Environmental Product Declaration

EPD of multiple products, based on worst-case results. In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

Untreated Bistål
Galvanized Bistål

from

Bistål i Västervik AB

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	S-P-13105
Publication date:	2024-06-13
Valid until:	2029-06-12

An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com

General information

Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	info@environdec.com

Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): Construction products, 2019:14, version 1.3.2
PCR review was conducted by: The Technical Committee of the International EPD System. See www.environdec.com for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact.
Life Cycle Assessment (LCA)
LCA accountability: Sofia Lindroth & Oline Haggren, Miljögiraff AB
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ EPD verification by individual verifier Third-party verifier: David Althoff Palm, Dalemarken AB Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☒ No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

Company information

Owner of the EPD:
Bistål i Västervik AB

Contact:
Kalle Hägg
kalle@bistal.se
0490-13134
Fridkullagatan 5,593 62 Västervik

Description of the organisation:
Established in 2001, our company is the largest supplier in the Nordic region of bistål for efficient and strong masonry reinforcement. In 2009, we built our own modern factory and our machinery consists of three drawing machines, five welding machines, tree straightening and cutting machines, a joining machine and a galvanizing plant. We are known for our high quality and we have efficient internal logistics with high flexibility in the process, which enables us to adapt our production as needed. We can keep a large stock and can therefore maintain a high level of delivery reliability.

Bistål i Västervik has 7 employees and is part of the EBIM group.

Product-related or management system-related certifications:
CE-approved according to harmonized standard and ETA. See all product related certification on Bistal.se[1]

Name and location of production site(s):
Bistål i Västervik, Sweden

Product information

Product name:
Untreated- and galvanized Bistål

Product identification:
The EPD is representable for untreated and galvanized Bistål. The results within this EPD reflects worst-case result of the investigated products, where the galvanized product is used and has a 50% higher GWP-GHG result for modules A1-A3 compared to untreated Bistål.

Product description:
Bistål is reinforcing steel which is placed in the horizontal joints of masonry. The reinforcing steel consists of two longitudinal parallel bars with a circular cross-section joined by short transverse bars to create a ladder-like appearance.

UN CPC code:
41263

Geographical scope:
Sweden

[1] bistal.se/dokumentation/prestandadeklarationer

LCA information

Declared unit:
1 kg Bistål

Database(s) and LCA software used:
Database used is ecoinvent 3.9.1. The data for the steel used at the steel wire supplier is represented by its EPD, Hot rolled steel - Norwegian production from Celsa Armeringsstål AS_SP-04910. The LCA software used is SimaPro 9.5.

Time representativeness & data quality:
The data used to model product manufacturing corresponds to year 2023. No data used is older than 10 years.

Site-specific manufacturing data has been retrieved. Some primary data for upstream materials and production process have been gathered while most upstream and downstream processes have been modelled based on generic data from databases. The collected data was reviewed according to EN 15804 and is deemed as of good quality.

Allocation:
Allocation had to be applied for pre-consumer steel scrap used in as input material and spillage of steel created in the manufacturing process at Bistål.

All pre-consumer steel scrap used in the product has been allocated based on co-product allocation. In accordance with the PCR, a conservative assumption has been made where it is assumed that the pre-consumer steel carries the same environmental impact as virgin material.

The scrap production of steel in the core manufacturing at Bistål is close to 0%. Since the amount of scrap produced in the production process is significantly small, the economic allocation will allocate almost all environmental impact to the main product. Therefore, a conservative approach has been applied were the main product carries all the environmental impact from previous lifecycle steps.

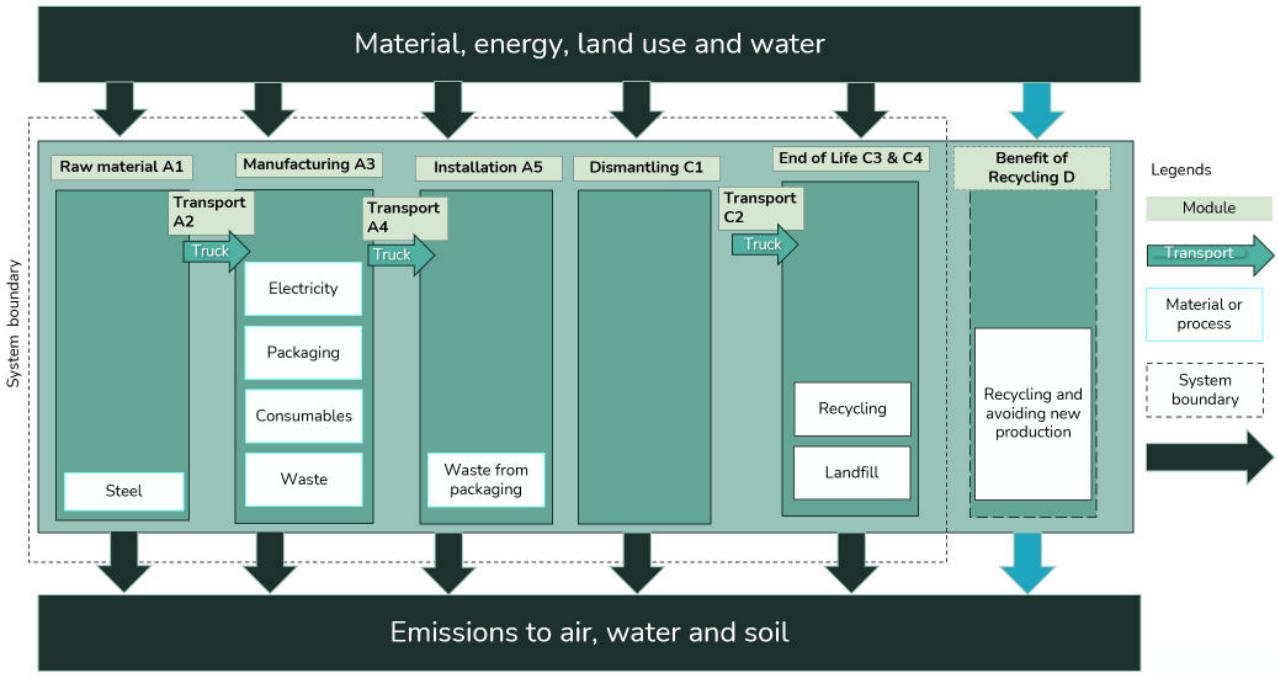
The allocation of waste follows the polluter-pays principle. The system boundary to the subsequent product system is set where the waste (e.g., the discarded product) reaches the end-of-waste state, i.e., when the material has become a usable flow (e.g., for reuse, energy recovery and/or recycling).

Cut-off criteria:
The cut-off criteria established by the PCR is 1% of all material and energy flows to a single unit process and 5% of total inflows (mass and energy) per module. No cut-offs exceeding this limit have been made.

In this study, the infrastructure and capital goods are included in the LCA analysis since it is not possible within reasonable effort to subtract the data on infrastructure/capital goods.

Description of system boundaries:
Cradle to gate with options, modules C1–C4, module D and with optional modules A4 and A5. The product does not have any environmental impact in the use phase, which is why the B modules are not considered.

System diagram:



Manufacturing process & More information:
Steel is transported to the manufacturing in Västervik were all manufacturing takes place: we draw our own wire, weld and galvanize. During this process, electricity is used and there is only a small amount of production waste. The electricity used has been modelled with Nordic residual mix which has a climate impact (GWP-GHG) of 0,501 kg CO2 eq/kWh. The finished products are packaged on wood pallets before distributed to customer.

The distribution transport (A4) is modelled with truck, freight lorry 16-32t, EURO6, load factor 58%, powered with diesel fuel, 230 km.

Installation of the product (A5) is assumed to occur in a way that has no environmental impact, e.g. by hand, what is considered for the installation is the waste treatment of the packaging materials that comes with the product.

After use the product is transported to waste processing and the steel is recycled with an 85% collection and recovery rate according to recycling rates (R2) used in the Circular footprint formula of PEF, as found in Annex C[2]. In the C module deconstruction (C1) is assumed to occur in a way that has no environmental impact, as well as any environmental impact from recycling is not considered following the cut-off approach applied (C3). What is considered in the C module is the transportation to waste processing which is assumed to occur with truck 50km (C2), sorting and preparation of steel scrap for recycling (C3), and disposal (landfill) of waste not sent for recycling (C4).

[2] R2 values, available at https://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml

Modules declared, geographical scope, share of specific data (in GWP-GHG results) and data variation (in GWP-GHG results):

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared	X	X	X	X	X	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	SE/NO	SE	SE	SE	SE	-	-	-	-	-	-	-	SE	SE	SE	SE	SE
Specific data used	49,2%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	33%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

X: Module declared, ND: Module not declared, SE: Sweden, NO: Norway

Content information

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/declared unit
Galvanized steel	1,00	73%	0% & 0 kg C/kg
TOTAL	1,00	73%	0% & 0 kg C/kg
Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	**Biogenic material, weight-% and kg C/declared unit**
Wood pallet	0,02	0%	100% & 0,01 kg C/kg
TOTAL	0,02	0%	100% & 0,01 kg C/kg

The product does not contain any Substances of Very High Concern (SVHC)[3] that exceeds 0.1% of the product weight.

[3] SVHC and the Candidate List of SVHC are available via the European Chemicals Agency Candidate List of substances of very high concern for Authorisation - ECHA (europa.eu)

Results of the environmental performance indicators

EN 15804 reference package based on EF 3.1 has been used for calculating the environmental impact.

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks. It should be noted that the EPD results of modules A1-A3 without considering the results of module C is discouraged.

The variation of the results for Untreated- and Galvanized Bistål and presented under additional information.

Mandatory impact category indicators according to EN 15804

Results per declared unit									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	**1,70E+00**	4,33E-02	2,14E-04	0,00E+00	7,25E-02	2,28E-02	1,24E-02	-1,86E-01
GWP-biogenic	kg CO_2 eq.	**-3,28E-02**	0,00E+00	3,28E-02	0,00E+00	0,00E+00	0,00E+00	2,52E-03	5,39E-04
GWP-luluc	kg CO_2 eq.	**9,38E-04**	2,14E-05	6,51E-08	0,00E+00	6,36E-06	6,17E-05	5,47E-06	-1,51E-04
GWP-total	kg CO_2 eq.	**1,67E+00**	4,34E-02	3,30E-02	0,00E+00	7,25E-02	2,28E-02	1,49E-02	-1,86E-01
ODP	kg CFC 11 eq.	**4,02E-08**	9,43E-10	9,60E-12	0,00E+00	1,30E-09	3,60E-10	8,05E-10	-4,54E-09
AP	mol H^+ eq.	**7,22E-03**	9,47E-05	6,29E-06	0,00E+00	3,39E-04	2,75E-04	5,62E-05	-6,87E-04
EP-freshwater	kg P eq.	**8,07E-05**	3,52E-07	3,65E-09	0,00E+00	1,32E-07	8,59E-07	2,36E-07	-9,57E-06
EP-marine	kg N eq.	**1,71E-03**	2,33E-05	2,97E-06	0,00E+00	1,61E-04	6,42E-05	1,83E-05	-1,51E-04
EP-terrestrial	mol N eq.	**1,74E-02**	2,43E-04	3,40E-05	0,00E+00	1,74E-03	7,34E-04	2,06E-04	-1,78E-03
POCP	kg NMVOC eq.	**4,94E-03**	1,47E-04	9,12E-06	0,00E+00	7,60E-04	2,19E-04	6,48E-05	-9,93E-04
ADP-minerals&metals*	kg Sb eq.	**6,78E-05**	1,42E-07	4,58E-10	0,00E+00	4,06E-08	1,60E-06	6,56E-08	8,53E-08
ADP-fossil*	MJ	**2,57E+01**	6,16E-01	2,19E-03	0,00E+00	8,62E-01	3,28E-01	1,15E-01	-2,13E+00
WDP*	m^3	**3,84E-01**	2,54E-03	5,18E-05	0,00E+00	1,54E-03	4,12E-03	7,13E-04	-1,16E-02
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption								

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*

Additional mandatory and voluntary impact category indicators

Results per declared unit									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[4]	kg CO2 eq.	**1,76E+00**	4,34E-02	2,18E-04	0,00E+00	7,25E-02	2,29E-02	1,24E-02	-1,87E-01
PM	disease inc.	**6,26E-08**	3,22E-09	5,34E-11	0,00E+00	8,73E-09	3,95E-09	9,23E-10	-1,30E-08
IR[5]	kBq U-235 eq	**2,81E-01**	3,12E-04	2,10E-06	0,00E+00	1,66E-04	2,21E-03	1,97E-04	-7,34E-03
ETP – FW*	CTUe	**2,46E+01**	3,04E-01	2,66E-03	0,00E+00	3,69E-01	2,68E-01	9,78E-02	-5,14E-01
HTP – C*	CTUh	**1,28E-09**	1,98E-11	5,90E-12	0,00E+00	8,69E-12	3,89E-11	2,98E-11	-1,04E-09
HTP – NC*	CTUh	**3,43E-08**	4,37E-10	1,16E-11	0,00E+00	1,76E-10	1,76E-09	6,19E-10	-5,50E-10
Land use, SQP*	Pt	**1,44E+01**	3,72E-01	5,68E-04	0,00E+00	9,05E-02	6,26E-01	1,53E-01	-5,57E-01
Acronyms	PM: Particulate Matter, IRP: Ionizing Radiation - Human Health, ETP-FW: Ecotoxicity Potential – Freshwater, HTP-C: Human Toxicity Potential – Cancer, HTP-NC: Human Toxicity Potential – Non-Cancer, SQP: Soil Quality Potential Index								

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*

Disclaimer: The results of the impact categories land use, human toxicity (cancer), human toxicity, non-cancer and ecotoxicity (freshwater) may be highly uncertain in LCAs that include capital goods/infrastructure in generic datasets, in case infrastructure/capital goods contribute greatly to the total results. This is because the LCI data of infrastructure/capital goods used to quantify these indicators in currently available generic datasets sometimes lack temporal, technological and geographical representativeness. Caution should be exercised when using the results of these indicators for decision-making purposes.

[4] This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO_2 is set to zero.

[5] 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 nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

Resource use indicators

The use of primary energy resources is calculated according to option B in Annex 3 in PCR Construction Products v.1.3.2

Results per declared unit									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	**5,83E+00**	9,68E-03	8,78E-05	0,00E+00	4,59E-03	6,44E-02	7,83E-03	-1,75E-01
PERM	MJ	**3,80E-01**	0,00E+00	-3,80E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	**6,21E+00**	9,68E-03	-3,80E-01	0,00E+00	4,59E-03	6,44E-02	7,83E-03	-1,75E-01
PENRE	MJ	**2,69E+01**	6,54E-01	2,36E-03	0,00E+00	9,17E-01	3,46E-01	1,22E-01	-2,24E+00
PENRM	MJ	**3,10E-02**	0,00E+00	-3,10E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	**2,69E+01**	6,54E-01	-2,86E-02	0,00E+00	9,17E-01	3,46E-01	1,22E-01	-2,24E+00
SM	kg	**7,30E-01**	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	**0,00E+00**	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	**0,00E+00**	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m^3	**1,55E-02**	1,03E-04	2,16E-05	0,00E+00	6,09E-05	1,30E-04	1,57E-04	-7,07E-04
Acronyms	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								

Waste indicators

Results per declared unit									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	2,08E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Non-hazardous waste disposed	kg	2,13E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Radioactive waste disposed	kg	4,22E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Output flow indicators

Results per declared unit									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	1,57E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	8,50E-01	0,00E+00	0,00E+00
Materials for energy recovery	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, electricity	MJ	0,00E+00	0,00E+00	9,86E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, thermal	MJ	0,00E+00	0,00E+00	2,30E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Additional information

Comparison of results for Untreated- and Galvanized Bistål

What differs for Untreated- and Galvanized Bistål is that an additional galvanization process in the manufacturing of Galvanized Bistål, part from that the lifecycles are similar. It is therefore mainly the results for the A1-A3 modules that differs for the products.

How the A1-A3 result for GWP-GHG indicator variates are shown below.

A1-A3 result variation in declared indicators		
Impact category	**Unit**	**% variation of Untreated- compared to Galvanized Bistål**
GWP-GHG	kg CO2 eq	-33%

How the A-C results for all declared indicators variates are shown below.

A-C result variation in declared indicators		
Indicator	**Unit**	**% variation of Untreated- compared to Galvanized Bistål**
GWP-fossil	kg CO_2 eq.	-32%
GWP-biogenic	kg CO_2 eq.	-100%
GWP-luluc	kg CO_2 eq.	-49%
GWP-total	kg CO_2 eq.	-32%
ODP	kg CFC 11 eq.	-39%
AP	mol H^+ eq.	-34%
EP-freshwater	kg P eq.	-42%
EP-marine	kg N eq.	-26%
EP-terrestrial	mol N eq.	-29%
POCP	kg NMVOC eq.	-26%
ADP-minerals&metals*	kg Sb eq.	-92%
ADP-fossil*	MJ	-35%
WDP*	m^3	-63%
GWP-GHG	kg CO2 eq	-31%
PM	disease inc.	-14%
IR	kBq U-235 eq	-33%
ETP – FW*	CTUe	-71%
HTP - C*	CTUh	-53%
HTP - NC*	CTUh	-63%
Land use, SQP*	Pt	-16%
PERE	MJ	-13%
PERM	MJ	0%
PERT	MJ	-13%
PENRE	MJ	-35%
PENRM	MJ	0%

PENRT	MJ	-35%
SM	kg	0%
RSF	MJ	0%
NRSF	MJ	0%
FW	m^3	-93%

References

General Programme Instructions of the International EPD® System. Version 4.0.

ISO 14025:2006, Environmental labels and declarations – Type III environmental declarations – Principles and procedures.

ISO 14040:2006, Environmental management – Life cycle assessment – Principles and framework.

ISO (2006c). ISO 14044: 2006, Environmental management – Life cycle assessment – Requirements and guidelines.

PCR Construction, PCR 2019:14, Version 1.3.2

Life Cycle Assessment Of Bistål – Bed Joint Reinforcement by Bistål i Västervik AB, Sofia Lindroth & Oline Haggren, Miljögiraff AB, 2024

EPD®

www.environdec.com