Statement of Verification

BREG EN EPD No.: 000590 Issue 01

This is to verify that the

Environmental Product Declaration

provided by:

Amtico International

is in accordance with the requirements of:

EN 15804:2012+A2:2019

and

BRE Global Scheme Document SD207

This declaration is for:

1m2 Amtico Marine (2.85kg/m2)

Company Address

Amtico International
Kingfield Road,
Coventry
UK
CV6 5AA

amtico
A MANNINGTON COMPANY

Signed for BRE Global Ltd	Laura Critien Operator	30 May 2024 Date of this Issue
30 May 2024 Date of First Issue		29 May 2029 Expiry Date

Environmental Product Declaration

EPD Number: **000590**

General Information

EPD Programme Operator	Applicable Product Category Rules
BRE Global Watford, Herts WD25 9XX United Kingdom	BRE 2023 Product Category Rules (PN 514 Rev 3.1) for Type III environmental product declaration of construction products to EN 15804:2012+A2:2019
Commissioner of LCA study	**LCA consultant/Tool**
Amtico International Kingfield Road, Coventry UK CV6 5AA	John Baggaley/BRE LINA A2
Declared/Functional Unit	**Applicability/Coverage**
1m^2 Amtico Marine (2.85kg/m^2)	Product Specific.
EPD Type	**Background database**
Cradle to Gate with module C and D and options	Ecoinvent v3.8 (2021)

Demonstration of Verification
CEN standard EN 15804 serves as the core PCR [a]
Independent verification of the declaration and data according to EN ISO 14025:2010 ☐Internal ☒ External
(Where appropriate [b])Third party verifier: Roger Connick

a: Product category rules
b: Optional for business-to-business communication; mandatory for business-to-consumer communication (see EN ISO 14025:2010, 9.4)

Comparability
Environmental product declarations from different programmes may not be comparable if not compliant with EN 15804:2012+A2:2019. Comparability is further dependent on the specific product category rules, system boundaries and allocations, and background data sources. See Clause 5.3 of EN 15804:2012+A2:2019 for further guidance

Information modules covered

Product			Construction		Use stage							End-of-life					Benefits and loads beyond the system boundary
					Related to the building fabric					Related to the building							
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4		D
Raw materials supply	Transport	Manufacturing	Transport to site	Construction – Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal		Reuse, Recovery and/or Recycling potential
☑	☑	☑	☑	☑	☐	☑	☐	☐	☐	☐	☐	☑	☑	☑	☑		☑

Note: Ticks indicate the Information Modules declared.

Manufacturing site(s)

Amtico International
Kingfield Road
Coventry
United Kingdom
CV6 5AA

Construction Product:

Product Description

Amtico Marine is a LVT Flooring collection, consisting of a range of Wood, Stone and Abstract designs, available in a range of finishes, sizes and laying patterns.

All Amtico Marine products are approved by Lloyds Register Marine to the Marine Equipment Directive and IMO SOLAS and are Wheelmark and Red Ensign certified products.

Amtico Marine products have a total thickness of 2.0mm with a 0.55mm wear layer, providing a usage classification (EN ISO 10582) of

1. 33 Heavy Commercial
2. 42 General Light Industrial

The Marine Collection comes with a 10 year wear out warranty.

Marine is manufactured from ortho-phthalate free plasticisers, and has an antimicrobial additive, for enhanced hygiene and protection from bacteria and viruses such as MRSA, E. coli and SARS-CoV-2.

Amtico Marine is a low VOC product, certified to Eurofins Indoor Air Comfort Gold and Finnish RTS M1.

Technical Information

Property	Value, Unit
Usage Classification (EN ISO 10874)	33,42
Manufacturing Standard (EN ISO 10582)	Pass
Total Thickness (EN ISO 24346)	2.0mm
Wear Layer Thickness (EN ISO 24340)	0.55mm
Mass per Unit Area (EN ISO 23997)	2.85kg/m^2
Abrasion Resistance (EN ISO 10582)	Type 1
Flammability/Smoke Emissions (IMO MSC FTP Code 2010, Part 2 & 5)	Pass
Slip Resistance (EN 13893)	DS
Full TDS can be found at www.amtico.com	

Construction | Multiple Performance System

Total thickness of product: 2mm

A. Quantum Guard Elite
Amtico's patented urethane formula provides superior durability and resistance against abrasions and stains. The reinforced low gloss finish is highly realistic.

B. High density 0.55mm wear layer
Toughened upper layer, giving excellent impact resistance and high clarity, allowing the product designs to shine through..

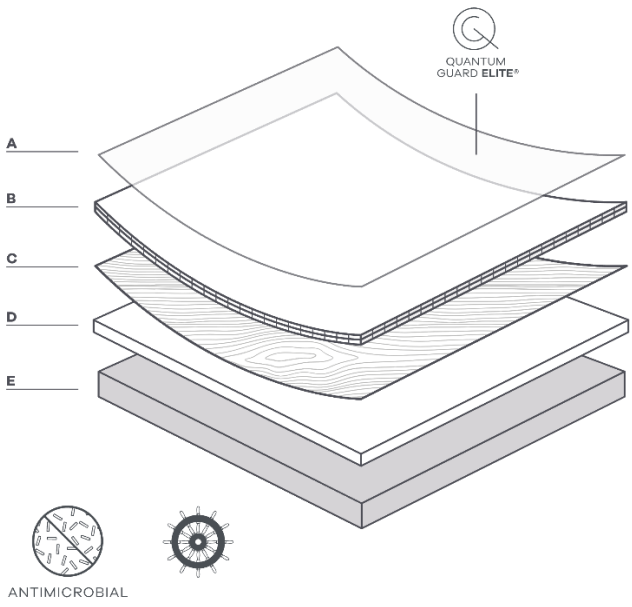
C. Design layer
Carefully crafted print films create the distinctive Amtico Wood, Stone and Abstract product designs.

D. Core layer
Enhances low smoke and flammability characteristics..

E. Backing layer
The foundation of the product which ®provides long lasting stability.

*Antimicrobial - This ionic silver additive has been proven to reduce bacteria present on a floor by more than 99% over 24 hours.

**Amtico Marine is approved by Lloyd's Register Deutschland GmbH to the Marine Equipment Directive and SOLAS.



Main Product Content

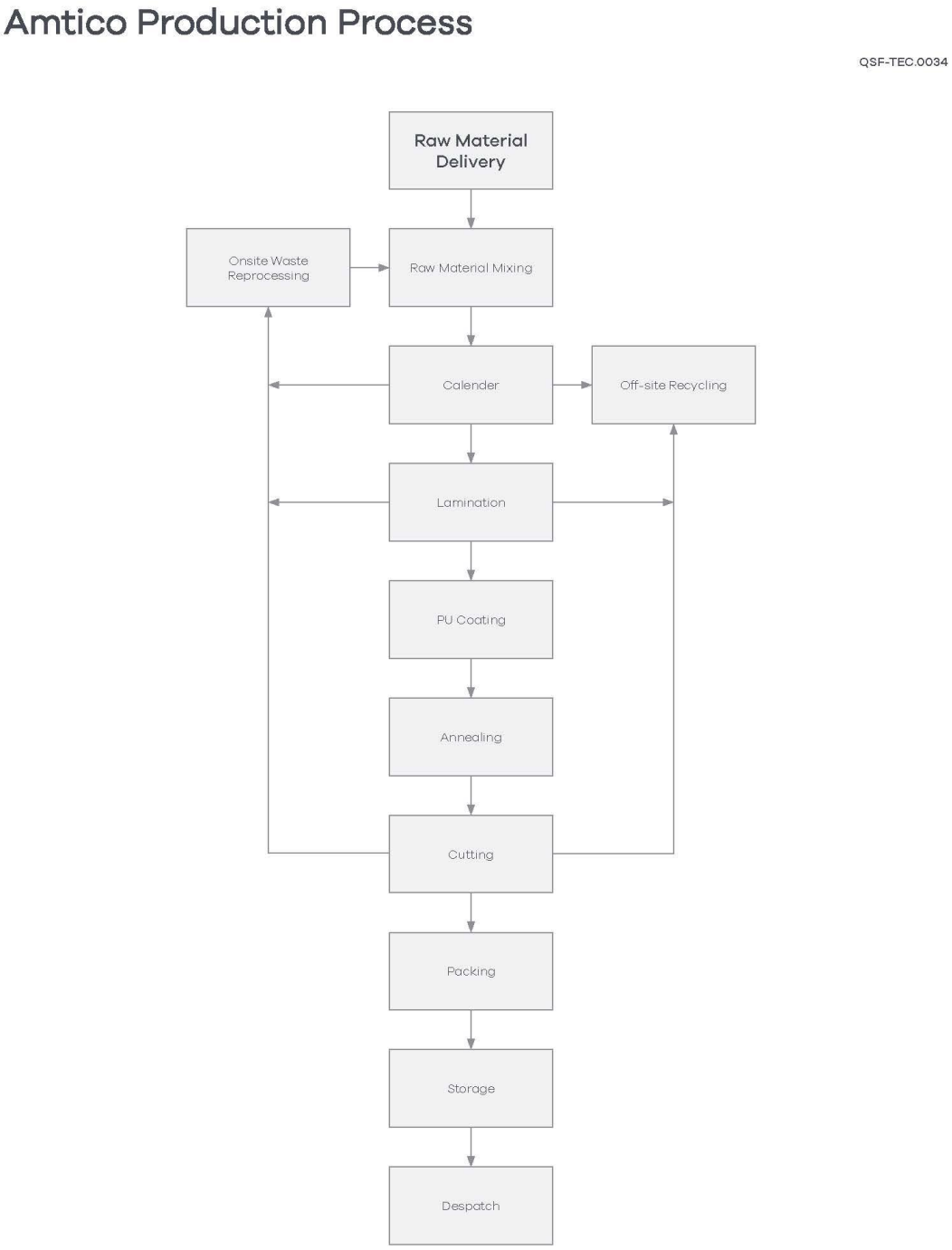
Material/Chemical Input	%
Polyurethane Lacquer	<0.5
Polymer Resins	36
Plasticisers	12
Print Film	3.5
Filler	40
Stabiliser, Process Aids & Pigments	<8

Manufacturing Process

The product is constructed by the thermal lamination of the wear layer, print film and backing plies. The wear layer and backing plies are all manufactured as follows

1. Required ply raw materials are initially blended
2. The ply blend is then heated and calendered on a mill to produce a ply of the required thickness.
3. The plies required to form the end product, along with the print film, are thermally laminated together under pressure, to form the final product.
4. The product is then coated with polyurethane, before being cut to size, boxed and dispatched to the customer.
5. Cutting waste is reground on-site and reused in the production of further backing plies.

Process flow diagram



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Construction Installation

Amtico Marine should be bonded with a suitably low emissions, marine use approved adhesives to an appropriately prepared subfloor. Full details on installation can be found at

https://www.amtico.com/commercial/technical/docs/marine-collection/

Marine installation off cuts can be disposed of via recycling, energy recovery schemes or landfilled. Wherever possible it is recommended that products should always be recycled

Use Information

All Amtico Marine manufacturing sites are all certificated to ISO 9001, ISO 45001 and ISO 14001. Amtico Marine adheres to the emission requirements of Indoor Air Comfort Gold, German AgBB/DIBt, Belgium, and is rated as A+ in the French “Emissions dans l’air interieur” scheme

End of Life

At the end of the product's life, the flooring is mechanically removed from the subfloor and disposed of by landfill, incineration/energy recovery or recycling. It is assumed that no energy required to remove the floor.

It is assumed that 87% of the product will go to landfill, 12% to incineration/energy recovery schemes and 1% to recycling. The distance travelled from the demolition site to a disposal site will be no more than 200km.

Life Cycle Assessment Calculation Rules

Declared / Functional unit description

1m^2 Amtico Marine (2.85kg/m^2)

System boundary

This is a cradle-to-gate with module C and D and options LCA study that follows the modular design defined in EN15804:2012+A2:2019 and BRE 2023 Product Category Rules (PN 514 Rev 3.1) and includes the processes covered in the manufacturing site and product stage A1 to A3, A4, A5, B2, C1-C4 and D.

Data sources, quality and allocation

Specific primary data derived from Amtico’s production process in the Coventry factory, have been modelled using the BRE LINA A2 software and the Ecoinvent v3.8 (2021) database. In accordance with the requirements of EN15804:2012+A2:2019, the most current available data has been used. The manufacturer-specific data from Amtico covers a period of one year (01/01/2021 – 31/12/2021). Secondary data has been obtained for all other upstream and downstream processes that are beyond the control of the manufacturer (i.e. raw material production) from the Ecoinvent v3.8 (2021) database. All Ecoinvent v3.8 (2021) datasets are complete within the context used and conform to the system boundary and the criteria for the exclusion of inputs and outputs, according to the requirements specified in EN15804:2012+A2:2019.

Amtico manufactures other LVT products at its production site, in addition to the product covered by this EPD. Calculations were performed to enable allocation of total site energy use, water and waste to the Amtico Marine product. Allocation procedures were by mass allocation and are according to EN 15804 and are based on the ISO14044 guidance. All the input and output materials such as packaging, transportation, energy, water use and wastes are included. Only exceptions are outputs to air, water or soil as these are not measured at the site.

Products manufactured in Coventry are then disturbed in the UK, across Europe, Scandinavia, the Middle and Far East. The average distance transported for each geographical market was calculated by multiplying the distance travelled by the percentage sales volume by square meter. Regions where sales were less than 1% were not considered.

The electricity supply was determined by the electricity supplier's meters. The assumed electricity generation GWP was 0.312 kg CO_2 eq./kWh (Electricity, GB).
Natural gas is used for heat generation and steam production. The assumed GWP was 0.232 kg CO_2 eq./kWh (Natural gas, at industrial furnace, GB).
Wastewater to sewer was determined by a water meter.

Module C4 end of life assumes that 1% of the PVC flooring is recycled, 12% is used in energy recovery/incineration, with the remainder going to landfill. This ratio is based on a study performed by BRE.

Quality Level	Geographical representativeness	Technical representativeness	Time representativeness
Very Good	Data from area under study.	Data from processes and products under study. Same state of technology applied as defined in goal and scope (i.e. identical technology).	There is less than 5 years between the Ecoinvent v3.8 (2021) LCI reference year, and the time period for which the LCA was undertaken.

Specific UK datasets have been selected from the Ecoinvent v3.8 (2021) LCI for this LCA. The quality level of geographical and technical representativeness is therefore Very Good. The quality level of time representativeness is Very Good as the background LCI datasets are based on Ecoinvent v3.8 (2021) which was compiled in 2021. Therefore, there is less than 5 years between the Ecoinvent v3.8 (2021) LCI reference year and the time period for which the LCA was undertaken.

Cut-off criteria

All stages of the manufacturing process have been included. Transport distances to site were not calculated for Sales Business Units with <1% of product sales. The product life was based on the commercial 10 years warranty. All inputs or outputs have been included and all raw materials, packaging and transport, energy, water use and wastes, are included, except for direct emissions to air, water and soil, which are not measured. Upstream extraction and/or processing of inputs are included within the use of the background datasets within LINA. The pre-existing recycled content of raw materials can be omitted in module D since it is less than 1 %, which is in line with the cut-off rule provisions of EN15804:2012+A2:2019.

LCA Results

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts									
			GWP-total	GWP-fossil	GWP-biogenic	GWP-luluc	ODP	AP	EP-freshwater
			kg CO_2 eq	kg CO_2 eq	kg CO_2 eq	kg CO_2 eq	kg CFC11 eq	mol H^+ eq	kg $(PO_4)^{3-}$ eq
Product stage	Raw material supply	A1	4.69E+00	4.13E+00	2.71E-01	2.88E-01	6.82E-06	2.26E-02	2.96E-03
	Transport	A2	2.36E-01	2.36E-01	1.43E-04	1.14E-04	5.31E-08	3.18E-03	1.24E-05
	Manufacturing	A3	1.40E+00	1.61E+00	-2.16E-01	2.38E-03	1.25E-07	4.24E-03	2.41E-04
	Total (of product stage)	A1-3	6.33E+00	5.98E+00	5.45E-02	2.90E-01	6.99E-06	3.00E-02	3.21E-03
Construction process stage	Transport	A4	9.59E-01	9.58E-01	9.81E-04	4.11E-04	2.19E-07	4.45E-03	7.18E-05
	Construction	A5	1.06E+00	5.91E-01	4.17E-01	5.51E-02	2.72E-07	3.42E-03	4.79E-04
Use stage	Use	B1	MND	MND	MND	MND	MND	MND	MND
	Maintenance	B2	1.27E+00	1.22E+00	4.76E-02	1.12E-03	1.21E-07	9.03E-03	5.25E-04
	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
87% Landfill, 12% Incineration/Energy Recovery, 1% Recycled									
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	9.49E-02	9.47E-02	8.08E-05	3.72E-05	2.19E-08	3.85E-04	6.10E-06
	Waste processing	C3	7.33E-01	7.31E-01	1.54E-03	1.07E-04	2.35E-08	5.66E-04	3.30E-05
	Disposal	C4	2.09E-01	2.09E-01	2.62E-04	2.74E-05	7.95E-09	2.28E-04	3.82E-06
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-2.68E-01	-2.65E-01	-2.88E-03	-2.74E-04	-4.64E-08	-1.46E-03	-1.27E-04

GWP-total = Global warming potential, total;
GWP-fossil = Global warming potential, fossil;
GWP-biogenic = Global warming potential, biogenic;
GWP-luluc = Global warming potential, land use and land use change;

ODP = Depletion potential of the stratospheric ozone layer;
AP = Acidification potential, accumulated exceedance; and
EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment

LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts									
			EP-marine	EP-terrestrial	POCP	ADP-mineral &metals	ADP-fossil	WDP	PM
			kg N eq	mol N eq	kg NMVOC eq	kg Sb eq	MJ, net calorific value	m^3 world eq deprived	disease incidence
Product stage	Raw material supply	A1	4.74E-03	3.93E-02	1.34E-02	5.70E-05	9.39E+01	3.13E+00	2.19E-07
	Transport	A2	8.21E-04	9.09E-03	2.49E-03	4.79E-07	3.45E+00	1.42E-02	2.08E-08
	Manufacturing	A3	1.30E-03	1.20E-02	3.07E-03	3.98E-06	3.63E+01	3.26E-01	3.49E-08
	Total (of product stage)	A1-3	6.86E-03	6.03E-02	1.90E-02	6.14E-05	1.34E+02	3.47E+00	2.75E-07
Construction process stage	Transport	A4	1.32E-03	1.44E-02	4.41E-03	4.75E-06	1.44E+01	6.98E-02	8.47E-08
	Construction	A5	1.03E-03	7.48E-03	2.41E-03	7.75E-06	1.32E+01	6.45E-01	3.31E-08
Use stage	Use	B1	MND	MND	MND	MND	MND	MND	MND
	Maintenance	B2	5.20E-03	1.60E-02	5.22E-03	1.74E-05	3.55E+01	1.55E+00	1.05E-07
	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
87% Landfill, 12% Incineration/Energy Recovery, 1% Recycled									
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	1.16E-04	1.27E-03	3.88E-04	3.29E-07	1.43E+00	6.45E-03	8.18E-09
	Waste processing	C3	1.67E-04	1.52E-03	4.27E-04	8.27E-07	1.22E+00	1.36E+00	4.89E-09
	Disposal	C4	9.80E-04	8.35E-04	2.84E-04	8.70E-08	6.19E-01	2.77E-02	4.50E-09
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-2.29E-04	-2.27E-03	-6.69E-04	-1.18E-06	-4.59E+00	-1.22E-01	-1.09E-08

EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment;
EP-terrestrial = Eutrophication potential, accumulated exceedance;
POCP = Formation potential of tropospheric ozone;
ADP-mineral&metals = Abiotic depletion potential for non-fossil resources;
ADP-fossil = Depletion potential of the stratospheric ozone layer;
WDP = Water (user) deprivation potential, deprivation-weighted water consumption; and
PM = Particulate matter.

LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts							
			IRP	ETP-fw	HTP-c	HTP-nc	SQP
			kBq U^{235} eq	CTUe	CTUh	CTUh	dimensionless
Product stage	Raw material supply	A1	4.71E-01	1.12E+02	9.06E-09	1.63E-07	2.52E+01
	Transport	A2	1.69E-02	2.53E+00	1.00E-10	2.49E-09	2.89E+00
	Manufacturing	A3	9.35E-01	1.73E+01	6.99E-10	1.06E-08	3.48E+01
	Total (of product stage)	A1-3	1.42E+00	1.32E+02	9.86E-09	1.76E-07	6.29E+01
Construction process stage	Transport	A4	7.62E-02	1.16E+01	5.25E-10	1.26E-08	9.42E+00
	Construction	A5	9.11E-02	1.56E+01	5.92E-10	1.31E-08	6.27E+00
Use stage	Use	B1	MND	MND	MND	MND	MND
	Maintenance	B2	7.26E-02	1.01E+02	3.35E-09	6.36E-08	5.56E+00
	Repair	B3	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND
87% Landfill, 12% Incineration/Energy Recovery, 1% Recycled							
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	7.36E-03	1.12E+00	3.62E-11	1.17E-09	9.84E-01
	Waste processing	C3	8.13E-03	4.03E+01	1.59E-10	1.13E-08	7.13E-01
	Disposal	C4	2.92E-03	9.57E+00	2.11E-11	1.86E-09	1.47E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-5.45E-02	-4.19E+00	-9.09E-11	-2.67E-09	-1.12E+00

IRP = Potential human exposure efficiency relative to U235;
ETP-fw = Potential comparative toxic unit for ecosystems;
HTP-c = Potential comparative toxic unit for humans;
HTP-nc = Potential comparative toxic unit for humans; and
SQP = Potential soil quality index.

LCA Results (continued)

Parameters describing resource use, primary energy								
			PERE	PERM	PERT	PENRE	PENRM	PENRT
			MJ	MJ	MJ	MJ	MJ	MJ
Product stage	Raw material supply	A1	5.06E+00	1.97E+00	7.03E+00	5.73E+01	3.62E+01	9.34E+01
	Transport	A2	3.81E-02	0.00E+00	3.81E-02	3.39E+00	0.00E+00	3.39E+00
	Manufacturing	A3	5.14E+00	4.35E+00	9.49E+00	3.18E+01	4.57E+00	3.64E+01
	Total (of product stage)	A1-3	1.02E+01	6.32E+00	1.66E+01	9.25E+01	4.07E+01	1.33E+02
Construction process stage	Transport	A4	2.27E-01	0.00E+00	2.27E-01	1.42E+01	0.00E+00	1.42E+01
	Construction	A5	-3.77E+00	6.02E+00	2.25E+00	5.28E+00	6.59E+00	1.19E+01
Use stage	Use	B1	MND	MND	MND	MND	MND	MND
	Maintenance	B2	1.59E+00	0.00E+00	1.59E+00	1.30E+01	2.09E+01	3.39E+01
	Repair	B3	MND	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND	MND
87% Landfill, 12% Incineration/Energy Recovery, 1% Recycled								
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	2.02E-02	0.00E+00	2.02E-02	1.41E+00	0.00E+00	1.41E+00
	Waste processing	C3	1.04E-01	0.00E+00	1.04E-01	-7.45E+00	8.57E+00	1.12E+00
	Disposal	C4	1.11E-02	0.00E+00	1.11E-02	-5.27E+01	5.33E+01	6.08E-01
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-3.96E-01	0.00E+00	-3.96E-01	-2.18E+00	6.13E-01	-1.57E+00

PERE = Use of renewable primary energy excluding renewable primary energy used as raw materials;
PERM = Use of renewable primary energy resources used as raw materials;
PERT = Total use of renewable primary energy resources;
PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials;
PENRM = Use of non-renewable primary energy resources used as raw materials;
PENRT = Total use of non-renewable primary energy resource

LCA Results (continued)

Parameters describing resource use, secondary materials and fuels, use of water						
			SM	RSF	NRSF	FW
			kg	MJ net calorific value	MJ net calorific value	m^3
Product stage	Raw material supply	A1	0.00E+00	0.00E+00	0.00E+00	7.45E-02
	Transport	A2	0.00E+00	0.00E+00	0.00E+00	3.50E-04
	Manufacturing	A3	1.01E-02	3.29E-07	0.00E+00	8.13E-03
	Total (of product stage)	A1-3	1.01E-02	3.29E-07	0.00E+00	8.30E-02
Construction process stage	Transport	A4	0.00E+00	0.00E+00	0.00E+00	1.73E-03
	Construction	A5	3.49E-04	9.86E-09	0.00E+00	1.52E-02
Use stage	Use	B1	MND	MND	MND	MND
	Maintenance	B2	3.95E-03	0.00E+00	0.00E+00	3.66E-02
	Repair	B3	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND
87% Landfill, 12% Incineration/Energy Recovery, 1% Recycled						
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	0.00E+00	0.00E+00	0.00E+00	1.60E-04
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00	3.18E-02
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	6.51E-04
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0.00E+00	0.00E+00	0.00E+00	-3.00E-03

SM = Use of secondary material;
RSF = Use of renewable secondary fuels;
NRSF = Use of non-renewable secondary fuels;
FW = Net use of fresh water

LCA Results (continued)

Other environmental information describing waste categories					
			HWD	NHWD	RWD
			kg	kg	kg
Product stage	Raw material supply	A1	1.21E+00	5.87E+00	1.70E-04
	Transport	A2	3.92E-03	5.60E-02	1.57E+01
	Manufacturing	A3	6.59E-02	1.05E+00	2.56E-04
	Total (of product stage)	A1-3	1.28E+00	6.97E+00	1.57E+01
Construction process stage	Transport	A4	1.78E-02	3.25E-01	1.20E+01
	Construction	A5	6.80E-02	9.17E-01	4.70E-01
Use stage	Use	B1	MND	MND	MND
	Maintenance	B2	9.13E-02	1.61E+00	2.37E-01
	Repair	B3	MND	MND	MND
	Replacement	B4	MND	MND	MND
	Refurbishment	B5	MND	MND	MND
	Operational energy use	B6	MND	MND	MND
	Operational water use	B7	MND	MND	MND
87% Landfill, 12% Incineration/Energy Recovery, 1% Recycled					
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	1.58E-03	2.80E-02	9.69E-06
	Waste processing	C3	1.89E-01	4.66E-01	5.57E-06
	Disposal	C4	1.23E-03	2.50E+00	3.67E-06
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-7.54E-03	-5.77E-01	-1.32E-05

HWD = Hazardous waste disposed;
NHWD = Non-hazardous waste disposed;
RWD = Radioactive waste disposed

LCA Results (continued)

Other environmental information describing output flows – at end of life								
			CRU	MFR	MER	EE	Biogenic carbon (product)	Biogenic carbon (packaging)
			kg	kg	kg	MJ per energy carrier	kg C	kg C
Product stage	Raw material supply	A1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-3.95E-02	0.00E+00
	Transport	A2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Manufacturing	A3	0.00E+00	1.45E-01	2.12E-08	6.48E-04	7.11E-03	-4.88E-02
	Total (of product stage)	A1-3	0.00E+00	1.45E-01	2.12E-08	6.48E-04	-3.24E-02	-4.88E-02
Construction process stage	Transport	A4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Construction	A5	0.00E+00	4.04E-01	7.30E-09	1.94E-05	8.06E-03	8.83E-02
Use stage	Use	B1	MND	MND	MND	MND	MND	MND
	Maintenance	B2	0.00E+00	5.65E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Repair	B3	MND	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND	MND
87% Landfill, 12% Incineration/Energy Recovery, 1% Recycled								
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Waste processing	C3	0.00E+00	2.85E-02	3.42E-01	0.00E+00	0.00E+00	0.00E+00
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

CRU = Components for reuse;
MFR = Materials for recycling

MER = Materials for energy recovery;
EE = Exported Energy

Scenarios and additional technical information

Scenarios and additional technical information			
Scenario	Parameter	Units	Results
A4 – Transport to the building site	Products manufactured at Coventry are disturbed in the UK, across Europe, Scandinavia, the Middle and Far East. The average distance transported for each geographical market was calculated by multiplying the distance travelled by the percentage sales volume by square meter. Regions where sales were less than 1% of the total sales were not considered. The sales volumes were those in 2021. The transportation data is taken from Ecoinvent v3.8 (2021) datasets		
	UK Direct Delivery:	Diesel / Van	0.32l/km
	Distance:	km	23
	Capacity utilisation (incl. empty returns)	%	61
	Bulk density of transported products	kg/m^3	1425
	Worldwide: Road	Diesel / 16-32 tonne Lorry	0.032l/km
	Distance:	km	1308
	Capacity utilisation (incl. empty returns)	%	61
	Bulk density of transported productskg/m3	kg/m^3	1425
	Worldwide: Sea	Marine Bunker Oil / Container Ship	0.21tonnes/km
	Distance:	km	916
	Capacity utilisation (incl. empty returns)	%	65
	Bulk density of transported productskg/m3	kg/m^3	1425
A5 – Installation in the building	Amtico Marine should be bonded with a suitable, low emissions, Marine use approved adhesive to an appropriately prepared subfloor as detailed in BS8302. Full details on installation can be found at www.amtico.com		
	Installation Wastage Rate	%	3
	Post installation Cleaning	l/m^2	0.02
	Ancillary Materials	Mass per unit area of product installed kg/m^2	0.288
	Material Waste	Installation off cuts mass per unit area of product installed kg/m^2	0.0855
	Cardboard Packaging	Mass per unit area of product installed kg/m^2	0.149

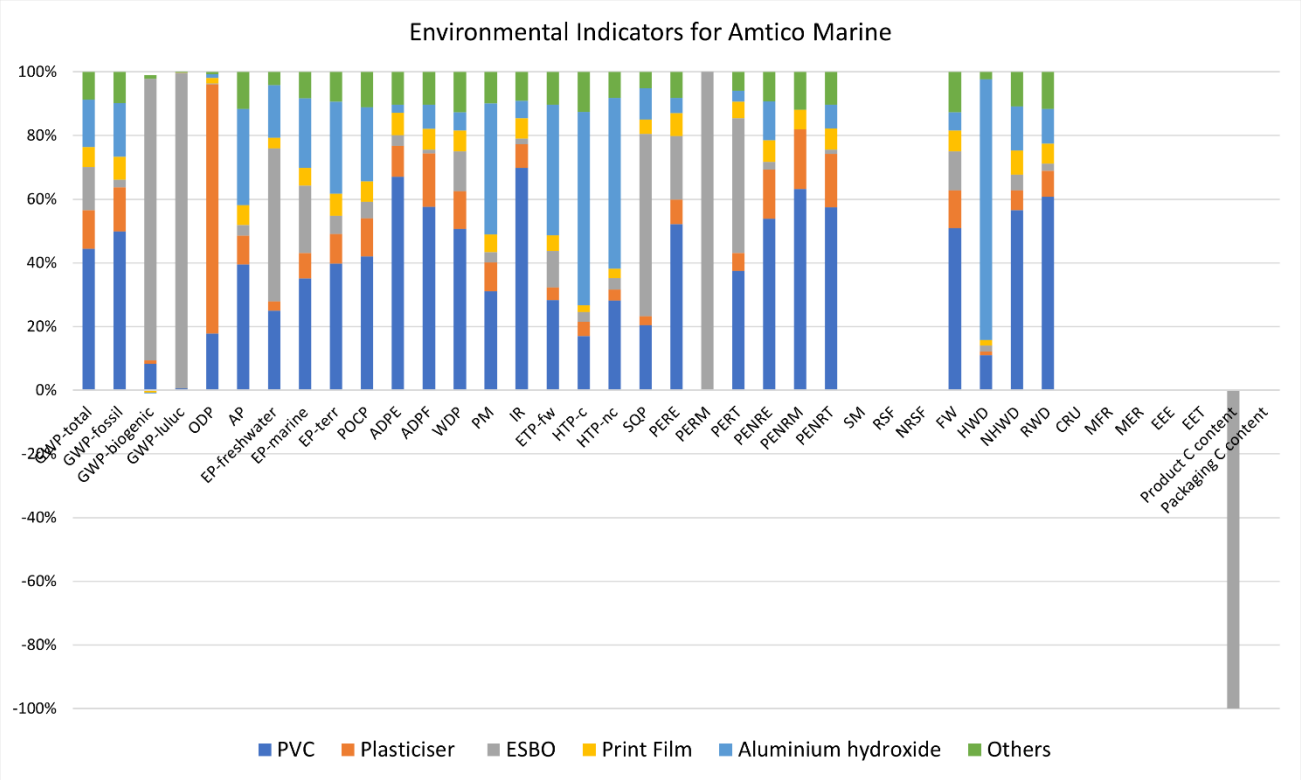
Scenarios and additional technical information			
Scenario	Parameter	Units	Results
	Wood Packaging	Mass per unit area of product installed kg/m^2	0.197
	Plastic Packaging	Mass per unit area of product installed kg/m^2	0.006
B2 – Maintenance	The required recommended cleaning and maintenance regime is dependent on the place of installation and the foot traffic over the floor. High traffic areas will generally require more cleaning and maintenance than low traffic situations. Dry cleaning may be performed with a dust mop or with a vacuum cleaner. Wet cleaning can be performed with a mop, detergent and water. Power cleaning is also a possibility with scrubber driers etc. The calculations are assumed for 1m2 per year.		
	52 Wet Cleans per year (Water use)	l/yr./m^2	3.224
	Detergent usage	kg/yr./m^2	0.0416
Reference service life	Amtico International guarantees that in the event of the Amtico Marine flooring supplied to the original purchaser under their agreement, requiring replacement due to 'Wear-out' from normal foot traffic within ten years from the date of purchase, the floor will be repaired or replaced with the same or similar material free of charge. 'Wear-out' means the removal of the pattern and colour from the Amtico Marine floor caused by the removal of the protective wear layer. Reference service life used in LCA was the commercial warranty.		
	Commercial Product Warranty.	Years	10
C1 to C4 End of life,	Data for post-consumer end of life for PVC flooring scenarios is limited. BRE BREEAM PEP scheme (2008) assumed 87% went to landfill, 12% for incineration/energy recovery and 1% was recycled. An Axion report "Post-Zero Avoidable Waste in Flooring-Towards a Circular Economy", published February 2022, also has a figure of 1%. The 87:12:1 ratio was used in this study.		
C1 Deconstruction	At the product's end of life that the product is manually mechanically removed from the sub-floor. No ancillary materials, energy or water was required for the process.	kg/m^2	2.85
C2 Transport	It has been assumed that the disposal facility will be within 200km of the demolition site.		
	Disposal from demolition site to landfill	km	174
	Disposal from demolition site to incinerator/energy recovery plant	km	24
	Disposal from demolition site to recycling plant	km	2
C3 Waste Processing	Minimal waste processing was considered necessary with no further ancillary materials, energy or water required.		
	1% is recycled	kg/m^2	0.0285
	12% is incinerated /energy recovery	kg/m^2	0.342
C4 Disposal	87% of the material is assumed to go to landfill	kg/m^2	2.4795

Module D	BRE BREEAM PEP scheme used a recycling figure of 1% in its calculations. (2008). An Axion report "Post-Zero Avoidable Waste in Flooring-Towards a Circular Economy", published February 2022, also has a figure of 1%. The pre-existing recycled content in the raw material can be omitted since it is less than 1 %.	kg/m^2	0.0285
	Data for post-consumer recycling rates for vinyl flooring is limited. BRE BREEAM PEP scheme used an energy recovery figure of 12% in its calculations. (2008)	kg/m^2	0.342

Interpretation

Out of the total mass of input materials, aluminium filler makes up 40%, followed by PVC of 36%, plasticiser makes up 10%, ESBO 2%, print film 4%, other additives make up the remaining of 8%. The bulk of the environmental impacts and primary energy demand are attributed to the manufacturing phase, covered by information modules A1-A3 of EN15804:2012+A2:2019.

As a result, PVC ranks first in terms of overall environmental impacts and is responsible for the greatest impact on all environmental impact indicators except GWP-bio, GWP-luluc, ODP, EP-freshwater, PM, ETP-fw, HTP-c, HTP-nc, SQP, PERM, PERT, HWD, biogenic carbon content. Aluminium filler and ESBO rank second and third in terms of overall environmental impacts.



Summary, comments and additional information

Front Cover Image

Figure 1

About Amtico:

LVT is in our DNA.

Amtico is a British manufacturer of industry-leading flooring. A joint venture between American Biltrite and manufacturing giant Courtaulds, we began designing and making luxury vinyl tiles (LVT) in 1964. We're located in Coventry, a historic city, globally recognised for its continued contribution to British design, craft and engineering.

Today, we sell our floors in over 130 countries, but we are the only manufacturer who can proudly say we still make a large proportion of our LVT flooring from scratch, here in the UK.

A passion for brilliance

We've been setting the standard for creative expression in floor design for a long time. And we've become pretty good at it. The formula is simple. We combine relentless dedication with top-of-class expertise. Then we

add that to every single floor we make. Our people stop at nothing to ensure every one of our products delivers what's required of it – excellence.

And if you need something completely unique, our in-house design team are ready to provide advice on product choice, laying patterns and finishes. Plus, we have a team of CAD experts who will work with you to draw up your design ready for manufacture.

Where we stand on sustainability

When you choose an Amtico floor, we want you to be sure it's built on foundations that protect our planet and empower our people.

So, we are working on our strategy – a plan for tackling the major challenges, not in the next 20 years, but right now.

To read more about our strategy on sustainability, please visit https://www.amtico.com/commercial/sustainability/.

References

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BSI. Environmental labels and declarations – Type III Environmental declarations – Principles and procedures. BS EN ISO 14025:2010 (exactly identical to ISO 14025:2006). London, BSI, 2010.

BSI. Environmental management – Life cycle assessment – Principles and framework. BS EN ISO 14040:2006. London, BSI, 2006.

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BS EN ISO 10582:2018 Resilient floor coverings. Heterogeneous poly(vinyl chloride) floor covering. Specifications.

BS EN ISO 24340:2012Resilient floor Coverings. Determination of thickness of layers

BS EN ISO 24346:2012 Resilient floor coverings. Determination of overall thickness.

BS EN ISO 23997:2012 Resilient floor coverings. Determination of mass per unit area.

BS EN 13893:2002 Resilient, laminate and textile floor coverings. Measurement of dynamic coefficient of friction on dry floor surfaces.

IMO MSC FTP Code 2010, Part 2 & 5 Smoke, Toxicity and Flammability for Surface Materials.