KNAUF

ENVIRONMENTAL PRODUCT DECLARATION

Steel profile:

Suprawall Stud 92

In accordance with: ISO 14025, EN15804+A2:2019/AC:2021, ISO 21930

Program:	The International EPD® System www.environdec.com
Programme operator:	EPD International AB
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Programme-related information and verification

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EPDs within the same product category but registered in different EPD programs, or not compliant with EN 15804+A2, 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 characterization factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804+A2 and ISO 14025.

Programme:	**The International EPD® System** EPD registered through the fully aligned regional hub: EPD Southeast Asia
Address:	**EPD International AB** Box 210 60, SE-100 31 Stockholm, Sweden **EPD Southeast Asia** Jl. Kembangan Raya No. 79-81, RT.2/RW.2, Kembangan Sel., Kec. Kembangan, Kota Jakarta Barat, Daerah Khusus Ibukota Jakarta 11610 **Website** www.environdec.com www.epd-southeastasia.com **Email** info@environdec.com
EPD registration number:	EPD-IES-0024990
Published:	2025-12-15
Valid until:	2030-12-15
EPD owner	**Entity:** Knauf Vietnam Co., Ltd. Lot B3A, Hiep Phuoc IZ, Hiep Phuoc Commune, Ho Chi Minh City, Vietnam Knauf Việt Nam I Knauf.com Contact: Jiaxin Li (epd.apac@knauf.com)
Product Category Rules:	PCR 2019:14. Construction Product (EN 15804+A2) Version 2.0
Product group classification:	UN CPC 42190
Reference year for plant data:	2024
Geographical application scope:	Vietnam

Product Category Rules (PCR)
CEN standard EN 15804+A2 serves as the Core Product Category Rules (PCR)
Product category rules (PCR): PCR 2019:14. Construction Product (EN 15804+A2) Version 2.0.1 Complementary product category rules (C-PCR) to PCR 2019:14: N/A
PCR review was conducted by: The Technical Committee of the International EPD System *Review chair: Rob Rouwette* *The review panel may be contacted via support@environdec.com.*

Verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006. ☐ Individual EPD verification without a pre-verified LCA/EPD tool ☐ Individual EPD verification with a pre-verified LCA/EPD tool ☒ EPD process certification* without a pre-verified LCA/EPD tool ☐ EPD process certification* with a pre-verified LCA/EPD tool ☐ Fully pre-verified EPD tool Third-party verification: *Bureau Veritas Certification Sweden AB with accreditation number 1236* Third-party verifier is accredited by: *SWEDAC - Sverige AB 1236* *EPD process certification involves an accredited certification body certifying and periodically auditing the EPD process and conducting external and independent verification of EPDs that are regularly published. More information can be found in the General Programme Instructions on www.envrondec.com.
Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☒ No

Version	Date	Reason
Original version of the EPD	2025-07-02	Initial Release

General information

Information about the company

Description of the organisation:

The Knauf Group is one of the world's leading manufacturers of modern insulation materials, dry lining systems, plasters and accessories, thermal insulation composite systems, floor screed, floor systems, and construction equipment & tools. With more than 300 production facilities and sales organizations in over 90 countries, the Knauf Group is one of the largest players in the industry on all continents.

Knauf Vietnam has started its production in 2013 and offers walls and ceiling solutions and is installed in two locations: Ho Chi Minh and Hai Phong and supplies the Vietnam market with locally produced gypsum board and steel profiles.

Figure 1 : Knauf site in Ho Chi Minh, Vietnam (Source : Knauf Vietnam)

Name and location of production site:
The intended application of this product in the construction industry is within Vietnam. The data utilized for the production stage life cycle assessment is related to production plants located in Ho Chi Minh and Hai Phong, in Vietnam.

Both sites are ISO 9001-2015, ISO 14001-2015 and ISO 45001-2018 certified.

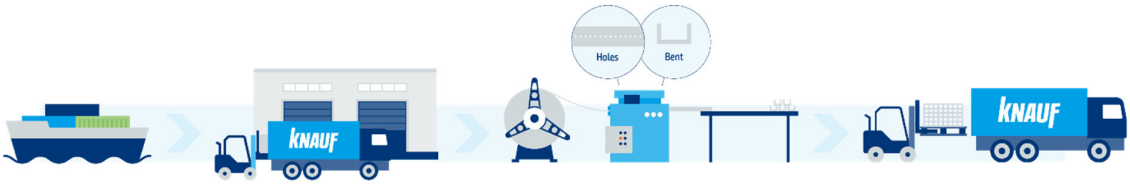
- Ho Chi Minh: Lot B3a, Hiep Phuoc Industrial Zone, Hiep Phuoc Commune, Ho Chi Minh City, Vietnam, 700000
- Hai Phong: Lot CN4.4A, Dinh Vu Industrial Zone, Dinh Vu - Cat Hai Economic Zone, Dong Hai Ward, Hai Phong City, Vietnam, 180000

Information about steel profiles

Steel profiles are used to be applied as part assemblies in internal walls and ceilings constructions. Typical applications are residential buildings, industrial and commercial buildings, sports facilities, schools and hospitals.

Knauf profiles are made of hot-dip galvanized steel sheets in conformity with EN 10346:2015 standard. Wide coils of hot-dip galvanised steel are cut to with. Then, the sections of the different finished product are then manufactured through cold roll forming technique. Holes are punched before or after the rolling process. The finished profile is cut to length and product information such as product codes and manufacturing date are applied by in-line printers.

Production cycle for steel profiles



Product information

Product name: Suprawall Stud 92

Product identification: Suprawall Stud 92 is a steel profile.

Product description: Suprawall Stud 92 is a frame part for plasterboards fixation in drywall system. The product is compliant with ASTM C645.

Geographical scope: The manufacturing is done in two sites in Vietnam (Ho Chi Minh and Hai Phong). Energy-related information is described in the next section. Regarding the market area, the product is marketed in Vietnam.

Technical Characteristics:

Parameter	Value	Unit
Thickness	0,5	mm
Weight	0,626	kg/lm
Quality steel grade	G300	Grade

UN CPC code:

42190: Other structures (except prefabricated buildings) and parts of structures, of iron, steel or aluminium; plates, rods, angles, shapes, sections, profiles, tubes and the like, prepared for use in structures, of iron, steel or aluminium; props and similar equipment for scaffolding, shuttering or pitpropping

LCA information

Functional unit / declared unit

The declared unit is 1 linear meter (lm) of steel profile Suprawall Stud 92 with thickness of 0,5 mm and linear density of 0,626 kg/lm.

Reference service life: The steel profiles have a reference service life (RSL) of 50 years.

Time representativeness & Information on Primary Data:

Plant production data for the complete year 2024 is used. The product considered in this EPD is produced in Vietnam (Ho Chi Minh and Hai Phong).

The data which is used to carry out the LCA calculations contains 0,6% primary data. Data quality information used in this EPD is compliant with EN 15941.

Database(s) and LCA software used:

The LCA model, the data aggregation and environmental impacts are calculated with the software LCA for Experts 10.9.1.17 version with 2025.1 database. The impact models used are those indicated in EN 15804+A2, version EF 3.1.

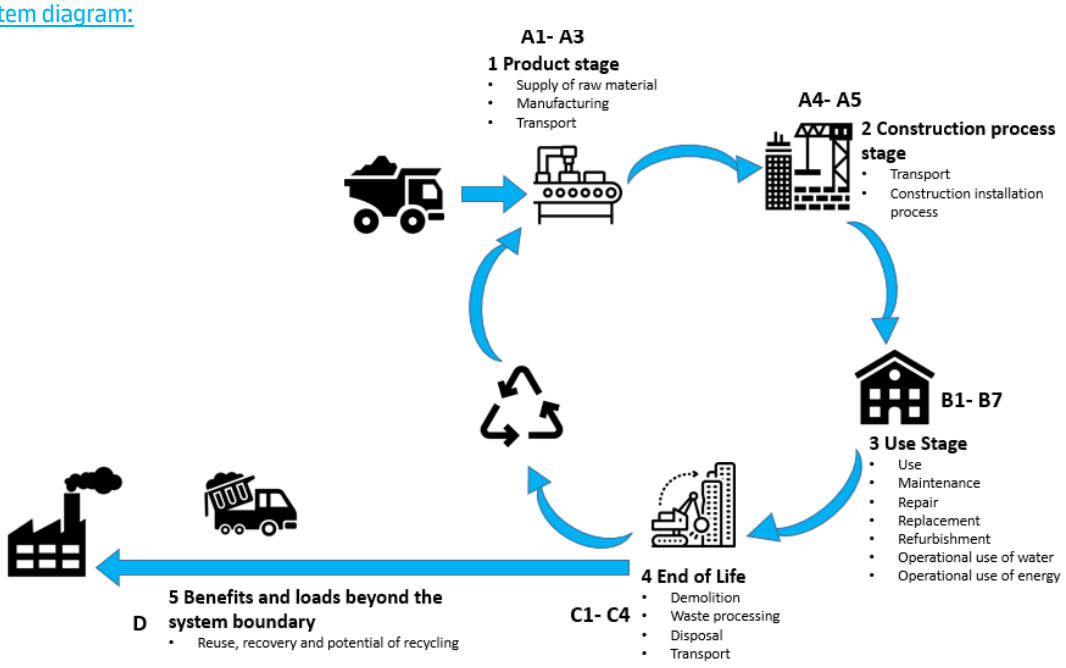
Energy information

Energy input (reference year: 2024]) from Vietnam is selected. The emission of CO_2 is 0,631 kg per kWh for electricity. No natural gas is used.

Cut-off criteria:

At least 99% of the total mass and energy flows across the life cycle stages assessed are included. Neglected processes cumulatively contribute less than 1% to the total impacts for all environmental indicators. Energy use, transport, and packaging materials are accounted for across all relevant life cycle stages, and no significant processes have been omitted.

System diagram:



Description of system boundaries:

The system boundary of the EPD follows the modularity approach defined by the EN 15804+A2.

The type of EPD is cradle-to-gate with options, modules C1–C4, and module D.

For a comprehensive assessment, it is strongly recommended to consider the results from all the modules. Relying exclusively on Modules A1–A3 may lead to incomplete conclusions.

A comprehensive list and detailed explanations of each stage within the EPD are available as follows.

The product stage (A1–A3) includes:

- A1 – raw material extraction and processing, processing of secondary material input (e.g. recycling processes),
- A2 – transport to the manufacturer and
- A3 – manufacturing.

This includes provision of all materials, products and energy, packaging processing and its transport, as well as waste processing up to the end-of-waste state or disposal of final residues during the product stage.

The LCA results are presented in an aggregated format for the product stage, where modules A1, A2, and A3 are consolidated into a single module, denoted as A1–A3.

Product Parameters	Value
Length	1 lm
Product weight	0,626 kg/lm
Thickness	0,5 mm
Packaging – Polyprolylene strap	0,345 g/lm
Packaging – Gypsum stripes	15,7 g/lm

The construction process stage includes:
- A4 – transport to the construction site and
- A5 – installation into the building.

The transport to the building site (A4) included in this LCA use the following parameters:

Parameter	Value
Average transport distance (truck)	100 km
Type of fuel and vehicle used for transport (truck)	Truck Euro V (20 – 26 t gross weight/ 17,3 t payload).
Truck capacity utilization (including [90] % of empty returns)	55 % of the weight capacity
Loss of steel materials on site	5%
Packaging – Polypropylene	100 % incinerated
Packaging – Gypsum stripes	100 % landfilled

During the installation (A5) of steel profiles, no installation energy is required. The parameters below were considered.

Parameter	Value
Ancillary materials	None
Water use	None
Other resource use	None
Energy consumption	None

The treatment and the transport of the packaging waste after the installation of the product (A5) has been considered.

The Use stage (B1-B7) includes:
- B1: Use
- B2: Maintenance
- B3: Repair
- B4: Replacement
- B5: Refurbishment
- B6: Operational Energy Use
- B7: Operational Water Use

Once installation is complete, no actions or technical operations are required during the use stages until the end of life. Therefore, the Suprawall Stud 92 has no impact on this stage.

The end-of-life stage includes:
- C1 – de-construction, demolition,
- C2 – transport to waste processing,
- C3 – waste processing for reuse, recovery and/or recycling and
- C4 – disposal.

This includes provision of all transport, materials, products and related energy and water use.

When the partition is dismantled, steel profiles should be segregated for recycling with other ferrous metals. Besides recycling, a small part of the steel profiles goes to landfill, the assumption chosen in this study is 12% for recycling and 88% for landfill (C4) after the use phase.

Parameter	Value
Energy consumption for demolition/deconstruction	1,1 kWh diesel/lm steel profile
Disposal type	12 % recycled 88 % landfill
Average transport distance waste (C2)	80 km
Type of vehicle used for transport.	Truck-trailer, Euro V, 20 - 26 gross weight / 17,3 t payload capacity
Truck capacity utilization	55 % of the weight capacity

Module D includes reuse, recovery and/or recycling potentials. According to EN 15804+A2 any declared benefits and loads from net flows leaving the product system not allocated as co-products and having passed the end-of waste state shall be included in module D. The benefits considered in module D originate from packaging recycling or incineration.

Cut-off rules and Additional information:

All raw materials used in the manufacture of the declared product, the required energy, water consumption and the resulting emissions are considered in the LCA. As a result, recipe components with a share of less than 1% are included. All neglected processes contribute less than 5% to the total mass or less than 5% to the total energy consumption. For information, the impact of the steel profiles plant construction or manufacturing equipment is not taken into account in the life cycle assessment.

Ancillary materials required for fixing and installation are included in the scope of this LCA. The impact of any additional construction products or materials are not included in this EPD and should be accounted for at building level.

Conversion to mass

The conversion factor used in this EPD involves multiplying the results by 1,595 to obtain Environmental Impact Indicator results for 1 kg.

Name and contact information of LCA practitioner:

South Pole
Technoparkstrasse 1 · 8005 Zurich · Switzerland
Contact: s.vanbrussel@southpole.com

Content Declaration

The product does not contain substances on the "Candidate List of Substances of Very High Concern for Authorisation" in force at the time of the EPD publication under the REACH regulation (if above 0,1% of the mass).

The steel Knauf uses to produce the profile contains 12% recycled content. However, in the modelling this could not be reflected and a dataset containing 2% recycled content has been used.

Product components	Weight %	Post-consumer recycled material %	Biogenic material, kg C/component % (out of total)	Biogenic material, kg C/product
Steel	> 99,9 %	12	0	0
Other elements	< 0,1 %	0	0	0
Packaging Materials	**Weight, kg/ DU or FU**	**Weight -% (versus the product)**		**Biogenic material, kg C/product**
Packaging – polypropylene strap (no recycled content)	8,32E-04	0,06		0
Packaging – gypsum stripes (no recycled content)	3,18E-02	2,5		3,82E-03
TOTAL	3,26E-02	2,56		3,82E-03

Declared Modules, geography, share of specific data (in GWP-GHG indicator) & data variation

Life cycle stages and the description of the system boundaries for the reference product LCA (INCL= included in the LCA, MNI = included bus has no impact on the environment MND = module is not declared)

Production stage			Construction stage		Use stage	End of life stage				Loads and benefits beyond the system boundary
A1	A2	A3	A4	A5	B1 - B7	C1	C2	C3	C4	D
Raw Materials	Raw materials transport	Manufacturing	Delivery (transport)	Installation	Use Maintenance Repair Replacement Refurbishment Operational energy Operational water	Demolition or deconstruction	Transport to treatment site	Waste processing	Disposal	Future reuse, recycling or energy recovery potential
INCL	INCL	INCL	INCL	INCL	INCL	INCL	INCL	INCL	INCL	INCL
Rest of the world	Rest of the world	Vietnam	Rest of the world	Rest of the world	Rest of the world	Rest of the world	Rest of the world	Rest of the world	Rest of the world	Rest of the world
Share of primary data	0,6%									
Variation* - products	/									
Variation** - Sites	<10%									

*Variation regarding the average EPD result in terms of GWP-GHG indicator amongst products covered with this EPD
**Variation regarding the average EPD result in terms of GWP-GHG indicator

The grouping of the 2 profiles in each plant is done by average scenario (50%-50%) for the entire life cycle.

According to PCR 2019:14 v2.0.1 infrastructure should be outside of the system boundary (expect for energy-related infrastructure). However, infrastructure impacts could have been considered in some Sphera or Ecoinvent background datasets.

The result of the data quality assessment for each process that is contributing more than 10% to the GWP-GHG results:

Process	**Source**	**Source type**	**Reference year**	**Data category**	**Geographical representative-ness**	**Technological representative-ness**
Steel production	Database	Sphera 2025.1	2024	Secondary data	Good	Very good

Environmental performance

Potential environmental impacts: 1 lm of steel profile Suprawall Stud 92 with a thickness of 0,5 mm and weight of 0,626 kg

These results are representative of all the products mentioned in this EPD.

ENVIRONMENTAL IMPACTS										
Parameter	**Unit**	**A1-3*****	**A4**	**A5**	**B1-B7**	**C1**	**C2**	**C3**	**C4**	**D****
GWP-totals	kg CO_2 eq.	1,93E+00	7,84E-03	8,63E-02	0,00E+00	3,22E-05	2,43E-03	1,37E-04	1,19E-02	-1,22E-01
GWP-fossil	kg CO_2 eq.	1,93E+00	7,83E-03	6,74E-02	0,00E+00	3,22E-05	2,43E-03	1,37E-04	1,18E-02	-1,23E-01
GWP-biogenic	kg CO_2 eq.	-1,93E-03	1,24E-05	1,89E-02	0,00E+00	3,37E-11	3,85E-06	-3,23E-07	-1,67E-05	7,22E-04
GWP-luluc	kg CO_2 eq.	3,88E-04	4,02E-07	1,51E-05	0,00E+00	1,05E-08	1,25E-07	1,79E-08	3,71E-05	-1,63E-05
ODP	kg CFC 11 eq.	3,29E-11	8,54E-16	6,87E-12	0,00E+00	2,24E-17	2,65E-16	4,14E-13	3,83E-14	1,64E-13
AP	mol H^+ eq.	4,56E-03	3,74E-05	1,59E-04	0,00E+00	1,12E-07	1,16E-05	1,08E-06	7,38E-05	-3,00E-04
EP-freshwater	kg P eq.	5,15E-06	9,47E-10	1,91E-07	0,00E+00	2,48E-11	2,94E-10	5,41E-08	1,67E-08	-2,85E-08
EP-marine	kg N eq.	9,13E-04	1,86E-05	3,30E-05	0,00E+00	3,43E-08	5,75E-06	1,68E-07	1,80E-05	-4,81E-05
EP-terrestrial	mol N eq.	9,41E-03	2,04E-04	3,43E-04	0,00E+00	3,76E-07	6,34E-05	1,75E-06	1,96E-04	-4,31E-04
POCP	kg NMVOC eq.	3,33E-03	3,73E-05	1,18E-04	0,00E+00	1,34E-07	1,16E-05	5,27E-07	5,58E-05	-1,96E-04
ADP-minerals&metals*	kg Sb eq.	1,11E-05	1,14E-10	3,68E-07	0,00E+00	2,97E-12	3,52E-11	9,48E-11	8,05E-10	-6,94E-07
ADP-fossil*	MJ	2,17E+01	1,05E-01	7,42E-01	0,00E+00	2,75E-03	3,25E-02	4,23E-03	1,97E-01	-1,22E+00
WDP*	m^3 world eq.	4,67E-01	3,07E-05	1,60E-02	0,00E+00	8,04E-07	9,51E-06	8,63E-06	1,38E-03	-8,27E-03
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 2: 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.*

***: [Life Cycle D stage covers benefits and loads beyond the system boundary stage (reuse, recovery and recycling potential) therefore, when summing up results, this stage should be considered separately].*

**** The indicator's results are calculated using a reference product, with equal weighting between plants, if this is a single plant, it means 100% for that plant.*

Potential environmental impact – additional mandatory and voluntary indicators

Indicator	Unit	Tot.A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
GWP-GHG [2]	kg CO_2 eq.	1,93E+00	7,83E-03	6,74E-02	0,00E+00	3,22E-05	2,43E-03	1,37E-04	1,19E-02	-1,23E-01

[2] 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

Use of resources: 1 lm of steel profile Suprawall Stud 92 with a thickness of 0,5 mm and weight of 0,626 kg

These results are representative of all the products mentioned in this EPD.

RESOURCES USE										
Parameter	**Unit**	**A1-3*****	**A4**	**A5**	**B1-B7**	**C1**	**C2**	**C3**	**C4**	**D***
PERE [3]	MJ	2,09E+00	5,25E-04	7,15E-02	0,00E+00	1,38E-05	1,63E-04	2,83E-04	3,15E-02	4,81E-02
PERM [3]	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	0,00E+00
PERT [3]	MJ	2,09E+00	5,25E-04	7,15E-02	0,00E+00	1,38E-05	1,63E-04	2,83E-04	3,15E-02	4,81E-02
PENRE [3]	MJ	2,16E+01	1,05E-01	7,41E-01	0,00E+00	2,75E-03	3,25E-02	4,23E-03	1,97E-01	-1,22E+00
PENRM [3]	MJ	3,68E-02	0,00E+00	1,22E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT [3]	MJ	2,17E+01	1,05E-01	7,42E-01	0,00E+00	2,75E-03	3,25E-02	4,23E-03	1,97E-01	-1,22E+00
SM	kg	7,57E-02	0,00E+00	2,51E-03	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	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	0,00E+00
FW	m^3	1,66E-02	8,08E-07	5,63E-04	0,00E+00	2,12E-08	2,50E-07	2,03E-07	4,07E-05	-1,24E-02
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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water									

**: [Life Cycle D stage covers benefits and loads beyond the system boundary stage (reuse, recovery and recycling potential) therefore, when summing up results, this stage should be considered separately].*
**** The indicator's results are calculated using a reference product, with equal weighting between plants, if this is a single plant, it means 100% for that plant.*

[3] From International EPD PCR 2.0.1 for Construction Products, the option B, mentioned in Annex 3, was used for the calculation if the primary energy use indicators.

Waste production and output flows: 1 lm of steel profile Suprawall Stud 92 with a thickness of 0,5 mm and weight of 0,626 kg

These results are representative of all the products mentioned in this EPD.

OUTPUT FLOWS AND WASTE CATEGORIES										
Parameter	**Unit**	**A1-3*****	**A4**	**A5**	**B1-B7**	**C1**	**C2**	**C3**	**C4**	**D***
Hazardous waste disposed	kg	5,29E-04	2,15E-12	2,15E-05	0,00E+00	5,64E-14	6,68E-13	6,88E-06	4,18E-11	-9,11E-09
Non-hazardous waste disposed	kg	4,61E-02	3,58E-06	6,28E-02	0,00E+00	9,37E-08	1,11E-06	7,00E-06	5,56E-01	1,47E-02
Radioactive waste disposed	kg	1,70E-06	4,11E-08	2,33E-07	0,00E+00	1,08E-09	1,27E-08	1,08E-09	2,68E-06	1,33E-07
Components for reuse	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	0,00E+00
Material for recycling	kg	0,00E+00	0,00E+00	3,98E-03	0,00E+00	0,00E+00	0,00E+00	7,57E-02	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	0,00E+00
Exported energy, electricity	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	0,00E+00
Exported energy, thermal	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	0,00E+00

**: [Life Cycle D stage covers benefits and loads beyond the system boundary stage (reuse, recovery and recycling potential) therefore, when summing up results, this stage should be considered separately].*
**** The indicator's results are calculated using a reference product, with equal weighting between plants, if this is a single plant, it means 100% for that plant.*

Additional impact categories and indicators: 1 lm of steel profile Suprawall Stud 92 with a thickness of 0,5 mm and weight of 0,626 kg

kg

These results are representative of all the products mentioned in this EPD.

ADDITIONAL IMPACT CATEGORIES AND INDICATORS										
Parameter	**Unit**	**A1-3******	**A4**	**A5**	**B1-B7**	**C1**	**C2**	**C3**	**C4**	**D*****
PM	Disease Incidence	1,94E-07	2,15E-10	6,53E-09	0,00E+00	1,80E-12	6,67E-11	3,12E-12	8,48E-10	-2,81E-09
IRP*	kBq U235 eq.	1,66E-02	2,84E-06	5,78E-04	0,00E+00	7,44E-08	8,80E-07	3,44E-07	3,60E-04	2,75E-03
ETP-fw**	CTUe	3,18E+00	1,24E-01	1,22E-01	0,00E+00	3,26E-03	3,85E-02	3,45E-03	1,51E-01	-6,39E-02
HTP-c**	CTUh	9,53E-10	1,87E-12	3,28E-11	0,00E+00	4,89E-14	5,80E-13	5,76E-14	2,55E-12	5,01E-11
HTP-nc**	CTUh	3,76E-09	2,82E-11	1,34E-10	0,00E+00	7,37E-13	8,73E-12	1,27E-12	7,37E-11	2,39E-10
SQP**	dimensionless	1,55E+00	2,03E-04	6,31E-02	0,00E+00	5,31E-06	6,28E-05	1,67E-04	3,20E-02	-1,58E-02
Acronyms	PM = Particulate matter emissions; IRP= Ionising radiation, human health; ETP-fw: Ecotoxicity (freshwater); ETP-c: Human toxicity, cancer effects; HTP-nc: Human toxicity, non-cancer effects; SQP: Land use related impacts / soil quality									

** 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 of these results are high or as there is limited experience with the indicator.*
****: [Life Cycle D stage covers benefits and loads beyond the system boundary stage (reuse, recovery and recycling potential) therefore, when summing up results, this stage should be considered separately].*
***** The indicator's results are calculated using a reference product, with equal weighting between plants, if this is a single plant, it means 100% for that plant.*

Note: The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins and/or risks.

The results of the end-of-life stage (modules C1-C4) should be considered when using the results of the product stage (modules A1-A3). Environmental impacts from the product's full life cycle must be evaluated to ensure a comprehensive understanding.

Information on biogenic carbon content

Results per functional or declared unit		
BIOGENIC CARBON CONTENT	**kg C**	**kg CO_2 eq.**
Biogenic carbon content in product	0	0
Biogenic carbon content in packaging	3,82E-03	1,40E-02

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

Results for alternative end of life scenarios:

Landfill 100%:

Indicator	Unit	A1-A3	A4	A5	B	C1	C2	C3	C4	D
GWP-tot	kg CO_2 eq.	1,93E+00	7,84E-03	8,64E-02	0,00E+00	3,22E-05	2,61E-03	0,00E+00	1,35E-02	0,00E+00
GWP-fos	kg CO_2 eq.	1,93E+00	7,83E-03	6,75E-02	0,00E+00	3,22E-05	2,61E-03	0,00E+00	1,35E-02	0,00E+00
GWP-bio	kg CO_2 eq.	-1,93E-03	1,24E-05	1,89E-02	0,00E+00	3,37E-11	4,14E-06	0,00E+00	-1,90E-05	0,00E+00
GWP-luc	kg CO_2 eq.	3,88E-04	4,02E-07	1,54E-05	0,00E+00	1,05E-08	1,34E-07	0,00E+00	4,22E-05	0,00E+00
ODP	kg CFC 11 eq.	3,29E-11	8,54E-16	6,84E-12	0,00E+00	2,24E-17	2,84E-16	0,00E+00	4,35E-14	0,00E+00
AP	mol H^+ eq.	4,56E-03	3,74E-05	1,60E-04	0,00E+00	1,12E-07	1,24E-05	0,00E+00	8,39E-05	0,00E+00
EP-fw	kg P eq.	5,15E-06	9,47E-10	1,89E-07	0,00E+00	2,48E-11	3,15E-10	0,00E+00	1,90E-08	0,00E+00
EP-mar	kg N eq.	9,13E-04	1,86E-05	3,31E-05	0,00E+00	3,43E-08	6,18E-06	0,00E+00	2,04E-05	0,00E+00
EP-ter	mol N eq.	9,41E-03	2,04E-04	3,44E-04	0,00E+00	3,76E-07	6,80E-05	0,00E+00	2,23E-04	0,00E+00
POCP	kg NMVOC eq.	3,33E-03	3,73E-05	1,18E-04	0,00E+00	1,34E-07	1,24E-05	0,00E+00	6,35E-05	0,00E+00
ADPE	kg Sb eq.	1,11E-05	1,14E-10	3,68E-07	0,00E+00	2,97E-12	3,78E-11	0,00E+00	9,15E-10	0,00E+00
ADPF	MJ	2,17E+01	1,05E-01	7,43E-01	0,00E+00	2,75E-03	3,49E-02	0,00E+00	2,23E-01	0,00E+00
WDP	m^{11}	4,67E-01	3,07E-05	1,60E-02	0,00E+00	8,04E-07	1,02E-05	0,00E+00	1,57E-03	0,00E+00

Indicator	A1-A3	A4	A5	B	C1	C2	C3	C4	D
GHG	1,93E+00	7,83E-03	6,75E-02	0,00E+00	3,22E-05	2,61E-03	0,00E+00	1,35E-02	0,00E+00

Indicator	Unit	A1-A3	A4	A5	B	C1	C2	C3	C4	D
PERE	MJ	2,09E+00	5,25E-04	7,17E-02	0,00E+00	1,38E-05	1,75E-04	0,00E+00	3,58E-02	0,00E+00
PERM	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	0,00E+00
PERT	MJ	2,09E+00	5,25E-04	7,17E-02	0,00E+00	1,38E-05	1,75E-04	0,00E+00	3,58E-02	0,00E+00
PENRE	MJ	2,16E+01	1,05E-01	7,42E-01	0,00E+00	2,75E-03	3,49E-02	0,00E+00	2,23E-01	0,00E+00
PENRM	MJ	3,68E-02	0,00E+00	1,22E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	2,17E+01	1,05E-01	7,43E-01	0,00E+00	2,75E-03	3,49E-02	0,00E+00	2,23E-01	0,00E+00
SM	kg	7,57E-02	0,00E+00	2,51E-03	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	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	0,00E+00
FW	m^{11}	1,66E-02	8,08E-07	5,63E-04	0,00E+00	2,12E-08	2,69E-07	0,00E+00	4,62E-05	0,00E+00

Indicator	Unit	A1-A3	A4	A5	B	C1	C2	C3	C4	D
Hazardous waste disposed	kg	5,29E-04	2,15E-12	2,12E-05	0,00E+00	5,64E-14	7,17E-13	0,00E+00	4,75E-11	0,00E+00
Non-hazardous waste disposed	kg	4,61E-02	3,58E-06	6,68E-02	0,00E+00	9,37E-08	1,19E-06	0,00E+00	6,32E-01	0,00E+00
Radioactive waste disposed	kg	1,70E-06	4,11E-08	2,52E-07	0,00E+00	1,08E-09	1,37E-08	0,00E+00	3,04E-06	0,00E+00
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	0,00E+00
Material for recycling	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	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	0,00E+00
Exported energy, electricity	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	0,00E+00
Exported energy, thermal	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	0,00E+00

Indicator	Unit	A1-A3	A4	A5	B	C1	C2	C3	C4	D
PM	disease incidence	1,94E-07	2,15E-10	6,53E-09	0,00E+00	1,80E-12	7,16E-11	0,00E+00	9,64E-10	0,00E+00
IRP	kg U235 eq/FU	1,66E-02	2,84E-06	5,80E-04	0,00E+00	7,44E-08	9,45E-07	0,00E+00	4,09E-04	0,00E+00
ETF	CTUe/FU	3,18E+00	1,24E-01	1,23E-01	0,00E+00	3,26E-03	4,14E-02	0,00E+00	1,71E-01	0,00E+00
HTP-c	CTUh/FU	9,53E-10	1,87E-12	3,28E-11	0,00E+00	4,89E-14	6,22E-13	0,00E+00	2,89E-12	0,00E+00
HTP-nc	CTUh/FU	3,76E-09	2,82E-11	1,34E-10	0,00E+00	7,37E-13	9,37E-12	0,00E+00	8,37E-11	0,00E+00
Land Use Related impacts	dimensionless	1,55E+00	2,03E-04	6,33E-02	0,00E+00	5,31E-06	6,74E-05	0,00E+00	3,64E-02	0,00E+00

Recycling 100%:

Indicator	Unit	A1-A3	A4	A5	B	C1	C2	C3	C4	D
GWP-tot	kg CO_2 eq.	1,93E+00	7,84E-03	8,58E-02	0,00E+00	3,22E-05	1,12E-03	1,14E-03	0,00E+00	-1,02E+00
GWP-fos	kg CO_2 eq.	1,93E+00	7,83E-03	6,69E-02	0,00E+00	3,22E-05	1,12E-03	1,14E-03	0,00E+00	-1,02E+00
GWP-bio	kg CO_2 eq.	-1,93E-03	1,24E-05	1,89E-02	0,00E+00	3,37E-11	1,77E-06	-2,69E-06	0,00E+00	6,02E-03
GWP-luc	kg CO_2 eq.	3,88E-04	4,02E-07	1,32E-05	0,00E+00	1,05E-08	5,73E-08	1,49E-07	0,00E+00	-1,36E-04
ODP	kg CFC 11 eq.	3,29E-11	8,54E-16	7,02E-12	0,00E+00	2,24E-17	1,22E-16	3,45E-12	0,00E+00	1,37E-12
AP	mol H^+ eq.	4,56E-03	3,74E-05	1,56E-04	0,00E+00	1,12E-07	5,34E-06	8,98E-06	0,00E+00	-2,50E-03
EP-fw	kg P eq.	5,15E-06	9,47E-10	2,11E-07	0,00E+00	2,48E-11	1,35E-10	4,51E-07	0,00E+00	-2,38E-07
EP-mar	kg N eq.	9,13E-04	1,86E-05	3,23E-05	0,00E+00	3,43E-08	2,65E-06	1,40E-06	0,00E+00	-4,01E-04
EP-ter	mol N eq.	9,41E-03	2,04E-04	3,34E-04	0,00E+00	3,76E-07	2,92E-05	1,46E-05	0,00E+00	-3,60E-03
POCP	kg NMVOC eq.	3,33E-03	3,73E-05	1,16E-04	0,00E+00	1,34E-07	5,32E-06	4,39E-06	0,00E+00	-1,63E-03
ADPE	kg Sb eq.	1,11E-05	1,14E-10	3,68E-07	0,00E+00	2,97E-12	1,62E-11	7,90E-10	0,00E+00	-5,78E-06
ADPF	MJ	2,17E+01	1,05E-01	7,34E-01	0,00E+00	2,75E-03	1,49E-02	3,53E-02	0,00E+00	-1,02E+01
WDP	m^{12}	4,67E-01	3,07E-05	1,59E-02	0,00E+00	8,04E-07	4,37E-06	7,19E-05	0,00E+00	-6,89E-02

indicator	A1-A3	A4	A5	B	C1	C2	C3	C4	D

GHG	1,93E+00	7,83E-03	6,69E-02	0,00E+00	3,22E-05	1,12E-03	1,15E-03	0,00E+00	-1,02E+00

Indicator	Unit	A1-A3	A4	A5	B	C1	C2	C3	C4	D
PERE	MJ	2,09E+00	5,25E-04	7,00E-02	0,00E+00	1,38E-05	7,49E-05	2,36E-03	0,00E+00	4,01E-01
PERM	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	0,00E+00
PERT	MJ	2,09E+00	5,25E-04	7,00E-02	0,00E+00	1,38E-05	7,49E-05	2,36E-03	0,00E+00	4,01E-01
PENRE	MJ	2,16E+01	1,05E-01	7,33E-01	0,00E+00	2,75E-03	1,49E-02	3,53E-02	0,00E+00	-1,02E+01
PENRM	MJ	3,68E-02	0,00E+00	1,22E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	2,17E+01	1,05E-01	7,34E-01	0,00E+00	2,75E-03	1,49E-02	3,53E-02	0,00E+00	-1,02E+01
SM	kg	7,57E-02	0,00E+00	2,51E-03	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	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	0,00E+00
FW	m^{12}	1,66E-02	8,08E-07	5,61E-04	0,00E+00	2,12E-08	1,15E-07	1,69E-06	0,00E+00	-1,03E-01
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	5,29E-04	2,15E-12	2,42E-05	0,00E+00	5,64E-14	3,07E-13	5,74E-05	0,00E+00	-7,59E-08
Non-hazardous waste disposed	kg	4,61E-02	3,58E-06	3,35E-02	0,00E+00	9,37E-08	5,10E-07	5,83E-05	0,00E+00	1,23E-01
Radioactive waste disposed	kg	1,70E-06	4,11E-08	9,32E-08	0,00E+00	1,08E-09	5,86E-09	9,01E-09	0,00E+00	1,11E-06
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	0,00E+00
Material for recycling	kg	0,00E+00	0,00E+00	3,32E-02	0,00E+00	0,00E+00	0,00E+00	6,31E-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	0,00E+00
Exported energy, electricity	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	0,00E+00
Exported energy, thermal	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	0,00E+00
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B**	**C1**	**C2**	**C3**	**C4**	**D**
PM	disease incidence	1,94E-07	2,15E-10	6,49E-09	0,00E+00	1,80E-12	3,07E-11	2,60E-11	0,00E+00	-2,34E-08
IRP	kg U235 eq/FU	1,66E-02	2,84E-06	5,59E-04	0,00E+00	7,44E-08	4,05E-07	2,87E-06	0,00E+00	2,29E-02
ETF	CTUe/FU	3,18E+00	1,24E-01	1,16E-01	0,00E+00	3,26E-03	1,77E-02	2,88E-02	0,00E+00	-5,33E-01

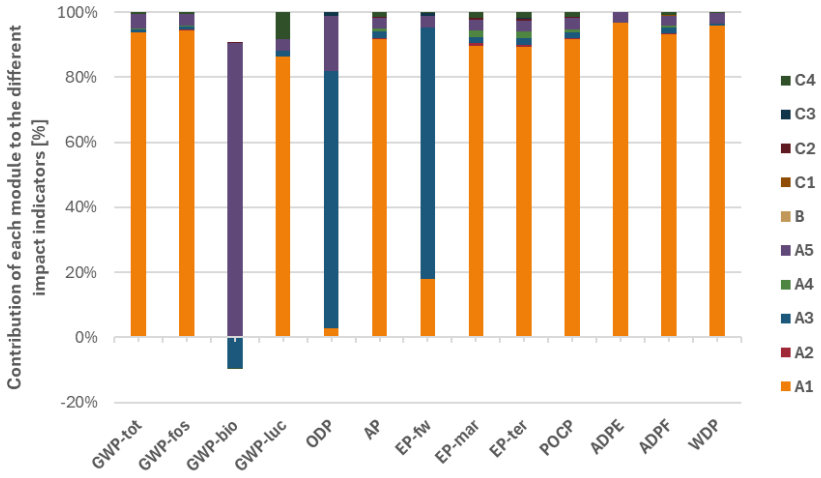
HTP-c	CTUh/FU	9,53E-10	1,87E-12	3,27E-11	0,00E+00	4,89E-14	2,67E-13	4,80E-13	0,00E+00	4,17E-10
HTP-nc	CTUh/FU	3,76E-09	2,82E-11	1,31E-10	0,00E+00	7,37E-13	4,02E-12	1,06E-11	0,00E+00	1,99E-09
Land Use Related impacts	dimensionless	1,55E+00	2,03E-04	6,15E-02	0,00E+00	5,31E-06	2,89E-05	1,39E-03	0,00E+00	-1,32E-01

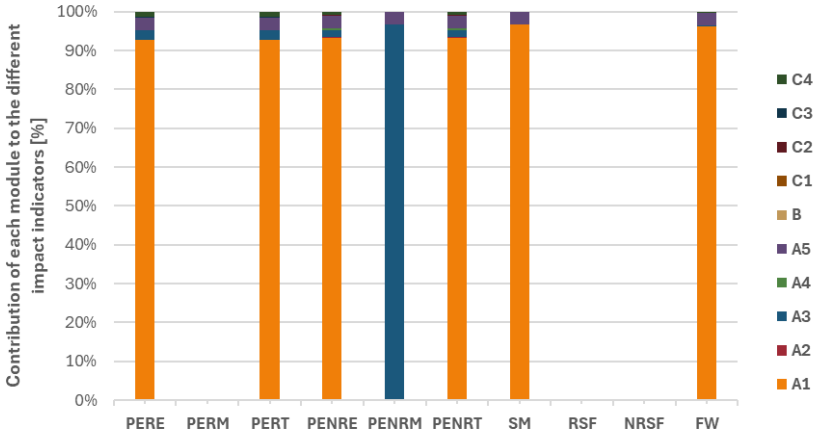
LCA interpretation

ENVIRONMENTAL IMPACTS

The raw materials production (almost only the steel) is the main driver of the emissions for almost all indicators. The production process (forming and shaping of the profile), is not very energy intensive, which is why all the impact lies in the steel used to make the profile. The main indicators (the ones contributing together to more than 80% of the single score) are **Global Warming Potential (GWP-total) and Depletion of abiotic resources of fossil fuels (ADPF).**

The resource use indicators show a similar trend, with the steel being the main driver of the impact.





Abbreviations

ADP	Abiotic Depletion Potential
AP	Acidification Potential
CEN	European Committee for Standardization
CO_2	Carbon dioxide
CPC	Central product classification
CPR	Construction product regulation
c-PCR	Complementary product category rules
EP	Eutrophication potential
EPD	Environmental product declaration
EU	European Union
FU	Functional Unit
FW	Fresh Water
GHG	Greenhouse gas
GPI	General programme instructions
GWP	Global warming potential
HTP	Human Toxicity Potential
IRP	Ionising radiation Potential
ISO	International Organization for Standardization
LCA	Life cycle assessment
LDPE	Low density Polyethylene
NRSF	Use of non-renewable secondary fuels
ODP	Depletion potential of the stratospheric ozone layer
PCR	Product category rules
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 re-sources
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
PM	Particulate Material
POCP	Potential of Tropospheric Ozone
RSF	Use of renewable secondary fuels
RSL	Reference Service Life
SM	Use of secondary material
SQP	Soil Quality Potential
UN	United Nations
WDP	Water Deprivation Potential

References

International EPD® System
General Programme Instructions of the International EPD® System. Version 5.0.
Product category rules (PCR): PCR 2019:14 v2.0.1. Construction products (EN 15804+A2) Version 1.0

LCA for Experts 10.9.1.17
LCA for Experts 10.9.1.17: Software and database for life cycle engineering. LBP, University of Stuttgart and Sphera, 2023.

ISO 21930:2017
Sustainability in buildings and civil engineering works — Core rules for environmental product declarations of construction products and services

ISO 14021
ISO 14021:2016 Environmental labels and declarations — Self-declared environmental claims (Type II environmental labelling)

ISO 14025
DIN EN ISO 14025:2011-10: Environmental labels and declarations — Type III environmental declarations — Principles and procedures

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

EN 15941:2024
Sustainability of construction works - Data quality for environmental assessment of products and construction work - Selection and use of data

Background report - Knauf Vietnam EPDs - Steel (Background Report)
Calculation rules for the Life Cycle Assessment and Requirements and more details about the production on the Background Report.

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