

Environmental Product Declaration



In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

Sandwich panels with a polyurethane core and made of XCarb[®] recycled and renewably produced steel

from

ArcelorMittal Construction



Programme:	The International EPD [®] System, www.environdec.com
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An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com

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General information

Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
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Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): <i>EPD International Product Category Rules for construction products (PCR 2019:14 v1.2.5)</i> . The product group classification for the assessed products is UN CPC 412.
PCR review was conducted by: <i>Technical Committee of the International EPD® System</i> . See https://www.environdec.com/about-us/the-international-epd-system-about-the-system for a list of members. Review chair: <i>Claudia Peña, University of Concepción, Chile</i> . The review panel may be contacted via the Secretariat https://www.environdec.com/contact-us .
Life Cycle Assessment (LCA)
LCA accountability: <i>Julia Florin, Sphera Solutions GmbH</i>
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:
<input checked="" type="checkbox"/> EPD verification by individual verifier
Third-party verifier: <i>Dr Matthew Fishwick, Fishwick Environmental Ltd</i>

Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier:
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent

data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

Company information

Owner of the EPD: ArcelorMittal Construction – Morinval – 55 800 Contrisson - France

Contact: Laura Descos laura.descos@arcelormittal.com

Description of the organisation:

ArcelorMittal Construction is part of the world's leading steelmaker and mining company. It offers a comprehensive range of building envelope and solutions with the aim to inspire the construction sector to build in smarter ways. Its product range includes architectural profiles, sandwich panels for roof and walls, composite floors, cold store products. ArcelorMittal Construction and its entities are present all over Europe.

Product-related or management system-related certifications: Products covered have relevant CE-marking including Declaration of Performances. Some plants covered have ISO 9001, ISO 14001, or ISO 50001.

Name and location of production site(s):

- ArcelorMittal Construction Austria: Traun (Pflaum)
- ArcelorMittal Construction Belgium: Geel
- ArcelorMittal Construction Germany: Brehna
- ArcelorMittal Construction France: Contrisson, Onnaing
- ArcelorMittal Construction Poland: Rawa
- ArcelorMittal Construction Portugal: Cartaxo
- ArcelorMittal Construction Spain: Berrioplano
- Europerfil: Cervera, Spain

Product information

Product name: Sandwich panels with a polyurethane core and made of XCarb® recycled and renewably produced steel.

Product identification: Sandwich panels included into this Environmental Product Declaration are composed on two external steel sheets with an insulated polyurethane core. They are made using XCarb® recycled and renewably produced hot rolled coils.

They have the CE-marking in accordance to the following standard:

- EN 14509:2013 Self-supporting double skin metal faced insulating panels - Factory made products - Specifications

Their technical performances (mechanical, thermal...) are presented into the Declaration Of Performances (DOP) based on the above mentioned standard or on the product datasheet. Both are available either on demand or our website.

Product description:

This Environmental Product Declaration covers sandwich panels with a polyurethane core made with XCarb® recycled and renewably produced steel.

Finished products are exclusively produced from XCarb® recycled and renewably produced hot rolled coils coming from ArcelorMittal Sestao in Spain. They are produced from electric arc furnace primary facility with a high percentage of scrap and 100% of renewable electricity.

The targeted application is roof, facade and agri-food sandwich panels.

These sandwich panels are available in different foam thickness from 30mm to 240mm. The self-weight varies from 6,83 kg/m² to 20,3 kg/m².

The expected service lifetime is 50 years. The lifetime depends on the application and corresponding service. At the end of life, the steel can be recovered and recycled in a new steel product.

The environmental performances are indicated for a standard configuration of a sandwich panel made with XCarb[®] recycled and renewably produced defined as below:

- Total self-weight: 11,59 kg/m²
- Foam thickness: 60mm
- Metallic coating: zinc-magnesium-aluminium with a grammage of 60 g/m² and 100 g/m² respectively on the internal and external facings
- Organic coating: thickness of 12µm and 25µm respectively on the internal and external facings

A methodology to estimate environmental performances for other configurations (different weight of steel and foam thickness) is provided in the first part of the section “Additional environmental information”.

The third part of the same section provides environmental performances according to EN 15804+A1.

UN CPC code: 412 Products of iron or steel.

Geographical scope: European

LCA information

Functional unit / declared unit: 1m² PIR sandwich panels made with XCarb[®] recycled and renewably produced steel, with a foam thickness of 60mm and a self-weight of 11,59 kg/m² defined as a standard product.

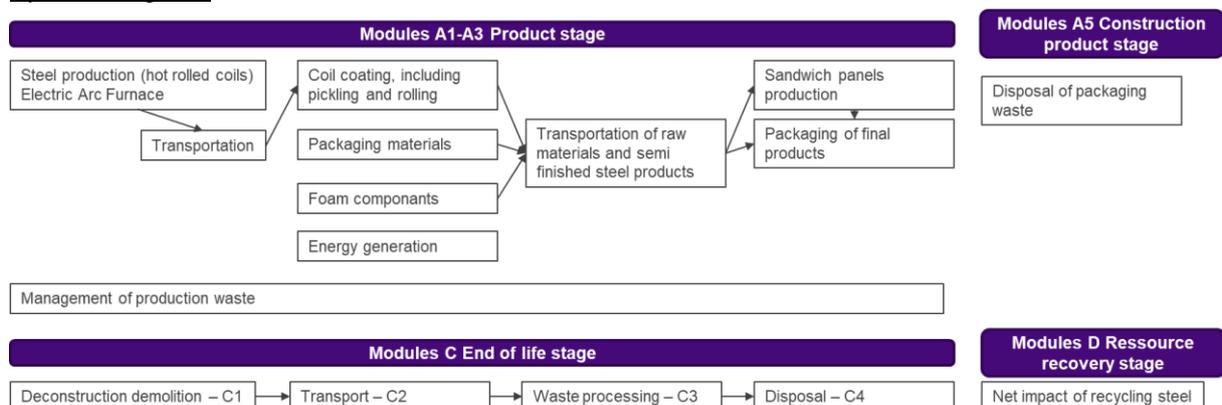
Reference service life: 50 years.

Time representativeness: 2021.

Database(s) and LCA software used: Sphera LCA FE (GaBi) database CUP 2023.1.

Description of system boundaries: Cradle to gate with options, modules C1–C4, module D.

System diagram:



- *Module A1 to A3:*

The product stage includes provision of all materials, products, and energy, as well as waste processing up to the end-of waste state or disposal of final residues during the product stage.

These modules consider the manufacturing of galvanized, prepainted coils at the site Contrisson or one of the sites of ArcelorMittal group, the sandwich panels production at several sites across Europe, as mentioned above, as well as the transport to and between the production sites of the products under study.

Sandwich panels production covers the following process: the two facings are cold rolled formed (profiling), a liquid polyurethane foam is injected in between the two facings and cured in a double belt press. Then the panels enter in a cooling device to reach their final state.

The disposal of packaging materials (wood pallets and plastic foils are incinerated) are declared in module A3.

- *Module C1 to C4:*

These modules consider the dismantling of the considered product (C1), the transportation of the dismantled components to their final end-of-life destination (C2), the waste processing for recovery or recycling (C3) as well as the disposal (C4), if given.

For the module C2, a transportation of the dismantled components is considered by truck over a distance of 100km.

Based on common practices, steel and foam are separated and the following end of life scenario is considered for the steel part of the sandwich panels:

- 89% is recycled
- 10% is reused
- 1% is sent to landfill

100% of the foam is incinerated with energy recovery.

At end-of-life the steel material leaves the product system in C3 for recycling and reuse in module D as well as disposal in module C4.

Environmental burdens of the incineration of the polyurethane foam are assigned to module C3; resulting potential benefits and loads for thermal and electrical energy are declared in module D.

Processes	Values per declared unit
Collection process specified by type	11,59 kg collected separately
Recovery system specified by type	0,90 kg for re-use
	8,04 kg for recycling
	2,56 kg for energy recovery
Disposal specified by type	0,09 kg for landfill
Assumptions for scenario development	Transportation of the dismantled components is considered by truck over a distance of 100km

The second part of the section “Additional environmental information” provides the environmental performances considering that 100% of steel is recycled at the end of life.

- *Module D:*

Module D includes any declared benefits and loads from net flows leaving the product system that have not been allocated as co-products and that have passed the end-of-waste state in the form of reuse, recovery and/or recycling potentials.

Metals are assumed to reach the end of waste status directly at the construction site. The treatment as well as net impacts and benefits of reuse or recycling potentials (for the net scrap amount only) are grouped to module D.

Potential environmental benefits are given for the net steel scrap that is produced at the end of a final product's life. This net scrap is determined as follows:

Net scrap = Amount of steel recycled at end-of-life – Scrap input from previous product life cycles

Cut-off criteria: More than 95% of the total inflows (mass and energy) per modules are considered, in compliance with the used PCR. All reported data were incorporated and modelled using best available LCI data.

Data quality and sources: Data quality is compliant with ISO 14025:2006. All primary data were collected for 2021. All background data come from the Sphera LCA FE (GaBi) 2023 databases and are representative for the years 2018-2023.

Allocation: All allocations are done as per EN15804+A2 and the applied PCR. For all background data used in the model, the standard allocation assumptions of the used datasets were maintained. No allocation has been used for foreground data and processes.

More information: <https://construction.arcelormittal.com/en>

Modules declared, geographical scope, share of specific data (in GWP-GHG results) and data variation (in GWP-GHG results):

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	EU	EU	EU	-	-	-	-	-	-	-	-	-	EU	EU	EU	EU	EU
Specific data used	>95%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	Not relevant*			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	<10%**			-	-	-	-	-	-	-	-	-	-	-	-	-	-

X: Module declared
 ND: Not declared

*The first part of the section “Additional environmental information” is available to propose a methodology to calculate the environmental indicators for the different configurations of products.

**Variations in site only concerned A3 modules which represents less than 10% of the GWP-GHG.

Content information

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Steel	8,75	26,8%	0 resp. 0
Metallic coating	0,160	0%	0 resp. 0
Organic coating	0,115	0%	0 resp. 0
Foam components	2,56	0%	0 resp. 0
TOTAL	11,59	20,2%	0 resp. 0
Packaging materials	Weight, kg	Weight-% (versus the product)	Weight biogenic carbon, kg C/kg
Wood pallets	0,02	0,17%	0,4
Plastic foil	0,03	0,26%	0
EPS blocks	0,03	0,26%	0
Polypropylene material	0,02	0,17%	0
TOTAL	0,172	1,93%	0,4

The product does not contain any REACH “candidate list of substances of very high concern for authorisation” in amounts greater than 0,1 % (1000 ppm). The product contains 0% bio-based material.

Results of the environmental performance indicators

The environmental performance of the functional/declared unit of one square meter of a sandwich panels with a 60mm thick polyurethane core and made of XCarb® recycled and renewably produced steel with a total self-weight of 11,59 kg/m² are reported below using the parameters and units as specified in PCR 2019:14.

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

Mandatory impact category indicators according to EN 15804+A2

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
GWP-fossil	kg CO ₂ eq.	1,64E+01	3,26E-02	9,24E-02	5,65E+00	1,36E-03	-3,80E+00
GWP-biogenic	kg CO ₂ eq.	-3,59E-02	-1,10E-02	-1,29E-03	4,05E-04	-4,51E-05	-1,06E-02
GWP- luluc	kg CO ₂ eq.	1,61E-02	1,74E-03	8,49E-04	9,03E-06	4,21E-06	-1,35E-03
GWP – total	kg CO ₂ eq.	1,64E+01	2,33E-02	9,20E-02	5,65E+00	1,32E-03	-3,81E+00
GWP - GHG	kg CO ₂ eq.	1,61E+01	3,12E-02	9,16E-02	5,64E+00	1,34E-03	-3,74E+00
ODP	kg CFC 11 eq.	8,25E-10	7,69E-14	1,19E-14	4,55E-13	3,45E-15	-9,59E-11
AP	mol H ⁺ eq.	4,19E-02	1,31E-04	6,65E-04	3,33E-03	9,62E-06	-7,09E-03
EP-freshwater	kg P eq.	4,69E-05	7,01E-07	3,35E-07	1,24E-07	2,73E-09	-4,87E-06
EP- marine	kg N eq.	1,19E-02	2,70E-05	3,29E-04	1,61E-03	2,49E-06	-1,87E-03
EP-terrestrial	mol N eq.	1,27E-01	3,55E-04	3,64E-03	1,86E-02	2,74E-05	-1,96E-02
POCP	kg NMVOC eq.	3,46E-02	1,01E-04	6,30E-04	4,14E-03	7,50E-06	-5,51E-03
ADP-minerals&metals*	kg Sb eq.	6,33E-04	1,27E-08	6,04E-09	4,34E-09	6,25E-11	-2,72E-05
ADP-fossil*	MJ	3,27E+02	2,75E+00	1,25E+00	1,49E+00	1,81E-02	-5,86E+01
WDP*	m ³	4,34E+00	2,98E-03	1,11E-03	5,56E-01	1,49E-04	-6,37E-01

* Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

8,39 kg steel scrap is used in the production/manufacturing of 1 m² of sandwich panels. After use, 8,04 kg steel is recycled. The potential environmental impact of steel recycling calculated for the end-of-life stage (module D) is based on the net amount of scrap left in the system, which is 8,04 kg – 8,39 kg = -0,35 kg. In addition 0,903 kg profiles are reused which results in an additional scrap amount of 0,828

kg steel scrap available in module D via the crediting due to reuse. Overall, the system has a net surplus of 0,477 kg scrap.

Acronyms:

GWP-fossil = Global Warming Potential fossil fuels
 GWP-biogenic = Global Warming Potential biogenic
 GWP-luluc = Global Warming Potential land use and land use change
 ODP = Depletion potential of the stratospheric ozone layer
 AP = Acidification potential, Accumulated Exceedance
 EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment
 EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment
 EP-terrestrial = Eutrophication potential, Accumulated Exceedance
 POCP = Formation potential of tropospheric ozone
 ADP-minerals&metals = Abiotic depletion potential for non-fossil resources
 ADP-fossil = Abiotic depletion for fossil resources potential
 WDP = Water (user) deprivation potential, deprivation-weighted water consumption

Resource use indicators

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
PERE	MJ	1,98E+02	2,22E-01	9,09E-02	2,81E-01	2,94E-03	-2,92E+01
PERM	MJ	3,00E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	1,98E+02	2,22E-01	9,09E-02	2,81E-01	2,94E-03	-2,92E+01
PENRE	MJ	3,25E+02	2,76E+00	1,25E+00	1,49E+00	1,81E-02	-5,86E+01
PENRM	MJ	2,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	3,27E+02	2,76E+00	1,25E+00	1,49E+00	1,81E-02	-5,86E+01
SM	kg	8,39E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-1,67E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m ³	1,33E-01	2,35E-04	9,95E-05	1,31E-02	4,56E-06	-2,03E-02

Acronyms:

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 re-sources
 SM = Use of secondary material
 RSF = Use of renewable secondary fuels
 NRSF = Use of non-renewable secondary fuels
 FW = Use of net fresh water

Waste indicators

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
Hazardous waste disposed	kg	1,65E-07	4,57E-12	3,88E-12	1,32E-10	3,94E-13	-1,04E-08
Non-hazardous waste disposed	kg	4,10E-01	4,32E-04	1,91E-04	2,84E-02	9,04E-02	6,52E-02
Radioactive waste disposed	kg	9,79E-03	1,43E-05	2,35E-06	6,12E-05	2,06E-07	-3,71E-03

Output flow indicators

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	9,03E-01	0,00E+00	0,00E+00
Material for recycling	kg	0,00E+00	0,00E+00	0,00E+00	8,04E+00	0,00E+00	0,00E+00
Materials for energy recovery	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported electricity	MJ	3,76E-01	0,00E+00	0,00E+00	9,77E+00	0,00E+00	0,00E+00
Exported thermal energy	MJ	6,70E-01	0,00E+00	0,00E+00	1,75E+01	0,00E+00	0,00E+00

Information on biogenic carbon content

Biogenic carbon content	Unit	Quantity
In product	kg C	0,00E+00
In packaging	kg C	8,00E-3

References

- PCR: EPD International Product Category Rules for construction products (PCR 2019:14 v1.2.5)
- EN 15804:2012+A2:2019: Sustainability of construction works -Environmental Product Declarations - Core rules for the product category of construction products
- EN ISO 14025:2006: Environmental labels and declarations - Type III environmental declarations - Principles and procedures
- EN ISO 14040:2009-11: Environmental management - Life cycle assessment - Principles and framework
EN ISO 14040:2009-11: Environmental management - Life cycle assessment - Principles and framework
- CPR: Regulation (EU) No 305/2011 of the European parliament and of the council of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC

Additional environmental information

1/ Methodology to calculate environmental performances indicators for different configurations (EN15804+A2)

In order to enable the user of the EPD to calculate the environmental indicators for sandwich panels with different steel and foam thickness, the table below provides the methodology.

g is the self-weight of the steel part of the sandwich panels (in kg/m²)

t is the foam thickness (in mm/m²)

For each indicators and modules, the performances is calculated by summing the impact of steel (proportional to its self-weight), the impact of foam (proportional to its thickness) and a constant.

Indicator		A1-A3	C1	C2	C3	C4	D
GWP - total	* g	9,97E-01	1,92E-03	7,59E-03	0,00E+00	1,39E-04	-1,59E-01
	* t	1,12E-01	8,05E-05	3,17E-04	8,83E-02	0,00E+00	-3,26E-02
	* 1	2,98E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-8,02E-02
GWP-fossil	* g	9,96E-01	2,69E-03	7,62E-03	0,00E+00	1,43E-04	-1,59E-01
	* t	1,13E-01	1,13E-04	3,19E-04	8,83E-02	0,00E+00	-3,24E-02
	* 1	2,98E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-7,97E-02
GWP-biogenic	* g	-1,09E-03	-9,10E-04	-1,06E-04	0,00E+00	-4,76E-06	1,75E-04
	* t	-4,36E-04	-3,81E-05	-4,44E-06	6,33E-06	0,00E+00	-1,84E-04
	* 1	3,07E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-4,54E-04
GWP- luluc	* g	1,28E-03	1,44E-04	7,00E-05	0,00E+00	4,45E-07	-1,29E-04
	* t	6,96E-05	6,01E-06	2,93E-06	1,41E-07	0,00E+00	-2,10E-06
	* 1	1,79E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-5,16E-06
ODP	* g	8,83E-11	6,34E-15	9,83E-16	0,00E+00	3,64E-16	-8,47E-12
	* t	-6,29E-16	2,65E-16	4,11E-17	7,13E-15	0,00E+00	-2,53E-13
	* 1	3,25E-13	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-6,24E-13
AP	* g	3,09E-03	1,08E-05	5,49E-05	0,00E+00	1,02E-06	-4,35E-04
	* t	2,09E-04	4,51E-07	2,30E-06	5,21E-05	0,00E+00	-4,02E-05
	* 1	5,38E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-9,90E-05
EP-freshwater	* g	1,58E-06	5,78E-08	2,76E-08	0,00E+00	2,89E-10	-1,48E-07
	* t	5,04E-07	2,42E-09	1,16E-09	1,94E-09	0,00E+00	-5,23E-08
	* 1	2,09E-06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-1,29E-07
EP- marine	* g	8,83E-04	2,23E-06	2,71E-05	0,00E+00	2,63E-07	-1,10E-04
	* t	5,93E-05	9,33E-08	1,13E-06	2,52E-05	0,00E+00	-1,17E-05
	* 1	9,92E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-2,89E-05
EP-terrestrial	* g	6,02E-04	1,23E-06	1,25E-05	2,90E-04	0,00E+00	-1,26E-04
	* t	1,11E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-3,09E-04
	* 1	1,11E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-3,09E-04
POCP	* g	2,40E-03	8,29E-06	5,20E-05	0,00E+00	7,93E-07	-3,30E-04
	* t	2,00E-04	3,47E-07	2,17E-06	6,48E-05	0,00E+00	-3,27E-05
	* 1	3,32E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-8,04E-05
ADP- minerals&metals	* g	2,04E-05	1,05E-09	4,98E-10	0,00E+00	6,61E-12	-2,94E-06
	* t	1,29E-08	4,39E-11	2,08E-11	6,79E-11	0,00E+00	-2,32E-09
	* 1	5,56E-09	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-5,71E-09
ADP-fossil*	* g	1,45E+01	2,27E-01	1,03E-01	0,00E+00	1,91E-03	-1,91E+00
	* t	3,15E+00	9,50E-03	4,31E-03	2,34E-02	0,00E+00	-5,92E-01

	* 1	4,34E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-1,46E+00
WDP	* g	3,31E-01	2,45E-04	9,13E-05	0,00E+00	1,57E-05	-4,31E-02
	* t	2,57E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-7,56E-03
	* 1	2,57E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-7,56E-03

As per example, to calculate the GWP total for module A1-A3 for a sandwich panels of a self-weight g and a foam thickness of t :

$$GWP - total_{A1-A3} = 0,997 * g + 0.112 * t + 0.298$$

These coefficients are determined using interpolations between a minimum, standard and maximum configurations to cover the different possible products variations.

A complete analysis demonstrates that, for each environmental indicators and modules, the proportion of variance of these interpolations is closed to 1. As they are not equal to 1 (but superior to 0,995), it leads to a small acceptable variation between the environmental performances presented on the core of this document for the standard configuration and when this proposed methodology is used.

2/ Environmental performance indicators considering different end-of-life scenario (EN15804+A2)

The table below provide environmental performance indicators for a sandwich panels with a 60mm thick polyurethane core and made of XCarb® recycled and renewably produced steel with a self-weight of 11,59 kg/m² considering the following end of life scenario: steel is 100% recycled at the end of life (and 100% of the foam is incinerated).

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
GWP-fossil	kg CO ₂ eq.	1,64E+01	3,26E-02	9,24E-02	5,65E+00	0,00E+00	-3,20E+00
GWP-biogenic	kg CO ₂ eq.	-3,59E-02	-1,10E-02	-1,29E-03	4,05E-04	0,00E+00	-1,17E-02
GWP- luluc	kg CO ₂ eq.	1,61E-02	1,74E-03	8,49E-04	9,03E-06	0,00E+00	-1,61E-04
GWP - total	kg CO ₂ eq.	1,64E+01	2,33E-02	9,20E-02	5,65E+00	0,00E+00	-3,21E+00
ODP	kg CFC 11 eq.	8,25E-10	7,69E-14	1,19E-14	4,55E-13	0,00E+00	-1,68E-11
AP	mol H ⁺ eq.	4,19E-02	1,31E-04	6,65E-04	3,33E-03	0,00E+00	-4,92E-03
EP-freshwater	kg P eq.	4,69E-05	7,01E-07	3,35E-07	1,24E-07	0,00E+00	-3,66E-06
EP- marine	kg N eq.	1,19E-02	2,70E-05	3,29E-04	1,61E-03	0,00E+00	-1,18E-03
EP-terrestrial	mol N eq.	1,27E-01	3,55E-04	3,64E-03	1,86E-02	0,00E+00	-1,18E-02
POCP	kg NMVOC eq.	3,46E-02	1,01E-04	6,30E-04	4,14E-03	0,00E+00	-3,78E-03
ADP-minerals&metals*	kg Sb eq.	6,33E-04	1,27E-08	6,04E-09	4,34E-09	0,00E+00	-2,77E-06

ADP-fossil*	MJ	3,27E+02	2,75E+00	1,25E+00	1,49E+00	0,00E+00	-4,89E+01
WDP*	m ³	4,34E+00	2,98E-03	1,11E-03	5,56E-01	0,00E+00	-3,99E-01

3/ Environmental performances indicators following the EN 15804+A1

To ensure consistency within the different versions of the EN 15804 for user performing a complete LCA of a building, the table below indicates the environmental performances of the standard product following the version +A1 of EN 15804.

Mandatory impact category indicators according to EN 15804+A1

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
Global warming potential	kg CO ₂ eq.	1,59E+01	1,82E-02	8,95E-02	5,64E+00	1,28E-03	-3,71E+00
Depletion potential of the stratospheric ozone layer	kg CFC 11 eq.	9,75E-10	9,05E-14	1,40E-14	5,36E-13	4,06E-15	-1,13E-10
Acidification potential of land and water	kg SO ₂ eq.	3,29E-02	1,00E-04	4,52E-04	2,22E-03	7,65E-06	-5,65E-03
Eutrophication potential	kg (PO ₄) ³⁻ eq.	4,55E-03	1,81E-05	1,15E-04	5,72E-04	8,69E-07	-7,03E-04
Formation potential of tropospheric ozone photochemical oxidants	Kg ethene eq.	2,24E-03	1,86E-05	-1,77E-04	1,41E-04	5,76E-07	-6,32E-04
Abiotic depletion potential for non-fossil resources	kg Sb eq.	6,33E-04	1,28E-08	6,05E-09	4,75E-09	6,38E-11	-2,72E-05
Abiotic depletion potential for fossil resources	MJ	2,96E+02	2,69E+00	1,23E+00	1,31E+00	1,73E-02	-4,73E+01

Resource use indicators

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
PERE	MJ	1,99E+02	2,22E-01	9,09E-02	2,81E-01	2,94E-03	-2,92E+01
PERM	MJ	3,00E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	1,99E+02	2,22E-01	9,09E-02	2,81E-01	2,94E-03	-2,92E+01
PENRE	MJ	3,25E+02	2,76E+00	1,25E+00	1,49E+00	1,81E-02	-5,86E+01
PENRM	MJ	2,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	3,27E+02	2,76E+00	1,25E+00	1,49E+00	1,81E-02	-5,86E+01
SM	kg	8,42E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-1,67E+00

RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m ³	1,33E-01	2,35E-04	9,95E-05	1,31E-02	4,56E-06	-2,03E-02

Output flows and waste categories

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
Hazardous waste disposed	kg	1,65E-07	4,57E-12	3,88E-12	1,32E-10	3,94E-13	-1,04E-08
Non-hazardous waste disposed	kg	4,11E-01	4,32E-04	1,91E-04	2,84E-02	9,04E-02	6,52E-02
Radioactive waste disposed	kg	9,81E-03	1,43E-05	2,35E-06	6,12E-05	2,06E-07	-3,71E-03
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	9,03E-01	0,00E+00	0,00E+00
Material for recycling	kg	0,00E+00	0,00E+00	0,00E+00	8,04E+00	0,00E+00	0,00E+00
Materials for energy recovery	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, electricity	MJ	3,76E-01	0,00E+00	0,00E+00	9,77E+00	0,00E+00	0,00E+00
Exported energy, thermal	MJ	6,78E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

