31,79	588
III/6	20,18	51,18	52,47	32,09	592
Diameter					**581**
Spread					**97,9**
IV/1	20,16	50,68	51,87	31,15	588
IV/2	20,20	50,82	51,85	30,95	581
IV/3	20,23	50,72	51,82	31,39	590
IV/4	20,27	50,81	51,90	31,08	581
IV/5	20,19	50,79	51,95	33,24	624
IV/6	20,24	50,81	51,80	32,19	604
Diameter					**595**
Spread					**274,6**
V/1	20,24	50,88	52,07	31,83	594
V/2	20,28	50,96	52,06	32,00	595
V/3	20,31	52,03	50,97	31,34	582
V/4	20,19	50,97	52,08	31,83	594
V/5	20,21	51,02	51,84	31,38	587
V/6	20,22	50,76	51,80	32,34	608
Diameter					**593**
Spread					**78,7**
VI/1	20,23	50,88	51,92	31,43	588
VI/2	20,25	50,83	51,88	31,02	581
VI/3	20,25	50,95	51,99	31,93	595
VI/4	20,13	51,13	51,82	31,16	584
VI/5	20,17	51,15	52,08	31,84	593
VI/6	20,19	51,11	52,15	31,20	580
Diameter					**587**
Spread					**39,4**

Sample No.	t [mm]	b_1 [mm]	b_2 [mm]	m_w [g]	p [kg.m^{-2}]
VII/1	20,19	50,97	52,31	31,33	582
VII/2	20,26	51,00	52,03	31,37	583
VII/3	20,26	50,96	52,40	31,66	585
VII/4	20,26	51,01	52,20	32,45	602
VII/5	20,23	51,06	52,58	32,15	592
VII/6	20,22	51,01	52,42	32,41	599
Diameter					**591**
Spread					**70,6**
VIII/1	20,19	51,10	52,17	31,41	584
VIII/2	20,18	50,88	51,82	31,27	588
VIII/3	20,20	51,14	52,54	30,98	571
VIII/4	20,21	51,11	52,10	30,89	574
VIII/5	20,25	51,21	52,59	32,21	591
VIII/6	20,20	51,13	52,42	31,51	582
Diameter					**581**
Spread					**59,3**
Total diameter					**590**
Standard deviation between board diameters					**7,1**
Average standard deviation inside boards					**11,6**

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5.4 Density of 2-layer 21 mm thick

Sample No.	t [mm]	b_1 [mm]	b_2 [mm]	m_w [g]	p [kg.m²]
I/1	21,28	49,65	51,84	35,64	651
I/2	21,25	49,66	52,16	36,50	663
I/3	21,23	49,67	51,89	35,55	650
I/4	21,35	49,71	52,75	36,43	651
I/5	21,26	49,70	51,86	35,39	646
I/6	21,25	49,70	52,03	36,82	670
Diameter					**655**
Spread					**87,8**
II/1	21,38	49,60	52,03	34,40	624
II/2	21,29	49,57	51,91	34,03	621
II/3	21,34	49,61	51,99	36,36	661
II/4	21,27	49,62	52,15	35,94	653
II/5	21,23	49,71	51,96	35,61	649
II/6	21,23	49,61	52,00	36,33	663
Diameter					**645**
Spread					**338,2**
III/1	21,42	49,36	52,19	35,96	652
III/2	21,34	49,83	52,06	35,89	648
III/3	21,41	49,53	51,91	35,04	636
III/4	21,35	49,79	52,04	35,30	638
III/5	21,37	49,65	51,80	33,74	614
III/6	21,25	49,74	51,95	33,69	614
Diameter					**634**
Spread					**271,2**
IV/1	21,32	49,77	52,25	36,96	667
IV/2	21,30	49,81	52,12	35,61	644
IV/3	21,29	49,64	51,74	35,13	642
IV/4	21,26	49,82	52,00	35,46	644
IV/5	21,28	49,64	51,98	35,42	645
IV/6	21,32	49,50	52,50	36,52	659
Diameter					**650**
Spread					**102,3**
V/1	21,28	49,78	51,75	35,61	650
V/2	21,22	49,82	51,86	36,21	660
V/3	21,32	49,70	51,94	35,55	646
V/4	21,26	49,68	51,73	34,03	623
V/5	21,25	49,86	52,14	36,19	655
V/6	21,30	49,66	51,82	35,56	649
Diameter					**647**
Spread					**169,2**
VI/1	21,25	49,83	51,98	35,30	641
VI/2	21,39	49,62	52,22	34,43	621
VI/3	21,27	49,40	51,83	34,24	629
VI/4	21,26	49,66	52,12	35,84	651
VI/5	21,24	49,78	51,98	37,21	677
VI/6	21,31	49,70	52,09	35,96	652
Diameter					**645**
Spread					**392,8**

Sample No.	t [mm]	b_1 [mm]	b_2 [mm]	m_w [g]	p [kg.m²]
VII/1	21,26	49,73	52,05	36,31	660
VII/2	21,21	49,76	51,84	34,56	632
VII/3	21,27	49,83	51,85	35,47	645
VII/4	21,23	49,75	51,84	36,04	658
VII/5	21,24	49,74	51,86	35,82	654
VII/6	21,22	49,78	51,89	35,76	652
Diameter					**650**
Spread					**108,0**
VIII/1	21,28	49,67	52,06	35,50	645
VIII/2	21,31	49,67	51,94	35,10	638
VIII/3	21,24	49,63	51,77	33,39	612
VIII/4	21,27	49,66	51,81	36,16	661
VIII/5	21,20	49,68	51,86	35,26	646
VIII/6	21,22	49,66	51,78	33,74	618
Diameter					**637**
Spread					**336,5**
Total diameter					**645**
Standard deviation between board diameters					**7,0**
Average standard deviation inside boards					**15,0**

Measurement uncertainty expression:
$U_{k=2}$= ± 0.003 g for sample weight measurement
$U_{k=2}$= ± 0.02 mm for sample dimensions measurement
The mentioned extended measurement uncertainty $U_{k=2}$ is given as a standard measurement uncertainty multiplied by the extension coefficient of k=2, which for common division corresponds to a covering probability of app. 95%.

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