

ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804+A2

Owner of the Declaration	Give Steel A/S
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-GIV-20220239-IBA1-EN
Issue date	31/08/2023
Valid to	30/08/2028

Galvanized Structural Steel Give Steel A/S

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1. General Information

Give Steel A/S

Programme holder

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

Declaration number

EPD-GIV-20220239-IBA1-EN

This declaration is based on the product category rules:

Structural steels, 01/08/2021
(PCR checked and approved by the SVR)

Issue date

31/08/2023

Valid to

30/08/2028



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



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

Galvanized Structural Steel

Owner of the declaration

Give Steel A/S
Sjællandsvej 14
7330 Brande
Denmark

Declared product / declared unit

1 t of galvanized structural steel.

Scope:

The declaration covers galvanized structural steel produced at the production site in Brande, Denmark. The declaration covers all life cycle modules from A1-A5, C1-C4 and D and is based on product-specific data provided by Give Steel A/S and background data from GaBi professional 2020 and Ecoinvent v3.6.

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	
<input type="checkbox"/>	internally
<input checked="" type="checkbox"/>	externally



Mrs Kim Allbury,
(Independent verifier)

2. Product

2.1 Product description/Product definition

This EPD applies to 1 ton of galvanized structural steel. Structural steel constructions from Give Steel are designed and produced according to European design codes and production standards, as well as in compliance with project specifications. While Eurocode 1 and Eurocode 3 apply to the design and civil engineering works, manufacturing is carried out according to *EN 1090* for steel construction.

Furthermore, these codes and standards outline specific product standards for choosing the most appropriate constitute products for each component. Such standards include *EN 10025* which defines the requirements for non-alloy and fine grain weldable structural steels, *EN 10219* for cold formed hollow sections and *EN 13479* and *ISO 544* which sets out the same set of requirements for materials. 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 10025-1:2004* Hot rolled products of structural steels – Part 1: General technical delivery conditions and the CE-marking.

2.2 Application

The product can be used as part elements or as an independent static system, where all parts are made of steel. The product is widely used in numerous construction projects. Examples are:

- Single-story buildings (industrial and storage halls, animal stables, data centres, etc.)
- Multi-story buildings (offices, residential buildings, car parks, etc.)
- Bridges (railway bridge, road bridge, pedestrian bridge, etc.)
- Other structures (Stadiums, convention centres, airports, stations, etc.)

2.3 Technical Data

This EPD is valid for galvanized structural steel of different forms of delivery. Specific information on dimension tolerances, constructional data as well as mechanical and chemical properties can be found in the relevant literature and/or the standards.

Constructional data

Name	Value	Unit
Density	7850	kg/m ³
Modulus of elasticity	210000	N/mm ²
Coefficient of thermal expansion	12	10 ⁻⁶ K ⁻¹
Thermal conductivity	48	W/(mK)
Melting point	1536	°C

Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to *EN 10025*, Hot-rolled products of structural steels.

2.4 Delivery status

The dimensions of the product declared in this EPD may vary depending on the intended application.

2.5 Base materials/Ancillary materials

Material composition

Name	Value	Unit
Scrap steel	78	%
Primary steel	20	%
Welding rod (iron)	1	%
Galvanization (zinc)	1	%

The product constitutes primarily of steel scrap (78 %) and primary steel (20 %). Welding rod (iron) and galvanization (zinc) account for 1 % respectively.

The galvanized structural steel does not contain substances listed in the 'Candidate List of Substances of Very High Concern for Authorisation' (SVHC).

This product/article/at least one partial article contains substances listed in the *candidate list* (date: 23.05.2023) 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**

2.6 Manufacture

The product stage comprises the acquisition of all raw materials, products and energy, transport to the production site, packaging and waste processing up to the "end-of-waste" state or final disposal. The LCA results are declared in aggregated form for the product stage, which means that the sub-modules A1, A2 and A3 are declared as one module A1-A3.

The raw materials: flat iron, plate and beams are brought in, processed, shot cleaned, cut and welded. The process will vary, depending on the involved raw material.

The various materials are transported by side loader from our warehouse to the appropriate production machines: Flat iron to the computerized numerical control (CNC) flat iron machine, plate to the CNC plasma cutter and beams to the shot ball cleaner. Flat iron is processed if necessary, by adding holes and cutting into strips. Plate is plasma cut following 2D models. Beams are shot cleaned and cut to length. Flat iron, steel plate and beams are shot cleaned before production to produce the correct surface. The shot cleaner is always kept full to save power. The steel balls are reused in production until steel dust is all that remains. After cleaning, the flat iron and plate are distributed for use as beams and to the welding robot, respectively. Beams and associated plates are stapled together. Beams are then welded, according to design diagrams.

When manufacturing welded wedges for robot welding, all parts are assembled from the CNC cutting table and CNC flat iron cutter. Once the parts are collected they are stapled together according to design diagrams. The stapled wedges are robot welded and sent on. The remaining components are mounted or welded manually.

Beams that need to be galvanized are loaded onto a lorry and transported to a subcontractor. After galvanization, the beams are brought back to the factory and stored until delivery to the construction site.

2.7 Environment and health during manufacturing

During the entire manufacturing process, no other health protection measures are required extending beyond the legally specified industrial protection measures for commercial enterprises.

2.8 Product processing/Installation

The product is installed using a diesel truck. No auxiliary materials are used.

2.9 Packaging

The product is delivered with metal strips and cardboard as packaging.

2.10 Condition of use

During use, no changes in material composition shall occur. The product does not require maintenance.

2.11 Environment and health during use

Under normal use conditions, structural steel products do not cause any adverse health effects nor release other emissions to indoor air. Also, no environmental impacts on water, air or soil are expected.

2.12 Reference service life

A reference service life for structural steel is not declared. It is a construction product with many different application purposes. The lifetime therefore will be limited by the service life of the work. The same applies for aging.

2.13 Extraordinary effects

Fire

The material is class A1, i.e. not flammable per *EN 13501*. The

material does not emit fumes or fire gases.

Fire protection

Name	Value
Building material class according to EN 13501-1	A1

Water

Steel is stable in water, insoluble and does not emit substances in water. In case of flooding, no impacts are to be expected. Steel can corrode in the presence of oxygen in the water (= slow oxidation).

Mechanical destruction

Steel components display very good characteristics when exposed to extraordinary mechanical impact. As a general rule, no chips, breaking edges or similar are incurred.

2.14 Re-use phase

The product has a 100 % recycling potential.

2.15 Disposal

Due to its high value as a resource, steel scrap is not disposed of but instead fed into a well-established cycle of reuse or recycling. However, in the case of dumping due to collection loss, no environmental impacts are expected. Waste code in accordance with the *European Waste Catalogue (EWC)*: (17 04 05 Iron and steel).

2.16 Further information

Further information on the product can be obtained from givesteel.com.

3. LCA: Calculation rules

3.1 Declared Unit

The declared unit is 1 ton of galvanized structural steel. The galvanization accounts for 1 % of the product's weight-%.

Declared unit

Name	Value	Unit
Declared unit	1	t
Density	7850	kg/m ³

The conversion factor to 1 kg is 0.001.

3.2 System boundary

Type of EPD: Cradle to gate with options.

Module A1-A3, A4, A5, B1-B7, C1-C4 and D are considered. Yet, no environmental impacts are associated with modules B1-B7, thus these modules are declared as 'not relevant' or 'not declared'.

Modules A1-A3 include the acquisition of all raw materials, products and energy, transport to the production site, the manufacturing of the galvanized structural steel and waste processing up to the 'end-of-waste' state.

Module A4 includes the transport of the product to the construction site.

Module A5 includes the installation of the product using a diesel truck.

Module C1 considers the deconstruction of the structural steel using a truck. In **module C2**, the demolished steel is transported to a waste processing site, with the waste processing considered in **module C3**.

Finally, **module D** considers the benefits from recycling the demolished steel parts.

3.3 Estimates and assumptions

It is assumed that 100 % of the product can be recycled, though 5 % of the product is lost at recycling. The recycling of the product is assumed to replace scrap steel in module D.

3.4 Cut-off criteria

The declaration covers all relevant processes and aspects of the life cycle for galvanized structural steel. Only the production of capital goods, buildings and equipment during the production of steel in A1 has been omitted from the LCA study, as it is assumed to be negligible.

Thus, the declaration is in compliance with the rules in *EN 15804, 6.3.5*, where the omission for input-flows per module must be a maximum 5 % of energy usage and mass and at most 1 % for unit processes.

3.5 Background data

The LCA model is developed using *GaBi Software* developed by Sphera Solutions GmbH. The databases, *GaBi Professional 2020* and *EcolInvent 3.6*, provide the life cycle inventory data used from the background system.

3.6 Data quality

The product-specific data have been collected by Give Steel A/S and are based on the yearly production amounts and energy consumption at the production site located in Brande, Denmark in 2019. Background data are based on *GaBi Professional* and *EcolInvent 3.6* and are less than 10 years old. Generally, the used background datasets are of good quality, and the majority of the datasets are only a couple of years old.

3.7 Period under review

The foreground data was collected by Give Steel A/S in the period January 2019 to December 2019. The declaration is therefore based on average values for the production amount

from the year 2019.

3.8 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

3.9 Allocation

The allocation is made in accordance with the provisions of *EN 15804*. A conservative approach is used for the allocation of by-products in steel manufacturing, meaning that all impact is attributed to the main product of steel. Energy, heat and water

consumption at the production site is allocated through mass allocation.

3.10 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. Background data was mainly taken from GaBi Professional 2020. Ecoinvent 3.6 was used when datasets were not available in GaBi Professional 2020.

4. LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon

The product does not contain any biogenic carbon. The packaging includes a small amount of biogenic carbon, as cardboard is used as packaging.

Note: 1 kg biogenic carbon is equivalent to 44/12 kg of CO₂

Information on describing the biogenic Carbon Content at factory gate

Name	Value	Unit
Biogenic carbon content in product 0	-	kg C
Biogenic carbon content in accompanying packaging 0	0.012	kg C

A conservative distance of 300 km is used in module A4.

Transport to the building site (A4)

Name	Value	Unit
Litres of fuel	2.7	l/100km
Transport distance	300	km
Capacity utilisation (including empty runs)	85	%
Gross density of products transported	7850	kg/m ³
Capacity utilisation volume factor	0.55	-

Installation into the building (A5)

A diesel truck is used to install the product. Based on annual data from Give Steel A/S, 0.261 kg diesel is used for the installation of 1 ton of galvanized structural steel.

Name	Value	Unit
Other resources Diesel	0.261	kg

Use stage (B1-B7)

There are no environmental impacts associated with the use stage (B1-B7).

Reference service life

The reference service life of the product depends on its application.

A reference service life for structural steel is not declared.

End of life (C1 - C4)

Name	Value	Unit
Collected separately structural steel	1000	kg
Collected as mixed construction waste	-	kg
Reuse	-	kg
Recycling	1000	kg
Energy recovery	-	kg
Landfilling	-	kg

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

The product has a 100 % recycling potential, yet, 5 % of the product is assumed to be lost through the recycling process.

5. LCA: Results

The LCA results cover modules A1-A5, C1-C4 and D. No environmental impacts are associated with modules B1-B7; thus, these modules are marked as 'not relevant' or 'not declared' in the table below.

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; ND = 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 ton galvanized structural steel

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO ₂ eq	1.04E+03	8.39E+00	6.58E-01	6.58E-01	8.47E+00	2.33E+01	0	-3.16E+02
GWP-fossil	kg CO ₂ eq	1.03E+03	8.23E+00	6.93E-01	6.93E-01	8.32E+00	2.47E+01	0	-3.15E+02
GWP-biogenic	kg CO ₂ eq	2.94E+00	8.95E-02	0	0	9.04E-02	0	0	-2.04E-01
GWP-luluc	kg CO ₂ eq	1.26E+00	6.74E-02	7.62E-03	7.62E-03	6.8E-02	2.81E-02	0	4.56E-02
ODP	kg CFC11 eq	8.63E-12	1.53E-15	1.73E-16	1.73E-16	1.54E-15	3.54E-06	0	-5.26E-13
AP	mol H ⁺ eq	2.99E+00	3E-02	3.41E-03	3.41E-03	3.03E-02	2.99E-01	0	-5.66E-01
EP-freshwater	kg P eq	1.66E-03	2.54E-05	2.87E-06	2.87E-06	2.56E-05	2.09E-02	0	-6.45E-05
EP-marine	kg N eq	8.43E-01	1.37E-02	1.52E-03	1.52E-03	1.38E-02	6.79E-02	0	-8.44E-02
EP-terrestrial	mol N eq	9.17E+00	1.53E-01	1.69E-02	1.69E-02	1.54E-01	7.66E-01	0	-8.23E-01
POCP	kg NMVOC eq	2.56E+00	2.67E-02	4.29E-03	4.29E-03	2.7E-02	2.09E-01	0	-4.32E-01
ADPE	kg Sb eq	2.94E-04	6.73E-07	7.61E-08	7.61E-08	6.8E-07	1.37E-03	0	-6.86E-04
ADPF	MJ	1.12E+04	1.11E+02	1.26E+01	1.26E+01	1.12E+02	3.7E+02	0	-2.74E+03
WDP	m ³ world eq deprived	1.46E+01	8.12E-02	9.18E-03	9.18E-03	8.2E-02	6.97E+00	0	-6.19E+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 ton galvanized structural steel

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	2.14E+03	6.42E+00	7.26E-01	7.26E-01	6.49E+00	5.37E+01	0	2.52E+02
PERM	MJ	5.88E-02	0	0	0	0	0	0	0
PERT	MJ	2.14E+03	6.42E+00	7.26E-01	7.26E-01	6.49E+00	5.37E+01	0	2.52E+02
PENRE	MJ	1.13E+04	1.11E+02	1.26E+01	1.26E+01	1.13E+02	3.7E+02	0	-2.75E+03
PENRM	MJ	0	0	0	0	0	0	0	0
PENRT	MJ	1.13E+04	1.11E+02	1.26E+01	1.26E+01	1.13E+02	3.7E+02	0	-2.75E+03
SM	kg	7.84E+02	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	2.14E+00	7.48E-03	8.46E-04	8.46E-04	7.56E-03	1.62E-01	0	-1.39E+00

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 ton galvanized structural steel

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
HWD	kg	3.85E-05	5.16E-06	5.83E-07	5.83E-07	5.21E-06	0	0	7.66E-07
NHWD	kg	1.09E+01	1.77E-02	2E-03	2E-03	1.78E-02	0	0	3.3E+01
RWD	kg	2.96E-01	2.06E-04	2.32E-05	2.32E-05	2.08E-04	0	0	9.95E-05
CRU	kg	0	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	1.86E+02	0	0
MER	kg	6.11E+00	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
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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 ton galvanized structural steel

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PM	Disease incidence	3.74E-05	1.72E-07	3.76E-08	3.76E-08	1.74E-07	3.78E-06	0	3.21E-05
IR	kBq U235 eq	2.66E+01	3.03E-02	3.43E-03	3.43E-03	3.06E-02	3.52E+00	0	3.85E+01
ETP-fw	CTUe	2.69E+03	8.31E+01	9.4E+00	9.4E+00	8.39E+01	1.7E+03	0	4.57E+03
HTP-c	CTUh	7.46E-07	1.72E-09	1.94E-10	1.94E-10	1.73E-09	3.61E-08	0	8.92E-07
HTP-nc	CTUh	1.79E-05	1E-07	1.08E-08	1.08E-08	1.01E-07	1.71E-06	0	1.56E-05
SQP	SQP	2.24E+03	3.9E+01	4.41E+00	4.41E+00	3.94E+01	6.98E+02	0	3.13E+03

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.

This EPD was created using a software tool.

6. LCA: Interpretation

The calculated environmental impacts primarily stem from the production of scrap steel, which accounts for 78 % of the product's weight. The production of scrap steel is the main contributor to 6 out of 19 environmental impact categories. The production of ore-based steel is the main contributor to 8 out of 19 environmental impact categories. The most dominant module is therefore module A1, since the module includes both

the production of scrap steel and ore-based steel. The structural steel product is manufactured using water, electricity and heat at the production site in Brande, Denmark. These processes only have a minor effect on the overall environmental impacts of the product. The main contributor to the environmental impacts in module A3 is heat consumption, as natural gas is used.

7. Requisite evidence

7.1 Weathering Performance

The corrosion rate of zinc depends on the position of the component and the conditions of the surrounding atmosphere (corrosivity categories according to EN ISO 12944-2). For corrosivity category C3, which according to this standard is

characteristic of an urban and industrial atmosphere with moderate sulfur dioxide load and a coastal atmosphere with low salt load and thus corresponds to the typical corrosive load of steel structures, the corrosion rate is assumed to be 1.3µm/year.

8. References

Standards

AgBB

AgBB, Ausschuss zur gesundheitlichen Bewertung von Bauprodukten (Committee for Health-related Evaluation of Building Products).

EN 1090

EN 1090-2:2018, Execution of steel structures and aluminium structures - Part 2: Technical requirements for steel structures.

EN 10025

EN 10025-2:2019, Hot rolled products of structural steels - Part 2: Technical delivery conditions for non-alloy structural steels.

EN 10219

EN 10219-1:2006, Cold formed welded structural hollow sections of non-alloy and fine grain steels - Part 1: Technical delivery conditions.

EN 13479

EN 13479:2017, Welding consumables - General product standard for filler metals and fluxes for fusion welding of metallic materials.

EN 13501

EN 13501-1:2010, Fire classification of construction products and building elements.

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.

EN 16516

EN 16516:2017+A1:2020, Construction products: Assessment of release of dangerous substances. Determination of emissions into indoor air.

ISO 544

ISO 544:2017, Welding consumables — Technical delivery conditions for filler materials and fluxes — Type of product, dimensions, tolerances and markings.

ISO 12944

ISO 12944-2: 2017, Paints and varnishes — Corrosion protection of steel structures by protective paintsystems -- Part 2: Classification of environments

ISO 14025

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

ISO 16000-6

ISO 16000-6:2011, Indoor air - Part 6: Determination of volatile organic compounds in indoor and test chamber air by active sampling on Tenax TA sorbent, thermal desorption and gas chromatography using MS or MSFID.

Further references

Candidate List of Substances of Very High Concern for Authorisation

Candidate List of substances of very high concern for Authorisation, 2021, ECHA, echa.europa.eu

CPR

Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC Text with EEA relevance.

EMICODE

<https://www.emicode.com/>

Eurofins Product Testing

<https://www.eurofins.dk/product-testing/>

EWC

European Waste Catalogue, European Commission

PCR Part A

Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report according to EN 15804+A2:2019. Institut Bauen und Umwelt e.V. (IBU). Version 1.2. November 2021. www.ibu-epd.com

PCR Part B

Requirements on the EPD for www.ibu-epd.com Structural steels. Institut Bauen und Umwelt e.V. (IBU). Version 1.1. 2017. www.ibu-epd.com

Software

GaBi Software

Sphera Solutions GmbH. (2020). For further information see: gabi.sphera.com/international/index

Databases

GaBi Professional

Sphera Solutions GmbH. (2020). GaBi LCA Database Documentation. Retrieved from gabi.sphera.com/international/support/gabi

Ecoinvent 3.6

<http://www.gabi-software.com/nw-eu-danish/databases/ecoinvent>

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