



REUSABLE STEEL ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH ISO 14025 AND EN 15804:2012+A2:2019

Programme

The International EPD® System
www.environdec.com

Programme Operator

EPD International AB

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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



PROGRAMME INFORMATION

PROGRAMME

The International EPD® System

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Product Category Rules (PCR): 2019:14 Version 1.11, 2021-02-05, Construction Products and CPC 54 Construction Services, EN 15804:2012 + A2:2019 Sustainability of Construction Works

Independent third-party verification of the declaration and data, according to ISO 14025:2006:

EPD process certification EPD verification ✓

Third party verifier: Prof. Vladimír Kocí

Approved by: The International EPD® System Technical Committee, supported by the Secretariat

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 from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804. Images courtesy of GPE and Bricesco

EPD GUIDANCE

GENERAL INFORMATION

The first section of the EPD gives general information about the product, manufacturer, program operator etc. In this EPD, reusable steel is a product that is manufactured by EMR and EPD International is the operator which carries out the programme. Prof. Vladimir Koci, who is an independent verifier, approved by International EPD System is the verifier.

EPDs are valid for five years, so you'll see the date of validity and the Product Category Rule (PCR) for the specific kind of material being appraised. You'll also find the declared unit of the product used in the assessment.

EPDs can be reviewed if it is needed. The revised document goes through the same revision processes. If it is verified again, the revised document is published with the revision number and validation date.

SYSTEM BOUNDARY

The system boundaries of the product are specifically examined during the life of the product to indicate its limitations with previous or subsequent product systems. In order to understand the impact of the stages, life cycle stages are divided into modules. The system boundaries depend on the type of EPD that is declared.

LCA INFORMATION

Measuring the environmental performance of a product allows a company to compare similar products. In order for products to be compared, it is important that the LCA information is consistent for two products. The limitations on the stages of the life cycle covered by the EPD are called the system boundary. In most EPDs, the stages within the system boundary are marked with an X, and those beyond the system boundary are marked NR (not relevant).

Data collection is one of the main elements of an EPD and LCA. The quality of the data provided is directly related to the quality of the study. The raw material(s), resource consumption and waste data of the product, known as primary data, are provided by the company. Here, data security is ensured by collecting data from reports submitted to legal authorities and relevant literature. Literature and databases are used for environmental impact factors and necessary secondary data. All sources used are mentioned in the references.

RESULTS

The environmental impacts of the products are described in the results section. Columns of given result tables indicate each life cycle stage where rows indicate each environmental impact assessed (ex: GWP, Eutrophication etc.). The second table provides results for resource use and the third table relates to the waste produced during the production. The final table shows the results for the GWP-GHG indicator, which is almost equivalent to the GWP-Total indicator, yet excludes the biogenic carbon content.

COMPANY INFORMATION

“Now more than ever, improving environmental performance, while supporting people and businesses to be more sustainable is essential. Committing to decarbonisation is key to driving the green recovery of the global economy, creating jobs and driving investment, while delivering on global climate objectives.”

OUR ROADMAP TO
BECOMING CARBON
NET-ZERO BY 2040

Chris Sheppard
Group CEO

At EMR we are proud to play our role in the circular economy. We create sustainable value by making high quality, low carbon feedstocks through recycling end of life products. We are committed to supporting the decarbonisation of our own industry and our partners.

This Environmental Product Declaration confirms that our Reusable Steel products have a Global Warming Potential of 47 kg CO₂-e/tonne.

EMR recycles around 10 million tonnes of materials per year producing over 100 different grades of ferrous and non-ferrous metals. In addition, EMR operates a state-of-the-art plastic recycling facility, MBA Polymers UK, which generates plastics for use in a wide range of high-value applications.

EMR sources materials from across a number of sectors including construction, demolition, decommissioning, automotive and engineering. Materials are then subject to sophisticated separation and processing techniques before being supplied to customers to continue their life cycle in low carbon production.

EMR is extending its range of services to include the reuse of materials and has begun this process by making available ultra-low carbon steel sections which dramatically reduce embodied carbon within the built environment. Reusable steel materials are the subject of this Environmental Product Declaration.

PRODUCT INFORMATION

This declaration is for reusable steel sections supplied for the fabrication of structural steelwork in accordance with:

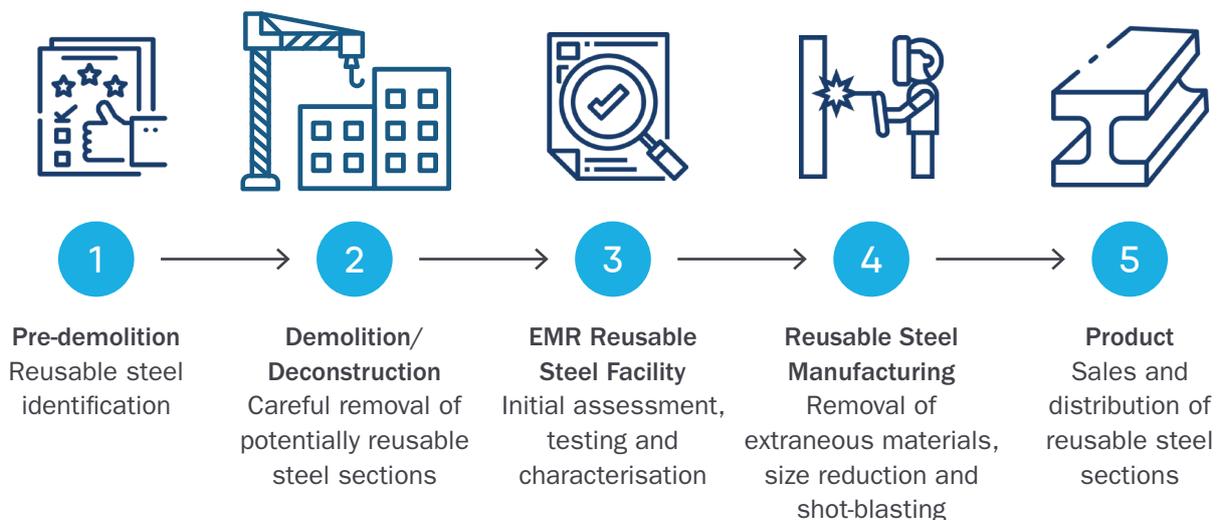
Brown DG, Pimentel RJ, Sansom MR (2019). Structural steel reuse - assessment, testing and design principles (SCI-P427). The Steel Construction Institute, Ascot. SCI-P427 is founded on the principle that given appropriate determination of material characteristics and tolerances, re-fabricated reusable steelwork can be fabricated and CE marked in accordance with BS EN 1090.

Reusable steel sections are defined as individual elements recovered from an existing steel structure during its demolition/deconstruction and/or those which have been designed and fabricated for use within a defined structure which was not erected.

The types of sections declared and supplied will be detailed between EMR and the customer and will include but not be limited to Universal Beams and Universal Columns.

As the raw materials for Reusable Steels are sourced and extracted from existing structures within the urban mine, this positively increases resource efficiency whilst decreasing carbon intensity.

EMR's typical reusable steel workflow is shown below:



LCA INFORMATION

Declared Unit
1 tonne of Reusable Steel

Time Representativeness
2021

Database(s) and LCA Software Used
Ecoinvent 3.5, SimaPro 9.0

This EPD's system boundary is cradle to gate with options. The results of the LCA with the indicators as per EPD requirement are given in the following tables for product manufacture (A1, A2, A3), end of life stage (C1, C2, C3, C4) and benefits and load stage (D).

There is no biogenic carbon content in the reusable steel product.

The system boundaries in tabular form for all modules are shown in the table below.

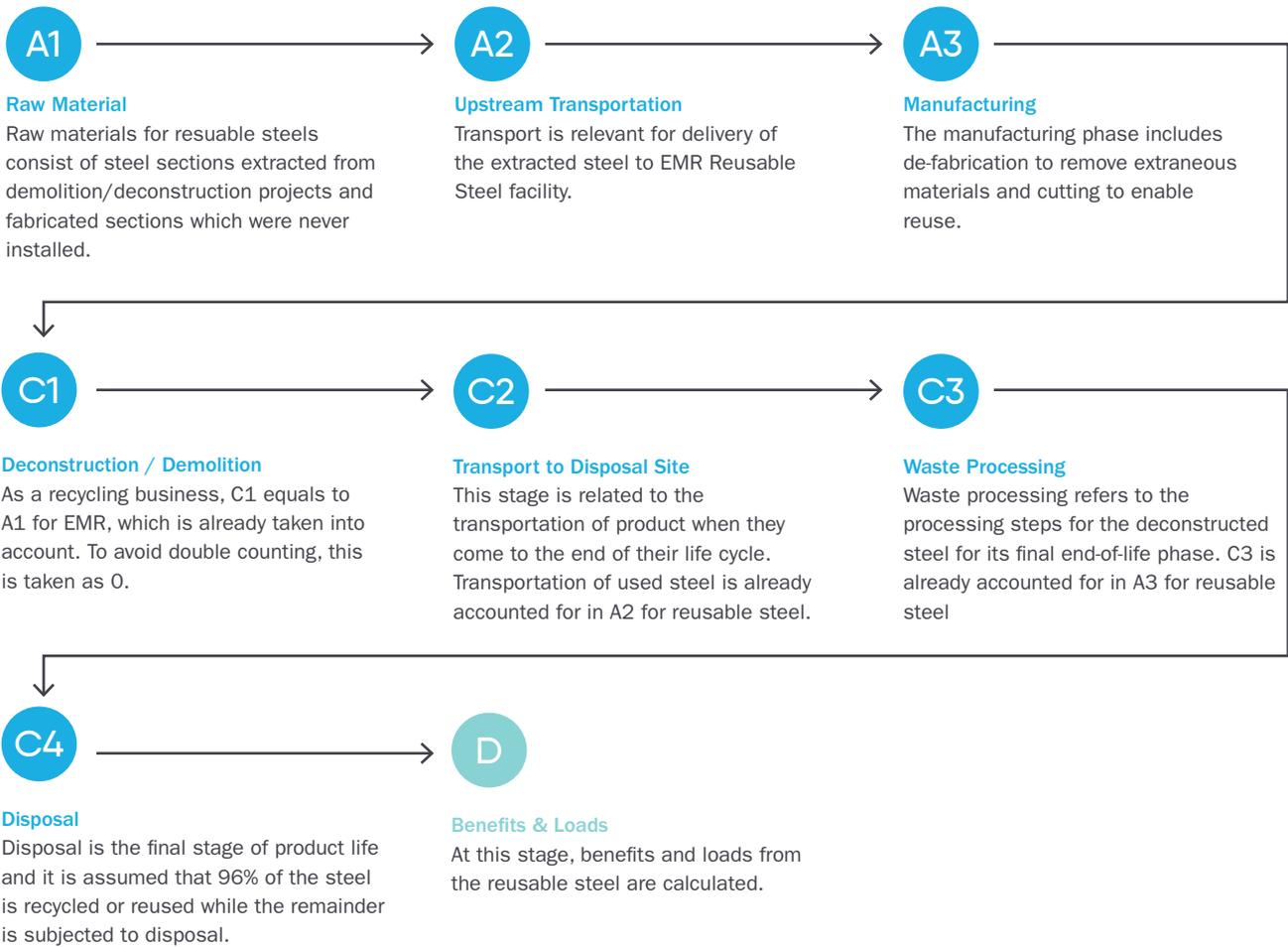
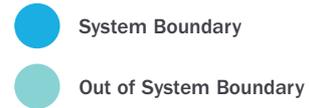
	Product Stage			Construction Process Stage		Use Stage							End of Life Stage			Benefits and Loads	
	Raw Material Supply	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy Use	Operational Water Use	Deconstruction/demolition	Transport	Waste Processing	Disposal	Future reuse, recycling or energy recovery potentials
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules Declared	X	X	X	NR	NR	NR	NR	NR	NR	NR	NR	NR	X	X	X	X	X
Geography	GB	GB	GB	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO
Specific Data Used	90%					-	-	-	-	-	-	-	-	-	-	-	-
Variation – Products	NR					-	-	-	-	-	-	-	-	-	-	-	-
Variation – Sites	NR					-	-	-	-	-	-	-	-	-	-	-	-

Description of the system boundary (X = Included in LCA, NR: Not Relevant)

Note: The LCA was modelled for specific product at plant so there is no variation.

Note: All primary data is taken from EMR and Ecoinvent was used for secondary data.

SYSTEM BOUNDARY

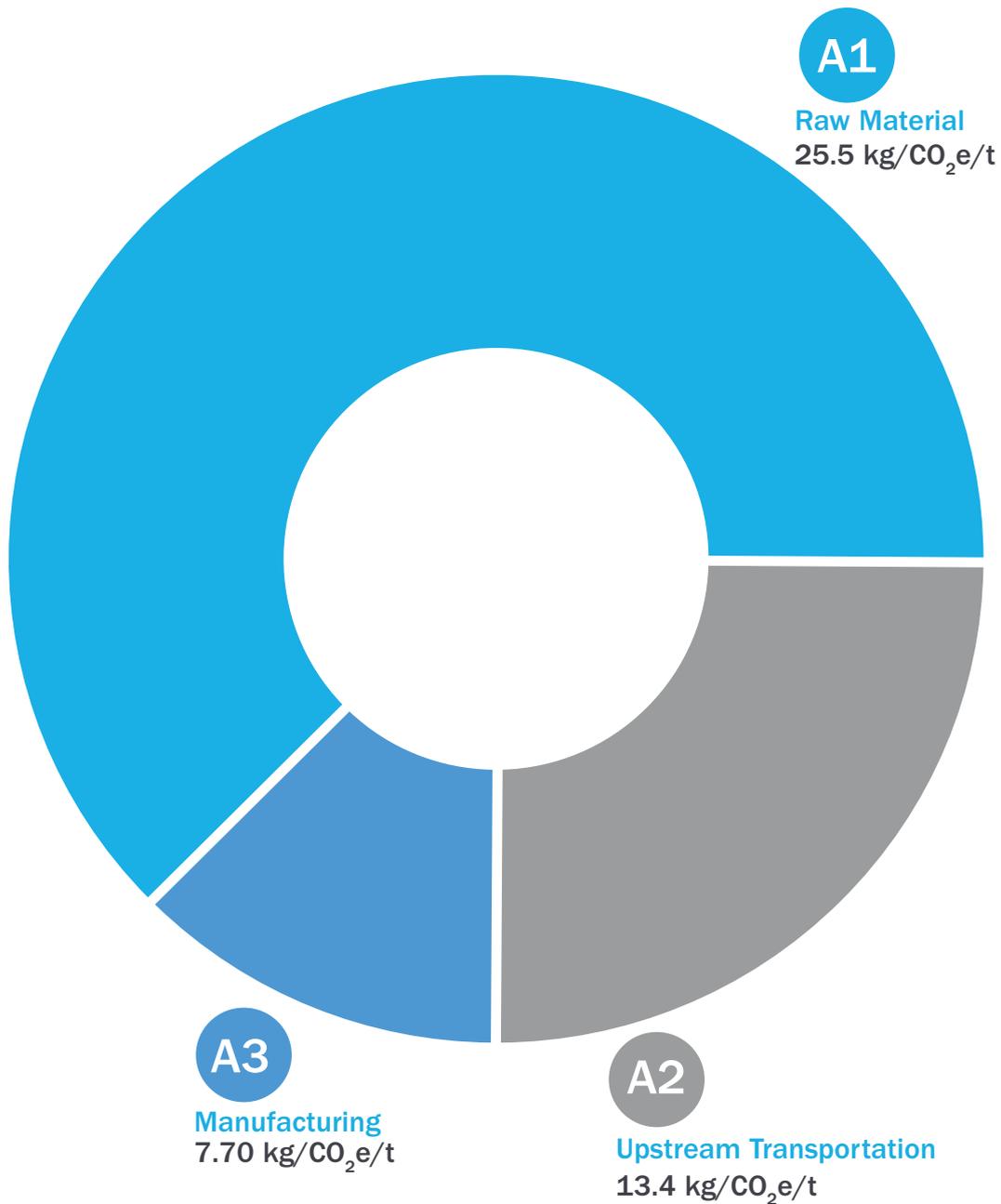


Modules A4-B7 (transport to site and the use phase) fall outside of the system boundary as these activities are undertaken by other parties in the supply chain.

THE GWP CONTRIBUTIONS

for the modules A1-A3 for our Reusable Steel product are shown below

 +  +  = 46.6 kg/CO₂e/t



Modules A4-B7 fall outside of the system boundary as these activities are undertaken by other parties in the supply chain.

LCA INFORMATION

Goal and Scope

Evaluation of environmental impacts for 1 tonne of reusable steel.

Declared Unit

1 tonne of reusable steel.

System Boundary

This 15804:A2 type EPD's boundary is cradle to gate with options C1-C4 and module D. System boundary covers A1 - A3 product stages referred as 'Raw material supply', 'Transport' and 'Manufacturing', C1-C4 end of life stages as 'Deconstruction/demolition', 'Transport', 'Waste Processing', 'Disposal', and benefits and load (D) stages.

Database and LCA Software

Ecoinvent database (Ver.3.5) (www.ecoinvent.org) and SimPro 9.0 is used for the calculation.

Data Quality

Raw materials, energy and water consumption, waste, material and product transport data is primary data collected from EMR.

Period Under Review

All primary data collected from EMR is for the period year of 2021.

REACH Regulation

No substances included in the Candidate List of Substances of Very High Concern for authorization under the REACH regulations are present in this product either above the threshold for registration with the European Chemicals Agency or above 0.1% (wt/wt).

Cut-Off Criteria

1% cut-off applied. Data for elementary flows to and from the product system contributing to a minimum of 99% of the declared environmental impacts have been included.

Allocations

No allocation was performed for this EPD. There are no co-products in the production of reusable steel, hence, there is no need for co-product allocation. Transport is allocated according to tonnages for raw materials bought by EMR. Similarly, water consumption and energy consumption are also allocated according to the production figures.

Geographical Scope

The geographical scope of this EPD is global.

LCA RESULTS

LCA Results										
Impact Category	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
GWP- Fossil	kg CO ₂ eq	25.6	13.4	7.69	46.6	0	0	0	0.172	-1711
GWP- Biogenic	kg CO ₂ eq	-0.046	0.006	0.004	-0.036	0	0	0	699E-6	-4.48
GWP- Luluc	kg CO ₂ eq	0.023	0.004	0.009	0.036	0	0	0	27.9E-6	-0.878
GWP- Total	kg CO ₂ eq	25.5	13.4	7.70	46.6	0	0	0	0.173	-1708
ODP	kg CFC11 eq	1.58E-6	3.25E-6	1.71E-6	6.54E-06	0	0	0	85.6E-9	-99.7E-6
AP	mol H ⁺ eq	0.154	0.042	0.080	0.276	0	0	0	1.70E-3	-9.43
*EP - Freshwater	kg P eq	0.010	0.001	433E-6	0.012	0	0	0	13.0E-6	-1.67
EP - Freshwater	kg PO ₄ eq	0.031	0.004	0.001	0.036	0	0	0	39.8E-6	-5.11
EP - Marine	kg N eq	0.024	0.009	0.034	0.067	0	0	0	619E-6	-1.93
EP - Terrestrial	mol N eq	0.259	0.096	0.378	0.733	0	0	0	6.88E-3	-21.3
POCP	kg NMVOC eq	0.066	0.038	0.104	0.207	0	0	0	1.95E-3	-8.16
ADPE	kg Sb eq	9.21E-6	34.9E-6	3.27E-6	4.73E-05	0	0	0	184E-9	-0.022
ADPF	MJ	489	217	112	818	0	0	0	5.70	-18555
WDP	m ³ depriv.	4.10	1.60	0.626	6.33	0	0	0	24.1E-3	-451
PM	disease inc.	334E-9	1.07E-6	0.000	3.47E-06	0	0	0	36.0E-9	-159E-6
IR	kBq U-235 eq	13.0	1.07	0.591	14.6	0	0	0	29.6E-3	-84.8
ETP-FW	CTUe	432	154	68.7	655	0	0	0	2.93	-68117
HTTP-C	CTUh	6.02E-9	4.33E-9	2.33E-9	1.27E-08	0	0	0	60.7E-12	-15.0E-6
HTTP-NC	CTUh	283E-9	180E-9	58.7E-9	5.21E-07	0	0	0	1.65E-9	-180E-6
SQP	Pt	207	217	30.2	455	0	0	0	12	-6187
Acronyms	GWP-total: Climate change. GWP-fossil: Climate change- fossil. GWP-biogenic: Climate change - biogenic. GWP-luluc: Climate change - land use and transformation. ODP: Ozone layer depletion. AP: Acidification terrestrial and freshwater. EP-freshwater: Eutrophication freshwater. EP-marine: Eutrophication marine. EP-terrestrial: Eutrophication terrestrial. POCP: Photochemical oxidation. ADPE: Abiotic depletion - elements. ADPF: Abiotic depletion - fossil resources. WDP: Water scarcity. PM: Respiratory inorganics - particulate matter. IR: Ionising radiation. ETP-FW: Ecotoxicity freshwater. HTP-c: Cancer human health effects. HTP-nc: Non-cancer human health effects. SQP: Land use related impacts. soil quality.									
Legend	1: Raw Material Supply. A2: Transport. A3: Manufacturing. A1-A3: Sum of A1. A2. and A3. A4: Transport. C1: Deconstruction / Demolition. C2: Transport. C3: Waste Processing. C4: Disposal. D: Benefits and Loads Beyond the System Boundary.									
Disclaimer 1	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.									
Disclaimer 2	The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.									
*Disclaimer 3	EP-freshwater: This indicator is calculated both in kg PO ₄ eq and kg P eq as required in the characterization model. (EUTREND model. Struijs et al. 2009b. as implemented in ReCiPe; http://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml)									

LCA RESULTS

Climate Impact										
Impact Category	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
GWP-GHG	kg CO ₂ eq	25.2	13.3	7.62	46.1	0	0	0	0.172	-1647
Acronyms	GWP-GHG = Global Warming Potential total excl. biogenic carbon following IPCC AR5 methodology* The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus equal to the GWP indicator originally defined * The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus equal to the GWP indicator originally defined in EN 15804:2012+A1:2013in EN 15804:2012+A1:2013									
Resource Use										
Impact Category	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
PERE	MJ	61.45	2.41	13.3	77.2	0	0	0	0.075	-1666
PERM	MJ	0	0	0	0	0	0	0	0	0
PERT	MJ	61.45	2.41	13.3	77.2	0	0	0	0.075	-1666
PENRE	MJ	489	217	112	818	0	0	0	5.70	-18554
PENRM	MJ	0	0	0	0	0	0	0	0	0
PENRT	MJ	489	217	112	818	0	0	0	5.70	-18554
SM	kg	0	0	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0
FW	m ³	0.114	0.045	0.011	0.169	0	0	0	0.006	-8.71
Acronyms	PERE: Use of renewable primary energy excluding resources used as raw materials. PERM: Use of renewable primary energy resources used as raw materials. PERT: Total use of renewable primary energy. PENRE: Use of non-renewable primary energy excluding 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. SM: Secondary material. RSF: Renewable secondary fuels. NRSF: Non-renewable secondary fuels. FW: Net use of fresh water.									
Waste & Output Flows										
Impact Category	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
HWD	kg	30	0	0	30	0	0	0	0	0
NHWD	kg	0	0	10	10	0	0	0	0	0
RWD	kg	0	0	0	0	0	0	0	0	0
CRU	kg	0	0	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0	0	0	0
MER	kg	0	0	0	0	0	0	0	0	0
EE (Electrical)	MJ	0	0	0	0	0	0	0	0	0
EE (Thermal)	MJ	0	0	0	0	0	0	0	0	0
Acronyms	HWD: Hazardous waste disposed, NHWD: Non-hazardous waste disposed, RWD: Radioactive waste disposed, CRU: Components for reuse, MFR: Material for recycling, MER: Materials for energy recovery, EE (Electrical): Exported energy electrical, EE (Thermal): Exported energy, Thermal.									
Legend	1: Raw Material Supply, A2: Transport, A3: Manufacturing, A1-A3: Sum of A1, A2, and A3, A4: Transport, C1: Deconstruction / Demolition, C2: Transport, C3: Waste Processing, C4: Disposal, D: Benefits and Loads Beyond the System Boundary.									

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/ISO 14040/44/ DIN EN ISO 14040:2006-10. Environmental management - Life cycle assessment - Principles and framework (ISO14040:2006) and Requirements and guidelines (ISO 14044:2006)

/PCR for Construction Products and CPC 54 Construction Services/ Prepared by IVL Swedish Environmental Research Institute. Swedish Environmental Protection Agency. SP Trä. Swedish Wood Preservation Institute. Swedisol. SCDA. Svenskt Limträ AB. SSAB. The International EPD System. 2019:14 Version 1.11 DATE 2019-12-20

/SimaPro/ SimaPro LCA Software. Pré Consultants. the Netherlands. www.pre-sustainability.com

/The International EPD® System/ The International EPD® System is a programme for type III environmental declarations. maintaining a system to verify and register EPD® s as well as keeping a library of EPD® s and PCRs in accordance with ISO 14025. www.environdec.com

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