ENVIRONMENTAL PRODUCT DECLARATION

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

Owner of the Declaration	European Association for Panels and Profiles e. V. (PPA-Europe)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-PPA-20240129-CBG1-EN
Issue date	19/07/2024
Valid to	18/07/2029

Profiled sheets made of steel for roof, wall, deck and ceiling constructions

PPA-Europe

Institut Bauen und Umwelt e.V.

ECO PLATFORM EPD VERIFIED

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European Association for
Panels and Profiles

General Information

PPA-Europe

Programme holder

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

Declaration number

EPD-PPA-20240129-CBG1-EN

This declaration is based on the product category rules:

Thin walled profiles and profiled panels of metal, 01/08/2021
(PCR checked and approved by the SVR)

Issue date

19/07/2024

Valid to

18/07/2029

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

Profiled sheets made of steel for roof, wall, deck and ceiling constructions

Owner of the declaration

European Association for Panels and Profiles e. V. (PPA-Europe)
Europark Fichtenhain A 13a
47807 Krefeld
Germany

Declared product / declared unit

1m² industrially produced steel profiled sheets

Scope:

This document is an association EPD for 1 m² of steel trapezoidal 135/310 profile and it represents an average EPD, based on vertical averaging of the specific producer datasets under consideration of the yearly production amounts. Its applicability is limited to steel profiled sheets, which are manufactured by member companies of the European Association for Panels and Profiles.

The following member companies of the European Association for Panels and Profiles have provided data for the year 2022:

1. ArcelorMittal Group, Construction Division
    - ArcelorMittal Construction Austria
    - ArcelorMittal Construction Belgium
    - ArcelorMittal Construction Deutschland
    - ArcelorMittal Construcción España
    - ArcelorMittal Construction France
    - ArcelorMittal Construction Nederland
    - Arcelormittal Construction Polska
    - ArcelorMittal Construção Portugal
    - ArcelorMittal Construction Slovakia
    - ArcelorMittal Construction Sverige
    - Europerfil
    - Münker Metallprofile
2. Fischer Profil
3. Hans Laukien
4. Isolpack
5. Joris Ide Belgium
6. MAAS Profilzentrum
7. Montana Bausysteme
8. PAGOUNI
9. SAB-profiel
10. Wurzer Profiliertechnik
11. Zambelli RIB-ROOF

These companies are representative for the European production of steel profiled sheets.

Additionally, the EPD includes a public annex. This annex applies to:

- 1 m² steel trapezoidal profile 35/207
- 1 m² steel standing seam profile
- 1 m² steel liner tray
- 1 kg steel profile.

The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

The EPD was created according to the specifications of EN 15804+A2. In the following, the standard will be simplified as *EN 15804*.

Verification

The standard EN 15804 serves as the core PCR
Independent verification of the declaration and data according to ISO 14025:2011
☐ internally ☒ externally

Florian Pronold (Managing Director Institut Bauen und Umwelt e.V.)	Mr Olivier Muller, (Independent verifier)

Product

Product description/Product definition
The EPD is valid for prefabricated thin-walled profiled sheets made of steel for load-bearing, self-supporting and non-supporting applications in single- and multi-layer roof, wall, deck and ceiling structures.

The profiled sheets are made of a core of steel, which is protected against corrosion with zinc and organic coatings. The LCA is based on vertical averaging of the specific producer datasets under consideration of the respective yearly production amounts.

For the placing of the product on the market in the European Union / European Free Trade Association (EU/EFTA) (with the exception of Switzerland), *CPR* applies. The product needs a Declaration of Performance taking into consideration *EN 14782* or *EN 1090* and the CE-marking. The data listed in the respective Declaration of Performance apply.

For the application and use, the respective national provisions apply.

Application
The products are used as covering components in single- and multi-layer roof and wall structures, as well as supporting trays in single- and multi-layer roof, wall, deck and ceiling structures for mainly static loads.

The profiled sheets are used in interior and exterior applications.

Technical Data
Technical specifications for profiled sheets are:

- *EN 14782*
- *EN 508*
- *EN 1090*

Constructional data
Trapezoidal profile 135/310

Name	Value	Unit
Thickness of the sheet, according EN 10143	0.75	mm
Surface weight	8.87	kg/m²
Height of the profile, according EN 508 or EN 1090	135 - 137	mm

Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to *EN 14782* or *EN 1090*.

Base materials/Ancillary materials
Steel sheet according to *EN 10346*:
S280 GD to S350 GD

Metallic coating according to *EN 10346*:
Zinc Z275, coating 275 g/m²

The zinc layer has a content of at least 99 weight percent zinc and typical thickness of 20 µm.

Organic coating according to *EN 10169*:
Polyester (SP), coil coating, 25 µm on the application side and max. 15 µm on the backside.

The product does not contain any SVHCs (Substances of Very High Concern) *REACH*.

Reference service life
Thin-walled profiled sheets made of steel used in lightweight metal constructions must withstand a term of protection of at least 15 years. The term of protection is the period until first slight renewals in the surface are required, only if there is no need of frequent inspections and service.

The term of protection depends on the location, weather conditions and the quality of the coating.

The reference service life for the product range of steel profiled sheets is not declared, since the lifetime will depend on specific applications as well as environmental conditions. As a structural part of the building, steel profiled sheets are expected and specified to reach the same service life as that of the building. The steel reference service life can be of > 50 years.

The information in this section does not refer to a reference service life according to *ISO 15686*.

LCA: Calculation rules

Declared Unit
The declared unit is 1 m^2 of steel profile. The averaging is done weighted based on the production volume (in m²) per company.

Declared unit

Name	Value	Unit
Declared unit	1	m^2
Grammage (surface weight)	8.87	kg/m^2
Conversion factor to 1 kg	0.113	-
Layer thickness (coating outside)	2.5e-5	m

System boundary
Type of the EPD: cradle to gate - with options, modules C1-C4 and module D (A1-A3, C, D and additional modules A4 and A5)

Production stage (modules A1-A3) includes processes that provide materials and energy input for the system, manufacturing and transport processes up to the factory gate, as well as waste processing.
Module A4: Delivery to the construction site- fixed transport distance of 100 km.
Module A5: Disposal of transport packaging at the construction site and installation by construction machineries- diesel and electricity driven.

Module C1: Dismantling with the use of machineries- diesel and electricity driven.
Module C2: Transport to the site of end-of-life treatment- fixed transport distance of 50 km.
Module C3: Metal recycling of the steel profiles
Module C4: Deposition/landfill (no environmental impact).

Module D: Potential credits for substitution processes or recycling materials from A5 and C3. For the end of life, it is

assumed that the steel is recycled with credit for the recycling potential declared in module D.
For the end of life, a collection rate of 100 % is assumed.

Geographic Representativeness

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

Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to *EN 15804* and the building context, respectively the product-specific characteristics of performance, are taken into account. *LCA FE* (fka *GaBi*) software and database *CUP 2023.1 LCA FE* were used as calculation basis.

LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon

Information on describing the biogenic Carbon Content at factory gate

Name	Value	Unit
Biogenic carbon content in product	-	kg C
Biogenic carbon content in accompanying packaging	0.05	kg C

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

The following technical information is a basis for the declared modules.

Transport to the building site (A4)

Name	Value	Unit
Transport distance	100	km
Capacity utilisation (including empty runs)	61	%

Installation into the building (A5)

Packaging materials:
PE film 0.010 kg/m² profile
Wooden pallets 0.140 kg/m² profile
A5 covers the waste treatment of packaging material at the point of installation.

Name	Value	Unit
Output substances following waste treatment on site	0.15	kg
Machines for installation - diesel driven, per kg	0.004	L
Machines for installation - electricity driven, per kg	1.89	Wh

End of life (C1-C4)

Name	Value	Unit
Machines for dismantling - diesel driven, per kg	0.005	L
Machines for dismantling - electricity driven, per kg	0.63	Wh
Collected separately waste type	8.87	kg
Recycling	8.87	kg
Landfilling	-	kg

Reuse, recovery or recycling potential (D)

The avoided production of primary steel sheet is considered. Resulting potential benefits and loads for the metal recycling are declared in module D.

LCA: Results

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR NOT DECLARED; MNR = MODULE NOT RELEVANT)

Product stage			Construction process stage		Use stage							End of life stage				Benefits and loads beyond the system boundaries
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	MND	MND	MNR	MNR	MNR	MND	MND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 m² steel trapezoidal profile 135/310 (8.87 kg/m²)

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO_2 eq	2.6E+01	6.43E-02	5.84E-01	4.11E-01	3.21E-02	0	0	-1.79E+01
GWP-fossil	kg CO_2 eq	2.62E+01	6.35E-02	3.67E-01	4.05E-01	3.18E-02	0	0	-1.79E+01
GWP-biogenic	kg CO_2 eq	-1.93E-01	1.88E-04	2.13E-01	1.61E-03	9.38E-05	0	0	3.47E-02
GWP-luluc	kg CO_2 eq	1.02E-02	5.88E-04	3.16E-03	3.73E-03	2.94E-04	0	0	-7.39E-03
ODP	kg CFC11 eq	2.22E-11	8.27E-15	1.64E-11	8.17E-14	4.13E-15	0	0	5.19E-11
AP	mol H^+ eq	6.29E-02	8.15E-05	2.05E-03	2.37E-03	4.08E-05	0	0	-4.02E-02
EP-freshwater	kg P eq	2.16E-05	2.32E-07	1.27E-06	1.48E-06	1.16E-07	0	0	-1.36E-06
EP-marine	kg N eq	1.54E-02	2.76E-05	9.9E-04	1.15E-03	1.38E-05	0	0	-9.65E-03
EP-terrestrial	mol N eq	1.66E-01	3.33E-04	1.1E-02	1.28E-02	1.66E-04	0	0	-1.04E-01
POCP	kg NMVOC eq	4.92E-02	7.03E-05	2.63E-03	3.07E-03	3.51E-05	0	0	-3.21E-02
ADPE	kg Sb eq	6.55E-04	4.18E-09	2.34E-08	2.68E-08	2.09E-09	0	0	-1.87E-07
ADPF	MJ	2.5E+02	8.66E-01	4.8E+00	5.52E+00	4.33E-01	0	0	-1.33E+02
WDP	m^3 world eq deprived	8.43E-01	7.68E-04	3.07E-02	5.22E-03	3.84E-04	0	0	-2.57E-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 m² steel trapezoidal profile 135/310 (8.87 kg/m²)

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	2.12E+01	6.3E-02	2.96E+00	4.19E-01	3.15E-02	0	0	2.18E+01
PERM	MJ	2.55E+00	0	-2.55E+00	0	0	0	0	0
PERT	MJ	2.37E+01	6.3E-02	4.11E-01	4.19E-01	3.15E-02	0	0	2.18E+01
PENRE	MJ	2.51E+02	8.69E-01	5.43E+00	5.54E+00	4.34E-01	0	0	-1.35E+02
PENRM	MJ	6.04E-01	0	-6.04E-01	0	0	0	0	0
PENRT	MJ	2.52E+02	8.69E-01	4.82E+00	5.54E+00	4.34E-01	0	0	-1.35E+02
SM	kg	2.14E+00	0	0	0	0	0	0	0
RSF	MJ	3.84E-22	0	0	0	0	0	0	0
NRSF	MJ	4.51E-21	0	0	0	0	0	0	0
FW	m^3	3.13E-02	6.9E-05	1.02E-03	4.54E-04	3.45E-05	0	0	-1.16E-02

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 m² steel trapezoidal profile 135/310 (8.87 kg/m²)

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
HWD	kg	8.35E-06	2.69E-12	7.81E-12	1.44E-11	1.35E-12	0	0	-5.09E-10
NHWD	kg	1.34E+00	1.32E-04	5.03E-03	8.64E-04	6.62E-05	0	0	-2.65E-01
RWD	kg	3.21E-03	1.63E-06	2.8E-05	1.56E-05	8.13E-07	0	0	2.21E-03
CRU	kg	0	0	0	0	0	0	0	0
MFR	kg	1.65E-01	0	0	0	0	8.87E+00	0	0
MER	kg	0	0	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0	0	0

EET	MJ	0	0	0	0	0	0	0	0

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 m² steel trapezoidal profile 135/310 (8.87 kg/m²)

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PM	Disease incidence	9.07E-07	5.97E-10	4.02E-08	4.71E-08	2.98E-10	0	0	-5.87E-07
IR	kBq U235 eq	3.5E-01	2.42E-04	4.45E-03	2.42E-03	1.21E-04	0	0	2.39E-01
ETP-fw	CTUe	5.04E+01	6.15E-01	3.37E+00	3.91E+00	3.07E-01	0	0	-2.31E+01
HTP-c	CTUh	3.07E-08	1.26E-11	7.13E-11	8.02E-11	6.29E-12	0	0	-2.74E-08
HTP-nc	CTUh	3.32E-07	6.7E-10	4.64E-09	5.26E-09	3.35E-10	0	0	-1.07E-07
SQP	SQP	5.31E+01	3.62E-01	2E+00	2.31E+00	1.81E-01	0	0	1.23E+01

PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index

Disclaimer 1 – concerning Potential Human exposure efficiency relative to U235 (IRP) - 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 – concerning (ADP-minerals & metals, ADP-fossil, WDP, ETP-fwm HTP-c, HTP-nc, SQP) - The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high as there is limited experience with the indicator.

References

EN 508-1
Roofing and cladding products from metal sheet - Specification for self-supporting products of steel, aluminium or stainless steel sheet - Part 1: Steel

EN 1090-1
Execution of steel structures and aluminium structures - Part 1: Requirements for conformity assessment of structural components

EN 1090-4
Execution of steel structures and aluminium structures - Part 4: Technical requirements for thin-gauge, cold-formed steel elements and structures for roof, ceiling, floor and wall applications

EN 14782
Self-supporting metal sheet for roofing, external cladding and internal lining - Product specification and requirements

EN 15804+ A2:2019
Sustainability of construction works -Environmental Product Declarations - Core rules for the product category of construction products

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

IBU PCR Part A
PCR - Part A: Calculation rules for the Life Cycle Assessment and Requirements on the Background Report, version 1.3, Institut Bauen und Umwelt e.V., www.bau-umwelt.com, August 2021

IBU PCR Part B
PCR – Part B: Requirements of the EPD for thin walled profiles and profiled panels of metal, v8, Institut Bauen und Umwelt e.V., www.bau-umwelt.com, 2023-10

LCA FE Software and Database
LCA FE software-system and CUP 2023.1 databases, University of Stuttgart and Sphera Solutions GmbH, Leinfelden-Echterdingen, 2023 https://sphera.com/product-sustainabilitygabi-data-search/

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Annex for profiled sheets made of steel for roof, wall, deck and ceiling constructions

- **Steel profile- trapezoidal profile 35/207**
- **Steel profile- standing seam profile 65/400**
- **Steel profile- liner tray 130/600**
- **1kg steel profile**

to the

ENVIRONMENTAL PRODUCT DECLARATION
as per /ISO 14025/ and /EN 15804+A2/

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General Information

This document applies to steel - trapezoidal profile 35/207, standing seam profile, liner tray, 1kg steel profile as a public annex to the EPD-PPA-20240129-CBG1-EN document. The declared unit is 1 m² and 1kg. The LCA data were based on production data from the year 2022.

European Association for Panels and Profiles

General Information on Products

This annex contains the LCA results for:

- Steel trapezoidal profile 35/207
- Steel standing seam profile 65/400
- Steel liner tray profile 130/600
- 1kg steel profile

Technical Data for Steel profile Trapezoidal 35/207

Technical specifications for profiled sheets are:

- *EN 14782*
- *EN 508*
- *EN 1090*

Constructional Data

Name	Value	Unit
Thickness of the sheet, according EN 10143	0.75	mm
Surface weight	6.65	kg/m²
Height of the profile, according *EN 508* or *EN 1090*	35	mm

Technical Data for Steel profile standing seam profile

Technical specifications for profiled sheets are:

- *EN 14782*
- *EN 508*
- *EN 1090*

Constructional Data

Name	Value	Unit
Thickness of the sheet, according EN 10143	0.75	mm
Surface weight	7.2	kg/m²
Height of the profile, according *EN 508* or *EN 1090*	65	mm

Technical Data for Steel profile Liner tray

Technical specifications for profiled sheets are:

- *EN 14782*
- *EN 508*
- *EN 1090*

Constructional Data

Name	Value	Unit
Thickness of the sheet, according EN 10143	0.75	mm
Surface weight	9.42	kg/m²
Height of the profile, according *EN 508* or *EN 1090*	130	mm

Technical Data for 1kg steel sheet

- Steel sheet according to *EN 10346*: S280 GD to S350 GD with organic coating according to EN 10169

1. LCA: Calculation rules

Declared unit

Product name	Name	Value	Unit
Trapezoidal 35/207	Declared unit	1	m²
	Surface weight of the profile (total value)	6.65	kg/m²
Standing seam profile	Declared unit	1	m²
	Surface weight of the profile (total value)	7,2	kg/m²
Liner tray	Declared unit	1	m²
	Surface weight of the profile (total value)	9.42	kg/m²
1kg Steel profile	Declared unit	1	kg

The annex includes the individual calculation for steel profiles, according to the declared unit mentioned above.
The last declaration, for 1kg steel profile, is calculated including all the modules. The individual calculation for the steel profile can further be utilized to estimate the LCA results for the products with different weight. The results for 1kg steel profile shall be scaled by the mass of the desired profile.

2. LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon

Information on describing the biogenic Carbon Content at factory gate

Product name	Name	Value	Unit
Trapezoidal 35/207	Biogenic carbon content in accompanying packaging	0,058	kg C

Standing seam profile	Biogenic carbon content in accompanying packaging	0,090	kg C
Liner tray	Biogenic carbon content in accompanying packaging	0,103	kg C
1kg Steel profile	Biogenic carbon content in accompanying packaging	0,012	kg C

The following technical information is a basis for the declared modules.

Transport to the building site (A4)
The transport to building site A4 is standardized and can be scaled up to building level. Hence, it is considered to be 100km.

Name	Value	Unit
Transport distance	100	km
Capacity utilisation (including empty runs)	61	%

Installation (A5)
The following packaging material is considered in A1- A3: polyethylene foil and wooden pallets
A5 covers the waste treatment of packaging material at the point of installation. Disposal of transport packaging at the construction site and installation by construction machineries- diesel and electricity driven.
Energy benefits resulting from the waste treatment of the packaging material is quantified in module D.

Installation into the building (A5)

Product name	Name	Value	Unit
Trapezoidal 35/207	Output substances following waste treatment on site	0.222	kg
Standing seam profile	Output substances following waste treatment on site	0.290	kg
Liner tray	Output substances following waste treatment on site	0.265	kg
1kg Steel profile	Output substances following waste treatment on site	0.040	kg

End of life (C1-C4)

Product name	Name	Value	Unit
Trapezoidal 35/207	Collected separately waste type waste type	6.65	kg
	Recycling	6.65	kg
	Energy recovery	-	kg
	Landfilling	-	kg
Standing seam profile	Collected separately waste type waste type	7.2	kg
	Recycling	7.2	kg
	Energy recovery	-	kg
	Landfilling	-	kg
Liner tray	Collected separately waste type waste type	9.42	kg
	Recycling	9.42	kg
	Energy recovery	-	kg
	Landfilling	-	kg
1kg Steel profile	Collected separately waste type waste type	1	kg
	Recycling	1	kg
	Energy recovery	-	kg
	Landfilling	-	kg

Reuse, recovery or recycling potential (D)

Resulting potential benefits and loads for the metal recycling are declared in module D.

3. LCA: Results

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	MND	MND	MND	MND	MND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1m² Steel profile-Trapezoidal 35/207

Core Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-total	[kg CO_2-Eq.]	1,84E+01	4,82E-02	4,94E-01	3,08E-01	2,41E-02	0,00E+00	0,00E+00	-1,34E+01
GWP-fossil	[kg CO_2-Eq.]	1,84E+01	4,76E-02	2,79E-01	3,04E-01	2,38E-02	0,00E+00	0,00E+00	-1,34E+01
GWP-biogenic	[kg CO_2-Eq.]	1,75E-02	1,41E-04	2,12E-01	1,21E-03	7,03E-05	0,00E+00	0,00E+00	2,60E-02
GWP-luluc	[kg CO_2-Eq.]	7,14E-03	4,41E-04	2,37E-03	2,80E-03	2,21E-04	0,00E+00	0,00E+00	-5,54E-03
ODP	[kg CFC11-Eq.]	2,13E-10	6,20E-15	1,51E-11	6,13E-14	3,10E-15	0,00E+00	0,00E+00	3,88E-11
AP	[mol H^+-Eq.]	4,43E-02	6,11E-05	1,55E-03	1,77E-03	3,06E-05	0,00E+00	0,00E+00	-3,01E-02
EP-freshwater	[kg P-Eq.]	9,55E-05	1,74E-07	9,54E-07	1,11E-06	8,71E-08	0,00E+00	0,00E+00	-1,03E-06
EP-marine	[kg N-Eq.]	1,12E-02	2,07E-05	7,45E-04	8,65E-04	1,04E-05	0,00E+00	0,00E+00	-7,24E-03
EP-terrestrial	[mol N-Eq.]	1,18E-01	2,49E-04	8,28E-03	9,57E-03	1,25E-04	0,00E+00	0,00E+00	-7,84E-02
POCP	[kg NMVOC-Eq.]	3,47E-02	5,27E-05	1,98E-03	2,30E-03	2,64E-05	0,00E+00	0,00E+00	-2,41E-02
ADPE	[kg Sb-Eq.]	4,49E-04	3,14E-09	1,76E-08	2,01E-08	1,57E-09	0,00E+00	0,00E+00	-1,41E-07
ADPF	[MJ]	1,81E+02	6,49E-01	3,62E+00	4,14E+00	3,24E-01	0,00E+00	0,00E+00	-1,00E+02
WDP	[m^3 world-Eq deprived]	7,13E-01	5,76E-04	2,92E-02	3,92E-03	2,88E-04	0,00E+00	0,00E+00	-1,93E-01

Caption	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: 1m² Steel profile-Trapezoidal 35/207

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	[MJ]	1,61E+01	4,72E-02	2,85E+00	3,14E-01	2,36E-02	0,00E+00	0,00E+00	1,63E+01
PERM	[MJ]	2,54E+00	0,00E+00	-2,54E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	[MJ]	1,87E+01	4,72E-02	3,12E-01	3,14E-01	2,36E-02	0,00E+00	0,00E+00	1,63E+01
PENRE	[MJ]	1,79E+02	6,51E-01	7,36E+00	4,16E+00	3,26E-01	0,00E+00	0,00E+00	-1,01E+02
PENRM	[MJ]	3,73E+00	0,00E+00	-3,73E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	[MJ]	1,83E+02	6,51E-01	3,63E+00	4,16E+00	3,26E-01	0,00E+00	0,00E+00	-1,01E+02
SM	[kg]	1,47E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	[MJ]	1,74E-22	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	[MJ]	2,04E-21	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	[m^3]	2,57E-02	5,17E-05	9,08E-04	3,40E-04	2,59E-05	0,00E+00	0,00E+00	-8,72E-03

Caption	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: 1m² Steel profile-Trapezoidal 35/207

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
HWD	[kg]	5,72E-06	2,02E-12	6,16E-12	1,08E-11	1,01E-12	0,00E+00	0,00E+00	-4,22E-10
NHWD	[kg]	8,99E-01	9,93E-05	4,82E-03	6,48E-04	4,97E-05	0,00E+00	0,00E+00	-1,99E-01
RWD	[kg]	2,75E-03	1,22E-06	2,18E-05	1,17E-05	6,10E-07	0,00E+00	0,00E+00	1,62E-03
CRU	[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
MFR	[kg]	7,22E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,65E+00	0,00E+00	0,00E+00
MER	[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
EEE	[MJ]	3,24E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EET	[MJ]	6,20E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Caption	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: 1m² Steel profile-Trapezoidal 35/207

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PM	[Disease Incidence]	6,41E-07	4,47E-10	3,02E-08	3,53E-08	2,24E-10	0,00E+00	0,00E+00	-4,40E-07
IRP	[kBq U235-Eq.]	3,80E-01	1,82E-04	3,46E-03	1,82E-03	9,09E-05	0,00E+00	0,00E+00	1,74E-01
ETP-fw	[CTUe]	4,28E+01	4,61E-01	2,53E+00	2,93E+00	2,30E-01	0,00E+00	0,00E+00	-1,74E+01
HTP-c	[CTUh]	2,12E-08	9,43E-12	5,41E-11	6,01E-11	4,72E-12	0,00E+00	0,00E+00	-2,06E-08
HTP-nc	[CTUh]	2,43E-07	5,02E-10	3,51E-09	3,94E-09	2,51E-10	0,00E+00	0,00E+00	-8,01E-08
SQP	[-]	4,84E+01	2,71E-01	1,50E+00	1,73E+00	1,36E-01	0,00E+00	0,00E+00	9,18E+00

Caption	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

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1m² Steel profile-Standing seam profile

Core Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-total	[kg CO_2-Eq.]	1,98E+01	5,22E-02	6,25E-01	3,34E-01	2,61E-02	0,00E+00	0,00E+00	-1,46E+01
GWP-fossil	[kg CO_2-Eq.]	2,01E+01	5,16E-02	2,92E-01	3,29E-01	2,58E-02	0,00E+00	0,00E+00	-1,46E+01
GWP-biogenic	[kg CO_2-Eq.]	-3,27E-01	1,52E-04	3,30E-01	1,31E-03	7,62E-05	0,00E+00	0,00E+00	2,81E-02
GWP-luluc	[kg CO_2-Eq.]	7,94E-03	4,78E-04	2,57E-03	3,03E-03	2,39E-04	0,00E+00	0,00E+00	-6,00E-03
ODP	[kg CFC11-Eq.]	2,02E-11	6,71E-15	4,47E-12	6,64E-14	3,36E-15	0,00E+00	0,00E+00	4,19E-11
AP	[mol H^+-Eq.]	4,81E-02	6,62E-05	1,69E-03	1,92E-03	3,31E-05	0,00E+00	0,00E+00	-3,27E-02
EP-freshwater	[kg P-Eq.]	2,02E-05	1,89E-07	1,04E-06	1,20E-06	9,43E-08	0,00E+00	0,00E+00	-1,13E-06
EP-marine	[kg N-Eq.]	1,19E-02	2,24E-05	8,11E-04	9,37E-04	1,12E-05	0,00E+00	0,00E+00	-7,85E-03
EP-terrestrial	[mol N-Eq.]	1,28E-01	2,70E-04	9,02E-03	1,04E-02	1,35E-04	0,00E+00	0,00E+00	-8,50E-02
POCP	[kg NMVOC-Eq.]	3,77E-02	5,71E-05	2,16E-03	2,49E-03	2,85E-05	0,00E+00	0,00E+00	-2,61E-02
ADPE	[kg Sb-Eq.]	4,92E-04	3,40E-09	1,91E-08	2,17E-08	1,70E-09	0,00E+00	0,00E+00	-1,53E-07
ADPF	[MJ]	1,99E+02	7,03E-01	3,94E+00	4,48E+00	3,51E-01	0,00E+00	0,00E+00	-1,09E+02
WDP	[m^3 world-Eq deprived]	6,62E-01	6,23E-04	4,15E-02	4,24E-03	3,12E-04	0,00E+00	0,00E+00	-2,10E-01

Caption	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: 1m² Steel profile-Standing seam profile

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	[MJ]	1,71E+01	5,12E-02	4,30E+00	3,41E-01	2,56E-02	0,00E+00	0,00E+00	1,76E+01
PERM	[MJ]	3,96E+00	0,00E+00	-3,96E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	[MJ]	2,11E+01	5,12E-02	3,44E-01	3,41E-01	2,56E-02	0,00E+00	0,00E+00	1,76E+01
PENRE	[MJ]	1,97E+02	7,06E-01	7,17E+00	4,50E+00	3,53E-01	0,00E+00	0,00E+00	-1,10E+02
PENRM	[MJ]	3,22E+00	0,00E+00	-3,22E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	[MJ]	2,01E+02	7,06E-01	3,95E+00	4,50E+00	3,53E-01	0,00E+00	0,00E+00	-1,10E+02
SM	[kg]	1,61E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	[MJ]	6,25E-22	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	[MJ]	7,34E-21	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	[m^3]	2,53E-02	5,60E-05	1,22E-03	3,68E-04	2,80E-05	0,00E+00	0,00E+00	-9,51E-03

Caption	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: 1m² Steel profile- Standing seam profile

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
HWD	[kg]	6,27E-06	2,18E-12	7,25E-12	1,17E-11	1,09E-12	0,00E+00	0,00E+00	-5,13E-10
NHWD	[kg]	8,97E-01	1,08E-04	7,23E-03	7,02E-04	5,38E-05	0,00E+00	0,00E+00	-2,15E-01
RWD	[kg]	2,90E-03	1,32E-06	2,49E-05	1,27E-05	6,60E-07	0,00E+00	0,00E+00	1,71E-03
CRU	[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
MFR	[kg]	6,58E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,20E+00	0,00E+00	0,00E+00
MER	[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
EEE	[MJ]	4,74E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EET	[MJ]	8,65E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Caption	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: 1m² Steel profile- Standing seam profile

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PM	[Disease Incidence]	7,10E-07	4,85E-10	3,28E-08	3,83E-08	2,42E-10	0,00E+00	0,00E+00	-4,77E-07
IRP	[kBq U235-Eq.]	3,32E-01	1,97E-04	3,97E-03	1,97E-03	9,85E-05	0,00E+00	0,00E+00	1,81E-01
ETP-fw	[CTUe]	4,32E+01	4,99E-01	2,75E+00	3,18E+00	2,50E-01	0,00E+00	0,00E+00	-1,89E+01
HTP-c	[CTUh]	2,34E-08	1,02E-11	5,96E-11	6,51E-11	5,11E-12	0,00E+00	0,00E+00	-2,23E-08
HTP-nc	[CTUh]	2,60E-07	5,44E-10	3,87E-09	4,27E-09	2,72E-10	0,00E+00	0,00E+00	-8,69E-08
SQP	[-]	6,79E+01	2,94E-01	1,63E+00	1,87E+00	1,47E-01	0,00E+00	0,00E+00	9,90E+00

Caption	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

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1m² Steel profile-Liner tray

Core Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-total	[kg CO_2-Eq.]	2,47E+01	6,83E-02	7,57E-01	4,37E-01	3,42E-02	0,00E+00	0,00E+00	-1,90E+01
GWP-fossil	[kg CO_2-Eq.]	2,51E+01	6,75E-02	3,75E-01	4,31E-01	3,37E-02	0,00E+00	0,00E+00	-1,91E+01
GWP-biogenic	[kg CO_2-Eq.]	-3,60E-01	1,99E-04	3,78E-01	1,71E-03	9,97E-05	0,00E+00	0,00E+00	3,68E-02
GWP-luluc	[kg CO_2-Eq.]	9,85E-03	6,25E-04	3,36E-03	3,97E-03	3,13E-04	0,00E+00	0,00E+00	-7,86E-03
ODP	[kg CFC11-Eq.]	2,16E-11	8,79E-15	1,79E-13	8,69E-14	4,39E-15	0,00E+00	0,00E+00	5,49E-11
AP	[mol H^+-Eq.]	6,02E-02	8,67E-05	2,20E-03	2,52E-03	4,33E-05	0,00E+00	0,00E+00	-4,28E-02
EP-freshwater	[kg P-Eq.]	2,05E-05	2,47E-07	1,35E-06	1,57E-06	1,23E-07	0,00E+00	0,00E+00	-1,47E-06
EP-marine	[kg N-Eq.]	1,48E-02	2,94E-05	1,06E-03	1,23E-03	1,47E-05	0,00E+00	0,00E+00	-1,03E-02
EP-terrestrial	[mol N-Eq.]	1,60E-01	3,53E-04	1,18E-02	1,36E-02	1,77E-04	0,00E+00	0,00E+00	-1,11E-01
POCP	[kg NMVOC-Eq.]	4,71E-02	7,47E-05	2,82E-03	3,26E-03	3,74E-05	0,00E+00	0,00E+00	-3,42E-02
ADPE	[kg Sb-Eq.]	6,27E-04	4,45E-09	2,50E-08	2,85E-08	2,22E-09	0,00E+00	0,00E+00	-2,00E-07
ADPF	[MJ]	2,38E+02	9,20E-01	5,14E+00	5,87E+00	4,60E-01	0,00E+00	0,00E+00	-1,42E+02
WDP	[m^3 world-Eq deprived]	8,05E-01	8,16E-04	4,77E-02	5,55E-03	4,08E-04	0,00E+00	0,00E+00	-2,75E-01

Caption	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: 1m² Steel profile-Liner tray

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	[MJ]	2,03E+01	6,70E-02	4,98E+00	4,46E-01	3,35E-02	0,00E+00	0,00E+00	2,31E+01
PERM	[MJ]	4,53E+00	0,00E+00	-4,53E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	[MJ]	2,48E+01	6,70E-02	4,47E-01	4,46E-01	3,35E-02	0,00E+00	0,00E+00	2,31E+01
PENRE	[MJ]	2,40E+02	9,24E-01	5,50E+00	5,89E+00	4,62E-01	0,00E+00	0,00E+00	-1,44E+02
PENRM	[MJ]	3,41E-01	0,00E+00	-3,41E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	[MJ]	2,40E+02	9,24E-01	5,16E+00	5,89E+00	4,62E-01	0,00E+00	0,00E+00	-1,44E+02
SM	[kg]	2,05E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	[MJ]	2,59E-22	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	[MJ]	3,05E-21	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	[m^3]	2,99E-02	7,33E-05	1,44E-03	4,82E-04	3,67E-05	0,00E+00	0,00E+00	-1,24E-02

Caption	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: 1m² Steel profile-Liner tray

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
HWD	[kg]	7,99E-06	2,86E-12	9,17E-12	1,53E-11	1,43E-12	0,00E+00	0,00E+00	-6,26E-10
NHWD	[kg]	1,14E+00	1,41E-04	8,38E-03	9,19E-04	7,04E-05	0,00E+00	0,00E+00	-2,82E-01
RWD	[kg]	3,14E-03	1,73E-06	3,17E-05	1,66E-05	8,64E-07	0,00E+00	0,00E+00	2,27E-03
CRU	[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
MFR	[kg]	2,04E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	9,42E+00	0,00E+00	0,00E+00
MER	[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
EEE	[MJ]	5,34E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EET	[MJ]	9,62E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Caption	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: 1m² Steel profile-Liner tray

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PM	[Disease Incidence]	8,90E-07	6,34E-10	4,29E-08	5,01E-08	3,17E-10	0,00E+00	0,00E+00	-6,24E-07
IRP	[kBq U235-Eq.]	3,46E-01	2,58E-04	5,08E-03	2,57E-03	1,29E-04	0,00E+00	0,00E+00	2,43E-01
ETP-fw	[CTUe]	4,76E+01	6,53E-01	3,60E+00	4,16E+00	3,27E-01	0,00E+00	0,00E+00	-2,47E+01
HTP-c	[CTUh]	2,93E-08	1,34E-11	7,74E-11	8,53E-11	6,69E-12	0,00E+00	0,00E+00	-2,92E-08
HTP-nc	[CTUh]	3,18E-07	7,12E-10	5,03E-09	5,59E-09	3,56E-10	0,00E+00	0,00E+00	-1,14E-07
SQP	[-]	7,68E+01	3,84E-01	2,13E+00	2,45E+00	1,92E-01	0,00E+00	0,00E+00	1,30E+01

Caption	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

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2 1 kg Steel profile with production processes

Core Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-total	[kg CO_2-Eq.]	2,75E+00	7,25E-03	7,43E-02	4,63E-02	3,62E-03	0,00E+00	0,00E+00	-2,02E+00
GWP-fossil	[kg CO_2-Eq.]	2,75E+00	7,16E-03	4,20E-02	4,57E-02	3,58E-03	0,00E+00	0,00E+00	-2,02E+00
GWP-biogenic	[kg CO_2-Eq.]	2,43E-03	2,12E-05	3,19E-02	1,81E-04	1,06E-05	0,00E+00	0,00E+00	3,91E-03
GWP-luluc	[kg CO_2-Eq.]	1,07E-03	6,64E-05	3,56E-04	4,21E-04	3,32E-05	0,00E+00	0,00E+00	-8,34E-04
ODP	[kg CFC11-Eq.]	3,19E-11	9,32E-16	2,26E-12	9,22E-15	4,66E-16	0,00E+00	0,00E+00	5,84E-12
AP	[mol H^+-Eq.]	6,64E-03	9,20E-06	2,33E-04	2,67E-04	4,60E-06	0,00E+00	0,00E+00	-4,54E-03
EP-freshwater	[kg P-Eq.]	1,43E-05	2,62E-08	1,43E-07	1,67E-07	1,31E-08	0,00E+00	0,00E+00	-1,55E-07
EP-marine	[kg N-Eq.]	1,68E-03	3,12E-06	1,12E-04	1,30E-04	1,56E-06	0,00E+00	0,00E+00	-1,09E-03
EP-terrestrial	[mol N-Eq.]	1,77E-02	3,75E-05	1,25E-03	1,44E-03	1,88E-05	0,00E+00	0,00E+00	-1,18E-02
POCP	[kg NMVOC-Eq.]	5,19E-03	7,93E-06	2,98E-04	3,46E-04	3,96E-06	0,00E+00	0,00E+00	-3,63E-03
ADPE	[kg Sb-Eq.]	6,75E-05	4,72E-10	2,65E-09	3,02E-09	2,36E-10	0,00E+00	0,00E+00	-2,12E-08
ADPF	[MJ]	2,65E+01	9,76E-02	5,44E-01	6,23E-01	4,88E-02	0,00E+00	0,00E+00	-1,51E+01
WDP	[m^3 world-Eq deprived]	1,07E-01	8,66E-05	4,39E-03	5,89E-04	4,33E-05	0,00E+00	0,00E+00	-2,91E-02

Caption	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 kg Steel profile with production processes

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	[MJ]	2,33E+00	7,10E-03	4,29E-01	4,73E-02	3,55E-03	0,00E+00	0,00E+00	2,45E+00
PERM	[MJ]	3,82E-01	0,00E+00	-3,82E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	[MJ]	2,72E+00	7,10E-03	4,69E-02	4,73E-02	3,55E-03	0,00E+00	0,00E+00	2,45E+00
PENRE	[MJ]	2,66E+01	9,80E-02	6,14E-01	6,25E-01	4,90E-02	0,00E+00	0,00E+00	-1,52E+01
PENRM	[MJ]	6,86E-02	0,00E+00	-6,86E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	[MJ]	2,67E+01	9,80E-02	5,46E-01	6,25E-01	4,90E-02	0,00E+00	0,00E+00	-1,52E+01
SM	[kg]	2,21E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	[MJ]	2,62E-23	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	[MJ]	3,07E-22	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	[m^3]	3,76E-03	7,78E-06	1,37E-04	5,12E-05	3,89E-06	0,00E+00	0,00E+00	-1,31E-03

Caption	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 kg Steel profile with production processes

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
HWD	[kg]	8,60E-07	3,03E-13	9,26E-13	1,63E-12	1,52E-13	0,00E+00	0,00E+00	-6,35E-11
NHWD	[kg]	1,35E-01	1,49E-05	7,25E-04	9,75E-05	7,47E-06	0,00E+00	0,00E+00	-2,99E-02
RWD	[kg]	4,04E-04	1,83E-07	3,28E-06	1,76E-06	9,17E-08	0,00E+00	0,00E+00	2,44E-04
CRU	[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
MFR	[kg]	7,72E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,00E+00	0,00E+00	0,00E+00
MER	[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
EEE	[MJ]	4,88E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EET	[MJ]	9,33E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Caption	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 kg Steel Sheet with auxiliary processes

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PM	[Disease Incidence]	9,61E-08	6,73E-11	4,54E-09	5,32E-09	3,36E-11	0,00E+00	0,00E+00	-6,62E-08
IRP	[kBq U235-Eq.]	5,62E-02	2,73E-05	5,20E-04	2,73E-04	1,37E-05	0,00E+00	0,00E+00	2,62E-02
ETP-fw	[CTUe]	6,08E+00	6,93E-02	3,81E-01	4,41E-01	3,47E-02	0,00E+00	0,00E+00	-2,61E+00
HTP-c	[CTUh]	3,18E-09	1,42E-12	8,13E-12	9,05E-12	7,09E-13	0,00E+00	0,00E+00	-3,09E-09
HTP-nc	[CTUh]	3,62E-08	7,55E-11	5,29E-10	5,93E-10	3,78E-11	0,00E+00	0,00E+00	-1,20E-08
SQP	[-]	7,22E+00	4,08E-02	2,26E-01	2,60E-01	2,04E-02	0,00E+00	0,00E+00	1,38E+00

Caption	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.