



| PRODUCT DESCRIPTION | | |
|---------------------------------|-------------------|--|
| Size | Overall Thickness | 12mm |
| Top layer | Type | Overlay+decor melamine impregnated paper |
| | Thickness | 0.15mm |
| Core | Type | High density fiber board |
| | Thickness | 11.7mm |
| | Color | Black |
| | Density | ≥850kg/m ³ |
| Balanced layer | Type | Melamine impregnated paper |
| | Thickness | 0.15mm |
| Backing | Type | None |
| | Thickness | None |
| Bevel | | 4V nano bevel |
| Locking system | | Tight lock |
| Type of installation | | Floating |
| Underfloorheating compatibility | | Yes but under certain condition- See installation instruction manual |
| DIMENSIONAL TOLERANCE | | |
| Thickness tolerance | | +/- 0.5mm |
| Width tolerance | | +/- 0.2mm |
| Length tolerance | | +/- 0.5mm |
| Height difference | | Handscraped texture ≤ 0.30mm, Others texture ≤ 0.15mm |
| Gap between planks | | ≤ 0.20mm |
| Cupping up | | ≤ 0.15% of the planks width |
| Cupping down | | ≤ 0.2% of the planks width |
| End lift | | ≤ 0.5% of the planks length |
| Bowing | | ≤ 1.0% of the planks length |
| Squareness | | ≤ 0.2mm |


| | Norm | Test method | Requirement | Test results | Conclusion |
|---|-----------------------------------|---------------------------------|-----------------------------------|--------------|--|
| CHEMICAL COMPOSITION | | | | | |
| Formaldehyde emission | CARB | ASTM D6007 | ≤ 0.11 ppm | 0.046 | Meet CARB phase 2 requirement |
| | EN 14041 | EN 717-1 | Release ≤ 0.124 mg/m ³ | 0.04 | E0 |
| VOC | Decret No2011-321 | ISO 16000 | TVOC<1000µg/m ³ | 5 | VOC A |
| | DIBT | ISO 16000 | TVOC<1000µg/m ³ | 24 | Meet AgBB requirement - U mark certified |
| Ortho-phthalates | Prop 65 | Spectrometry | Ortho-phthalate free | Not detected | Ortho-phthalate free, Comply with Prop 65 |
| Lead | CPSIA | CPSC-CH-E-1002-08 | ≤ 90ppm | Not detected | Meet children toy regulation |
| PAHs | EU REACH regulation No. 1907/2006 | Spectrometry and chromatography | <1mg/kg | Not detected | Meet requirement of product that can be put in mouth |
| PCP | EN 14041 | EN 12673 | <1ppm | Not detected | Pass |
| Substances of Very High Concern (SVHC) (mercury, chromium VI, Cadmium, SCCp, benzene, Xylene, tributyltin, etc) | EU REACH regulation No. 1907/2006 | Spectrometry and chromatography | ≤ 0.1% (w/w) | Not detected | REACH compliant |

| PHYSICAL PROPERTIES | | | | | | |
|---|----------------------|------------------|-----------------------------|---|---|--|
| Dimensional variation (humidity change) | | EN 13329 | EN 13329 | $\Delta W/\Delta L \leq 0.9\%$ | $\Delta W/\Delta L \leq 0.28\%$ | Pass |
| Swelling after submersion in water | | EN 13329 | EN 13329 | 18% | 12% | Class 33, heavy commercial |
| | | NALFA LF 01-2011 | NALFA LF 01-2011 | 16% | 12% | Class 4, heavy commercial |
| Impact sound reduction (IIC) | | - | ASTM E492-09 | - | NA | NA |
| Sound transmission reduction (STC) | | - | ASTM E90-09 | - | NA | NA |
| Thermal conductivity | | EN 14041 | EN 12667 | - | 0.123 W/(m.k) | Suitable for underfloor heating system |
| Thermal resistance (R value) | | - | EN 12667/ASTM C518 | - | 0.103 m ² ·K/W | Suitable for underfloor heating system |
| Reaction to fire | | EN 14041 | EN 13051-1 | - | PASS | Class Cfl -S1 |
| Optical smoke density | | - | ASTM E662 | - | < 450 | Pass |
| Critical Radiant Flux | | - | ASTM E648 | - | 1.08W/cm ² | Class I |
| WATER RESISTANCE/Swelling | | HDF | Finished Without Click | Finished With Click and Wax | Time before Start Swelling | Real Life Swelling Ratio |
| | Norms | EN 317 | EN 13329 | Similar to EN 13329 | Real life test | Similar to EN 382-2 |
| | Official Requirement | $\leq 15\%$ | $\leq 18\%$ | N.A. | N.A. | N.A. |
| Regular Laminate | Internal Standard | $\leq 10\%$ | $\leq 18\%$ | $\leq 12\%$ | 3H | 9% |
| | Actual Value | 7-9% | 14-16% | 8-11% | 6-8H | 4-8% |
| Atroguard | Internal Standard | $\leq 5.5\%$ | $\leq 10\%$ | $\leq 6\%$ | 24H | 3% |
| | Actual Value | $\leq 5.5\%$ | $\leq 10\%$ | 4-5% | 25-28H | 0-2% |
| SURFACE PROPERTIES | | | | | | |
| Wear resistance | | EN 13329 | EN 13329 | ≥ 4000 cycles | 5000 | AC4, Class 32, General commercial |
| | | NALFA LF 01-2011 | NALFA LF 01-2011 | ≥ 4000 cycles | 5000 | AC4, Class 3, Commercial |
| Scratch | | - | - | $\geq 4N$ | 4N | Pass |
| Surface bonding | | NALFA LF 01-2011 | EN311/NALFA LF 01-2011 | 1.25 N/mm ² | 1.4 N/mm ² | Class 3, commercial |
| Static load (250LBS/115KG) | | NALFA LF 01-2011 | ASTM F970 | ≥ 8 Mpa | 15 | Class 4, Heavy commercial |
| Residual indentation | | ASTM F1700 | ASTM F1914 | $\leq 8\%$ (140 lbs/63kg) | 0.50% | Pass |
| | | EN 16511 | EN 433/ISO 24343-1 | ≤ 0.15 mm | 0.03 | Class 34, Heavy commercial |
| Impact resistance (big ball) | | EN 13329 | EN 13329 | ≥ 1600 mm | ≥ 1600 | IC3, Class 33, Commercial |
| | | NALFA LF 01-2011 | NALFA LF 01-2011 | ≥ 1400 mm | ≥ 1400 | Class 4, Heavy commercial |
| Impact resistance (small ball) | | EN 13329 | EN438 | ≥ 15 N | 16 | IC3, Class 33, Heavy commercial |
| | | NALFA LF 01-2011 | NALFA LF 01-2011 | ≥ 500 mm (19.7 in) | 950 | Class 4, Heavy commercial |
| Slipperiness | | EN14041 | EN 13893 | DryCOF ≥ 0.3 | 0.43 | Class DS |
| | | - | ASTM C1028 | ≥ 0.5 | NA | NA |
| | | - | D 51130 | $\geq R9$ | NA | NA |
| Colour fastness to light | | EN 13329 | ISO 105-B02:1994, Method 3a | \geq Grade 6 | ≥ 6 | Pass |
| | | NALFA LF 01-2011 | NALFA LF 01-2011 | Slight change only | Slight change only | Class 4, Heavy commercial |
| Resistance to staining | | EN 13329 | EN 438-2 | Group 1 and 2: grade 5, group3: grade 4 | Group 1 and 2: grade 5, group3: grade 4 | Class 34, Heavy commercial |
| | | NALFA LF 01-2011 | NALFA LF 01-2011 | Slight change only | No change | Class 4, Heavy commercial |

LEED SCORECARD

LEED was developed to address all buildings everywhere, regardless of where they are in their life cycle. From hospitals to data centers, from historical buildings to those still in the design phase, there is a LEED certification program for every building. Our products will contribute value to a building's LEED v4 Scorecard in the following LEED certification program categories recognized by the USGBC as per following

| LEED program certification | Category | Credit title | LEED points attainable | Credit description | How our product contribute to obtain LEED points |
|---|--|--|---|--|---|
|  <p>BD+C Building Design and Construction</p> <p>Applies to buildings that are being newly constructed or going through a major renovation; includes New Construction, Core & Shell, Schools, Retail, Hospitality, Data Centers, Warehouses & Distribution Centers, and Healthcare</p> | <p>Indoor Environmental Quality</p> | <p>Credit 1: Enhanced Indoor Air Quality Strategies – Option 2 Additional Enhanced IAQ Strategies - option D</p> | <p>1 point ID&C, 2 points Retail CI</p> | <p>To reduce concentrations of chemical contaminants that can damage air quality, human health, productivity, and the environment.</p> | <p>1. TVOCs are less than 0.5mg/m3.</p> |
| | | <p>Credit 2: Low-Emitting Materials – Option1 Flooring</p> | <p>1 point</p> | <p>To reduce concentrations of chemical contaminants that can damage air quality, human health, productivity, and the environment.</p> | <p>1. VOC emission are less than 0.5mg/m3.</p> |
| | | <p>Credit 4: Indoor Air Quality Assessment - Option 2 Air Testing</p> | <p>2 points</p> | <p>To establish better quality indoor air in the building</p> | <p>1. TVOCs are less than 0.5mg/m3.</p> |
| | <p>Material & Resource</p> | <p>Credit 4: Material ingredient – Option 2</p> | <p>1 point</p> | <p>Minimize the use and generation of harmful substances</p> | <p>The product is 100% REACH compliant</p> |
| | | <p>Credit 6 – PBT source reduction: lead, cadmium and copper</p> | <p>1 point</p> | <p>To reduce the release of persistent, bioaccumulative, and toxic chemicals</p> | <p>The product is free of lead, cadmium and copper</p> |
|  <p>O+M Building Operations and Maintenance</p> <p>Applies to existing buildings that are undergoing improvement work.</p> | <p>Material & Resource</p> | <p>Credit 3: Purchasing - Facility maintenance and renovation</p> | <p>1 point</p> | <p>To reduce the environmental harm from materials used in building renovations</p> | <p>1. The product is 100% REACH compliant 2. TVOCs are less than 0.5mg/m3. 3. Test report according to ISO 16000 is available on request.</p> |

| LEED programm certification | Category | Credit title | LEED points attainable | Credit description | How our product contribute to obtain LEED points |
|--|------------------------------|---|----------------------------------|---|--|
|  <p data-bbox="353 376 517 416">Interior Design and Construction</p> <p data-bbox="210 549 660 627">Applies to projects that are a complete interior fit-out; includes Commercial Interiors, Retail and Hospitality</p> | Indoor Environmental Quality | Credit 1: Enhanced Indoor Air Quality Strategies – Option 2 Additional Enhanced IAQ Strategies - option D | 1 point ID&C, 2 points Retail CI | To reduce concentrations of chemical contaminants that can damage air quality, human health, productivity, and the environment. | 1. TVOCs are less than 0.5mg/m3. |
| | | Credit 2: Low-Emitting Materials – Option1 Flooring | 1 point | | 1. VOC emission are less than 0.5mg/m3. |
| | | Credit 4: Indoor Air Quality Assessment - Option 2 Air Testing | 2 points | To establish better quality indoor air in the building | 1. TVOCs are less than 0.5mg/m3. |
| | Material & Resource | Credit 4: Material ingredient – Option 2 | 1 point | Minimize the use and generation of harmful substances | The product is 100% REACH compliant |
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