meTecno
The Specialist

LATIN AMERICA EPD®

Environmental Product Declaration
In accordance with ISO 14025 and EN 15804 for:

Insulated metal sandwich panels for walls, ceilings and roofings

Programme:	**The International EPD® System www.environdec.com**
EPD registered through the fully aligned regional programme/hub:	**EPD Latin America, www.epd-latinamerica.com**
Programme operator:	**EPD International AB**
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Revision date:	**2019-07-30**
Geographical scope:	**Mexico**

EPD Content

METECNO is a company dedicated to the panel´s manufacture/commercialization and architectural solutions with thermal and acoustic insulation, supporting its management in the following pillars:

1. Offers competitive and innovative alternatives, quality and technology to the construction market.
2. Responds in a timely and efficient way to the market's demands in which it participates.
3. Looks for improvements in the processes, to generate the profitability expected by the shareholders.
4. Encourages and supports the people's development, in order to have a talented and committed work team.
5. Contributes to the development and conservation of a healthy and sustainable environment.

This company of Italian origin has presence in the Mexican market since 1992. METECNO currently has commercial offices in different cities of Mexico and a production plant located in the state of Querétaro, location that allows communication between important cities such as Mexico City, Monterrey, Guadalajara, and ports such as Veracruz and Manzanillo.

METECNO has two production lines that use last generation cyclopentane, one line of specialties and one for the personalized flashings. METECNO has a production capacity of more than 4 million square meters per year of insulated and self-supporting metal panels injected with polyurethane, destined to the national market, North American countries.

Insulated metal sandwich panels for walls, ceilings and roofs are a durable system due to the use of steel in its structure. The system is modular, lightweight and easy to transport, avoids the excessive consumption of resources such as energy and other materials during the installation, what makes it competitive in terms of costs.

The panels are also characterized to be optimal suppliers of thermal insulation, reducing the costs of heating and air conditioning during the building´s operational life.

A wide range of products is produced in METECNO's facilities, used for various construction applications and architectural solutions; additionally, METECNO provides its customers fixing elements and accessories that turn its products into the New Millennium System.

METECNO is revolutionizing the way to build in Mexico, Central America and the Caribbean with mineral wool panels, fire resistant and acoustic insulation.

This Environmental Product Declaration (EPD) includes six types of composite panels fabricated by METECNO in Mexico and it is in accordance with ISO 14025 and EN 15804. Insulated metal sandwich panels for walls, ceilings and roofings.

EPD of constructions products may not be comparable if they do not comply with EN 15804 Sustainability of construction works – Environmental product declarations – Core rules for product group: UN CPC 4299, 4357,4394,4931 and 4954. Fabricated products made out of metal composite material (MCM); V.1.0

The EPD owner has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804.

2. General information

Product:	Insulated metal sandwich panels for walls, ceilings and roofs.
Declaration owner:	METECNO SA de CV / Av. Mesa de León No. 116, Parque Industrial Querétaro Santa Rosa Jáuregui, Qro. CP 76220
Description of the construction product:	Insulated sandwich-type metal panels, composed of steel and polyurethane: They are used by the construction sector as elements of exterior cladding, for their mechanical resistance, thermal insulation, the rise of load-bearing walls and covering surfaces of a wide range of buildings. The environmental performance of the panels is presented as follows: Group 1: Average of GLAMET® FRIGO (141-B), GLAMET® FRIGO (Cyclopentane) and METCOPPO®. Group 2: Average of SUPERWALL® (Cyclopentane) and HWALL®8P Independent panel: SUPERWALL® (141-B)
Declared Unit:	1 m^2 of composite panels or sandwich type, with 25 dB sound reduction, variable thermal resistance and weight according to panel type.
Construction product identification:	UN CPC 4299, 4357,4394,4931 and 4954.
Description of the main product components and or materials:	The structure of composite METECNO panels has galvanized steel sheets and an insulating core injected with high-density polyurethane, to be used as roofings, facades, walls and in cold rooms, sound chambers, among other applications.
Life cycle stages not considered:	Distribution, use, end of life.
Declaration content:	This EPD is based on information modules that do not cover the aspects of use and end of life of the product. It contains in detail, for Module A1, A2 and A3: Product definition and physical data. / Information about raw materials and origin. / Specifications on the product manufacturing. / Notes on product processing. / LCA based on a declared unit, cradle-to-gate. / LCA results. / Evidence and verifications.
For more information consult:	Ing. Luz Faynori Martínez Pedraza Technical Support Director soporte_tecnico@metecnomexico.com Phone: 01 442 229 53 00 Address: Av. Mesa de León No. 116 Parque Industrial Qro., Santa Rosa Jáuregui, Qro., Querétaro CP 76220 www.metecnomexico.com
Site for which this EPD is representative:	Production plant located in the state of Querétaro (Av. Mesa de León No. 116 Parque Industrial Qro., Santa Rosa Jáuregui, Qro., Querétaro CP 76220)
Public intended:	B2B (Business to business)

3. Product description

Composite insulated metal sandwich panels are used by the construction sector as elements of exterior cladding, for their mechanical resistance, thermal insulation, the rise of load-bearing walls and covering surfaces of a wide range of industrial, commercial, and residential buildings in the world. For more than 50 years the composite panels have offered engineers and architects new possibilities for planning, design, and cost management for new buildings construction and refurbishment, as they have proven to be a profitable, effective and versatile solution.

Composite panels' use has increased due to the need of the construction industry of a panel with a specific relatively light weight, that also offers high values of thermal insulation and ease in installation.

Thermal insulation feature is satisfied thanks to the technical development of polyurethane (PUR) and polyisocyanurate (PIR) foams. The ease during installation is achieved with the simplicity of assembly in the load-bearing structure. This feature has turned out the main factor of the popularity of this product, since construction times have been reduced significantly compared to traditional methods, with consequent savings in labor costs.

Over the years, the structure of composite or sandwich type panels has always been based on the same configuration.
Starting from two thin surfaces with high mechanical properties, which enclose a material relatively light, with an appropriate rigid as provides the insulation conditions.

METECNO panels have galvanized steel sheets and an insulating core made of high-density polyurethane foam or high-density polyisocyanurate. This panel configuration has a special combination of properties that makes it ideal for use in facades, wall and roofings.

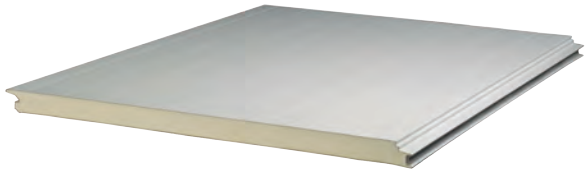
Above is an image of a work made with METECNO panels:

Composite panels included in this EPD

GLAMET® FRIGO: Metallic panel for covers of cold-storage chambers, warehouses and other cold constructions, with pre-painted galvanized steel sheet in both sides and polyurethane core. Presents thicknesses of 6.35 cm, 7.62 cm, 10.16 cm, 12.7 cm, 15.64 cm. Smaller thicknesses such as 2.54 cm, 3.81 cm and 5.08 cm, the product changes its name to GLAMET®.

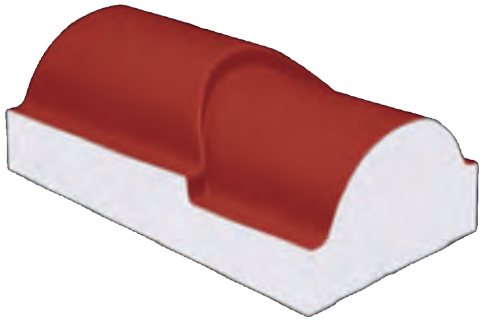
SUPERWALL®: It is a panel with hidden fixing and gasket in the overlaps. It is recommended for facade and previous divisions in buildings that require aesthetic characteristics and as a wall for modular construction due to its self-supporting characteristic. It offers excellent finishes for interior and exterior.

This product has thicknesses of 4.13cm and 5.08cm. For thicknesses greater of 6.35cm, 7.62cm, 10.16cm, 12.7cm and 15.24cm, the product changes its name to SUPERWALL® FRIGO.



METCOPPO®: This panel is made of two galvanized and pre-painted steel sheets with a polyurethane core. It is recommended as a cover for buildings with high aesthetic requirements.

It gives an option to preserve the traditional aesthetic style of the architecture due to its similarity to the traditional corrugated tile, maintaining the advantages of thermal insulation and mechanical resistance, as well as helping to eliminate the maintenance of a traditional tile roof and does not require waterproofing.



HWALL® 8P: It is recommended to use it as a facade in buildings that require aesthetic characteristics, with polyurethane core, it is excellent to be installed in a horizontal way between structural frames without any additional secondary pole, achieving a pleasant visual effect.

4. Content declaration

A list of materials and chemical substances, including information about hazardous properties, are provided according to the European Chemicals Agency.

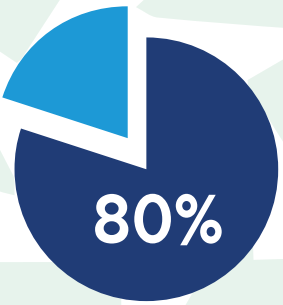
Material content in insulated metal sandwich panels			
Material	Weight	Function	Health class[1]
GLAMET® FRIGO (cyclopentane)			
Galvanized steel	74%	Structural	Non hazardous
Polyurethane	26%	Thermal insulation	Non hazardous
Others	<1%	Packaging	Non hazardous
GLAMET® FRIGO (141B)			
Galvanized steel	73%	Structural	Non hazardous
Polyurethane	26%	Thermal insulation	Non hazardous
Others	1%	Packaging	Non hazardous
METCOPPO®			
Galvanized steel	82%	Structural	Non hazardous
Polyurethane	18%	Thermal insulation	Non hazardous
Others	<1%	Packaging	Non hazardous
SUPERWALL® (Cyclopentane)			
Galvanized steel	84%	Structural	Non hazardous
Polyurethane	16%	Thermal insulation	Non hazardous
Others	<1%	Packaging	Non hazardous
SUPERWALL® (141-B)			
Galvanized steel	80%	Structural	Non hazardous
Polyurethane	18%	Thermal insulation	Non hazardous
Others	2%	Packaging	Non hazardous
HWALL® 8P			
Galvanized steel	77%	Structural	Non hazardous
Polyurethane	22%	Thermal insulation	Non hazardous
Others	1%	Packaging	Non hazardous

Table 1. Content declaration

[1]According to EN15804 declaration of material content of the product shall List of Substances of Very High Concern (SVHC) that are listed by European Chemicals Agency.

4.1 Recycled material content

The present product does not contain recycled materials, but one of its main components is galvanized steel that can contain up to 80% recycled steel.



4.2 Distribution packaging

The materials used for packaging are expanded polystyrene (EPS), cardboard and Packaging film (low-density polyethene).

5. LCA Rules

This document does not present information related to cut off criteria or allocation, since the data was generated by METECNO according to the functional unit.

5.1. Declared unit

1 m^2 of composite insulated metal sandwich panel´s, with 25 dB of sound reduction and variable thermal resistance and weight according to the panel type.

Panel	Weight (kg/m^2)	($W/ m^2.K$)	(ft^2h °F/BTU)
GLAMET® FRIGO (141-B)	11.32 - 13.80	0.33 - 0.14	17.42 - 40.65
GLAMET® FRIGO (Cyclopentane)	11.32 - 13.80	0.33 - 0.14	17.42 - 40.65
SUPERWALL® (141-B)	10.17 - 11.18	0.5459 - 0.4094	10.40 - 13.87
SUPERWALL® (Cyclopentane)	10.17 - 11.18	0.5459 - 0.4094	10.40 - 13.87
HWALL® 8P (Cyclopentane)	11.75 - 13.40	0.34 - 0.23	16.71 - 24.69
METCOPPO®	11.22 - 11.62	0.33 - 0.26	14.93 - 18.83

Table 2. Technical specification

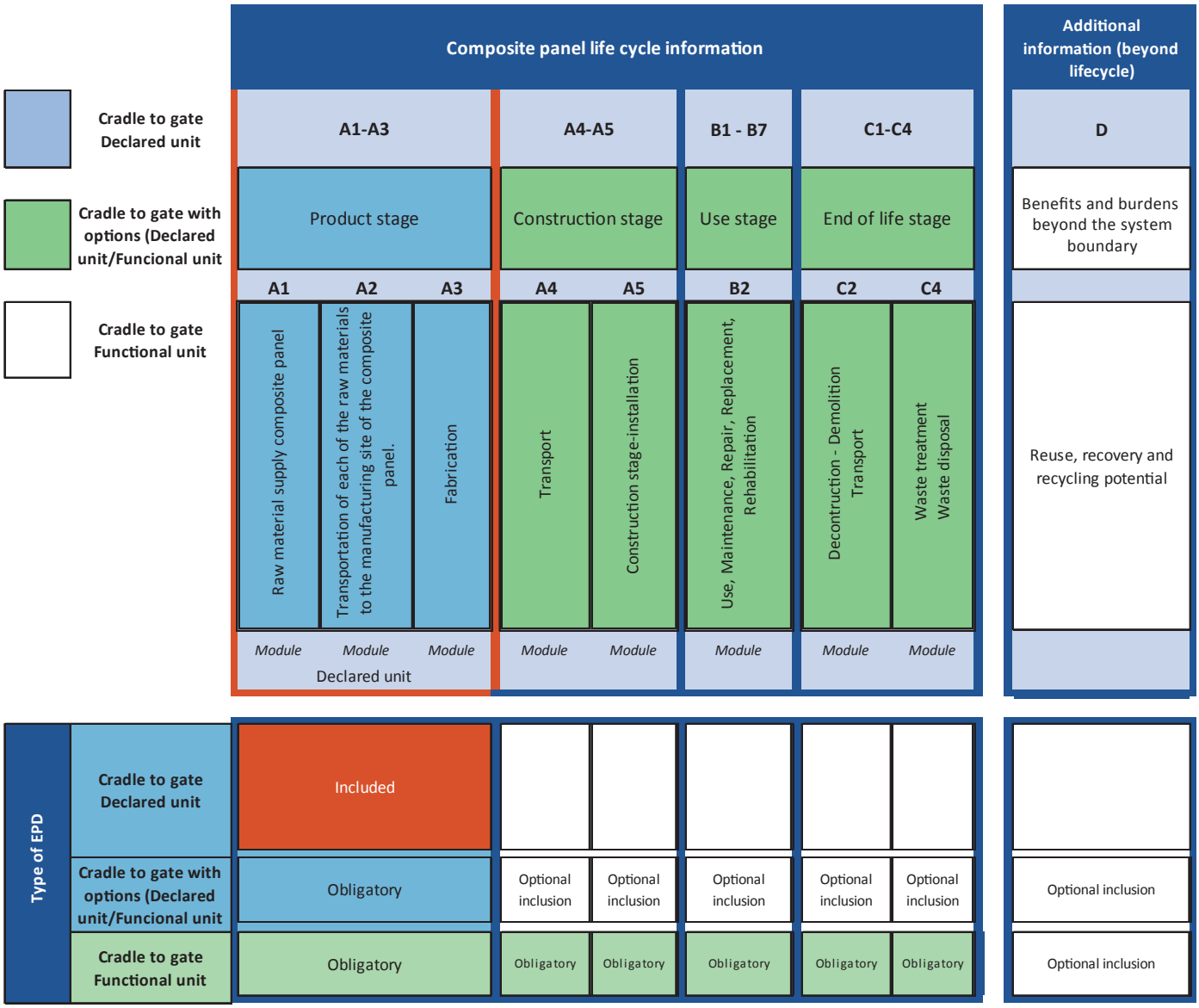
Acoustic isolation: Laboratory tests were performed on each type of panel to obtain acoustic insulation results, under ISO 140-1 measurement, ISO 140-3 noise reduction and ISO 717-1 classification.

5.2. System Boundary

Environmental potential impacts were calculated, according to EN 15804:2012 and PCR 2012:01 Construction products and construction services Version 2.2 (2017-05-30). The scope of is a "Cradle-to-gate" EPD, in line with ISO 14025:2006.

The potential environmental impacts were calculated through Life Cycle Assessment (LCA) methodology of Insulated sandwich-type metal panels according to ISO 14040:2006 and ISO 14044:2006. (Metecno 2019). This study went through a critical review process in accordance with ISO / TS 14071: 2014. For a “cradle-to-gate ” EPD is be based on information modules A1 to A3. (see table 3).

Table 3. System boundary



METECNO Mexico collected primary (specific) data from annual internal records of the year 2015 for the following aspects:

A1) Raw materials supply

Raw materials consumption for panels manufacturing.

A2) Transportation

Transportation distance of raw materials and ancillary materials for panels.

Transportation of other raw materials.

Transportation of auxiliary materials.

Internal transportation requirements.

Transportation distance to waste treatment.

A3) Manufacturing

Energy consumption for panels manufacturing.

Production yield and products generation.

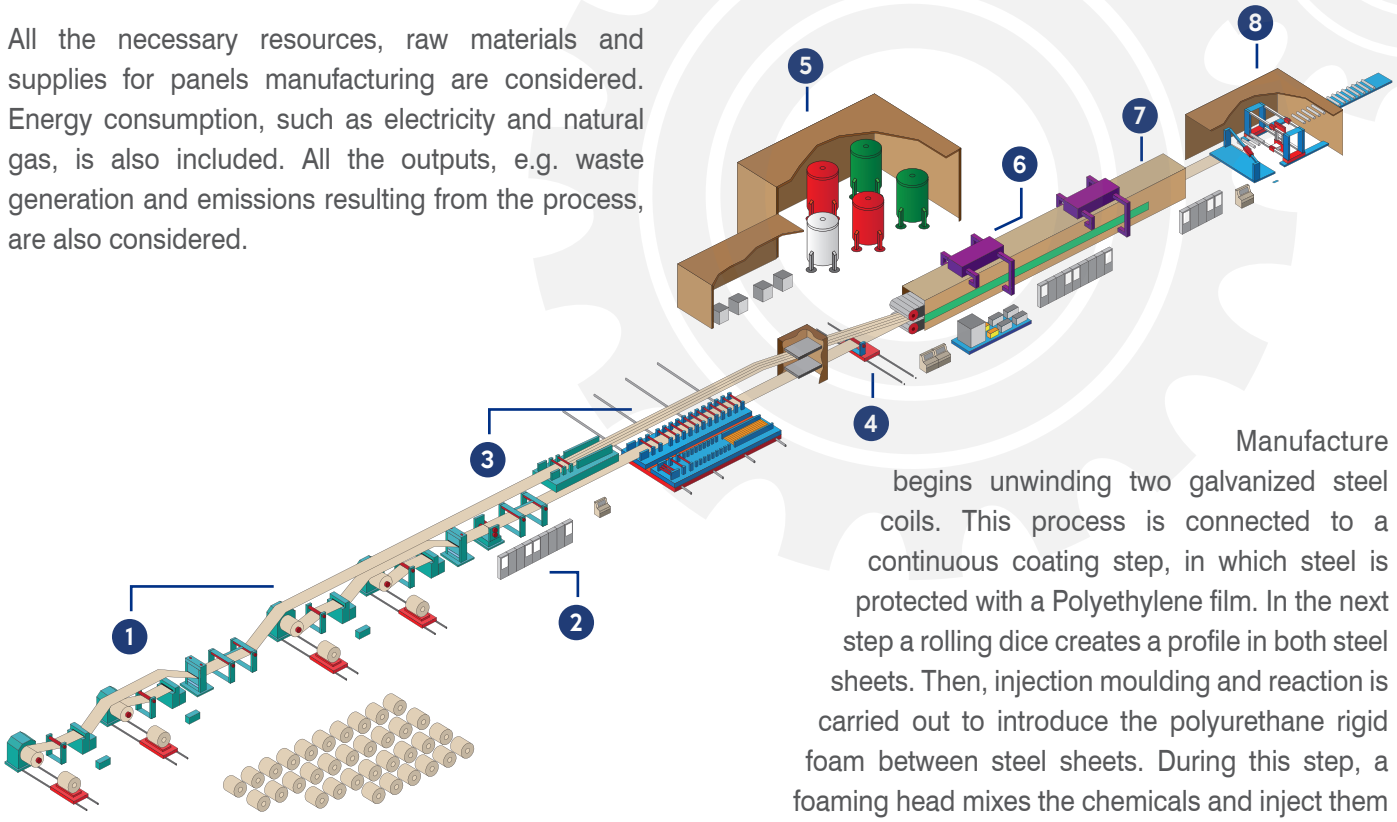
Waste generation and management strategies.

Emissions to air during manufacturing process.

Table 4. Description of information modules included in this EPD

5.3. Description of the manufacturing process

All the necessary resources, raw materials and supplies for panels manufacturing are considered. Energy consumption, such as electricity and natural gas, is also included. All the outputs, e.g. waste generation and emissions resulting from the process, are also considered.



Manufacture begins unwinding two galvanized steel coils. This process is connected to a continuous coating step, in which steel is protected with a Polyethylene film. In the next step a rolling dice creates a profile in both steel sheets. Then, injection moulding and reaction is carried out to introduce the polyurethane rigid foam between steel sheets. During this step, a foaming head mixes the chemicals and inject them to form the panel core. The reactions take place in a furnace. After the reaction time has elapsed, the panel is taken out and cut to the specified dimension.

1. Unrolling
2. Electrical control
3. Profiling
4. Galvanizing
5. Deposit Tanks
6. Dosage
7. Dual Band
8. Transversal Cutter

5.4. Assumptions

1. The manufacturing inventory and the potential environmental impact production of cyclopentane was modeled using alternative datasets from Ecoinvent. A sensitivity analysis showed no significant differences among them.

2. It is assumed that the Gasket is composed of 50% low density polyethylene and 50% Polyurethane.

3. The gasket transport distances of suppliers 2 and 3 are assumed as national and state, respectively.

4. The transport distance of L.P. gas and diesel is considered.

5. A municipal distance is assumed for the transport of waste to treatment.

6. The outputs were adjusted to the inputs, if they are reporting waste that comes from other processes that are being included in the ICV.

7. Data from the lateral label reported by METECNO de Colombia was used.

5.5. Cut-off criteria

All flows of fuel, energy, materials and supplies necessary for the production of the panel have been considered; materials that could be used in preventive or corrective maintenance of machinery and equipment were disregarded, as well as the use of uniforms and personal protective equipment or other auxiliary materials, which could be used eventually in the process, for the performance of preventive maintenance or corrective of machinery correctiveness, leaving out textile impregnated with oils and the final disposal of these as hazardous waste.

5.6. Allocation

No allocation was made to the input or output data of the panel since METECNO does not report co-products during its internal manufacturing processes or other situations that require.

5.7. Time representativeness

Data corresponds to the year 2015.

5.8. Data quality assessment

Data quality assessment per module is provided in Tables 8, 9 and 10.

Data quality requirement	Temporal coverage	Geographic coverage	Technological coverage	Precision	Integrity	Representativeness	Coherence	Reproducibility	Sources of information	Measured or estimated	Scale uncertainty
Summary of the data quality analysis for module A1)											
Raw materials' consumption for the panel's manufacture	2015	Mexico	Current	✓	✓	✓	✓	✓	METECNO	M	Low
Galvanized steel producttion	2015	Mexico / China	Current	✓	✓	✓	✓	✓	Ecoinvent 3 Mexicaniuh	M&E	Low
Isocyanate production	1995 - 2016	European production	Current	✓	✓	✓	✓	✓	Ecoinvent 3	M	Medium
Polyol production	1995 - 2016	European production	Current	✓	✓	✓	✓	✓	Ecoinvent 3	M	High
Catalyst	2000 - 2016	Switzerland "global"	Current						Ecoinvent 3	M	Medium
Foaming (cyclopentane and 141B)	2001 - 2016	European production	Current	✓	✓	✓	✓	✓	Ecoinvent 3	M	High
Gasket	1996 -2016	European production	Current	✓	✓	✓	✓	✓	Created	M&E	Low
PE film to coat steel	1999 - 2016	European production	Current	✓	✓	✓	✓	✓	Ecoinvent 3	M&E	Medium
Side label	2000 - 2016	European production	Current	✓	✓	✓	✓	✓	Ecoinvent 3	M&E	High
Production of raw materials packaging	2000 - 2016	Mexican and European production	Current	✓	✓	✓	✓	✓	Ecoinvent 3 Mexicaniuh	M&E	Low
Data quality analysis for module A2) "Transportation"											
Transport Distance of raw materials	2015	Mexico	does not apply	✓	✓	✓	✓	✓	METECNO and Google Maps	M&E	Low
Transport Distance of packaging materials	2015	Mexico	does not apply	✓	✓	✓	✓	✓	METECNO and Google Maps	M&E	Low
Fuel transport distance	2015	Mexico	does not apply	✓	✓	✓	✓	✓	METECNO and Google Maps	M&E	Low
Waste transport distance	2015	Mexico	does not apply	✓	✓	✓	✓	✓	METECNO and Google Maps	M&E	Low
Transport Distance of raw materials	1992-2014	Worldwide average based on Europe	Worldwide average based on Europe	✓	✓	Worldwide average based on Europe	✓	✓	Ecoinvent 3.3	M&E	High
Data quality for module A3) "Manufacturing"											
Production yield and generation of by-products.	2015	Mexico	Current	✓	✓	✓	✓	Confidential data of METECNO	METECNO	M	Low

Data quality requirement	Temporal coverage	Geographic coverage	Technological coverage	Precision	Integrity	Representativeness	Coherence	Reproducibility	Sources of information	Measured or estimated	Scale uncertainty
Electricity consumption for the panel's manufacture	2015	Mexico	Current	✓	✓	✓	✓	✓	METECNO	M	Low
Electricity Production consumed in the panel's manufacture	1990 - 2016	Mexico	Technological mix for Mexico	✓	✓	✓	✓	✓	Mexicaniuh	M&E	Low
Fuel consumption for the panel's manufacture	2015	Mexico	Current	✓	✓	✓	✓	✓	METECNO	M	Low
Fuel production consumed in the panel's manufacture	2015	Mexico	Technological mix for Mexico	✓	✓	✓	✓	✓	Mexicaniuh	M&E	Low
Energy and materials consumption for the auxiliary materials manufacture for the panel's packaging	1990 - 2015	Worldwide average based on Europe	Worldwide average based on Europe	✓	✓	Worldwide average based on Europe	✓	✓	Ecoinvent 3.3	M&E	High
Waste generation during manufacturing	2015	Mexico	Current	✓	✓	✓	✓	✓	METECNO	M	Low
Processes of waste treatment, consumptions of materials and related energy	1990 - 2015	Worldwide average based on Europe	Worldwide average based on Europe	✓	✓	Worldwide average based on Europe	✓	✓	METECNO	M&E	High
Emissions to air and water during the manufacturing process	2015	Mexico	Current	✓	Some emissions were estimated with EPA factors	✓	✓	✓	METECNO	M	Low
Waste transport distance	2015	Mexico	Current	✓	Some distances were estimated	✓	✓	✓	METECNO and Google Maps	M	Low

6. Environmental performance

SimaPro 8.4 was used for Life Cycle Impact Assessment.

For the elaboration of this EPD, a data analysis resulting from the environmental impact of each of the panels was carried out, validating the percentage variation of the results, all those that did not present a difference greater than 10% were grouped.

Due to the similarity in the environmental performance results of the panels, it was decided to carry out three groupings, in order to present the repetitive data:

Group 1: Average of GLAMET® FRIGO (141-B), GLAMET® FRIGO (cyclopentane) and METCOPPO®, it has a difference of 3% among them.

Group 2: Average of SUPERWALL® (cyclopentane) and HWALL® 8P, it has a difference of 6% between them.

Independent panel: SUPERWALL® (141-B). This panel presented a variation percentage greater than 15%, with respect to the other panels, that is why its results are presented independently. Since this is a Cradle to Gate EPD, reference service life is not specified.

6.1. Use of resources

Parameters describing resource use were evaluated with the Cumulated Energy Demand method version 1.09 (Frischknecht et al. 2007) except for the use of net fresh water indicator that was evaluated with Recipe 2016 Midpoint (H) version 1.00 (Huijbregts et al. 2017). The Table below shows the results for the declared unit.

Parameter	Unit	Group 1			Group 2			Superwall (141B)		
		A1	A2	A3	A1	A2	A3	A1	A2	A3
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	45.45	0.71	12.21	38.07	0.71	12.19	30.84	0.71	12.19
Use of renewable primary energy as raw materials	MJ	0	0	0	0	0	0	0	0	0
Total use of renewable primary energy resources	MJ	45.45	0.71	12.21	38.07	0.71	12.19	30.84	0.71	12.19
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	744.74	48.85	77.93	562.79	48.85	77.07	469.35	48.85	79.73
Use of non-renewable primary energy used as raw materials	MJ	0	0	0	0	0	0	0	0	0
Total use of non-renewable primary energy resources	MJ	744.74	48.85	77.93	562.79	48.85	77.07	469.35	48.85	79.73
Use of secondary material	kg	0	0	0	0	0	0	0	0	0
Use of renewable secondary fuels	kg	0	0	0	0	0	0	0	0	0
Use of non-renewable secondary fuels	kg	0	0	0	0	0	0	0	0	0
Use of net fresh water	m3	54.39	0.01	23.86	49.59	0.01	22.53	37.41	0.01	22.57

6.2 Potential environmental impact.

Parameters describing environmental potential impacts were calculated using CML-IA method version 3.04 (Guinee et al. 2001; Huijbregts et al. 2003; Wegener et al. 2008) as implemented in SimaPro 8.4. Water scarcity potential was calculated using AWARE method (Boulay et al. 2016).

6.2.1 Description of information modules and environmental results
A1) Raw material supply:

The following raw materials are used for the panels preparation, with the exception that some of them use the cyclopentane as a blowing agent, and others use a component known as agent 141 b.

- Galvanized steel
- Isocyanate
- Polyol
- Catalyst
- Foaming (Agent 141b)
- Foaming (Cyclopentane)

Other supplies

- Gasket
- PE film for coat steel
- Side label
- Glue for PU
- Raw material packaging

Table 6. Environmental Results for A1 Group 1.

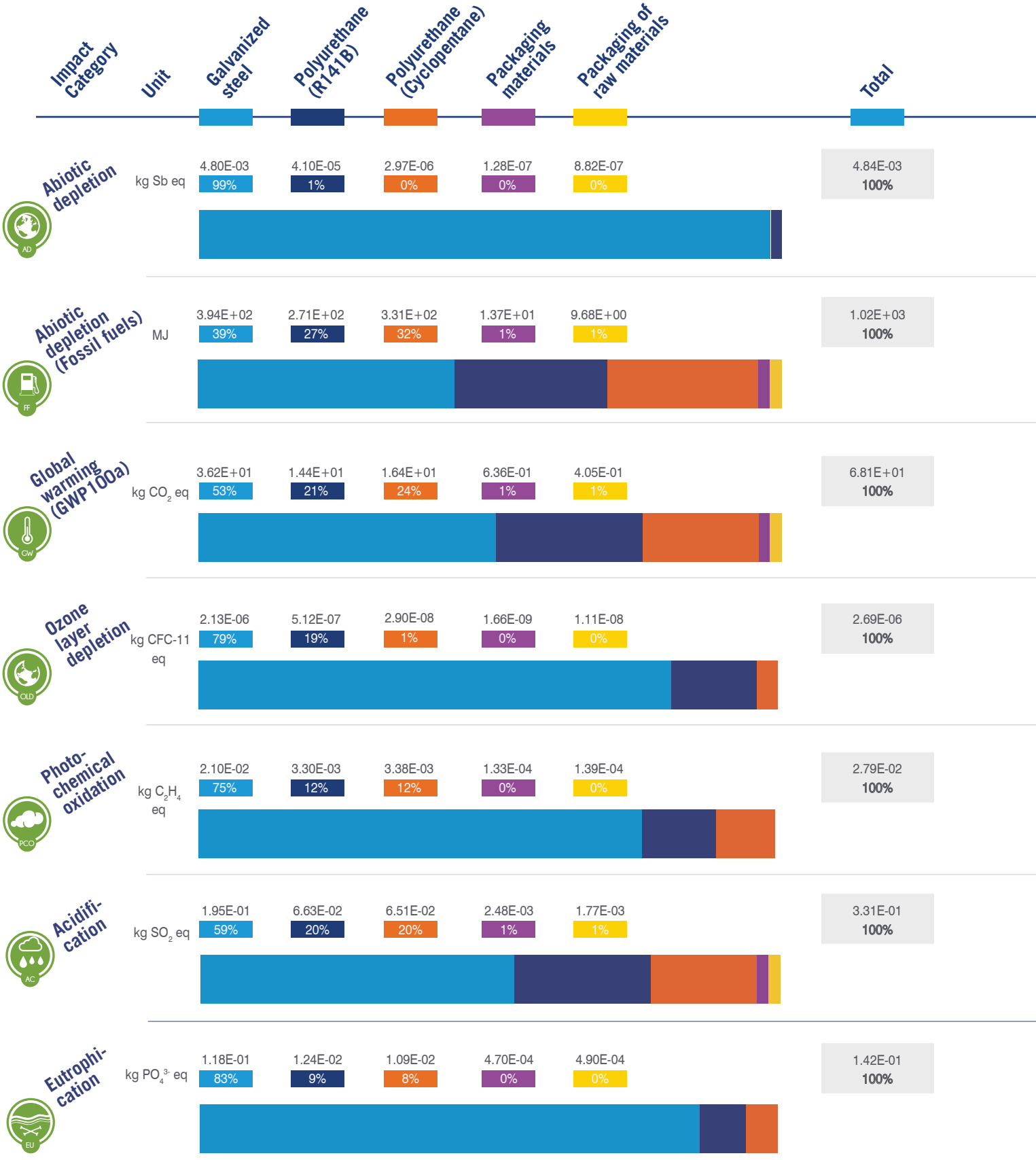
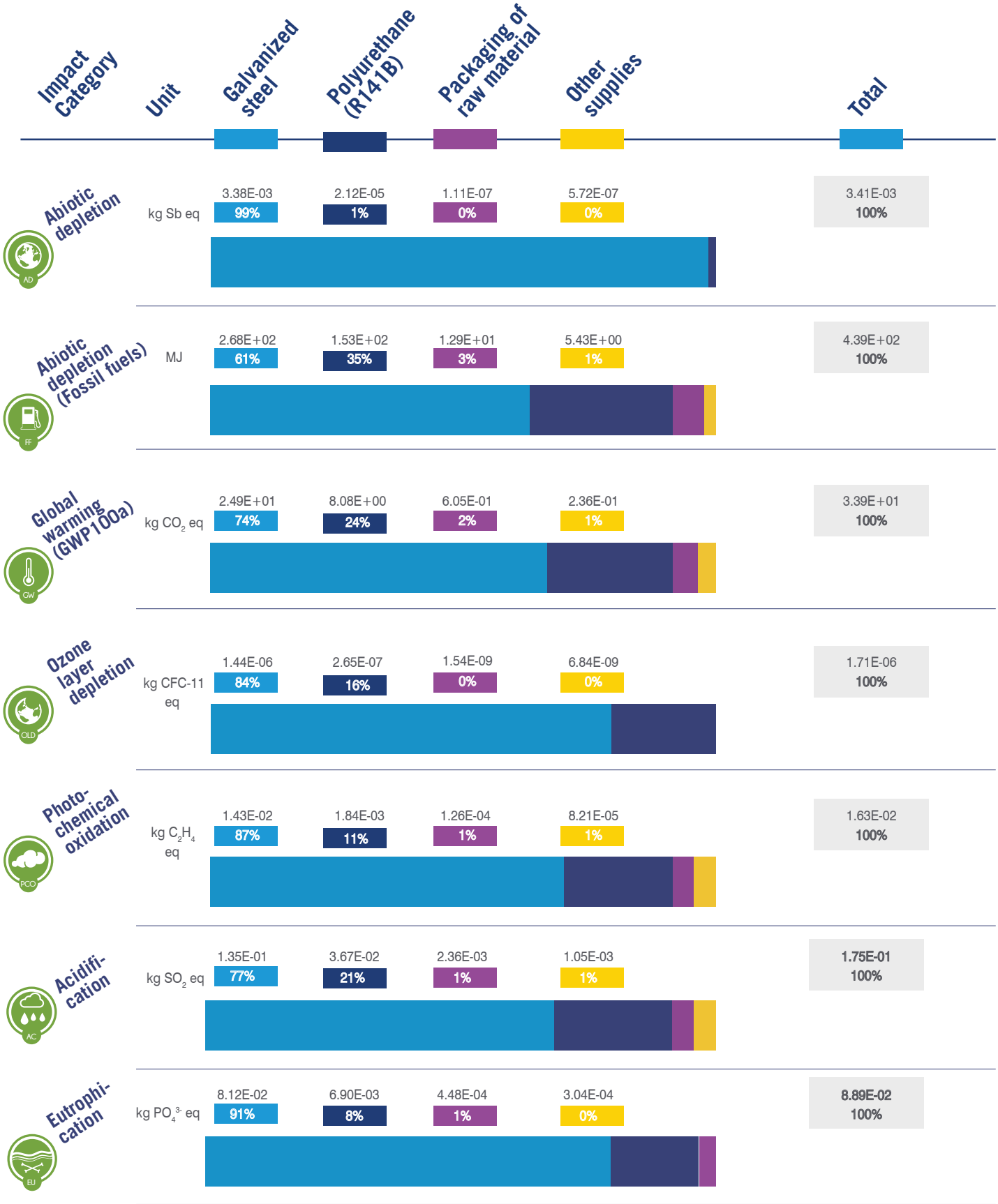


Table 7.Environmental Results for A1 Group 2.

Table 8. Environmental Results for A1 SUPERWALL® (141-B)



6.2.2 Description of information modules and environmental results A2) Transport:

All the transport associated with the materials contained in the different types of panels and the distances of each one from suppliers were considered.

For the management of this generated waste, the company normally hires a service provider that is responsible for recycling or waste disposal.

Table 9.Environmental Results for A2 Group 1.

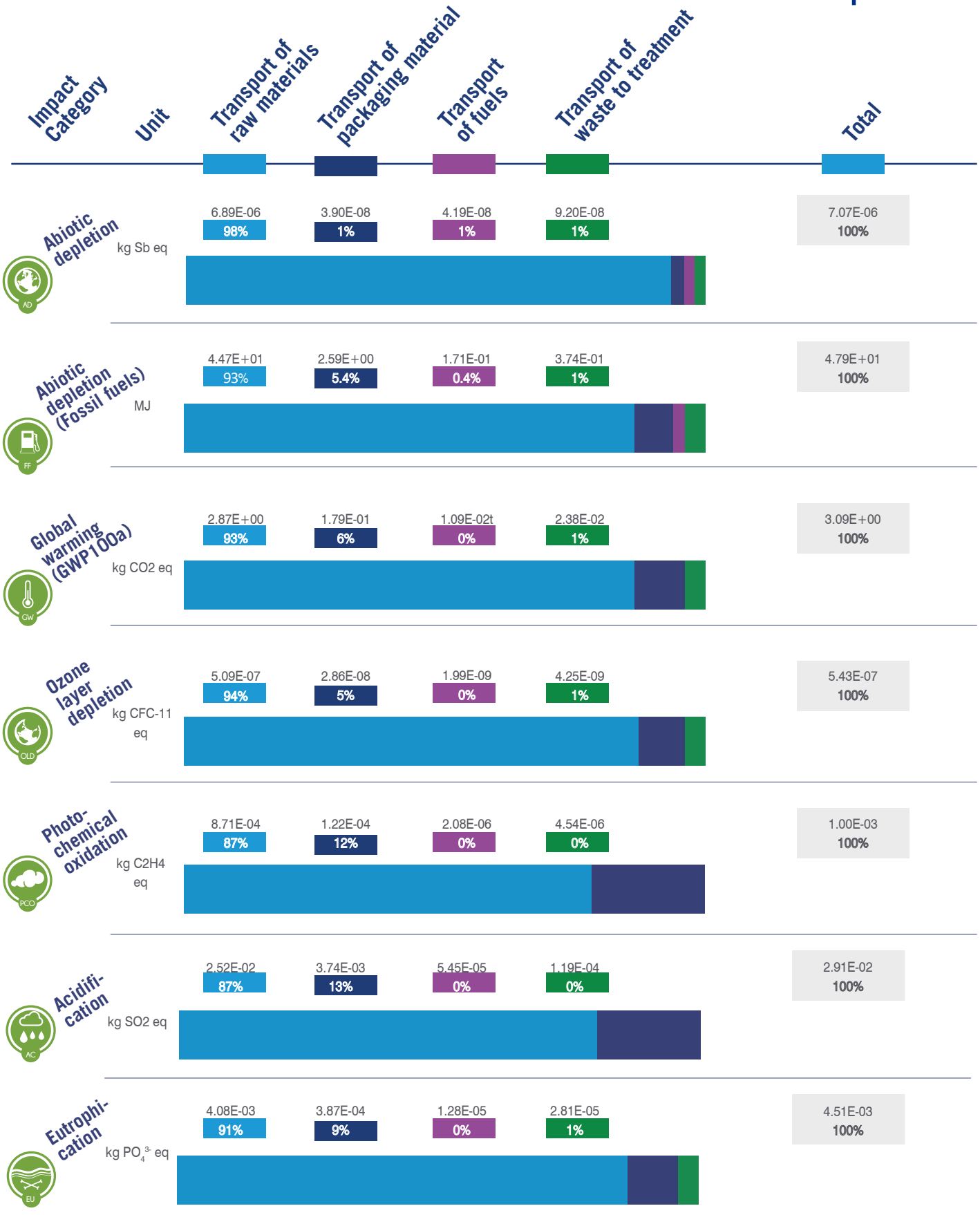


Table 10. Environmental Results for A2 Group 2.

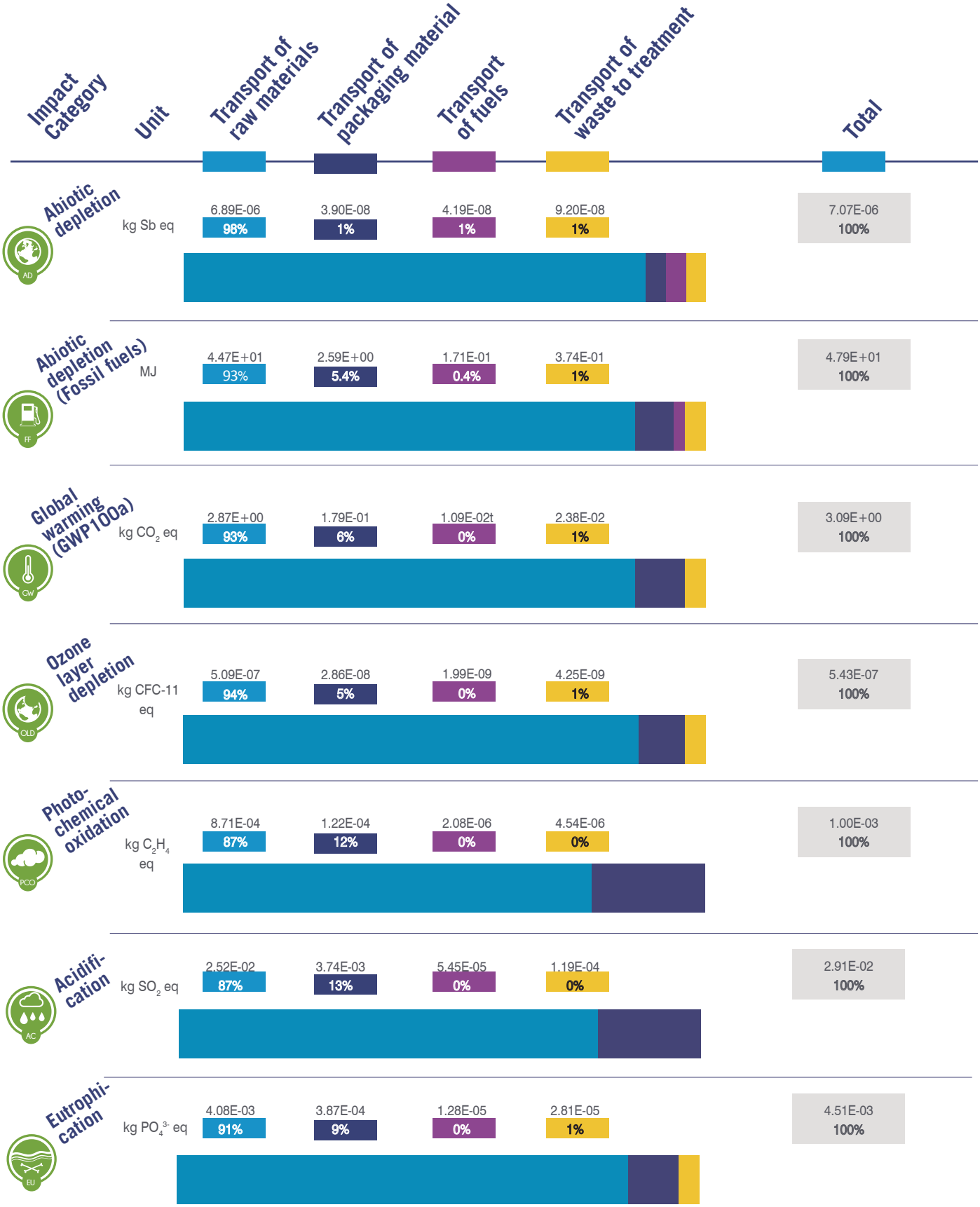


Table 11. Environmental Results for A1 SUPERWALL® (141-B)

Impact Category	Unit	Transport of raw materials	Transport of packaging materials	Transport of fuels	Transport of waste to treatment	Total
Abiotic depletion	kg Sb eq	6.89E-06 98%	3.90E-08 1%	4.19E-08 1%	9.20E-08 1%	7.07E-06 100%
Abiotic depletion (Fossil fuels)	MJ	4.47E+01 93%	2.59E+00 5.4%	1.71E-01 0.4%	3.74E-01 1%	4.79E+01 100%
Global warming (GWP100a)	kg CO_2 eq	2.87E+00 93%	1.79E-01 5%	1.09E-02 0%	2.38E-02 1%	3.09E+00 100%
Ozone layer depletion	kg CFC-11 eq	5.09E-07 94%	2.86E-08 5%	1.99E-09 0%	4.25E-09 1%	5.43E-07 100%
Photo-chemical oxidation	kg C_2H_4 eq	8.71E-04 87%	1.22E-04 12%	2.08E-06 0%	4.54E-06 0%	1.00E-03 100%
Acidifi-cation	kg SO_2 eq	2.52E-02 87%	3.74E-03 13%	5.45E-05 0%	1.19E-04 0%	2.91E-02 100%
Eutrophi-cation	kg PO_4^{3-} eq	4.08E-03 91%	3.87E-04 8%	1.28E-05 0%	2.81E-05 1%	4.51E-03 100%

6.2.3 Description of information modules and environmental results A3) Fabrication:

In module A3 the necessary inputs for the panel´s manufacture and the materials for the packaging of the finished product were considered, as can be seen in the result tables below.

The process' outputs, which are all waste generated during manufacturing, were also considered.

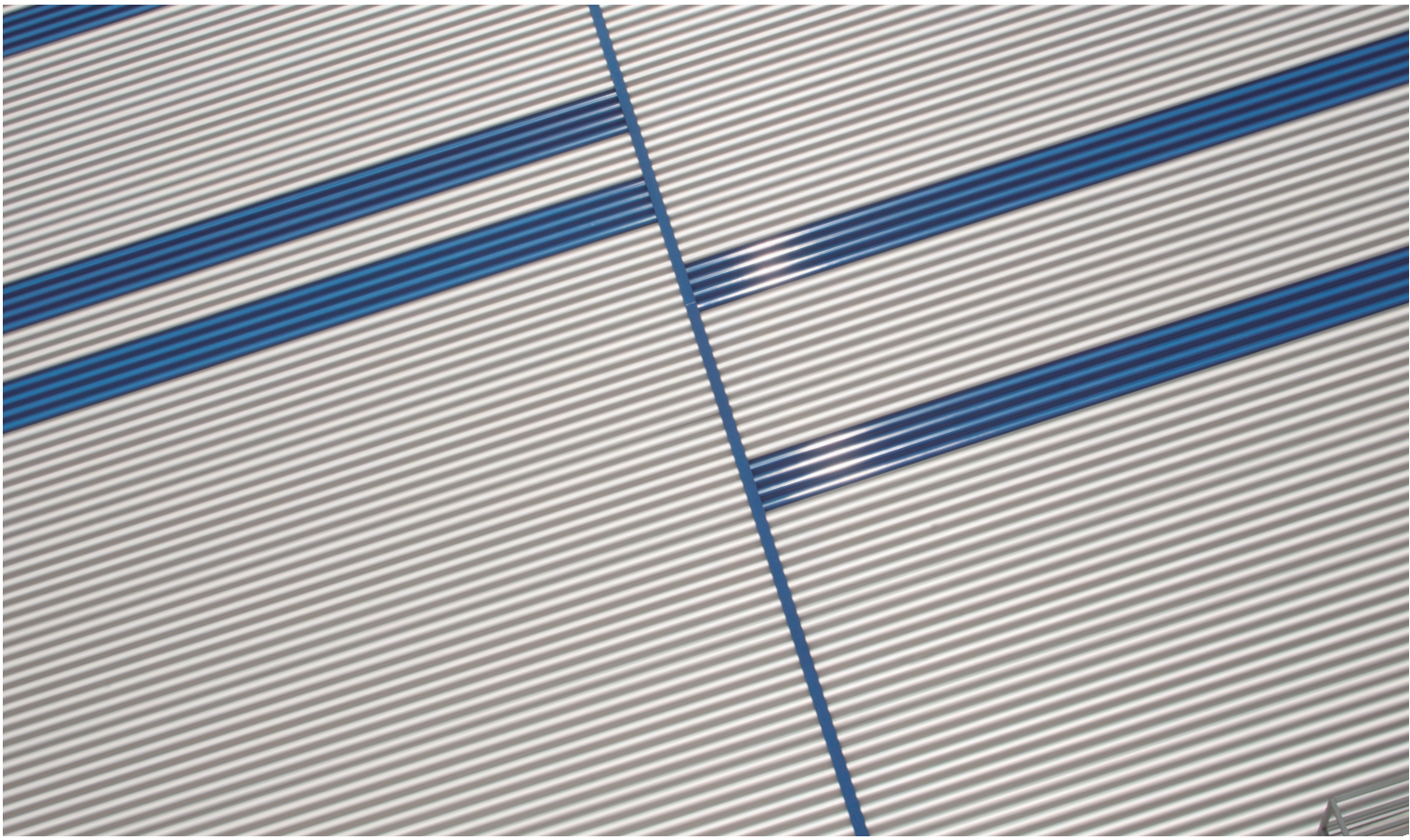
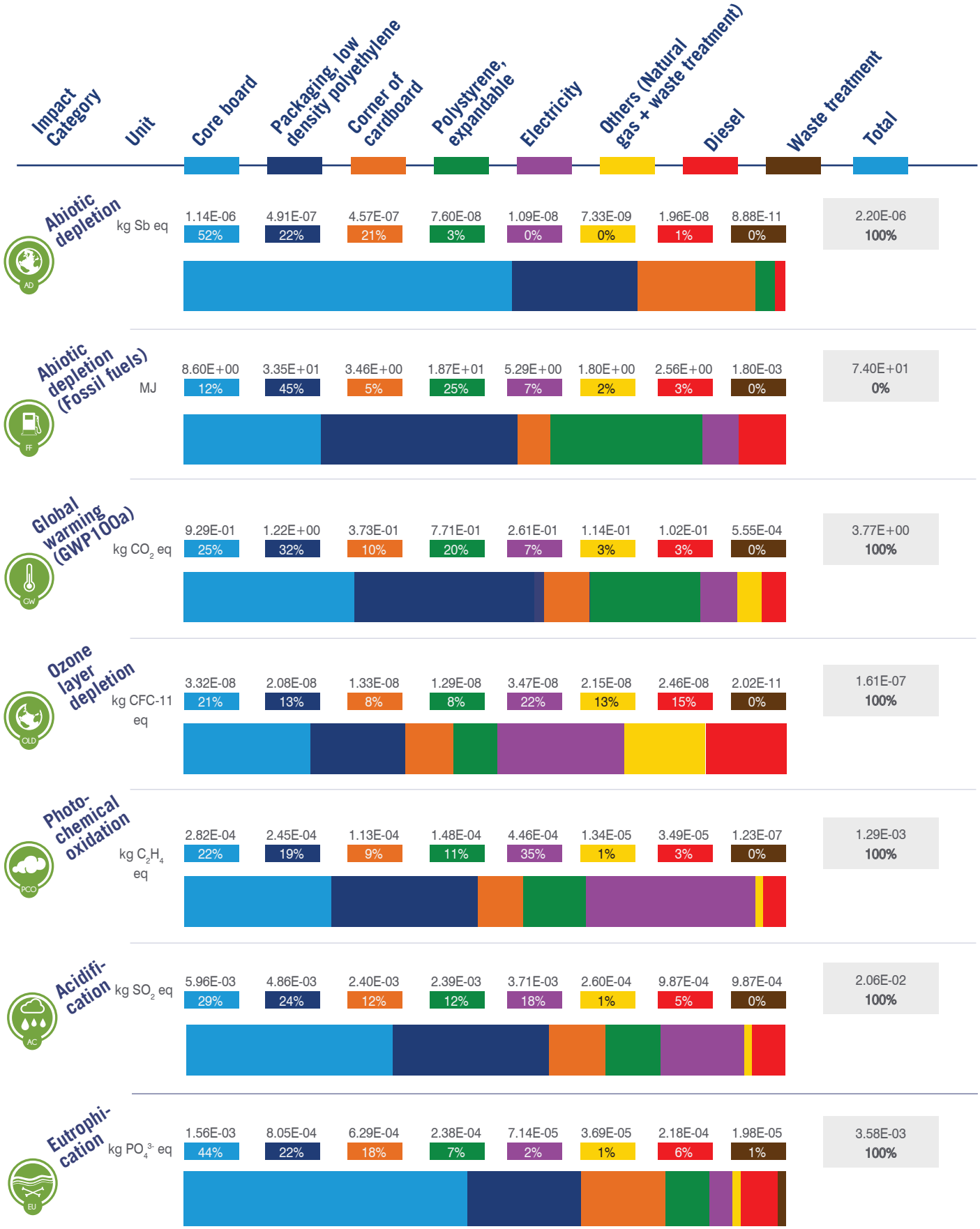


Table 12.Environmental Results for A3 Group 1.

Table 13. 8 Environmental Results for A3 Group 2.

Table 14. Environmental Results for A3 SUPERWALL® (141-B).



6.2.4 Total Environmental Results

Impact category	Total performances Group 1			Total performances Group 2			Superwall (141B)		
	A1	A2	A3	A1	A2	A3	A1	A2	A3
Abiotic depletion kg Sb eq	4.84E-03	7.07E-06	2.18E-06	4.33E-03	7.07E-06	1.52E-06	3.41E-03	7.07E-06	2.18E-06
Abiotic depletion (fossil fuels) MJ	1.02E+03	4.79E+01	7.19E+01	7.09E+02	4.79E+01	9.35E+01	4.39E+02	4.79E+01	7.14E+01
Global warming (GWP100a) kg CO_2 eq	6.81E+01	3.09E+00	3.73E+00	4.99E+01	3.09E+00	4.16E+00	3.39E+01	3.09E+00	3.75E+00
Ozone layer depletion (ODP) kg CFC-11 eq	2.69E-06	5.43E-07	1.32E-07	1.88E-06	5.43E-07	1.32E-07	1.71E-06	5.43E-07	1.37E-07
Photochemical oxidation kg C_2H_4 eq	2.79E-02	1.00E-03	1.28E-03	2.20E-02	1.00E-03	1.35E-03	1.63E-02	1.00E-03	1.28E-03
Acidification kg SO_2 eq	3.31E-01	2.91E-02	1.99E-02	2.43E-01	2.91E-02	1.97E-02	1.75E-01	2.91E-02	2.04E-02
Eutrophication kg PO_4^{3-} eq	1.42E-01	4.51E-03	3.44E-03	1.16E-01	4.51E-03	3.66E-03	8.89E-02	4.51E-03	3.56E+00

6.2.5 Water Scarcity potential

In the following table is shown the water scarcity per group or Independent panel.

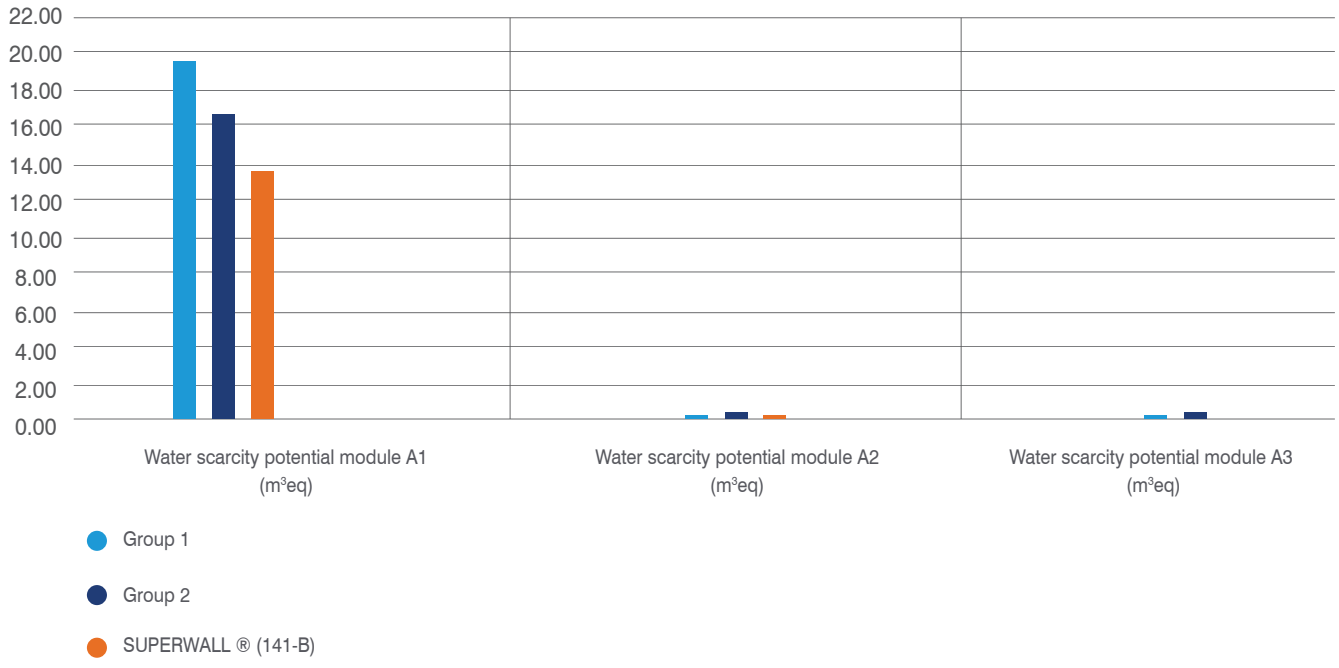


Table 15. Water scarcity potential

TYPE OF PANEL	Water scarcity potential module A1 (m^3eq)	Water scarcity potential module A2 (m^3eq)	Water scarcity potential module A3) (m^3eq)
Group 1	19.66	0.11	0.12
Group 2	16.60	0.21	0.30
SUPERWALL® (141-B)	13.60	0.13	0.00

6.3 Waste Generation

Parameters describing hazardous, non-hazardous and radioactive waste were calculated using EDIP.

Table 16. Waste Production

Parameter	Unit	Group 1			Group 2			Group 3		
		A1	A2	A3	A1	A2	A3	A1	A2	A3
Hazardous waste	kg	4.13E-03	2.78E-05	1.88E-05	3.75E-03	2.78E-05	1.86E-05	2.86E-03	2.78E-05	1.97E-05
Non hazardous waste	kg	1.17E+01	1.54E+00	1.24E-01	1.04E+01	1.54E+00	1.21E-01	8.15E+00	1.54E+00	1.22E-01
Radioactive waste*	kg	7.12E-04	3.09E-04	6.52E-05	6.04E-04	3.09E-04	6.09E-05	5.09E-04	3.09E-04	7.77E-05

*No radioactive waste is produced during METECNO operation.

6.4 Interpretation

1. The global warming potential impact is dominated by modules (A1) and (A2) for each of the groups and individual panel analyzed.

2. The A1 module is the main contributor in all environmental impact categories analyzed.

3. In the raw material module (A1), for all the considered groups galvanized steel production is the major contributor for each of the environmental impact categories.

4. The contribution of the transportation stage (A2) to global warming and Ozone layer depletion (ODP) is greater than the contribution generated by the manufacturing module (A3) and originated from fuel combustion.

5. The manufacturing stage (A3) is a significant contributor to Abiotic depletion (fossil fuels), due to the use of energy and fossil fuels for the panels' manufacture.

7. Verification and registration

Programme:	International EPD® System www.environdec.com EPD registered through the fully aligned regional programme/hub: EPD Latin America www.epd-americalatina.com
Programme operator:	EPD International AB / Box 210 60 / SE-100 31 Stockholm, Sweden EPD Latin America / Chile: Alonso de Ercilla 2996, Ñuñoa, Santiago Chile. Mexico: Av. Convento de Actopan 24 Int. 7A, Colonia Jardines de Santa Mónica, Tlalnepantla de Baz, Estado de México, México, C.P. 54050
EPD registration number:	S-P-01232
Date of publication (issue):	2019-08-29
Date of validity:	2024-07-29
Date of revision:	2019-07-30
Reference year of data:	2015
Geographical scope:	Mexico
Product Category Rules (PCR):	PRODUCT GROUP: UN CPC 4299, 4357, 4394, 4931, 4954, FABRICATED PRODUCTS MADE OUT OF METAL COMPOSITE MATERIAL (MCM), registration no: 2015:04, publication date 2015-08-19, version 1.0. International EPD System
PCR review was conducted by:	The Technical Committee of the International EPD®. System. Chair: Massimo Marino. Contact via info@environdec.com
Independent verification of the declaration data, according to ISO 14025:2006.	☐ EPD process certification (Internal) ☑ EPD verification (External)
Third-party verifier and critical reviewer of the LCA:	Dr. Pablo Alejandro Arena aparena@gmail.com
Approved by:	The International EPD® System
Procedure for follow-up of data during EPD validity involves third-party verifier:	☐ Yes ☑ No
LCA:	This environmental product declaration was carried out based on the Life Cycle Assesment study of Insulated metal sandwich panels for walls, ceilings, and roofings. (CADIS; Claudia Luque; Andrés Martínez; Juan Pablo Chargoy, 2018)

8. Additional environmental information

8.1 Environmental positive contribution (foaming agent substitution)

After carrying out the Life Cycle Assessment of each of the panels, it is important to note that the foaming agent Cyclopentane decreases the environmental impact in all the impact categories compared to foaming agent 141B.

The cyclopentane used as a foaming agent to produce polyurethane is present in liquid form at room temperature and its properties are very similar due to its composition with the butane or hexane.

The main reasons for this type of change to occur in the industry is because the use of R-11 (CFC-11) as an expanding agent is forbidden globally due to its high ODP (depletion potential of the ozone layer), replacing it by R-141B (an HCFC) that under the Montreal Protocol in Article 5, states that developing countries can still use it; while for developed countries, only the use of a substance with zero ODP is valid, which may be an HFC such as R-245fa or an HC such as cyclopentane. (Mundo HVACR, 2011)

METECNO begins to include cyclopentane in some of its products, with the firm purpose of collaborating with the protection of the ozone layer and preserving the environment free of HCFCs (hydrochlorofluorocarbons), responsible to a large extent for the ozone layer depletion and are the gases with high global warming potential.

8.2 Certifications

The company has the following certifications:

9. Contact information

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Assesment study of Insulated metal sandwich panels for walls, ceilings, and roofings.
(CADIS; Claudia Luque; Andrés Martínez; Juan Pablo Chargoy, 2018)

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• ISO 14040:2006 Environmental management -- Life cycle assessment -- Principles and framework.

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