University of Zagreb - Faculty of Forestry
Department for furniture and wood products
LABORATORY FOR WOOD IN CONSTRUCTION

Nr: LDG-4-2/2020
Zagreb, 9.7.2020

## Declaration of reaction to fire

| | |
|---|---|
| Product : | Multilayer parquet elements |
| Manufacturer: | Bjelin d.o.o.<br>Žegar VI/39, 47300 Ogulin |
| Manufacturing plant: | Bjelin d.o.o.<br>Žegar VI/39, 47300 Ogulin |
| Technical description and intended use: | Three-layered parquet elements with top layer made of oak, beech or ash wood, with factory applied surface finish, intended to be glued or laid as floating floor to the load-bearing substrate in interior applications. |

According to the requirements of the standard EN 14342:2013 (part 4.2, table 1) surface finished wood flooring elements with **minimum density** of the top layer greater than **500 kg/m³** and minimum overall **thickness** of **14 mm** are classified without further testing (CWFT) as

**$D_{fl}$ - s1**

Based on the documents of the factory production control (FPC) and technical documentation of the product it is evident that the manufacturer's control of wood species, processing and surface finishing materials ensures that the product does not contain substances or exert physical properties that could affect this Declaration.

The Manufacturer holds responsibility that his product has the same characteristics relevant for performance as the one that has been subjected to ITT, and that there are no significant differences regarding production technology and the production control process compared to those used for the manufacture of the product subjected to ITT.

Head of Laboratory

Prof.dr.sc. Hrvoje Turkulin

MP

Dean

Prof.dr.sc. Tibor Pentek

University of Zagreb - Faculty of Forestry
Department for furniture and wood products LABORATORY FOR WOOD IN CONSTRUCTION

Nr: LDG-4-3/2020
Zagreb, 9.7.2020

# Declaration of biological durability

| | |
|---|---|
| Product : | Multilayer parquet elements |
| Manufacturer: | Bjelin d.o.o.<br>Žegar VI/39, 47300 Ogulin |
| Manufacturing plant: | Bjelin d.o.o.<br>Žegar VI/39, 47300 Ogulin |
| Technical description and intended use: | Three-layered parquet elements with top layer made of oak, beech or ash wood, with factory applied surface finish, intended to be glued or laid as floating floor to the load-bearing substrate in interior applications. |

According to the requirements of the standard EN 14342:2013 (part 4.8) and the standard HRN EN 350-2:2005 wood floor covering is manufactured from layers of solid wood. The final product is therefore classified regarding its biological durability without further testing as in Table 1.

Based on the documents of the factory production control (FPC) and technical documentation of the product it is evident that the manufacturer's control of wood species, processing and surface finishing materials ensures that the product does not contain substances or exert physical properties that could affect this Declaration.

Head of Laboratory

Prof.dr.sc. Hrvoje Turkulin

MP

Dean

Prof.dr.sc. Tibor Pentek

Table 1. Biological durability of solid wood (according to EN 350-2:1994)

| Common name | Scientific name | Average density (kg/m$^3$) | Class of natural biological durability to fungi |
|---|---|---|---|
| Oak | *Quercus robur* L., *Quercus petraea* (Matt.) Liebl. | 710 | 2 |
| Beech | *Fagus sylvatica* L. | 710 | 5 |
| Ash | *Fraxinus excelsior* L. | 700 | 5 |
| Fir / Spruce | *Abies alba* Mill. / *Picea abies* Karst. | 450 | 4 |

University of Zagreb - Faculty of Forestry
Department for furniture and wood products LABORATORY FOR WOOD IN CONSTRUCTION

Nr: LDG-4-4/2020
Zagreb, 9.7.2020.

## Declaration of release of formaldehyde

| | |
|---|---|
| Product : | Multilayer parquet elements |
| Manufacturer: | Bjelin d.o.o.<br>Žegar VI/39, 47300 Ogulin |
| Manufacturing plant: | Bjelin d.o.o.<br>Žegar VI/39, 47300 Ogulin |
| Technical description and intended use: | Three-layered parquet elements with top layer made of oak, beech or ash wood, with factory applied surface finish, intended to be glued or laid as floating floor to the load-bearing substrate in interior applications. |

According to the requirements of the standard EN 14342:2013 (part 4.3.1 and Annex A) wood flooring elements are manufactured from solid wood supplied form a FSC certified source and without additional formaldehyde-containing materials. The final product is therefore classified without further testing as class

**E1**

Based on the documents of the factory production control (FPC) and technical documentation of the product it is evident that the manufacturer's control of wood species, processing and surface finishing materials ensures that the product does not contain substances or exert physical properties that could affect this Declaration.

Head of Laboratory

Prof.dr. Hrvoje Turkulin

MP

Dean

Prof.dr. Tibor Pentek

**Complementary document to this Declaration is the Declaration about the absence of formaldehyde by the manufacturer/supplier of finishing materials.**

Svetošimunska cesta 25, 10002 Zagreb, Croatia, telephone: +385(0)1 235 25 55, telefax: +385(0)1 235 25 31
SWIFT code: ZABA HR 2X 2500-03281485 Account number 2100061795 IBAN HR 0923600001101340148

University of Zagreb - Faculty of Forestry
Department for furniture and wood products LABORATORY FOR WOOD IN CONSTRUCTION

Nr: LDG-4-5/2020
Zagreb, 9.7.2020

## Declaration of pentachlorophenol content

| | |
|---|---|
| Product : | Multilayer parquet elements |
| Manufacturer: | Bjelin d.o.o.<br>Žegar VI/39, 47300 Ogulin |
| Manufacturing plant: | Bjelin d.o.o.<br>Žegar VI/39, 47300 Ogulin |
| Technical description and intended use: | Three-layered parquet elements with top layer made of oak, beech or ash wood, with factory applied surface finish, intended to be glued or laid as floating floor to the load-bearing substrate in interior applications. |

According to the requirements of the standard EN 14342:2013 (part 4.3.2) wood flooring elements are manufactured from solid wood supplied form a FSC certified source without any pentachlorophenol containing materials. The final product is therefore classified without further testing as

**PCP < 5 ppm**

Based on the documents of the factory production control (FPC) and technical documentation of the product it is evident that the manufacturer's control of wood species, processing and surface finishing materials ensures that the product does not contain substances or exert physical properties that could affect this Declaration.

Head of Laboratory

Prof.dr.sc. Hrvoje Turkulin

MP

Dean

Prof.dr.sc. Tibor Pentek

University of Zagreb - Faculty of Forestry
Department for furniture and wood products
LABORATORY FOR WOOD IN CONSTRUCTION

Nr: LDG-4-6/2020
Zagreb, 9.7.2020

## Declaration of thermal conductivity

| | |
|---|---|
| Product : | Multilayer parquet elements |
| Manufacturer: | Bjelin d.o.o.<br>Žegar VI/39, 47300 Ogulin |
| Manufacturing plant: | Bjelin d.o.o.<br>Žegar VI/39, 47300 Ogulin |
| Technical description and intended use: | Three-layered parquet elements with top layer made of oak, beech or ash wood, with factory applied surface finish, intended to be glued or laid as floating floor to the load-bearing substrate in interior applications. |

According to the requirements of the standard EN 14342:2013 (part 4.7 and table 2) wood floor covering is manufactured from layers of solid wood. Based on the above mentioned, the calculated values of thermal conductivity are listed in Table 1 of this Declaration.

Based on the documents of the factory production control (FPC) and technical documentation of the product it is evident that the manufacturer's control of wood species, processing and surface finishing materials ensures that the product does not contain substances or exert physical properties that could affect this Declaration.

Head of Laboratory

Prof.dr.sc. Hrvoje Turkulin

MP

Dean

Prof.dr.sc. Tibor Pentek

Table 1. Thermal conductivity λ (W/mK) of multilayer parquet elements depending on the wood species of the top layer

| Common name | Scientific name | Average density (kg/m$^3$) | λ (W/mK) |
|---|---|---|---|
| Oak | *Quercus robur* L., *Quercus petraea* (Matt.) Liebl. | 710 | 0,13 |
| Beech | *Fagus sylvatica* L. | 710 | 0,13 |
| Ash | *Fraxinus excelsior* L. | 700 | 0,13 |

University of Zagreb - Faculty of Forestry
Department for furniture and wood products LABORATORY FOR WOOD IN CONSTRUCTION

*Test report Nr.* **LDG 4-20/2020**

# Multilayer one strip parquet - Surface soundness

***Customer:*** **Bjelin d.o.o.**
**Ul. Žegar VI 39**
**47 300 Ogulin**
**Croatia**

***Head of Laboratory***

Prof Hrvoje Turkulin, PhD

***Dean***

Prof Tibor Pentek, PhD

Zagreb, 14.07.2020.

17025 HAA

# Test Report Nr. LDG 4-20/2020

**Details of the sample**

| | |
|---|---|
| Sample mark | *B1 - one strip* |
| Reference number | *4/20* |
| Sampling date | *09.03.2020.* |
| Sampling method | *Performed by client* |
| Name/type of finishing system | *UV industrial varnish* |
| Substrate | *Oak wood* |
| Condition of the sample | *Properly* |
| Manufacturer | *Bjelin d.o.o.* |
| Customer | *Bjelin d.o.o.* |

**Details of the test:**

| | |
|---|---|
| Date of the test | *13.07.2020.* |
| Test title | ***surface soundness*** |
| Reference standard | *EN 311:2010* |
| Sample conditioning before testing | *According to the reference standard* |
| Climatic conditions | *23±2°C/50±5%* |

**Sample description**

Detailed description of the element, contact area positions, properties of finish (type, appearance, thickness, gloss etc)

Finished three-layer oak wood parquet industrially surface treated with UV curing varnish.

**Testing results:**

| Nr. | Surface soundness (SS) | | | | | | |
|---|---|---|---|---|---|---|---|
| | Maximum force (F) | Surface area (A) | SS = F/A | Failure mode | Cohasion fracture in wood | Cohasion fracture in interlayer | Adhesion failure |
| | *N* | *mm²* | *N/mm²* | | | | |
| 1 | 2581 | 1000 | 2,58 | 4 | 85% | 10% | 5% |
| 2 | 2220 | 1000 | 2,22 | 4 | 70% | 25% | 5% |
| 3 | 2689 | 1000 | 2,69 | 4 | 80% | 15% | 5% |
| 4 | 2422 | 1000 | 2,42 | 4 | 80% | 15% | 5% |
| 5 | 2444 | 1000 | 2,44 | 4 | 75% | 20% | 5% |
| 6 | 2581 | 1000 | 2,58 | 4 | 75% | 20% | 5% |
| 7 | 3190 | 1000 | 3,19 | 4 | 85% | 5% | 10% |
| 8 | 2419 | 1000 | 2,42 | 4 | 95% | 5% | 0% |
| 9 | 2369 | 1000 | 2,37 | 4 | 75% | 25% | 0% |
| 10 | 2530 | 1000 | 2,53 | 4 | 65% | 30% | 5% |
| | | | | | 79% | 17% | 5% |

Failure mode record:

1. within coating/top material
2. within glueline
3. between surface material and underlying board
4. within underlying board

**Interpretation of results:**

Average surface soundness (N/mm²): 2,54

Average failure mode: 4

**Remarks:**

The results refer only to the tested sample. Estimated measurement uncertainty statement is issued upon request.

**END OF REPORT.**

Measured by

Assist. prof. Tomislav Sedlar, PhD

Checked by

Prof Hrvoje Turkulin, PhD
Head of Laboratory

University of Zagreb - Faculty of Forestry
Department for furniture and wood products LABORATORY FOR WOOD IN CONSTRUCTION

# *Test report Nr.* **LDG 4-24/2020**

## Multilayer one strip parquet - Brinell hardness

***Customer:*** **Bjelin d.o.o.**
**Ul. Žegar VI 39**
**47 300 Ogulin**

***Head of Laboratory***

Prof Hrvoje Turkulin, PhD

***Dean***

Prof Tibor Pentek, PhD

Zagreb, 10.7.2020



Svetošimunska cesta 25, 10002 Zagreb, Croatia, telephone: +385(0)1 235 25 55, telefax: +385(0)1 235 25 31
SWIFT code: ZABA HR 2X 2500-03281485 Account number 2100061795 IBAN HR 0923600001101340148

# Test Report Nr. LDG 4-24/2020

**Details of the sample:**

| | |
|---|---|
| Sample mark | *B1 - one strip* |
| Reference Number | *4/20* |
| Sampling date | *09.03.2020.* |
| Sampling method | *Performed by client* |
| Number of specimens | *50* |
| Product name | *Multilayer parquet* |
| Wood species / class | *Oak wood cover* |
| Dimensions | *2200x200x15,5 mm* |
| Surfacing / finishing | *YES* |
| Condition of the sample | *Properly* |

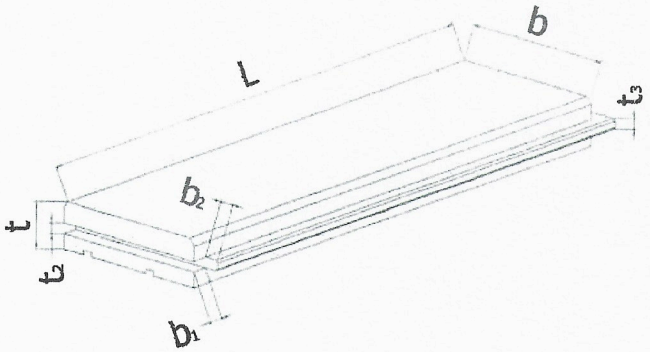
**Details of the testing:**

| | |
|---|---|
| Testing date | *09.07.2020.* |
| Test title | ***Brinell hardness*** |
| Reference standards | *EN 1534:2010* |
| Sample conditioning before testing | *NONE* |
| Climatic conditions | *23˚C i 53 % r.v.z.* |

Short description of the test equipment

*Brinell hardness is determined by pressing a metal ball of 10 mm diameter onto the test surface. The impression diameter is used to calculate HB.*

**Principle dimensions and tolerances:**




**Analysis of results:**

| | |
|---|---|
| average | 29,64 |
| standard deviation | 8,95 |
| characteristic value | 14,70 |

**Remarks:**

The results refer only to the tested sample. Estimated measurement uncertainty statement is issued upon request.

Measured by

Assist. prof. Tomislav Sedlar, PhD

Checked by

Prof Hrvoje Turkulin, PhD
Head of Laboratory

**Rezultati:**

| Br. | Tvrdoća po Brinellu | | | |
|---|---|---|---|---|
| | $d_1$ | $d_2$ | $d_{sr}$ | HB |
| 1. | 5,5 | 5,3 | 5,4 | 40,23 |
| 2. | 5,7 | 5,0 | 5,4 | 41,05 |
| 3. | 5,0 | 5,0 | 5,0 | 47,54 |
| 4. | 5,0 | 5,0 | 5,0 | 47,54 |
| 5. | 5,4 | 5,1 | 5,3 | 42,78 |
| 6. | 5,3 | 5,1 | 5,2 | 43,68 |
| 7. | 5,7 | 5,6 | 5,7 | 36,42 |
| 8. | 5,9 | 5,7 | 5,8 | 34,36 |
| 9. | 5,0 | 5,8 | 5,4 | 40,23 |
| 10. | 4,7 | 5,5 | 5,1 | 45,55 |
| 11. | 7,0 | 6,9 | 7,0 | 22,67 |
| 12. | 7,5 | 7,0 | 7,3 | 20,46 |
| 13. | 7,5 | 7,3 | 7,4 | 19,45 |
| 14. | 6,8 | 7,3 | 7,1 | 21,90 |
| 15. | 7,2 | 7,3 | 7,3 | 20,46 |
| 16. | 6,9 | 7,1 | 7,0 | 22,28 |
| 17. | 6,8 | 7,3 | 7,1 | 21,90 |
| 18. | 7,2 | 7,0 | 7,1 | 21,53 |
| 19. | 6,7 | 6,7 | 6,7 | 24,72 |
| 20. | 7,7 | 7,9 | 7,8 | 17,02 |
| 21. | 7,5 | 6,0 | 6,8 | 24,29 |
| 22. | 6,6 | 5,0 | 5,8 | 34,36 |
| 23. | 5,5 | 5,4 | 5,5 | 39,42 |
| 24. | 6,0 | 6,7 | 6,4 | 28,00 |
| 25. | 5,8 | 6,0 | 5,9 | 33,07 |
| 26. | 5,7 | 5,0 | 5,4 | 41,05 |
| 27. | 5,6 | 6,0 | 5,8 | 34,36 |
| 28. | 7,5 | 5,4 | 6,5 | 27,01 |
| 29. | 6,0 | 5,0 | 5,5 | 38,64 |
| 30. | 5,5 | 5,0 | 5,3 | 42,78 |
| 31. | 7,5 | 5,5 | 6,5 | 26,53 |
| 32. | 8,0 | 7,0 | 7,5 | 18,81 |
| 33. | 7,0 | 7,2 | 7,1 | 21,53 |
| 34. | 7,5 | 7,0 | 7,3 | 20,46 |
| 35. | 7,1 | 7,0 | 7,1 | 21,90 |
| 36. | 7,7 | 7,4 | 7,6 | 18,50 |
| 37. | 6,5 | 6,1 | 6,3 | 28,51 |
| 38. | 7,0 | 7,0 | 7,0 | 22,28 |
| 39. | 7,1 | 6,1 | 6,6 | 25,61 |
| 40. | 6,8 | 7,0 | 6,9 | 23,06 |
| 41. | 7,1 | 6,0 | 6,6 | 26,06 |
| 42. | 7,0 | 6,0 | 6,5 | 26,53 |
| 43. | 8,0 | 7,0 | 7,5 | 18,81 |
| 44. | 7,5 | 6,0 | 6,8 | 24,29 |
| 45. | 7,0 | 7,1 | 7,1 | 21,90 |
| 46. | 5,5 | 5,4 | 5,5 | 39,42 |
| 47. | 6,0 | 6,0 | 6,0 | 31,85 |
| 48. | 6,2 | 5,8 | 6,0 | 31,85 |
| 49. | 6,0 | 6,0 | 6,0 | 31,85 |
| 50. | 7,1 | 5,7 | 6,4 | 27,50 |

**END OF REPORT.**

*Test report Nr.* **LDG-4-1/2020**

# Multy-layer parquet elements - slip resistance

***Customer:*** **Bjelin d.o.o.**
**Ul. Žegar VI 39**
**47 300 Ogulin**
**CROATIA**

***Head of Laboratory***

Prof Hrvoje Turkulin, PhD

***Dean***

Prof Tibor Pentek, PhD

Zagreb, 02.07.2020.

*This test report must always be reproduced in its entirety. Additions, deletion or alterations are not permitted.*

F.7.2/15-3

# Test Report Nr. LDG-4-1/2020

**Details of the sample**

| | |
|---|---|
| Sample mark | *B1-B3* |
| Reference number | *4/20* |
| Sampling date | *9. 3. 2020.* |
| Sampling method | *Made by customer* |
| Name/type of finishing system | *UV industrial varnish* |
| Substrate | *Oak* |
| Condition of the sample | *No remarks* |
| Manufacturer | *Bjelin d.o.o.* |
| Customer | *Bjelin d.o.o.* |

**Details of the test:**

| | |
|---|---|
| Date of the test | *25.6.2020.* |
| Test title | ***slip resistance*** |
| Reference standard | *DIN CEN/TS 15676/08* |
| Sample conditioning before | *According to the reference standard* |
| Climatic conditions | *25 °C i 55 % r.v.z.* |
| Type of rubber slider | *#55* |

**Sample description**

Detailed description of the element, contact area positions, properties of finish (type, appearance, thickness, gloss etc)

TESTING RESULTS

| Nr. | Unpolished sliding resistance values (USRV) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Dry testing | | | $x_{sr}$ | Wet testing | | | $x_{sr}$ |
| 1 | 74 | 77 | 76 | 75,67 | 30 | 30 | 30 | 30,00 |
| 2 | 61 | 60 | 63 | 61,33 | 29 | 29 | 26 | 28,00 |
| 3 | 71 | 71 | 69 | 70,33 | 25 | 25 | 25 | 25,00 |
| 4 | 66 | 67 | 67 | 66,67 | 27 | 27 | 26 | 26,67 |
| 5 | 63 | 61 | 64 | 62,67 | 20 | 20 | 20 | 20,00 |
| 6 | 62 | 64 | 65 | 63,67 | 24 | 25 | 24 | 24,33 |
| 7 | 62 | 60 | 63 | 61,67 | 24 | 25 | 24 | 24,33 |
| 8 | 67 | 70 | 69 | 68,67 | 21 | 20 | 20 | 20,33 |
| 9 | 75 | 76 | 78 | 76,33 | 24 | 23 | 23 | 23,33 |
| 10 | 73 | 76 | 75 | 74,67 | 21 | 21 | 21 | 21,00 |

**Summary of results:**

Average resistance in dry testing: 68 USRV
Average resistance in wet testing: 24 USRV

**Remarks:**

The results refer only to the tested sample. Estimated measurement uncertainty statement is issued upon request.

**END OF REPORT.**

Measured by

a.r.

doc.dr.sc. Josip Miklečić

Checked by

rof.dr.sc. Hrvoje Turkuli
Head of Laboratory

University of Zagreb - Faculty of Forestry
Department for furniture and wood products
LABORATORY FOR WOOD IN CONSTRUCTION

**TECHNICAL REPORT**

Nr LDG - 08/2020

**THREE-LAYER PRE-FABRICATED WOOD FLOORING BOARDS (*HERRINGBONE*)**

CLIENT: Bjelin d.o.o.
Žegar VI 39
47300 OGULIN
CROATIA

Dean, Faculty of Forestry

Prof Dr Tibor Pentek

Zagreb, 14.07.2020.

Svetošimunska cesta 25, 10002 Zagreb, Croatia, telephone: +385(0)1 235 25 55, telefax: +385(0)1 235 25 31
SWIFT code: ZABA HR 2X 2500-03281485 Account number 2100061795 IBAN HR 0923600001101340148