

# **BALEXMETAL**

## **Sandwich panels with mineral wool core**



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### **EPD program operator:**

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### **Manufacturer:**

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### **Basic information**

This declaration is the type III Environmental Product Declaration (EPD) based on EN 15804 and verified according to ISO 14025 by an external auditor. It contains the information on the impacts of the declared construction materials on the environment. Their aspects were verified by the independent body according to ISO 14025. Basically, a comparison or evaluation of EPD data is possible only if all the compared data were created according to EN 15804 (see point 5.3 of the standard).

**Life cycle analysis (LCA):** A1-A3 modules in accordance with EN 15804 (Cradle to Gate)

**The year of preparing the EPD:** 2020

**Declared durability:** Under normal conditions, BalexMetal sandwich panel with mineral wool core has reference service life (RSL) of 50 years

**PCR:** ITB PCR A (PCR based on EN 15804)

**Declared unit:** 1 m<sup>2</sup> of BalexMetal sandwich panel with mineral wool core

**Reasons for performing LCA:** B2B

**Representativeness:** Polish product

## Manufacturer and Product Information

BalexMetal Sp. z o.o. is a leading producer of steel building materials in Poland. In the company's offer there are complete solutions and steel roof and facade systems for residential construction, construction for companies and agricultural construction.

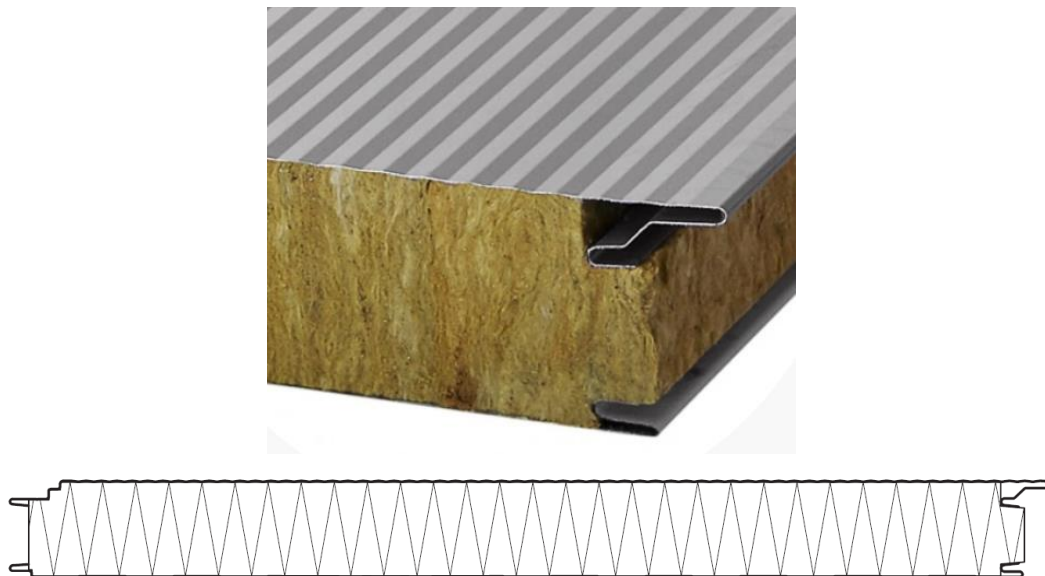
The assortment is appreciated by customers in Poland, Belarus, Lithuania, Latvia, Estonia, Ukraine, the Czech Republic, Slovakia, Germany, Denmark, Sweden and Norway. Advice and sales are provided through our own network of regional branches, cooperating distributors and a team of professional advisers.

BalexMetal is a market leader in the production of sandwich panels with double-sided cladding metal with cores made of various thermal insulation materials is due to its high level of advancement technology of production lines purchased from the most renowned European companies, perfectly a qualified team of employees and special attention to quality.

BalexMetal has introduced complete curtain wall and roof covering systems to its offer. The most important elements of the described systems are wall and roof sandwich panels, consisting of two steel sheet claddings connected to the structural and insulating core. The offer of Balex Metal includes plates in steel cladding with three types of insulation core:

- sandwich panels with a mineral wool core with a fiber orientation perpendicular to the facings,
- sandwich panels with a polyurethane core marked as PUR or a polyisocyanurate core
- sandwich panels with polystyrene core - PWS and PWD

This Environmental Product Declaration includes sandwich panels with mineral wool core in double-sided metal cladding suitable as external walls and wall cladding or partition walls. The product range and technical specification among this document is presented in Table 1



**Fig. 1.** Example of MW-W-PLUS wall sandwich panel with mineral wool core

Table 1. Product range and technical specification of sandwich panels with mineral wool core

Trade name with unique identification code:	Thickness [mm]	Thermal insulation [kg/m <sup>3</sup> ]	Type of profile: external / internal
Wall panel MW STANDARD (MW-W-ST)	80 - 240	100 -10/+15%	Lining, Microprofiled, Grooving, Flat / Lining, Flat
Wall panel MW LIGHT (MW-LT-W-ST)	80 - 200	100, -10/+15%	Lining, Microprofiled, Grooving, Flat / Lining, Flat
Wall panel MW PLUS (MW-W-PLUS)	80 - 240	90, -10/+15%	Lining, Microprofiled, Grooving, Flat / Lining, Grooving
Wall panel MW DEFENDER (MW-D-W-ST DEFENDER)	200 - 240	150, -10/+15%	Lining, Microprofiled, Grooving, Flat / Lining, Flat
Roofing panel MW (MW-R)	100 - 160	110 -10/+ 15%	Trapezoidal / Lining, Flat

Mineral wool sandwich panels consist of two steel sheet claddings and a construction and insulation core. The core is made of hard mineral wool lamellas with an apparent density of 110 kg/m<sup>3</sup>. It is a material with the highest fire resistance parameters, responsible for transferring tangential stresses, maintaining a constant distance between the facings and ensuring high thermal and acoustic insulation. The cladding of the panels is made of S250GD steel sheet, 0.50 - 0.70 mm thick, galvanized on both sides with a zinc layer with a weight of 275 g/m. The task of the cladding is to transfer normal stresses as well as to protect the building against weather conditions. The panel may be finished with special organic or metallic coatings in variety of colours.

The described structure of the panel causes that the mineral wool panels are characterized by high load-bearing capacity and stiffness, allowing for increasing the spacing of supports (purlins, transoms and columns). The variety of panel cladding profiles, along with their wide range of colors, allows architects and designers to shape the facades of buildings in various ways, maintaining the balance between aesthetics and functionality.

Environmental characteristics (LCA) for BALEXMETAL sandwich panels with mineral wool core is presented in a few cases, depending on the thickness of mineral wool core (mm): 80, 100, 150, 200, 230.

## LIFE CYCLE ASSESSMENT (LCA) – general rules applied

### Allocation

The allocation rules used for this EPD are based on general ITB-PCR A. Production of the MW-W-ST, MW-W-PLUS, MW-LT-W-ST, MW-D-W-ST DEFENDER, MW-R sandwich panels is a line process in one factory of BalexMetal Sp. z o.o. in Bolszewo (Poland). Allocation was done on product mass basis.

All impacts from raw materials extraction are allocated in A1 module of EPD. 100% of impacts from line production were inventoried and 9.78% were allocated to mineral wool sandwich panel production. Municipal waste and waste water of whole factory were allocated to module A3. Electricity was inventoried for whole production process. Emissions are measured separately as well and presented in A3 module.

### System limits

The life cycle analysis of the examined products covers “Product Stage”, A1-A3 modules (Cradle to Gate) in accordance with EN 15804+A1 and ITB-PCR A. Details on systems limits are provided in product specific report. All materials and energy consumption inventoried in factory were included in calculation. Office impacts were also taken into consideration. In the assessment, all significant parameters from gathered production data are considered, i.e. all material used per formulation, utilized thermal energy, internal fuel and electric power consumption, direct production waste, and all available emission measurements. This study also takes into account some material flows of less than 1% and energy flows with a proportion of less than 1 %. It can be assumed that the total sum of omitted processes does not exceed 5% of all impact categories. In accordance with EN 15804, machines and facilities (capital goods) required for and during production are excluded, as is transportation of employees.

### A1 and A2 Modules: Raw materials supply and transport

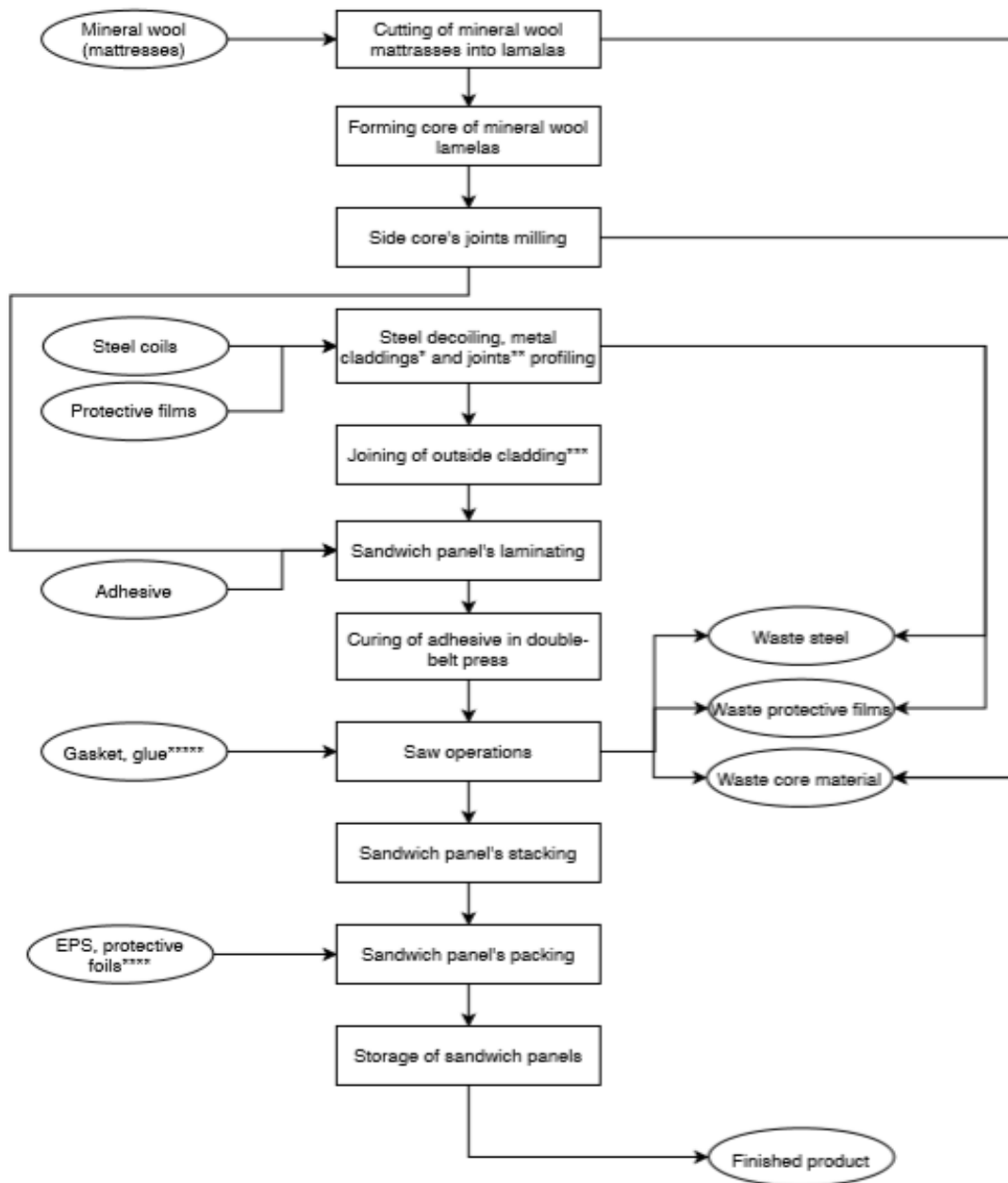
Raw materials for components of BalexMetal mineral wool sandwich panels production come from local suppliers and more distant locations. Data on transport of the different products to the manufacturing plants is collected and modelled for factory by assessor. Means of transport include road and marine transport and Polish and European fuel averages are applied.

### A3: Production

The Fig. 2 show the working process during the production of the MW-W-ST, MW-W-PLUS, MW-LT-W-ST, MW-D-W-ST DEFENDER, MW-R sandwich panels.

Manufacture covers all processes linked to production, which comprises various related operations besides on-site activities, including BalexMetal mineral wool sandwich panels components production process, packaging and internal transportation. The manufacturing process also yields data on the combustion of refinery products, such as diesel and gasoline, related to the production process. Use of electricity, fuels and auxiliary materials in the production is taken into account using national data. The environmental profile of these energy carriers is modelled by ITB for average Polish and European conditions. Packaging-related flows in the production process and all upstream packaging are included in the manufacturing module. Apart from production of packaging material, the supply and transport of packaging material are also considered in the LCA model. It is assumed that packaging waste generated in the course of production and up-stream processes is 100% collected based on a multi-input and multi-output process specific to the elementary composition of the waste. Energy (e.g. electricity) are credited using national production averages.

Manufacturing process of MW-W-ST, MW-W-PLUS, MW-LT-W-ST, MW-D-W-ST wall sandwich panels and MW-R roofing sandwich panels at Balex Metal Sp. z o.o. Production Plant in Bolaszewo



\* At MW-R roofing sandwich panels outside cladding is profiled in exact finished product's dimensions

\*\* At MW-R roofing sandwich panels only for inside cladding

\*\*\* Only for outside cladding at MW-R roofing sandwich panels

\*\*\*\* EPS - expanded polystyrene

\*\*\*\*\* Only for specific wall panel's orders

Fig. 2 Production scheme of BalexMetal sandwich panels with mineral wool core at plant in

## **Data collection period**

The data for manufacture of the examined products refer to period between 01.01.2018-31.12.2018. The life cycle assessments were prepared for Poland as reference area.

## **Data quality**

The values determined to calculate the LCA originate from verified BalexMetal Sp. z o.o. inventory data.

## **Assumptions and estimates**

The impacts of the representative BalexMetal Sp. z o.o. products were aggregated using weighted average. The weighted average method was used according to the percentage of each product in sandwich panels with mineral wool core based on the relation to whole production quantity. Impacts for each product and factory were inventoried and calculated separately.

## **Calculation rules**

LCA was done in accordance with PCR A document.

## **Databases**

The data for the processes come from the following databases: Ecoinvent, ITB-Data. Specific data quality analysis was a part of external ISO 14001 audit. Characterization factors are CML ver. 4.2 based on EN 15804:2012+A1:2013 version. (PN-EN 15804+A1:2014-04)



## LIFE CYCLE ASSESSMENT (LCA) - Results

### Declared unit

The declaration refers to 1 m<sup>2</sup> of complete BALEXMETAL sandwich panel with mineral wool core.

**Table 2. System boundaries for environmental characteristic for BALEXMETAL sandwich panel with mineral wool core**

Environmental assessment information (MNA – Module not assessed, MD – Module Declared, INA – Indicator Not Assessed)																
Product stage			Construction process		Use stage							End of life				Benefits and loads beyond the system boundary
Raw material supply	Transport	Manufacturing	Transport to construction site	Construction-installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction 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
MD	MD	MD	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA

**BALEXMETAL sandwich panel with 80mm mineral wool core**

Environmental impacts: (1 m <sup>2</sup> , MW 80 mm)					
Indicator	Unit	A1	A2	A3	A1-A3
Global warming potential	[kg CO <sub>2</sub> eq.]	4,02E+01	9,19E-01	3,63E-02	4,11E+01
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	2,54E-06	0,00E+00	3,64E-05	3,90E-05
Acidification potential of soil and water	[kg SO <sub>2</sub> eq.]	1,63E-01	7,39E-03	1,76E-04	1,71E-01
Eutrophication potential	[kg (PO <sub>4</sub> ) <sup>3-</sup> eq.]	1,59E-02	1,23E-03	7,60E-06	1,71E-02
Formation potential of tropospheric ozone	[kg Ethene eq.]	2,41E-02	4,53E-04	4,37E-05	2,46E-02
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	1,69E-02	0,00E+00	1,34E-07	1,69E-02
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	5,19E+02	5,27E+00	4,29E+00	5,29E+02
Environmental aspects on resource use: (1 m <sup>2</sup> , MW 80 mm)					
Indicator	Unit	A1	A2	A3	A1-A3
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Use of renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	3,11E+01	3,93E-02	2,65E-01	3,14E+01
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Use of non-renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	5,52E+02	5,79E-01	4,72E+00	5,58E+02
Use of secondary material	[kg]	3,70E+00	0,00E+00	0,00E+00	3,70E+00
Use of renewable secondary fuels	[MJ]	2,30E+00	2,90E-02	0,00E+00	2,33E+00
Use of non-renewable secondary fuels	[MJ]	9,38E-02	0,00E+00	0,00E+00	9,38E-02
Net use of fresh water	[dm <sup>3</sup> ]	INA	INA	INA	INA
Other environmental information describing waste categories: (1 m <sup>2</sup> , MW 80 mm)					
Indicator	Unit	A1	A2	A3	A1-A3
Hazardous waste disposed	[kg]	7,37E-02	1,62E-04	0,00E+00	7,39E-02
Non-hazardous waste disposed	[kg]	8,52E-01	2,70E-02	1,13E-01	9,92E-01
Radioactive waste disposed	[kg]	9,35E-03	0,00E+00	0,00E+00	9,35E-03
Components for re-use	[kg]	0,00E+00	0,00E+00	1,33E-01	1,33E-01
Materials for recycling	[kg]	2,79E-01	0,00E+00	3,52E-03	2,82E-01
Materials for energy recover	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	[MJ per energy carrier]	0,00E+00	0,00E+00	0,00E+00	0,00E+00



**BALEXMETAL sandwich panel with 100mm mineral wool core**

Environmental impacts: (1 m <sup>2</sup> , MW 100 mm)					
Indicator	Unit	A1	A2	A3	A1-A3
Global warming potential	[kg CO <sub>2</sub> eq.]	4,27E+01	9,19E-01	3,63E-02	4,37E+01
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	2,57E-06	0,00E+00	3,64E-05	3,90E-05
Acidification potential of soil and water	[kg SO <sub>2</sub> eq.]	1,74E-01	7,39E-03	1,76E-04	1,81E-01
Eutrophication potential	[kg (PO <sub>4</sub> ) <sup>3-</sup> eq.]	1,62E-02	1,23E-03	7,60E-06	1,75E-02
Formation potential of tropospheric ozone	[kg Ethene eq.]	2,60E-02	4,53E-04	4,37E-05	2,65E-02
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	1,71E-02	0,00E+00	1,34E-07	1,71E-02
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	5,48E+02	5,27E+00	4,29E+00	5,57E+02
Environmental aspects on resource use: (1 m <sup>2</sup> , MW 100 mm)					
Indicator	Unit	A1	A2	A3	A1-A3
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Use of renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	3,15E+01	3,93E-02	2,65E-01	3,18E+01
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Use of non-renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	5,83E+02	5,79E-01	4,72E+00	5,89E+02
Use of secondary material	[kg]	4,33E+00	0,00E+00	0,00E+00	4,33E+00
Use of renewable secondary fuels	[MJ]	2,30E+00	2,90E-02	0,00E+00	2,33E+00
Use of non-renewable secondary fuels	[MJ]	1,15E-01	0,00E+00	0,00E+00	1,15E-01
Net use of fresh water	[dm <sup>3</sup> ]	INA	INA	INA	INA
Other environmental information describing waste categories: (1 m <sup>2</sup> , MW 100 mm)					
Indicator	Unit	A1	A2	A3	A1-A3
Hazardous waste disposed	[kg]	8,26E-02	1,62E-04	0,00E+00	8,28E-02
Non-hazardous waste disposed	[kg]	9,27E-01	2,70E-02	1,13E-01	1,07E+00
Radioactive waste disposed	[kg]	9,50E-03	0,00E+00	0,00E+00	9,50E-03
Components for re-use	[kg]	0,00E+00	0,00E+00	1,33E-01	1,33E-01
Materials for recycling	[kg]	2,86E-01	0,00E+00	3,52E-03	2,89E-01
Materials for energy recover	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	[MJ per energy carrier]	0,00E+00	0,00E+00	0,00E+00	0,00E+00

**BALEXMETAL sandwich panel with 150mm mineral wool core**

Environmental impacts: (1 m <sup>2</sup> , MW 150 mm)					
Indicator	Unit	A1	A2	A3	A1-A3
Global warming potential	[kg CO <sub>2</sub> eq.]	4,91E+01	9,19E-01	3,63E-02	5,00E+01
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	2,63E-06	0,00E+00	3,64E-05	3,90E-05
Acidification potential of soil and water	[kg SO <sub>2</sub> eq.]	2,00E-01	7,39E-03	1,76E-04	2,08E-01
Eutrophication potential	[kg (PO <sub>4</sub> ) <sup>3-</sup> eq.]	1,72E-02	1,23E-03	7,60E-06	1,84E-02
Formation potential of tropospheric ozone	[kg Ethene eq.]	3,07E-02	4,53E-04	4,37E-05	3,12E-02
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	1,75E-02	0,00E+00	1,34E-07	1,75E-02
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	6,19E+02	5,27E+00	4,29E+00	6,28E+02
Environmental aspects on resource use: (1 m <sup>2</sup> , MW 150 mm)					
Indicator	Unit	A1	A2	A3	A1-A3
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Use of renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	3,24E+01	3,93E-02	2,65E-01	3,27E+01
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Use of non-renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	6,62E+02	5,79E-01	4,72E+00	6,67E+02
Use of secondary material	[kg]	5,90E+00	0,00E+00	0,00E+00	5,90E+00
Use of renewable secondary fuels	[MJ]	2,31E+00	2,90E-02	0,00E+00	2,34E+00
Use of non-renewable secondary fuels	[MJ]	1,69E-01	0,00E+00	0,00E+00	1,69E-01
Net use of fresh water	[dm <sup>3</sup> ]	INA	INA	INA	INA
Other environmental information describing waste categories: (1 m <sup>2</sup> , MW 150 mm)					
Indicator	Unit	A1	A2	A3	A1-A3
Hazardous waste disposed	[kg]	1,05E-01	1,62E-04	0,00E+00	1,05E-01
Non-hazardous waste disposed	[kg]	1,12E+00	2,70E-02	1,13E-01	1,26E+00
Radioactive waste disposed	[kg]	9,86E-03	0,00E+00	0,00E+00	9,86E-03
Components for re-use	[kg]	0,00E+00	0,00E+00	1,33E-01	1,33E-01
Materials for recycling	[kg]	3,04E-01	0,00E+00	3,52E-03	3,08E-01
Materials for energy recover	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	[MJ per energy carrier]	0,00E+00	0,00E+00	0,00E+00	0,00E+00

**BALEXMETAL sandwich panel with 200mm mineral wool core**

Environmental impacts: (1 m <sup>2</sup> , MW 200 mm)					
Indicator	Unit	A1	A2	A3	A1-A3
Global warming potential	[kg CO <sub>2</sub> eq.]	5,54E+01	9,19E-01	3,63E-02	5,64E+01
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	2,69E-06	0,00E+00	3,64E-05	3,91E-05
Acidification potential of soil and water	[kg SO <sub>2</sub> eq.]	2,27E-01	7,39E-03	1,76E-04	2,34E-01
Eutrophication potential	[kg (PO <sub>4</sub> ) <sup>3-</sup> eq.]	1,81E-02	1,23E-03	7,60E-06	1,94E-02
Formation potential of tropospheric ozone	[kg Ethene eq.]	1,81E-02	4,53E-04	4,37E-05	1,86E-02
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	1,79E-02	0,00E+00	1,34E-07	1,79E-02
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	6,90E+02	5,27E+00	4,29E+00	6,99E+02
Environmental aspects on resource use: (1 m <sup>2</sup> , MW 200 mm)					
Indicator	Unit	A1	A2	A3	A1-A3
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Use of renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	3,33E+01	3,93E-02	2,65E-01	3,36E+01
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Use of non-renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	INA	5,79E-01	4,72E+00	5,30E+00
Use of secondary material	[kg]	7,47E+00	0,00E+00	0,00E+00	7,47E+00
Use of renewable secondary fuels	[MJ]	2,32E+00	2,90E-02	0,00E+00	2,35E+00
Use of non-renewable secondary fuels	[MJ]	2,22E-01	0,00E+00	0,00E+00	2,22E-01
Net use of fresh water	[dm <sup>3</sup> ]	INA	INA	INA	INA
Other environmental information describing waste categories: (1 m <sup>2</sup> , MW 200 mm)					
Indicator	Unit	A1	A2	A3	A1-A3
Hazardous waste disposed	[kg]	1,27E-01	1,62E-04	0,00E+00	1,27E-01
Non-hazardous waste disposed	[kg]	1,30E+00	2,70E-02	1,13E-01	1,44E+00
Radioactive waste disposed	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Components for re-use	[kg]	0,00E+00	0,00E+00	1,33E-01	1,33E-01
Materials for recycling	[kg]	3,22E-01	0,00E+00	3,52E-03	3,26E-01
Materials for energy recover	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	[MJ per energy carrier]	0,00E+00	0,00E+00	0,00E+00	0,00E+00

**BALEXMETAL sandwich panel with 230mm mineral wool core**

Environmental impacts: (1 m <sup>2</sup> , MW 230 mm)					
Indicator	Unit	A1	A2	A3	A1-A3
Global warming potential	[kg CO <sub>2</sub> eq.]	5,92E+01	9,19E-01	3,63E-02	6,02E+01
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	2,72E-06	0,00E+00	3,64E-05	3,91E-05
Acidification potential of soil and water	[kg SO <sub>2</sub> eq.]	2,42E-01	7,39E-03	1,76E-04	2,50E-01
Eutrophication potential	[kg (PO <sub>4</sub> ) <sup>3-</sup> eq.]	1,87E-02	1,23E-03	7,60E-06	1,99E-02
Formation potential of tropospheric ozone	[kg Ethene eq.]	3,81E-02	4,53E-04	4,37E-05	3,86E-02
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	1,82E-02	0,00E+00	1,34E-07	1,82E-02
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	7,32E+02	5,27E+00	4,29E+00	7,42E+02
Environmental aspects on resource use: (1 m <sup>2</sup> , MW 230 mm)					
Indicator	Unit	A1	A2	A3	A1-A3
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Use of renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	3,38E+01	3,93E-02	2,65E-01	3,41E+01
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Use of non-renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	INA	5,79E-01	4,72E+00	5,30E+00
Use of secondary material	[kg]	8,41E+00	0,00E+00	0,00E+00	8,41E+00
Use of renewable secondary fuels	[MJ]	2,32E+00	2,90E-02	0,00E+00	2,35E+00
Use of non-renewable secondary fuels	[MJ]	2,54E-01	0,00E+00	0,00E+00	2,54E-01
Net use of fresh water	[dm <sup>3</sup> ]	INA	INA	INA	INA
Other environmental information describing waste categories: (1 m <sup>2</sup> , MW 230 mm)					
Indicator	Unit	A1	A2	A3	A1-A3
Hazardous waste disposed	[kg]	1,40E-01	1,62E-04	0,00E+00	1,40E-01
Non-hazardous waste disposed	[kg]	1,42E+00	2,70E-02	1,13E-01	1,56E+00
Radioactive waste disposed	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Components for re-use	[kg]	0,00E+00	0,00E+00	1,33E-01	1,33E-01
Materials for recycling	[kg]	3,33E-01	0,00E+00	3,52E-03	3,37E-01
Materials for energy recover	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	[MJ per energy carrier]	0,00E+00	0,00E+00	0,00E+00	0,00E+00

## Verification

The process of verification of this EPD is in accordance with EN ISO 14025, ISO 21930 and ECO checklist document. After verification, this EPD is valid for a 5-year-period. EPD does not have to be recalculated after 5 years, if the underlying data have not changed significantly.

The basis for LCA analysis was EN 15804
Independent verification corresponding to ISO 14025 & 8.3.1. <input checked="" type="checkbox"/> external <input type="checkbox"/> internal
External verification of EPD: PhD. Eng. Halina Prejzner LCA, LCI audit and input data verification: M.Sc. Eng. Dominik Bekierski, <a href="mailto:d.bekierski@itb.pl">d.bekierski@itb.pl</a> Verification of LCA: PhD Eng. Michał Piasecki, <a href="mailto:m.piasecki@itb.pl">m.piasecki@itb.pl</a>

## References

- ITB PCR A- General Product Category Rules for Construction Products
- ISO 14025:2006 Environmental labels and declarations -- Type III environmental declarations -- Principles and procedures
- ISO 21930:2017 Sustainability in buildings and civil engineering works -- Core rules for environmental product declarations of construction products and services
- ISO 14044:2006, Environmental management – Life cycle assessment – Requirements and guidelines
- ISO 15686-1:2011 Buildings and constructed assets -- Service life planning -- Part 1: General principles and framework
- ISO 15686-8:2008 Buildings and constructed assets -- Service-life planning -- Part 8: Reference service life and service-life estimation
- EN 15804:2012+ A1:2013 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products
- EN 15942:2011 Sustainability of construction works - Environmental product declarations - Communication format business-to-business



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**CERTIFICATE No 108/2020**  
**of TYPE III ENVIRONMENTAL DECLARATION**

Product:

sandwich panels with a mineral wool core

**MW-W-ST**

**MW-LT-W-ST**

**MW-W-PLUS**

**MW-D-W-ST DEFENDER**

**MW-R**

Manufacturer:

**Balex Metal Sp. z o.o.**

Wejherowska 12C, 84-239 Bolszewo, Poland

confirms the correctness of the data included in the development of  
Type III Environmental Declaration and accordance with the requirements of the standard

**PN-EN 15804+A1:2014-04**

**Sustainability of construction works.**

**Environmental product declarations.**

**Core rules for the product category of construction products.**

This certificate, issued for the first time on 1<sup>st</sup> September 2020 is valid for 5 years  
or until amendment of mentioned Environmental Declaration

Deputy Head of the Thermal Physic, Acoustics  
and Environment Department



Agnieszka Winkler-Skalna, PhD



Deputy Director  
for Research and Innovation



Krzysztof Kuczyński, PhD

Warsaw, September 2020