



Karndean
Designflooring

ENVIRONMENTAL PRODUCT DECLARATION

LOOSELAY POLYVINYL CHLORIDE FLOOR COVERING



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ENVIRONMENTAL PRODUCT DECLARATION: Program related informations

EPD Program operator	The Australasian EPD® Programme c/o Enviro-Mark Solutions Level 14 / Prime Property Tower 86-90 Lambton Quay Wellington 6011 New Zealand http://www.epd-australasia.com	
Product Category Rules (PCR)	PCR 2012:01 International EPD system - Product Category Rule 2012:01 - Construction products and services V2.0. EN 15804:2012+A1:2013- Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products	
PCR review conducted by	Technical committee of the International EPD System - information available on http://epd-australasia.com/	
Independent Verification according ISO 14025:2006	EPD verification ☒ internal ☐ external EPD process verification ☐	
Approved third party verifier	Jane Anderson (Principal Consultant, Thinkstep) Email: jane.anderson@thinkstep.com	
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UN CPC code	36910 - floor covering of plastics in rolls or in the form of tiles	
ANZSIC code	1912 - Rigid and semi-rigid polymer product manufacturing	
Geographic scope of application of the EPD	Australia, New Zealand	
Year taken as reference for the LCA calculation	2014	
Issue date	06/03/2017	
Valid to	05/03/2022	
Registration number	S-P-00862	

ENVIRONMENTAL PRODUCT DECLARATION

1- Karndean Designflooring - For over 40 years we have been creating stylish, high quality design flooring for the home and commercial projects. A global leader in flooring design with operations in the USA, Australia, New Zealand and Europe, we pride ourselves on environmental awareness in the supply and maintenance of our products worldwide. As a family-owned business, we remain true to our roots and are fiercely committed to our customers.

This EPD is conducted on the basis of ISO 14044, ISO 14025, EN 15804 and International EPD system - Product Category Rule 2012:01 - Construction products and services V2.0 For BtoB communication for the Australian and New Zealand markets. This EPD has been previously edited for North American and European markets.

Production sites: The product is manufactured at one production site, certified ISO 9001 located in South Korea.

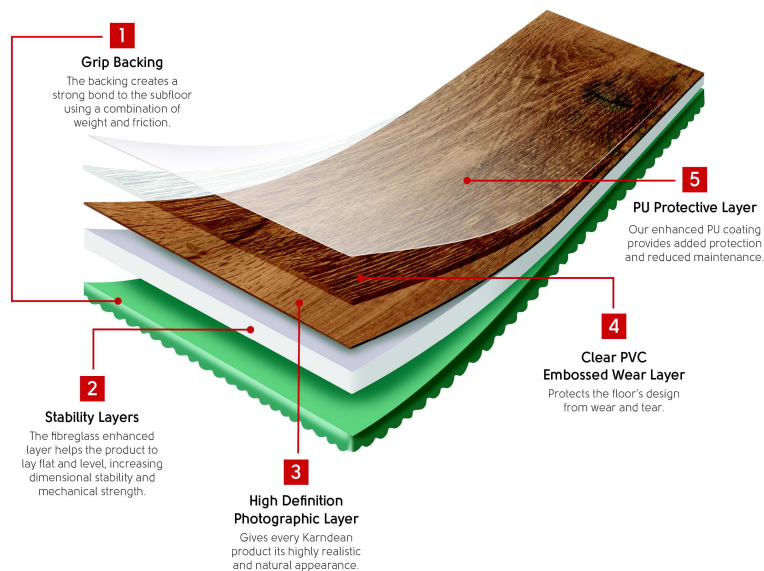
2 - Product description

2.1 - Product definition

This declaration is for LooseLay floor covering for the Australian and New Zealand markets.

Vinyl tile is made primarily from calcium carbonate (limestone), polyvinyl chloride, plasticizers, additives (i.e., pigments and stabilizers). It is structured with five layers: two PVC backing layers, one high definition photographic layer, one clear PVC embossed wear layer and a last PU protective layer.

Diagram 1: Structure of the product



LooseLay Vinyl tile is used in both commercial and residential interiors. It is available in 4.5 mm total thickness and 0.5 mm wear layer thickness. The weight of the reference product is 7.472 kg/m².

Post-industrial materials are recycled back into the production of LooseLay vinyl tile.

Decorative applications and PVC transparent wear layer are applied to the surface and a lacquer is used as finish on

the wear layer.

LooseLay vinyl flooring is commonly used commercially in educational, healthcare, aged care, speciality retail and commercial, light commercial, and residential interiors where long lasting performance are preferred.

The products are classified 36910 "floor covering of plastics, in rolls or in the form of tiles" according to the UN CPC classification.

2.2 - Product standards

The product considered in this EPD meets one of the following Technical Specifications:

- ASTM F 1700 - Standard Specification for Solid Vinyl Floor tiles : Class III, type B
- ISO 10582 - Resilient floor coverings - Heterogeneous polyvinyl chloride floor covering - Specification : Class 23-34

Fire Testing:

- Class 1 when tested in accordance with ASTM E 648/NFPA 253, Standard Test Method for Critical Radiant Flux.
- Meets 450 or less when tested in accordance with ASTM E 662/NFPA 258, Standard Test Method for Smoke Density if applicable.
- Tested according AN/NZ 9239.1: Reaction to fire tests for floorings. Determination of the burning behaviour using a radiant heat source

2.3 - Product Characteristics

Table 1: Products characteristics

Characteristics		Average Value	Unit	Maximum Value	Minimum Value
Product Thickness		4.5 (0.177)	mm (inch)	5.0 (0.227)	4.0 (0.127)
Wear Layer Thickness		0.5 (0.0197)	mm (inch)		0.5 (0.0197)
Product Weight		7.472 (24.48)	kg/m ² (oz/ft ²)	7.572 (28.00)	7.372 (20.96)
Size	Planks	1050x250 (41.3x9.85) 500x610 (19.7x24)	mm (inch)	+/- 1.3 mm/lin m +/-0.016"/lin ft	

VOC emissions test method: Compliant with California Department of public Health Standard v1.1 2010 and certified by Floorscore flooring products Certification Program for Indoor Air Quality EC10.3-2014 and Indoor Air quality Certified to GreenStar IEQ VOC.

3 - Declared unit

The declared unit is 1 m² of installed LooseLay vinyl flooring for the intended use.

4 - Reference service life

The reference service life is 15 years according the warranty given by Karndean for this product.

The respect of this service life depends on the correct installation taking account of the declared use classification and the intended use.

5- Material contents

Table 4 : Material contents

Components	%	Comments
PVC	23.4	Polyvinyl chloride suspension
Internal recycled material	14.6	Internal factory recyclate
External recycled compounds	3.4	External recyclate compounds
Filler	44.7	calcium carbonate

Components	%	Comments
Plasticizer	10.1	diisooctyl terephthalate
Stabilizers	1.0	Ca/Zn, Ba/Zn stabilizer, Ba stearate
Process aid	0.4	Acrylic copolymer
Ink, pigments	0.3	Carbon black, ink
Recycled semi-hardness sheet	1.4	Reinforced layer PVC sheet
Glass fiber	0.7	Vinyl acetate binding glass fiber
Coating	0.1	Polyurethane UV cured finish

6 - Content declaration:

There are no substances listed in the "Candidate List of Substances of Very High Concern (SVHC) for authorisation" according to the Regulation (EC) No 1907/2006 of the European parliament and of the council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals.

7 - System boundaries

It is a cradle to gate with options EPD according to EN 15804. The system boundary is based on the EN 15804 description. The optional modules included in this study are A4, A5, B2, C1, C2, C4.

Modules A1-A3, mandatory, include processes that provide materials and energy input for the system, manufacturing and transport processes up to the factory gate, as well as waste processing.

Module A4 includes transport of the floor covering to the place of installation.

Module A5 includes the production of adhesive for the installation of the floor covering, the manufacture and the transport of the 5% extra product order for laying and land filling of these 5% off-cuts and recycling of packaging material.

Module B2 includes provision of cleaning agents, energy and water consumption for the cleaning of the floor covering. The LCA results in this EPD are declared for a period of 15 years.

Module C1 considers manual operations without electricity use for the de-construction of the flooring.

Module C2 includes transportation of the post-consumer waste to waste processing.

Module C4: end of life scenario declared for 100% land filling of the used products

Module D, optional, is not considered in this study.

7.1 - Production and transport of main materials

Limestone

Limestone is calcium carbonate used as inert filler. It is an abundant mineral found in all parts of the world. It can be ground to varying particle sizes and is widely used as filler in formulated flooring system.

Polyvinyl chloride

Commonly abbreviated to PVC and derived from fossil fuel and salt, this is the third-most widely produced polymer, after polyethylene and polypropylene. Petroleum or natural gas are processed to make ethylene. Salt electrolysis produces chlorine. Ethylene and chlorine react together to produce ethylene dichloride, which is further processed at high temperature into vinyl chloride monomer. Polymerization of vinyl chloride monomer converts it into a white, fine powder called vinyl resin.

Plasticizers

Plasticizers are colourless and odourless liquids commonly used in vinyl products to make them more flexible and/or durable. DOTP is manufactured from DMT (a common material for producing fizzy drink bottles) and 2-ethylhexanol. Some of our products may contain small amounts of DINP from recycled PVC. ESO is manufactured from soybean oil through an epoxidation process.

Additives

These products are used to make vinyl resistant to light and oxidation. They are viscous liquids consisting of alkaline earth metal (barium or calcium) and zinc salts of fatty acids.

Finish

The finish is a polyurethane UV cured lacquer.

Ink and Pigment

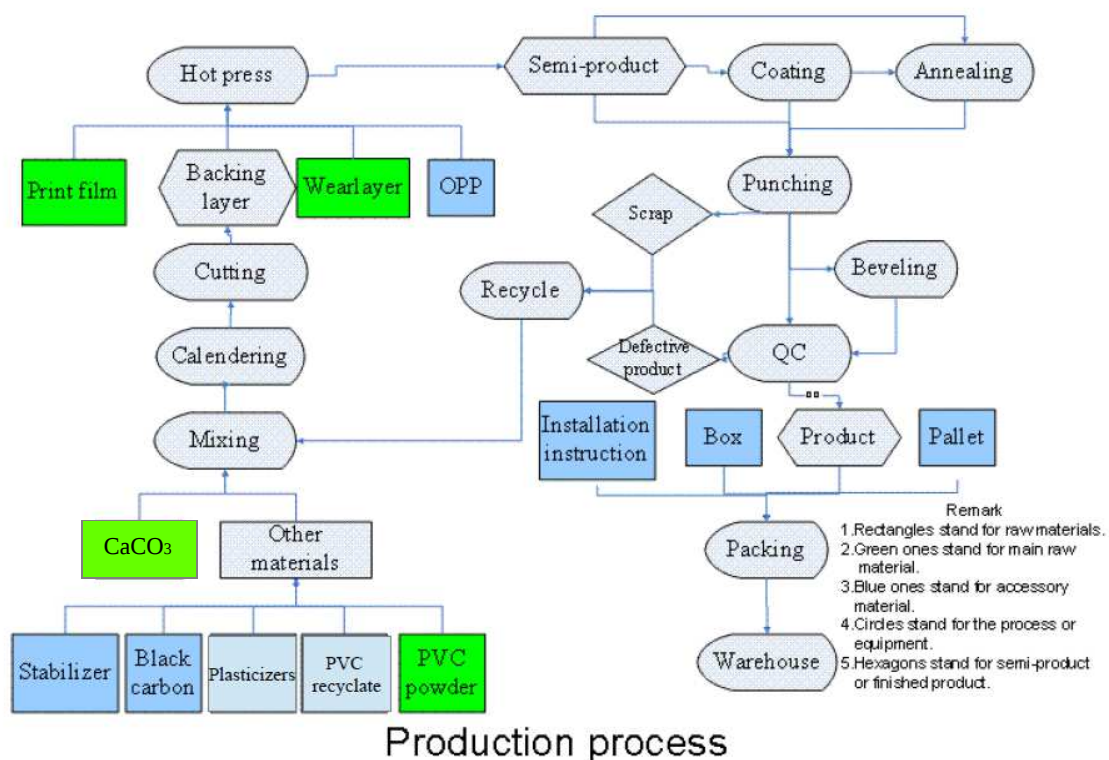
Inks are used to print the decorative patterns.

All these raw materials are produced in South Korea and transport to the manufacturing site is included.

7.2 - Production of LooseLay vinyl tile

The product is manufactured at one production site, certified ISO 9001 located in South Korea. The site has Ecospecifier Global GreenTag certification to GreenStar Level 'A' requirements. The production process is depicted below.

Diagram 2



Legend: print film: decorative pattern of the floor; wearlayer: transparent upper layer above the print film;
OPP: accessory layer, only for processing; CaCO3: limestone

7.3 - Delivery and Installation of the floor covering

7.3.1 - Delivery

The delivery includes shipping from Asia to Melbourne or Auckland by transoceanic freight ship of the manufactured products and transport from port to warehouse, then to construction site by truck with an average distance of 2000 km in Australia and 800 km in New Zealand.

7.3.2 - Installation

The scenario is based on 1/3 of each method.

Installation can be done without adhesive, with pressure-sensitive adhesive (200g/m²) or using double-sided tape. Water based acrylic VOC compliant adhesive is recommended. During installation, 5% of the total material is cut off as waste. The scrap is modelled as being disposed of in landfill.

Installation requires adhesive: 200 g/m² are used. Water based acrylic VOC compliant adhesive is recommended. During installation, 5% of the total material is cut off as waste. The scrap is modelled as being disposed of in landfill or recycled at a rate of 87/13. All emissions are allocated to installation.

Packaging: Products are packaged in printed cardboard boxes on polypropylene filmed wood pallets with separating wood panels. Pallets are reused at 100%; cardboards are landfilled or recycled at a rate of 96/4; wood panels are landfilled or recycled at a rate of 80/20; plastics are landfilled or recycled at a rate of 87/13. All emissions are allocated to installation. The table below gives the packaging composition.

Table 5: Packaging

Components	g / m ²
Wood pallets	127.4
Cardboard angle	7.7
PE film	1.1
Cardboard box	63.7
MDF board	95.5

7.4 - Use Stage

The proper use of the described products is not a hazard to water, air and soil. It is inert in its proper use. No damage to health is expected under normal use.

7.4.1 - Cleaning and maintenance

As maintenance is dependent on the place where the floor is installed, we take an average maintenance based on typical installation.

The results of the maintenance phase impacts are scaled to 15 year's maintenance.

7.4.2 - Cleaning process

The average cleaning process is for commercial and residential use.

Table 6: cleaning process

Cleaning process	Cleaning frequency	Energy & resources
Dust mop	Daily (240 d/y)	50% manual 50% with hoover (1.5 kWh, 600 m ² /h)
Damp mop / cleaner	Daily (240 d/y)	Hot water / neutral detergent 75% manual 25 % with device (1.5 kWh, 600 m ² /h)
Stripping/remover	2/y	Water / stripper 75% manual 25 % with device (1.5 kWh, 600 m ² /h)
Spray buff / restorer	1/y	Floor finish / water / Electricity

7.4.3 - Health during use stage

The Floor coverings supplied by Karndean are tested to the Floorscore Certification Programme and comply with the VOC requirements of the California Department of Public Health Standard Method v1.1 and Ecospecifier Global GreenStar IEQ (Indoor Environmental Air Quality: VOC reduced exposure to pollutants).

Cleaning materials with low VOCs are available for maintaining vinyl floors.

7.5 - End of Life

For this EPD, the removed floor covering is considered disposed of in landfill. It is the prerogative of the owner or specifier to determine the method of disposal of clean waste PVC floor coverings if recycling is an option.

8 - Life Cycle Assessment

The Life Cycle Inventory (LCI) and Life Cycle Impact Assessment (LCIA) were undertaken with guidelines from ISO 14040/ISO 14044, ISO 14025, EN 15804 and PCR NSF 1201 v2.0.

The main purpose of EPDs is for use in business-to-business communication. As all EPDs are publicly available via the Program Operator and are therefore accessible to the end consumer, they can also be used in business-to consumer communication.

8.1-Declared Unit Description

The declaration refers to a declared unit of 1 m² installed floor covering for specified application and uses areas as per ASTM F 1700.

8.2 - Cut-off Criteria

At a minimum, all raw materials representing 0.1% of input mass or greater were included. In order to satisfy the condition that neglected input flows shall be a maximum of 5% mass, material flows with a proportion of less than 1% were also considered so that ultimately, materials below the cut-off criteria accounted for no more than 5% of total input mass. For manufacturing, the utilized thermal energy, the electrical energy, the required packaging materials, and all direct production waste were all included in the analysis.

8.3 - Background Data

As a general rule, specific data derived from specific production processes or average data derived from specific production processes is preferred as the basis for calculating LCA results.

For life cycle modelling of the products, the software OpenLCA v1.4.0 is used to model the products system.

All background datasets including energy, transportation and materials were taken from Ecoinvent v3.1 database.

8.4 - Data quality

A variety of tests and checks were performed throughout the project to ensure that the completed LCA was of high quality..

Checks included an extensive review of project-specific LCA models and background data used.

8.5 - Temporal Coverage

Foreground data is based on 1 year averaged data of the year 2014.

Background data sets are all based on data from the last 3 years (since 2012), with the majority of datasets based on data from 2014.

8.6 - Technological Coverage

The raw material inputs in the calculation for this EPD are based on annual total purchases divided by annual production. Waste, emissions and energy use are based on measured data during the reference year.

8.7 - Geographical Coverage

In order to satisfy cut-off criteria, proxy datasets were used as needed for raw material inputs to address lack of data for a specific material or for a specific geographical region. These proxy datasets were chosen for their representativeness of the actual product.

8.8 - System Boundaries

This is a cradle to gate with options EPD. The stages are represented below. The system boundary of this EPD is described in the following pages. In some cases certain modules may not be relevant to the environmental performance of a product. In such cases the irrelevant module shall be declared as “Module Not Declared, MND”.

The stages A1-A3 are mandatory. The optional modules included are: transport to customers (A4), installation (A5), maintenance (B2), deconstruction (C1), transport of waste (C2) and disposal (C4). The optional module D is not considered in this study.

Diagram 3 : System boundaries

Product stage			construction stage		Use stage							end of life stage				Benefit or Load beyond the system
Raw material supply	Transport	Manufacturing	Transport	Construction – installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction Demolition	Transport	Waste processing	Disposal	Reuse, recovery or recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3/I	C4/L	D
X			X	X	MND	X	MND	MND	MND	MND	MND	X	X	MND	X	MND

MND : Module not determined

8.8.1 - The sourcing/extraction stage A1 is a mandatory stage and includes raw materials extraction and processing and the transport to the manufacturer. Packaging materials are also considered at this stage. This also includes provision of all materials, products and energy, as well as emissions in air and water and waste processing up to the end-of-waste state or disposal of final residues during the product stage.

8.8.2 - Transport Stage A2 is a mandatory stage and includes transport of the raw materials from the Korean suppliers to the production site. This includes provision of all materials, products and energy, as well as emissions in air and water and waste processing up to the end-of-waste state or disposal of final residues during the transport stage.

8.8.3 - The manufacturing stage A3 is a mandatory stage and includes manufacturing of the floor covering with the sourced raw materials. This includes provision of all materials, products and energy, as well as emissions in air and water and waste processing up to the end-of-waste state or disposal of final residues during the manufacturing stage. Overheads and personnel related issues are not considered in this study.

8.8.4 - The transport A4 and construction process A5 stages includes transport to the building site and installation into the building. Provision of all materials, products and energy, as well as waste processing up to the end-of-waste state or disposal of final residues during the construction process stage are also considered. This stage also includes all impacts and aspects related to any losses during this construction process stage (i.e. production, transport, and waste processing and disposal of the lost products and materials).

For this study, transport by ship from the suppliers to Melbourne and Auckland ports and by truck from ports to the warehouse then an average distance of 2000 km in Australia or 800 km in New Zealand to installation site by truck and flooring installation in the building are included.

8.8.4 - The use stage B2 related to the building flooring includes cleaning and maintenance of the floor covering during its useful life as well as the extraction, manufacturing, and transport of all supporting materials, if relevant for the maintenance and above the cut-off levels. Provision and transport of all materials, products and related energy and water use, as well as emissions and waste processing up to the end-of-waste state or disposal of final residues are also considered during this part of the use stage. The cleaning processes considered in this EPD are daily dust mopping, weekly damp mopping and monthly spray buffing.

8.8.5 - The end-of-life C1, C2, C4 stages includes de-construction, demolition, transport to waste processing or disposal. Transports, provision of all materials, products and related energy and water use are also considered. Materials are assumed transported 200 km by truck to disposal.

8.9 - Allocation

8.9.1 - Co-product allocation

There is no co-product allocation.

8.9.2 - Multi-input process allocation

No multi-input allocation occurs in the product system.

8.9.3 - Reuse, recycling, and recovery allocation

The cut-off allocation approach is adopted in the case of any pre-consumer recycled content, which is assumed to enter the system burden-free. Only environmental impacts from the point of recovery and forward (e.g. collection, sorting, processing, etc.) are considered.

Product and packaging waste is modelled as being disposed of in landfill or recycled at very low rate (4% for cardboard, 17% for PE film, 20% for wood). Plastic and other construction waste is assumed to be inert in landfills, so no system expansion or allocation is necessary as landfill gas is not produced.

9 - Results

It is noted that results reported in the tables below represent the values corresponding to the reference product LooseLay.

The values of the impact categories are calculated by using the characterisation factors outlined in EN 15804 provided by CML - Leiden University. (CML baseline).

The optional biogenic carbon storage in products is not selected because the products are not involved in this type of environmental indicator.

Caution should be used when comparing the results presented in this EPD to the environmental performance of other vinyl tile products as the thickness or weight of floors will influence their environmental impact.

EPD of construction products may not be comparable if they do not comply with EN 15804.
EPD within the same product category from different programs may not be comparable.

9.1 - Life cycle impact assessment

The tables below present the results of the impact assessment for 1 m². The results for stage B2 refer to a period of 15 years.

In some cases certain modules may not be relevant to the environmental performance of a product. In such cases the irrelevant module shall be declared as "Module Not Declared, MND". Such a declaration shall not be regarded as an indicator result of zero.

Table 7: environmental impacts

Environmental Impacts			Global warming potential; GWP kg CO ₂ equiv.	Depletion potential of the stratospheric ozone layer; ODP kg CFC 11 equiv.	Acidification potential of land and water sources; AP kg SO ₂ equiv.	Eutrophication potential; EP kg PO ₄ equiv.	Formation potential of tropospheric ozone photo- chemical oxidants; POCP kg Ethene equiv.	Abiotic depletion potential for non fossil resources kg Sb equiv.	Abiotic depletion potential for fossil resources MJ
Product stage	Total Production	A1-A3	9.88E+00	2.80E-05	3.14E-02	9.78E-01	2.60E-03	2.80E-05	1.69E+02
construction stage	Transport	A4	3.21E+00	5.71E-07	2.56E-02	4.04E-03	9.27E-04	6.99E-06	7.16E+00
	Installation	A5	1.35E+00	1.47E-06	4.70E-03	5.14E-02	3.03E-04	2.70E-06	1.78E+01
	Total construction stage		4.56E+00	2.04E-06	3.03E-02	5.54E-02	1.23E-03	9.69E-06	2.50E+01
use stage	Use	B1	MND	MND	MND	MND	MND	MND	MND
	Maintenance	B2	2.24E+01	2.19E-06	1.48E-01	8.30E-02	6.18E-03	7.86E-05	3.27E+02
	Repair	B3	MND	MND	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND	MND	MND
	Total use stage		2.24E+001	2.19E-006	1.48E-001	8.30E-002	6.18E-003	7.86E-005	3.27E+002
end of life	De-construction	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	2.55E-01	4.64E-08	9.38E-04	2.00E-04	4.27E-05	7.01E-07	3.79E+00
	Waste processing	C3	MND	MND	MND	MND	MND	MND	MND
	Disposal	C4	4.84E-01	2.79E-05	4.01E-04	2.57E-02	1.03E-04	1.07E-07	1.90E+00
	Total end of life		7.39E-01	2.79E-05	1.34E-03	2.59E-02	1.46E-04	8.08E-07	5.69E+00
Potential benefits and loads beyond the system boundaries		D	MND	MND	MND	MND	MND	MND	MND
Total			3.75E+01	6.02E-05	2.11E-01	1.14E+00	1.02E-02	1.17E-04	5.27E+02

Table 8: Use of resources

RESOURCE USE			Use of renewable primary energy excluding renewable primary energy resources used as raw materials	Use of renewable primary energy resources used as raw materials	Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	Use of non renewable primary energy excluding non renewable primary energy resources used as raw materials	Use of non renewable primary energy resources used as raw materials	Total use of non renewable primary energy resources (primary energy and primary energy resources used as raw materials)	Use of secondary material	Use of renewable secondary fuels	Use of non renewable secondary fuels	Use of net fresh water
			MJ	MJ	MJ	MJ	MJ	MJ	kg	MJ	MJ	m ³
Product stage	Total Production	A1-A3	7.00E+00	3.81E+00	1.08E+01	1.37E+02	1.03E+02	2.40E+02	2.54E-01	0.00E+00	0.00E+00	4.23E-01
construction stage	Transport	A4	7.00E-01	0.00E+00	7.00E-01	4.87E+01	0.00E+00	4.87E+01	0.00E+00	0.00E+00	0.00E+00	2.75E-03
	Installation	A5	5.64E-01	1.91E-01	7.54E-01	1.68E+01	5.15E+00	2.20E+01	1.27E-02	0.00E+00	0.00E+00	1.22E-01
	Total installation		1.26E+00	1.91E-01	1.45E+00	6.55E+01	5.15E+00	7.07E+01	1.27E-02	0.00E+00	0.00E+00	1.25E-01
use stage	Use	B1	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
	Maintenance	B2	1.38E+01	0.00E+00	1.38E+01	3.97E+02	4.65E+00	4.01E+02	0.00E+00	0.00E+00	0.00E+00	3.32E+00
	Repair	B3	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
	Total use stage		1.38E+01	0.00E+00	1.38E+01	3.97E+02	4.65E+00	4.01E+02	0.00E+00	0.00E+00	0.00E+00	3.32E+00
end of life	De-construction	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	4.89E-02	0.00E+00	4.89E-02	3.87E+00	0.00E+00	3.87E+00	0.00E+00	0.00E+00	0.00E+00	3.56E-04
	Waste processing	C3	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
	Disposal	C4	5.68E-02	0.00E+00	5.68E-02	2.02E+00	0.00E+00	2.02E+00	0.00E+00	0.00E+00	0.00E+00	3.53E-03
	Total end of life stage		1.06E-01	0.00E+00	1.06E-01	5.89E+00	0.00E+00	5.89E+00	0.00E+00	0.00E+00	0.00E+00	3.89E-03
	Potential benefits and loads beyond the system boundaries	D	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
	Total		2.22E+01	4.00E+00	2.62E+01	6.05E+02	1.13E+02	7.18E+02	2.67E-01	0.00E+00	0.00E+00	3.87E+00

Table 9: Wastes and other resources outputs

Wastes and others output flows			Hazardous waste disposed	Non hazardous waste disposed	Radioactive waste disposed	Components for re-use	Materials for recycling	Materials for energy recovery	Exported thermal energy	Exported electric energy
			kg	kg	kg	kg	kg	kg	MJ	MJ
Product stage	Total Production	A1-A3	2.30E-01	2.34E+00	3.70E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
construction stage	Transport	A4	3.02E-02	3.44E-01	3.22E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Installation	A5	3.76E-02	8.06E-01	5.64E-05	1.27E-01	5.81E-02	0.00E+00	0.00E+00	0.00E+00
Total Installation stage			6.78E-02	1.15E+00	3.78E-04	1.27E-01	5.81E-02	0.00E+00	0.00E+00	0.00E+00
use stage	Use	B1	MND	MND	MND	MND	MND	MND	MND	MND
	Maintenance	B2	6.99E-01	5.88E+00	9.74E-05	0.00E+00	9.00E-02	0.00E+00	0.00E+00	0.00E+00
	Repair	B3	MND	MND	MND	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND	MND	MND	MND
Total use stage			6.99E-01	5.88E+00	9.74E-05	0.00E+00	9.00E-02	0.00E+00	0.00E+00	0.00E+00
end of life	De-construction	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	2.44E-03	1.98E-01	2.61E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Waste processing	C3	MND	MND	MND	MND	MND	MND	MND	MND
	Disposal	C4	1.87E-03	7.50E+00	1.10E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total end of life stage			4.31E-03	7.70E+00	2.72E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Potential benefits and loads beyond the system boundaries		D	MND	MND	MND	MND	MND	MND	MND	MND
Total			1.00E+00	1.71E+01	8.73E-04	1.27E-01	1.48E-01	0.00E+00	0.00E+00	0.00E+00

10 - Life cycle interpretation

Energy

The total energy consumption is 740 MJ shared between materials (117 MJ, 16%) and energy (627 MJ, 84%). 88% of the material energy is PVC (103 MJ) then packaging materials.

Use stage with B2 stage is the main contributor (401 MJ) with consumption of electricity during the maintenance of the product during 15 years.

Production stage is the second contributor (251 MJ) with A1 stage (183 MJ, 51%), then manufacturing (63MJ, 18%) and the third contributor is transport to customers (49 MJ, 14%) where 37MJ (76 %) is only for truck transport in Australia or New Zealand.

The total renewable and non-renewable energy for materials and energy use for A1-A3 is 251 MJ where 16.3 MJ is electricity at A3 stage and represents 19.5% with a delivered to primary energy ratio of 3.

Global warming potential

Stage B2 with a global warming potential of 22.4 kg eq CO₂ is the main contributor because of the production of electricity generated at 75% by coal, gas or oil plants.

Stage A1 with a global warming potential of 6.72 kg eq CO₂ is the second contributor where PVC (4.78 kg eq CO₂) and phthalates (1.81 kg eq) are the major emitter.

For A3 stage, the global warming potential of GWP is 2.84 kg eq. Where electricity is the main contributor (2.82 kg eq).

For A4 stage global warming potential is 3.21 kg eq. Transport by truck in Australia/New Zealand has 3 times more contribution (2.40 kg eq) than the transport by sea from South Korea (0.74 kg eq).

Globally, maintenance of the product, PVC and plasticizers production, and transport by truck in Australia or New Zealand and transport by sea are the main contributors to environmental impact.

Wastes

Hazardous waste production is 1.00 kg where 70% are produced at B2 stage.

Non-hazardous waste production is 17,10 kg where landfill stage C4 is the main contributor.

Water

The total water consumption is 3.87 m³ for 15 years use where the cleaning of the product during this period (B2 stage) represents 86% and production stage 11%.

11 - Others environmental information

There is no other environmental information.

12 - References

GPI 2015	General Programme Instructions of the Australasian EPD programme (2015), The Australasian EPD programme.
ISO 10582	ISO 10582: 2012-04 Resilient floor coverings - Heterogeneous poly(vinylchloride) floor coverings - Specification
ISO 14025	ISO 14025:2011-10 Environmental labels and declarations - Type III environmental declarations - Principles and procedures
ISO 14040	ISO 14040:2009-11 Environmental management - Life cycle assessment - Principles and framework
ISO 14044	ISO 14044:2006-10 Environmental management - Life cycle assessment - Requirements and guidelines
EN 15804	EN 15804:2010-08 Sustainability of construction works -Environmental Product Declarations - Core rules for the product category of construction products
ISO 21930	Sustainability of construction products - Environmental declaration of building products.
PCR 2012:01	The International EPD system - Product Category Rule 2012:01 - Construction products and services V2.0.
Ecoinvent	http://www.ecoinvent.org/support/documents-and-files/documents-and-files.html