ENVIRONMENTAL PRODUCT DECLARATION

as per /ISO 14025/ and /EN 15804/

Owner of the Declaration	**European Association for Panels and Profiles e. V. (PPA-Europe)**
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-PPA-20180077-CBG2-EN
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Valid to	13.09.2023

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

European Association for Panels and Profiles (PPA-Europe)

Institut Bauen und Umwelt e.V.

www.ibu-epd.com / https://epd-online.com

European Association for Panels and Profiles

General Information

European Association for Panels and Profiles

Programme holder
IBU - Institut Bauen und Umwelt e.V.
Panoramastr. 1
10178 Berlin
Germany

Declaration number
EPD-PPA-20180077-CBG2-EN

This Declaration is based on the Product Category Rules:
Thin walled profiles and profiled panels of metal, 07.2014
(PCR tested and approved by the SVR)

Issue date
14.09.2018

Valid to
13.09.2023

Prof. Dr.-Ing. Horst J. Bossenmayer
(President of Institut Bauen und Umwelt e.V.)

Dipl. Ing. Hans Peters
(Managing Director IBU)

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

Owner of the Declaration
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Declared product / Declared unit
1m² industrially produced trapezoidal profiles, liner-trays and standing seam profiles made of steel

Scope:
This document is an association EPD and it represents an average EPD, based on vertical averaging of the specific producer data under consideration of the yearly production amounts. Its applicability is limited to profiled sheets made of steel, which are manufactured by member companies of the European Association for Panels and Profiles.

The following eleven member companies of the European Association for Panels and Profiles have provided data for the year 2016:

1. ArcelorMittal Construction Deutschland
2. Fischer Profil
3. Hoesch Bausysteme
4. Isolpack
5. Italpannelli
6. Montana Bausysteme
7. N.V. Joris Ide Belgium
8. SAB-profiel
9. Salzgitter Bauelemente
10. Wurzer Profiliertechnik
11. Zambelli RIB-ROOF

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

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.

Verification

The CEN Norm /EN 15804/ serves as the core PCR
Independent verification of the declaration according to /ISO 14025/
☐ internally ☒ externally

Mr Carl-Otto Neven
(Independent verifier appointed by SVR)

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 double-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 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 double-layer roof and wall structures, as well as supporting tray in single- and double-layer roof, wall, deck and ceiling structures for mainly static loads. The profiled sheets are used in interior and exterior application.

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	11.3	kg/m²
Height of the profile, according /EN 508/ or /EN 1090/	135 - 137	mm

Base materials / Ancillary materials
Steel according /EN 10346/:
S280 GD to S350 GD
Metallic coating according /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 /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. Thin walled profiled sheets made of steel exhibit an estimated service life of 40 – 45 years. This declaration depends on Life Cycle Assessment and relies on the use conditions, according to the /BBSR table/.

LCA: Calculation rules

Declared Unit
The declared unit is 1 m² 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	m²
Surface weight	11.3	kg/m²
Conversion factor to 1 kg	0.088	-

Type of EPD: 2a) Declaration of a specific product as an average from several manufacturers´ plants.

The environmental impact is mainly determined by the raw metal sheet and thus correlates with the area weight which is declared in the EPD. Under consideration of this limitation the analysis shows a good representativeness of the results declared in the EPDs for the members of PPA Europe.

System boundary
Type of the EPD: cradle to gate - with options

Steel profiles standing seam: 7.5 kg/m2
Steel profiles liner tray: 11.1 kg/m2
Steel profiles trapezoidal 35/207: 7.1 kg/m2

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.
For the end of life a collection rate of 90% is assumed. This means after use stage and demolishment, 10% of construction steel products is considered as lost. The loses are modelled with landfilling. The 90% recollected steel is modelled with a credit given as if it was re-melted in an *Electric Arc Furnace* secondary steel plan and substituted by the same amount of steel which is produced in a Blast Furnace primary steel plan (*/worldsteel* LCA methodology/).

Factors for different types
The LCA results for the steel profiles declared in the EPD refer to a trapezoidal 135/310 type with an average weight of 11.3 kg/m2.
In order to enable the user of the EPD to calculate the results for different profiles type the factors in the following table can be used for the calculation. For A1-A3, A4, C and D the LCA results of the declared product have to be multiplied with these factors.
The different types have the following average weight:

Impact Categories	trapezoidal profile 35/207	Liner-tray 130/600	standing seam profile 65/400	trapezoidal profile 35/207	Liner-tray 130/600	standing seam profile 65/400	trapezoidal profile 35/207	Liner-tray 130/600	standing seam profile 65/400	trapezoidal profile 35/207	Liner-tray 130/600	standing seam profile 65/400
	A1-A3	A1-A3	A1-A3	A4	A4	A4	C4	C4	C4	D	D	D
GWP	0.63	0.98	0.68	0.63	0.98	0.66	0.63	0.98	0.66	0.63	0.99	0.69
ODP	0.5	0.68	0.53	0.63	0.98	0.66	0.63	0.98	0.66	0.63	0.99	0.69
AP	0.64	1	0.7	0.63	0.98	0.66	0.63	0.98	0.66	0.63	0.99	0.69
EP	0.64	1	0.69	0.63	0.98	0.66	0.63	0.98	0.66	0.63	0.99	0.69
POCP	0.63	0.98	0.7	0.63	0.98	0.66	0.63	0.98	0.66	0.63	0.99	0.69
ADPE	0.63	0.99	0.69	0.63	0.98	0.66	0.63	0.98	0.66	0.63	0.99	0.69
ADPF	0.64	0.99	0.71	0.63	0.98	0.66	0.63	0.98	0.66	0.63	0.99	0.69

The declared results for A5 are valid for all product variations.

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. GaBi 8 software and databases /GaBi ts/ were used as calculation basis.

LCA: Scenarios and additional technical information

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)	85	%

Installation (A5)
The following packaging material is considered in A1-A3:
Polyethylene film 0.01 kg/m² profile
Wooden pallets 0.14 kg/m² profile
A5 covers the recycling of packaging material at the point of installation. The export of biogenic carbon dioxide from the packaging material is declared in the table of results in module A5. Recycling potential of the packaging material is neglected and not quantified in module D.

End of life (C1-C4)

Name	Value	Unit
Collected separately waste type	11.3	kg
Recycling	10.2	kg
Landfilling	1.1	kg

Collection rate of 90% is a conservative assumption.

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 NOT DECLARED)

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	MND	MND	MND	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 m² Steel profile (11.3 kg/m²)

Parameter	Unit	A1-A3	A4	A5	C4	D
Global warming potential	[kg CO_2-Eq.]	26.67	0.06	0.85	0.02	-15.61
Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	4.92E-10	2.14E-14	IND	1.84E-14	-7.13E-11
Acidification potential of land and water	[kg SO_2-Eq.]	9.13E-2	2.70E-4	IND	1.08E-4	-5.98E-2
Eutrophication potential	[kg $(PO_4)^{3-}$-Eq.]	8.09E-3	6.72E-5	IND	1.47E-5	-4.69E-3
Formation potential of tropospheric ozone photochemical oxidants	[kg ethene-Eq.]	1.16E-2	-9.92E-5	IND	8.61E-6	-8.62E-3
Abiotic depletion potential for non-fossil resources	[kg Sb-Eq.]	2.06E-3	5.14E-9	IND	6.53E-9	1.40E-6
Abiotic depletion potential for fossil resources	[MJ]	307.46	0.88	IND	0.24	-146.65

RESULTS OF THE LCA - RESOURCE USE: 1 m² Steel profile (11.3 kg/m²)

Parameter	Unit	A1-A3	A4	A5	C4	D
Renewable primary energy as energy carrier	[MJ]	21.74	0.04	IND	0.03	8.84
Renewable primary energy resources as material utilization	[MJ]	1.62	0.00	IND	0.00	0.00
Total use of renewable primary energy resources	[MJ]	23.36	0.04	IND	0.03	8.84
Non-renewable primary energy as energy carrier	[MJ]	318.24	0.89	IND	0.24	-140.52
Non-renewable primary energy as material utilization	[MJ]	0.57	0.00	IND	0.00	0.00
Total use of non-renewable primary energy resources	[MJ]	318.81	0.89	IND	0.24	-140.52
Use of secondary material	[kg]	1.17	0.00	0.15	0.00	9.00
Use of renewable secondary fuels	[MJ]	6.25E-22	0.00E+0	IND	0.00E+0	0.00E+0
Use of non-renewable secondary fuels	[MJ]	7.34E-21	0.00E+0	IND	0.00E+0	0.00E+0
Use of net fresh water	[m³]	1.26E-1	8.23E-5	IND	4.64E-5	-9.00E-3

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: 1 m² Steel profile (11.3 kg/m²)

Parameter	Unit	A1-A3	A4	A5	C4	D
Hazardous waste disposed	[kg]	4.58E-7	4.65E-8	IND	3.86E-9	-1.06E-7
Non-hazardous waste disposed	[kg]	3.63E-1	6.77E-5	IND	1.13E+0	-2.17E-1
Radioactive waste disposed	[kg]	4.55E-3	1.21E-6	IND	3.33E-6	2.42E-3
Components for re-use	[kg]	0.00	0.00	IND	0.00	0.00
Materials for recycling	[kg]	0.00	0.00	IND	10.17	0.00
Materials for energy recovery	[kg]	0.00	0.00	IND	0.00	0.00
Exported electrical energy	[MJ]	0.00	0.00	IND	0.00	0.00
Exported thermal energy	[MJ]	0.00	0.00	IND	0.00	0.00

The CO_2 incorporation by using natural packaging materials (wooden pallets, paper) represent 3.2% of the GWP A1-A3.

References

PCR - Part A: Calculation rules for the Life Cycle Assessment and Requirements on the Background Report, version 1.6, Institut Bauen und Umwelt e.V., www.bau-umwelt.com, April 2017

PCR - Part B: Thin walled profiles and profiled panels of metal, Institut Bauen und Umwelt e.V., www.bau-umwelt.com, July 2014

Institut Bauen und Umwelt
Institut Bauen und Umwelt e.V., Berlin (pub.): Generation of Environmental Product Declarations (EPDs);
General Principles
for the EPD range of Institut Bauen und Umwelt e.V. (IBU), 2015/10
www.ibu-epd.de

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

/EN 15804/
/EN 15804:2012-04+A1 2013/, Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products

/ISO 14044/
DIN EN/ ISO 14044/ Environmental management - Life cycle assessment - Requirements and guidelines

/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

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

/EN 508-1/
Roofing and cladding products from metal sheet - Specification for self-supporting 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 10346/
Continuously hot-dip coated steel flat products for cold forming - Technical delivery conditions

/EN 10169/
Continuously organic coated (coil coated) steel flat products - Technical delivery conditions

/Steel Recycling/
Steel Recycling Institute: Steel recycling rates, 2011

/Lebenszyklusanalyse 2009/
Holger König, Niklaus Kohler, Johannes Kreißig, Thomas Lützkendorf: Lebenszyklusanalyse in der Gebäudeplanung Grundlagen Berechnungen Planungswerkzeuge, Institut für internationale Architektur-Dokumentation GmbH&Co. KG, München, 2009

/World steel LCA Methodology/
World Steel Association: Life cycle assessment methodology report, 2011 (worldsteel LCI methodology 12/2012)

/GaBi ts/
GaBi 8 dataset documentation for the software-system and databases, LBP, University of Stuttgart and thinkstep, Leinfelden-Echterdingen, 2017 (http://documentation.gabi-software.com/)

/BBSR table/
BBSR table (german): „Nutzungsdauern von Bauteilen zur Lebenszyklusanalyse nach BNB“, Federal Institute for Research on Building, Urban Affairs and Spatial Development, Referat II Nachhaltiges Bauen; online available under http://www.nachhaltigesbauen.de/baustoff-und-gebaeudedaten/nutzungsdauern-von-bauteilen.html

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