ENVIRONMENTAL PRODUCT DECLARATION

as per /ISO 14025/ and /EN 15804/

Owner of the Declaration	Romakowski GmbH & Co. KG
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-ROK-20180145-IBC1-EN
ECO EPD Ref. No.	ECO-00000780
Issue date	26.11.2018
Valid to	25.11.2023

ROMA quick-assembly insulating panel, types FP, FP+, FV & FV+

Romakowski GmbH & Co. KG

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

1. General Information

Romakowski GmbH & Co. KG	Sandwich panels with a core made of mineral wool
Programme holder IBU - Institut Bauen und Umwelt e.V. Panoramastr. 1 10178 Berlin Germany	**Owner of the declaration** Romakowski GmbH & Co. KG Herdweg 31 86647 Buttenwiesen Deutschland
Declaration number EPD-ROK-20180145-IBC1-EN	**Declared product / declared unit** 1 m² ROMA prefabricated double skin steel faced sandwich panels with an insulating core made of mineral wool
This declaration is based on the product category rules: Double skin metal faced sandwich panels, 07.2014 (PCR checked and approved by the SVR)	**Scope:** This EPD is based on a declared unit of 1 m² continuously produced sandwich panels with skins made of steel and a core made of mineral wool with a surface weight of 21.1 kg/m², manufactured by ROMA Dämmsysteme in Buttenwiesen (Germany). The weighted average is representative for all ROMA elements. Therefore, the produced quantities as well as the variance of the element's thicknesses were taken into account. 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.
Issue date 26.11.2018	
Valid to 25.11.2023	**Verification** The standard /EN 15804/ serves as the core PCR Independent verification of the declaration and data according to /ISO 14025:2010/ ☐ internally ☒ externally
Prof. Dr.-Ing. Horst J. Bossenmayer (President of Institut Bauen und Umwelt e.V.)	Matthias Klingler (Independent verifier appointed by SVR)
Dipl. Ing. Hans Peters (Head of Board IBU)	

2. Product

2.1 Product description / Product definition

Prefabricated double skin steel faced ROMA-sandwich panels with a core made of mineral wool used for load-bearing, self-supporting and non-supporting application in roof, wall and ceiling structures.
The profiled internal and external steel sheets are made of a core of steel, which is protected against corrosion with zinc and organic coatings. The thermal insulating core material is made of mineral wool according to /DIN EN 13162/ with sealing tapes according to /DIN 18542/. The core is linked on both sides with resistance to shear forces to the profiled steel sheets.
The elements are manufactured in a width up to 1150 mm and in thicknesses up to 240 mm. Flat and profiled sheets of steel are used as cover layers.
The placing on the market of the product in the EU / EFTA (with the exception of Switzerland) is governed by Regulation (EU) No 305/2011 (CPR). The product requires a declaration of performance taking into account the / EN 14509: 2013 /, Self-supporting sandwich panels with double-sided metal facings - factory made products - specifications, and the CE marking. For use, the respective national regulations apply.
For use in Germany, the general building inspectorate approval of the DIBT (DIBt represents the authority of the German Länder Governments for a uniform fulfilment of technical tasks in the field of public law) applies.

2.2 Application

Application as covering component in roof and wall structures mainly for static loads.
Sandwich panels in wall and roof applications overtake tasks of the building physics, especially sound, heat and moisture safety. They perform simultaneously the function of air tightness of the building envelope.

2.3 Technical Data

Technical specifications for sandwich panels with a core of mineral wool are given in:

- /DIN EN 14509/ Self-supporting double skin metal faced insulating panels - Factory made products - Specifications
- /DIN EN 13162/ Thermal insulation products for buildings - Factory made mineral wool (MW) products - Specification
- technical approvals for sandwich panels /Z-10.49-511/

Constructional data

Name	Value	Unit
Density of the insulation	100 - 135	kg/m^3
Thickness of the element referring to the overall height of the element (D) in case of flat outer layers; referring to the consistent core thickness without profile (dc) in case of heavily profiled elements	60 - 240	mm
Thickness of the outer layer	0.6	mm
Thickness of the inner layer	0.5	mm
Calculation value for thermal conductivity of the insulation	0.042 - 0.046	W/(mK)
Heat transfer coefficient of the total Element incl. heat bridges due to overlap and fixing elments	0.76 - 0.175	W/(m^{2}K)
Airborne sound reduction Rw(C;Ctr); Verification according EN ISO 140-3 (if required)	34	dB
Sound absorption coefficient *	n.a.	%

*Not applicable for the declared product acc. to /EN 14509/.

Performance values of the product according to the Declaration of Performance in relation to its essential characteristics according to / EN 14509: 2013 /, Self-supporting sandwich panels with double-sided metal coatings - Factory made products - Specifications

2.4 Delivery status

The sandwich elements are commissioned on a project-specific basis, manufactured in the ordered delivery lengths as a plate form in commission-related lengths up to 24 m, thicknesses up to 220 mm and widths up to 1,150 mm, and delivered as prefabricated construction .

2.5 Base materials / Ancillary materials

Composition of the sandwich panels:

material	Thickness of the element		
	60 mm	100 mm	240 mm
steel sheet	63%	50%	30%
thermal insulation core	37%	50%	70%

Steel according /DIN EN 10169/:
S 280 GD to S 320 GD

Metallic coating according /DIN EN 10346/:
Zinc Z 275, a total of 275 g / m² with a zinc content of> 99% or equivalent corrosion protection by another zinc alloy.

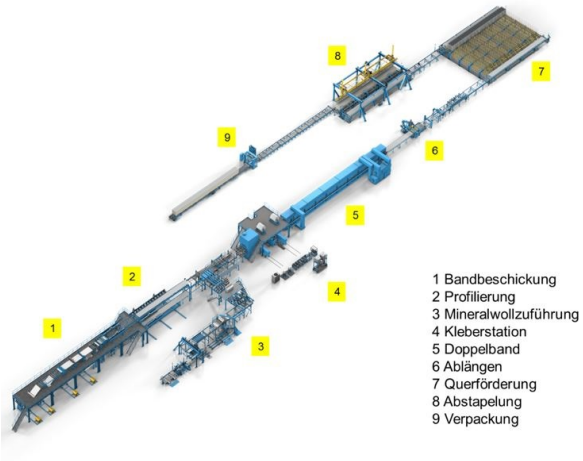
Organic coating according /DIN EN 12944-1/(DIN 55634):
Standard polyester coating (SP), coil coating, 25 µm on the visible side and max. 15 µm on the back or alternatively higher-quality coatings.

Thermal insulation core according /DIN EN 13162/:
mineral wool

There aren't used any substances that are included in the candidate list SVHC.

2.6 Manufacture

The production of sandwich panels takes place on continuously operating production facilities. The production speed is depending on the thickness and ranges between 4 to 8 m/min.
The rollforming process of the two steel faces starts on the winches. The profile types are related to a defined number of rolls, the higher the profiles the higher the number of rolls. The profiling process runs inside out, starting in the middle.
MW sandwich panels are made by introducing prepared mineral wool bars on an adherent layer within the inlay station. The element thickness is fixed by revolving steel plate conveyors. After leaving the reaction zone, the elements are cut to the ordering length. Subsequently, the elements are stacked in an automatically stacking system into transport and assembly compatible packages. The process ends here.



2.7 Environment and health during manufacturing

No measures relating to safety, health and environment protecting during the manufacturing process extending beyond national guidelines are known.

2.8 Product processing/Installation

The sandwich panels are unloaded on the application site manually or with the aid of lifting equipment or cranes. Prior to the installation / finalisation the protective film must be removed.
The mounting of sandwich panels to the substructure must refer to the national approval /Z-14.4-407/ or in accordance with European technical assessments (ETA screws manufacturer). The required holes for mounting are either pre-drilled or the connecting elements intersect the wellbore during the setting

process using drill bits.
Careful planning limits cuts and sheers on the construction site to a minimum. For technical correct construction cuts shears, electric metal shears, nibbler, special stitch, circular or chain saws or oscillating multi-cutter has to be used. The used blades must be suitable for the use, working without spark or heat. If cutting is done with angle grinder or plasma cutters, the coil coated surface has to be protected against injury. At risk of corrosion (e. g. outdoor areas), a post-treatment of the cut surfaces is required.
For use in an airtight and heat-insulating building envelope sealant strips according to /DIN 18542/ and insulation made of polyurethane or mineral wool are in use.

2.9 Packaging
Transport and delivery runs on packaging racks made of wood. The packages are foiled avoiding damage and dirt. The edges are protected with slides made of metal, plastics or wood.
The packages can be handled with stacker or cranes. Packaging materials shall be collected separately for recycling.

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2.10 Condition of use
The substantial composition during the use phase refers to the composition during the manufacture.

2.11 Environment and health during use
The loss of zinc refers to the local micro climatic conditions. Categorisation follows /DIN EN 12944-2/ and depends on surface depending loss of mass.

2.12 Reference service life
Double skin steel faced sandwich panels with the use 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 needed, only if there is no need of frequently inspections and service.
The term of protection depends on the location, weather conditions and the quality of the coating. Double skin steel faced sandwich panels exhibit an estimated service life of 40 – 45 years depending on the use conditions.

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

2.13 Extraordinary effects

Fire
The ROMA quick-assembly insulating panels are hardly flammable. They are slassified in class A2-s1,d0 according to /DIN 13501-1/

Fire protection

Name	Value
Building material class	A2
Smoke gas development	s1
Burning droplets	d0

Water
No risks for the environment and living organisms are known under unforeseeable water effects.

Mechanical destruction
No risks for the environment and living organisms are known under unforeseeable mechanical destruction.

2.14 Re-use phase
The steel sheets of the sandwich panels can be detached from the core and collected, reused or recycled after dismantling. The recycling of the mineral wool core is possible. If appropriate recycling facilities do not exist, the mineral wool is landfilled.

2.15 Disposal
The disposal code for thin walled profiled sheets made of steel, protected with zinc coatings refer to the German List of Wastes Ordinance (/AVV/) and European waste Index (EWC):
17 04 05 – Iron and steel
17 06 04 – Insulation materia

2.16 Further information
Technical information on the products and technical rules for the design, planning and execution is available at www.roma-daemmsysteme.de.

3. LCA: Calculation rules

3.1 Declared Unit
This EPD refers to a declared unit of 1 m² of double skin steel faced sandwich panel with a core made of mineral wool. The results represent an average surface weight of 21.09 kg/m² and a specific thickness of 109.5 mm.

Declared unit

Name	Value	Unit
Declared unit	1	m^2
Grammage	21.1	kg/m^2
Conversion factor to 1 kg	0.04742	-

Sandwich panels produced by ROMA vary mainly in the thickness of the thermal insulation material. Therefore, the referring product was calculated based on the analysis and weighting of both the produced running meter of the single types of elements and their specific thickness. The thickness of the steel sheets is constant for each product. However, the specific profile of the steel layer may differ depending on the type of element.

3.2 System boundary
The life cycle assessment of average sandwich panels produced by ROMA refers to a cradle-to-gate analysis with options. The following lifecycle phases are taken into consideration in the analysis:

Module A1-A3 | Product stage
The product stage includes upstream burdens of raw materials (steel sheets, thermal insulation core etc.) and the corresponding transports to the production site at Buttenwiesen. Environmental impacts of the steel sheet and thermal insulation material are calculated based on primary data of the specific suppliers. Thermal energy is provided by natural gas . Electrical energy is procured from the German national grid.

Module C3 | Waste management
Product flows that reach Module D for recycling leave the product system in C3. Environmental impacts resulting from the grinding and sorting of steel scrap are not included.

Module C4 | Landfilling
Module C4 declares environmental impacts due to landfilling of mineral wool after disassembling and sorting. Furthermore, landfilling of steel recycling losses are declared in Module C4.

Module D | Credits and loads beyond the system boundary
Using an European average scenario, Module D sets out the substitution potential resulting from recycling of steel.

3.3 Estimates and assumptions
All assumptions are verified through detailed documentation and correspond to the best possible representation of reality based on the available data. Regional applicability of the used background data refers to average data under European or German conditions taken from the /GaBi database/.

3.4 Cut-off criteria
All inputs and outputs for which data are available are included in the LCA model. Data gaps are filled with conservative assumptions from average data (when available) or with generic data and are documented accordingly. Only data with a contribution of less than 1% were cut off. Ignoring such data is justified based on the insignificance of the expected effect. The overall total of neglected input flows does not amount to more than 5% of the total energy and mass flows. Environmental impacts of machines, plants and infrastructure were not included.

3.5 Background data
Primary and secondary data are used to depict the background system in the LCA model. Data of the applied components regarding mineral wool were provided by specific suppliers. Product specific EPDs depicting the upstream supply chain for steel suppliers of ROMA are available as well. Secondary data originate from the /GaBi 8/ database developed by thinkstep AG.

3.6 Data quality
Data collection is based on product specific questionnaires. It follows an iterative process clarifying questions via e-mail, telephone calls or in personal meetings. Intensive discussion between Romakowski and Daxner & Merl results in an accurate mapping of product related material and energy flows. This leads to a high quality of foreground data collected. Data collection relies on a consistent process according to /ISO 14044/.
The technological, geographical and time-related representativeness of the database was kept in mind when selecting background data. Whenever specific data were missing, either generic datasets or representative average data were used instead. The implemented GaBi background datasets are not more than five years old.

3.7 Period under review
Foreground data for the life cycle inventory analysis were collected for the year of production in 2017. The data are based on the volumes produced on annual basis.

3.8 Allocation
Background data for organic coated steel were selected in conformity to /EN 15804/. Primary data are allocated using the partitioning approach developed by /worldsteel 2014/ for calculating life cycle inventories of coproducts in steel production, which is in line with the provisions of /EN 15804/. The so-called partitioning approach provides for the allocation of environmental effects to the steelmaking process and the emerging byproducts based on their physical relations. Material-inherent flow properties are thus taken into account. The net flows are calculated by deducting the external steel scrap in A1-A3 from the overall mass of the product.

3.9 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.

. The GaBi background database was used to calculate the LCA.

4. LCA: Scenarios and additional technical information

Assembly (A5)
The end-of-life of packaging materials is not declared in Module A5.

Name	Value	Unit
Product packaging for waste treatment at the construction site (wood)	2.88	kg
Product packaging for waste treatment at the construction site (polyethylene)	0.07	kg
Product packaging for waste treatment at the construction site (polysterene)	0.61	kg
Product packaging for waste treatment at the construction site (cardboard)	0.002	kg

End of Life (C1-C4)
The end-of-life scenario used in this LCA study is based on the following assumptions:

Name	Value	Unit
Collected separately	21.1	kg
To recycling	9.6	kg
To landfilling (5 % steel losses)	0.5	kg
To landfilling (mineral wool)	11.0	kg

Reuse, recovery and recycling potential (D), relevant scenario specifications

Name	Value	Unit
Net flow of steel scrap	8.0	kg

This scenario contains a recycling rate of 95 %. Since steel scrap is obtained in the upstream supply chain for the production of the organic coated steel sheets

purchased, this is offset against the steel scrap for recycling (net flow).

5. LCA: Results

The following table contains the LCA results for a declared unit of 1 m² of double skin steel faced sandwich panels with a core made of mineral wool with an average surface density of 21.1 kg.

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	MND	MND	MND	MND	MNR	MNR	MNR	MND	MND	MND	MND	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 m² Sandwich panel (21.1 kg/m²)

Parameter	Unit	A1-A3	C3	C4	D
Global warming potential	[kg CO_2-Eq.]	4.69E+1	0.00E+0	1.99E-1	-1.29E+1
Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	2.43E-10	0.00E+0	4.59E-14	7.21E-8
Acidification potential of land and water	[kg SO_2-Eq.]	1.56E-1	0.00E+0	1.09E-3	-2.55E-2
Eutrophication potential	[kg $(PO_4)^{3-}$-Eq.]	1.65E-2	0.00E+0	1.49E-4	-1.89E-3
Formation potential of tropospheric ozone photochemical oxidants	[kg ethene-Eq.]	1.57E-2	0.00E+0	8.63E-5	-5.97E-3
Abiotic depletion potential for non-fossil resources	[kg Sb-Eq.]	1.67E-3	0.00E+0	2.66E-8	-3.97E-5
Abiotic depletion potential for fossil resources	[MJ]	5.72E+2	0.00E+0	2.60E+0	-1.25E+2

RESULTS OF THE LCA - RESOURCE USE: 1 m² Sandwich panel (21.1 kg/m²)

Parameter	Unit	A1-A3	C3	C4	D
Renewable primary energy as energy carrier	[MJ]	3.68E+1	0.00E+0	3.16E-1	8.32E+0
Renewable primary energy resources as material utilization	[MJ]	4.15E+1	0.00E+0	0.00E+0	0.00E+0
Total use of renewable primary energy resources	[MJ]	7.83E+1	0.00E+0	3.16E-1	8.32E+0
Non-renewable primary energy as energy carrier	[MJ]	6.04E+2	0.00E+0	2.70E+0	-1.21E+2
Non-renewable primary energy as material utilization	[MJ]	5.64E+1	0.00E+0	0.00E+0	0.00E+0
Total use of non-renewable primary energy resources	[MJ]	6.60E+2	0.00E+0	2.70E+0	-1.21E+2
Use of secondary material	[kg]	1.59E+0	0.00E+0	0.00E+0	8.04E+0
Use of renewable secondary fuels	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Use of non-renewable secondary fuels	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Use of net fresh water	[m³]	9.70E-2	0.00E+0	4.46E-4	1.73E-2

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: 1 m² Sandwich panel (21.1 kg/m²)

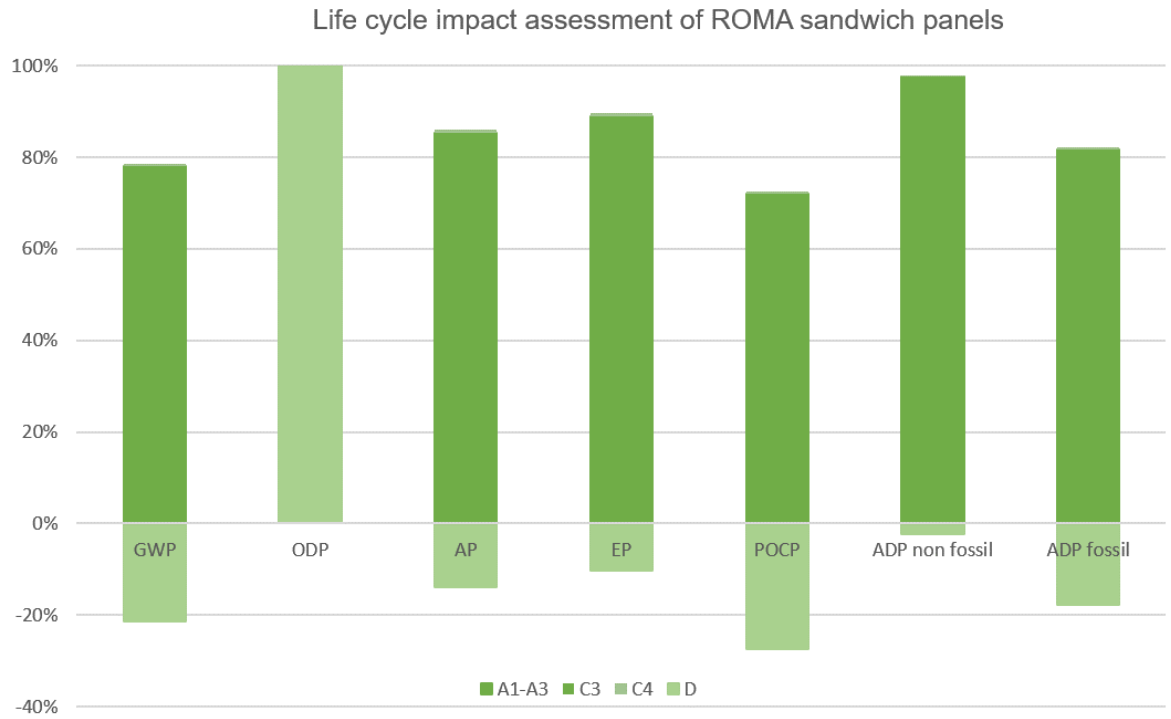
Parameter	Unit	A1-A3	C3	C4	D
Hazardous waste disposed	[kg]	1.71E-3	0.00E+0	4.22E-8	-8.45E-6
Non-hazardous waste disposed	[kg]	1.21E+0	0.00E+0	1.15E+1	1.39E+0
Radioactive waste disposed	[kg]	9.92E-3	0.00E+0	3.89E-5	4.16E-6
Components for re-use	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Materials for recycling	[kg]	0.00E+0	1.01E+1	0.00E+0	0.00E+0
Materials for energy recovery	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Exported electrical energy	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Exported thermal energy	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0

6. LCA: Interpretation

The following interpretation contains a summary of the LCA results referenced to a functional unit of 1 m² of average MW sandwich panel produced by ROMA.

A comparison of the individual lifecycle phases results in a clear dominance of the production phase (**Modules A1-A3**) in any category except the depletion potential of stratospheric ozone. The environmental effects in the production phase are mainly dominated by the upstream products' environmental effects in the value chain.

Environmental effects of landfilling of mineral wool and steel losses (**C4**) make up a minor fraction of the total environmental impact of the product.



As a result of product recyclability, the material removed at the end of life can substitute primary steel. **Module D** shows the recycling potential of steel at the end of its product life. With the exception of depletion potential of stratospheric ozone (**ODP**) and abiotc depletion potential of non-fossil resources (**ADP non fossil**), this results in credits from the substitution of primary steel.

Global warming potential (**GWP**) as well as potential acidification (**AP**) and potential eutrophication (**EP**) in the production phase (Modules A1-A3) of sandwich panels mainly result from environmental burdens in the production of both organic coated steel sheets and mineral wool.

Potential formation of tropospheric ozone (**POCP**) as well as the use of fossil resources (**ADP fossil**) mainly results from emissions in the production of the steel layers and the mineral wool. In addition, packaging materials contribute to these impact categories.

Ozone depletion potential (**ODP**) mainly stems from the production of steel layers as well as the background data used for the depiction of the production of the adhesive layer. With the implementation of strong regulatory instruments for restricting the utilisation of ozone depleting substances (Montreal Protocol), the application of substances affected by these regulations changed rapidly. Due to the declining environmental relevance and comparably high effects of the age of applied data, **ODP** can generally be classified with a high degree of uncertainty.

The upstream supply chain of steel sheets represents the main driver of the abiotic depletion potential of non-fossil resources (**ADP non fossil**), with zinc coating playing a major role.

The utilisation of both, renewable primary energy (**PERT**) and non-renewable primary energy (**PENRT**), result from the upstream supply chain of steel sheets as well as the thermal insulation material of mineral wool.

Variance
The thickness of the steel layer remains constant for all element types. As a result, the environmental impacts of the panels are dependent on the thickness of the insulation core and referring variations. The subsequent factors represent a simple approximation for the estimation of environmental impacts of sandwich panels with varying thicknesses:

ADPf =	+/-	1,15E+01	per 10 mm thickness
ADPnf =	+/-	2,73E-07	per 10 mm thickness
AP =	+/-	6,32E-03	per 10 mm thickness
EP =	+/-	7,05E-04	per 10 mm thickness
GWP =	+/-	1,32E+00	per 10 mm thickness
ODP =	+/-	1,69E-12	per 10 mm thickness
POCP =	+/-	3,13E-04	per 10 mm thickness
PENRT =	+/-	1,23E+01	per 10 mm thickness
PERT =	+/-	1,90E+00	per 10 mm thickness

Nevertheless, these factors represent rough approximations and need to be used with caution.

7. Requisite evidence

Double skin steel faced sandwich panels in Wall and roof application encloses the rooms. The internal skin is in direct contact to the interior. The measurement of VOC emissions is not postulated by laws. Nevertheless, a study on behalf of IFBS shows that thin walled profiled sheets with zinc and organic

coating accomplish AgBB scheme /AgBB/.
VOC emissions are not relevant for the external skin.

8. References

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/DIN 18542/
DIN 18542:2009-07, Sealing of outside wall joints with impregnated sealing tapes made of cellular plastics - Impregnated sealing tapes - Requirements and testing

/DIN EN 10169/
DIN EN 10169:2012-06, Continuously organic coated (coil coated) steel flat products - Technical delivery conditions

/DIN EN 10346/
DIN EN 10346:2009-07, Continuously hot-dip coated steel flat products for cold forming - Technical delivery conditions

/DIN EN 13162/
DIN EN 13162:2013-03, Thermal insulation products for buildings - Factory made mineral wool (MW) products - Specification

/DIN EN 13501/
DIN EN 13501:2010-01, Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests

/DIN EN 14509/
DIN EN 14509:2009-04 Self-supporting double skin metal faced insulating panels - Factory made products - Specifications

/DIN EN ISO 12944/
DIN EN ISO 12944:1998-07, Paints and varnishes - Corrosion protection of steel structures by protective paint systems

/Z-14.4-407/
Z-14.4-407, Thread-forming screws for fastening of sandwich panels to steel or timber supporting structures

/ ISO 15686 /
ISO 15686:2011-05 Buildings and constructed assets - Service life planning

/Z-10.49-511/
Z-10.49-511, Sandwich panels "ROMA Schnellbau Dämmpaneele" according to EN 14509 with steel cover layers and a core material of mineral wool; Type "FP", "FP +", "FV" and "FV +"

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