ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804

Owner of the Declaration	**ALUCOIL, S.A.**
Program operator	The International EPD® System
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	S-P-00363
Registration number	MR-ENV-EPD-ACO-20140001-EN
Issue date	15.03.2017
Valid to	15.03.2022

larson pe®-larson fr®
Aluminium composite panel for architectural sector, corporate design applications, automotive and naval sector, among others

Alucoil, S.A.

Registered under the scope of mutual recognition between Institut Bauen und Umwelt e.V. (IBU) and The International EPD® System

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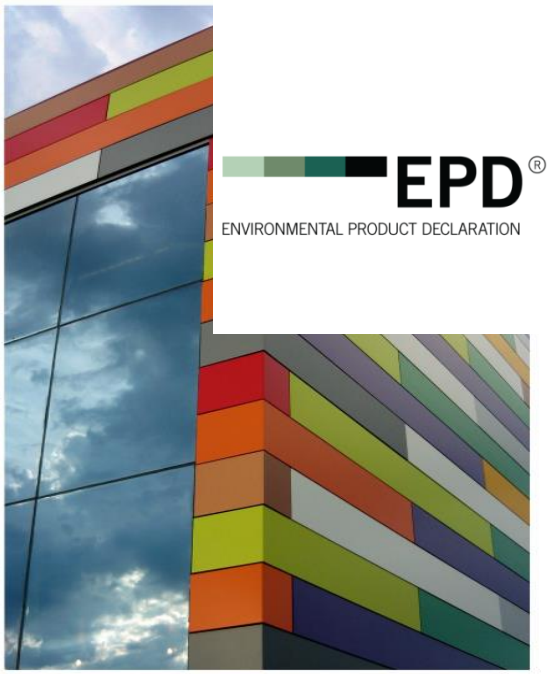
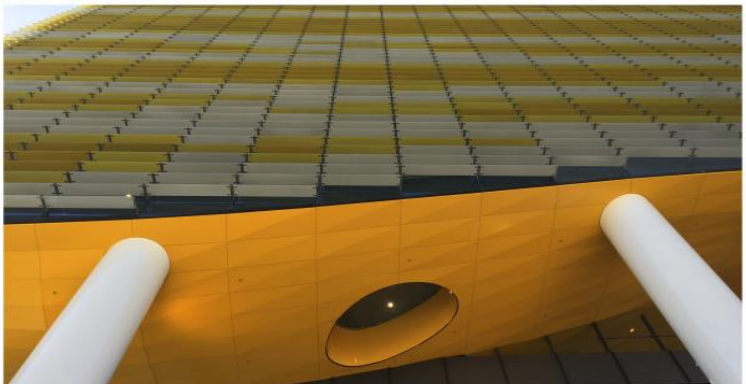
Institut Bauen und Umwelt e.V.

EPD®
ENVIRONMENTAL PRODUCT DECLARATION




  	Summary Environmental Product Declaration
The International EPD® System EPD® THE GREEN YARDSTICK www.environdec.com EPD International AB Box 210 60 SE-100 31 Stockholm Sweden	Program holder
Alucoil, S.A. C/ Ircio Parc. R72 - R77 Pol. Ind. de Bayas 09200 Miranda de Ebro Burgos (SPAIN) Tel: +34 947 333320 Fax: +34 947 324913 / +34 947 331224 www.alucoil.com Alucoil® Grupo Alibérico	Declaration holder
S-P-00363	Declaration number
Aluminium composite panel for use in architecture, automotive, naval and corporate image applications, among others, This declaration is an environmental product declaration according to ISO 14025 and EN 15804:2012+A1 and describes the specific environmental impacts of the building products mentioned. It is intended to foster the sustainable development of environmental and health friendly compatible construction. All relevant environmental data is contained in this validated declaration. The declaration is based on the PCR 2015:04 v1.0.	Declared building products
This validated declaration entitles the use of the logotype of the International EPD® System. This exclusively applies to the mentioned products; five years from the date of issue. The declaration holder is liable for the basic information and verifications.	Validity
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-A3: • Product definition and physical data • Information about raw materials and origin • Specifications on manufacturing the product • Notes on product processing • LCA based on a declared unit, cradle-to-gate • LCA results • Evidence and verifications	Content of the declaration



Summary

Environmental Product Declaration

2014-05-14	Registration date
2017-03-15	Revision date
2022-03-15	Valid until
Lorena Pereda Pereda	Verifier appointed by EPD®System

Signatures

Lorena Pereda Pereda
External EPD Verifier

Raúl Mariscal Díaz de Sarralde
Plant Manager-Alucoil, S.A.

Product description

larson pe® is a composite panel produced by two metal sheets (Aluminium) with a low density polyethylene inside core that lends flatness and lightness to the material.
larson fr® is an innovative composite panel developed by Alucoil using two metal sheets (Aluminium), and a mineral core. The core delays combustion to achieve a B-S1, d0 classification according to the regulations UNE-EN 13501.
In both products, the aluminium front sheet is coated of PVdF 70% Kynar 500 or similar, an anticorrosion pretreatment is included on top and reverse side. The aluminium back sheet is treated to provide the product with a regular and well attached layer which will protect it against corrosion and increase the adherence of the core.

Applications

larson® composite panels are advanced materials for building, transport and industry applications.
larson pe® is especially recommended for new-construction ventilated facade sectors as well as restoration. It allows for ventilated, semi-ventilated or air-tight facades.
larson fr® is the first step of a new composite panel generation with which Alucoil hopes to answer modern architectural needs.

Scope of the LCA

The Life Cycle Assessment (LCA) was performed according to ISO 14040 ff. corresponding to the requirements of the guidelines concerning Type III declarations. Specific industrial data from Alucoil, S.A., data from the data base ecoinvent 3.2 and sector data from GDA (Gesamtverband der Aluminiumindustrie e.V (GDA) are used in this LCA.
The method applied for assessment is CML-IA baseline v4.2 (April 2013) EU25, included in SimaPro software version 8.3.0.

Results of the LCA

Environmental Indicator		larson pe® A1-A3	larson fr® A1-A3
Global warming (GWP100)	kg CO2 eq	34.5	36.9
Ozone layer depletion (ODP)	kg CFC-11 eq	1.02E-06	1.29E-06
Acidification (AP)	kg SO2 eq	0.169	0.173
Eutrophication (EP)	kg PO4- eq	0.0103	0.0142
Photochemical oxidation (POCP)	kg C2H2 eq	9.87E-03	1.03E-03
Abiotic depletion (elements)	kg Sb eq	1.49E-05	1.46E-05
Abiotic depletion (fossil)	MJ	521	466

Issued by: Alucoil, S.A.

Evidence and verifications

The Environmental Product Declaration gives evidence of the validation of the used data. Data quality requirements are declared.
Furthermore, specific applied chemical substances are declared in accordance with Regulation (EC) n ° 1907/2006.

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1. PRODUCT RELATED INFORMATION

1.1 SPECIFICATION OF THE MANUFACTURING COMPANY

ALUCOIL is a Spanish multinational company, with headquarters in Miranda de Ebro (Burgos-SPAIN), and part of the Alibérico Group – specialist s in the transformation and manufacture of advanced materials for building, transport and industry applications. ALUCOIL, with four modern factories in four continents (Europe, Africa, America & Oceania), is a high-tech company, innovative and growth-orientated, whose cutting-edge production lines turn out the latest innovative products. ALUCOIL has been since 1996 manufacturing and transforming high-tech aluminium materials for building and construction, with more than 40 years of know-how in the aluminium field.

The ALUCOIL global product line is spread over five business units:

- Powder Coating of aluminum sheet & coil for protective and decorative applications under the brands of termolac ® and durolac ®.
- Top Quality ACM – aluminum Composite Panels commercialized internationally under the renowned brands larson ® and signi ® for architectural wall cladding and corporate image design. Metal composite options are also available in Stainless Steel, Copper, Zinc and Anodized Aluminum.
- Almirr ®: multi-laminate aluminum mirror panels, external grade, for concentrated solar panel arrays and building architecture accents.
- larcore ®: lightweight aluminum honeycomb panels. Continuous process manufactured, available up to 78.75″ wide (2 meters) and in custom lengths, it is ideal as a structural wall panel for buildings, elevators, buses, ferries, RV’ s, and high speed trains.
- anolac ®: Corrugated aluminum sheets for roofing, walls, accent coverings, and enclosures for roofing, walls, and enclosures.

Picture 1: Facilities of Alucoil, S.A. in Miranda de Ebro. Source: Alucoil S.A.

Starting in 1987, the Alibérico Group is an industrial and technological leader in the aluminium sector. It has grown through acquisition and creation of new businesses, becoming today a consolidated corporate structure comprising of 35 companies with factories in Spain, Portugal, Belgium, UK and Germany, commercial offices in Spain, France, Italy, Portugal, Germany, Poland, Croatia and Morocco as well as distributor warehouses throughout Europe and North Africa.

At Alibérico, we have an international calling, exporting 60% of our production to 45 countries on five continents, with the support of our own sales offices.

The Alibérico Group is an industrial and technological group very diversified in terms of product range, the sectors it serves and geographic markets where it is present.

The Group has factories in Spain, Germany and Portugal, and sales offices in the major European Union countries and is organized in 6 areas of business.

- Coating: Coating and anodizing coils, sheets, aluminium and steel profiles and accessories.
- Building: Composite and honeycomb panels in all types of metals. Shaped and formed metal.
- Transport: Aluminium Honeycomb Panels, for the construction of trucks, buses, and high-speed trains and ferries.
- Foil: Coating and printing of aluminium foil.
- Packaging: Containers, packaging and household rolls of plastic and aluminium.
- Distribution: Marketing of semi-transformed aluminium products.

Picture 2: Distribution of Alucoil industrial plants. Source: Alucoil S.A.

1.2 SPECIFICATION OF THE PRODUCT

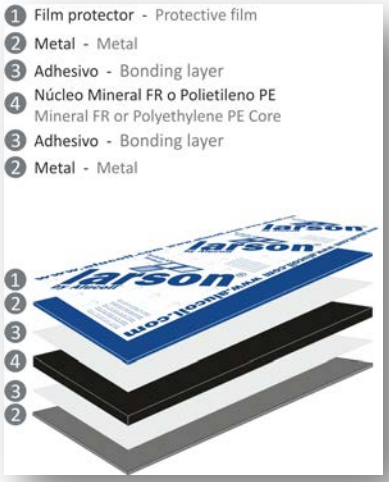
Scope of validity: This document applies to all aluminium composite panels pe® and larson fr® manufactured by Alucoil, S.A. in the plant located in Miranda de Ebro (Burgos). Data for all products has been used to develop the Environmental Product Declaration.

UN-CPC code: 4299, 4357, 4394, 4931 and 4954.

Picture 3 shows the product concept under study.

The process flow diagram under study is displayed in **Figure 1**.

This EPD is intended to be used is in a Business to Business (B2B) communication.



Picture 3: Aluminium composite panel larson pe ® and larson fr®. Source: Alucoil, S.A.

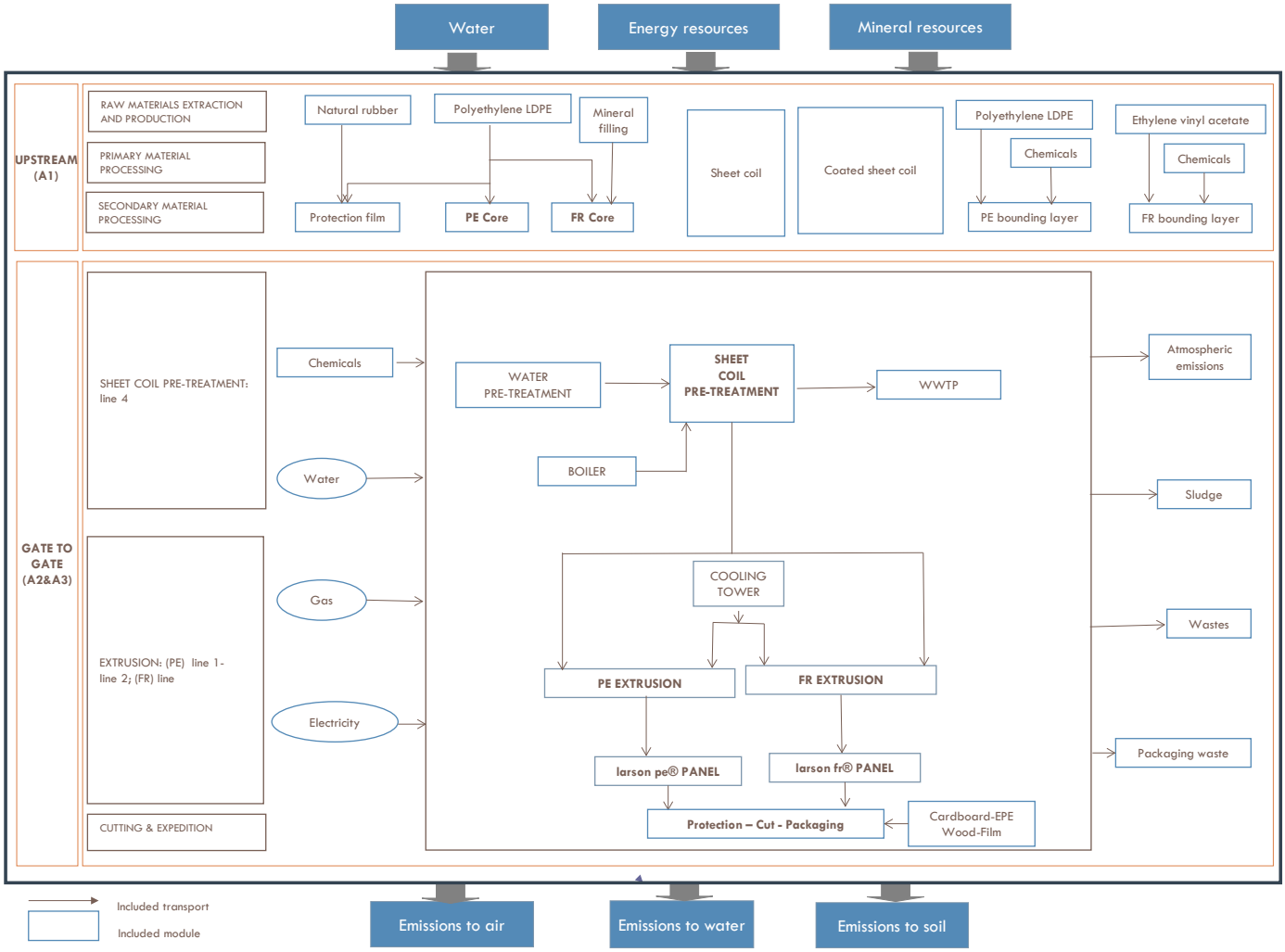


Figure 1: System boundaries of the products larson pe® and larson fr®. Source: Alucoil, S.A.

Product definition

The products are composite panels or sandwich panels of various dimensions made of two aluminium sheets, which are joined together by a thermoplastic resin polyethylene (PE) core or a mineral (FR) core.

Aluminium front sheet: it is coated of PVdF 70% Kynar 500 or similar. Both sides require anticorrosion pretreatment to facilitate the adherence and a primer layer.

Aluminium back sheet: it is treated to provide the product with a regular and well attached layer which will protect it against corrosion and increase the adherence of the core.

Application

Building: ventilated facade elements, roofing, cladding, partition walls, curved elements; automotive and naval sector; and corporate design applications, among others.

larson fr® delays combustion to achieve a B-S1, d0 classification according to the regulations UNE-EN 13501.

larson® panels are manufactured by a sophisticated process which gives them an extraordinary strength, the double than the normal standard requires for these types of union.

The advanced production process for larson® composites results in an extraordinary adherence between the different layers. The results of tests performed on all the products have doubled the parameters recommended by the current regulations. Thanks to the perfect assembly between the different parts, larson® panels offer an extraordinary flatness and lightness: They also have five-six possible installation system.

larson® panels provide an excellent capability for to be machined, drilled, bent and curved without losing their technical characteristics.

Product certifications

Management certifications

ER-0726/2011

GA-2011/0356

Delivery status

larson® panels are manufactured in different dimensional specifications which are indicated in the Product Technical Notebook and on request.

Constructional data

Table 1: Technical data of larson® panels

	larson pe®	larson fr®
Panel weight (kg/m²)	5.56	7.78
Moment of inertia (cm⁴/m)	0.263 DIN 53293	0.307 DIN 53293
Core	LDPE (Low Density Polyethylene)	Mineral FR
Rigidity E^{-1} (kNcm²/m)	1 846 DIN 53293	2 150 DIN 53293
Modulus of elasticity (N/mm²)	70 000	70 000
Ultimate tensile strength (N/mm²)	$125<R_m<140$	125<Rm<140
Yield strength (N/mm²)	$80<R_{p0.2}<120$	$80<R_{p0.2}<120$
Elongation (%)	>7	>7
Alloy	5005 UNE-EN 573-3	5005 UNE-EN 573-3
Audible reduction (dB)	28 UNE-EN ISO 7171	31 UNE-EN ISO 7171
Thermal resistance (m²K/W)	0.0125 UNE 92-202-89:1989	0.0126 UNE 92-202-89:1989
Thermal conductivity (W/mK)	0.32 UNE 92-202-89:1989	0.317 UNE 92-202-89:1989
Temperature resistance T^a (°C)	-50/+80	-50/+80
Reaction to fire test	M1 UNE 23717-NF P92-501	B-s1, d0 UNE EN 13501

1.3 DECLARED UNIT

Declared Unit

1 square metre (1m²) of aluminium composite panel larson pe® and larson fr® with standard dimensions: 5 000 mm length; 1 500 mm width; 4 mm thickness, and with a weight of 5.56 y 7.78 kg/m², respectively.

1.4 CONTENT OF MATERIAL AND CHEMICAL SUBSTANCES

Table 2: Materials content per larson pe® panel. Source: Alucoil, S.A.

CONTENT OF MATERIAL AND CHEMICAL SUBSTANCES				larson pe®	
ALL MATERIALS/ COMPONENTS	SUBSTANCES	kg/m²	%	ENVIONMENTAL CLASS	HEALTH CLASS
Protective film	Polyethylene & natural rubber	0.09	2	no	no
Front sheet (metal)	Aluminium 5005 coated sheet coil	1.33	23	no	no
Back sheet (metal)	Aluminium 5005 sheet coil	1.31	23	no	no
Core material	Polyethylene LDPE	2.79	49	no	no
Bounding layer	Polyethylene (resin)	0.160	3	no	no
			100	According to SDS	According to SDS

Table 3: Materials content per larson fr® panel. Source: Alucoil, S.A.

CONTENT OF MATERIAL AND CHEMICAL SUBSTANCES				larson fr®	
ALL MATERIALS/ COMPONENTS	SUBSTANCES	kg/m²	%	ENVIONMENTAL CLASS	HEALTH CLASS
Protective film	Polyethylene & natural rubber	0.09	1	no	no
Front sheet (metal)	Aluminium 5005 I coated sheet coil	1.33	17	no	no
Back sheet (metal)	Aluminium 5005 sheet coil	1.31	17	no	no
Core Material	Polyethylene LDPE & mineral	5.00	63	no	no
Bounding layer	Polyethylene (resin)	0.163	2	no	no
			100	According to SDS	According to SDS

SVHC List

larson® panels do not contain any substance included in the Candidate List of Substances of Very High Concern (SVHC) in concentrations greater than 0.1% by weight.

2. ENVIRONMENTAL PERFORMANCE– RELATED INFORMATION

2.1 RULES FOR DELCARING INFORMATION PER MODULE DERIVED FROM LCA

This EPD is based on information modules that do not cover the aspects of construction stage (A4-A5), use stage (B1-B7), end of life stage (C1-C4) nor additional information (D). It is a "***cradle to gate***" EPD. It contains in detailed form, for Module A1-A2-A3:

Module A1

Upstream processes, from cradle to gate. The acquisition, production of the sheet coil and the coated sheet coil, core materials, bounding layer and protective film are included in Module A1.

Module A2

The module A2 includes external transportation to the core process and external transport to waste disposal (in the case of waste outflows). A geographical mix for different suppliers or waste managers is evaluated in the module A2.

Module A3

From gate to gate, manufacturing process of larson pe® and larson fr® panels. This process starts when the components and materials come into the Alucoil´s facilities and finishes when the larson® panels leave the plant. The module A3 includes the pre-treatment of the sheet coil, the extrusion of panels, the production of chemicals, energy flows: natural gas and electricity, emission into air, solid and water wastes and packing materials used for the finished panels.

Modular scope and unit processes studied within the system boundaries are showed in **Figure 1**.

2.2 ENVIRONMENTAL PERFORMANCE DECLARATION –MINIMUM SET OF PARAMETERS FROM THE LCA STUDY

The unit processes studied in each module A1-A2-A3 are displayed in **Figure 1**.

Allocation

The area of pre-treated sheet coil (square metre) was selected as physical property to separate the inputs and outputs associated with the sub-process "aluminium coil pretreatment" of larson®

panels from the flows linked to the rest of panels. Moreover, m2 of finished aluminium composite panel (monitored/checked product) is used to evaluate the production losses. No allocation has been required for the extrusion process of Line 1-Line 2 –Line FR, because these processes generate only one type of panel.

Cut-off criteria

There has been no cut-off conducted within Module A1. In Module A3, 96% of total material inflows are included, 99% of total material outflows are considered and 100% of the energy inflows are studied. The cut off criteria exclude from this assessment material and energy flows that contribute equal or less that 0.7%.

Data quality

The data are collected by Alucoil for the production year 2015 (specific operations of the analysed site). There is a contribution of 5% (6 vs 94) of secondary data in the Module A3. The environmental impact of the secondary data is minor than 0.05% on GWP and energy.

Secondary/background data to account for the production of base materials used in the manufacturing process as well as energy consumption have been taken from ecoinvent 3.2 (March 2016.), and GDA (Gesamtverband der Aluminiumindustrie e.V (GDA) for coated sheet coils (EPD-GDA-20130259-IBG1-EN, 18/11/2013), sheet coils (EPD-GDA-20130258-IBG1-EN, 18/11/2013) and wooden pallet and tape for the packaging (EPD-STE-20150327-IBD1-EN, 05/02/2016).

Electricity

Spanish power grid mix was used for the larson® panel site. The basic data in ecoinvent 3.2 was applied for electricity; this dataset describes the electricity inputs produced in Spain and from imports, as well as the transmission and distribution of electricity.

Assumptions

No credits are supplied for the metal content in Aluminium sheet coil. The data set from declaration number EPD-GDA-20130258-IBG1-EN and EPD-GDA-20130259-IBG1-EN were applied (A1-A3).

Transports

Transport of base materials, pre-products, ancillary products and wastes has been taken into account in Module A2. “Transport, freight, lorry, unspecified {RER}| size-specific lorry transport to generic market for lorry transport | Alloc Def, U (from ecoinvent 3.2).

Provincial capitals were selected as representative locations in national road transport, country capitals were selected as representative locations in international road transport. Distances were calculated using online tools.

Different suppliers for the same item were taken into account for the temporal boundaries 2015. So, geographical variability of suppliers was assessed by a weighted average of the distances and load.

2.3 POTENCIAL ENVIRONMENTAL IMPACT-AGGREGATION INFORMATION MODULES

Table 4 and Table 5 give the absolute and relative contribution of the production of 1 m^2 of larson pe® and larson fr®, “from cradle to gate”.

The life cycle assessment of larson® panels was carried out in accordance with PCR 2015:04. Potential environmental impacts have been declared under the aggregation factors CML-IA baseline v4.2 (April 2013) EU25, included in SimaPro software version 8.3.0.. Long-term emissions are excluded.

Product group:	ACM, aluminium composite material	
Declaration holder:	Alucoil, S.A.	Issued
Declaration number:	S-P-00363	15/03/2017

Table 4: Results of the impact assessment from cradle to gate of larson pe® panel

MODULE	DESCRIPTION	GLOBAL WARMING (GWP100)		OZONE LAYER DEPLETION (ODP)		ACIDIFICATION (AP)		EUTROPHICATION (EP)		PHOTOCHEMICAL OXIDATION (POCP)		ABIOTIC DEPLETION (ELEMENTS)		ABIOTIC DEPLETION (FOSSIL)	
		kg CO2eq	%	kg CFC-11eq	%	kg SO2 eq	%	kg PO4- eq	%	kg C2H2 eq	%	kg Sb eq	%	MJ	%
A1	RAW MATERIALS	33.1	96	7.73E-07	76	1.59E-01	94	9.02E-03	87	9.42E-03	95	1.48E-05	99	496	95
A2	TRANSPORTATION	0.737	2	1.38E-07	14	3.66E-03	2	7.56E-04	7	1.15E-04	1	1.71E-09	0	11.4	2
A3	MANUFACTURING	0.631	2	1.05E-07	10	6.21E-03	4	5.03E-04	5	3.29E-04	3	9.15E-08	1	13.5	3
TOTAL		34.5	100	1.02E-06	100	0.169	100	0.0103	100	9.87E-03	100	1.49E-05	100	521	100

Table 5: Results of the impact assessment from cradle to gate of larson fr® panel

MODULE	DESCRIPTION	GLOBAL WARMING (GWP100)		OZONE LAYER DEPLETION (ODP)		ACIDIFICATION (AP)		EUTROPHICATION (EP)		PHOTOCHEMICAL OXIDATION (POCP)		ABIOTIC DEPLETION (ELEMENTS)		ABIOTIC DEPLETION (FOSSIL)	
		kg CO2 eq	%	kg CFC-11 eq	%	kg SO2 eq	%	kg PO4- eq	%	kg C2H2 eq	%	kg Sb eq	%	MJ	%
A1	RAW MATERIALS	34.0	92	8.24E-07	64	1.54E-01	89	1.19E-02	84	9.54E-03	92	1.45E-05	98	421	90
A2	TRANSPORTATION	1.39	4	2.61E-07	20	6.92E-03	4	1.43E-03	10	2.17E-04	2	3.23E-09	0	21.5	5
A3	MANUFACTURING	1.43	4	2.03E-07	16	1.15E-02	7	8.82E-04	6	5.70E-04	6	1.20E-07	2	22.8	5
TOTAL		36.9	100	1.29E-06	100	0.173	100	0.0142	100	1.03E-02	100	1.46E-05	100	466	100

2.4 USE OF RESOURCES

Table 6: Parameter unit expressed per declared unit (m^2)

		larson pe®	larson fr®
PARAMETER	UNIT	A1+A2+A3	A1+A2+A3
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	137	139
Use of renewable primary energy resources used as raw materials	MJ	6.47	2.17
Total use of renewable primary energy resource (primary energy and primary resources used as raw materials)	MJ	143	141
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	601	546
Use of non-renewable primary energy resources used as raw materials	MJ	0.284	7.98
Total use of non- renewable primary energy resource (primary energy and primary resources used as raw materials)	MJ	601	554
Use of secondary material	kg		
Use of renewable secondary fuels[1]	MJ	0.139	0.139
Use of non-renewable secondary fuels[2]	MJ	0.143	0.143
Use of net fresh water	m3	0.700	0.6999

Table 7: Other indicator describing waste category per declared unit (m^2)

		larson pe®	larson fr®
PARAMETER	UNIT	A1+A2+A3[3]	A1+A2+A3[4]
Hazardous waste disposed	kg	3.38E-02	3.38E-02
Non-hazardous	kg	6.60	6.60E
Disposed of, radioactive waste	kg	2.28E-02	2.28E-02

3. COMPARATION OF EPDS

To be able to compare EPDs within this product category they have to be based on PCR 2015:04

"EPDs from different programmes may not be comparable"

"EPD of construction products may not be comparable if they do not comply with EN 15804"

[1] Only coated sheet coils and sheet coils are included.
[2] Only coated sheet coils and sheet coils are included.
[3] Only primary wastes are included.
[4] Only primary wastes are included.

4. CHANGES IN THIS DOCUMENT

Original Version 1.0, 2014-05-04

Update EN 15804:2012+A1, Sustainability of construction works. Environmental product declarations. Core rules for the product category of construction products.

Updated PCR 2012:01, Construction Products and Construction Services V2.1.

Update Ecoinvent database: Ecoinvent 3.2-allocation, recycled content-unit.

Update CML characterisation factors: CML-IA baseline v4.2 (April 2013) EU25.

Update software SimaPro 8.3.0

5. REFERENCES

(ISO 14025:2006) Environmental Labels and Declarations-type III Environmental Declarations- Principles and Procedures

(ISO 14044:2006) Environmental Management -- Life cycle Assessment --Requirements and Guidelines

Alonso L (2017) Actualización del estudio de Análisis de Ciclo de Vida (ACV) del producto panel de composite larson®.

EN 15804, Sustainability of Construction Works. Environmental Product Declarations. Core rules for the product category of construction.

EPD-GDA-20130258-IBG1-EN Blank aluminium sheet GDA-Gesamtverband der Aluminiumindustrie e.V. (2013)

EPD-GDA-20130259-IBG1-EN Coil-coated aluminium sheet GDA-Gesamtverband der Aluminiumindustrie e.V. (2013)

EPD-STE-20150327-IBD1-EN Wood fibre insulation materials, STEICO SE (2016).

General Programme Instructions for the International EPD System v2.5. (2015).

Product Category rules Construction products and CPC54 construction services PCR 2012:01 v1.2 (2013).

Product group: UN CPC 4299, 4357, 4394, 4931, 4954 Fabricated products made of metal composite material (MCM) PCR 2015:04 v1.0 (2015).

Wernet, G., Bauer, C., Steubing, B., Reinhard, J., Moreno-Ruiz, E., and Weidema, B., 2016. The ecoinvent database version 3 (part I): overview and methodology. The International Journal of Life Cycle Assessment, [online] 21(9), pp.1218–1230