

**COMPANY INFORMATION / DECLARATION OWNER**

**hertalan**<sup>®</sup>  
the Waterproof Solution

**CARLISLE**  
CM EUROPE

Carlisle Construction Materials bv  
Industrieweg 16  
8263 AD KAMPEN

**FOR**

Hertalan Easy Cover

**MRPI code**

Xxxxxxx

**DATE OF ISSUE**

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**END OF VALIDITY**

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**AUTHOR OF THE LIFE CYCLE ASSESSMENT**

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**FUNCTIONAL UNIT / DECLARED UNIT**

1 m<sup>2</sup> waterproof EPDM roofing including fastening of a flat or gently sloping roof with a maximum gradient of 20°, which meets the requirements of the Dutch Building Act, with a functional life span of 50 years. Based on a roof of 1.000 m<sup>2</sup> (40x25 m<sup>1</sup>), representative for a roof of more than 50 m<sup>2</sup>.

**SCOPE OF THE DECLARATION**

A1-A3, A4, A5, B1, B2, B3, C2, C4, D (declare modules EN 15.804)

This MRPI – certificate is verified by IVAM UvA BV . The LCA is executed by NIBE Research bv. The Environmental Product Declaration is in accordance with ISO 14025, EN 15804, the NL national guidelines from the SBK protocol version 2.0 of November 2014 and the MRPI – review protocol version May 2011. The EPD of construction products may not be comparable if they do not comply with EN15804. The verification meets the standards of the ECO platform verification. If relevant, in the case where an EPD is declared as an average environmental performance for a number of products, a statement to that effect shall be included in the declaration, together with a description of the range/variability of the LCIA results if significant.

**PART OF THE FUNCTIONAL UNIT/ DECLARED UNIT**

**PRODUCT DESCRIPTION**

Hertalan EPDM easy cover roofing of 1,2mm including adhesives and sealants (Hertalan ks143 for the flat part and ks137 for the borders)

Material composition (>1%wt).	%
EPDM easy cover roofing	81 %
Hertalan ks143 / ks137	19 %



### DESCRIPTION OF THE SYSTEM BOUNDARY

This is a Cradle to gate with options EPD. The life cycle stages included are as shown below (X = included, MND = module not declared):

Raw material supply	Transport	Manufacturing	from the gate to the	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction	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	X	X	X	MND	MND	MND	MND	MND	X	MND	X	X

### ENVIRONMENTAL PROFILE FUNCTIONAL UNIT/ DECLARED UNIT

Impact category	Unit	Parameter	Unit
Depletion of abiotic resources-elements	5,03E-05 kg Sb	renewable primary energy ex. raw materials	1,66 MJ
Depletion of abiotic resources-fossil fuels	4,89E-02 kg Sb	renewable primary energy used as raw materials	0,00 MJ
Global warming	8,03E+00 kg CO <sub>2</sub>	renewable primary energy total	1,66 MJ
Ozone layer depletion	9,30E-07 kg CFK-11	non-renewable primary energy ex. raw materials	116,52 MJ
Photochemical oxidants creation	3,70E-03 kg ethene	non-renewable primary energy used as raw materials	0,00 MJ
Acidification (soil and water)	2,03E-02 kg SO <sub>2</sub>	non-renewable primary energy total	116,52 MJ
Eutrophication	2,02E-03 kg PO <sub>4</sub> <sup>3-</sup>	use of secondary material	0,00 kg
Human toxicity	2,12E+00 kg 1,4 DB	use of renewable secondary fuels	0,00 MJ
Ecotoxicity, fresh water	1,28E-01 kg 1,4 DB	use of non-renewable secondary fuels	0,00 MJ
Ecotoxicity, marine water (MAETP)	7,44E+01 kg 1,4 DB	use of net fresh water	5,29 m <sup>3</sup>
Ecotoxicity, terrestrial	4,58E-02 kg 1,4 DB	hazardous waste disposed	-0,32 kg
		non-hazardous waste disposed	0,57 kg
		radioactive waste disposed	0,00 kg
		Components for re-use	0,00 kg
		Materials for recycling	0,10 kg
		Materials for energy recovery	0,00 kg
		Exported energy	18,20 MJ

### ENVIRONMENTAL PROFILE AND RATINGS REPRESENTATIVE

The input data are representative for Hertalan Easy Cover, a product of Carlisle Construction Materials bv. The data are representative for the Netherlands.

### NL Building-act information

Impact category	Unit
Depletion of abiotic resources-elements	5,03E-05 kg Sb
Depletion of abiotic resources-fossil fuels	4,89E-02 kg Sb
Global warming	8,03E+00 kg CO <sub>2</sub>



## DATA QUALITY

The data quality is described below by theme.

<i>Geographical coverage:</i>	The input data is representative for Hertalan Easy Cover of Carlisle Construction Materials bv. The data is representative for sales in the Netherlands.
<i>Time period covered:</i>	Production data concerning the material composition are collected in the period 2013-2014 and relate to the year 2013. The amounts of electricity and gas use for production are based on consumption data in the year 2013.
<i>Technology coverage:</i>	The (current) technology for the production of raw materials in the year 2014 is used.

Attention was paid to the accuracy, completeness, representativeness, consistency and reproducibility of the data, as follows:

<i>Precision:</i>	Production Data are collected from financial statements, calculations, measurements and estimates. The collected data has sufficient accuracy for true outcomes.
<i>Completeness:</i>	The aim was to obtain complete data of materials, transportation, energy, emissions and waste. All relevant environmental interventions are included in the inventory.
<i>Representativeness:</i>	The representativeness of the data is good, because they are based on the processes of Carlisle that occur in one factory. The origin of the materials is properly inventoried. The input data are representative for the actually produced roofing membrane.
<i>Consistency:</i>	By using Ecoinvent v2.2 as a basis, the consistency is guaranteed.
<i>Reproducibility:</i>	The values on which this LCA is performed, can be found in this report and the corresponding project file. The way on which the data are collected and where the information is based on, is included. As a result, the performed LCA is reproducible.

## Cut-off criteria

In the Life cycle assessment the following is included in this study:

### Product stage (A1-A3)

The production phase consists the extraction of raw materials, processing them into materials and the production of the roofing membrane. The required energy for production is included. The transportation of materials to the factory where the roofing materials are manufactured is also included.

### Construction process stage (A4-A5)

This stage consists of the transport of the product from the factory where the roofing sheets are made, to the building site where they are mounted on the roof of a building. Hertalan Easy Cover is manually assembled with mechanical fasteners whereby the energy consumption is practically zero.

### 4. Use stage (B1-B7)

The use stage includes all processes that are related to the operational use. This includes the cleaning of the membranes. However, the environmental impacts of the cleaning are disregarded because they go beyond the responsibility of the producer. The environmental impact of the heat loss through the roof is disregarded in the use stage.

The use stage also includes all of the processes that are necessary for the maintenance of the function during the period that is defined in the functional unit. The service life of EPDM roofing membranes has been set at 50 years. This LCA is considering the service life of the EPDM membranes and therefore no replacements are included.

### 5. End of life stage (C1-C4)

When the end of the life of the building is reached, the de-construction/demolition begins. The de-construction/demolition is not included in the system boundaries, because they go beyond the responsibility of the producer. The de-construction/demolition of the EPDM membranes is done mainly manual, there is probably no significant environmental impact on the performance.

The waste treatment is also not included in this study, because the waste scenarios prescribed in the SBK Bepalingsmethode v2.0, November 2014, do not contain the waste treatment. In addition, the various literature sources don't contain complete and / or good-quality data.

This EPD does include the necessary transport (C2) from the demolition site to the sorting location and final disposal. In addition, the prescribed waste scenarios from the SBK Bepalingsmethode v2.0 have been used for the various materials in the product. The end of life stage includes the disposal to landfill and incineration. Recycling, re-use and exported energy are part of 'supplementary information' beyond the building life cycle.

## 7. Supplementary information outside the building life cycle (D)

This stage contains the environmental costs and benefits of recycling and re-use of material released during demolition, and the environmental benefits of recycled or re-used materials used as raw material in the product. In addition, the environmental benefits of saving energy due to incineration where energy is generated, are granted at this stage. The amount of avoid energy production is based on the Lower Heating Values of the materials and the efficiencies of the incinerators as mentioned in the SBK Bepalingsmethode v2.0

### Source of background data

Raw material	Source:
EPDM	Ecoinvent 2.2
Carbon Black	Ecoinvent 2.2
Paraffinic oil	Ecoinvent 2.2
Mineral filler kaolin	Ecoinvent 2.2
Mineral filler Magnesium	Ecoinvent 2.2
Sulfur	Ecoinvent 2.2
Organic accelerator A	Ecoinvent 2.2
Organic accelerator B	Ecoinvent 2.2
Additives	Ecoinvent 2.2
Zinc oxide	Ecoinvent 2.2
Cardboard tube	Ecoinvent 2.2
Wrap foil (LDPE)	Ecoinvent 2.2
Adhesives and sealants (Hertalan ks143)	Supplier adhesives and sealants
Vulcanization linen	Ecoinvent 2.2

### More information

For more information please contact Carlisle Construction Materials bv.

## DESCRIPTION OF THE MANUFACTURING PROCESS

### Base materials / Ancillary materials

Hertalan easy cover is a homogeneous EPDM mixture consisting of 25-40 % EPDM synthetic rubber, 10-20 % mineral oil, 15-25 % filler, 15-30 % carbon black and 0-10 % additives.

### Manufacture

The whole production process takes place at Kampen-NL. The mixing of the raw materials is followed by shaping the uncured mixture into a sheet material. In the next step, by heat treatment, the EPDM mixture will be vulcanized. After vulcanization the product will be cut into the required sizes or through hot bonding seam process formed into bigger prefab sheets.

### Product processing/Installation

Depending on the delivery form, hertalan easy cover is rolled or folded out at the desired position at the roof surface. The hertalan easy cover is secured in place by adhering, mechanically fixing or placing ballast onto it. Depending on the application method only spray equipment (adhesive) or tools for mechanically fixing are required. No particular measures are required to ensure protection of the fitters health. The instructions in the installation guideline must be observed.

### Packaging

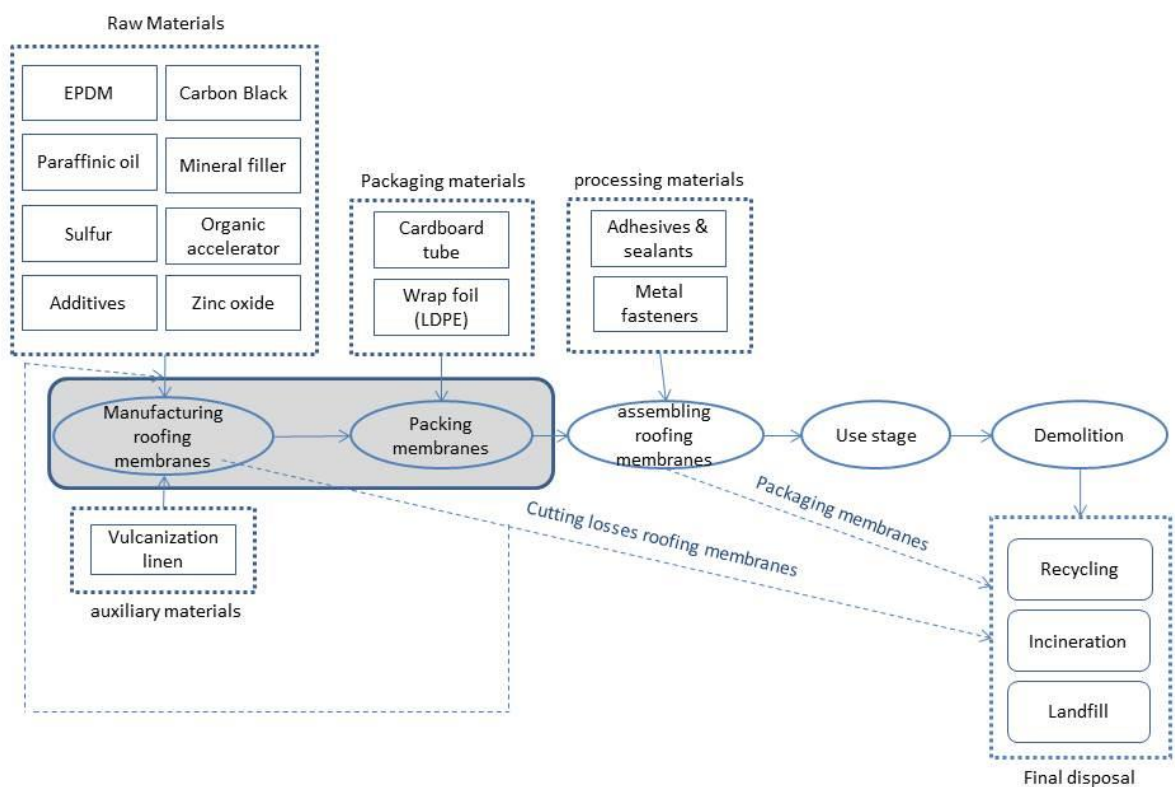
Rolls of Hertalan easy cover are provided with a label through tape. Up to 10 rolls are placed onto a pallet. Prefabricated sheets are folded up, packed in PE foil and placed onto a pallet. Packaging material can be recycled separately.

**REFERENCE SERVICE LIFE**

The Hertalan roofing systems are on the market for more than 40 years. According to report 37236/99-VI (SKZ, D) Hertalan roofing systems have an expected service life of 50 years and more.

**LIFE CYCLE STAGES**

(simple) flow diagram in accordance with the modular approach



There is no maintenance or repairs needed during the use stage, the product also doesn't leach out. Therefore, there are no environmental impacts taking place during the use stage(B1-7) and B1-B7 aren't part of the result presented.

**ENVIRONMENTAL PRODUCT DECLARATION**  
**PRODUCT STAGE (A1 -3)**

- **A1, raw material extraction and processing, processing of secondary material input (e.g. recycling processes)**
- **A2, transport to the manufacturer**
- **A3, manufacturing**

Impact category	Unit	A1-3
Depletion of abiotic resources-elements	Kg Sb	4,97E-05
Depletion of abiotic resources-fossil fuels	Kg Sb	6,96E-02
Global warming	Kg CO <sub>2</sub> Equiv.	5,93E+00
Ozone layer depletion	Kg CFC-11 Equiv.	1,05E-06
Photochemical oxidants creation	Kg Ethene Equiv.	3,84E-03
Acidification of soil and water	Kg SO <sub>2</sub> Equiv.	2,28E-02
Eutrophication	Kg PO <sub>4</sub> <sup>3-</sup> Equiv.	2,61E-03
Human toxicity	kg 1,4 DB	2,37E+00
Ecotoxicity, fresh water	kg 1,4 DB	1,28E-01
Ecotoxicity, marine water (MAETP)	kg 1,4 DB	2,23E+02
Ecotoxicity, terrestrial	kg 1,4 DB	4,58E-02
Parameter	Unit	A1-3
renewable primary energy ex. raw materials	MJ	3,27
renewable primary energy used as raw materials	MJ	0
renewable primary energy total	MJ	3,27
non-renewable primary energy ex. raw materials	MJ	159,41
non-renewable primary energy used as raw materials	MJ	0
non-renewable primary energy total	MJ	159,41
use of secondary material	Kg	0,00
use of renewable secondary fuels	MJ	0,00
use of non-renewable secondary fuels	MJ	0,00
use of net fresh water	M <sup>3</sup>	6,00
hazardous waste disposed	Kg	3,84
non hazardous waste disposed	Kg	0,32
radioactive waste disposed	Kg	0,01
Components for re-use	Kg	0,00
Materials for recycling	Kg	0,02
Materials for energy recovery	Kg	0,00
Exported energy	MJ	0,64

**ENVIRONMENTAL PRODUCT DECLARATION  
CONSTRUCTION PROCES STAGE (A4 -5)**

- **A4, transport to the building site**
- **A5, installation into the building**

Impact category	Unit	A4	A5
Depletion of abiotic resources-elements	Kg Sb	1,21E-07	4,66E-09
Depletion of abiotic resources-fossil fuels	Kg Sb	3,00E-04	1,20E-05
Global warming	Kg CO <sub>2</sub> Equiv.	4,15E-02	6,00E-03
Ozone layer depletion	Kg CFC-11 Equiv.	6,65E-09	2,14E-10
Photochemical oxidants creation	Kg Ethene Equiv.	3,05E-05	2,39E-06
Acidification of soil and water	Kg SO <sub>2</sub> Equiv.	2,24E-04	1,64E-05
Eutrophication	Kg PO <sub>4</sub> <sup>3-</sup> Equiv.	5,13E-05	3,86E-06
Human toxicity	kg 1,4 DB	1,20E-02	3,74E-03
Ecotoxicity, fresh water	kg 1,4 DB	5,12E-04	1,76E-04
Ecotoxicity, marine water (MAETP)	kg 1,4 DB	2,10E+00	1,18E+00
Ecotoxicity, terrestrial	kg 1,4 DB	1,35E-04	1,68E-05
Parameter	Unit	A4	A5
renewable primary energy ex. raw materials	MJ	0,01	0,00
renewable primary energy used as raw materials	MJ	0,00	0,00
renewable primary energy total	MJ	0,01	0,00
non-renewable primary energy ex. raw materials	MJ	0,70	0,03
non-renewable primary energy used as raw materials	MJ	0,00	0,00
non-renewable primary energy total	MJ	0,70	0,03
use of secondary material	kg	0,00	0,00
use of renewable secondary fuels	MJ	0,00	0,00
use of non-renewable secondary fuels	MJ	0,00	0,00
use of net fresh water	m <sup>3</sup>	0,05	0,00
hazardous waste disposed	kg	0,02	0,00
non hazardous waste disposed	kg	0,01	0,00
radioactive waste disposed	kg	0,00	0,00
Components for re-use	kg	0,00	0,00
Materials for recycling	kg	0,00	0,00
Materials for energy recovery	kg	0,00	0,00
Exported energy	MJ	0,00	0,00

**A4, transport to the building site**

Parameter	Unit / functional unit
Fuel type and consumption of vehicle – or – vehicle type used for transport	0,268 kg diesel per km Transport, lorry >16t, fleet average
Distance	150 km
Capacity utilisation (including empty returns)	50 % (loaded up and return empty)
Bulk density of transported products	1.225 kg/m <sup>3</sup>
Volume capacity utilisation factor	1

**A5, installation of the product in the building**

Parameter	Unit / functional unit
Ancillary materials for installation	0,387 kg Hertalan ks143/ks137
Water use	0,00 m <sup>3</sup>
Other resource use	Inapplicable
Quantitative description of energy type and consumption during the installation process	Inapplicable
Waste materials on the building site before waste processing, generated by the product's installation	0,00 kg EPDM membrane
Output materials as result of waste processing at the building site	0,0392 kg cardboard 0,00163 kg LDPE
Direct emissions to ambient air, soil and water	inapplicable

**ENVIRONMENTAL PRODUCT DECLARATION**

**END OF LIFE STAGE (C1 -4)**

- **C1, de-construction, demolition**
- **C2, transport to waste processing**
- **C3, waste processing for reuse, recovery and/or recycling**
- **C4, disposal**

Impact category	Unit	C2	C4
Depletion of abiotic resources-elements	Kg Sb	1,12E-07	4,42E-07
Depletion of abiotic resources-fossil fuels	Kg Sb	2,78E-04	8,22E-04
Global warming	Kg CO <sub>2</sub> Equiv.	3,85E-02	4,82E+00
Ozone layer depletion	Kg CFC-11 Equiv.	6,16E-09	1,26E-08
Photochemical oxidants creation	Kg Ethene Equiv.	2,83E-05	1,14E-04
Acidification of soil and water	Kg SO <sub>2</sub> Equiv.	2,08E-04	8,25E-04
Eutrophication	Kg PO <sub>4</sub> <sup>3-</sup> Equiv.	4,76E-05	1,61E-04
Human toxicity	kg 1,4 DB	1,11E-02	8,24E-02
Ecotoxicity, fresh water	kg 1,4 DB	4,75E-04	3,69E-03
Ecotoxicity, marine water (MAETP)	kg 1,4 DB	1,95E+00	7,72E+00
Ecotoxicity, terrestrial	kg 1,4 DB	1,26E-04	2,12E-03
Parameter	Unit	C2	C4
renewable primary energy ex. raw materials	MJ	0,01	0,11
renewable primary energy used as raw materials	MJ	0,00	0,00
renewable primary energy total	MJ	0,01	0,11
non-renewable primary energy ex. raw materials	MJ	0,65	2,10
non-renewable primary energy used as raw materials	MJ	0,00	0,00
non-renewable primary energy total	MJ	0,65	2,10
use of secondary material	kg	0,00	0,00
use of renewable secondary fuels	MJ	0,00	0,00
use of non-renewable secondary fuels	MJ	0,00	0,00
use of net fresh water	m <sup>3</sup>	0,05	0,64
hazardous waste disposed	kg	0,02	0,52
non hazardous waste disposed	kg	0,01	0,36
radioactive waste disposed	kg	0,00	0,00
Components for re-use	kg	0,00	0,00
Materials for recycling	kg	0,00	0,08
Materials for energy recovery	kg	0,00	0,00
Exported energy	MJ	0,00	0,00

**End – of - life**

Processes	Unit / functional unit
Collection process	0,00 kg collected separately 2,06 kg collected with mixed construction waste
Recovery system	0,00 kg for re - use 0,082 kg for recycling 1,814 kg for energy recovery
Disposal	0,163 kg EPDM membrane
Further assumptions for scenario development	



**ENVIRONMENTAL PRODUCT DECLARATION**  
**BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY (D)**

Impact category	Unit	D
Depletion of abiotic resources-elements	Kg Sb	-1,40E-07
Depletion of abiotic resources-fossil fuels	Kg Sb	-2,21E-02
Global warming	Kg CO <sub>2</sub> Equiv.	-2,81E+00
Ozone layer depletion	Kg CFC-11 Equiv.	-1,43E-07
Photochemical oxidants creation	Kg Ethene Equiv.	-3,20E-04
Acidification of soil and water	Kg SO <sub>2</sub> Equiv.	-3,75E-03
Eutrophication	Kg PO <sub>4</sub> <sup>3-</sup> Equiv.	-8,49E-04
Human toxicity	kg 1,4 DB	-3,57E-01
Ecotoxicity, fresh water	kg 1,4 DB	-5,61E-03
Ecotoxicity, marine water (MAETP)	kg 1,4 DB	-1,62E+02
Ecotoxicity, terrestrial	kg 1,4 DB	-2,34E-03
Parameter	Unit	D
renewable primary energy ex. raw materials	MJ	-1,75
renewable primary energy used as raw materials	MJ	0,00
renewable primary energy total	MJ	-1,75
non-renewable primary energy ex. raw materials	MJ	-46,36
non-renewable primary energy used as raw materials	MJ	0,00
non-renewable primary energy total	MJ	-46,36
use of secondary material	kg	0,00
use of renewable secondary fuels	MJ	0,00
use of non-renewable secondary fuels	MJ	0,00
use of net fresh water	m <sup>3</sup>	-1,45
hazardous waste disposed	kg	-4,73
non hazardous waste disposed	kg	-0,14
radioactive waste disposed	kg	-0,01
Components for re-use	kg	0,00
Materials for recycling	kg	0,00
Materials for energy recovery	kg	0,00
Exported energy	MJ	17,56

**ACCOUNTABILITY**

CEN standard EN 15804 serves as the core PCR  
 Independent verification of the declaration, according to EN ISO 14025:2010,  Internal  External  
 Third party verifier: Dr. Niels Jonkers, IVAM UvA BV

As a general rule, a comparison or evaluation of EPD data is only possible when all the data records to be compared have been drawn up in accordance with EN 158084, and the building context and/or product-specific performance features are taken into consideration.

**PUBLISHER / PROGRAM OPERATOR**



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