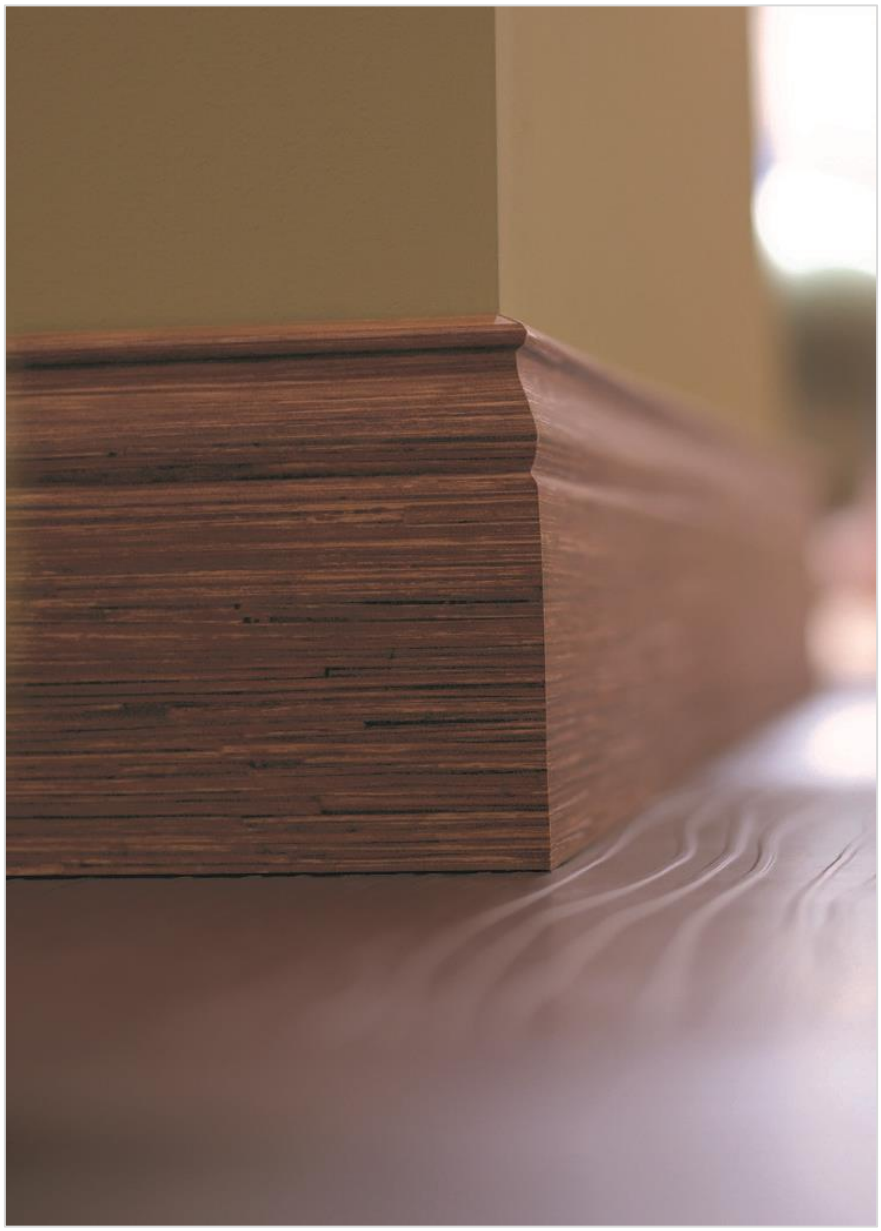
ENVIRONMENTAL PRODUCT DECLARATION

THERMOPLASTIC RUBBER WALL BASE

THERMOPLASTIC RUBBER (TP) WALL BASE



Tarkett Masquerade® Thermoplastic Rubber Wall Base

Tarkett THE ULTIMATE FLOORING EXPERIENCE

Tarkett is a global leader in innovative and sustainable solutions for flooring and sports surfaces serving customers in more than 100 countries worldwide. Committed to sustainable development, the Tarkett Group has implemented an eco-innovation strategy and promotes circular economy. Cradle to Cradle principals are used to strategically design and optimize products on the basis of material health, resource stewardship and reuse and recycling at end of use.

For more information visit www.tarkettna.com

UL CERTIFIED ENVIRONMENTAL PRODUCT DECLARATION UL.COM/EPD

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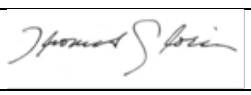
THERMOPLASTIC RUBBER WALL BASE
THERMOPLASTIC (TP) RUBBER WALL BASE

According to ISO 14025 and EN 15804

This declaration is an environmental product declaration (EPD) in accordance with ISO 14025. EPDs rely on Life Cycle Assessment (LCA) to provide information on a number of environmental impacts of products over their life cycle. Exclusions: EPDs do not indicate that any environmental or social performance benchmarks are met, and there may be impacts that they do not encompass. LCAs do not typically address the site-specific environmental impacts of raw material extraction, nor are they meant to assess human health toxicity. EPDs can complement but cannot replace tools and certifications that are designed to address these impacts and/or set performance thresholds – e.g. Type 1 certifications, health assessments and declarations, environmental impact assessments, etc. Accuracy of Results: EPDs regularly rely on estimations of impacts, and the level of accuracy in estimation of effect differs for any particular product line and reported impact. Comparability: EPDs are not comparative assertions and are either not comparable or have limited comparability when they cover different life cycle stages, are based on different product category rules or are missing relevant environmental impacts. EPDs from different programs may not be comparable.

PROGRAM OPERATOR	UL Environment
DECLARATION HOLDER	Tarkett
DECLARATION NUMBER	13CA29936.104.1
DECLARED PRODUCT	Tarkett® Thermoplastic Rubber Wall Base
REFERENCE PCR	Environdec, Product Category Rules for Construction Products and Construction Services, Version 2.1. Stockholm, 2016.
DATE OF ISSUE	February 1, 2017
PERIOD OF VALIDITY	5 Years
CONTENTS OF THE DECLARATION	Product definition and information about building physics Information about basic material and the material's origin Description of the product's manufacture Indication of product processing Information about the in-use conditions Life cycle assessment results Testing results and verifications
The PCR review was conducted by:	Martin Erlandsson Swedish Environmental Research Institute Martin.erlandsson@ivl.se
This declaration was independently verified in accordance with ISO 14025 by Underwriters Laboratories ☐ INTERNAL ☒ EXTERNAL	 Wade Stout
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	 Thomas Gloria

This EPD conforms with EN 15804

ENVIRONMENTAL PRODUCT DECLARATION

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Product Definition

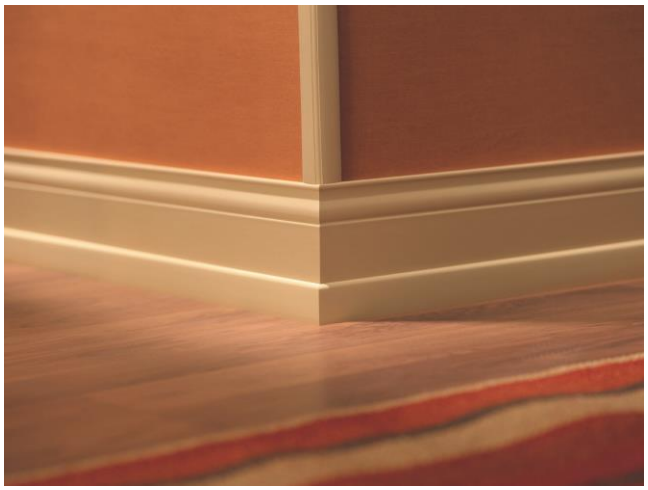
Product Classification and Description

For more than 100 years, Tarkett has been a leader in providing innovative flooring solutions that integrate function, design, life safety, and sustainability to enhance productivity in commercial spaces. Johnsonite, a North American brand of Tarkett, manufactures wall base products with unmatched durability using top quality materials that provide years of exceptional performance. Johnsonite's products are designed for use in commercial buildings and resist scuffing, fading, cracking and will not shrink or separate from the wall.

This EPD includes Thermoplastic Rubber (TP) wall base as defined in ASTM F-1861-16. Depending on the product line, wall base is available as linear strips and rolls, with a thickness of up to 0.75" (19 mm) and a height of up to 8" (203 mm). Products can be manufactured with toe or toeless sections as well as inside or outside corners. The product lines covered in this study include Johnsonite's Thermoplastic Rubber (TP) wall base and accessories including Millwork®, Perceptions® Designer Wall Base, Masquerade®, Wall Art™ Decorative Wall Base, rePLACE® Demountable Base System, Traditional Wall Base and TightLock® Carpet and Resilient Wall Base.

Range of Applications

Thermoplastic Rubber (TP) wall base is a barrier that prevents physical damage to walls, cabinets, columns, casework, pilasters, toe spaces and other permanent fixtures. It is most often used in commercial environments where aesthetics and durability are important. It is extremely flexible and easy to install—even around curves and columns. Products are available in a variety of contoured profiles and colors along with coordinating accessories such as chair rails, corner guards, self-stick quarter round and shoe moulding.



Tarkett Thermoplastic Rubber Wall Base

ENVIRONMENTAL PRODUCT DECLARATION

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According to ISO 14025

Product Standards and Performance

Tarkett's thermoplastic rubber wall base products meet the performance requirements of ASTM F-1861 for resilient wall base. The products are also certified in the FloorScore® indoor air quality program by SCS Global Services and meet the requirements of Califoria Specification 01350.

Table 1: Thermoplastic Rubber Wall Base Specifications

Product Classification	
Millwork®, Masquerade®, rePLACE®	ASTM F 1861-16 – Type TP, Group 1
TightLock® for Carpet	ASTM F 1861-16 – Type TP and TV, Group 1
Traditional	ASTM F 1861-16 – Type TP and TV, Group 1 Style A and B
Product Specifications	
Product Thickness [inch]	0.25 – 0.75 (Millwork); 0.375 (Masquerade); 0.326 (rePLACE); 0.25 (TightLock); 0.125 (Traditional)
Product Height [inch]	3.5 – 8.0 (Millwork); 4, 5.25 (Masquerade); 4.375, 4.508 (rePLACE); 3.25 – 6.5 (TightLock); 4 (Traditional)
Product Profile Length [ft]	4 (all heights)
Product Roll Length [ft]	120 (2.5" and 4" heights), 100 (6" height)

Table 2: Thermoplastic Rubber Wall Base Performance Specifications

Product Performance		
Indoor Air Quality	FloorScore® Certified	
Indoor Air Quality	Meets the requirements of California 01350	
Flexibility	ASTM F 137 – passes ¼" mandrel	
Aging and Stability	ASTM F1861-16 – passes resistance to heat/light aging, chemical and dimensional stability	
Chemical Resistance	ASTM (F925) – passes 5% acetic acid, 70% IPA, mineral oil, 5% sodium hydroxide, 5% hydrochloric acid, 5% ammonia, 5.25% bleach	
Flammability / Critical Radiant	**TP Rubber**	ASTM E 648 – 0.45 watts/cm^2 or greater Class 1
Flame Spread / Smoke Density	**TP Rubber**	ASTM E 84 – Class A; < 450

Accreditations

- FloorScore®
- ISO 14001 Environmental Management System
- ISO 9001 Quality Management System

Material Content

Material Content in the Product

Although the product typically contains an average of 14% preconsumer content, the recycled content of the product was not taken into account in the LCA model to remain conservative.

Table 3: Material Content of Thermoplastic Rubber Wall Base

Component	Material	Mass%	Availability Renewable	Non Renewable	Recycled	Origin of Material
Polymer	PVC/Nitrile Rubber	30-45		Fossil Limited		Global
Filler	Calcium Carbonate	30-45		Mineral Abundant		Global
Plasticizer	DOTP	15-25		Fossil Limited		Global
Additives	Kaolin/Calcium Stearate	2-5		Abundant Mineral		Global
Colorants	Various Pigments	1-2		Abundant Mineral		Global

Production of Main Materials

Calcium carbonate ($CaCO_3$) is also known as limestone. It is a mineral filler that is mined from natural surface deposits.

Calcium Stearate, classified and calcium soap, is produced by heating stearic acid and calcium oxide.

Calcium Zinc (CaZn) stabilizers, based on a combination of Calcium and Zinc soaps provide high heat stability during processessing.

Colorants a added substance that causes a change in color, such as, a dye, pigment, ink, etc.

Dioctyl terephthalate (DOTP), a non ortho-phthalate plasticizer, is a diester of terephthalic acid and the branched-chain 2-ethylhexanol.

Kaolin Clay is a naturally occurring clay mineral; the primary constituent is the mineral kaolinite, a hydrous aluminum silicate formed by the decomposition of minerals such as feldspar.

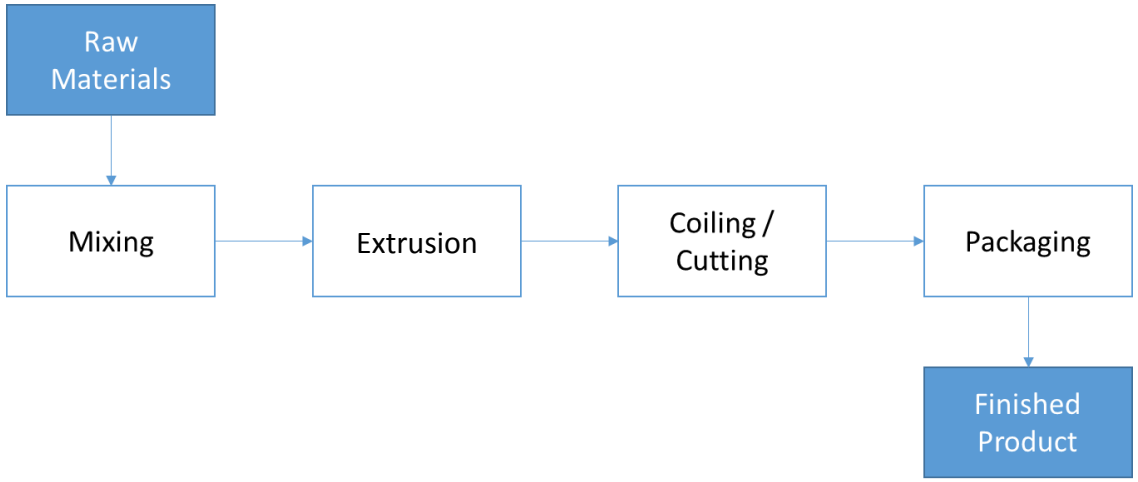
Nitrile Rubber a synthetic rubber copolymer of acrylonitrile (ACN) and butadiene.

Polyvinyl Chloride (PVC) polymer is a thermoplastic polymer made by combining ethylene (derived from petroleum, natural gas or coal) and chlorine from common salt.

Production of Wall Base

Thermoplastic rubber wall base is manufactured via co-extrusion using nitrile rubber, vinyl, filler, additives, and colorants to form a single layer, homogeneous composition. The resulting product is cut into lengths, stacked or rolled and packaged.

Figure 1: Manufacturing Process for Thermoplastic Rubber Wall Base



Production Waste

Scrap during manufacturing is both recycled (7.5% of the finished product) and sent to the landfill as manufacturing waste (2.4% of the finished product).

Health and Safety Aspects during Production

- ISO 14001 Environmental Management System
- ISO 9001 Quality Management System
- World Class Manufacturing (WCM) – a comprehensive Environment, Health and Safety program focused on continual improvement in industrial performance, safety, quality, customer service and the environment.

Delivery and Installation

Delivery

For the transport of finished products to installation, the products are assumed to be shipped an average of 751 km by truck and 118 km by boat to the customer. These shipping distances represent a weighted average of distribution based on the location of customers.

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Installation

Wall base should be installed on clean, smooth, flat, dry, adequately prepared walls according to the manufacturers recommended installation procedures. For installation, 0.0146 gal (0.0553 L) of adhesive are used per linear meter. Recommended adhesives should be utilized. Detailed installation instructions can be found at www.tarkettna.com.

Installation Waste

During installation, approximately 3% of the wall base is removed as waste. Although installation trim can be reclaimed in the company's ReStart® program, it was conservatively modeled as being disposed of in a landfill.

Packaging

Thermoplastic rubber wall base is packaged in cardboard boxes and stacked on pallets. Although packaging is often recycled, packaging waste was also modeled as being sent to a landfill.

Health Safety and Environmental Aspects during Installation

Thermoplastic rubber wall base has low VOC emissions—less than 10 μg/m3 (14 days/ASTM D-5116), which is well below industry standards. Wall Base products are certified in the FloorScore Indoor Air Quality program and comply with the VOC emission requirements of the California Department of Public Health (CDPH) Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions for Indoor Sources Using Environmental Chambers v1.1, Feb 2010 (also known as the California 01350 Specification). Additionally, adhesives meet the VOC emission requirements of the South Coast Air Quality Management District - Rule 1168. Tarkett's recommended installation instructions should be followed and the appropriate Safety Data Sheets (SDSs) referenced.

End of Life

With recycling facilities in the US and abroad, Tarkett has recycled over 60 million pounds of postconsumer material since 2009. The company strives to develop products that can be reused within production cycles and at the end of their use as part of their closed loop circular design strategy. Postconsumer flooring, installation waste, samples and portfolios are actively reclaimed and recycled in the company's ReStart reclamation program. For more information, visit *http://www.tarkettna.com/sustainability/restartreclamationrecyclingprogram*.

Although vinyl wall base is recyclable in the ReStart program, for the purposes of this study, post-use wall base was modeled as being transported by a diesel-powered truck 32 miles (52 km) for disposal in a landfill.

Life Cycle Assessment – Product System and Modeling

A “cradle-to-gate with options” life cycle assessment (LCA) was conducted for this EPD. The analysis was done according to the product category rules (PCR) for construction products by Environdec and followed LCA principles, requirements and guidelines laid out in the ISO 14040/14044 standards. As such, EPDs of construction products may not be comparable if they do not comply with EN 15804 or the same PCR or if they are from different programs. While the intent of the PCR is to increase comparability, there may still be differences among EPDs that comply with the same PCR (e.g., due to differences in system boundaries, background data, etc.).

Declared Unit

The declared unit is **1 m of installed wall base product**, consistent with the PCR. The product is sold in units of length, with a production-weighted average mass of 0.450 kg / meter. The product’s typical height is 4” (102 mm).

Life Cycle Stages Assessed

The following life cycle stages are covered in the “cradle-to-gate (A1-A3) with options (A4-A5, C2, C4)” system boundaries:

- **Upstream:** Raw material supply (including virgin and recycled materials); generation of electricity, steam and heat from primary energy resources; inbound transportation of raw materials
- **Core:** Manufacturing of wall base product, packaging of finished product, manufacturing waste, releases to the environment
- **Downstream:** Distribution of the product from the production plant to a distributor (if applicable) and from there, to the building site; installation process, installation wastes and releases to the environment; End-of-Life (EoL) transport to final disposal site, final disposition

Figure 1 and Figure 2 offer visualizations of the life cycle stages and information modules declared in this EPD.

Figure 1: Life cycle stages included in system boundary

Figure 2: Complete life cycle stages with relevant modules declared (X), modules not declared (MND)

PRODUCT STAGE			CONSTRUCTION PROCESS		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport	Construction-installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
X	X	X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	X	MND	X	MND

Transportation Assumptions

Primary data included transportation distances via truck for the transport of the raw materials to the production facilities. Transport of the finished product to installation was estimated as described in Table 4.

Table 4: A4 Transport to the construction site, per declared unit

Additional technical information				
Scenario title	**Parameter**	**Unit**	**Value**	**Value**
A4 Transport to site	Vehicle type used for transport	n/a	Truck 8b	Container ship
	Vehicle load capacity	kg per vehicle	20,410	27,500,000
	Fuel type and consumption	Liter of fuel type per distance	0.0135 (diesel)	0.00022 (heavy fuel oil)
	Distance to construction site	km	751	118
	Capacity utilization (including empty returns)	%	78	48
	Bulk density of transported products	kg/m^3	n/a	n/a
	Volume capacity utilization factor (factor: = 1 or < 1 or ≥ 1 for compressed or nested packaged products)	n/a	≥1	≥1

Installation Assumptions

Wall base is installed manually with an estimated scrap rate of 3%. Installation materials and wastes are indicated in Table 5.

Table 5: A5 Installation of the product, per declared unit

Additional technical information			
Scenario title	**Parameter**	**Unit**	**Value**
A5 Installation of the product	Ancillary material for installation: Adhesive	kg	0.0628
	Water use	m^3	-
	Other resource use	kg	-
	Quantitative description of energy type consumption during preparation and installation	MJ	-
	Direct emissions to ambient air, soil and water	kg	-
	Waste materials on the building site, generated by product's installation, incl. packaging: - Corrugated paperboard - Wall base scrap	 kg kg	 0.077 0.014
	Output materials (specified by type) as result of waste processing at the construction site: - Paper to landfill - Plastic to landfill	 kg kg	 0.077 0.014

Use

Not considered in this study.

End-of-Life Assumptions

At end-of-life, the wall base is removed from the deconstructed building. While PVC products can be recycled, doing so currently is not common practice in the industry. Therefore, the analysis assumes that, after removal, the wall base is transported to the disposal site and landfilled as described in Table 6.

Table 6: C End of Life, per declared unit

Additional technical information			
Module	**Parameter**	**Unit**	**Value**
C2 Transport	Dump truck transport to landfill, distance	km	32
C4 Disposal	Inert material to landfill	kg	0.45

Cut-off Criteria

No cut-off criteria were applied in this study.

Period under Consideration

Primary data were collected on 2015 wall base production for two North American Tarkett manufacturing plants, i.e., Chagrin Falls, Ohio (USA), and Waterloo, Ontario (CAN).

Background Data

The LCA model was created using the GaBi ts software system for life cycle engineering, developed by thinkstep. The GaBi 2016 LCI database provided the life cycle inventory data for upstream and downstream processes of the background system. US-specific background data were used whenever possible, with European or global data substituted as proxies as necessary.

Data Quality

Data quality and representativeness are considered to be good to high. Foreground data were collected from Tarkett's manufacturing facility, with seasonal variations accounted for by collecting 12 months-worth of data. No data were omitted under cut-off criteria. All primary data were collected with the same level of detail while all background data were sourced from the GaBi databases. Allocation and other methodological choices were made consistently throughout the model.

Allocation

No allocation was applied in this study.

Life Cycle Assessment – Results and Analysis

Resource Use and Wastes

Tables 7 and 8 show use of resources and other indicators describing waste categories per declared unit, respectively. Energy resource consumption is broken down between renewable and non-renewable resources.

Table 7: Resource use, per declared unit

		Upstream		Core	Downstream			
Metric	**Unit**	**A1**	**A2**	**A3**	**A4**	**A5**	**C2**	**C4**
PERE	[MJ]	5.33E-01	8.47E-03	1.75E+00	9.59E-03	6.19E-01	3.98E-04	1.98E-02
PERM	[MJ]	0	0	1.46E-01	0	0	0	0
PERT	[MJ]	5.33E-01	8.47E-03	1.89E+00	9.59E-03	6.19E-01	3.98E-04	1.98E-02
PENRE	[MJ]	8.03E+00	5.31E-01	3.12E+00	6.04E-01	2.17E+00	2.47E-02	3.13E-01
PENRM	[MJ]	2.84E+00	0	0	0	0	0	0
PENRT	[MJ]	1.09E+01	5.31E-01	3.12E+00	6.04E-01	2.17E+00	2.47E-02	3.13E-01
SM	[kg]	0	0	0	0	0	0	0
RSF	[MJ]	0	0	0	0	0	0	0
NRSF	[MJ]	0	0	0	0	0	0	0
FW	[m³]	2.24E-03	1.06E-04	2.06E-03	1.20E-04	3.40E-04	5.00E-06	4.82E-05
Caption	PERE = Use of renewable primary energy excluding renewable primary energy resources 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 resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of fresh water							

Table 8: Waste category indicators, per declared unit

		Upstream		Core	Downstream			
Metric	**Unit**	**A1**	**A2**	**A3**	**A4**	**A5**	**C2**	**C4**
HWD	[kg]	1.89E-07	6.55E-10	7.84E-05	7.70E-10	4.95E-09	3.16E-11	5.99E-10
NHWD	[kg]	1.20E+01	6.52E-01	6.87E+00	7.56E-01	2.33E+00	3.14E-02	3.24E-01
RWD	[kg]	1.98E-04	8.57E-07	1.66E-04	1.01E-06	2.98E-05	4.13E-08	3.18E-06
Caption	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed							

Life Cycle Impact Assessment

Table 9 contains life cycle impact assessment results per declared unit. Impact results were calculated using the CML 2001 – Apr. 2013 methodology for the following impact categories:

- Global warming potential excl. biogenic carbon, kg CO_2 equivalents (GWP_{100})
- Ozone depletion potential, kg CFC 11 equivalents (ODP)
- Acidification potential of land and water, SO_2 equivalents (AP)
- Eutrophication potential, PO_4^{3-} equivalents (EP)
- Photochemical ozone creation potential, C_2H_2 equivalents (POCP)
- Depletion potential of abiotic resources (elements), kg Sb equivalents (ADP_e)
- Depletion potential of abiotic resources (fossil), MJ net calorific value (ADP_f)

Table 9: Life cycle impact category results (CML 2001 – Apr. 2013), per declared unit

Impact Category	Unit	Upstream		Core	Downstream			
		A1	A2	A3	A4	A5	C2	C4
GWP_{100}	kg CO_2 eq	0.759	0.0364	0.242	0.0413	0.145	0.00169	0.0202
ODP	kg R 11 eq	9.01E-11	2.42E-13	4.44E-11	2.77E-13	6.37E-12	1.13E-14	3.86E-13
AP	kg SO_2 eq	0.00247	1.53E-04	7.66E-04	1.79E-04	1.85E-04	6.47E-06	2.76E-04
EP	kg PO_4^{3-} eq	2.70E-04	3.72E-05	8.13E-05	4.27E-05	6.78E-05	1.68E-06	1.22E-04
POCP	kg Ethen eq	4.24E-04	1.76E-05	6.07E-05	2.03E-05	5.03E-05	7.85E-07	1.27E-04
ADP_e	kg Sb eq	2.71E-06	5.59E-09	7.14E-08	6.40E-09	5.49E-08	2.62E-10	7.73E-09
ADP_f	MJ	17.4	0.529	2.70	0.601	2.10	0.0246	0.305

Interpretation

Upstream raw materials production (module A1)—in particular, the production of PVC and DOTP—represents the largest driver of environmental impact categories.

Manufacturing (A3) contributes significantly to GWP, ODP and AP, with impacts largely coming from electricity use.

The construction process (life cycle stages A4 and A5), on average, represents approx. 10% of the five major CML impact categories. The majority of impact comes from the adhesive used at installation and the landfilling of scrap material and product packaging (A5).

End of life (life cycle stages C2 and C4) contributes substantially only to EP and POCP. The landfilling of plastic waste, i.e., disposed wall base, (C4) contributes approx. 20% to overall life cycle impact for both impact categories.

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According to ISO 14025

References

GaBi ts software 2016	thinkstep AG, GaBi ts software: Software-System and Database for Life Cycle Engineering. Copyright, TM. Stuttgart, Echterdingen, 1992-2016.
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.
Environdec 2016	Environdec, Product Category Rules for Construction Products and Construction Services, Version 2.1. Stockholm, 2016.

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