



Recyclable PVC-free Flooring

**TIER ELEMENT PVC-FREE INDOOR FLOORING
TECHNICAL DATA SHEET**

VERSION: C1.2 - 2024-09-18



Please ensure you have downloaded the latest version by scanning this code.





CONTENTS

TIER Element PVC-free indoor flooring product	3
Document layout	3
Material composition	5
Physical properties	6
Mechanical properties	7
Thermal properties	10
Fire reaction properties	11
Acoustic properties	12
Weathering	14
Surface properties	14
Disclaimer and copyright	17
Contact information	17
Appendix A – Document citations	19
Appendix B – Chemical compatibility	22



TIER Element PVC-free indoor flooring product

Product name	TIER Element PVC-free Indoor Flooring
Product application	Indoor flooring
Material	PP and calcium carbonate
Material description	PVC-free polymer composite flooring, consists of a PP and mineral composite core, and a digitally printed wear layer with an IXPE underlay

Document layout

Eva-Last strives to evaluate their products in depth and present the technical and safety information available in a manner that assists with the application thereof. If additional data or information is required, please do not hesitate to contact us at rad@eva-last.com.

In an attempt to simplify the information, similar data is loosely grouped into the categories summarised below. This document is ordered according to these categories and the applicable page number for the start of each section is captured in the Table of Contents.

- Material composition
- Physical properties
- Mechanical properties
- Thermal properties
- Fire reaction properties
- Weathering properties
- Surface properties

The Material compositions section captures a summary of the product make-up from the Material Safety Data Sheet (MSDS). [A link to the MSDS](#) is provided for additional detail. Summaries of chemical compliance data available are also collected in this section.

The Physical properties section provides a summary of available profiles and general material properties such as density, water absorption, etc. Additional profile information can be obtained from drawings in the appropriate appendix. Where possible, material properties that can be assigned to more specific categories are moved to the relevant sections.

The Mechanical properties section captures data related to the product's reaction to various load conditions. The section is broadly assembled into the below categories. Additional profile and sectional information is captured by the drawings in the appropriate appendix.

- Material specific mechanical properties
- Profile specific mechanical properties
- Sectional properties

Product properties such as the expansion coefficient, thermal resistance, etc. are captured, where applicable, in the **[Thermal properties section](#)**.

Information regarding the product's reaction to fire is captured in the **[Fire reaction properties section](#)**.



Document layout - continued

Test data relating to the acoustic performance of the product, where applicable, is summarised in the [Acoustic properties section](#).

Information on the product's resistance to mould, termites, etc. is collected in the [Weathering section](#).

[The Surface properties section](#) summarises information regarding the finish or texture of the product. Test data on aspects such as slip resistance (where applicable) is included in this section.

Where the products form part of a system and, as a result, utilise other components, an additional section to capture useful data regarding these components is added to the document.

Where information is not yet available, the section is simply omitted. In the cases where information can be substituted or supplemented with alternative data (based on similar compositions, etc.), an attempt to do so is made. Where this is the case, it is highlighted. Please make use of the data accordingly. Links to relevant reports can be found in Appendix A. For any additional information regarding this, please feel free to contact rad@eva-last.com.

Always ensure the product, and application thereof is suitable, rational, and compliant with any applicable regulations or standards. Wherever necessary, consult a suitably qualified professional. For information about the installation and use of the product, please see the applicable [Installation Guide \(IG\)](#). For additional material safety and handling information, please refer to the applicable [MSDS](#). For any further information, please contact rad@eva-last.com.

Material composition

The table below provides a simplified breakdown of the TIER Element PVC-free material technology composition. For a more comprehensive understanding of the material's composition, safety guidelines, and handling instructions, please refer to the [TIER Element PVC-free MSDS](#). To determine substance compatibility or incompatibility with the product, consult the [Surface properties section](#).

Component	Substance	Mass (%)
Core	Calcium Carbonate	40 to 60
	Polypropylene	20 to 30
	Cellulose	5 to 20
	Other	Less than 35
Wear layer	Digital print layer (Ink)	N/A
	Polyurethane	N/A
Underlay layer	IXPE	N/A

Formaldehyde Content Test (ASTM D6007-22)

The Formaldehyde Content Test was conducted according to ASTM D6007-22 by Intertek Testing Services. This test measures the formaldehyde emission level from the material using a small-scale chamber method. [Report No. 240604006SHF-035](#) documents the findings, with the formaldehyde content determined by UV-VIS spectrophotometry under controlled environmental conditions.

Property	Result	Required result	Test method	Information
Formaldehyde content (ppm)	Not Detected (ND)	≤ 0.02	ASTM D6007-22	The Superior 7.0 Product was tested.

Soluble 8 Elements (ASTM F963-23)

Testing for Soluble 8 Elements was performed in accordance with ASTM F963-23 by Intertek Testing Services. The test evaluates the migration of specific hazardous elements from the material. The results were generated using Inductively Coupled Argon Plasma Spectrometry as documented in [Report No. 240604006 SHF-001](#).

Element	Result	Detection limit (ppm)	Limit in ASTM F963 (ppm)	Information
Soluble Barium (Ba)	Not Detected	5	1000	The Superior 7.0 Product was tested.
Soluble Lead (Pb)	Not Detected	5	90	
Soluble Cadmium (Cd)	Not Detected	5	75	
Soluble Antimony (Sb)	Not Detected	5	60	
Soluble Selenium (Se)	Not Detected	5	500	
Soluble Mercury (Hg)	Not Detected	5	60	
Soluble Arsenic (As)	Not Detected	2.5	25	
Soluble Chromium (Cr)	Not Detected	5	60	



Material composition - continued



GREENGUARD Certification Program Profile Study

The GREENGUARD Certification Program Profile Study was conducted according to UL 2821 by UL Environment at their Guangzhou Laboratory. This study evaluates the chemical emissions from flooring materials, including Total Volatile Organic Compounds (TVOC), formaldehyde, total aldehydes, and individual Volatile Organic Compounds (VOCs). The tests were performed under controlled environmental conditions to assess the materials' suitability for office and classroom environments under the GREENGUARD and GREENGUARD Gold standards. The results are documented in Report Nos. **1002410212-7478501 (9.0 mm)** and **1002410212-7478551 (5.5 mm)**.

Property	9.0mm product result*	5.5mm product result	Required result	Test method
Total Volatile Organic Compounds (TVOC)	12.0µg/m ² •hr (0.003mg/m ³) (2.99x10 ⁻⁹ oz/ft ³)	5.5µg/m ² •hr (0.01mg/m ³) (2.99x10 ⁻⁹ oz/ft ³)	Meets GREENGUARD Gold criteria	UL 2821
Formaldehyde	BQL	BQL		
Total Aldehydes	BQL	BQL		

*The tests were performed on a thicker profile than typical to provide the most conservative result.

- BQL denotes bellow quantifiable level of 0.04µg (1.4 x 10⁻⁹) based on a standard 18L (4.8gal US) air collection volume for TVOC and individual VOCS and 0.1µg (3.52 x 10⁻⁹) based on a standard 45L (11.9gal US) air collection volume for formaldehyde and total aldehydes.

Physical properties

Profile properties

Below is a summarised table of the TIER Element PVC-free profiles.

Profile ID	Core mm (")	Wear layer mm (")	Underlay mm (")	Total thickness mm (")	Width mm (")	Length mm (")	
Medium range	2G	4.35 (0.171)	0.15 (0.006)	1 (0.039)	5.5 (0.217)	182.0 (7.165)	1524 (60)
		4.35 (0.171)	0.15 (0.006)	1 (0.039)	5.5 (0.217)	305.0 (12.008)	610 (24.016)
Superior range	5G	5.33 (0.21)	0.17 (0.007)	1.5 (0.059)	7.0 (0.276)	228.0 (8.976)	1829 (72.008)

General material properties

Typical properties of the TIER material technology are captured below as an indication of the expected behaviour.

Properties	Results	Units	Test method
Density	1.76 (0.0636)	g.cm ³ oz/in ³	Internal

Physical properties - continued

Dimensional stability and curling (ASTM F2199-20)

Dimensional stability and curling testing was conducted following ASTM F2199-20 by Intertek Testing Services. This standard assesses the dimensional changes in resilient floor coverings under specified temperature and humidity conditions. Results are documented in Report Nos. [240604006SHF-015 \(7.0 mm\)](#) and [240604006SHF-006 \(5.5 mm\)](#).

Property	7.0 mm board	5.5 mm board	NAFLA Class	Test method
Dimensional stability	Length: 0.02% Width: -0.02%	Length: 0.01% Width: -0.03%	Class 4 Heavy Commercial	ASTM F2199-20
Curling inward	0.002 mm (7.9 x 10 ⁻⁵ "	0.002 mm (7.9 x 10 ⁻⁵ "		

Note – Negative values indicate shrinkage

Thickness swell (NALFA 3.2)

Thickness swell testing was performed according to NALFA 3.2 by Intertek Testing Services. The test determines the percentage increase in thickness of laminate flooring after immersion in water. The results are documented in [Report No. 240604006SHF-009 \(5.5 mm\)](#).

Property	Product	NAFLA Class	Test method	Information
Thickness swell	0.19%	Class 4 Heavy commercial	NALFA 3.2	The 5.5 mm thick profile was tested. Specimens were submerged under the water for 24 hours

Mechanical properties

The following table provides results from internal testing and is provided for information only. Further external testing is underway.

Abrasion resistance (ASTM D4060-19)

Abrasion Resistance was tested following ASTM D4060-19 by Intertek Testing Services. The test evaluates the wear resistance of the material by measuring the loss in mass after 1000 abrasion cycles using a 1kg (35oz) Taber Abrader. Results are provided in [Report No. 240604006SHF-023 \(7.0 mm with a 0.17 mm cap\)](#).

Property	7.0 mm board - mg (oz)	Test Method	Information
Mass/Weight loss	46.2mg (0.00163oz)	ASTM D4060-19	It is assumed the 5.5 mm with a 0.15 mm cap would act similarly as they had similar results in the castor chair resistance testing.

Static load resistance (ASTM F970-22)

Static Load Resistance testing was carried out according to ASTM F970-22 by Intertek Testing Services. This standard assesses the residual indentation of flooring materials when subjected to a constant load. Results are documented in [Report Nos. 240712011SHF-002 \(7.0 mm\)](#) and [240712011SHF-001 \(5.5 mm\)](#).

Property	7.0 mm board	5.5 mm board	Test method	Information
Residual indentation	0.23 mm (0.009in)	0.14 mm (0.006in)	ASTM F970-22	Results are based on averages.

Mechanical properties - continued

Small ball impact resistance (NALFA 3.6)

The Small Ball Impact Resistance test was conducted following NALFA 3.6 by Intertek Testing Services. This test evaluates the material's resistance to impact using an impact dark weighing 25g (0.88oz) with a 5mm (0.2") diameter steel ball dropped from a specified height. Results are recorded in [Report Nos. 240604006SHF-020 \(7.0 mm\)](#) and [240604006SHF-011 \(5.5 mm\)](#).

Property	7.0 mm board	5.5 mm board	NAFLA Class	Test method	Information
Small ball impact resistance	525 mm (20.7 in)	525 mm (20.7 in)	Class 4 Heavy commercial	NALFA 3.6	The values denote the height from which the impact dark was dropped.

Large ball impact resistance (NALFA 3.5)

Large ball impact resistance was tested according to NALFA 3.5 by Intertek Testing Services. This test measures the impact resistance of the material using a 224g (7.9 oz) steel ball with 38mm (1.5") diameter. Detailed results are provided in [Report Nos. 240604006SHF-019 \(7.0 mm\)](#) and [240604006SHF-010 \(5.5 mm\)](#).

Property	7.0 mm board	5.5 mm board	NAFLA Class	Test method	Information
Large ball impact resistance	≥ 1450 mm (57 in)	≥ 1450 mm (57 in)	Class 4 Heavy commercial	NALFA 3.5	The values denote the height from which the impact dark was dropped.

Castor chair resistance (NALFA 3.9)

Castor chair resistance was evaluated in line with NALFA 3.9 by Intertek Testing Services. This test assesses the material's durability under repeated rolling with a castor chair. The results are documented in [Report Nos. 240604006SHF-022 \(7.0 mm\)](#) and [240604006SHF-013 \(5.5 mm\)](#).

Property	7.0 mm board	5.5 mm board	NAFLA Class	Test method	Information
Castor chair resistance	Pass	Pass	Class 4 Heavy commercial	NALFA 3.9	After 35 000 cycles, test specimens had no visible damage.

Residual indentation (ASTM F1914)

Residual indentation was tested in compliance with ASTM F1914 by Intertek Testing Services. This standard assesses the indentation remaining in resilient floor coverings after removal of a load. The results are recorded in [Report Nos. 240604006SHF-005 \(5.5 mm\)](#).

Property	5.5 mm board	Test method
Residual indentation	0.04 mm (0.002 in)	ASTM F1914

Mechanical properties - continued

Locking Strength Test (EN ISO 10582:2018)

The Locking Strength Test was performed in compliance with EN ISO 10582:2018 Annex D. The test evaluates the flooring's locking mechanism's strength by measuring the force required to separate the long and short sides of the panels. The results are based on an average locking strength using a test speed of 100 mm/min, with samples conditioned at $23 \pm 2^\circ\text{C}$ and $50 \pm 5\%$ relative humidity for at least 24 hours. Results are recorded in [Report Nos. 240712011SHF-007 \(5.5mm\)](#) and [240712011SHF-008 \(7.0mm\)](#) ([240712011SHF-008_Lockin...](#))([240712011SHF-007_Lockin...](#)).

Property	7.0 mm board	5.5 mm board	Test Method	Information
Locking Strength (Long)	4.99 kN/m	6.25 kN/m	EN ISO 10582:2018 Annex D	Test speed 100 mm/min. Conditioned at $(23 \pm 2)^\circ\text{C}$ and $(50 \pm 5)\%$ relative humidity for at least 24 hours.
Locking Strength (Short)	4.25 kN/m	5.00 kN/m	EN ISO 10582:2018 Annex D	Test speed 100 mm/min. Conditioned at $(23 \pm 2)^\circ\text{C}$ and $(50 \pm 5)\%$ relative humidity for at least 24 hours.

Clip locking interactions

The following test results are based on internal test results and have been provided for information only.

Properties	Result	Requirement	Test method	Information
Locking tension long side	4.3kN/m (294.64 lb/ft)	N/A	ISO 10582:2017	-
Locking tension short side	3.58kN/m (245.31lb/ft)	N/A		-
Locking strength under high temperatures	No abnormalities	N/A	Internal	Profile heated at 60°C (140°F) for 6 Hours before the interaction was tested.
UV affects - cupping	0.09 mm (0.0035")	Less than 0.25 mm (0.0098")	Internal	-
UV affects - lock bulging	0.26 mm (0.0102")	Less than 0.30 mm (0.0118")	Internal	-

Thermal properties

The table below outlines typical thermal properties of the TIER Element PVC-free material based on internal test results.

Properties	Results	Requirements	Test method	Information
Coefficient of thermal expansion (CTE)	48.6 x 10 ⁻⁶ mm/mm/°C 26.83 x 10 ⁻⁶ in/in/°F	N/A	ASTM D6341	Temperature range change from 23°C (73.4°F) of -34.7°C (30.5°F) to 60°C (140°F).
	62.6x 10 ⁻⁶ mm/mm/°C 34.77x 10 ⁻⁶ in/in/°F	N/A	EN 15534	Temperature change from 23°C (73.4°F) to -20°C (-4°F) to 80°C (176 °F).

Resistance to heat (ASTM F1514)

Resistance to heat testing was performed following ASTM F1514 by Intertek Testing Services. The test measures the colour change of flooring materials when exposed to high temperatures. The complete results are available in

Report No. 240604006SHF-003 (5.5 mm).

Property	Medium 5.5 Product	Test method	Information
Colour Change (ΔE)	0.52	ASTM F1514	It is assumed that the 7.5 mm cap of 0.17 mm (0.007") will perform at least as well as the 5.5 mm cap of a 0.15 mm (0.006") cap.

Resistance to light (ASTM F1515)

The Resistance to Light test was carried out according to ASTM F1515 by Intertek Testing Services. This test evaluates the colour stability of the material after exposure to light. The findings are documented in **Report No. 240604006SHF-004 (5.5 mm).**

Property	Medium 5.5 Product	NAFLA class	Test method	Information
Colour Change (ΔE)	1.27	Class 4 - Heavy commercial*	ASTM F1515	It is assumed that the 7.5 mm cap of 0.17 mm (0.007") will perform at least as well as the 5.5 mm cap of a 0.15 mm (0.006") cap.

Fire reaction properties

Critical radiant flux (ASTM E648-23)

Critical radiant flux testing was conducted according to ASTM E648-23 by Intertek Testing Services. This test evaluates the flame spread characteristics of the material under radiant heat exposure. The findings are provided in [Report Nos. 240604006SHF-034 \(7.0 mm\)](#) and [240604006SHF-032 \(5.5 mm\)](#).

Property	Superior 7.0 Product	Medium 5.5 Product	Test method	Class
Average critical radiant flux	0.47 W/cm ² (436 W/ft ²)	0.53 W/cm ² (492 W/ft ²)	ASTM E648-23	Class 1
Standard deviation (W/cm ²)	0.04 W/cm ² (37.16 W/ft ²)	0.02 W/cm ² (18.6 W/ft ²)		
Coefficient of variation (%)	8.80%	4.33%		

Density of smoke (ASTM E662-21)

The density of smoke test was carried out in accordance with ASTM E662-21 by Intertek Testing Services. These standards measure the smoke generation of materials during combustion. Detailed results are found in Report No. [240604006SHF-036 \(5.5 mm\)](#).

Test Condition	Average Specific Optical Density (Ds)	Test standard	Notes
Non-flaming Condition	541.0	ASTM E662-21	Average Ds across three specimens
Flaming Condition	162.0	ASTM E662-21	Average Ds across three specimens

Fire reaction testing per EN 13 501 requirements

The following tables provide properties for the TIER Element PVC-free indoor flooring product in a flooring application per EU standard requirements. This product is thinner than the Prime 5.5 mm and Premier 7.0 mm ranges and is provided as reference only.

Standard	Properties	Result	Requirement	Test method	Information
EN 13501	Critical flux (transverse)	7.6 kW/m ² (0.70 kW/ft ²)	Less than 8.0 kW/m ² (0.74 kW/ft ²)	EN 13823	Profile 1220x181x6.0 mm (48.03 x 7.13 x 0.24") was tested with an IXPE layer.
	Critical flux (longitudinal)	7.0 kW/m ² (0.65 kW/ft ²)	Less than 8.0 kW/m ² (0.74 kW/ft ²)		
	Smoke	98%.min	Less than 750%.minute		
	Flame spread	Pass	Less than 150 mm (5.91") in 60 seconds	EN ISO 11925-2 Exposure 30s	



Acoustic properties

Impact Insulation Class (IIC) ASTM E492-22

The Impact Insulation Class (IIC) tests were conducted in accordance with ASTM E492-22 by Intertek Testing Services. This standard measures the impact sound transmission through floor assemblies, simulating common foot traffic and similar impact noises. The table below compares the IIC values for the Superior 7.0mm Product and Medium 5.5mm Product, both with and without a drop ceiling assembly modification.

The test results are documented in Report Nos. [240604006SHF-029 \(7.0 mm\)](#) and [240604006SHF-026 \(5.5 mm\)](#).

Property	Superior 7.0 Product	Medium 5.5 Product	Test method	Information
Impact Insulation Class (IIC)	56	56	ASTM E492-22	Test setup and conditions: <ul style="list-style-type: none"> • Temperature: 26°C • Relative Humidity: 70% • Volume of Source Room: 77 m³ • Volume of Receiving Room: 112 m³ • Specimen Area: 12.5 m²
IIC with Drop ceiling	68.4*	68.4*	Modified	

- * 1. The IIC and STC values presented for both products under the drop ceiling modification were tested using ASTM E492-22 modified and ASTM E90-23 modified standards, respectively. These modifications reflect specific adjustments for the addition of a drop ceiling.
2. All test conditions, including temperature, relative humidity, and room volume, were standardized to provide consistent results. However, real-world variations in installation and environmental conditions could result in deviations from the values presented here.
3. The drop ceiling modification shows a significant improvement in both IIC and STC values, but the exact degree of improvement may vary based on the specific ceiling materials and installation methods used in practice.
4. The results with the drop ceiling show improvements in IIC and STC, but these values may be inflated due to the removal of the room constant, which normally adjusts for sound absorption in the receiving room. This means the drop ceiling artificially enhances sound insulation, and care should be taken when applying these results to real-world conditions.

Sound Transmission Class (STC) ASTM E90-23

The Sound Transmission Class (STC) ratings were measured following ASTM E90-23 by Intertek Testing Services, which evaluates airborne sound transmission loss through floor assemblies. The results for the Superior 7.0mm Product and Medium 5.5mm Product are presented below, including the impact of adding a drop ceiling to improve sound insulation performance.

The findings are recorded in Report Nos. [240604006SHF-031 \(7.0 mm\)](#) and [240604006SHF-028 \(5.5 mm\)](#).

Property	Superior 7.0 Product	Medium 5.5 Product	Test method
Sound Transmission Class (STC)	53	53	ASTM E90-23
STC with Drop ceiling*	65.4*	65.4*	ASTM E90 - 23 modified

- * 1. The IIC and STC values presented for both products under the drop ceiling modification were tested using ASTM E492-22 modified and ASTM E90-23 modified standards, respectively. These modifications reflect specific adjustments for the addition of a drop ceiling.
2. All test conditions, including temperature, relative humidity, and room volume, were standardized to provide consistent results. However, real-world variations in installation and environmental conditions could result in deviations from the values presented here.
3. The drop ceiling modification shows a significant improvement in both IIC and STC values, but the exact degree of improvement may vary based on the specific ceiling materials and installation methods used in practice.
4. The results with the drop ceiling show improvements in IIC and STC, but these values may be inflated due to the removal of the room constant, which normally adjusts for sound absorption in the receiving room. This means the drop ceiling artificially enhances sound insulation, and care should be taken when applying these results to real-world conditions.

Acoustic properties - continued

Improvement in Impact Insulation Class (Δ IIC) ASTM E2179-21

The Improvement in Impact Insulation Class (Δ IIC) was evaluated according to ASTM E2179-21 by Intertek Testing Services. This test measures the reduction in impact sound transmission provided by the flooring material. Results are detailed in **Report Nos. 240604006SHF-030 (7.0 mm)** and **240604006SHF-027 (5.5 mm)**.

5.0 mm material report

Test Frequency	L_o (Bare Concrete) [dB]	L_c (With Covering) [dB]	$L_{ref, c}$ (Result Array) [dB]	Key Observations
250 Hz	64.9	58.7	62.8	Common frequency where moderate reduction is observed
500 Hz	66.2	50.5	54.8	Frequency showing significant improvement
1000 Hz	65.0	41.7	47.8	Strong reduction in impact sound transmission
3150 Hz	60.6	33.5	44.9	Highest frequency tested, showing major reduction
Δ IIC Classification	22			Overall improvement in Impact Insulation Class (Δ IIC)

7.0 mm material report

Test Frequency	L_o (Bare Concrete) [dB]	L_c (With Covering) [dB]	$L_{ref, c}$ (Result Array) [dB]	Key Observations
250 Hz	64.3	59.8	64.5	Represents a common frequency where significant reduction is observed
500 Hz	65	52.8	58.3	Common frequency with noticeable improvement
1000 Hz	64.1	46.7	54.6	Significant reduction in impact sound transmission
3150 Hz	61.2	32.1	42.9	Highest frequency tested, showing major reduction
Δ IIC Classification	22			Overall improvement in Impact Insulation Class (Δ IIC)

Weathering

The environment to which materials are exposed influences how quickly the material will weather (or deteriorate). This includes degradation factors like UV exposure, oxidation or contact with organisms within the environment such as termites or mould. The impact of these factors is captured below. The impact of weathering on the flexural performance (material factor estimate) of the products is captured in the Mechanical properties section above.

Colour fade

Weathering over time can result in a colour change of the material. ΔE is a common form of measurement for colour fade. The ΔE denotes the colour difference between an original sample and a tested sample after a certain number of hours of exposure to UV light (and potentially other weathering effects). ΔE is measured on a scale of 1 to 100 and provides a simple metric of how the human eye perceives colour change. Both 'light' and 'dark' colours are tested to provide an indication of the range of performance of the product.

Product	Name	Hours	ΔE	Observations	Test method	Notes
TIER Element PVC-free product	Heat resistance	7 days*	0.97	Perceptible at close observation	ASTM F1514-19	This test method specifies that a sample is subjected to 158°F ± 2°F (70°C ± 1°C) for 7 days, and the colour difference is measured by a spectrophotometer and expressed as ΔE units. *TIER Element PVC shares the same cap as the TIER Element PVC-free product and is assumed to be comparable.
	UV resistance	400 H*	1.6		ASTM F1515-21	

*The report was provided in line with the above listed established standards, though it omitted specific references to temperatures and test hours, and it is assumed that the results are in line with the test methods referenced, but without confirmation.

Surface properties

Slip resistance

Slip resistance refers to a surface's ability to prevent people from slipping or losing their footing. There are various methods used to measure slip resistance. These tests provide a measurement of slip resistance that can be used to compare different flooring materials. Slip resistance is influenced by factors such as the material and its surface, the angle of incline, the type of shoe being worn, and the presence of moisture or multiple contaminants.

Product slip resistance results

The following table provides slip resistance results for TIER Element 0.2 mm (0.0079") digitally printed wear layer materials by external laboratory.

Finish	Result	Test method	Information
Pendulum test result	36	DIN CEN/TS 15676-2008	The digital print layer was tested with a No. 55 rubber slider. It was not disclosed whether this was for wet or dry conditions.

Surface properties - continued

Static Coefficient of Friction (ASTM C1028-07e1)

The Static Coefficient of Friction was evaluated in accordance with ASTM C1028-07e1 by Intertek Testing Services. This test measures the static friction of floor surfaces under both wet and dry conditions.

Report Nos. [240604006SHF-016 \(7.0 mm\)](#) and [240604006SHF-007 \(5.5 mm\)](#).

Condition	Static coefficient of friction of Superior 7.0 Product	Static coefficient of friction of Medium 5.5 Product	Test method
Dry	1.02	0.94	ASTM C1028-07e1
Wet	0.66	0.56	ASTM C1028-07e1

Scratch resistance (ISO 1518-1:2019)

The scratch resistance of the 7.0 mm TIER Element PVC-free flooring was evaluated according to ISO 1518-1:2019 by Intertek Testing Services. This test assesses the ability of the flooring surface to resist scratches under specified conditions. The report can be found in [Report no: 240712011SHF-004](#).

Direction	Test load using 0.5 mm diameter tip	Test Load With 1.0 mm diameter tip [N]	Information
Vertical	9	20	No visible scratch on the surface
Horizontal	8.5	20	No visible scratch on the surface

Wear resistance (NALFA 3.7)

The wear resistance of the TIER Element PVC-free flooring was evaluated according to NALFA 3.7 by Intertek Testing Services. This test measures the flooring's resistance to wear through repeated cycles of abrasion. The results can be found in

[240815005SHF-001](#) and [240712011SHF-005](#).

Test standard	IP for 5.5 mm Board	IP for 7.0mm Board
NALFA 3.7	4050 cycles	9 500 cycles



Surface properties - continued

Stain and cleaning resistance (NALFA 3.4)

The Stain and Cleaning Resistance test was conducted according to NALFA 3.4 by Intertek Testing Services. This standard evaluates the flooring material's resistance to common staining agents, such as coffee, red wine, and mustard, as well as its cleanability after exposure to these substances. Additionally, the material's resistance to various chemicals was tested according to ASTM F925-13(2020), assessing its durability when exposed to substances. The results, including the material's stain resistance, cleanability, and chemical resistance, are documented in **Report Nos. 240604006SHF-018** and **240604006SHF-024**.

Condition	7.0 mm board	5.5 mm board	Test method	Score	NAFLA Classification
Reagent: Coffee	No effect	No effect	NALFA 3.4	0	Class 4 Heavy commercial
Reagent: Red Wine	No effect	No effect		0	
Reagent: Tea	No effect	No effect		0	
Reagent: Mustard	No effect	No effect		0	
Reagent: Vegetable Oil	No effect	No effect		0	
Reagent: 10% Povidone iodine	Slight effect, removable	Slight effect, removable		1	
Reagent: Black permanent marker	Slight effect, removable	Slight effect, removable		1	
Reagent: Black paste shoe polish	Slight effect, removable	Slight effect, removable		1	
Cleaning Resistance	No residual marks	No residual marks		0	
Total score				4	

Score references:

- 0:** Rinse with tap water, wipe with a water-moistened sponge, and blot dry. If the stain remains, proceed to the next step.
- 1:** Apply commercial cleaner, place a 1 kg weight on a moistened sponge, and move it back and forth for 25 cycles. Rinse and dry. If the stain persists, move to the next step.
- 2:** Create a paste with cleaner and baking soda, scrub the area with a stiff nylon brush for 25 cycles. Rinse and dry. If the stain remains, continue to the next step.
- 3:** Rub the stain with a cotton ball soaked in acetone for up to two minutes. Rinse and dry. If necessary, proceed to the next step.
- 4:** Place a bleach-soaked cotton ball on the stain for two minutes. Rinse and dry. If the stain persists, grade it as "5".
- 5:** If the stain is still visible, it is graded "5".



Disclaimer and copyright

Document disclaimer

The provided information is offered in good faith as accurate but without guarantee. Eva-Last makes no warranties or representations of any kind (express or implied) about the accuracy, adequacy, currency, or completeness of the information, or that it is necessarily suitable for the intended use.

Compliance with this document does not guarantee immunity from breach of any statutory requirements, building codes or relevant standards. The final responsibility for the correct design and specification rests with the designer and, for its satisfactory execution, with the contractor. Appropriate warnings and safe handling procedures should be provided to handlers and users.

While most data have been compiled from research, case histories, experience and testing, small changes in the environment can produce marked differences in performance. The decision to use a material, and in what manner, is made at your own risk. The use of a material and method may therefore need to be modified to its intended end use and environment.

Eva-Last, its directors, officers or employees shall not be responsible for any direct, indirect, or special loss or damage arising from, or as a consequence of, use of, or reliance upon, any information contained in this document or other documents referenced herein. Eva-Last expressly disclaims any liability which is based on or arises out of, the information or any errors, omissions, or misstatements herein.

Drawing disclaimer

All dimensions and specifications are offered in good faith as accurate but without guarantee. The information captured herein may not contain complete details. Eva-Last makes no warranties or representations of any kind (express or implied) about the accuracy, adequacy, currency, or completeness of the information, or that it is necessarily suitable for the intended use.

Compliance with this document does not guarantee immunity from breach of any statutory requirements, building codes or relevant standards. The final responsibility for the correct design and specification rests with the designer and, for its satisfactory execution, with the contractor.

Utilisation disclaimer

Legislation may differ between jurisdictions. Before installing any Eva-Last product, ensure that the application is rational and complies with the local regulations and building codes. Wherever necessary, consult a suitably qualified professional. Be sure to comply with material manufacturer specifications. Where manufacturers and building codes differ, revert to the building code requirements. Check that your choice of product is suitable for its intended application. For further product specification and information visit www.eva-last.com.

Copyright

If reprinted or reproduced or utilised in any form Eva-Last should be acknowledged as the source of the information. Eva-Last periodically updates the information contained in this document as well as that of the Eva-Last documents that have been referenced herein. Before using this document, please refer to the Eva-Last website (www.eva-last.com) for the most up-to-date documents.

Contact information

Eva-Last

Email: info@eva-last.com

Website: www.wwww.eva-last.com



Appendix A

Document citations



Appendix A – Document citations

- Intertek Testing Services (2024). Formaldehyde Content Test Report for TIER Element PVC-free (7.0 mm), **Report No. 240604006SHF-035**, Shanghai Fengxian Branch, 5 June 2024.
- Intertek Testing Services (2024). Soluble 8 Elements Test Report for TIER Element PVC-free (7.0 mm), **Report No. 240604006SHF-001**, Shanghai Fengxian Branch, 5 June 2024.
- Intertek Testing Services (2024). Dimensional Stability and Curling Test Report for TIER Element PVC-free (7.0 mm), **Report No. 240604006SHF-015**, Shanghai Fengxian Branch, 5 June 2024.
- Intertek Testing Services (2024). Dimensional Stability and Curling Test Report for TIER Element PVC-free (5.5 mm), **Report No. 240604006SHF-006**, Shanghai Fengxian Branch, 5 June 2024.
- Intertek Testing Services (2024). Static Coefficient of Friction Test Report for TIER Element PVC-free (7.0 mm), **Report No. 240604006SHF-016**, Shanghai Fengxian Branch, 5 June 2024.
- Intertek Testing Services (2024). Static Coefficient of Friction Test Report for TIER Element PVC-free (5.5 mm), **Report No. 240604006SHF-007**, Shanghai Fengxian Branch, 5 June 2024.
- Intertek Testing Services (2024). Thickness Swell Test Report for TIER Element PVC-free (5.5 mm), **Report No. 240604006SHF-009**, Shanghai Fengxian Branch, 19 June 2024.
- Intertek Testing Services (2024). Abrasion Resistance Test Report for TIER Element PVC-free (5.5 mm), **Report No. 240604006SHF-023**, Shanghai Fengxian Branch, 1 August 2024.
- Intertek Testing Services (2024). Static Load Resistance Test Report for TIER Element PVC-free (7.0 mm), **Report No. 240712011SHF-002**, Shanghai Fengxian Branch, 1 August 2024.
- Intertek Testing Services (2024). Static Load Resistance Test Report for TIER Element PVC-free (5.5 mm), **Report No. 240712011SHF-001**, Shanghai Fengxian Branch, 1 August 2024.
- Intertek Testing Services (2024). Small Ball Impact Resistance Test Report for TIER Element PVC-free (7.0 mm), **Report No. 240604006SHF-020**, Shanghai Fengxian Branch, 19 June 2024.
- Intertek Testing Services (2024). Small Ball Impact Resistance Test Report for TIER Element PVC-free (5.5 mm), **Report No. 240604006SHF-011**, Shanghai Fengxian Branch, 19 June 2024.
- Intertek Testing Services (2024). Large Ball Impact Resistance Test Report for TIER Element PVC-free (7.0 mm), **Report No. 240604006SHF-019**, Shanghai Fengxian Branch, 19 June 2024.
- Intertek Testing Services (2024). Large Ball Impact Resistance Test Report for TIER Element PVC-free (5.5 mm), **Report No. 240604006SHF-010**, Shanghai Fengxian Branch, 19 June 2024.
- Intertek Testing Services (2024). Castor Chair Resistance Test Report for TIER Element PVC-free (7.0 mm), **Report No. 240604006SHF-022**, Shanghai Fengxian Branch, 19 June 2024.
- Intertek Testing Services (2024). Castor Chair Resistance Test Report for TIER Element PVC-free (5.5 mm), **Report No. 240604006SHF-013**, Shanghai Fengxian Branch, 19 June 2024.
- Intertek Testing Services (2024). Resistance to Heat Test Report for TIER Element PVC-free (7.0 mm), **Report No. 240604006SHF-003**, Shanghai Fengxian Branch, 5 June 2024.
- Intertek Testing Services (2024). Resistance to Light Test Report for TIER Element PVC-free (7.0 mm), **Report No. 240604006SHF-004**, Shanghai Fengxian Branch, 5 June 2024.
- Intertek Testing Services (2024). Residual Indentation Test Report for TIER Element PVC-free (5.5 mm), **Report No. 240604006SHF-005**, Shanghai Fengxian Branch, 5 June 2024.
- Intertek Testing Services (2024). Residual Indentation Test Report for TIER Element PVC-free (7.0 mm), **Report No. 240604006SHF-005**, Shanghai Fengxian Branch, 5 June 2024.
- Intertek Testing Services (2024). Critical Radiant Flux Test Report for TIER Element PVC-free (7.0 mm), **Report No. 240604006SHF-034**, Shanghai Fengxian Branch, 19 June 2024.
- Intertek Testing Services (2024). Critical Radiant Flux Test Report for TIER Element PVC-free (5.5 mm), **Report No. 240604006SHF-032**, Shanghai Fengxian Branch, 19 June 2024.
- Intertek Testing Services (2024). Density of Smoke Test Report for TIER Element PVC-free (5.5 mm), **Report No. 240604006SHF-036**, Shanghai Fengxian Branch, 3 July 2024.



Appendix A – Document citations continued

- Intertek Testing Services (2024). Impact Insulation Class Test Report for TIER Element PVC-free (7.0 mm), **Report No. 240604006SHF-029**, Shanghai Fengxian Branch, 21 June 2024.
- Intertek Testing Services (2024). Impact Insulation Class Test Report for TIER Element PVC-free (5.5 mm), **Report No. 240604006SHF-026**, Shanghai Fengxian Branch, 21 June 2024.
- Intertek Testing Services (2024). Improvement in Impact Insulation Class Test Report for TIER Element PVC-free (7.0 mm), **Report No. 240604006SHF-030**, Shanghai Fengxian Branch, 21 June 2024.
- Intertek Testing Services (2024). Improvement in Impact Insulation Class Test Report for TIER Element PVC-free (5.5 mm), **Report No. 240604006SHF-027**, Shanghai Fengxian Branch, 21 June 2024.
- Intertek Testing Services (2024). Sound Transmission Class Test Report for TIER Element PVC-free (7.0 mm), **Report No. 240604006SHF-031**, Shanghai Fengxian Branch, 21 June 2024.
- Intertek Testing Services (2024). Sound Transmission Class Test Report for TIER Element PVC-free (5.5 mm), **Report No. 240604006SHF-028**, Shanghai Fengxian Branch, 21 June 2024.
- Intertek Testing Services (2024). Stain and Cleaning Resistance Test Report for TIER Element PVC-free (7.0 mm), **Report No. 240604006SHF-018**, Shanghai Fengxian Branch, 19 June 2024.
- Intertek Testing Services (2024). Resistance to Chemicals Test Report for TIER Element PVC-free (7.0 mm), **Report No. 240604006SHF-024**, Shanghai Fengxian Branch, 19 June 2024.
- Intertek Testing Services Shenzhen Ltd. Shanghai Fengxian Branch, 2024. Static load resistance test report: ASTM F970-22, 5.5mm sample. [online] Available at: <https://certs.intertek.com.cn> [Accessed 19 Sep. 2024].
- Intertek Testing Services Shenzhen Ltd. Shanghai Fengxian Branch, 2024. Locking strength test report: EN ISO 10582, 7.0mm sample. [online] Available at: <https://certs.intertek.com.cn> [Accessed 19 Sep. 2024].



Appendix B

Chemical compatibility

Appendix B – Chemical compatibility

The following information provides a list of substances that may negatively impact the TIER wear layer material. Below is an extensive (not complete) list of common substances and solutions known to influence the polyurethane surface of wear layer on TIER. It is important to check material compatibility when choosing chemicals that the product may encounter, as they may prematurely degrade the product, these may include ingredients in cleaning products, pool additives and even oils and saps from local vegetation.

Polyurethane - Chemical resistance	
Liquid	Classification
Acetic acid 20 – 80 10%	Conditionally resistant
Acetone	Not resistant
Aluminium chloride 10%	Vastly resistant
Aluminium Salts	Resistant
Ammonia 10%	Resistant
Ammonium carbonate	Not resistant
Ammonium chloride	Vastly resistant
Aniline	Not resistant
ASTM-Fuel No. I	Resistant
ASTM-Fuel No. II	Conditionally resistant
ASTM-Fuel No. III	Conditionally resistant
ASTM-Oil I	Resistant
ASTM-Oil II	Resistant
ASTM-Oil III	Resistant
Barium Salts	Resistant
Benzene	Not resistant
Bichromate of potash	Vastly resistant
Brake fluid ATE	Not resistant
Butanol	Not resistant
Butyl acetate	Not resistant
Calcium chloride 40%	Vastly resistant
Carbon disulfide	Not resistant
Carbon tetrachloride 100%	Not resistant
Chlorobenzene	Not resistant
Chloroform	Not resistant
Chloroprene	Not resistant
Chromic acid	Not resistant
Cutting oil	Conditionally resistant
Cyclohexan	Conditionally resistant

Polyurethane - Chemical resistance	
Liquid	Classification
Cyclohexanone	Not resistant
Diesel oil	Vastly resistant
Diethylether	Resistant
Diethylprestone	Resistant
Dimethylformamide	Not resistant
Ethanol	Conditionally resistant
Ethyl alcohol 100%	Conditionally resistant
Ethyl ether	Conditionally resistant
Ethylacetate	Not resistant
Ethylencoloride	Vastly resistant
Formaldehyde	Resistant
Formic acid 30%	Not resistant
R-12 dichlorodifluoromethane	Conditionally resistant
R-22 chlorodifluoromethane	Conditionally resistant
Gasoline	Resistant
Glycerine	Resistant
Glycol	Resistant
Hydraulic oil SAE 90	Conditionally resistant
Hydrochlorid acid	Not resistant
Isopropanol	Not resistant
Jet-fuel	Resistant
Kerosene	Resistant
Lactic acid 10%	Not resistant
Magnesium chloride 30%	Vastly resistant
Methanol < 5%	Conditionally resistant
Methylethylketon	Conditionally resistant
Mineral oil	Conditionally resistant
Motor oil	Not resistant
Mythyl acetate	Not resistant

Appendix B – Chemical compatibility continued

Polyurethane - Chemical resistance	
Liquid	Classification
Mythyl chloride	Not resistant
Mythylglycol	Not resistant
Mythylglycolacetate	Not resistant
Nitric acid 30%	Not resistant
Olive oil	Resistant
Ozone	Resistant
Paraffin oil	Resistant
Perchlore ethylene	Not resistant
Petroleum	Vastly resistant
Petroleum ether	Resistant
Phosphoric acid 50%	Not resistant
Potash lye 10%	Resistant
Potassium nitrate	Vastly resistant
Potassium permanganate	Not resistant
Sea water	Resistant
Silver salts 20%	Resistant
Soda lye 10%	Resistant
Sodium chloride 10%	Vastly resistant
Sulfuric acid 30%	Short-term resistant
Tataric acid < 10%	Resistant
Tetrahydrofuran	Not resistant
Toluene	Not resistant
Trachloroethylene	Not resistant
Trichloroethylene	Not resistant
Vegetable fats	Resistant
Vegetable oils	Resistant
Xylon	Not resistant