ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804

Owner of the Declaration	**European Association for Panels and Profiles**
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
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Valid to	11.09.2018

Double skin steel faced sandwich panels with a core made of polyurethane

European Association for Panels and Profiles

www.bau-umwelt.com

European Association for Panels and Profiles

General Information

European Association for Panels and Profiles

Programme holder

IBU - Institut Bauen und Umwelt e.V.
Panoramastraße 1
D-10178 Berlin

Declaration number

EPD-EPQ-20130170-CBG1-EN

This Declaration is based on the Product Category Rules:

Double skin metal faced sandwich panels, 07-2013
(PCR tested and approved by the independent expert committee [SVA])

Issue date

12.09.2013

Valid to

11.09.2018

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

Prof. Dr.-Ing. Hans-Wolf Reinhardt
(Chairman of SVA)

Double skin steel faced sandwich panels with a core made of polyurethane

Owner of the Declaration

European Association for Panels and Profiles
Europark Fichtenhain A 13a
D-47807 Krefeld

Declared product / Declared unit

1m² prefabricated double skin steel faced sandwich panels with a insulating core made of polyurethane rigid foam

Scope:

The purpose of this document is limited to continuously produced sandwich panels with face sheets made of steel that are manufactured by member companies of the European Association for Panels and Profiles.

Data has been provided by 12 member companies of the European Association for Panels and Profiles for the year 2011. These companies represent between 50% and 67% of the members producing sandwich panels. Production volume of these companies is about 50% to the European market.

The owner of the declaration shall be liable for the underlying information and evidence.

Verification

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

Matthias Schulz
(Independent tester appointed by SVA)

Product

Product description and placing on the market

Prefabricated double skin steel faced sandwich panels with a core made of polyurethane, 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 polyurethane according to /EN 13165/ with sealing tapes according /DIN 18542/. The core is linked on both sides with resistance to shear forces to the profiled steel sheets.

The LCA is based on vertical averaging of the specific producer datasets under consideration of the respective yearly production amounts.

The products must comply with the Regulation (EU) No 305/2011 taking into account the harmonised technical specification /EN 14509/; they may be put on the market with the Declaration of Performance and the CE-mark.

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 safely. They perform simultaneously the function of air tightness of the building envelope.

The application takes place according to national regulations.

Technical Data

Technical specifications for sandwich panels with a core of polyurethane are:

- /EN 14509/
- /EN 13165/

Constructional data

Name	Value			Unit
	40	100	160	
Density of the insulation	41-43			kg/m³
Thickness of the element. When the outer layers are	40	100	160	mm

Name	Value			Unit
	40	100	160	
flat, this is the overall height of the element (D); on heavily profiled elements this is the consistent core thickness without profile (dc)				
Thickness of the outer layer	0,6	0,6	0,6	mm
Thickness of the inner layer	0,5	0,5	0,5	mm
Calculation value for thermal conductivity of the insulation	0,0242	0,0242	0,0242	W/(mK)
Heat transfer coefficient of the total Element incl. heat bridges due to overlap and fixing elements	0,5850	0,2537	0,1529	W/(m²K)
Weight	10,6	12,9	16,1	kg/m²

Base materials / Ancillary materials

Composition of the sandwich panels:

material	Thickness of the element		
	40	100	160
Steel sheet	84%	69%	58%
Thermal insulation core	16%	31%	42%

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

Metallic coating according to /EN 10346/:
Zinc Z 275, coating 275 g/m². The zinc layer has a content of at least 99 weight percent zinc and a typical thickness of 20 µm.

Organic coating according to /EN 12944-1/:
Polyester (SP), coil coating, 25 µm on the application side and max.15 µm on the back side.

Thermal insulation core according to /EN 13165/:
rigid polyurethane foam made of isocyanate and polyole.

The panels contain sealing tapes (amount on total weight < 0,6%) according to DIN 18542.

No /REACH/ materials included.

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.

LCA: Calculation rules

Declared Unit

The declared unit is 1m² of sandwich panel. The averaging is done vertically based on the specific primary data.

Declared unit

PU 40 mm	Value	Unit
Declared unit	1	m²
Surface weight	10,6	kg/m²
Conversion factor to 1 kg	1/10,6	-
PU 100 mm	**Value**	**Unit**
Declared unit	1	m²
Surface weight	12,9	kg/m²
Conversion factor to 1 kg	1/12,9	-
PU 160 mm	**Value**	**Unit**
Declared unit	1	m²
Surface weight	16,1	kg/m²
Conversion factor to 1 kg	1/16,1	-

System boundary

Type of the EPD: cradle to gate - with options

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 it is assumed that the steel proportion is recycled with credit for the recycling potential declared in module D and the PU proportion is incinerated (module C4) with credit given for energy substitution in module D.

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: Scenarios and additional technical inform

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

End of life (C1-C4)

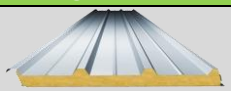
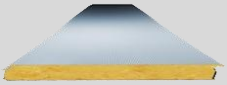
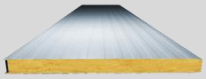
Name	Value			Unit
	40	100	160	
Recycling	8,9	8,9	9,3	kg
Energy retrieving	1,7	4,0	6,8	kg
Landfilling	0	0	0	kg

LCA: Ergebnisse

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 BOUNDARYS
Raw material supply	Transport	Manufacturing	Transport	Construction-installation process	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	MND	MND	MND	MND	MND	MND	MND	MND	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 m² Sandwich panel

		PU 40 mm			PU 100 mm			PU 160 mm		
Parameter	**Unit**	**A1 - A3**	**C4**	**D**	**A1 - A3**	**C4**	**D**	**A1 - A3**	**C4**	**D**
GWP	[kg CO_2-Äq.]	26,0	3,8	-15,2	32,8	9,1	-17,6	41,1	14,7	-20,5
ODP	[kg CFC11-Äq.]	8,17E-06	3,75E-11	3,15E-10	1,94E-05	9,13E-11	-6,89E-10	3,19E-05	1,47E-10	-1,71E-09
AP	[kg SO_2-Äq.]	0,092	0,002	-0,056	0,104	0,004	-0,061	0,123	0,006	-0,069
EP	[kg PO_4^{3-}- Äq.]	8,66E-03	3,83E-04	-4,57E-03	1,05E-02	9,32E-04	-4,94E-03	1,32E-02	1,51E-03	-5,47E-03
POCP	[kg Ethen Äq.]	1,30E-02	1,03E-04	-8,00E-03	1,56E-02	2,51E-04	-8,43E-03	1,95E-02	4,06E-04	-9,13E-03
ADPE	[kg Sb Äq.]	1,72E-03	2,62E-08	-5,04E-07	1,75E-03	6,37E-08	-7,04E-07	1,87E-03	1,03E-07	-9,25E-07
ADPF	[MJ]	368,7	0,9	-150,0	525,4	2,3	-185,0	708,2	3,6	-225,0
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									

RESULTS OF THE LCA - RESOURCE USE: 1 m² Sandwich panel

		PU 40 mm			PU 100 mm			PU 160 mm		
Parameter	**Unit**	**A1 - A3**	**C4**	**D**	**A1 - A3**	**C4**	**D**	**A1 - A3**	**C4**	**D**
PERE	[MJ]	18,3	-	-	22,2	-	-	29,2	-	-
PERM	[MJ]	0	-	-	0	-	-	0	-	-
PERT	[MJ]	18,3	0,1	-0,2	22,2	0,1	-3,4	29,2	0,2	-6,8
PENRE	[MJ]	337,1	-	-	437,0	-	-	560,3	-	-
PENRM	[MJ]	47,5	-	-	112,3	-	-	182,4	-	-
PENRT	[MJ]	384,6	1,1	-148,0	549,2	2,5	-189,0	742,8	4,1	-237,0
SM	[kg]	0	-	-	0	-	-	0	-	-
RSF	[MJ]	0	0	0	0	0	0	0	0	0
NRSF	[MJ]	0	0	0	0	0	0	0	0	0
FW*	[m³]	-	-	-	-	-	-	-	-	-
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 – OUTPUT FLOWS AND WASTE CATEGORIES: 1 m² Sandwich panel

		PU 40 mm			PU 100 mm			PU 160 mm		
Parameter	**Unit**	**A1 - A3**	**C4**	**D**	**A1 - A3**	**C4**	**D**	**A1 - A3**	**C4**	**D**
HDW*	[kg]	-	-	-	-	-	-	-	-	-
NHDW*	[kg]	-	-	-	-	-	-	-	-	-
RWD*	[kg]	-	-	-	-	-	-	-	-	-
CRU	[kg]	0	-	0	0	-	0	0	-	0
MFR**	[kg]	0	-	8,2	0	-	8,1	0	-	8,6
MER	[kg]	0	-	1,7	0	-	4,0	0	-	6,8
EEE [Typ1]	[MJ]	0	5,5	-	0	13,5	-	0	21,7	-
EET [Typ2]	[MJ]	0	15,2	-	0	37,1	-	0	59,9	-
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									

*The inventories do not support the methodological approach for the declaration of water and waste indicators. The material amounts, displayed with these inventories contribute significantly > 3% (referring to the mass of the declared unit). The indicators are not declared (decision of IBU advisory board 2013-01-07).

** No credit is given for the amount of recycled steel entering load free the system

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www.bau-umwelt.com

AgBB

Committee for Health-related Evaluation of Building Products (Ausschuss zur gesundheitlichen Bewertung von Bauprodukten)

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EN 10346:2009-07, Continuously hot-dip coated steel flat products - Technical delivery conditions

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

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EPAQ European Quality Regulations for Sandwich Panels

REACH - Regulation concerning the **R**egistration , **E**valuation , **A**uthorisation and Restriction of **CH**emicals

Following companies are represented with their products in this EPD

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