Sandwich panels with PIR insulation core

Environmental product declaration

In accordance with EN 15804 and ISO 14025

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General information

Owner of the declaration	Ruukki Construction Oy, Panuntie 11 00620 Helsinki. www.ruukki.com Jyrki Kesti, jyrki.kesti@ruukki.com
Product	Sandwich panels with steel facings and PIR insulation core
Manufacturer	Ruukki Construction Oy, Panuntie 11 00620 Helsinki
Manufacturing sites	Oborniki (Poland)
Product applications	External walls and partition structures
Declared unit	1 m^2 sandwich panel
LCA performed by	Karin Lindeberg, Diego Peñaloza IVL Swedish Environmental Research Institute, Valhallavägen 81 00127 Stockholm. www.ivl.se
Verified by	Anastasia Sipari Bionova Oy, Hämeentie 7 A 00500 Helsinki. www.bionova.fi
Product category rules	RTS PCR (English version 14.6.2018)
Program operator, publisher	Building Information Foundation RTS, Malminkatu 16 A 00100 Helsinki. http://epd.rts.fi

This environmental product declaration covers the environmental impacts of sandwich panels with PIR insulation core manufactured by Ruukki in Oborniki (Poland).

The EPD contains several different sandwich panels: SP2B type, SP2D type and SP2E type wall panels including Energy versions with E–PIRE, E–PIR, X–PIR or F–PIR core, available in different production variants and thicknesses.

According to supplier notifications, none of the product components contains substances restricted under REACH or included on the candidate list of Substances of Very High Concern (SVHC).

The declaration has been prepared in accordance with EN 15804:2012+A1:2013 and ISO 14025 standards and the additional requirements stated in the RTS PCR (English version 14.6.2018). This declaration covers the life cycle stages from cradle to gate with options.

The EPD of construction products may not be comparable if they do not comply with EN 15804 and seen in a building context.

Verified according to the requirements of EN 15804+A1 (product group rules)
Independent verification of the declaration, according to EN ISO 14025:2010

☒ External ☐ Internal

Third party verifier:

Anastasia Sipari / Bionova Oy
Verified 2.4.2020

Product

APPLICATION

Sandwich panels are cost-effective prefabricated elements for use in façades, compartment structures, partition walls, ceilings and roofs. Typical applications include industrial and commercial buildings, sports facilities, warehouses and power plants. The panels can be used in food industry construction and demanding clean room applications. An optimal insulation core is selected based on customer needs, ensuring excellent thermal insulation properties, even for thin panels. Moreover, the panels have a high sound reduction index and excellent fire resistance, making them an outstanding material for fire partitions.

Steel construction products can positively affect the overall assessment of buildings for LEED and BREEAM certification. For more information, visit at www.ruukki.com.

TECHNICAL INFORMATION

Sandwich panels are manufactured in different thicknesses with polyisocyanurate (PIR) insulation core. Our selection of sandwich panels also includes energy panels with extremely low air leakage rates. The term energy refers to air-tight energy efficient panel structures that is guaranteed by joint tightness. Ruukki energy panels are produced with special attention paid to production quality control and minimal engineering tolerances to achieve panel structures air-tightness and energy efficiency. Also in the installation, special energy sealant material is used to guarantee high-class joint tightness in the panel structures.

Figure 1. An example of a PIR panel with a polyisocyanurate insulation core.

The steel facings of sandwich panels shall be regularly inspected and maintained. The colour-coated steel is washable and easy to care for, and it can be repainted to prolong its useful life. Detailed technical information on products can be found on the Ruukki website at www.ruukki.com.

Ruukki has the right to use CE marking for sandwich panels (EN 14509). By affixing CE marking to a product, the manufacturer indicates that the product conforms to all relevant legislative requirements, in particular to health, safety and environmental protection requirements.

Product materials

Sandwich panels consist of an insulating core bonded between two steel sheets made of colour-coated steel or stainless steel. Panel facings are mainly made of hot-dip galvanised steel sheeting. Steel is an alloy of mainly iron and carbon, with small amounts of alloying elements. These elements improve the chemical and physical properties of steel such as strength, durability and corrosion resistance. The alloying elements of steel are closely linked to its chemical matrix. The steel density is 7 850 kg/m^3. The zinc coating quantity is 275 g/m^2, but lower zinc quantities may also be used, depending on end use application.

The steel sheets used in the panels are typically coated with Hiarc or polyester on the external facing side and with polyester on the reverse internal facing of the panel. Additionally, we offer special coatings and stainless steel options depending on the application and special weather resistance requirements.

The insulation core is made of rigid, HCFC-free, self-extinguishing and sustainable polyisocyanurate (PIR) foam frothed with pentane. The foam density of the material is 35–39 kg/m^3. Sandwich panels with PIR core are available in thicknesses ranging from 40 to 200 mm. Due to their extremely low thermal conductivity ratio, the sandwich panels result in thinner-than-average structures without compromising their insulation properties.

INFORMATION ON RELEASE OF DANGEROUS SUBSTANCES

Soil and water impacts during the product use phase have not been studied, since harmonized testing methods of European product standards are not available.

Product composition

Ruukki actively tracks and anticipates future changes in environmental, safety and chemical legislation and complies with valid EU chemical regulations, such as REACH (1907/2006/EC) and CLP (1272/2008/EC). By monitoring the list of Substances of Very High Concern (SVHC) and other legislative requirements, we ensure that products meet legal and customer requirements. According to supplier notifications, none of the product components contains substances restricted under REACH or included on the candidate list (SVHC).

Table 1 shows product composition of the sandwich panels with PIR insulation core. The product composition of energy sandwich panel is equivalent in weight and raw material content compared to other panels in the specific product group.

Table 1. Product composition of the sandwich panels with PIR insulation core

Product group	Product specification	Thickness (mm)	Weight (kg/m²)	Material content (% in weight)		
				Colour-coated steel (Hiarc and polyester)	Insulation	Adhesive
Sandwich panel with PIR core, insulation density 35–39 kg/m³	SP2B, SP2D and SP2E type of sandwich panel, steel facings 0,5/0,4 mm	100	11.0*	66.7	33.3	0
		120	11.7*	62.6	37.4	0
		160	13.0*	55.6	44.4	0
Origin of raw material				**EU**	**EU**	**EU**

*Average weight for sandwich panels with E-PIR and X-PIR insulation core. The deviation in the environmental impact values is not higher than 10% within product group.

Production

Sandwich panels that conform to this environmental product declaration are manufactured at Ruukki's plant in Oborniki (Poland). Prefabrication of sandwich panel structures results in minimum waste at the construction site.

Production process of sandwich panels with PIR core is described in Figure 2.

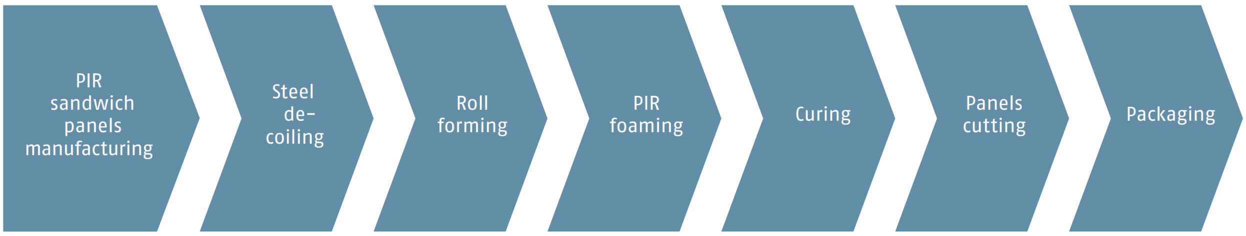

Figure 2. Sandwich panel production process

Information of energy in sandwich panel manufacturing phase (A3) is described in Table 2.

Table 2. Energy in sandwich panel manufacturing (A3)

Parameter	Value	Data quality
A3 Electricity information and CO_2 emissions kg CO_2 equiv. / kWh for Polish production	0.916	Thinkstep dataset (2016) for Electricity grid mix in Poland

Colour-coated and cold-rolled steel made at SSAB´s Hämeenlinna or Kankaanpää (Finland) sites is used in sandwich panel manufacturing. Hot-rolled steel manufactured at SSAB´s Raahe steel mill (Finland) from iron ore is used as the raw material for cold-rolled and colour-coated steel. The amount of total scrap steel used in hot-rolled steel is approximately 20% including pre- and post-consumer scrap.

When scrap steel is used instead of virgin raw materials in iron production, the carbon dioxide emissions originating from steel production decrease accordingly. Steel-making at SSAB Raahe uses scrap material from SSAB's own production processes and material sourced from the scrap steel market. For reasons of process technology, the content of scrap steel in blast-furnace based steel production cannot exceed around 30%. In addition, the amount of scrap steel in steel production is limited due to its availability. Once steel has been made, it can be recycled endlessly without weakening its properties.

Ruukki uses also steel from suppliers that manufacture steel from recycled steel scrap. The electric arc steel manufacturing method can use up to 100% of scrap steel in the process.

PACKAGING

The products are wrapped to protect them during handling and transport. A typical package consists of a wooden pallet, plastic straps, a plastic stretch wrap, corner pads made of cardboard or steel, plank wood and cardboard. Panel facings are protected with plastic wrap (PE) to protect the steel facings from mechanical damage during loading, unloading, storage and installation.

All packaging materials are recyclable as material or alternatively utilized as waste to energy (WtE). Packaging materials are sorted at construction sites according to local regulations and customer preferences.

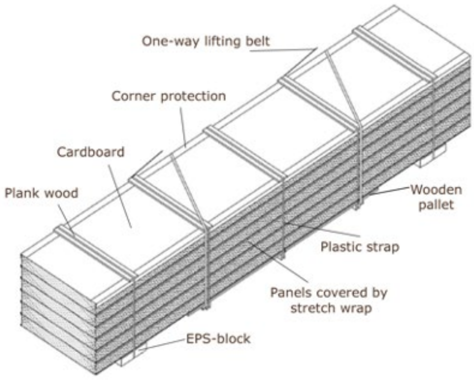

Figure 3. Standard package for sandwich panels

TRANSPORTATION

Raw materials are mostly transported to production sites by road. Finished products are transported by truck and ship. Ruukki's logistics unit is responsible for most of the transportation of raw materials and products. Logistics aims to optimise transport, maximise payloads and combine transport as efficiently as possible.

Environmental impacts for transport of finished product to the building site (A4), have been calculated based on the weighted average of the market shares. Table 3 describes parameters for the A4 transport scenario.

Table 3. Technical information on transport (A4) from production to the building site

Parameter	Value
Fuel type and consumption of vehicle used for transport	Truck: maximum load capacity 32 t and average diesel consumption 0.34 l/km. Specific transport emissions 0.02 kg CO_2/tkm Ship: maximum load capacity 10 000 t and average LFO consumption 69.2 l/km. Specific transport emissions 0.014 kg CO_2/tkm
Distance (km)	Average transport distance 888 km
Capacity utilization (%)	86% for truck and 70% for ship
Bulk density of transported products (kg/m^3)	Bulk density varies depending on product type and thickness
Volume capacity utilization factor	1

End-of-life recycling and waste processing

Waste materials from construction, repair and demolition are sorted and steel scrap is cycled back to the steel industry by the scrap trade. Scrap steel has a strong market position: an average of 95% of the steel removed from buildings at the end of their life cycle is used in the production of new steel.

Ruukki's PIR sandwich panels can be recycled and it is recommend that panels are sent to a reclamation facility where steel can be separated from the insulation core. Undamaged sandwich panels can be reused in less demanding applications. Damaged sandwich elements can be dismantled – steel is an important and fully recyclable raw material in new construction. PIR insulation core is recyclable. The material is either sorted at source and ground down, or extruded for use as a raw material in new products. At the end of their useful life, polyisocyanurates can be sent for reuse or chemical recycling, or can be incinerated for energy recovery. Table 4 describes scenario for the end-of-life processing.

Table 4. The end-of-life process description for sandwich panels with PIR insulation core

Process flow	Unit	Sandwich panels with PIR insulation core Thickness (mm)		
		100	120	160
Collection process specified by type	kg collected separately	11.0 kg (100%)	11.7 kg (100%)	13.0 kg (100%)
	kg collected with mixed construction waste	-	-	-
Recovery system specified by type	kg for reuse	-	-	-
	kg for recycling	8.1 kg (74%)	8.3 kg (71%)	8.7 kg (67%)
	kg for energy recovery	-	-	-
Disposal specified by type	kg product or material for final deposition	2.9 kg (26%)	3.4 kg (29%)	4.3 kg (33%)
Assumptions for scenario development	units as appropriate	Waste sandwich panels are transported 150 km by truck to recycling facility with capacity utilization of 45%		

No hazardous waste is formed from sandwich panels. The European recycling classification codes for Ruukki's Sandwich panel after use are as follows:

- for steel parts, 17 04 05 (iron and steel) and
- for insulation materials, 17 06 04 (excluding insulation materials mentioned in 17 06 01 and 17 06 03).

LCA calculation information

This environmental product declaration covers the following life cycle stages: A1 Raw material supply, A2 Transport, A3 Manufacturing and A4 Transportation of the product to construction site and end-of-life modules, C1 Deconstruction, C2 Transport end-of-life, C3 Waste processing and C4 Disposal, as well as module D benefits and loads beyond the system boundary; see Figure 4. The benefits of steel recycling in module D are calculated based on a recycling rate of 95% for steel.

The sandwich panel accessories, like fasteners, sealing materials and flashings, used in the installation phase (A5) are not included in the life cycle assessment.

System boundaries (X=included, MND=Module not declared, MNR=Module not relevant)

Product stage			Construc-tion stage	Use stage								End of life stage				Beyond the life cycle		
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	D	D
X	X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	MNR	MNR	X
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

- Mandatory modules
- Mandatory as per the RTS PCR section 6.2.1 rules and terms
- Optional modules based on scenarios

Figure 4. System boundaries of life cycle assessment (LCA)

DATA QUALITY

Life cycle inventory data has been collected from the Oborniki production site from 2018 production. Steel made at the SSAB steel mill in Raahe (Finland) and European steel are used in sandwich panel structures. The steel data is from 2017. For insulation materials, generic data from Gabi 9 software is used. No data is more than 10 years old. Gabi 9 software was used to calculate the environmental impact categories.

CUT-OFF CRITERIA

Life cycle inventory data for a minimum of 99% of total material and energy input flows have been included in the life cycle analysis.

ALLOCATION

Physical allocation was applied for different types of sandwich panels based on yearly production volumes (kg).

Environmental profile

All environmental impact values apply to 1 m^2 sandwich panels. Tables 5–7 show the environmental indicators based on the life cycle assessment of sandwich panels of a specific panel type and thickness.

The environmental impacts for sandwich panels with E-PIR and X-PIR insulation core has been calculated as average values for product group. The deviation in the environmental impact values is not higher than 10% within product group.

Reading example in environmental profile tables: 4.91E-02 = $4.91*10^{-2}$ = 0.0491

Table 5. Environmental profile for sandwich panel with 100mm PIR insulation core*

Sandwich panel average weight 11.0 kg/m², U-value depends on panel type		Life cycle stage						
Environmental impacts	**Unit**	**A1–A3 Total**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
GWP Global warming potential	kg CO_2 equiv.	28.6	0.170	4.91E-02	0.178	2.08E-02	0.682	-11.8
ODP Depletion potential of the stratospheric ozone layer	kg CFC-11 equiv.	1.91E-05	2.73E-17	3.90E-15	2.91E-17	6.76E-17	7.32E-16	-6.32E-07
AP Acidification potential of soil and water sources	kg SO_2 equiv.	6.83E-02	5.57E-04	7.14E-05	4.67E-04	1.47E-04	6.84E-04	-4.73E-02
EP Eutrophication potential	kg $(PO_4)^{3-}$ equiv.	7.99E-03	1.35E-04	1.14E-05	1.14E-04	3.51E-05	1.34E-04	-1.84E-02
POCP Photochemical ozone creation potential	kg ethene equiv.	9.11E-03	-7.97E-05	6.44E-06	-1.67E-04	1.62E-05	4.46E-05	-1.10E-02
ADP Abiotic depletion potential of resources – element	kg Sb equiv.	5.89E-04	1.12E-08	3.81E-08	1.25E-08	2.33E-08	9.43E-09	-1.17E-05
ADP Abiotic depletion potential of resources – fossil fuel	MJ	455	2.30	0.410	2.39	0.414	0.982	-189
Resource use and primary energy	**Unit**	**A1–A3 Total**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
Use of renewable primary energy used as energy carrier	MJ	29.6	0.120	1.03	0.139	2.96E-02	0.173	-9.13
Use of renewable primary energy resources used as raw material	MJ	0	0	0	0	0	0	0
Total use of renewable primary energy resources	MJ	29.6	0.120	1.03	0.139	2.96E-02	0.173	-9.13
Use of non-renewable primary energy used as energy carrier	MJ	475	2.30	0.737	2.39	0.417	1.10	-206
Use of non-renewable primary energy used as raw material	MJ	0	1.08E-04	0	1.26E-04	1.52E-05	4.13E-05	-2.37E-05
Total use of non-renewable primary energy resources	MJ	475	2.30	0.737	2.39	0.417	1.10	-206
Use of secondary material	kg	0.199	0	0	0	0	0	0
Use of renewable secondary fuels	MJ	3.43E-11	0	0	0	0	0	0
Use of non-renewable secondary fuels	MJ	4.36E-10	0	0	0	0	0	0
Net use of fresh water	m^3	0.104	2.02E-04	2.17E-04	2.35E-04	1.24E-04	5.84E-03	-7.28E-02
Waste categories	**Unit**	**A1–A3 Total**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	0.217	1.14E-07	6.85E-10	1.34E-07	1.30E-08	6.25E-09	-5.69E-06
Non-hazardous waste disposed	kg	0.768	1.68E-04	8.20E-04	1.95E-04	8.44E-05	2.90	3.64E-02
Radioactive waste disposed	kg	7.60E-03	0	0	0	0	0	0
Output flows	**Unit**	**A1–A3 Total**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
Components for reuse	kg	0	0	0	0	0	0	0
Materials for recycling	kg	0.693	0	8.07	0	0	0	0
Materials for energy recovery	kg	0	0	0	0	0	0	0
Exported electrical energy	MJ	0	0	0	0	0	0	0
Exported thermal energy	MJ	0	0	0	0	0	0	0

* SP2B type, SP2D type and SP2E type wall panels with E-PIRE, E-PIR, X-PIR or F-PIR core including Energy versions

Table 6. Environmental profile for sandwich panel with 120mm PIR insulation core*

Sandwich panel average weight 11.7 kg/m², U-value depends on panel type		Life cycle stage						
Environmental impacts	**Unit**	**A1–A3 Total**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
GWP Global warming potential	kg CO_2 equiv.	30.4	0.182	5.25E-02	0.189	2.15E-02	0.817	-12.1
ODP Depletion potential of the stratospheric ozone layer	kg CFC-11 equiv.	2.29E-05	2.91E-17	4.17E-15	3.09E-17	6.97E-17	8.72E-16	-6.34E-07
AP Acidification potential of soil and water sources	kg SO_2 equiv.	7.25E-02	5.95E-04	7.63E-05	4.97E-04	1.51E-04	8.15E-04	-4.80E-02
EP Eutrophication potential	kg $(PO_4)^{3-}$ equiv.	8.57E-03	1.44E-04	1.21E-05	1.21E-04	3.62E-05	1.61E-04	-1.85E-02
POCP Photochemical ozone creation potential	kg ethene equiv.	9.83E-03	-8.51E-05	6.88E-06	-1.78E-04	1.67E-05	5.30E-05	-1.12E-02
ADP Abiotic depletion potential of resources – element	kg Sb equiv.	5.91E-04	1.20E-08	4.07E-08	1.33E-08	2.40E-08	1.12E-08	-1.24E-05
ADP Abiotic depletion potential of resources – fossil fuel	MJ	502	2.45	0.438	2.54	0.414	1.16	-198
Resource use and primary energy	**Unit**	**A1–A3 Total**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
Use of renewable primary energy used as energy carrier	MJ	32.1	0.128	1.10	0.148	3.06E-02	0.206	-9.63
Use of renewable primary energy resources used as raw material	MJ	0	0	0	0	0	0	0
Total use of renewable primary energy resources	MJ	32.1	0.128	1.10	0.148	3.06E-02	0.206	-9.63
Use of non-renewable primary energy used as energy carrier	MJ	525	2.46	0.787	2.55	0.430	1.31	-215
Use of non-renewable primary energy used as raw material	MJ	0	1.15E-04	0	1.34E-04	1.57E-05	4.90E-05	-2.37E-05
Total use of non-renewable primary energy resources	MJ	525	2.46	0.787	2.55	0.430	1.31	-215
Use of secondary material	kg	0.199	0	0	0	0	0	0
Use of renewable secondary fuels	MJ	3.45E-11	0	0	0	0	0	0
Use of non-renewable secondary fuels	MJ	4.37E-10	0	0	0	0	0	0
Net use of fresh water	m^3	0.119	2.16E-04	2.32E-04	2.50E-04	1.28E-04	7.00E-03	-7.55E-02
Waste categories	**Unit**	**A1–A3 Total**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	0.218	1.22E-07	7.32E-10	1.42E-07	1.30E-08	7.23E-09	-6.83E-05
Non-hazardous waste disposed	kg	0.790	1.80E-04	8.76E-04	2.07E-04	8.70E-05	3.40	4.37E-02
Radioactive waste disposed	kg	8.59E-03	0	0	0	0	0	0
Output flows	**Unit**	**A1–A3 Total**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
Components for reuse	kg	0	0	0	0	0	0	0
Materials for recycling	kg	0.741	0	8.32	0	0	0	0
Materials for energy recovery	kg	0	0	0	0	0	0	0
Exported electrical energy	MJ	0	0	0	0	0	0	0
Exported thermal energy	MJ	0	0	0	0	0	0	0

* SP2B type, SP2D type and SP2E type wall panels with E-PIRE, E-PIR, X-PIR or F-PIR core including Energy versions

Table 7. Environmental profile for sandwich panel with 160mm PIR insulation core*

Sandwich panel average weight 13.0 kg/m², U-value depends on panel type		Life cycle stage						
Environmental impacts	**Unit**	**A1–A3 Total**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
GWP Global warming potential	kg CO_2 equiv.	33.3	0.202	5.82E-02	0.208	2.24E-02	1.07	-12.5
ODP Depletion potential of the stratospheric ozone layer	kg CFC-11 equiv.	3.00E-05	3.23E-17	4.62E-15	3.40E-17	7.25E-17	1.14E-15	-6.24E-07
AP Acidification potential of soil and water sources	kg SO_2 equiv.	7.94E-02	6.59E-04	8.45E-05	5.46E-04	1.57E-04	1.06E-03	-4.82E-02
EP Eutrophication potential	kg $(PO_4)^{3-}$ equiv.	9.56E-03	1.60E-04	1.34E-05	1.33E-04	3.76E-05	2.10E-04	-1.84E-02
POCP Photochemical ozone creation potential	kg ethene equiv.	1.11E-02	-9.43E-05	7.62E-06	-1.95E-04	1.73E-05	6.89E-05	-1.12E-02
ADP Abiotic depletion potential of resources – element	kg Sb equiv.	5.82E-04	1.33E-08	4.50E-08	1.47E-08	2.50E-08	1.46E-08	-1.37E-05
ADP Abiotic depletion potential of resources – fossil fuel	MJ	586	2.72	0.485	2.79	0.430	1.50	-211
Resource use and primary energy	**Unit**	**A1–A3 Total**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
Use of renewable primary energy used as energy carrier	MJ	36.4	0.141	1.22	0.163	3.18E-02	0.267	-10.4
Use of renewable primary energy resources used as raw material	MJ	0	0	0	0	0	0	0
Total use of renewable primary energy resources	MJ	36.4	0.141	1.22	0.163	3.18E-02	0.267	-10.4
Use of non-renewable primary energy used as energy carrier	MJ	613	2.73	0.871	2.80	0.447	1.69	-228
Use of non-renewable primary energy used as raw material	MJ	0	1.27E-04	0	1.47E-04	1.63E-05	6.34E-05	-2.33E-05
Total use of non-renewable primary energy resources	MJ	613	2.73	0.871	2.80	0.447	1.69	-228
Use of secondary material	kg	0.196	0	0	0	0	0	0
Use of renewable secondary fuels	MJ	3.39E-11	0	0	0	0	0	0
Use of non-renewable secondary fuels	MJ	4.30E-10	0	0	0	0	0	0
Net use of fresh water	m^3	0.148	2.39E-04	2.57E-04	2.75E-04	1.33E-04	9.19E-03	-7.93E-02
Waste categories	**Unit**	**A1–A3 Total**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	0.214	1.35E-07	8.10E-10	1.57E-07	1.40E-08	9.06E-09	-8.98E-06
Non-hazardous waste disposed	kg	0.816	1.99E-04	9.70E-04	2.28E-04	9.05E-05	4.32	5.75E-02
Radioactive waste disposed	kg	1.04E-02	0	0	0	0	0	0
Output flows	**Unit**	**A1–A3 Total**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
Components for reuse	kg	0	0	0	0	0	0	0
Materials for recycling	kg	0.820	0	8.66	0	0	0	0
Materials for energy recovery	kg	0	0	0	0	0	0	0
Exported electrical energy	MJ	0	0	0	0	0	0	0
Exported thermal energy	MJ	0	0	0	0	0	0	0

* SP2B type, SP2D type and SP2E type wall panels with E-PIRE, E-PIR, X-PIR or F-PIR core including Energy versions

References

RTS PCR Protocol: PCR published by the Building Information Foundation RTS sr, PT 18 RT EPD Committee (English version, 14.6.2018)

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We make steel-based products for walls and roofs, for both commercial buildings and private homes. We're a supplier of high-quality products, systems and solutions, developed sustainably and to live up to the highest demands on durability in harsh conditions.

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