



Environmental Product Declaration STACBOND COMPOSITE PANELS FOR FACADES

Version 1.0

PCR 2012:01 Construction Products and Construction Services (Version 2.2)

CPC 314 BOARDS AND PANELS



STAC

COMPANY: SISTEMAS TÉCNICOS DEL ACCESORIO Y COMPONENTES S.L.
WEBSITE: WWW.STAC.ES

EPD®

REGISTRY NUMBER: S-P-01289
REVISION DATES: 11th May, 2018
VALID TO: 7th May, 2023



REVISION DATES: 00000712

This Environmental Product Declaration (EPD) has been produced in accordance with ISO 14025 and EN 15804 regulations.
The scope of this EPD is international.

THE COMPANY AND ITS COMMITMENT TO THE ENVIRONMENT

Sistemas Técnicos del Accesorio y Componentes S. L. (STAC), is a company which specialises in the manufacture of products for the aluminium window and door industry.

Across its 5 separate divisions, STAC is meticulous in all aspects of the design of their products and attempts to respond to the quality and innovation demands of the modern-day market. For this, STAC boasts some of the best facilities for the various manufacturing lines and a highly-skilled team of technical experts, as well as their vast experience which has seen the company become one of the market leaders in the sector. The different divisions are:

- ✓ STAC – manufacture of hardware and accessories
- ✓ STAC Pol – manufacture of extruded and co-extruded polymer profiles
- ✓ STAC Mid – manufacture of polyamide profiles
- ✓ STAC Bond – manufacture of composite panels

STACBOND® is a worldwide benchmark brand in ventilated facade production. STAC has been developing products for aluminium profile systems and curtain walls, as well as polyamide profiles and seals, since 2001. Since 2008, as part of their continuing desire for growth and innovation, STAC has been designing and producing their own construction systems for the installation of architectural facades using STACBOND® Composite Panels. These are very high quality panels which offer a multitude of design possibilities thanks to their versatility and excellent physical and mechanical properties.

In the design process, STAC optimises all materials to achieve products which are simple, long-lasting, aesthetically pleasing and functional.

We continually study and improve our packaging to optimize transport volumes. This philosophy allows us to obtain savings and reduce transport costs, achieving greater cost efficiency and lowering our environmental impact.

We use 100% recyclable materials in the design of our products, including: zamak alloys, extruded aluminium, technical polymers (polyamides, polyethylenes, etc.), aluminium for injection moulding, stainless steel.

STAC considers the life cycle of their products right from the drawing board.

The company is ISO 14001:2015 certified, the international environmental management system regulations.



Fig. 1. STAC's ISO 14001 Certification

PRODUCT DESCRIPTIONS

The STACBOND® Composite Panel is composed of two sheets of aluminium with a fused thermoplastic resin core. They are lacquered with the highest quality paint -PVDF Kynar® 500 70/30 (polyvinylidene fluoride) which provides the highest level of ageing resistance. The manufacturing process for STACBOND® Composite Panels is verified by a strict system of testing and quality control. The panels can be employed in a wide range of applications, including:

- ✓ Ventilated facades.
- ✓ Roofing and suspended ceilings.
- ✓ Balconies and overhangs.
- ✓ External doors, entrances and awnings.
- ✓ Street furniture.
- ✓ All kinds of exterior facilities.
- ✓ Industrial applications (automotive industry, railways, furnishings, bodywork, etc.)

STACBOND® PE Aluminium Composite Panel

The STACBOND® PE panel has a thermoplastic resin core (low density polyethylene from 100% recycled sources) and have excellent mechanical properties, high level of acoustic insulation, high impact resistance, greater rigidity and reduced weight. The level of recycled aluminium used in these panels varies depending on supplier.

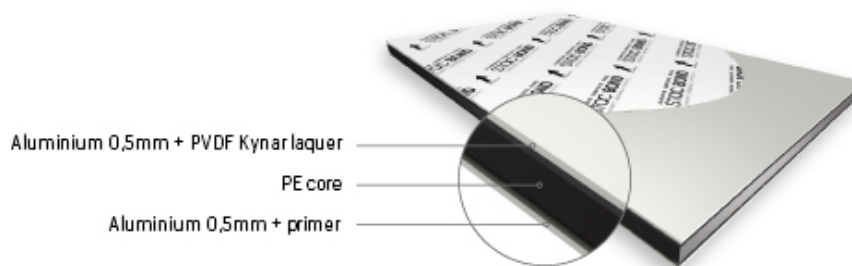


Fig. 2. Section of STACBOND® PE.

Components: 1 m2 STACBOND®PE Aluminium Composite Panel, 4 mm thickness

Component	Hazard	CASRN	% of weight
Polyethylene	N/A	9002-88-4	30-50 %
Aluminium	N/A	7429-90-5	30-50%
PVDF coating	N/A	24937-79-9	1-6%
Adhesive	R: 43	61788-97-4	2-7%
Primer	R: 21/44	113669-97-9 108-78-1	1-3%
Other components	H315/318/335	Various	1-3%

*The exact % of weight is not stated as this is considered confidential information.
The components listed as "other components" are confidential information.*

STACBOND®FR Aluminium Composite Panel

The STACBOND® FR panel has been designed to comply with the most demanding current fire safety regulations. The thermoplastic resin core (low density polyethylene + fire retardant) is classified as B-S1, d0 in accordance with UNE-EN-13501-1:2007+A1:2010 regulations. This panel is one of the most fire resistant panels available on the market. The level of recycled aluminium used in these panels varies depending on supplier.

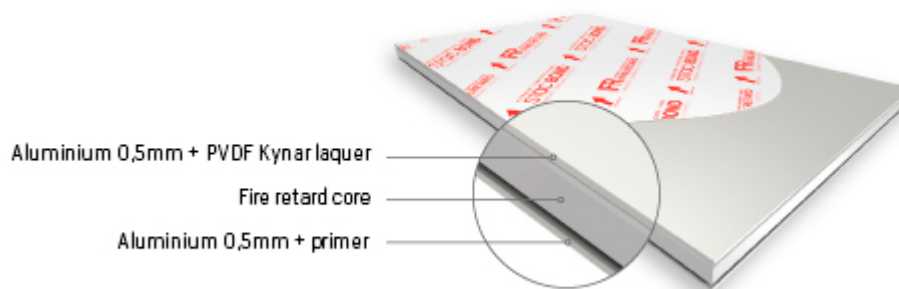


Fig. 3. Section of STACBOND® FR.

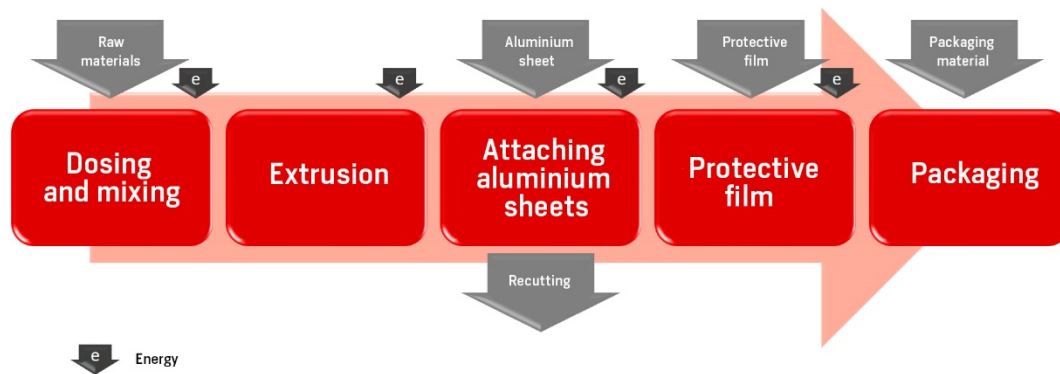
Components: 1 m2 STACBOND®FR Aluminium Composite Panel, 4 mm thickness

Component	Hazard	CASRN	% of weight
Polyethylene	N/A	9002-88-4	10-30%
Aluminium	N/A	7429-90-5	20-50%
PVDF coating	N/A	24937-79-9	1-7%
Adhesive	R: 43	61788-97-4	2-8%
Primer	R: 21/44	113669-97-9 108-78-1	1-5%
Other components	R: 36/37/38 S: 26-36 H:315/318/335	Various	30-60%

*The exact % of weight is not stated as this is considered confidential information.
The components listed as "other components" are confidential information.*

DESCRIPTION OF THE PROCESS STAGES

The products analysed are STACBOND® PE Aluminium and STACBOND® FR (Fire Retard) Aluminium. The manufacturing process of the two products is similar and follows the flow diagram below:



ENVIRONMENTAL BEHAVIOUR CALCULATION FOR STACBOND COMPOSITE PANELS

The environmental impact of STACBOND panels was analysed in accordance with international regulations established for EPDs, such as ISO 14025 for the implementation of the environmental product declaration, ISO 14040 and ISO 14044 for the performance of life-cycle assessment, UNE-EN 15804: 2012 and the Product Category Rules "PCR 2012:01 Construction Products and Construction Services (Version 2.2) of CPC group 314; from Environdec.

The software used for the life-cycle assessment was SimaPro and the database was Ecoinvent. The methodology used for calculating impact values was CML IA V. 4.8 (August 2016) and EDIP.

SYSTEM LIMITS AND DATA QUALITY

The system limits established in this EPD are defined following the directives of UNE-EN 15804:2012 and document PCR 2012:01 for Construction Products and Services. This PCR states that in the case that a more specific product category rule which establishes the scope does not exist, the mandatory scope of the EPD will be "Cradle to Gate", thus the construction (A4-A5), use (scenarios B1-B7), end of life (scenarios C1-C4) and reuse/recycling (scenario D) remain outside the scope of the study. Therefore, the scope considered for the STACBOND panels is the following:

Product Stage			Construction Stage		Use Stage							End of Life				Resource recovery
Raw materials	Transport	Manufacturing	Transport	Construction	Use	Maintenance	Repair	Replacement	Renovation	Energy use	Water use	Deconstruction and demolition	Transport	Waste Management	Disposal	Reuse, recovery, recycling
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

X = included in EPD; MND = module no declared in EPD

Product Stage:

A1) Raw materials supply

- ✓ Extraction and processing of raw materials and recycling processes of materials from recycled waste streams from a previous product system (Does not include the treatment processes of waste outside recycling as such).
- ✓ Generation of electricity, steam and heat from primary energy sources, including their extraction, refining and transport.
- ✓ Energy recovery from secondary fuels.

A2) Transport:

- ✓ External and internal transport of raw materials to factory.

A3) Manufacture:

- ✓ *Manufacture of the product subject to analysis: consumption of energy and materials.*
- ✓ *Packaging materials (where relevant)*
- ✓ *Treatment of waste generated during the manufacturing process.*

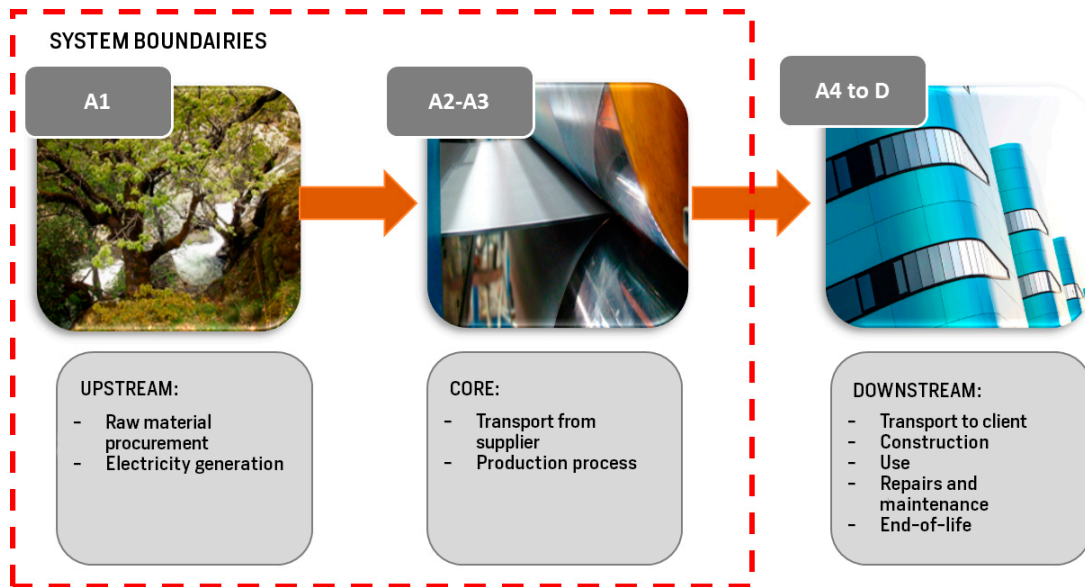


Fig. 4. System limits

All the data used to produce the Inventory of the Life Cycle were obtained during 2016 and are representative of the different processes employed for the manufacture of their products.

CUT-OFF CRITERIA AND LOAD ASSIGNMENT

ISO 14025 (specifically PCR 2012:01) for construction products and services allow cut-off criteria for inventory data.

Although PCR 2012: 01 allows flows (inputs or outputs) whose sum environmental impact is less than 1% of the total, measured in units of GWP or energy consumption, can be excluded from the life cycle inventory, in this study, no cut-off criteria of this type have been taken into account, except for the transport of the pallets on which the raw material arrives and which are subsequently reused. Furthermore, this study has not included the on-site commissioning of materials, nor the use stage or end-of-life stage.

As for load assignment, it was not necessary to assign any load between products and co-products. However, load assignments were made to allocate raw materials, energy and waste inventories to the functional unit of the study.

ESTIMATIONS

Various points relating to the scope and limits of the system need to be specified:

- The manufacturing processes for capital equipment, replacement parts and / or maintenance items with a life cycle over three years were not included.
- Impact caused by people (their work, commuting, etc.) was not taken into consideration.
- The processes associated with the production of fuels are intrinsically included in the indicators of the ECOINVENT database used in the realization of the LCA.
- The environmental impact of external transport was calculated for wagons in the ECOINVENT 3.2 database. These wagons were chosen to produce the most realistic scenario possible.
- The electricity source mix used was taken from Iberdrola's 2016 data.

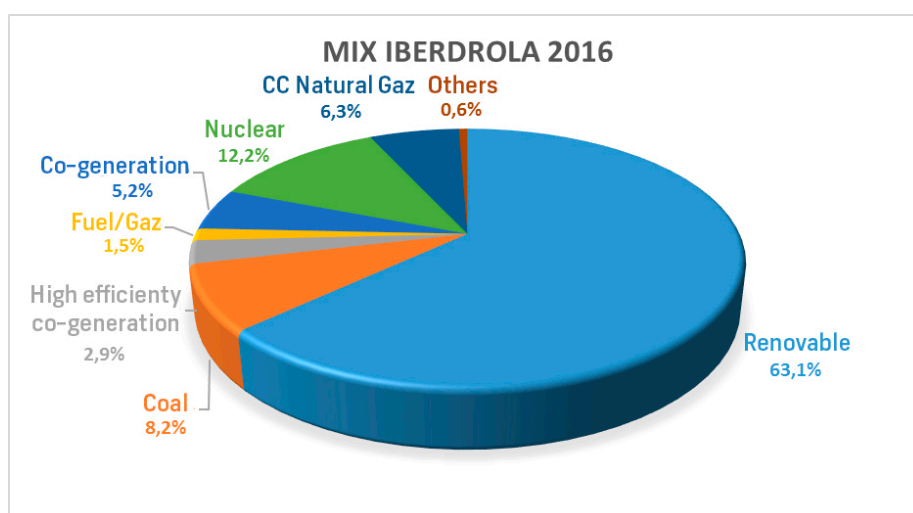


Fig. 5. Iberdrola Energy Source Mix 2016

ENVIRONMENTAL PROFILE

Below are the environmental profile and other indicators for the following declared units:

Declared Units:

**"1 m2 STACBOND®PE Aluminium Composite Panel, 4 mm thickness"
and
"1 m2 STACBOND®FR (Fire Retard) Aluminium Composite Panel, 4 mm thickness"**

These indicators were calculated in accordance with PCR 2012:01 for construction products and services:

Environmental Impact: 1 m2 STACBOND®PE Aluminium Composite Panel, 4 mm thickness

IMPACT CATEGORY	Raw Mat. Procurement [A1]	Transport [A2]	Manufacturing [A3]	TOTAL
Global warming potential (100 years) [kg CO ₂ eq]	1.88E+01	2.39E+00	5.35E-02	2.12E+01
Ozone layer depletion [kg CFC-11 eq]	8.65E-07	4.24E-07	8.01E-09	1.30E-06
Acidification [kg SO ₂ eq]	1.10E-01	7.78E-03	1.32E-04	1.18E-01
Eutrophication [kg PO ₄ ³⁻ eq]	3.14E-02	1.79E-03	8.87E-05	3.33E-02
Photochemical oxidation [kg C ₂ H ₄ eq.]	6.07E-03	4.07E-04	1.22E-05	6.48E-03
Exhaustion of abiotic resources (elements) [kg Sb eq]	8.40E-04	9.24E-06	3.65E-08	8.50E-04
Exhaustion of abiotic resources (fossil fuels)[MJ]	2.06E+02	3.73E+01	6.77E-01	2.44E+02

Waste: 1 m2 STACBOND®PE Aluminium Composite Panel, 4 mm thickness

WASTE DISPOSAL	Raw Mat. Procurement [A1]	Transport [A2]	Manufacturing [A3]	TOTAL
Hazardous waste [kg]	9.70E-03	2.43E-05	3.08E-07	9.73E-03
Non-hazardous waste [kg]	1.88E+00	1.37E+00	2.52E-02	3.27E+00
Radioactive waste [Kg]	5.60E-04	2.41E-04	4.54E-06	8.05E-04

Use of resources: 1 m2 STACBOND®PE Aluminium Composite Panel, 4 mm thickness

PARAMETERS FOR USE OF RESOURCES	Raw Mat. Procurement [A1]	Transport [A2]	Manufacturing [A3]	TOTAL
Use of renewable primary energy excluding renewable primary energy used as a raw material [MJ]	4.91E+01	4.93E-01	5.33E-03	4.96E+01
Use of renewable primary energy used as a raw material [MJ]	3.50E+00	0.00E+00	0.00E+00	3.50E+00
Total renewable primary energy resources (primary energy and primary energy used as a raw material) [MJ]	3.50E+00	0.00E+00	0.00E+00	3.50E+00
Use of non-renewable primary energy excluding non-renewable primary energy used as a raw material [MJ]	2.51E+02	3.83E+01	6.92E-01	2.90E+02
Use of non-renewable primary energy used as a raw material [MJ]	1.71E+02	0.00E+00	0.00E+00	1.71E+02
Total non-renewable primary energy resources (primary energy and primary energy used as a raw material) [MJ]	4.22E+02	3.83E+01	6.92E-01	4.61E+02
Use of secondary materials [Kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00

PARAMETERS FOR USE OF RESOURCES	Raw Mat. Procurement [A1]	Transport [A2]	Manufacturing [A3]	TOTAL
Use of non-renewable secondary fuels [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net fresh water usage [m3]	5.72E-05	4.87E-05	8.44E-06	4.57E-08

Environmental Impact: 1 m2 STACBOND® FR Aluminium Composite Panel, 4 mm thickness

IMPACT CATEGORY	Raw Mat. Procurement [A1]	Transport [A2]	Manufacturing [A3]	TOTAL
Global warming potential (100 years) [kg CO2 eq]	2.38E+01	2.80E+00	5.86E-02	2.67E+01
Ozone layer depletion [kg CFC-11 eq]	8.55E-07	4.96E-07	8.77E-09	1.36E-06
Acidification [kg SO2 eq]	1.22E-01	9.10E-03	1.45E-04	1.31E-01
Eutrophication [kg PO4 3-eq]	3.45E-02	2.09E-03	9.72E-05	3.66E-02
Photochemical oxidation [kg C2H4 eq.]	6.97E-03	4.76E-04	1.34E-05	7.46E-03
Exhaustion of abiotic resources (elements) [kg Sb eq]	8.40E-04	1.08E-05	4.00E-08	8.51E-04
Exhaustion of abiotic resources (fossil fuels)[MJ]	3.03E+02	4.36E+01	7.41E-01	3.48E+02

Waste: 1 m2 STACBOND® FR Aluminium Composite Panel, 4 mm thickness

WASTE DISPOSAL	Raw Mat. Procurement [A1]	Transport [A2]	Manufacturing [A3]	TOTAL
Hazardous waste [kg]	9.84E-03	2.84E-05	3.38E-07	9.87E-03
Non-hazardous waste [kg]	1.91E+00	1.60E+00	2.77E-02	3.54E+00
Radioactive waste [Kg]	5.51E-04	2.81E-04	4.97E-06	8.37E-04

Use of resources: 1 m2 STACBOND® FR Aluminium Composite Panel, 4 mm thickness

PARAMETERS FOR USE OF RESOURCES	Raw Mat. Procurement [A1]	Transport [A2]	Manufacturing [A3]	TOTAL
Use of renewable primary energy excluding renewable primary energy used as a raw material [MJ]	4.86E+01	5.77E-01	5.84E-03	4.91E+01
Use of renewable primary energy used as a raw material [MJ]	5.17E+00	0.00E+00	0.00E+00	5.17E+00
Total renewable primary energy resources (primary energy and primary energy used as a raw material) [MJ]	5.37E+01	5.77E-01	5.84E-03	5.43E+01
Use of non-renewable primary energy excluding non-renewable primary energy used as a raw material [MJ]	3.59E+02	4.48E+01	7.59E-01	4.05E+02
Use of non-renewable primary energy used as a raw material [MJ]	7.84E+01	0.00E+00	0.00E+00	7.84E+01

PARAMETERS FOR USE OF RESOURCES	Raw Mat. Procurement [A1]	Transport [A2]	Manufacturing [A3]	TOTAL
Total non-renewable primary energy resources (primary energy and primary energy used as a raw material) [MJ]	4.38E+02	4.48E+01	7.59E-01	4.83E+02
Use of secondary materials [Kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of non-renewable secondary fuels [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net fresh water usage [m3]	1.14E-04	9.88E-06	5.01E-08	1.23E-04

The data in this declaration remain valid whilst there are no significant changes made to the process under analysis.

This Environmental Product Declaration (EPD) has been produced in accordance with ISO 14025 and EN 15804 regulations.

The scope of this EPD is international.

REFERENCES

- **ISO14040:2006.** Environmental management. Life cycle assessment. Principles and framework.
- **ISO14044:2006.** Environmental management. Life cycle assessment. Requirements and guidelines.
- **ISO 14025:2006:** Environmental labels and declarations. Type III environmental declarations. Principles and procedures.
- **PCR** - "Construction Products and construction services" (PCR 2012:01.) (Version 2.2)
- **EN 15804:2012.** Sustainability of construction works - Environmental product declarations.
- **General Programme Instructions for The International EPD® System (v2.5)**

GENERAL INFORMATION ABOUT THE COMPANY AND ITS SERVICES

For more information about these or any other products, please visit the company website: www.stacbond.es or contact the company via email: acp@stac.es

SUMMARY OF THE ENVIRONMENTAL PRODUCT DECLARATION

STAC, Sistemas Técnicos del Accesorio y Componentes S. L., Technical Systems of Accessory and Components Ltd, is a company that specialises in the manufacturing of products for the aluminium windows and doors sector.

In each of its 5 divisions, STAC adopts absolute precision in design, trying to meet the actual market demands in quality and innovation requirements. Consequently, we retain not only the best facilities, which adapt and adhere to the different production lines, but also a specialized technical team whose vast experience has firmly positioned them as one of leaders in this sector.

In this EPD, the analysed unit are:

- 1m² of composite panel STACBOND®PE Aluminium 4 mm thickness
- 1m² of composite panel STACBOND®FR (Fire Retard) Aluminium 4 mm thickness

The data correspond to the year 2016. The system boundary of present EPD is:

PRODUCT STAGE			CONSTRUCTION PROCESS		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw materials Supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction	Transport	Waste processing	Disposal	Reuse/Recycling/Recovery potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA

(X=Included in the LCA; MNA=Module Not Assessed)

The certification is carried out in accordance with PCR 2012:01: "Product Category Rules for preparing an environmental product declaration for Construction Products and Construction Services" according to the International EPD system. This is a combined PCR, PCR Basic Module and it may be used for Building Products, and Services for an EPD based on a declared unit, with a scope of cradle-to-gate. The environmental impacts of the both declared units are shown in the table below:


1m² of composite panel STACBOND®PE Aluminium 4 mm of thickness

Impact Category	Quantity	Units
Global warming potential (100years)	2.12E+01	kg CO ₂ eq.
Ozone depletion	1.30E-06	kg CFC-11 eq
Acidification of land and water	1.18E-01	kg SO ₂ eq
Eutrophication	3.33E-02	kg PO ₄ ³⁻ eq
Photochemical ozone creation	6.48E-03	kg C ₂ H ₄ eq.
Depletion of abiotic resources (elements)	8.50E-04	kg Sb eq.
Depletion of abiotic resources (fossil)	2.44E+02	MJ

1m2 of composite panel STACBOND®FR Aluminium thickness 4 mm of thickness

Impact Category	Quantity	Units
Global warming potential (100years)	2.67E+01	kg CO ₂ eq.
Ozone depletion	1.36E-06	kg CFC-11 eq
Acidification of land and water	1.31E-01	kg SO ₂ eq
Eutrophication	3.66E-02	kg PO ₄ ³⁻ eq
Photochemical ozone creation	7.46E-03	kg C ₂ H ₄ eq.
Depletion of abiotic resources (elements)	8.51E-04	kg Sb eq.
Depletion of abiotic resources (fossil)	3.48E+02	MJ

For more information about these and other services, visit the website: www.stacbond.es
or contact us via the following email: acp@stac.es

EPD program and operator:	The International EPD® System EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
CEN standard EN 15804 served as the core PCR	
PCR:	PCR 2012:01 Construction products and Construction services, Version 2.2, 2017-05-30
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 and data, according to ISO 14025:	<input type="checkbox"/> EPD process certification (Internal) <input checked="" type="checkbox"/> EPD verification (External)
Third party verifier:	Tecnalia R&I Certificación, SL Auditor: Elisabet Amat eli.amat@tecnaliacertificacion.com
Accredited by:	ENAC nº125/C-PR283 accreditation
<div>  <div> <p>Address: Polígono Industrial Picusa, La Matanza, s/n, Padrón</p> <p>Phone: +34 981 81 70 36</p> <p>Fax: +34 981 81 70 37</p> <p>E-mail: acp@stac.es</p> </div> </div>	

EPDs for construction products are not comparable if they do not comply with the EN 15804 regulations.
The results obtained are not comparable for other product references nor against declaration based on other certification systems.

The scope of this EPD is international.

The program operator and verifier are not liable for any claims made against the product nor for the legality of the product.

More information about the certification system can be found on the Environdec website:
www.environdec.com.