IMPERVIA

Environmental Product Declaration

Impervia Flooring

Stone Polymer Composite Flooring

This environmental product declaration is provided by the manufacturers of Impervia Flooring.

The purpose of this document is to transparently communicate the environmental performance or impact of Impervia flooring over its lifetime.

Ryder International Limited T/A Impervia Flooring and The Solid Wood Flooring Company are working towards net zero by 2030. We have always been conscious of sustainability and reducing our impact on the environment.

Including basements

Protection for everyday use

Quick & easy to install

Saves money & installation time

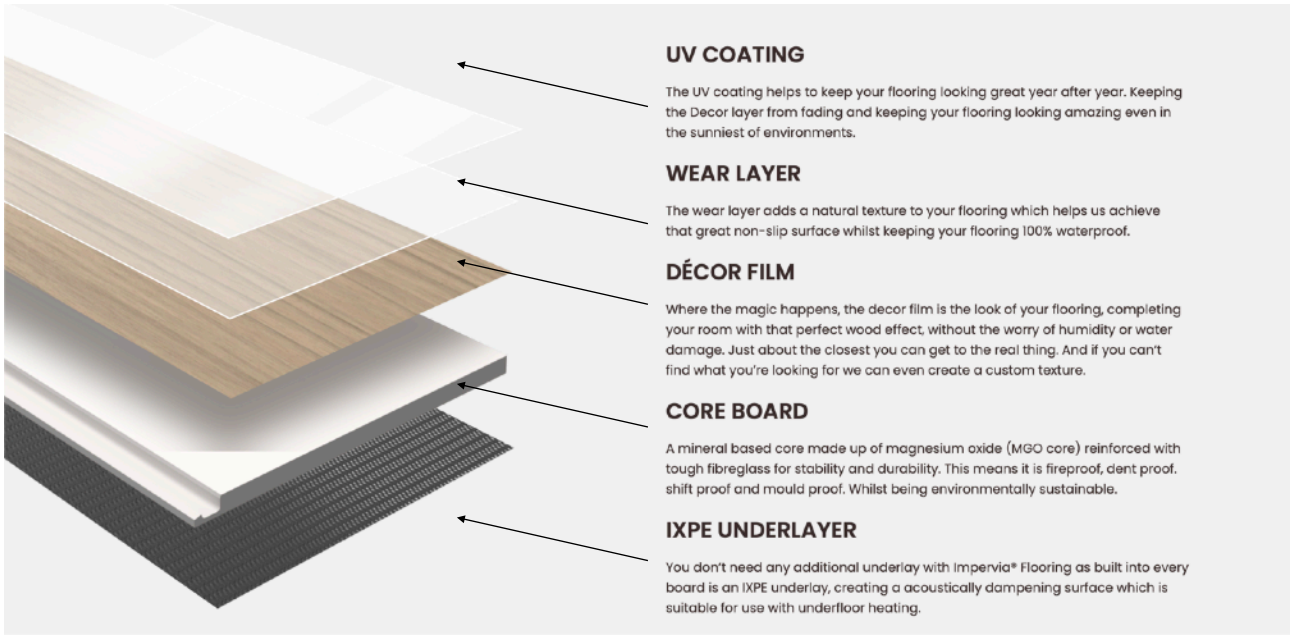

Figure 1: Diagram of Impervia Flooring

Flow Diagram

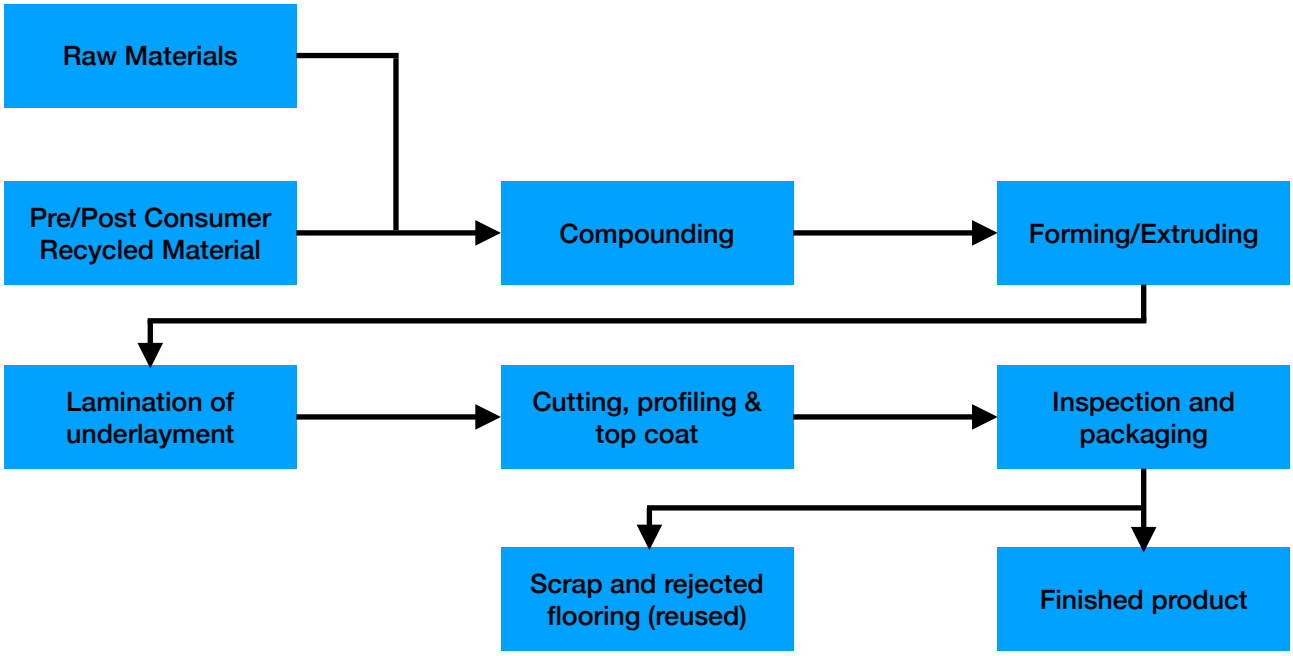

Figure 2: Diagram of production process

For global shipping, we use Maersk who are progressively working towards being Net Zero emissions by 2040. Maersk use a second-generation biofuel. Maersk's green fuel and supply chain are verified by the International Sustainability & Carbon Certification (ISCC).

The methodology for accounting emissions is based on Clean Cargo and GLEC (Global Logistics Emissions Council) emission factors and is certified by the Roundtable for Sustainable Biomaterials (RSB).

1.3 Application
Impervia flooring is commonly used in commercial, light commercial and residential interiors. Section 2.1 provides information about functional unit and service life.

1.4 Declaration of methodological framework
The EPD analysis uses a cradle-to-grave system boundary. As such, all relevant life cycle stages and modules are included. To calculate product use and replacement over a 100-year estimated service life of the building, a 75-year reference service life is assumed for Impervia flooring, which results in a total 2.2m2 of flooring needed over the building's lifetime. Impervia can be relayed, moved, installed multiple times over its lifetime.

1.5 Technical Requirements
Table 1: Impervia flooring technical data

Impervia flooring		Average value	Unit	Value
Product thickness		6.5	mm	6.5
Wear layer thickness		0.5	mm	0.5
Product weight		9.02	Kg/m2	9.02
Product form	Planks	6.5	mm	228x1524
	Herringbone	6.5	mm	128x615
	Tiles	6.5	mm	300x600

1.6 Market placement/Application rules
The products considered in the EPD meet or exceed at least one of the following technical specifications:
- ASTM F 3261 - Standard specification for resilient flooring in modular format with rigid polymeric core.

Fire Testing:
- Class 1 when tested in accordance with ASTM 648/NFPA 253, standard test method for critical radiant flux
- Meets 450 or less when tested to accordance with asthma e 662/nfpa 258, standard test method for smoke density
- Bf1-S1 (class 1) when tested in accordance with ASTM E648-06 standard test method for behaviour to fire

1.7 Properties of declared product as delivered
Refer to table 1 for properties of products as delivered for installation.

1.8 Material composition
Table 2: Material composition

Component	Mass %
Resins	33.46
Stone	60.60
Plasticiser (DOTP)	4.20
Additives	1.20
Carbon Black	0.30
Polyethylene	0.24

1. Scope 1 – Direct emissions

Scope 1 emissions include direct emissions from the company's owned or controlled sources. This includes on-site energy like natural gas and fuel, refrigerants, and emissions from combustion in owned or controlled boilers, and furnaces as well as emissions from fleet vehicles (e. g. cars, vans, trucks, helicopters for hospitals). Scope 1 emissions encompass process emissions that are released during industrial processes, and on-site manufacturing (e.g., factory fumes, chemicals).

Unlike direct emissions, the GHG Protocol defines indirect emissions as "a consequence of the activities from the reporting company but occur at sources owned or controlled by another company." These include Scope 2 and Scope 3 emissions. However, the GHG Protocol makes a clear distinction between the two categories.

2. Scope 2 emissions – Indirect emissions from purchased energy

According to the GHG Protocol scope 2 emissions represent one of the largest sources of global greenhouse gas emissions accounting for at least a third of it. That is why assessing and measuring Scope 2 emissions present a significant emissions reduction opportunity. But what do these emissions include?

Scope 2 emissions include indirect greenhouse gas emissions from purchased or acquired energy, like electricity steam, heat, or cooling, generated offsite and consumed by the reporting company. For example, electricity purchased from the utility company is generated offsite, so they are considered indirect emissions.

However, if the reporting company, for example, an industrial facility, generates its energy on-site from owned or controlled sources, the greenhouse emissions associated with the energy generation are classified as direct scope 1 emissions. The same applies to companies, such as electricity utilities or suppliers, which control their energy generation facilities and sell all their power into the local grid. The greenhouse gas emissions from these generation facilities are reported in Scope 1 emissions.

In summary, scope 2 encompasses indirect emissions associated only with the generation of purchased or acquired energy. However, other upstream emissions associated with the production and processing of upstream fuels, or transmission or distribution of energy within a grid, are tracked in Scope 3.

3. Scope 3 – Indirect value chain emissions

Scope 3 includes all indirect emissions that occur in the value chain of a reporting company. To make a clear distinction between Scope 2 and Scope 3 categories the US Environmental Protection Agency (EPA) describes the Scope 3 emissions as "the result of activities from assets not owned or controlled by the reporting organization, but that the organization indirectly impacts in its value chain." Even though these emissions are out of the control of the reporting company, they can represent the largest portion of its greenhouse gas emissions inventory.

Based on the financial transactions of the reporting company, the GHG Protocol divides the scope 3 emissions into Upstream and Downstream emissions.

Upstream emissions encompass the indirect greenhouse gas emissions within a company's value chain related to purchased or acquired goods (tangible products) and services (intangible products) and generated from cradle to gate.

Downstream emissions include the indirect greenhouse emissions within a company's value chain related to sold goods and services and emitted after they leave the company's ownership or control.

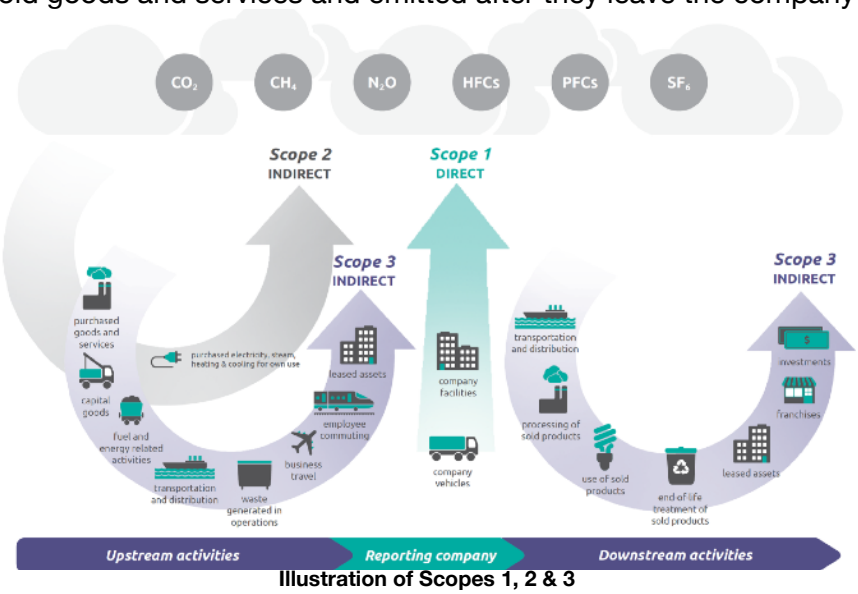

Illustration of Scopes 1, 2 & 3

1.9 Manufacturing
Impervia flooring is produced by an extrusion method. The wear layer, decorative layer and core are fused together. They are then taken by conveyor belt to the embossing station to imprint the texture. They are then cut and profiled. Next the IXPE underlay is bonded to the core and product then goes through quality check inspection prior to packing into cardboard cartons.
Our production facility has the following ISO certifications:
ISO 45001:2018 (Occupational Health & Safety Management System)
ISO 9001:2016 (Quality Management System)
ISO 14001:2015 (Environment Management System)

According to the NEA report, China's installed renewable generation capacity totalled 1,063 GW in 2021, accounting for **44.8%** of the nation's total generation capacity. Whereas in the same year, renewable energy sources made up **37.5 % of gross electricity consumption in the EU**, very similar to the previous year (37.4 % in 2020).

1.10 Packaging
Impervia only uses fully recyclable cardboard packaging for the individual packs/cartons. These are stacked on to timber pallets and secured with strapping.
Disposal is allocated to the onsite installation team and cannot be factored into this EPD, however both items can be recycled/reused.

1.11 Product installation
This study includes transportation from the warehouse and then to the construction site by truck. Installation of this product primarily involves hand tools for measuring and cutting materials. There is no requirement for adhesives or complex machinery. Approx. 4.5% of the material is assumed to be trimmed and discarded as waste. Whilst some of this waste could be recycled, this scrap is modelled as being disposed in landfill.

1.12 Use
The service life of Impervia flooring will vary depending on the amount of floor traffic and the type and frequency of maintenance. The level of maintenance is also dependant on the actual use and desired appearance of the floor. The recommended cleaning regime is highly dependent on the use of the premises where the floor covering is installed. In high traffic areas, more frequent cleaning will be needed compared to areas where there is low traffic. For the purposes of this EPD, average maintenance is presented based on typical installations. This EPD accounts for three cleaning processes within the use phase: dust mop, damp mop and finish restoring as detailed in table 4 and table 5 and summarised in table 10.

1.13 Reference service life and estimated building service life
The reference service life (RSL) for Impervia flooring 75 years, meaning that the product will meet its functional requirements for an average of 75 years before replacement. Estimated building service life is 100 years as specified by the per. Additional information is provided in table 9.

1.14 Reuse, recycling and energy recovery
Impervia flooring can be uplifted and reused provided it is in a serviceable condition. This does present the opportunity that the floor covering can outlast the buildings life expectancy.
Current recycling technologies do allow for the IXPE layer to be removed and then crush the core and top layer to produce stone granules for porous driveways and other stone requirements for the construction industry. This means that currently 69.2% of the product can be recycled with only 30% currently going to landfill. New recycling technologies are being developed that will eventually be able to recycle the IXPE backing layer.

1.15 Disposal
At the end-of-life, the product is assumed to be disposed per PCR requirements. Waste classification is based on Resource Conservation and Recovery Act (RCRA).

2. Life Cycle Assessment Background Information

2.1 Functional or declared unit

The declaration refers to the functional unit of 1m2 installed floor covering. Impervia flooring is assumed to have a reference service life of 75 years and installation losses of 4.5%.

Table 3: Functional unit information

Name	Value
Functional Unit	1m2
Mass	9.02kg/m2
Reference flow	2.08m2 @ 18kg

2.2 System Boundary

The system boundary of the EPD is “cradle-to-grave”. As such, the analysis includes the following modules:

- Product stage: modules A1 to A3
- Construction stage: modules A4 and A5
- Use stage: modules B1 to B5, B6 and B7
- End of life stage: modules C1 to C4
- Benefits and loads beyond the system boundary: module D

Each module includes provision of all relevant materials, products and energy. Potential impacts and aspects related to wastage (i.e. production, transport and waste processing and end-of-life stage of lost waste products and materials) are considered in the module in which the wastage occurs.

The use stage modules B1, B3, B5, B6 & B7 are declared as having zero impact as there are no direct emissions from resilient flooring once it is installed nor is any repair or refurbishment requirements expected. The other use stage modules account for cleaning the floor (i.e. maintenance, which consists of dust mopping, damp mopping and replacing the floor to match building service life.

Module D is considered in the analysis. It represents the benefits/loads beyond the system boundary - in particular, credits from capturing methane gas from landfilling of biodegradable materials which is used for electricity generation.

Per the PCR, capital goods and infrastructure flows are assumed to not significantly affect LCA results or conclusions and thus are excluded from the analysis.

2.3 Product-specific calculations for use phase

Tables 4 and 5 detail cleaning process assumptions and cleaning process inputs as calculated based on the assumptions.

Table 4: Cleaning process assumptions

Level of use	Cleaning process	Cleaning frequency	Consumption of energy and resources
Commercial / residential / industrial	Dust mop	Daily/as required	None
	Damp mop / neutral cleaner	Monthly/infrequent	Neutral detergent

Table 5: Cleaning inputs

Component	Amount	Units
Detergent	4.7	L / M2 / YR

2.4 Estimates and assumptions

A distance of 63 miles by diesel truck is used to represent the distribution of the product from the warehouse to central London. Brooks Transport Services declare Euro 6 emissions standards for diesels vehicles with a CO2 measurement of 0.50g/km according to emissions test results. The transport from site to waste processing is within the remits of the site control and is not within the scope of this analysis. Though it is assumed that site will recycle the cardboard packaging and reuse the pallets creating a 100% recycle/reuse process.

3 Life Cycle Assessment Scenarios

Table 6. Transport to the building site (illustrative to central London) (A4)

Name	Value	Unit
Fuel Type	Diesel	
Litres of fuel	14	MPG
Vehicle type	18T rigid truck	
Transport distance	63	Miles
Capacity utlisation	100 (groupage loads)	%
Gross density of products transported	9.02	Kg/m2

Table 7. Installation into the building (A5)

Name	Value	Unit
Ancillary Materials	0	
Product loss (wastage from cutting)	4.5	%
Biogenic carbon contained in packaging	0.94	CO2e/Kg

Table 8. Reference Service Life

Name	Value	Unit
RSL	75	Years

Table 9. Maintenance (B2)

Name	Value	Unit
Maintenance process information	See section 2.3	
Maintenance cycle (reference service life)	900 (monthly)	Number/RSL
Maintenance cycle (estimated service life)	12 (monthly)	Number/ESL
Net freshwater consumption	0	M3/ESL
Ancillary materials specified (neutral detergent)	47	L/m2/ESL

Table 10. Repair & Replacement (B3, B4 & B5)

Name	Value	Unit
Repair/Replacement cycle (reference service life)	0	Number/RSL
Repair/Replacement cycle (estimated service life)	0	Number/ESL

Table 11. Operational energy & water use (B6 & B7)

Name	Value	Unit
Net freshwater consumption	0	m3
Energy input	0	kWh

Table 12. End of Life (C1-C4)

Name		Value	Unit
Assumptions for scenario development, deconstruction, collection/transport and disposal			
Collection process	Collected separately	9.02	Kg/m2
	Collected with mixed waste	0	Kg/m2
Recovery	Reuse	0	Kg
	Recycling	6.25	Kg
	Landfill	2.77	Kg/m2
	Incineration	0	Kg
Disposal	Product or material for final deposition	0	Kg
Removals of biogenic carbon (excluding packaging)		0	Kg/CO2

4 Life Cycle Assessment Results

Table 13. Description of the system boundary modules

	Product Stage			Construction Stage		Use Stage							End of Life Stage				Benefit & Loads Beyond the System Boundary
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
	Raw Material Supply	Transport	Manufacturing	Transport from warehouse to site	Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Building operational energy use	Building operational water use	Deconstruction	Transport	Waste processing	Disposal	Reuse, recycle, recycle potencial
Cradle-to-Grave	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

4.1 Life Cycle Impact Assessment Results

Tables 14 to 16 contain cradle-to-grave results for 1m2 of Impervia flooring over the 75 year reference service life. Modules B1, B3, B5, B6 & B7 are not associated with any impact and are therefore declared as zero. Module C1 is not associated with any impact as the floor is manually deconstructed.

Table 14. Impact Assessment Results

14. TRACI v2.1	A1-A3	A4	A5	B2	B4	C2	C4	D
GWP 100 [kg CO2	2.05E+01	1.17E+00	1.60E+00	4.90E+00	3.57E+01	1.04E-01	4.12E-01	-1.21E-01
ODP [kg CFC-11 eq]	8.54E-10	3.26E-14	3.87E-11	1.71E-12	1.34E-09	3.07E-15	7.45E-14	-1.43E-13
AP [kg SO2 eq]	5.03E-02	2.94E-02	7.85E-03	1.54E-02	1.38E-01	2.39E-04	1.87E-03	-3.21E-04
EP [kg N eq]	7.99E-03	1.02E-03	1.51E-03	1.59E-02	1.60E-02	2.45E-05	9.48E-05	-1.35E-05
SFP [kg O3 eq]	8.14E-01	5.50E-01	7.72E-02	1.75E-01	2.23E+00	7.41E-03	3.71E-02	2.87E-03
ADP fossil [MJ	5.49E+01	2.07E+00	3.26E+00	1.32E+01	9.18E+01	2.11E-01	8.11E+01	1.33E-01

Information based on the average RFCI members participating in EPD studies for rigid core flooring. Impervia flooring will meet if not exceed these values.

4.2 Life Cycle Inventory Results

Table 15. Resource Use

15 Parameter	A1-A3	A4	A5	B2	B4	C2	C4	D
RPR_E [MJ, LHV]	3.63E+01	1.39E-01	2.35E+00	2.85E+00	5.89E+01	3.81E-02	4.58E-01	-1.97E-01
RPR_M [MJ, LHV]	0	0	0	0	0	0	0	0
$NRPR_E$ [MJ, LHV]	3.23E+02	1.55E+01	2.03E+01	1.03E+02	3.52E+02	1.58E+00	6.48E+00	-1.90E+00
$NRPR_M$ [MJ, LHV]	1.26E+02	0	5.69E+00	0	1.98E+02	0	0	0
SM [kg]	0	0	0	0	0	0	0	0
RSF [MJ, LHV]	0	0	0	0	0	0	0	0
NRSF [MJ, LHV]	0	0	0	0	0	0	0	0
RE [MJ, LHV]	0	0	0	0	0	0	0	0
FW [m^3]	1.09E-01	6.36E-04	5.80E-03	3.36E-02	1.75E-01	1.88E-04	7.85E-04	-5.62E-04

Information based on the average RFCI members participating in EPD studies for rigid core flooring. Impervia flooring will meet if not exceed these values.

Table 16. Output Flows & Waste Categories

16 Parameters	A1-A3	A4	A5	B2	B4	C2	C4	D
HWD [kg]	4.64E-06	3.14E-08	2.20E-07	-2.47E-07	7.38E-06	1.23E-08	2.23E-08	-8.45E-10
NHWD [kg]	5.83E-01	3.05E-04	8.39E-01	1.29E+00	1.60E+01	5.69E-05	9.23E+00	-5.73E-04
HLRW [kg]	1.02E-05	3.58E-08	5.17E-07	1.93E-06	1.62E-05	3.36E-09	8.40E-08	1.59E-07
ILLRW [kg]	8.31E-03	2.97E-05	4.17E-04	1.59E-03	1.32E-02	2.78E-06	6.65E-05	1.33E-04
CRU [kg]	0	0	0	0	0	0	0	0
MR [kg]	0	0	1.11E-01	0	1.66E-01	0	0	0
MER [kg]	0	0	0	0	0	0	0	0
EE, electrical [MJ, LHV]	3.26E-05	0	2.49E-01	0	3.73E-01	0	0	0
EE, thermal [MJ, LHV]	1.31E-05	0	1.10E-01	0	1.65E-01	0	0	0

Information based on the average RFCI members participating in EPD studies for rigid core flooring. Impervia flooring will meet if not exceed these values.

Note: Biogenic carbon is not reported in GWP as Impervia flooring (excluding packaging) does not contain bio-based materials. As such, carbon emissions and removals are not declared.

5. Additional Environmental Information

5.1 Mandatory Environmental Information

No substances required to be reported as hazardous are associated with the production of this product.

5.2 Extraordinary Effects (Prevention of damage)

Damage from wheeled vehicles and furniture can be prevented by using proper rests and wheels with suitable widths and diameters for the loads to be carried. Scratching from abrasive debris can be minimised by ensuring a mat is placed at entry points to the room/building to catch stones etc… from other areas. High heeled shoes need to ensure they are in good repair with the plastic/ rubber cap firmly secured on the heel of the shoe. Damage from dragging furniture can be avoided by placing felt pads to the feet of such items. Any movement should be done correctly with the item being picked up and placed rather than dragged.

Moisture in subfloors is always an important consideration. You should follow the recommended guidelines in ASTM F 710 and ASTM F 1482.

5.3 Environmental Activities and Certifications

Impervia flooring is free from VOCs and has no cryogenic or Formaldehyde emissions. It is certified by FloorScore(R).

6. References

ISO 14025
EN 15804+A1
ISO 21930:2017
ISO 14044: 2006
ISO 14040: 2009
RFCI > FloorScore(R)

General Information

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