ENVIRONMENTAL PRODUCT DECLARATION

as per *ISO 14025* and *EN 15804+A2*

Owner of the Declaration	ACO Ahlmann SE & Co. KG
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-ACO-20250409-CBK1-DE
Issue date	18.03.2026
Valid to	17.03.2031

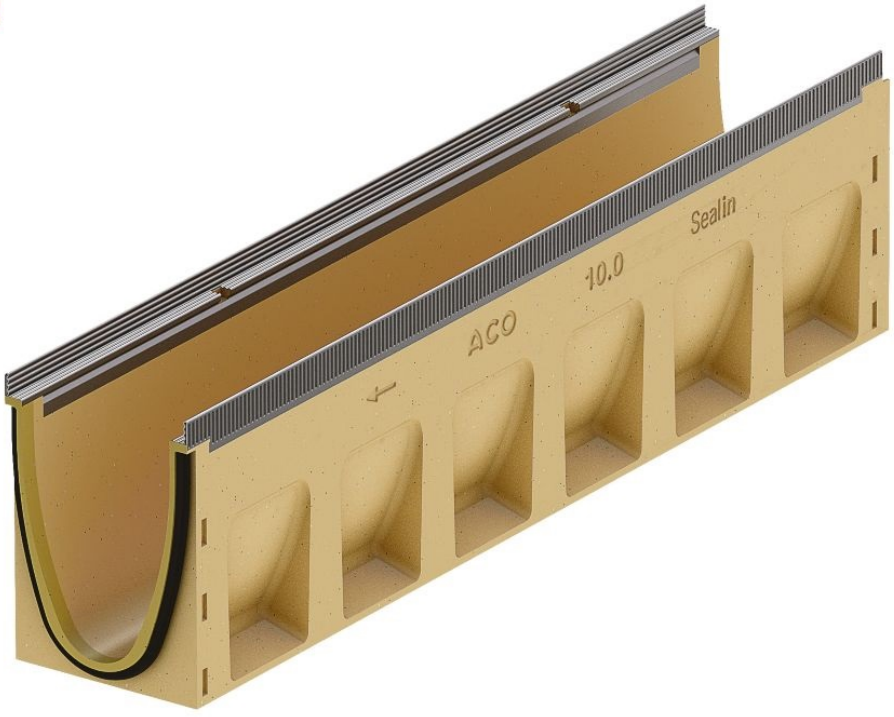
ACO DRAIN® Multiline Seal in V150S Type 10.0

ACO Ahlmann SE & Co. KG

Institut Bauen und Umwelt e.V.

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General Information

ACO Ahlmann SE & Co. KG

Programme holder

IBU – Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

Declaration number

EPD-ACO-20250409-CBK1-DE

This declaration is based on the product category rules:

Line drainage and point drainage products, 01.08.2021
(PCR checked and approved by the SVR)

Issue date

18.03.2026

Valid to

17.03.2031

Dipl.-Ing. Hans Peters
(Chairman of Institut Bauen und Umwelt e.V.)

Florian Pronold
(Managing Director Institut Bauen und Umwelt e.V.)

ACO DRAIN® Multiline Seal in V150S Type 10.0

Owner of the declaration

ACO Ahlmann SE & Co. KG
Am Ahlmannkai -
24782 Büdelsdorf
Germany

Declared product / declared unit

ACO DRAIN® Multiline Seal in V150S Type 10.0 / 1 rm

Scope:

The EPD declares 1 rm of drainage channel ACO DRAIN® Multiline Seal in V150S Type 10.0 (article no. 2003742 / 133350).
As it is declared as Model-EPD, it is also valid for following products:

- Multiline Seal in V150S Type 5.0 (2003736 / 133340)
- Multiline Seal in V150S Type 1 (2003713 / 133301)
- Multiline Seal in V150S Type 2 (2003714 / 133302)
- Multiline Seal in V150S Type 3 (2003715 / 133303)
- Multiline Seal in V150S Type 4 (2003716 / 133304)
- Multiline Seal in V150S Type 5 (2003717 / 133305)
- Multiline Seal in V150S Type 6 (2003718 / 133306)
- Multiline Seal in V150S Type 7 (2003719 / 133307)
- Multiline Seal in V150S Type 8 (2003720 / 133308)
- Multiline Seal in V150S Type 9 (2003721 / 133309)
- Multiline Seal in V150S Type 10 (2003723 / 133310)

The product is manufactured in Büdelsdorf, Germany. The Life Cycle Assessment is based on data covering the reference year 2024.
The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

The EPD was created according to the specifications of EN 15804+A2. In the following, the standard will be simplified as *EN 15804*.

Verification

The standard EN 15804 serves as the core PCR
Independent verification of the declaration and data according to ISO 14025:2011
☐ internally ☒ externally

Dr. Marco Muhl,
(Independent verifier)

Product

Product description/Product definition

The ACO DRAIN® Multiline Seal in is a high-performance drainage channel made of polymer concrete with a factory-integrated seal, ensuring a certified, reliable, and long-lasting joint tightness (*IKT – Institute for Underground Infrastructure gGmbH*). Additionally, the drainage channels feature an integrated edge rail made of galvanized steel.
The ACO DRAIN® Multiline Seal in is available in various nominal widths and load classes from A15 to E600, in accordance with D*IN EN 1433:2002 + AC:2004 + A1:2005*. It is offered in different modular designs (50 cm or 100 cm lengths, with or without a 0.5 % slope, and various overall heights). The drainage channels can be used with different covers and gratings made from a variety of materials. These are declared separately.

The EPD declares 1 rm of drainage channel ACO DRAIN® Multiline Seal in V150S Type 10.0 (article no. 2003742 / 133350). As it is declared as Model-EPD, it is also valid for following products:

- Multiline Seal in V150S Type 5.0 (2003736 / 133340)
- Multiline Seal in V150S Type 1 (2003713 / 133301)
- Multiline Seal in V150S Type 2 (2003714 / 133302)
- Multiline Seal in V150S Type 3 (2003715 / 133303)
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- Multiline Seal in V150S Type 5 (2003717 / 133305)
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- Multiline Seal in V150S Type 7 (2003719 / 133307)
- Multiline Seal in V150S Type 8 (2003720 / 133308)
- Multiline Seal in V150S Type 9 (2003721 / 133309)
- Multiline Seal in V150S Type 10 (2003723 / 133310)

For the placing on the market of the product in the European Union/European Free Trade Association (EU/EFTA) (with the exception of Switzerland) *Regulation (EU) No. 305/2011 (CPR)* applies. The product needs a declaration of performance taking into consideration *DIN EN 1433:2002 + AC:2004 + A1:2005, Drainage channels for vehicular and pedestrian areas - Classification, design and testing requirements, marking and evaluation of conformity* and the CE-marking.
For the application and use the respective national provisions apply.

The ACO Ahlmann SE & Co. KG production site is certified according to the *ISO 50001* energy management system, *ISO 14001* environmental management system and *ISO 9001* quality management system.

Further information about the company, products and contact details can be found on following website: https://www.aco.com

Application

The ACO DRAIN® Multiline Seal in can be used in a variety of way. Their application range covers both public and private areas, especially where efficient and long-lasting drainage is required. Typical applications include urban areas, access roads and pathways, public squares and walkways, parking lots, and pedestrian zones. According to *BRL 5076 (KIWA)*, the ACO DRAIN® Multiline Seal in does not release any harmful emissions into the environment.

Technical Data

The drainage channels are manufactured and certified in accordance with *DIN EN 1433:2002 + AC:2004 + A1:2005 (CE: ED / G1 / 1051)*. All relevant performance declarations can be found in the following table.

Constructional data

Name	Value	Unit
Load bearing capacity (acc. to DIN EN 1433 and DIN EN 124-1) *1	15-600	kN
Max. gap dimension (acc. to DIN EN 1433 and DIN EN 124-1)	7	mm
Edge Rail Protection (acc. to DIN EN 1433) *2	4	mm
Tolerances of the dimension – length (acc. to DIN EN 1433)	± 2	mm
Tolerances of the dimension – width (acc. to DIN EN 1433)	± 2	mm
Tolerances of the dimension – height (acc. to DIN EN 1433)	± 2.6	mm
Bending strength (acc. to. DIN EN 1433)	≥ 22	N/mm^2
Compressive strength (acc. to DIN EN 1433)	≥ 90	N/mm^2
Water Tightness (30 min) (acc. to DIN EN 1433)	fulfilled	-
Density	2100-2300	kg/m^3

*1 Depends on installation scenario and grating.
*2 Required for load bearing capacity 400 kN and above.

Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to *EN 1433:2002 + AC:2004 + A1:2005*.

Base materials/Ancillary materials

The ACO DRAIN® Multiline Seal in is made of polymer concrete, which contains sand, gravel, calcium carbonate, unsaturated polyester resin and additives. The integrated edge rail is made of galvanized steel. The polymer concrete represents approx. 89–96 wt. % of the product, the integrated edge rail approx. 4–10 wt. %, and the seal less than 1 wt. %.
This product/article/at least one partial article contains substances listed in the candidate list (date: 10.03.2025) exceeding 0.1 percentage by mass: **no**
This product/article/at least one partial article contains other carcinogenic, mutagenic, reprotoxic (CMR) substances in categories 1A or 1B which are not on the candidate list, exceeding 0.1 percentage by mass: **no**
Biocide products were added to this construction product or it has been treated with biocide products (this then concerns a treated product as defined by the (EU) Ordinance on Biocide Products No. 528/2012): **no**

Reference service life

The ACO DRAIN® Multiline Seal in is a long-lasting product, and its service life is highly dependent on the mechanical load, external environmental influences as well as the lifespan of the surrounding infrastructure. Based on the service life data of selected components from the *"Institut für Erhaltung und Modernisierung von Bauwerken e. V. (IEMB 2008)"*, the life span corresponds to 50 years.
Polymer concrete drainage channels are highly durable due to chemical resistance, low water absorption, and mechanical stability (certified according to *DIN EN 1433:2002 + AC:2004 +*

A1:2005). Through proper planning, installation, and maintenance in accordance with recognized technical standards, they can maintain their performance in the long term, even under demanding conditions such as high mechanical loads or varying environmental influences.

LCA: Calculation rules

Declared Unit
The declared unit is 1 rm of the line drainage, with 33.9 kg/rm.

Declared unit

Name	Value	Unit
Declared unit	1	rm
Mass reference	33.9	kg/rm

System boundary
The type of the EPD is "cradle-to-gate" with options. The modules considered in the Life Cycle Assessment are modules A1-A3, A4, A5, C and D. The declaration for module B is excluded as the product does not cause any environmental impacts during its service life.

Modules A1-A3
The product stage involves raw material supply, the transport of the raw materials and the manufacturing process, including all energy and water consumption during manufacturing. The production of the packaging is also included in module A3.
For the environmental impact, the use of green electricity was calculated. The proportion of the electricity demand covered by green electricity in the total electricity demand is 100 %. The renewable electricity mix was selected based on guarantees of origin and the dataset used has a total GWP of 0.00638 kg CO_2-eq./kWh.

Module A4
This module considers the environmental impact of transport from the production site to the construction site.

Module A5
The assembly stage is indicated without machinery, underground preparation and concrete foundation, as different quantities are required for the installation depending on the surrounding and the application of the load class.
The environmental impacts in this module derive from the waste treatment of the packaging material, plastics and wooden material get incinerated.

Module C1
For demolition the use of an electrically operated machine is considered.

Module C2
This module includes the transport to waste treatment.

Module C3
This module includes the environmental impacts of waste treatment of the product at the end of life. The waste processing covers sorting and crushing of the concrete component before it gets recycled. For the concrete and metal components, a 100 % recycling rate is assumed. The seal is designated for thermal treatment with energy recovery.

Module C4
No landfilling scenario is considered for the Life Cycle Assessment, so this module is declared zero.

Module D
This module includes potential benefits from the recycling of primary materials used in the declared product, such as the use of recycled concrete aggregate as a substitute for primary gravel. Also, the steel part is assumed to be recycled and leads to reduced primary production. It also considers energy recovery from the thermal treatment of the seal and packaging materials, like wooden pallets. This recovered energy reduces the need for primary energy production, represented by the European electricity mix, and contributes to environmental benefits.

Geographic Representativeness
Land or region, in which the declared product system is manufactured, used or handled at the end of the product´s lifespan: Global

Comparability
Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to *EN 15804* and the building context, respectively the product-specific characteristics of performance, are taken into account. The life cycle assessment is executed with the software L*CA for Experts by Sphera Solutions GmbH* and the background database *ecoinvent* version 3.9.1.

LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon
The product does not contain biogenic carbon. The packaging (euro-pallet and wooden strips) contains 0.15 kg biogenic carbon for the declared unit of 1 rm ACO DRAIN® Multiline Seal in V150S Type 10.0. In module A5, the biogenic carbon of the packaging leaves the product system.

Information on describing the biogenic Carbon Content at factory gate

Name	Value	Unit
Biogenic carbon content in product	-	kg C
Biogenic carbon content in accompanying packaging	0.15	kg C

Note: 1 kg of biogenic carbon is equivalent to 44/12 kg of CO_2.

The following technical information is the basis for the declared modules.

Transport from the gate to the site (A4)
Given that the ACO DRAIN® Multiline Seal in products are distributed across Europe, a road transportation by lorry over 100 km for the product is assumed to facilitate customer and project-specific scaling of module A4.

Name	Value	Unit
Litres of fuel	0.12	l/100km
Transport distance	100	km
Capacity utilisation (including empty runs)	67	%

Assembly (A5)

The product gets unpacked, and the packaging material is added to the thermal recycling. No material losses occur during installation.

Name	Value	Unit
Euro-pallet (*18 MJ/kg)	0.188	kg
Wooden strip (*18 MJ/kg)	0.150	kg
PET Strap (*18 MJ/kg)	0.014	kg

*Heating value

End of life (C1-C4)

Name	Value	Unit
Machine operation, electrically (C1)	1.7	MJ/rm
Litres of fuel (C2)	0.12	l/100km
Transport distance (C2)	50	km
Capacity utilization (including empty runs) (C2)	67	%
Collected as mixed construction waste (C3)	33.9	kg
Recycling (C3)	33.87	kg
Energy recovery (C3)	0.03	kg
Landfilling (C4)	-	kg

Reuse, recovery and/or recycling potentials (D), relevant scenario information

In module D, the potential benefits from recycling the product and energy recovery from the incineration of plastics and packaging are declared. For the benefits, only primary and no secondary materials were considered. A 100 % collection rate is assumed. Recycling losses are considered material-specific. Energy recovery from the incineration of plastic and wood packaging yields both thermal and electrical energy and are based on standard recovery rates from typical waste-to-energy plants, taken from the documentation of *ecoinvent* datasets: 7.7 MJ/kg (thermal) and 3.9 MJ/kg (electrical) for plastic, and 3.5 MJ/kg (thermal) and 1.7 MJ/kg (electrical) for wood.

LCA: Results

In the table "Description of the system boundary", all declared modules are indicated with an "X". Module B is not relevant for the product system, so modules B1, B2, B6 and B7 are indicated as "MND" (As default, the modules B3, B4, B5 are marked as MNR – module not relevant). In accordance to *EN 15804+A2* the characterization method based on EF 3.1 is used.

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR NOT DECLARED; MNR = MODULE NOT RELEVANT)

Product stage			Construction process stage		Use stage							End of life stage				Benefits and loads beyond the system boundaries
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	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	MNR	MNR	MNR	MND	MND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 rm ACO DRAIN® Multiline Seal in V150S Type 10.0

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO_2 eq	1.86E+01	5.13E-01	5.28E-01	1.76E-01	2.54E-01	4.3E-01	0	-2.62E+00
GWP-fossil	kg CO_2 eq	1.88E+01	5.12E-01	3.4E-02	1.7E-01	2.53E-01	4.28E-01	0	-2.62E+00
GWP-biogenic	kg CO_2 eq	-2.78E-01	4.08E-04	4.94E-01	5.77E-03	2.02E-04	2E-03	0	2.34E-03
GWP-luluc	kg CO_2 eq	1.23E-02	2.5E-04	1.47E-06	4.24E-04	1.24E-04	2.04E-04	0	-1.62E-03
ODP	kg CFC11 eq	1.05E-06	1.16E-08	9.79E-11	3.23E-09	5.75E-09	6.61E-09	0	-5.04E-08
AP	mol H^+ eq	7.84E-02	1.27E-03	6.02E-05	9.72E-04	6.27E-04	2.83E-03	0	-1.1E-02
EP-freshwater	kg P eq	5.09E-03	3.78E-05	2.34E-06	1.61E-04	1.87E-05	6.92E-05	0	-1.16E-03
EP-marine	kg N eq	1.59E-02	3.47E-04	3.28E-05	1.58E-04	1.72E-04	1.18E-03	0	-2.65E-03
EP-terrestrial	mol N eq	1.63E-01	3.54E-03	3.09E-04	1.42E-03	1.75E-03	1.27E-02	0	-2.82E-02
POCP	kg NMVOC eq	2.67E-01	2.07E-03	7.84E-05	4.58E-04	1.02E-03	3.89E-03	0	-1.29E-02
ADPE	kg Sb eq	1.31E+01	1.43E-06	9.56E-09	2.03E-06	7.09E-07	8.66E-07	0	-4.59E-06
ADPF	MJ	3.88E+02	7.85E+00	5.27E-02	4.25E+00	3.89E+00	5.81E+00	0	-3.61E+01
WDP	m^3 world eq deprived	9.57E+00	5.24E-02	-3.18E-03	1.31E-01	2.59E-02	1.13E-01	0	-9.49E-01

GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential)

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 rm ACO DRAIN® Multiline Seal in V150S Type 10.0

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	2.13E+01	1.14E-01	5.47E+00	8.4E-01	5.64E-02	2.7E-01	0	-1.4E+00
PERM	MJ	5.58E+00	0	-5.47E+00	0	0	0	0	0
PERT	MJ	2.69E+01	1.14E-01	1.18E-03	8.4E-01	5.64E-02	2.7E-01	0	-1.4E+00
PENRE	MJ	2.82E+02	7.85E+00	3.05E-01	4.25E+00	3.89E+00	1.12E+02	0	-3.61E+01
PENRM	MJ	1.06E+02	0	-2.52E-01	0	0	-1.06E+02	0	0
PENRT	MJ	3.88E+02	7.85E+00	5.27E-02	4.25E+00	3.89E+00	5.81E+00	0	-3.61E+01
SM	kg	1.83E-01	0	0	0	0	0	0	3.41E+01
RSF	MJ	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0
FW	m^3	2.33E-01	1.22E-03	-7.42E-05	3.04E-03	6.03E-04	2.63E-03	0	-2.21E-02

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 net fresh water

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 rm ACO DRAIN® Multiline Seal in V150S Type 10.0

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
HWD	kg	2.01E-03	4.83E-05	2.58E-07	6.76E-06	2.39E-05	3.04E-05	0	-2.27E-04
NHWD	kg	2.38E+01	7.59E-01	9.19E-03	1.05E-01	3.76E-01	6.23E+00	0	-2.94E+00
RWD	kg	2.56E-04	2.37E-06	1.39E-08	2.75E-05	1.17E-06	8.15E-06	0	-2.83E-05
CRU	kg	0	0	0	0	0	0	0	0
MFR	kg	4.07E-01	0	0	0	0	3.39E+01	0	0

MER	kg	0	0	0	0	0	0	0	0
EEE	MJ	0	0	5.29E-01	0	0	1.09E-01	0	0
EET	MJ	0	0	1.06E+00	0	0	2.14E-01	0	0

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional:
1 rm ACO DRAIN® Multiline Seal in V150S Type 10.0

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PM	Disease incidence	9.84E-07	3.83E-08	6.01E-10	3.28E-09	1.9E-08	1.93E-07	0	-1.91E-07
IR	kBq U235 eq	1.06E+00	9.81E-03	5.62E-05	1.07E-01	4.85E-03	3.21E-02	0	-1.14E-01
ETP-fw	CTUe	2.81E+02	3.69E+00	5.4E-02	6.48E-01	1.82E+00	2.46E+00	0	-9.6E+00
HTP-c	CTUh	4.29E-07	2.4E-10	1.63E-11	9.48E-11	1.19E-10	1.84E-10	0	-1.33E-08
HTP-nc	CTUh	2.35E-07	4.83E-09	7.57E-10	3.37E-09	2.39E-09	2.39E-09	0	-1.87E-08
SQP	SQP	1.3E+02	7.89E+00	1.34E-02	7.74E-01	3.9E+00	4.46E+00	0	-9.67E+00

PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index

Disclaimer 1 – for the indicator 'Potential Human exposure efficiency relative to U235'. This impact category deals mainly with the eventual impact of low-dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure or radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, radon and from some construction materials is also not measured by this indicator.

Disclaimer 2 – for the indicators 'abiotic depletion potential for non-fossil resources', 'abiotic depletion potential for fossil resources', 'water (user) deprivation potential, deprivation-weighted water consumption', 'potential comparative toxic unit for ecosystems', 'potential comparative toxic unit for humans – cancerogenic', 'Potential comparative toxic unit for humans - not cancerogenic', 'potential soil quality index'. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high as there is limited experience with the indicator.

Disclaimer 3 – for the waste indicators 'Hazardous waste disposed', 'Non-hazardous waste disposed', 'Radioactive waste disposed'. The results of these environmental impact indicators shall be used with care, as there are some uncertainties in these results.

References

Standards

DIN EN 1433
DIN EN 1433:2002 + AC:2004 + A1:2005, drainage channels for vehicular and pedestrian areas - Classification, design and testing requirements, marking and evaluation of conformity.

EN 15804
EN 15804:2012+A1 2013, Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products.

EN 15804
EN 15804:2012+A2:2019+AC:2021, Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products.

ISO 14025
EN ISO 14025:2011, Environmental labels and declarations — Type III environmental declarations — Principles and procedures.

ISO 14001
DIN EN ISO 14001:2015-11, Environmental management systems - Requirements with guidance for use (ISO 14001:2015)

ISO 50001
DIN EN ISO 50001:2018-12, Energy management systems - Requirements with guidance for use (ISO 50001:2018)

ISO 9001
DIN EN ISO 9001:2015-11, Quality management systems - Requirements (ISO 9001:2015)

Further References

Candidate List of SVHC
European Chemicals Agency (ECHA) Candidate List of Substances of Very High Concern (SVHC) for Authorisation https://echa.europa.eu/candidate-list-table (dated 10.03.2025)

IBU 2022
Institut Bauen und Umwelt e.V.: General Instructions for the EPD programme of Institut Bauen und Umwelt e.V., Version 2.1, Berlin: Institut Bauen und Umwelt e.V., 2022
www.ibu-epd.com

IEMB 2008
Nutzungsdauerangaben von ausgewählten Bauteilen und Bauteilschichten des Hochbaus für den Leitfaden 'Nachhaltiges Bauen' (Information on the service life of selected components and component layers in building construction for the "Sustainable Building" guideline), p. 113, No. 1299, Institut für Erhaltung und Modernisierung von Bauwerken e. V., TU Berlin, 2008

IKT
Nachweis der Dichtigkeit über 72 Stunden (according to DIN EN 1433), IKT Institute for Underground Infrastructure gGmbH, 2023

KIWA BRL5076
BRL 5076: Vooraf vervaardigde polymeerbeton producten (engl. Technical Requirements for Polymer Concrete Products). KIWA, 2015

Ordinance on Biocide Products
European Chemicals Agency (ECHA)
https://echa.europa.eu/regulations/biocidal-productsregulation/understanding-bpr
https://echa.europa.eu/regulations/biocidal-productsregulation/legislation (dated 10.03.2025)

PCR Part A
Institut Bauen und Umwelt e.V., Berlin: Product Category Rules for Construction Products from the range of Environmental Product Declarations of Institut Bauen und Umwelt (IBU), Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Background Report according to EN 15804 +A2, version 1.4, 04/2024

PCR Part B
Institut Bauen und Umwelt e.V., Berlin: Product Category Rules for Construction Products from the range of Environmental Product Declarations of Institut Bauen und Umwelt (IBU), Part B: Requirements on the EPD for Line drainage and point drainage products, version 11, Institut Bauen und Umwelt e.V., 08/2024

Regulation (EU) No. 305/2011
Regulation (EU) No. 305/2011 (CPR) of the European Parliament and of the Council, laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC, 09.05.2011

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Software: LCA for Experts, Software System for Life Cycle Engineering, Version 10.9, Sphera Solutions GmbH, 2025
Database: Ecoinvent 3, Version 3.9.1, Swiss Center of Life Cycle Inventories, 2022

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