ENVIRONMENTAL PRODUCT DECLARATION

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

Owner of the Declaration	SWARCO AG
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-SWA-20240355-CBC1-EN
Issue date	06.03.2025
Valid to	05.03.2030

SWARCOFLEX retroreflective glass beads
SWARCO

Institut Bauen und Umwelt e.V.

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Road Marking Systems

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Road Marking Systems

General Information

SWARCO

Programme holder

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

Declaration number

EPD-SWA-20240355-CBC1-EN

This declaration is based on the product category rules:

Lightweight aggregates / Bulk granulate, 01.08.2021
(PCR checked and approved by the SVR)

Issue date

06.03.2025

Valid to

05.03.2030

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

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

SWARCOFLEX retroreflective glass beads

Owner of the declaration

SWARCO AG
Blattenwaldweg 8
6112 Wattens
Austria

Declared product / declared unit

1 kg of SWARCOFLEX retroreflective glass beads.
Gross density (1500 kg/m3)

Scope:

This Environmental Product Declaration (EPD) applies to SWARCOFLEX retroreflective glass beads, which are used primarily to enhance road safety by improving the nighttime visibility of road markings. The EPD is a weighted average EPD representing data from two production sites:

- M. Swarovski GmbH in Neufurth, Austria
- SWARCO VESTGLAS GmbH in Recklinghausen, Germany

This EPD covers the declared product manufactured at two sites, which together account for 100 % of the product's annual production. The LCA results from both sites were aggregated into a weighted average (48 %, 52 %). Consequently, this is an average EPD representing both locations. The EPD type is classified as 'From cradle to gate with options, including Modules A4–A5, C1–C4, and D.
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.-Ing. Nikolay Minkov,
(Independent verifier)

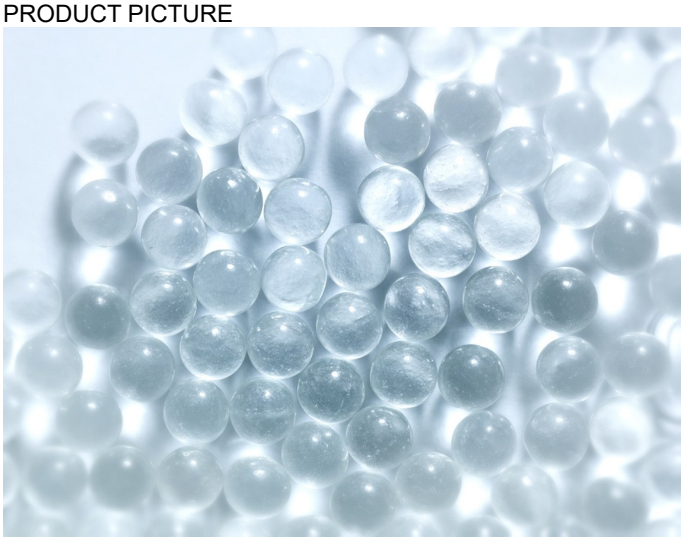
Road Marking Systems

Product

Product description/Product definition

SWARCOFLEX retroreflective glass beads are high-quality reflective materials specifically designed for use in road markings. These beads are available in particle size ranges from approximately 95 to 1000 micrometres, ensuring optimal retroreflective properties across various road marking applications. The product complies with the harmonized standards *EN 1423* and *EN 1424*, making it suitable for a wide range of road marking systems, including thermoplastics, solvent-based and water-based paints, and cold plastics.

PRODUCT PICTURE



The retroreflective glass beads are engineered to provide high retroreflection. They can be optionally coated with organosilanes to improve bonding with the marking material and thus increasing the durability of road markings. Furthermore, SWARCOFLEX beads can be intermixed with anti-skid particles upon customer request to enhance road safety by improving skid resistance.

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 *EN 1423:2012*, Glass beads and antiskid aggregates for road marking materials and the CE-marking. For the application and use, the respective national provisions apply.

Application

SWARCOFLEX retroreflective glass beads are primarily applied to improve nighttime visibility of road markings. The glass beads also protect the road marking material from abrasion by passing vehicles, thus prolonging durability. The main application method involves the drop-on process, where the beads are distributed onto freshly applied road marking material while it is still in a liquid state. The drop-on application can be executed mechanically or manually.

MECHANICAL DROP-ON

MANUAL DROP-ON

In addition to drop-on applications, SWARCOFLEX retroreflective glass beads can also be integrated directly into the road marking matrix during the production of thermoplastics, cold plastics, or similar marking materials. These products are ideal for use in various environments, including highways, urban roads, parking lots, and airport runways.

Excluded Applications: Applications beyond road markings, such as industrial blasting or filler beads, are not covered by this Environmental Product Declaration (EPD) or the corresponding Life Cycle Assessment (LCA). Additionally, the prepared mix products with SWARCOFLEX with other non-retroreflective bead types is excluded from the scope of this study.

Technical Data

SWARCOFLEX retroreflective glass beads are manufactured at two certified production facilities: M. Swarovski GmbH in Neufurth, Austria, and SWARCO VESTGLAS GmbH in Recklinghausen, Germany. Both facilities operate under stringent quality control measures and are certified according to the following standards: *ISO 9001* (Quality Management); *ISO 14001* (Environmental Management); *ISO 50001* (Energy Management)

The production process is audited regularly by external certification bodies to ensure compliance with the EU Construction Products Regulation (CPR). The following technical specifications apply to SWARCOFLEX retroreflective glass beads:

- Standards of technical data: Refractive Index: Class A standard (complies with *EN 1423/EN 1424*).
- Optional Additives: Anti-skid particles (e.g., corundum or crushed ceramics) upon request.
- Declaration of Performance: Performance declaration according to the Construction Products Regulation No. 305/2011 and Delegated *Regulation (EU) No. 574/2014*.
- LE-No./DoP-No: 100/1
- Certificate: Certificate of constancy of performance No. 1085 - CPR - 0625

Constructional data

Name	Value	Unit
Bulk density	~ 1.5	g/cm³
Particle size	95-1000	µm
Roundness	≥ 80	%
Refractive index (Class A according to EN 1423)	≥ 1.5	

Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to *EN 1423:2012*, Glass beads and antiskid aggregates for road marking materials.

Base materials/Ancillary materials

The SWARCOFLEX retroreflective glass beads do not include anti-skid materials or other types of glass beads used in blends for drop-on applications. Additionally, they do not contain substances of very high concern (SVHC) as defined by Article 59(10) of *Regulation (EC) No. 1907/2006* (*REACH* candidate list, dated 2024-01-23), at concentrations at or above 0.1 % by weight.
The Bill of Materials (BOM) has been normalized to represent the composition of SWARCOFLEX retroreflective glass beads, and the packaging BOM adjusted accordingly to maintain consistency.

Composition of SWARCOFLEX retroreflective glass beads

Name	Value	Unit
Glass cullet	99.98-99.99	%
Coating / Organosilane	0.01-0.02	%
TOTAL	100	%

Composition of packaging of SWARCOFLEX retroreflective glass beads

Name	Value	Unit
Pallet	83-87	%
Bags	13-14	%
PE packaging	1-4	%
TOTAL	100	%

Reference service life

The wear and durability of glass beads and road markings vary significantly depending on the geographical area and climatic conditions in which they are used. Under these circumstances, it is not possible to define a standardized service life for SWARCOFLEX retroreflective glass beads due to the wide range of operating conditions.
In warmer climates like Southern Europe and colder regions like Scandinavia, conditions vary widely, resulting in the service life of road markings with SWARCOFLEX retroreflective glass beads ranging from 0.5 to 10 years. Factors like the selection of the material for the coating layer of road markings, winter maintenance, traffic load and type, temperature, and humidity significantly impact the durability of the road markings and the beads, making a standardised service life impossible to calculate. The service life of road markings dictates that local conditions must be considered for a realistic estimate.

LCA: Calculation rules

Declared Unit

The conversion from kilograms (kg) to cubic meters (m³) is based on the bulk density of 1,500 kg/m³.

Name	Value	Unit
Gross density	1500	kg/m^3
Declared unit	1	kg

Other declared units are allowed if the conversion is shown transparently.

Data quality, representativeness and robustness of the LCA values: As this is an average EPD, the calculations and values presented here are based on the mass-weighted production amounts from each site for the year 2023. Data collection for both sites was carried out using identical LCA software and the same background database (*Ecoinvent v3.8*). Site-specific and geographically divergent processes or resources were taken into account.

System boundary

The EPD type is classified as 'From cradle to gate with options, including Modules A4–A5, C1–C4, and D.
The system boundaries define the processes and life cycle modules considered within this Life Cycle Assessment (LCA) of SWARCOFLEX retroreflective glass beads. This EPD is based on a modular approach in accordance with *EN 15804*. The following life cycle modules are included in this study:

- A1-A3: Raw material supply, transport, and manufacturing
- A4-A5: Transport and assembly
- C1-C4: Demolition, transport, waste processing, and disposal
- D: Reuse, recovery, or recycling potential

The methodological framework excludes wooden pallets as they are classified as capital goods due to their reuse in a return system. Their transport weight, however, is included in Module A4. Biogenic carbon related to pallet production and disposal is not considered, ensuring compliance with *EN 15804* and PCR 1.4 requirements.

A1 – A3: Product stage

A1 – Raw material supply: The first step in the production of SWARCOFLEX retroreflective glass beads is the procurement of a recycled flat glass cullet. The quality of the cullet is decisive for the final quality of the beads, as it directly influences the reflectivity and physical properties of the finished glass beads.

All relevant resources, materials and services in production phase A1 have been included in this study.

A2 – Transport: The flat glass (the main raw material) is transported to the production site by lorries. Other raw materials are also delivered by lorries.

All relevant transports to M. Swarovski GmbH's and SWARCO VESTGLAS GmbH's production plants have been included in this study. These LCA database references were calculated for an average load factor of 50 % (i.e. fully loaded transport from the supplier with empty returns).

A3 – Manufacturing: The production process begins with crushing, grinding, and sieving of the glass cullet, followed by the formation of glass beads in a state-of-the-art vertical shaft furnace with cooled or non-insulated flame guide. This beading process is essential for achieving the desired size and reflective properties of the beads. Afterward, the glass beads can be coated with organosilanes and then packaged in bags or FIBC big bags.

A4-A5: Construction process stage

A4 – Transport from the gate to the site:
Transport is modeled for truck shipment within Europe. The glass beads' weight and transport routes to road marking companies were averaged using internal sales data. This included distances from production sites to customer warehouses and an assumed average of 80 km from the warehouses to construction sites, based on typical locations in Germany (Hitzblech GmbH) and in Austria (SWARCO Markierung GmbH). Energy consumption and emissions were calculated based on transport distance and load weight.

A5 – Assembly:
Product installation is done manually or with machines. Transport, fuel consumption and emissions, and waste management for packaging (e.g., paper, plastic) were considered. The results are allocated by mass between glass beads and other road marking materials (e.g., paint) that utilize the machines.

B1 – B7: Use stage
The use stage (B1-B7) is excluded from the study as SWARCOFLEX retroreflective glass beads is a passive product, meaning it does not consume resources or energy during use, nor produce related environmental impacts. Potential particle release due to traffic wear is not considered due to insufficient knowledge and the lack of a relevant particle flow indicator in the methodology.

C1 – C4: End-of-life stage
To gain a comprehensive overview of the end-of-life scenarios for road markings, questions were posed to the two largest marking companies in Austria and Germany. The aim was to gain an insight into the ecological footprint of SWARCOFLEX retroreflective glass beads.

C1 – Deconstruction/Demolition: During the removal of the road markings, which relate to all C-stages, different scenarios were evaluated together with the aforementioned road marking companies. Accordingly, we have modelled the share where the road marking is removed without the asphalt. The case where the marking is removed along with the asphalt and recycled together is not considered here, as the share of glass beads in asphalt is less than 1 %, making their impact negligible.

C2 – Transport: In this stage, the transport of materials from the deconstruction location to the waste treatment facility or landfill site is considered.

C3 – Waste processing: No specific waste processing activities are modelled for SWARCOFLEX retroreflective glass beads in Module C3. Module C3 is set to zero in this assessment.

C4 – Disposal: In this stage, the final disposal of waste materials (glass waste) is addressed. The amount of waste and corresponding emissions are calculated based on the remaining materials after the product's functional service life.

D: Benefits and loads beyond the system boundaries
No credits or benefits are modelled for the recycling or reuse of the product itself. Module D addresses the potential environmental benefits and loads associated with the end-of-life management of packaging materials used for SWARCOFLEX retroreflective glass beads. These benefits include:

- Recycling: Packaging materials, such as paper and plastics, are recycled where possible, contributing to reduced demand for virgin materials.
- Energy Recovery: Incineration of packaging materials generates energy, which is accounted for as a credit in Module D.

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

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 was carried out using the software *Ecochain Helix 4.3.1 (© 2023 Ecochain Technologies B.V.)*. The Ecoinvent v3.8 database was used for the background data, which provides a comprehensive and up-to-date basis for calculating environmental impacts.

LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon

SWARCOFLEX retroreflective glass beads do not contain biogenic carbon. However, the packaging, specifically the paper bags, includes biogenic carbon, which is considered in the environmental assessment.

Biogenic carbon content

In the table below the biogenic carbon content of paper bags is shown (calculated and considered in A1 phase – raw material purchasing). The table shows the value at the end of A3 - Cradle-to-Gate.

Name	Value	Unit
Product Carbon content	0.00000	kg C
Packaging Carbon content	0.00102	kg C

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

The average GWP of the electricity mix used in modules A1-A3, considering the respective electricity sources at different production sites, is 0.6217 kg CO_2e/kWh.

LCA Scenarios and Additional Technical Information

The following scenarios describe the life cycle stages modelled after the production phase (A1–A3):

A4 – Transport from the gate to the site

Name	Value	Unit
Litres of fuel	-	l/100km
Transport distance	963	km
Capacity utilisation (including empty runs)	50	%
Gross density of products transported	1500	kg/m^3
Capacity utilisation volume factor	-	-

A5 – Assembly

Name	Value	Unit
Other resources Diesel consumption	1.8	MJ/kg

End-of-life (C1 - C4)

Name	Value	Unit
Collected separately waste type waste type	0.025	kg
Collected as mixed construction waste	0.475	kg
Reuse	-	kg
Recycling (together with asphalt)	0.475	kg
Energy recovery	-	kg
Landfilling	0.025	kg

It is assumed that at end-of-service life, half of the beads are lost through abrasion. Of the remainder, only 5 % is removed from the asphalt and landfilled. In all other cases, a new marking is applied over the existing one, or the marking is removed along with the asphalt and recycled. Since the share of glass beads in recycled asphalt is under 1 %, their impact is negligible and not considered further.

D - Benefits and Loads Beyond System Boundaries

Name	Value	Unit
Paper bags recycling	70.5	%
Paper bag incineration	29.5	%
PE packaging landfill	17.3	%
PE packaging recycling	37.8	%
PE packaging incineration	44.9	%

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LCA: Results

Declared Unit

The declared unit is "1 kilogram of SWARCOFLEX retroreflective glass beads", including the associated packaging. This unit is used to quantify the environmental impacts across the product's life cycle, including production, construction, end-of-life, disposal, and recycling.

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:

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO_2 eq	1.11E+00	1.3E-01	1.95E-01	1.85E-01	2.72E-04	0	1E-04	-2.56E-03
GWP-fossil	kg CO_2 eq	1.09E+00	1.3E-01	1.91E-01	1.85E-01	2.72E-04	0	1E-04	-2.54E-03
GWP-biogenic	kg CO_2 eq	1.39E-02	4.81E-05	3.81E-03	3.51E-05	1.01E-07	0	7.8E-08	-1.66E-05
GWP-luluc	kg CO_2 eq	1.19E-04	5.28E-05	2.63E-05	2.59E-05	1.11E-07	0	2.26E-08	-3.44E-06
ODP	kg CFC11 eq	2E-07	3.05E-08	4.1E-08	4.01E-08	6.38E-11	0	4.97E-11	-3.3E-10
AP	mol H^+ eq	1.34E-03	7.36E-04	1.86E-03	1.81E-03	1.54E-06	0	9.84E-07	-9.55E-06
EP-freshwater	kg P eq	3.45E-05	9.55E-07	7.28E-07	7.12E-07	2E-09	0	6.39E-10	-8.75E-08
EP-marine	kg N eq	3.98E-04	2.65E-04	8.1E-04	7.91E-04	5.54E-07	0	3.71E-07	-2.46E-06
EP-terrestrial	mol N eq	4.04E-03	2.91E-03	8.88E-03	8.68E-03	6.1E-06	0	4.08E-06	-3E-05
POCP	kg NMVOC eq	1.31E-03	8.33E-04	2.45E-03	2.39E-03	1.74E-06	0	1.17E-06	-8.81E-06
ADPE	kg Sb eq	4.93E-07	4.35E-07	1.66E-07	1.64E-07	9.11E-10	0	1.96E-10	-7.87E-09
ADPF	MJ	1.81E+01	2E+00	2.64E+00	2.58E+00	4.18E-03	0	3.25E-03	-5.5E-02
WDP	m^3 world eq deprived	2.63E-02	6.56E-03	4.81E-03	4.68E-03	1.37E-05	0	1.03E-05	-9.95E-04

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:

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	5.54E-01	2.87E-02	1.82E-02	1.78E-02	6.01E-05	0	6.61E-05	-3.77E-02
PERM	MJ	0	0	0	0	0	0	0	0
PERT	MJ	5.54E-01	2.87E-02	1.82E-02	1.78E-02	6.01E-05	0	6.61E-05	-3.77E-02
PENRE	MJ	1.99E+01	2.12E+00	2.8E+00	2.74E+00	4.44E-03	0	3.45E-03	-5.98E-02
PENRM	MJ	0	0	0	0	0	0	0	0
PENRT	MJ	1.99E+01	2.12E+00	2.8E+00	2.74E+00	4.44E-03	0	3.45E-03	-5.98E-02
SM	kg	0	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0
FW	m^3	1.51E-03	2.38E-04	1.75E-04	1.7E-04	4.99E-07	0	3.91E-06	-2.05E-05

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:

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
HWD	kg	1.19E-04	5.1E-06	7.15E-06	7.01E-06	1.07E-08	0	3.6E-09	-1.22E-07
NHWD	kg	1.18E-01	1.33E-01	2.77E-02	2.77E-02	2.79E-04	0	2.36E-02	-2.02E-04
RWD	kg	1.61E-05	1.35E-05	1.81E-05	1.78E-05	2.82E-08	0	2.19E-08	-6.3E-08
CRU	kg	0	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0	0	0

MER	kg	0	0	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0	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:

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PM	Disease incidence	8.7E-09	1.43E-08	4.87E-08	4.76E-08	3E-11	0	2.18E-11	-9.22E-11
IR	kBq U235 eq	1.34E-02	8.68E-03	1.13E-02	1.1E-02	1.82E-05	0	1.39E-05	-6.24E-05
ETP-fw	CTUe	6.68E+00	1.58E+00	1.62E+00	1.59E+00	3.31E-03	0	1.8E-03	-3.04E-02
HTP-c	CTUh	1.56E-10	6.31E-11	6.38E-11	6.18E-11	1.32E-13	0	4.11E-14	-8.08E-13
HTP-nc	CTUh	2.23E-09	1.82E-09	1.3E-09	1.28E-09	3.82E-12	0	8.51E-13	-1.99E-11
SQP	SQP	1.56E+00	1.71E+00	6.02E-01	5.98E-01	3.57E-03	0	7.22E-03	-2E-01

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.

References

EN 15804+A2
EN 15804:2012+A2:2019, 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 14040
ISO14040:2006; Environmental management - Life Cycle Assessment – Principles and Framework, International Organization for Standardization

ISO 9001
ISO 9001:2015, Quality management systems — Requirements

ISO 14001
ISO 14001:2015, Environmental management systems — Requirements with guidance for use

ISO 50001
ISO 50001:2018, Energy management systems — Requirements with guidance for use

ISO 14044
ISO 14044:2006-10, Environmental management - Life Cycle Assessment - Requirements and guidelines, International Organization for Standardization

PCR Part A
Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report according to EN 15804+A2:2019, version 1.4, valid as of April 15, 2024

PCR Part B
Lightweight Aggregates / Bulk Granulate, Version 08/2021 .

EN 1423
EN 1423:2012 + AC:2013, Road marking materials – Drop on materials – Glass beads, antiskid aggregates and mixtures of the two

EN 1424
EN 1424:2013, Road marking materials – Premix glass beads

Regulation (EU) No 305/2011 (CPR)
Construction Products, European Commission, 2011.

Regulation (EU) No 574/2014
Commission Implementing Regulation, European Commission, 2014.

REACH Regulation
Candidate List of Substances of Very High Concern for Authorisation

Software/database

Ecochain Helix
Environmental Intelligence Platform for Life Cycle Assessment and Sustainability Management - Ecochain version 4.3.1, 2024

Ecoinvent
Comprehensive Life Cycle Inventory Database for Environmental Impact Assessment; Ecoinvent version 3.8

Publisher

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

+49 (0)30 3087748- 0
info@ibu-epd.com
www.ibu-epd.com

Programme holder

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

+49 (0)30 3087748- 0
info@ibu-epd.com
www.ibu-epd.com

Author of the Life Cycle Assessment

IMPROVE Unternehmensberatung
Schießstandstraße 3
6322 Kirchbichl
Austria

+4366473878283
office@improve.co.at
www.improve.co.at

Owner of the Declaration

SWARCO AG
Blattenwaldweg 8
6112 Wattens
Austria

+43522458770
office.ag@swarco.com
www.swarco.com