Environmental Product Declaration (EPD)

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

Sandwich panels with one external facing in aluminum and internal facing in cardboard felt, fiberglass, centesimal aluminum and expanded rigid polyurethane or polyisocyanurate insulating core

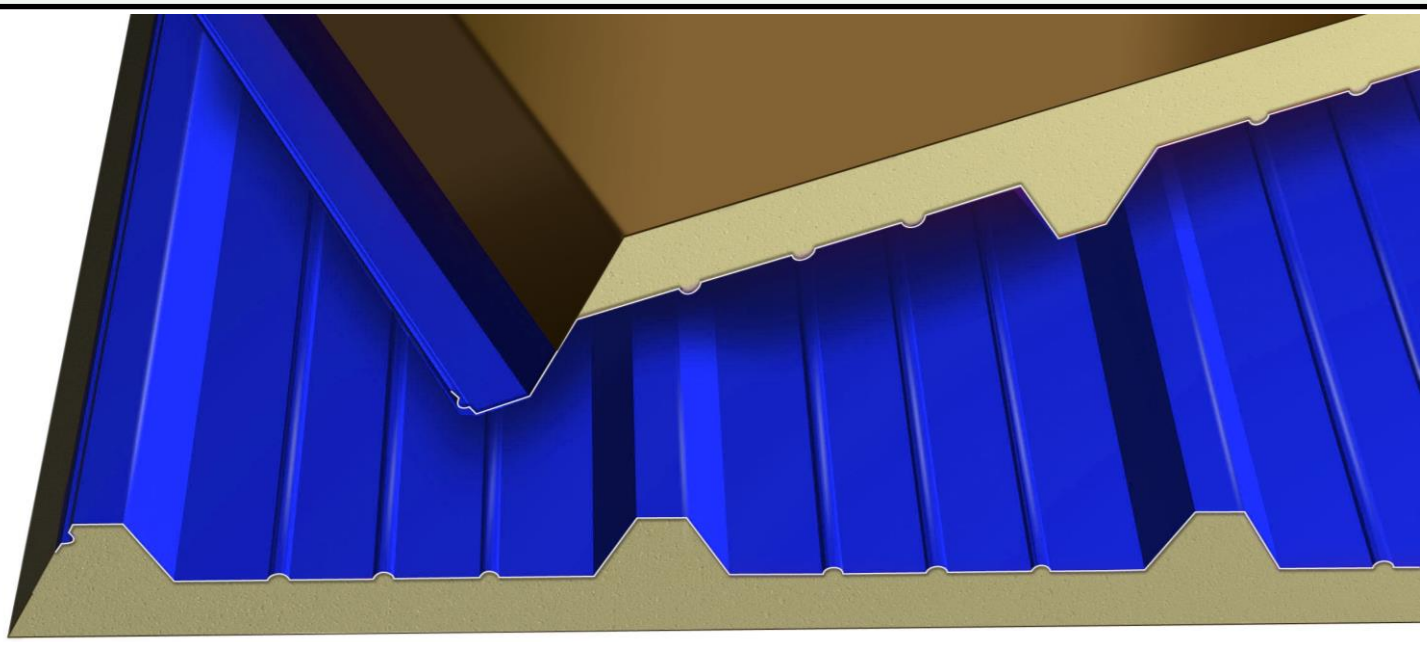
produced by

Isolpack S.p.A.

Multiple product EPDs, based on a representative product

Program:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
Registration Number:	S-P-11403
Publication date:	2023-12-06
Valid until:	2028-12-06

An Environmental Product Declaration must provide up-to-date information, and can be revised as conditions change. The declared validity is therefore subject to the maintenance of registration and publication on the www.environdec.com website



General information

About the program

Program:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	info@environdec.com

Liability for PCR, LCA and independent third-party verification
Product Category Rules (PCR)
The CEN EN 15804 standard is the Core Product Category Rules (PCR)
Product category rules (PCR): *Construction products, 2019:14, version 1.3.1 CPC 421*
PCR review conducted by: *technical committee of the International EPD® System*
Life Cycle Assessment (LCA)
LCA accountability: *Studio Fieschi & soci s.r.l. - C.so Vittorio Emanuele II, 18 10123 Torino, IT - www.studiofieschi.it*
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006 by means of: ☒ Verification of the EPD by a individual verifier Third-party verifier: *Guido Croce.* Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☒ No

Isolpack è l'unico proprietario e responsabile dell'EPD.

EPDs belonging to the same product category but registered in different EPD programs, or not complying with EN 15804, cannot 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 PCR or fully aligned PCR versions; cover products with identical functions, technical performance and use (e.g., identical declared/functional units); have equivalent system boundaries and data descriptions; apply data quality requirements, data collection methods and equivalent allocation methods; apply *identical cut-off* rules and impact assessment methods (including the same version of characterisation factors); have equivalent and valid content statements at the time of comparison. For more information on comparability, please refer to EN 15804 and ISO 14025.

Company Information

Owner of the EPD
Isolpack S.p.A
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10128 Torino (TO)

Contact
Name and Surname: Andrea Bracco
e-mail: rd@isolpack.com
Site: www.isolpack.com

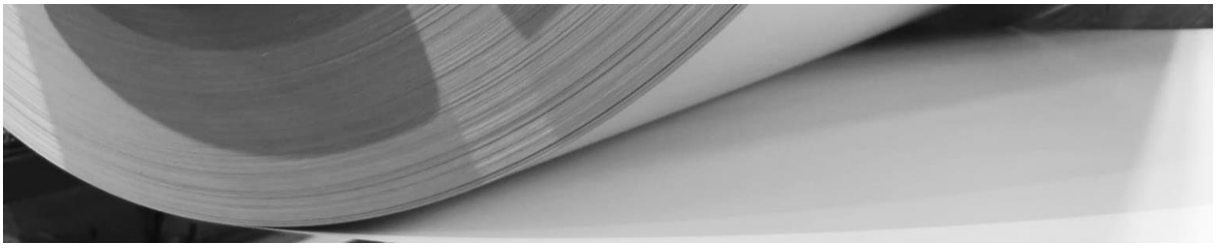
Description of the organization
Since 1951 Isolpack has been a leader in the production of building materials, with over 25 patents on modular metal components for roofs, floors, walls and false ceilings for civil and industrial construction. Specialized in self-supporting elements made of cold-formed steel.

Product or system management certifications
CE certification according to harmonized product standard EN14509 for self-supporting double-clad insulating panels with metal facings - Industrial/agricultural/civil products
EN ISO 9001:2015 Quality Certification
EN ISO 14001:2015 Safety Certification
EN ISO 45001:2019 Environmental Certification

Name and location of the production site
Isolpack production plant is located in the industrial area of Nichelino on the outskirts of Turin (Italy).

Product Information

Product name: Sandwich panels in rigid polyurethane and polyisocyanurate foam, with one external facing in aluminum and internal facing in cardboard, fiberglass, centesimal aluminum.
Product ID: Self-supporting sandwich panel. Quality control according to internal FPC on model EN14509 for Self-supporting double-clad insulating panels with metal facings - Industrial products
Product Description: Rigid polyurethane foam sandwich panels can be used as self-supporting covers, screens, room dividers, walls, cold rooms. They are fixed/screwed/interlocked to the supporting structure or become part of the structure themselves. The lifespan of the product and its condition depend on the specific durability characteristics of the product and its use. The lifespan of the product ranges from 10 to 30 years.
UN CPC code: 421 *Structural metal products and parts thereof.*
Geographical scope: A1-A3: Global, Italy. C1-C4: Europe.



Names and codes of the products included in the EPD:

D3	KAPPA5	FoamDeck 5	Monolamiera 5	Isoroof 5G
D4	KAPPA3	Kappa 3	Monolamiera 3	Isoroof 3G
D7	SIGMA	-	-	-
A4	SUPERCOPPO	-	-	-
A5	ISOGREK H28	-	-	-

LCA Information

Declared unit: 1 m^2 of single-sheet sandwich panel in polyurethane and rigid polyisocyanurate foam, with external facing in aluminium and internal facing in alternative material (cardboard felt, fibreglass, centesimal aluminium).

Products represented

The products represented by the EPD may vary in terms of:

- Thickness of the upper face (sheet metal).
- Thickness of the insulation core.

For the sheet that replaces the lower face, a single material with average characteristics was modeled between felt cardboard, fiberglass and centesimal aluminum.

All variants considered are shown in the following tables.

Polyurethane foam insulation	
Thickness (mm)	**kg/m²**
25	0,98
30	1,17
40	1,56
50	1,95
60	2,34
80	3,12
100	3,9
120	4,68
140	5,46
150	5,85
160	6,24
180	7,02
200	7,8
220	8,58
240	9,36

Aluminium faces	
Thickness (mm)	**kg/m²**
	Length 1235 mm (Roof)
0,5	1,66
0,6	2
0,7	2,33
0,8	2,6

The representative product was selected based on the following criteria:

Thicknesses: Isolpack's best-selling products have been chosen as representative thicknesses of the facings and the insulating layer.

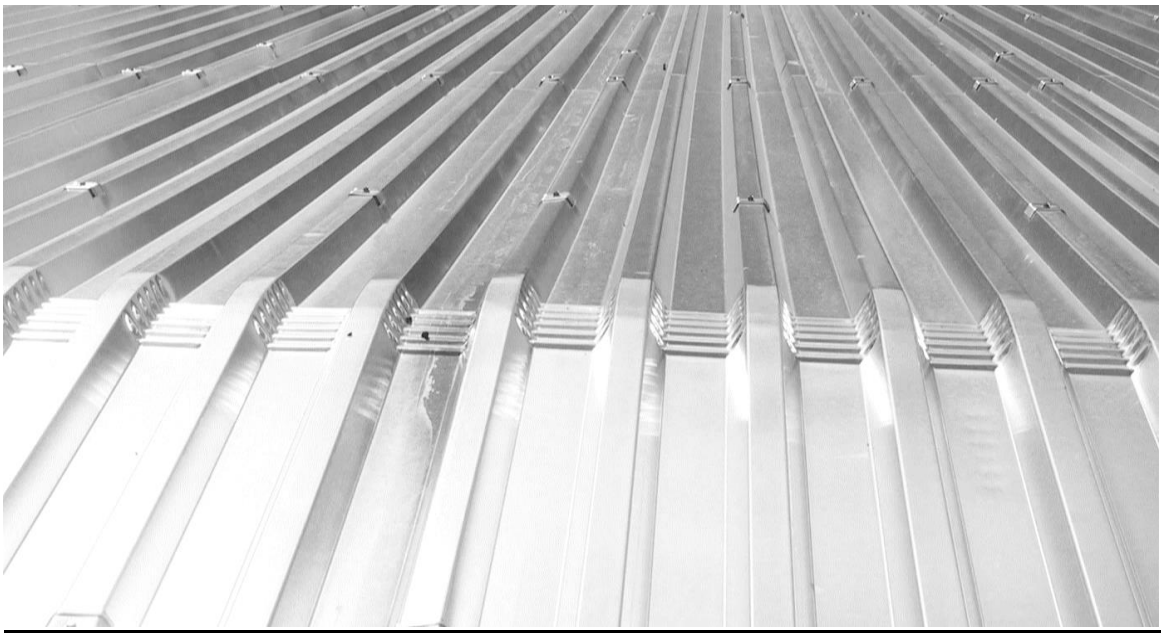
The representative product chosen is 1 m^2 of sandwich panel with a covering function and with:

- 0,5 mm aluminum face with a density per m^2 of 1,67 kg/m^2;
- sheet made of alternative material;
- polyurethane insulation layer produced by Isolpack of 100mm and density per m^2 of 4,20 kg/m^2.

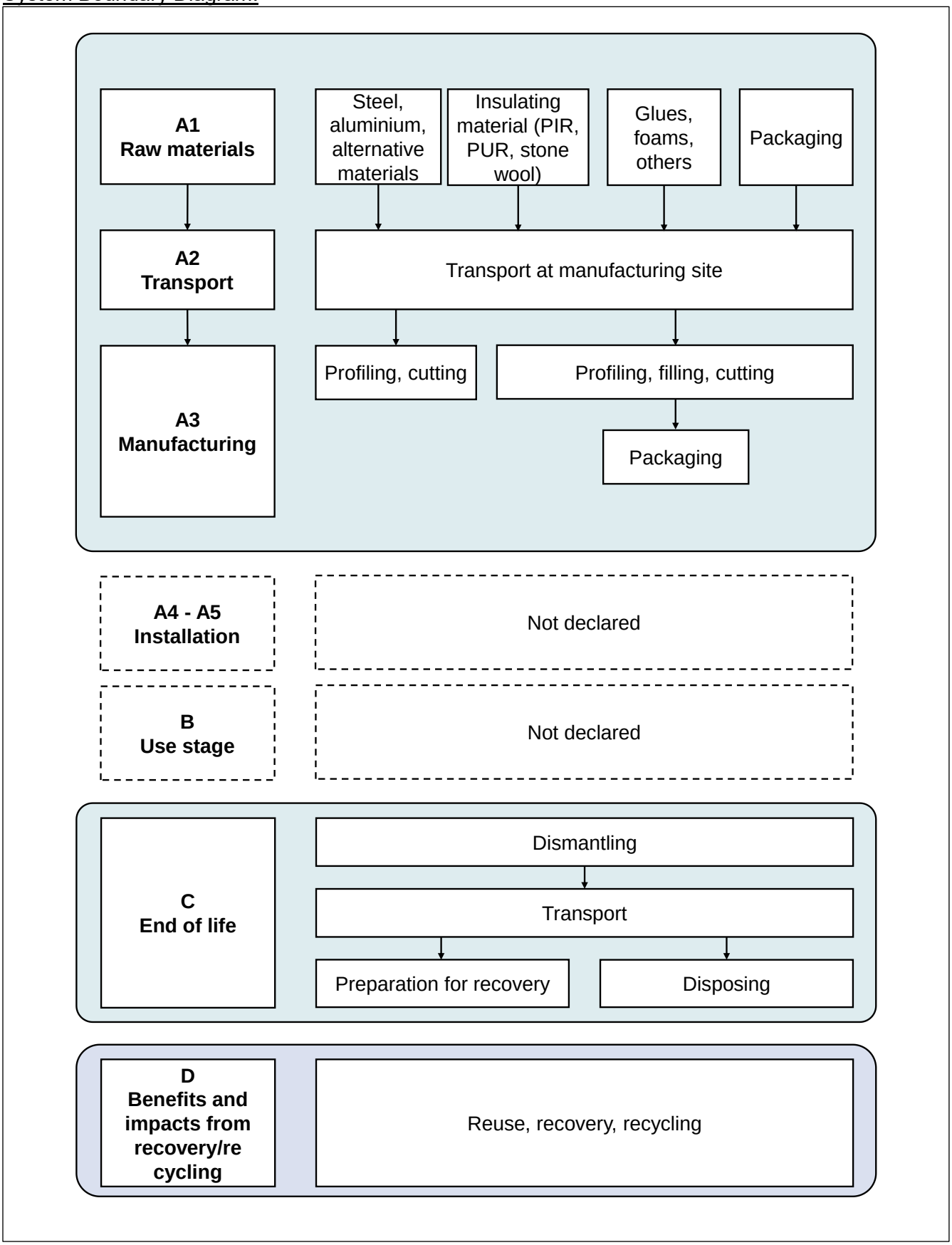
The specific results for the rest of the thicknesses of the facings and the insulating layer can be obtained through the formulas in the tables at the bottom of the document. More details in the section on additional environmental information.

Temporal representativeness: all the manufacturer's primary data refer to the year 2022.
LCA database and software used: SimaPro 9, Ecoinvent 3.9.1.
System boundary description: *cradle-to-gate* with modules C1–C4 and module D (A1–A3 + C + D)

PRODUCTION	A1	Extraction and processing of the raw materials necessary for the production of the products, including the processing of secondary materials entering the system (e.g. aluminum from recycled material).
	A2	Transport of materials to the Isolpack production site.
	A3	Production of the products in the Isolpack production site. Production and consumption of auxiliary materials (e.g. lubricants). Production of energy carriers (electricity, heat) used in production processes (A3)
END OF LIFE	C1	Dismantling or demolition process
	C2	Transport of waste to treatment/disposal points
	C3	Treatment of waste in preparation for recovery-recycling
	C4	Final Disposal
BENEFITS AND IMPACTS RELATED TO THE REUSE, RECOVERY, RECYCLING OF MATERIALS	D	Potential benefits and impacts related to recovery-reuse-recycling of materials and energy throughout the life cycle. In this module, the benefits and/or impacts related to, for example, the potential recycling of materials at the end of their life of the products under study are evaluated.



System Boundary Diagram:



Types of data collected

Primary data shall be used, where possible and as a matter of priority, for the production processes of the product under investigation, for the bill of materials under consideration, the specific processes and treatments for the products concerned, as well as the packaging, the distance of the suppliers of the raw materials, auxiliary materials, packaging, the overall energy consumption of the plant and production lines (including the supplier's mix, self-produced energy and the use of fuels), waste management.

The secondary data were used for the production of the raw materials that make up the sheets and panels, the packaging used, the auxiliary materials, the electricity purchased, the means of transport used for the procurement of the materials used in the production, disposal and treatment of waste, the means of transport used.

Materials

Aluminium: it arrives at the factory already galvanised and/or variously painted and wound in coils. To represent the supply and production of aluminium, the following aspects were considered:

- The recycled content: only the impacts due to the processing of scrap were considered and those related to its preparation for recycling were excluded.
- Machining: the aluminium rolling process was also considered.
- The paint applied.

Alternative material: as already mentioned, the sheet that replaces the lower face can be made of three different materials (felt cardboard, fiberglass, centesimal aluminum).
To take into account all three possible alternative sheets used, a single dataset was created with a weighted average composition with respect to sales volumes.

Polyurethane insulation layer: Polyurethane foam is produced directly in situ from the primary ingredients. In particular, **polyurethane foam (PUR)** or **polyisocyanurate (PIR) can be used.** For the representative product, an average composition between the ingredients of PIR and PUR has been defined.

Production

The panel production process begins with the unwinding of the aluminium coils on the conveyor belt, followed by cold profiling, which gives the shape to the facings that enclose the insulating material. In the case of PIR and PUR, the required amount of ingredients is poured directly onto the bottom face and bordered by sponge strips and tape. The product is cut to the customer's desired length, stacked and packed.
The entire process, from profiling to packaging, is highly automated and powered by electricity, used for the operation of the conveyor belts, for the production of heat and for the handling of electric forklifts.
For plant waste, the impacts of transport and possible preparation for recycling/recovery were considered.

Energy mix

The electricity purchased from the grid in the production phase was modelled using the supplier's data reported in the bill. Part of the electricity is self-produced by photovoltaic panels installed on the roof of the plant. Below is the supplier's energy mix used for energy from the grid:

Source	%
Renewable sources	18%
Carbon	12%
Natural Gas	58%
Oil products	1%
Nuclear	6%
Other Sources	5%

Considering also the photovoltaic panels, the impact of climate change per kWh consumed in the Isolpack plant is equal to: 0,405 kg CO_2-eq /kWh.

End-of-life scenario

The end-of-life scenario includes all the operations necessary for the treatment of the product, from the demolition of the building in which they are installed to the disposal or reaching the end-of-waste state.

The end-of-life scenario is based on the latest available statistics and literature data on demolition activities (amount and source of energy needed), transport (mode of transport) and recovery/disposal rates.

- Demolition (C1): during the demolition phase of the building or replacement of the panels, it is necessary to unscrew the fasteners that keep the panel fixed on the load-bearing structure. This process is manual and the only expected consumption is that of a drill. These consumptions were judged to be negligible and, therefore, the C1 form is null and void. In the case of panels whose components are sent for recycling/recovery, these must be separated, also in this case manually.
- Transport (C2): for the transport of materials to the treatment plants for recovery, a distance of 50 km is assumed, traveled by road (truck). The density considered for the representative product is 6,23 kg/m^2.
- Treatment, reuse, recovery, recycling and disposal (C3 and C4): on the basis of the available literature, it can be said that construction products, in particular those containing metals, are mostly collected and sent for recovery processes. A study carried out on several demolition sites in Europe has shown that about 96% of the aluminum present in materials at the end of their life of buildings is managed through separate collection and sent to recycling[1] plants; This can reasonably be extended to steel components as well. In the context of this work, it is conservatively assumed that 90% of the amount of product at the end of its life is collected and sent for recovery, while the remaining 10% is destined for landfill. This scenario is extended to each material that makes up the product. Only for bituminous felt board and fiberglass, less common materials, the only destination was to dispose of them in landfills. For the

[1] Collection of Aluminium from Buildings in Europe, TU Delf study for EEA, 2004

Tackling recycling aspects in EN 15804, Christian Leroy et al. 2012

polyurethane insulation layer and aluminium facings, the "end-of-waste" status in C3 is reached after the material preparation for recycling.

Module D

It is assumed that no loss of material quality occurs during the recycling process; therefore, the quality ratio between the output recovered material and the replaced material is considered 1.

Cut-off criteria

Cut-offs were those that together represent less than 1% of the total mass of waste.

Allocation Procedures

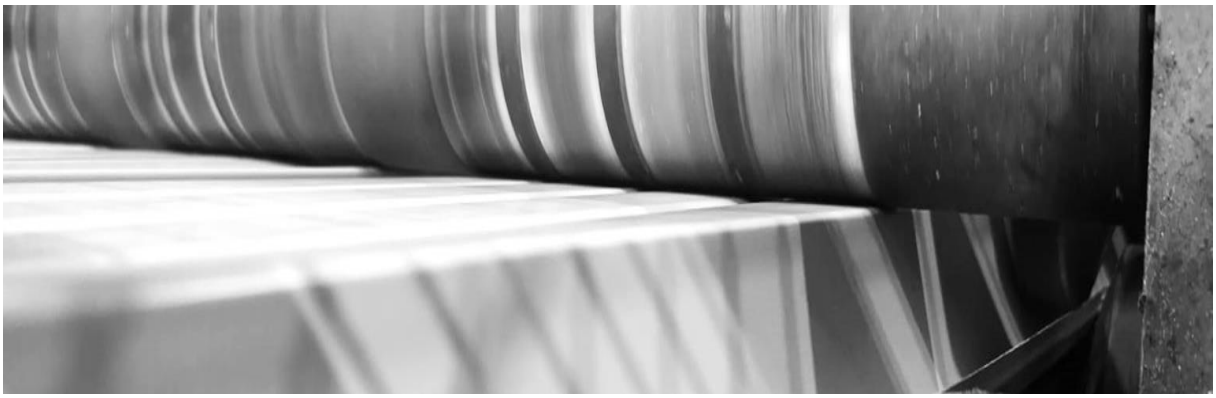
The auxiliary materials used were allocated for the m^2 produced by the respective production lines for the reference year.
The general consumption of electricity has been allocated for the total m^2 produced in the plant. Energy and natural gas consumption per m^2 are the same for all lines. For the general aspects of the plant, i.e. those energy or material consumptions that cannot be traced back to a specific production line (electricity for general purposes, general auxiliary materials, fuels, packaging and waste), the allocation was made on the m^2 produced by the entire plant and the impacts were attributed to all representative products.
For flows that leave system boundaries, the polluter pays principle applies, according to which the impacts related to the production of recycled material streams are borne by the system that produced them until they reach the end-of-waste status (PCR 2019:14 v 1.3, §4.5.2). Downstream impacts (e.g. impacts of recycling processes to obtain secondary raw material) are borne by the system that uses the secondary material.
Therefore, depending on the fate of the material, the following impacts have been attributed:

- Recycling: Impacts of Transportation to the Recycling Preparation Plant and Preparation for Recycling;
- Energy Recovery: Impacts of Transport and Energy Recovery;
- Landfill: Impacts of Landfill Transportation and Disposal;
- Scrap sold: no impact.

As a result, recycled materials enter the system considering the impact of recycling (not the preparation for recycling phase).
According to the requirements of EN 15804 §6.3.5.2, waste streams leaving the system reaching end-of-waste status in phase A1-A3 must be allocated as co-products. In the present study, and in accordance with PCR 2019:14 §4.5.1, a precautionary approach is taken and no allocation of environmental fluxes is applied to these co-products, attributing them entirely to the main products.

Declared modules, geographical scope, share of specific data (in GWP-GHG results) and change in data (in GWP-GHG results):

	Product			Construction		Phase of use							End of life				Resource Retrieval
	Production of raw materials	Transport	Production	Transport	Installation	Use	Maintenance	Repair	Substitution	Restructuring	Energy use	Use of water	Demolition	Transport	Waste treatment	Disposal	Potential reuse-recovery-recycling
Modules	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Declared Modules	x	x	x	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	x	x	x	x	x
Geography	GLO	GLO	IT	-	-	-	-	-	-	-	-	-	EU	EU	EU	EU	EU
Specific data	>90%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products[2]	Min -50%; Max 105%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Change – plants	-			-	-	-	-	-	-	-	-	-	-	-	-	-	-



[2] Change in GWP-GHG indicator for A1-A3 modules. The variation is reported with respect to the configuration with the lowest impact (i.e. the lowest thickness of both metal face and insulation) and the one with the highest impact (the one with the greatest thicknesses of both metal facings and insulators).

Content Declaration

The table refers to the representative product defined according to the criteria set out in the "Products represented" section, i.e. 1 m^2 of sandwich panel with a covering function and with:

- 0,5 mm aluminum face with a density per m^2 of 1,67 kg/m^2;
- sheet made of alternative material;
- polyurethane insulation layer produced by Isolpack of 100mm and density at m^2 of 4,20 kg/m^2.

Product Components	Weight, kg	Post-consumer material[3], in % - by weight
Aluminium	1,67	72% - 1,20 kg[4]
Bituminous felt board	0,26	65% - 0,17 kg
Centesimal aluminum	0,01	1,5% - 3,52E-04 kg
Fibreglass	0,09	0% - 0 kg
Polyurethane	4,20	0% - 0 kg
TOTAL	**6,23**	
Packaging	**Weight, kg**	**Weight - % (on the product)**
EPS	3,56E-02	0,1 %
Polypropylene	5,18E-02	0%
LLDPE	2,15E-02	0%
LDPE	2,81E-02	0%
TOTAL	**1,37E-01**	

The product does not contain the substances included in the "Candidate List of SVHC" document issued by the European Chemicals Agency (http://echa.europa.eu/candidate-list-table).

[3] See p. 17 for the percentage of recycled material as defined in the CAM.
[4] Average post-consumer recycled content of Isolpack's aluminium suppliers, weighted for 2022 purchases. Depending on the specific product purchased, this percentage may be higher or lower than the one indicated.

Results of environmental performance indicators

Mandatory impact indicators according to the standard EN 15804

Results per unit declared							
Indicator	**Units of Measurement**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	3,09E+01	0,00E+00	4,01E-02	1,13E+00	5,46E-02	-2,22E+01
GWP-biogenic	kg CO_2 eq.	1,49E-01	0,00E+00	3,01E-05	1,82E-01	3,10E-05	1,32E-03
GWP-luluc	kg CO_2 eq.	3,06E-02	0,00E+00	1,61E-03	9,94E-04	2,24E-06	-1,67E-02
GWP-total	kg CO_2 eq.	3,11E+01	0,00E+00	4,18E-02	1,32E+00	5,46E-02	-2,22E+01
ODP	kg CFC 11 eq.	1,52E-06	0,00E+00	1,51E-09	1,53E-08	2,61E-10	-6,21E-07
AP	mol H^+ eq.	1,83E-01	0,00E+00	1,35E-04	4,17E-03	6,34E-05	-1,18E-01
EP-freshwater	kg P eq.	1,56E-03	0,00E+00	4,58E-07	2,75E-05	7,95E-08	-1,58E-03
EP-marine	kg N eq.	2,49E-02	0,00E+00	5,76E-05	1,39E-03	5,24E-04	-2,02E-02
EP-terrestrial	mol N eq.	3,15E-01	0,00E+00	4,82E-04	1,33E-02	2,90E-04	-2,15E-01
POCP	kg NMVOC eq.	7,19E-02	0,00E+00	1,19E-04	3,40E-03	7,92E-05	-5,13E-02
ADP-minerals&metals*	kg Sb eq.	5,03E-04	0,00E+00	1,45E-07	5,81E-06	3,38E-08	-1,44E-04
ADP-fossil*	MJ	4,71E+02	0,00E+00	5,60E-01	1,47E+01	1,91E-01	-3,45E+02
WDP*	m^3	2,18E+01	0,00E+00	6,92E-03	1,70E-01	9,46E-04	-1,93E+01
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						

** Disclaimer: The results of this impact indicator should be used with care as uncertainties about the results are high or experience in using the indicator is limited.*

Additional impact indicators

Results per unit declared							
Indicator	**Units of Measurement**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[5]	kg CO_2 eq.	3,11E+01	0,00E+00	4,18E-02	1,32E+00	5,46E-02	-2,22E+01

Additional environmental impact indicators are not declared in this EPD. For details on the results of these indicators, please refer to the LCA Report of the product, cited in Bibliography.

Resource Utilization Indicators

Results per unit declared							
Indicator	**Units of Measurement**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	3,96E+01	0,00E+00	2,27E-02	7,53E-01	2,45E-02	-2,54E+01
PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	3,96E+01	0,00E+00	2,27E-02	7,53E-01	2,45E-02	-2,54E+01
PENRE	MJ	6,08E+02	0,00E+00	5,63E-01	-2,38E+02	2,09E-01	-3,76E+02
PENRM	MJ	1,42E+02	0,00E+00	0,00E+00	-1,27E+02	0,00E+00	0,00E+00
PENRT	MJ	4,66E+02	0,00E+00	5,63E-01	-1,11E+02	2,09E-01	-3,76E+02
SM	kg	1,69E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+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	5,67E-01	0,00E+00	2,38E-04	4,85E-03	2,81E-04	-4,75E-01
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						

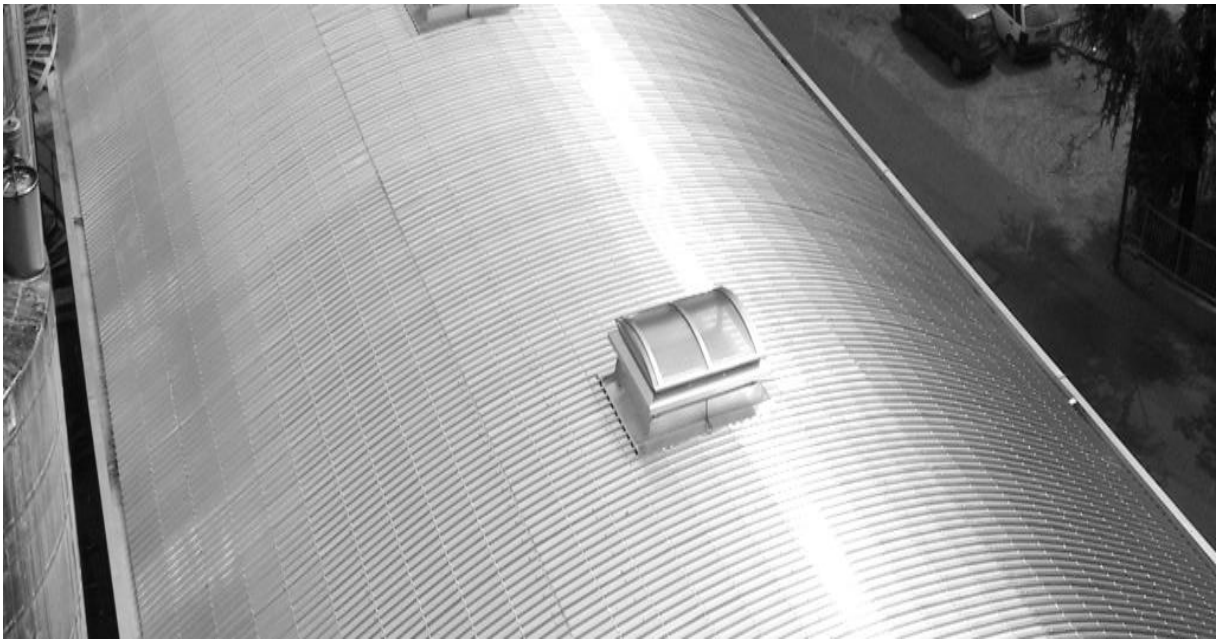
[5] Questo indicatore tiene conto di tutti i gas a effetto serra, tranne l'assorbimento e le emissioni di anidride carbonica biogenica e il carbonio biogenico immagazzinato nel prodotto. In quanto tale, l'indicatore è identico al GWP-totale, tranne per il fatto che il CF per la CO2 biogenica è impostato a zero.

Waste generation indicators

Results per unit declared							
Indicator	**Units of Measurement**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Non-hazardous waste disposed	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Radioactive waste disposed	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Outbound Flow Indicators

Results per unit declared							
Indicator	**Units of Measurement**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	0,00E+00	0,00E+00	0,00E+00	5,30E+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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, thermal	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00



Additional Environmental Information

The sandwich panel, thanks to its characteristics of durability and performance stability over time, guarantees perfect high-performance insulation. The product guarantees high energy savings over the life of the building.

CAM compliance with VOCs and Formaldehyde

All products have been found to comply with the most restrictive standards within the countries of the European Community regarding the emission of volatile organic compounds. Below is a summary of the results obtained:

- French VOC Regulation - Class A rating - reg. of March and May 2011
- French CMR components - Pass - Regulation April and May 2009
- Italian CAM Edilizia - Pass - Regualtion june 2022
- AgBB/ABG - Pass - Anforderungen an bauliche Anlagen Bezuglich des Gesundheitsschutzes August 2018 AGBB
- Belgian Regulation - Pass - Royal Decree of May 2014
- EMICODE - EC 1 PLUS - April 2020
- Indoor Air Confort - Pass - Indoor Air Comfort 7.0 of May 2020
- Formaldehyde Emission Class - E1 - EN16516 October 2017
- BREEAM International - Basic Level - Breeam International New Construction v.2.0

SRI Reflectance

The reflectance values for standard paints are listed below. The reflectance values are the result of specific tests carried out directly by the suppliers/steel mills of pre-painted coils.
It is the customer's responsibility to verify the request in the specifications and define the value necessary to meet the requirements of the project. The values shown in the table represent the minimum value that can be measured on the types of paint listed below.

Color/Similral	TSR(b)	SRI(a)	ε(c)
Ral 9002	0,61	75	0,95
Ral 9006	0,38	41	0,87
Ral 9007	0,35	38	0,88
Ral 9010	0,73	89	0,83
Ral 6005	0,2	18	0,88
Ral 8019	0,08	4	0,87
Ral 3009	0,23	22	0,87
Rosso Coppo	0,28	27	0,86
Ral 1011	0,34	36	0,88
Verde Foresta	0,19	15	0,85
Ral 7012	0,13	10	0,87

CAM - Minimum Environmental Criteria, Compliance and Product Technical Specifications

The panels are in compliance with the requirements listed in point 2.4.2.9 of the CAM Minimum Environmental Criteria Regulation:

- During the production process, no flame retardants are used that are subject to restrictions or prohibitions provided for by applicable national or EU regulations

- Blowing agents with more than zero ozone depletion potential are not used during the production process;
- No lead catalysts are used during the production process.

The upper calorific value of the insulating material is given below:

- PIR: 28 MJ/kg
- PUR: 38 MJ/kg

The specific heat of the insulating material is given below:

- PIR: 1450 J/kgK
- PUR: 1450 J/kgK

The minimum percentages of recycled material present at the origin within the raw materials used in production (including recycled, post-consumer and pre-consumer material, recovered, by-products) are detailed below. The percentages are in accordance with the Decree of 23 June 2022 – Minimum environmental criteria for the award of the design service of building interventions, for the award of works for building interventions and for the joint award of design and works for building interventions. par. 2.5.7.

	% Recycled material	Weight per m^3
Aluminium	80%	2700 kg
Polyurethane PIR	2,7%	39 kg
Polyurethane PUR	5,5%	39 kg
Bituminous felt board	65%	1.020 kg
Centesimal aluminum	40%	2.800 kg
Fiberglass/Laminate	0%	1.500 kg

Result Conversion Formulas

The formulas to allow the conversion of the results for the sandwich panel depending on the thickness of the facings and the thickness are given in the following table.
The legend of the variables contained in the formulas is as follows:

- p=thickness of the metal face;
- i=Insulation core thickness.

Indicator name and abbrevation (EN)	Unit (EN)	Module					
Core environmental impact indicators		Total A1-A3	C1	C2	C3	C4	D
Global warming potential - fossil fuels (GWP-fossil)	kg CO_2 eq.	1,24E+01*p+2,05E-01*i+4,13E+00	-	2,24E-02*p+2,66E-04*i+2,27E-03	8,83E-02*p+1,01E-02*i+7,85E-02	5,23E-03*p+4,64E-04*i+5,61E-03	-9,67E+00*p+-1,58E-01*i+-1,59E+00
Global warming potential - biogenic (GWP-biogenic)	kg CO_2 eq.	4,35E-02*p+1,04E-03*i+2,26E-02	-	1,68E-05*p+2,00E-07*i+1,70E-06	2,82E-02*p+1,55E-03*i+1,22E-02	2,55E-05*p+1,52E-07*i+3,09E-06	-7,51E-03*p+5,06E-05*i+8,77E-06
Global warming potential - land use and land use change (GWP-luluc)	kg CO_2 eq.	2,37E-02*p+1,34E-04*i+5,42E-03	-	9,00E-04*p+1,07E-05*i+9,11E-05	4,80E-05*p+9,00E-06*i+6,97E-05	1,47E-06*p+1,04E-08*i+4,66E-07	-2,02E-02*p+-5,37E-05*i+-1,18E-03

Global warming potential - total (GWP-total)	kg CO_2 eq.	1,25E+01*p+2,07E-01*i+4,16E+00	-	2,34E-02*p+2,77E-04*i+2,36E-03	1,17E-01*p+1,17E-02*i+9,08E-02	5,25E-03*p+4,64E-04*i+5,61E-03	-9,69E+00*p+-1,58E-01*i+-1,59E+00
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC-11 eq.	1,53E-07*p+1,29E-08*i+1,53E-07	-	8,42E-10*p+9,99E-12*i+8,52E-11	1,45E-09*p+1,35E-10*i+1,05E-09	1,32E-10*p+1,19E-12*i+7,55E-11	-8,24E-08*p+-5,36E-09*i+-4,44E-08
Acidification potential, accumulated exceedance (AP)	mol H^+ eq.	9,23E-02*p+1,17E-03*i+1,99E-02	-	7,54E-05*p+8,95E-07*i+7,63E-06	4,37E-04*p+3,66E-05*i+2,86E-04	3,26E-05*p+3,22E-07*i+1,49E-05	-5,88E-02*p+-8,06E-04*i+-8,45E-03
Eutrophication potential - freshwater (EP-freshwater)	kg P eq.	4,91E-04*p+1,14E-05*i+1,68E-04	-	2,56E-07*p+3,04E-09*i+2,59E-08	1,97E-06*p+2,46E-07*i+1,91E-06	5,37E-08*p+3,84E-10*i+1,42E-08	-2,79E-04*p+-1,33E-05*i+-1,13E-04
Eutrophication potential - marine (EP-marine)	kg N eq.	1,22E-02*p+1,55E-04*i+3,29E-03	-	3,22E-05*p+3,82E-07*i+3,26E-06	1,45E-04*p+1,22E-05*i+9,54E-05	1,32E-05*p+4,75E-06*i+4,20E-05	-9,62E-03*p+-1,40E-04*i+-1,44E-03
Eutrophication potential - terrestrial (EP-terrestrial)	mol N eq.	1,39E-01*p+2,10E-03*i+3,58E-02	-	2,69E-04*p+3,20E-06*i+2,73E-05	1,37E-03*p+1,17E-04*i+9,14E-04	1,46E-04*p+1,47E-06*i+6,94E-05	-1,06E-01*p+-1,46E-03*i+-1,53E-02
Photochemical ozone creation potential (POCP)	kg NMVOC eq.	3,81E-02*p+4,38E-04*i+9,08E-03	-	6,63E-05*p+7,87E-07*i+6,71E-06	3,32E-04*p+3,00E-05*i+2,34E-04	3,53E-05*p+4,38E-07*i+1,77E-05	-2,96E-02*p+-3,29E-04*i+-3,66E-03
Abiotic depletion potential - non-fossil resources (ADPE)	kg Sb eq.	2,94E-04*p+3,21E-06*i+3,50E-05	-	8,13E-08*p+9,65E-10*i+8,23E-09	1,27E-06*p+4,79E-08*i+3,81E-07	2,22E-08*p+1,90E-10*i+3,65E-09	4,82E-05*p+-1,57E-06*i+-1,05E-05
Abiotic depletion potential - fossil resources (ADPF)	MJ, net calorific value	1,22E+02*p+3,42E+00*i+6,75E+01	-	3,13E-01*p+3,72E-03*i+3,17E-02	9,30E-01*p+1,32E-01*i+1,02E+00	9,27E-02*p+8,96E-04*i+5,53E-02	-8,66E+01*p+-2,77E+00*i+-2,46E+01
Water (user) deprivation potential (WDP)	m3 world eq. deprived	3,27E+00*p+1,72E-01*i+2,94E+00	-	3,87E-03*p+4,59E-05*i+3,91E-04	1,15E-02*p+1,52E-03*i+1,18E-02	5,11E-04*p+4,79E-06*i+2,11E-04	-1,02E+00*p+-1,74E-01*i+-1,38E+00

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