



Environmental Product Declaration

Stone wool thermoacoustic boards

Environmental Product Declaration

In accordance with ISO 14025:2006 and EN 15804:2012

Programme:	The International EPD® System EPD registered through the fully aligned regional programme/hub: EPD Latin America
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Stone wool thermoacoustic boards

Center for
Life Cycle Assessment
and Sustainable Design



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1. Aislantes Minerales S.A. de C.V.

Aislantes Minerales S.A. de C.V. is a company in the field of insulation; was established in 1978 and is currently the leading Latin American manufacturer of stone wool fiber under its Rolan® brand. Rolan® manufacturing plant is in San Luis Potosí, Mexico, and produces a complete range of products, such as: stone wool and extruded polystyrene. Rolan® complements its insulating products line with other quality insulating materials such as cellular glass, elastomeric foam, expanded perlite, calcium silicate and fiberglass.

Rolan® also sells the materials and accessories necessary for installation and finishing, such as aluminum, metal cladding and stainless-steel bands and seals, mastics, adhesives, sealants, and coatings. The company has the human resources, quality materials and cutting-edge technologies to provide solutions in thermal and acoustic insulation, as well as technical advice.



2. General information

Product:	Stone wool thermoacoustic boards
Declaration owner:	Aislantes Minerales S.A. de C.V. Descartes 104, Col. Nueva Anzures, Ciudad de México C.P. 11590 Contact person: Héctor Rogelio Rodríguez Frappé hector.rodriguez@rolan.com The EPD owner has the sole ownership, liability, and responsibility for the EPD.
Description of the construction product and CPC-code:	Boards for thermal and acoustic insulation of all kinds of constructions. Offer high resistance to heat transmission (RSI) and high sound absorption coefficients. Fireproof, do not spread flames and do not generate smoke in case of fire. 54650
Declared Unit:	1 m ² of stone wool thermoacoustic boards to provide thermal resistance (RSI) in a building with a service life of 60 years.
Main product components:	Basalt wool and synthetic resin.
Life cycle stages not considered:	Use (B1), maintenance (B2), replace (B3), replacement (B4), refurbishment (B5), demolition (C1) and waste transport (C2).
Content of the declaration:	A Cradle-to-gate with options system is evaluated, including the following modules of information: raw material supply (A1), transport (A2), manufacturing (A3), distribution (A4), installation (A5) and disposal (C4). The declaration contains these sections: <ul style="list-style-type: none"> • General Information • Product Description • LCA Rules • Environmental performance • Verification and registration • Contact information
For more information consult:	www.rolan.com
Site for which this EPD is representative:	Manufacturing Plant Eje 110 esq. Minerales, Zona Industrial San Luis Potosí, S.L.P., México C.P. 78395
Intended Public:	B2B (Business to Business)

EPD of construction products may not be comparable if they do not comply with EN 15804; and EPDs within the same product category but from different programmes may not be comparable.

3. Product description

Boards for thermal and acoustic insulation in all types of buildings: residential, commercial, industrial and service providers. Rolan® thermoacoustic boards are made from basalt wool and a specially formulated synthetic resin. They offer high resistance to heat transmission (R-value) and high sound absorption coefficients. They are fireproof, do not spread flames and do not generate smoke in case of fire. Their melting point is above 1100 °C.

Rolan® thermoacoustic boards characteristics:

- ➔ Water repellent.
- ➔ Do not absorb moisture and prevent steam condensation on the contact surfaces with the substrates.
- ➔ Do not cause corrosion of metals or concrete.
- ➔ Retain their shape, dimensions, and mechanical properties indefinitely.
- ➔ Do not shrink or expand due to environmental influences such as temperature or humidity changes.
- ➔ Are semi-rigid, light, resilient; self-sustaining on the vertical planes.

- ➔ Easy to cut and quick to install.
- ➔ Do not contain HCFCs or CFCs.

3.1 Technical specifications.

Table 1. Technical specifications.

Standard dimensions			61 x 122	cm
Stone wool thermoacoustic boards	RSI*	Thermal conductivity *	Density	Weight
	for every 2.5 cm of thickness	λ	ρ	for every 2.5 cm of thickness
	m ² · K/W (h·ft ² ·°F/BTU)	W/m · K (BTU·in/ft ² ·h·°F)	kg/m ³ (lb/ft ³)	kg/m ² (lb/ft ²)
FF-32 (Aislamuro Rolan®)	0.7320 (4.17)	0.0347 (0.241)	32 (2.00)	0.81 (0.17)
FF-40	0.7362 (4.19)	0.0345 (0.239)	40 (2.50)	1.02 (0.21)
FF-48	0.7405 (4.22)	0.0343 (0.238)	48 (3.00)	1.22 (0.25)
FF-64	0.7427 (4.23)	0.0342 (0.237)	64 (4.00)	1.63 (0.33)
FF-96	0.7449 (4.24)	0.0341 (0.236)	96 (6.00)	2.44 (0.50)
FF-128	0.7471 (4.25)	0.0340 (0.236)	128 (8.00)	3.25 (0.66)

* At 24 °C mean temperature

If more information is required on technical specifications, such as acoustic properties, resistance to humidity and corrosion, among others, please consult the Rolan® website: www.rolan.com

4. Content declaration

This section presents the relevant materials and chemical substances in the Rolan® thermoacoustic boards. Table 2 presents the chemical substance, function, relative weight (%), CAS number and EC numbers of the product’s content and also shows that these substances are not listed in the “Candidate List of Substances of Very High Concern” (SVHC).

Table 2. Content of Rolan® thermoacoustic boards.

Homogeneous material or chemical substances	Chemical substances	Weight (%)	CAS Number	Function of chemical substance	EC/List No.	SVHC
Urea	Carbamide	0.8%	57-13-6	Used to spread the resin	200-315-5	Not listed
Resin	Ammonia-Urea-Formaldehyde Polymer	3.2%	27967-29-9	Fiber binder, stiffening	-	Not listed
Slag	Mixture	82.0%	91722-09-7	Main component	294-409-3	Not listed
Basalt	Mixture	13.9%	14808-60-7	Main component	-	Not listed
Aditive	(3-Aminopropyl)triethoxysilane	0.004%	919-20-2	Improves resin adhesion to the fiber	232-263-4	Not listed



5. LCA Rules

Environmental potential impacts were calculated according to EN 15804:2012 and PCR 2012:01 Construction products and construction services Version 2.3 (2018-11-15) and Sub-PCR *EN 16783:2017 Thermal insulation product*. This EPD is in accordance with ISO 14025:2006.

Environmental potential impacts were calculated through Life Cycle Assessment (LCA) methodology according to ISO 14040:2006 and ISO 14044:2006. An external third-party verification process of the EPD was conducted according to General Programme Instructions for the International EPD® System Version 3.0. Verification includes a documental review and a validation of both the underlying LCA study and documents describing additional environmental information that justify data provided in the EPD.

5.1 Declared unit (with options)

1 m² of stone wool thermoacoustic boards to provide thermal resistance (RSI) in a building with a service life of 60 years.

RSI values for each thermoacoustic board are included in Table 1.

5.2 System boundary.

The declared EPD is a "Cradle-to-gate with options EPD" in line with ISO14025:2006. Description of the system boundary is in Table 3.

Table 3. Rolan® thermoacoustic boards product system.

Life cycle environmental information of Rolan® thermoacoustic boards								Other environmental information
A1 - A3		A4 - A5		B1 - B7		C1 - C4		D
Product stage			Construction process stage		Use stage	End of life stage		Reuse recovery stage
A1	A2	A3	A4	A5	B1 - B7	C1 - C3	C4	D
Raw materials acquisition	Transport of raw materials	Manufacture	Product transport	Installation	Use, maintenance, replace, replacement and refurbishment	Demolition waste transport and treatment	Waste disposal	Future, reuse, recycling or energy recovery potentials
✓	✓	✓	✓	✓	MND	MND	✓	MND
Cradle to gate with options								

*Included = ✓ *MND = Module Not Declared

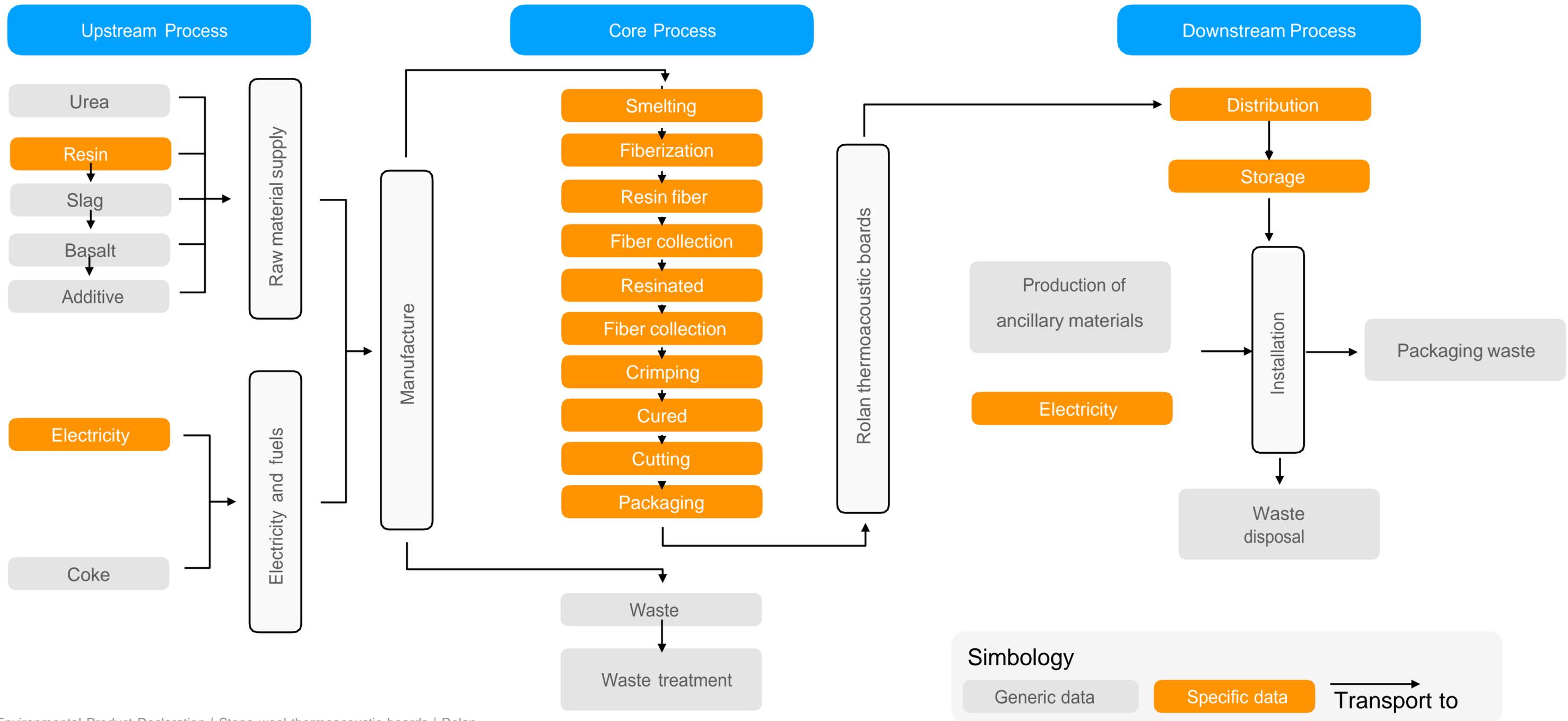
Description of information modules is included in Table 4.

Table 4. Description of information modules included in this EPD.



5.3 Description of manufacturing process. The manufacturing process is described in Figure 1:

Figure 1. Life cycle flow diagram of Rolan® thermoacoustic boards.



5.4 Assumptions.

- Lubricating oil output equaled the oil input.
- Distance for the distribution of the board considers Mexico City, Monterrey and Guadalajara.
- Board waste in installation stage is 2% and is disposed in sanitary landfill.
- At the end-of-life stage, waste is sent to sanitary landfill.

5.5 Cut-off criteria.

A minimum of 95% of the total flows (matter and energy) is included in the declared modules. Company infrastructure, employee's transportation and consumptions related with administrative activities were kept out of the scope of this study.

The materials that could be used in preventive or corrective maintenance of machinery were disregarded, as well as the use of uniforms and personal protective equipment.

5.6 Allocation.

Allocation processes were applied to the produced products at the San Luis Potosi plant, since other stone wool products were manufactured apart from the stone wool thermoacoustic boards. The percentage of production of other products was 59% of total annual production.

No co-products are generated, so no allocation procedure related to this aspect was applied.

The polluter pays principle was applied to the allocation procedure during recycling.

For generic data Mexicaniuh and Ecoinvent 3.3 (Allocation - Recycled Content version) databases were used.

5.7 Time representativeness.

Direct data obtained from Aislantes Minerales S.A. de C.V. is representative for 2017.

5.8 Data quality assessment.

Data quality assessment per information module is provided in Tables 5 to 10.

Table 5. Raw material supply module data quality assessment.

Data	Time related coverage	Geographic coverage	Technological coverage	Data source	Measured or estimated
Raw material consumption	2017	Mexico	Modern	Rolan®	M
Electricity consumption	2017	Mexico	Modern	Rolan®	M
Fuels consumption (natural gas and coke)	2017	Mexico	Modern	Rolan®	M
Raw material packaging materials consumption	2017	Mexico	Modern	Rolan®	M
Energy consumption, emissions, waste generation and waste treatment related to the urea production	1980 - 2016	World average	World average	Ecoinvent 3.3	M&E
Energy consumption, emissions, waste generation and waste treatment related to the resin production	2017	Mexico	Average	Data from supplier	M
Energy consumption, emissions, waste generation and waste treatment related to the slag and basalt production	1980 - 2016	World average adapted to Mexico	World average adapted to Mexico	Ecoinvent 3.3	M&E
Fuels consumption and emissions related to the generation and distribution of electricity in Mexico	2017	Mexico	Mexican technological Mix	Mexicanuih	M&E
Materials and energy consumption, emissions, waste generation and waste treatment related to the natural gas production in Mexico	2017	Mexico	Mexican Mix	Mexicanuih	M&E
Materials and energy consumption, emissions, waste generation and waste treatment related to the coke production in Mexico	1980 - 2016	World average adapted to Mexico	World average adapted to Mexico	Ecoinvent 3.3	M&E

M&E: Measured and Estimated, M: Measured, E: Estimated

Table 6. Transportation module data quality assessment.

Data	Time related coverage	Geographic coverage	Technological coverage	Data source	Measured or estimated
Transportation distance of raw materials	2017	Mexico	Modern	Rolan®	M
Transportation distance of the packaging materials for the finished product	2017	Mexico	Modern	Rolan®	M
Transportation distance of coke	2017	Mexico	Modern	Rolan®	M
Consumption of materials and energy consumption, emissions related to transportation requirements.	1992 - 2014	World average	World average	Ecoinvent 3.3	M&E

M&E: Measured and Estimated, M: Measured, E: Estimated

Table 7. Manufacture module data quality assessment.

Data	Time related coverage	Geographic coverage	Technological coverage	Data source	Measured or estimated
Water consumption	2017	Mexico	Modern	Rolan®	M
Auxiliary materials consumption used during manufacture	2017	Mexico	Modern	Rolan®	M
Energy consumption, emissions, waste generation and waste treatment related to auxiliary materials production	1980 - 2016	World average	World average	Ecoinvent 3.3	M&E
Waste water generation	2017	Mexico	Modern	Rolan®	M
Air emissions	2017	Mexico	Modern	Rolan®	M
Waste generation	2017	Mexico	Modern	Rolan®	M
Waste treatment, materials consumptions and energy processes related.	1990 - 2016	World average based in Europe	World average based in Europe	Ecoinvent 3.3	M&E
Waste transportation distance to the disposal or recycling site	2017	Mexico	Modern	Rolan®	M
Materials consumption, energy and emissions related to waste transportation requirements	1992 - 2014	World average	World average	Ecoinvent 3.3	M&E

M&E: Measured and Estimated, M: Measured, E: Estimated

Table 8. Transport of product module data quality assessment.

Data	Time related coverage	Geographic coverage	Technological coverage	Data source	Measured or estimated
Transportation distance to construction site or warehouse	2017	Mexico	Modern	Rolan®	M
Materials and energy consumption, emissions related to transportation requirements	1992 - 2014	World average	World average	Ecoinvent 3.3	M&E

M&E: Measured and Estimated, M: Measured, E: Estimated

Table 9. Installation module data quality assessment

Data	Time related coverage	Geographic coverage	Technological coverage	Data source	Measured or estimated
Materials consumption for installation	2017	Mexico	Modern	Rolan®	M
Electricity consumption for installation	2017	Mexico	Modern	Rolan®	M
Energy consumption, emissions, waste generation and waste treatment related to auxiliary materials production	1980 - 2016	World average	World average	Ecoinvent 3.3	M&E
Fuels consumption and emissions related to the generation and distribution of electricity in Mexico	2017	Mexico	Mexican technological Mix	Mexicanuih	M&E
Waste treatment, materials consumptions and energy processes related.	1990 - 2016	World average	World average	Ecoinvent 3.3	M&E

M&E: Measured and Estimated, M: Measured, E: Estimated

Table 10. Waste disposal module data quality assessment

Data	Time related coverage	Geographic coverage	Technological coverage	Data source	Measured or estimated
Waste disposal, materials consumptions and energy processes related.	1990 - 2016	World average	World average	Ecoinvent 3.3	M&E

M&E: Measured and Estimated, M: Measured, E: Estimated

6. Environmental performance

SimaPro 8.4 was used for Life Cycle Impact Assessment.

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 indicator of use of net fresh water that was evaluated with Recipe 2016 Midpoint (H) version 1.00 (Huijbregts et al. 2017). The detailed description of the use of resources is provided in Table 11.

The LCA covers all the thermoacoustic boards described in Table 1. The materials used to manufacture all the boards are the same, the quantities per kilogram required are similar and the consumption associated with manufacturing (per kg) is the equal for all products.

Table 11. Resource Indicators per square meter of Rolan® thermoacoustic boards.

FF32/Aislamuro Rolan®								
Parameter	Unit	A1) Raw material supply	A2) Transport	A3) Manufacture	A4) Distribution	A5) Installation	C4) Waste disposal	Total
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	9.73E-01	3.97E-02	2.22E-01	1.20E-02	3.99E+00	1.18E-01	5.36E+00
Use of renewable primary energy as raw materials	MJ	0	0	0	0	0	0	0
Total use of renewable primary energy resources	MJ	9.73E-01	3.97E-02	2.22E-01	1.20E-02	3.99E+00	1.18E-01	5.36E+00
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	3.05E+01	3.38E+00	5.80E+00	1.04E+00	8.76E+01	4.74E+00	1.33E+02
Use of non-renewable primary energy used as raw materials	MJ	0	0	0	0	0	0	0

Total use of non-renewable primary energy resources	MJ	3.05E+01	3.38E+00	5.80E+00	1.04E+00	8.76E+01	4.74E+00	1.33E+02
Use of secondary material	kg	1.38E+00	0	0	0	0	0	1.38E+00
Use of renewable secondary fuels	MJ	0	0	0	0	0	0	0
Use of non-renewable secondary fuels	MJ	0	0	0	0	0	0	0
Use of net fresh water	m ³	1.71E-02	6.36E-04	3.33E-03	1.94E-04	3.67E-02	3.18E-03	6.11E-02
FF40								
Parameter	Unit	A1) Raw material supply	A2) Transport	A3) Manufacture	A4) Distribution	A5) Installation	C4) Waste disposal	Total
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	1.22E+00	4.96E-02	2.78E-01	1.50E-02	3.99E+00	1.19E-01	5.67E+00
Use of renewable primary energy as raw materials	MJ	0	0	0	0	0	0	0
Total use of renewable primary energy resources	MJ	1.22E+00	4.96E-02	2.78E-01	1.50E-02	3.99E+00	1.19E-01	5.67E+00
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	3.81E+01	4.22E+00	7.25E+00	1.30E+00	8.76E+01	4.77E+00	1.43E+02
Use of non-renewable primary energy used as raw materials	MJ	0	0	0	0	0	0	0
Total use of non-renewable primary energy resources	MJ	3.81E+01	4.22E+00	7.25E+00	1.30E+00	8.76E+01	4.77E+00	1.43E+02
Use of secondary material	kg	1.73E+00	0	0	0	0	0	1.73E+00
Use of renewable secondary fuels	MJ	0	0	0	0	0	0	0
Use of non-renewable secondary fuels	MJ	0	0	0	0	0	0	0
Use of net fresh water	m ³	2.13E-02	7.95E-04	4.16E-03	2.43E-04	4.59E-02	3.98E-03	7.64E-02

FF48								
Parameter	Unit	A1) Raw material supply	A2) Transport	A3) Manufacture	A4) Distribution	A5) Installation	C4) Waste disposal	Total
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	1.46E+00	5.95E-02	3.33E-01	1.80E-02	4.00E+00	1.20E-01	5.99E+00
Use of renewable primary energy as raw materials	MJ	0	0	0	0	0	0	0
Total use of renewable primary energy resources	MJ	1.46E+00	5.95E-02	3.33E-01	1.80E-02	4.00E+00	1.20E-01	5.99E+00
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	4.58E+01	5.07E+00	8.71E+00	1.56E+00	8.76E+01	4.80E+00	1.53E+02
Use of non-renewable primary energy used as raw materials	MJ	0	0	0	0	0	0	0
Total use of non-renewable primary energy resources	MJ	4.58E+01	5.07E+00	8.71E+00	1.56E+00	8.76E+01	4.80E+00	1.53E+02
Use of secondary material	kg	2.08E+00	0	0	0	0	0	2.08E+00
Use of renewable secondary fuels	MJ	0	0	0	0	0	0	0
Use of non-renewable secondary fuels	MJ	0	0	0	0	0	0	0
Use of net fresh water	m ³	2.56E-02	9.55E-04	4.99E-03	2.92E-04	5.51E-02	4.77E-03	9.17E-02
FF64								
Parameter	Unit	A1) Raw material supply	A2) Transport	A3) Manufacture	A4) Distribution	A5) Installation	C4) Waste disposal	Total
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	1.95E+00	7.93E-02	4.44E-01	2.40E-02	4.00E+00	1.21E-01	6.61E+00
Use of renewable primary energy as raw materials	MJ	0	0	0	0	0	0	0
Total use of renewable primary energy resources	MJ	1.95E+00	7.93E-02	4.44E-01	2.40E-02	4.00E+00	1.21E-01	6.61E+00
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	6.10E+01	6.75E+00	1.16E+01	2.07E+00	8.76E+01	4.87E+00	1.74E+02

Use of non-renewable primary energy used as raw materials	MJ	0	0	0	0	0	0	0	0
Total use of non-renewable primary energy resources	MJ	6.10E+01	6.75E+00	1.16E+01	2.07E+00	8.76E+01	4.87E+00	1.74E+02	
Use of secondary material	kg	2.77E+00	0	0	0	0	0	2.77E+00	
Use of renewable secondary fuels	MJ	0	0	0	0	0	0	0	
Use of non-renewable secondary fuels	MJ	0	0	0	0	0	0	0	
Use of net fresh water	m ³	3.41E-02	1.27E-03	6.66E-03	3.89E-04	7.35E-02	6.36E-03	1.22E-01	
FF96									
Parameter	Unit	A1) Raw material supply	A2) Transport	A3) Manufacture	A4) Distribution	A5) Installation	C4) Waste disposal	Total	
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	2.92E+00	1.19E-01	6.66E-01	3.60E-02	4.00E+00	1.25E-01	7.86E+00	
Use of renewable primary energy as raw materials	MJ	0	0	0	0	0	0	0	
Total use of renewable primary energy resources	MJ	2.92E+00	1.19E-01	6.66E-01	3.60E-02	4.00E+00	1.25E-01	7.86E+00	
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	9.15E+01	1.01E+01	1.74E+01	3.11E+00	8.76E+01	5.00E+00	2.15E+02	
Use of non-renewable primary energy used as raw materials	MJ	0	0	0	0	0	0	0	
Total use of non-renewable primary energy resources	MJ	9.15E+01	1.01E+01	1.74E+01	3.11E+00	8.76E+01	5.00E+00	2.15E+02	
Use of secondary material	kg	4.15E+00	0	0	0	0	0	4.15E+00	
Use of renewable secondary fuels	MJ	0	0	0	0	0	0	0	
Use of non-renewable secondary fuels	MJ	0	0	0	0	0	0	0	
Use of net fresh water	m ³	5.12E-02	1.91E-03	9.99E-03	5.83E-04	1.10E-01	9.54E-03	1.83E-01	

FF128

Parameter	Unit	A1) Raw material supply	A2) Transport	A3) Manufacture	A4) Distribution	A5) Installation	C4) Waste disposal	Total
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	3.89E+00	1.59E-01	8.88E-01	4.80E-02	4.00E+00	1.28E-01	9.11E+00
Use of renewable primary energy as raw materials	MJ	0	0	0	0	0	0	0
Total use of renewable primary energy resources	MJ	3.89E+00	1.59E-01	8.88E-01	4.80E-02	4.00E+00	1.28E-01	9.11E+00
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	1.22E+02	1.35E+01	2.32E+01	4.15E+00	8.76E+01	5.13E+00	2.56E+02
Use of non-renewable primary energy used as raw materials	MJ	0	0	0	0	0	0	0
Total use of non-renewable primary energy resources	MJ	1.22E+02	1.35E+01	2.32E+01	4.15E+00	8.76E+01	5.13E+00	2.56E+02
Use of secondary material	kg	6.82E-02	0	0	0	0	0	6.82E-02
Use of renewable secondary fuels	MJ	0	0	0	0	0	0	0
Use of non-renewable secondary fuels	MJ	0	0	0	0	0	0	0
Use of net fresh water	m ³	6.82E-02	2.55E-03	1.33E-02	7.78E-04	1.47E-01	1.27E-02	2.45E-01

6.2 Potential environmental impact.

All information modules are reported and valued separately. However, this EPD presents itself the total impact across all stages.

Parameters describing environmental potential impacts were calculated using CML-IA method version 3.04 (Guinee et al. 2001; Wegener et al. 2008) as implemented in SimaPro 8.4. Water scarcity potential was calculated using AWARE method (Boulay et al. 2018).

Table 12. Potential environmental impact indicators per square meter of Rolan® thermoacoustic boards.

FF32/Aislamuro Rolan®								
Impact category	Unit	A1) Raw material supply	A2) Transport	A3) Manufacture	A4) Distribution	A5) Installation	C4) Waste disposal	Total
Abiotic depletion	kg Sb eq	9.29E-07	6.46E-07	7.70E-08	1.88E-07	3.49E-04	2.75E-07	3.51E-04
	%	0.3%	0.2%	0.02%	0.1%	99.4%	0.1%	100%
Abiotic depletion (fossil fuels)	MJ	2.97E+01	3.33E+00	5.20E+00	1.02E+00	8.43E+01	4.64E+00	1.28E+02
	%	23.2%	2.6%	4.1%	0.8%	65.7%	3.6%	100%
Global warming	kg CO ₂ eq	1.43E+00	2.09E-01	2.58E-01	6.42E-02	4.51E+00	7.02E-01	7.18E+00
	%	25.0%	4.2%	0.4%	1.3%	63.6%	5.5%	100%
Ozone layer depletion	kg CFC-11 eq	2.26E-07	3.82E-08	3.27E-09	1.18E-08	5.76E-07	4.98E-08	9.06E-07
	%	25.0%	4.2%	0.4%	1.3%	63.6%	5.5%	100%
Photochemical oxidation	kg C ₂ H ₄ eq	6.09E-04	4.00E-05	3.81E-05	1.22E-05	2.21E-03	4.88E-03	7.79E-03
	%	7.8%	0.5%	0.5%	0.2%	28.4%	62.7%	100%
Acidification	kg SO ₂ eq	8.74E-03	1.08E-03	7.54E-04	3.32E-04	2.68E-02	1.20E-01	1.57E-01
	%	5.6%	0.7%	0.5%	0.2%	17.1%	76.0%	100%

Eutrophication	kg PO ₄ --- eq	1.11E-03	2.51E-04	1.25E-04	7.72E-05	5.05E-03	2.00E-03	8.62E-03
	%	12.9%	2.9%	1.5%	0.9%	58.6%	23.2%	100%
Water scarcity	m ³ H ₂ O eq	6.91E-01	4.90E-02	4.00E-03	5.29E-03	1.49E+00	1.27E-01	2.36E+00
	%	29.2%	2.1%	0.2%	0.2%	62.9%	5.4%	100%
FF40								
Impact category	Unit	A1) Raw material supply	A2) Transport	A3) Manufacture	A4) Distribution	A5) Installation	C4) Waste disposal	Total
Abiotic depletion	kg Sb eq	1.16E-06	8.07E-07	9.62E-08	2.35E-07	3.49E-04	2.77E-07	3.51E-04
	%	0.3%	0.2%	0.03%	0.1%	99.3%	0.1%	100%
Abiotic depletion (fossil fuels)	MJ	3.71E+01	4.16E+00	6.50E+00	1.28E+00	8.43E+01	4.67E+00	1.38E+02
	%	26.9%	3.0%	4.7%	0.9%	61.1%	3.4%	100%
Global warming	kg CO ₂ eq	1.79E+00	2.61E-01	3.23E-01	8.02E-02	4.51E+00	7.03E-01	7.67E+00
	%	29.0%	4.9%	0.4%	1.5%	59.1%	5.1%	100%
Ozone layer depletion	kg CFC-11 eq	2.83E-07	4.77E-08	4.08E-09	1.47E-08	5.76E-07	5.02E-08	9.76E-07
	%	29.0%	4.9%	0.4%	1.5%	59.1%	5.1%	100%
Photochemical oxidation	kg C ₂ H ₄ eq	7.62E-04	5.00E-05	4.76E-05	1.53E-05	2.21E-03	4.88E-03	7.97E-03
	%	9.6%	0.6%	0.6%	0.2%	27.7%	61.3%	100%
Acidification	kg SO ₂ eq	1.09E-02	1.35E-03	9.43E-04	4.16E-04	2.68E-02	1.20E-01	1.60E-01
	%	6.8%	0.8%	0.6%	0.3%	16.8%	74.7%	100%
Eutrophication	kg PO ₄ --- eq	1.39E-03	3.14E-04	1.57E-04	9.65E-05	5.05E-03	2.00E-03	9.01E-03
	%	15.4%	3.5%	1.7%	1.1%	56.1%	22.2%	100%
Water scarcity	m ³ H ₂ O eq	8.63E-01	6.12E-02	4.99E-03	6.61E-03	1.49E+00	1.27E-01	2.55E+00
	%	33.9%	2.4%	0.2%	0.3%	58.3%	5.0%	100%

FF48

Impact category	Unit	A1) Raw material supply	A2) Transport	A3) Manufacture	A4) Distribution	A5) Installation	C4) Waste disposal	Total
Abiotic depletion	kg Sb eq	1.39E-06	9.69E-07	1.15E-07	2.82E-07	3.49E-04	2.78E-07	3.52E-04
	%	0.4%	0.3%	0.03%	0.1%	99.1%	0.1%	100%
Abiotic depletion (fossil fuels)	MJ	4.46E+01	5.00E+00	7.81E+00	1.54E+00	8.43E+01	4.71E+00	1.48E+02
	%	30.1%	3.4%	5.3%	1.0%	57.0%	3.2%	100%
Global warming	kg CO ₂ eq	2.15E+00	3.14E-01	3.88E-01	9.63E-02	4.51E+00	7.04E-01	8.16E+00
	%	32.5%	5.5%	0.5%	1.7%	55.1%	4.8%	100%
Ozone layer depletion	kg CFC-11 eq	3.40E-07	5.73E-08	4.90E-09	1.76E-08	5.76E-07	5.05E-08	1.05E-06
	%	32.5%	5.5%	0.5%	1.7%	55.1%	4.8%	100%
Photochemical oxidation	kg C ₂ H ₄ eq	9.14E-04	6.00E-05	5.71E-05	1.84E-05	2.21E-03	4.88E-03	8.14E-03
	%	11.2%	0.7%	0.7%	0.2%	27.1%	60.0%	100%
Acidification	kg SO ₂ eq	1.31E-02	1.62E-03	1.13E-03	4.99E-04	2.68E-02	1.20E-01	1.63E-01
	%	8.1%	1.0%	0.7%	0.3%	16.5%	73.5%	100%
Eutrophication	kg PO ₄ ⁻⁻⁻ eq	1.66E-03	3.77E-04	1.88E-04	1.16E-04	5.05E-03	2.01E-03	9.40E-03
	%	17.7%	4.0%	2.0%	1.2%	53.7%	21.3%	100%
Water scarcity	m ³ H ₂ O eq	1.04E+00	7.34E-02	5.99E-03	7.94E-03	1.49E+00	1.27E-01	2.74E+00
	%	37.8%	2.7%	0.2%	0.3%	54.3%	4.6%	100%

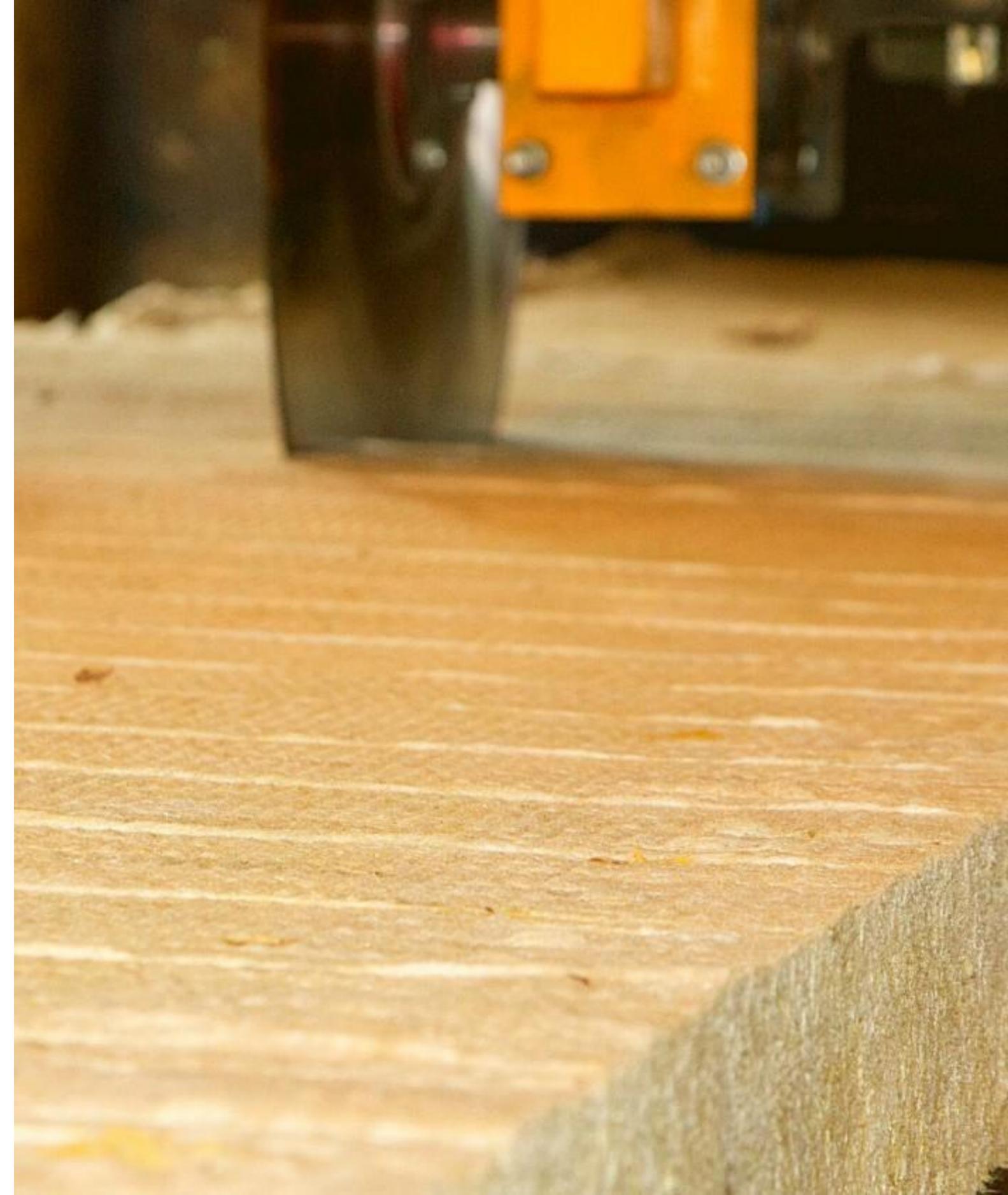
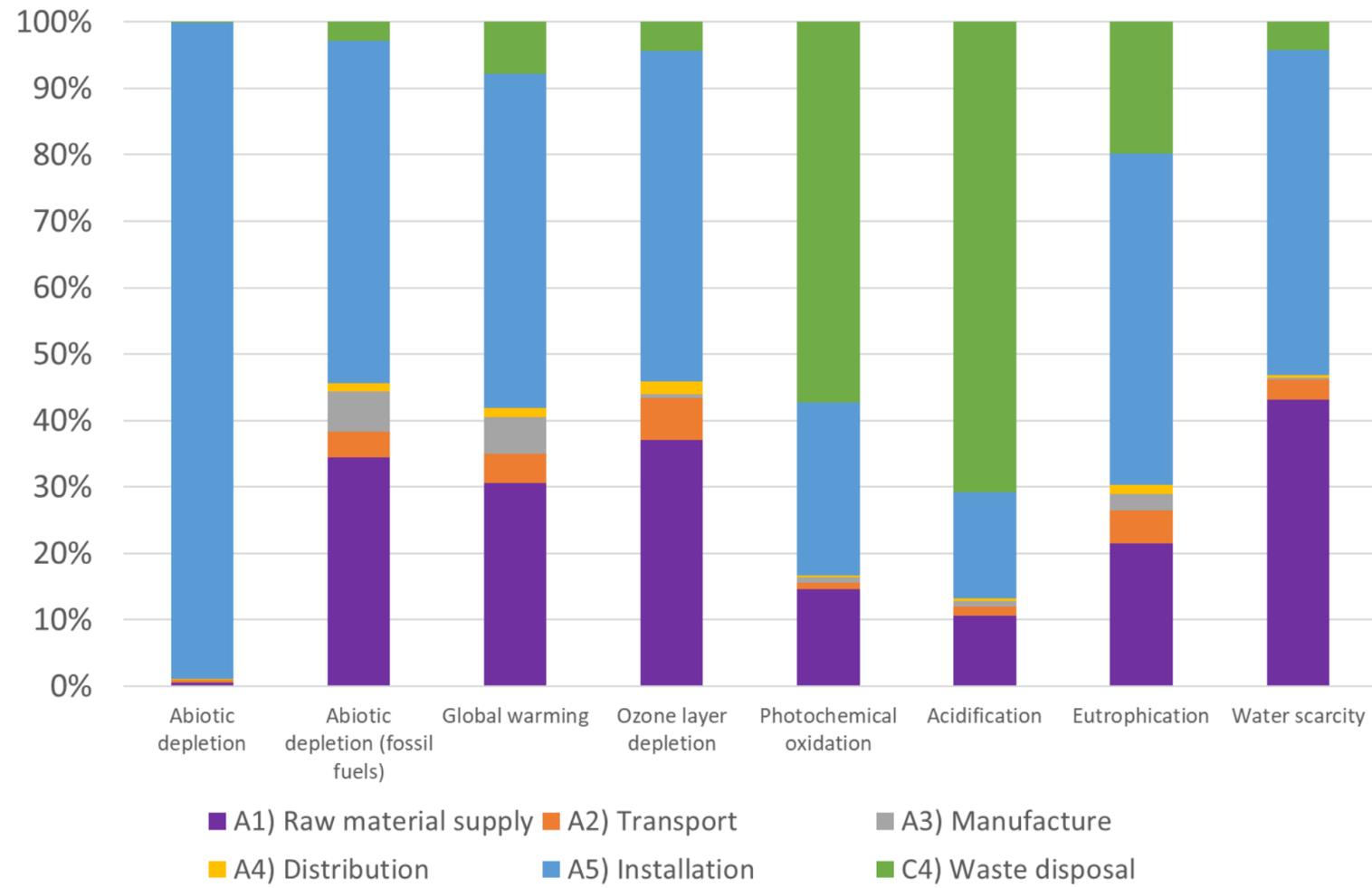
FF64

Impact category	Unit	A1) Raw material supply	A2) Transport	A3) Manufacture	A4) Distribution	A5) Installation	C4) Waste disposal	Total
Abiotic depletion	kg Sb eq	1.86E-06	1.29E-06	1.54E-07	3.76E-07	3.49E-04	2.80E-07	3.53E-04
	%	0.5%	0.4%	0.04%	0.1%	98.9%	0.1%	100%
Abiotic depletion (fossil fuels)	MJ	5.94E+01	6.66E+00	1.04E+01	2.05E+00	8.43E+01	4.77E+00	1.68E+02
	%	35.5%	4.0%	6.2%	1.2%	50.3%	2.8%	100%
Global warming	kg CO ₂ eq	2.86E+00	4.18E-01	5.17E-01	1.28E-01	4.51E+00	7.06E-01	9.14E+00
	%	38.2%	6.4%	0.6%	2.0%	48.6%	4.3%	100%
Ozone layer depletion	kg CFC-11 eq	4.53E-07	7.63E-08	6.53E-09	2.35E-08	5.76E-07	5.13E-08	1.19E-06
	%	38.2%	6.4%	0.6%	2.0%	48.6%	4.3%	100%
Photochemical oxidation	kg C ₂ H ₄ eq	1.22E-03	7.99E-05	7.62E-05	2.45E-05	2.21E-03	4.88E-03	8.49E-03
	%	14.4%	0.9%	0.9%	0.3%	26.0%	57.5%	100%
Acidification	kg SO ₂ eq	1.75E-02	2.16E-03	1.51E-03	6.65E-04	2.68E-02	1.20E-01	1.68E-01
	%	10.4%	1.3%	0.9%	0.4%	16.0%	71.1%	100%
Eutrophication	kg PO ₄ ⁻⁻⁻ eq	2.22E-03	5.03E-04	2.51E-04	1.54E-04	5.05E-03	2.01E-03	1.02E-02
	%	21.8%	4.9%	2.5%	1.5%	49.6%	19.7%	100%
Water scarcity	m ³ H ₂ O eq	1.38E+00	9.79E-02	7.99E-03	1.06E-02	1.49E+00	1.27E-01	3.11E+00
	%	44.4%	3.1%	0.3%	0.3%	47.8%	4.1%	100%

FF96								
Impact category	Unit	A1) Raw material supply	A2) Transport	A3) Manufacture	A4) Distribution	A5) Installation	C4) Waste disposal	Total
Abiotic depletion	kg Sb eq	2.79E-06	1.94E-06	2.31E-07	5.64E-07	3.49E-04	2.85E-07	3.55E-04
	%	0.8%	0.5%	0.07%	0.2%	98.4%	0.1%	100%
Abiotic depletion (fossil fuels)	MJ	8.92E+01	1.00E+01	1.56E+01	3.07E+00	8.43E+01	4.91E+00	2.07E+02
	%	43.1%	4.8%	7.5%	1.5%	40.7%	2.4%	100%
Global warming	kg CO ₂ eq	4.29E+00	6.28E-01	7.75E-01	1.93E-01	4.51E+00	7.11E-01	1.11E+01
	%	46.3%	7.8%	0.7%	2.4%	39.3%	3.6%	100%
Ozone layer depletion	kg CFC-11 eq	6.79E-07	1.14E-07	9.80E-09	3.53E-08	5.76E-07	5.28E-08	1.47E-06
	%	46.3%	7.8%	0.7%	2.4%	39.3%	3.6%	100%
Photochemical oxidation	kg C ₂ H ₄ eq	1.83E-03	1.20E-04	1.14E-04	3.67E-05	2.21E-03	4.89E-03	9.19E-03
	%	19.9%	1.3%	1.2%	0.4%	24.0%	53.1%	100%
Acidification	kg SO ₂ eq	2.62E-02	3.24E-03	2.26E-03	9.97E-04	2.68E-02	1.20E-01	1.79E-01
	%	14.6%	1.8%	1.3%	0.6%	15.0%	66.8%	100%
Eutrophication	kg PO ₄ ⁻⁻⁻ eq	3.33E-03	7.54E-04	3.76E-04	2.32E-04	5.05E-03	2.02E-03	1.18E-02
	%	28.3%	6.4%	3.2%	2.0%	43.0%	17.1%	100%
Water scarcity	m ³ H ₂ O eq	2.07E+00	1.47E-01	1.20E-02	1.59E-02	1.49E+00	1.27E-01	3.86E+00
	%	53.7%	3.8%	0.3%	0.4%	38.5%	3.3%	100%

FF128								
Impact category	Unit	A1) Raw material supply	A2) Transport	A3) Manufacture	A4) Distribution	A5) Installation	C4) Waste disposal	Total
Abiotic depletion	kg Sb eq	3.72E-06	2.58E-06	3.08E-07	7.52E-07	3.49E-04	2.90E-07	3.57E-04
	%	1.0%	0.7%	0.09%	0.2%	97.9%	0.1%	100%
Abiotic depletion (fossil fuels)	MJ	1.19E+02	1.33E+01	2.08E+01	4.10E+00	8.43E+01	5.04E+00	2.46E+02
	%	48.2%	5.4%	8.4%	1.7%	34.2%	2.0%	100%
Global warming	kg CO ₂ eq	5.72E+00	8.37E-01	1.03E+00	2.57E-01	4.51E+00	7.15E-01	1.31E+01
	%	51.8%	8.7%	0.7%	2.7%	33.0%	3.1%	100%
Ozone layer depletion	kg CFC-11 eq	9.06E-07	1.53E-07	1.31E-08	4.70E-08	5.76E-07	5.43E-08	1.75E-06
	%	51.8%	8.7%	0.7%	2.7%	33.0%	3.1%	100%
Photochemical oxidation	kg C ₂ H ₄ eq	2.44E-03	1.60E-04	1.52E-04	4.90E-05	2.21E-03	4.89E-03	9.89E-03
	%	24.6%	1.6%	1.5%	0.5%	22.3%	49.4%	100%
Acidification	kg SO ₂ eq	3.49E-02	4.32E-03	3.02E-03	1.33E-03	2.68E-02	1.20E-01	1.90E-01
	%	18.4%	2.3%	1.6%	0.7%	14.1%	62.9%	100%
Eutrophication	kg PO ₄ ⁻⁻⁻ eq	4.44E-03	1.01E-03	5.02E-04	3.09E-04	5.05E-03	2.02E-03	1.33E-02
	%	33.3%	7.5%	3.8%	2.3%	37.9%	15.2%	100%
Water scarcity	m ³ H ₂ O eq	2.76E+00	1.96E-01	1.60E-02	2.12E-02	1.49E+00	1.27E-01	4.61E+00
	%	59.9%	4.2%	0.3%	0.5%	32.3%	2.8%	100%

Figure 2. Average potential environmental impact contribution per square meter of Rolan® thermoacoustic boards.



6.3 Waste production.

Environmental indicators describing waste generation were obtained from LCI except for background information which has been calculated using EDIP 2003 method (Hauschild and Potting, 2005). Table 13 shows waste and other outputs generated during each information module.

Table 13. Waste and other outputs per square meter of Rolan® thermoacoustic boards.

FF32/Aislamuro Rolan®								
Parameter	Unit	A1) Raw material supply	A2) Transport	A3) Manufacture	A4) Distribution	A5) Installation	C4) Waste disposal	Total
Hazardous waste	kg	1.21E-02	1.96E-06	1.79E-05	5.91E-07	1.80E-02	5.36E-06	3.01E-02
Non hazardous waste	kg	6.08E-02	1.45E-01	9.33E-01	4.51E-02	5.33E-01	1.44E+01	1.61E+01
Radioactive waste*	kg	3.53E-05	2.15E-05	2.37E-06	6.63E-06	1.47E-04	2.88E-05	2.42E-04
Components for reuse	kg	0	0	0	0	0	0	0.00E+00
Materials for recycling	kg	0	0	0	0	0	0	0.00E+00
Materials for energy recovery	kg	0	0	0	0	0	0	0.00E+00
Exported electricity	MJ	0	0	0	0	0	0	0.00E+00
Exported heat	MJ	0	0	0	0	0	0	0.00E+00

FF40								
Parameter	Unit	A1) Raw material supply	A2) Transport	A3) Manufacture	A4) Distribution	A5) Installation	C4) Waste disposal	Total
Hazardous waste	kg	1.51E-02	2.45E-06	2.23E-05	7.39E-07	1.80E-02	5.38E-06	3.31E-02
Non hazardous waste	kg	7.60E-02	1.81E-01	1.17E+00	5.64E-02	5.37E-01	1.46E+01	1.66E+01
Radioactive waste*	kg	4.41E-05	2.69E-05	2.96E-06	8.29E-06	1.47E-04	2.91E-05	2.59E-04
Components for reuse	kg	0	0	0	0	0	0	0.00E+00
Materials for recycling	kg	0	0	0	0	0	0	0.00E+00
Materials for energy recovery	kg	0	0	0	0	0	0	0.00E+00
Exported electricity	MJ	0	0	0	0	0	0	0.00E+00
Exported heat	MJ	0	0	0	0	0	0	0.00E+00
FF48								
Parameter	Unit	A1) Raw material supply	A2) Transport	A3) Manufacture	A4) Distribution	A5) Installation	C4) Waste disposal	Total
Hazardous waste	kg	1.81E-02	2.95E-06	2.68E-05	8.87E-07	1.80E-02	5.40E-06	3.62E-02
Non hazardous waste	kg	9.13E-02	2.17E-01	1.40E+00	6.77E-02	5.41E-01	1.48E+01	1.71E+01
Radioactive waste*	kg	5.30E-05	3.23E-05	3.55E-06	9.95E-06	1.47E-04	2.93E-05	2.76E-04
Components for reuse	kg	0	0	0	0	0	0	0.00E+00
Materials for recycling	kg	0	0	0	0	0	0	0.00E+00

Materials for energy recovery	kg	0	0	0	0	0	0	0.00E+00
Exported electricity	MJ	0	0	0	0	0	0	0.00E+00
Exported heat	MJ	0	0	0	0	0	0	0.00E+00
FF64								
Parameter	Unit	A1) Raw material supply	A2) Transport	A3) Manufacture	A4) Distribution	A5) Installation	C4) Waste disposal	Total
Hazardous waste	kg	2.42E-02	3.93E-06	3.58E-05	1.18E-06	1.80E-02	5.44E-06	4.22E-02
Non hazardous waste	kg	1.22E-01	2.90E-01	1.87E+00	9.03E-02	5.49E-01	1.52E+01	1.81E+01
Radioactive waste*	kg	7.06E-05	4.31E-05	4.73E-06	1.33E-05	1.48E-04	2.97E-05	3.09E-04
Components for reuse	kg	0	0	0	0	0	0	0.00E+00
Materials for recycling	kg	0	0	0	0	0	0	0.00E+00
Materials for energy recovery	kg	0	0	0	0	0	0	0.00E+00
Exported electricity	MJ	0	0	0	0	0	0	0.00E+00
Exported heat	MJ	0	0	0	0	0	0	0.00E+00

FF96								
Parameter	Unit	A1) Raw material supply	A2) Transport	A3) Manufacture	A4) Distribution	A5) Installation	C4) Waste disposal	Total
Hazardous waste	kg	3.62E-02	5.89E-06	5.36E-05	1.77E-06	1.80E-02	5.53E-06	5.43E-02
Non hazardous waste	kg	1.82E-01	4.34E-01	2.80E+00	1.35E-01	5.65E-01	1.60E+01	2.01E+01
Radioactive waste*	kg	1.06E-04	6.46E-05	7.10E-06	1.99E-05	1.48E-04	3.05E-05	3.76E-04
Components for reuse	kg	0	0	0	0	0	0	0.00E+00
Materials for recycling	kg	0	0	0	0	0	0	0.00E+00
Materials for energy recovery	kg	0	0	0	0	0	0	0.00E+00
Exported electricity	MJ	0	0	0	0	0	0	0.00E+00
Exported heat	MJ	0	0	0	0	0	0	0.00E+00
FF128								
Parameter	Unit	A1) Raw material supply	A2) Transport	A3) Manufacture	A4) Distribution	A5) Installation	C4) Waste disposal	Total
Hazardous waste	kg	4.83E-02	7.86E-06	7.15E-05	2.37E-06	1.80E-02	5.61E-06	6.64E-02
Non hazardous waste	kg	2.43E-01	5.79E-01	3.73E+00	1.81E-01	5.82E-01	1.68E+01	2.21E+01
Radioactive waste*	kg	1.41E-04	8.61E-05	9.46E-06	2.65E-05	1.48E-04	3.13E-05	4.42E-04
Components for reuse	kg	0	0	0	0	0	0	0.00E+00

Materials for recycling	kg	0	0	0	0	0	0	0.00E+00
Materials for energy recovery	kg	0	0	0	0	0	0	0.00E+00
Exported electricity	MJ	0	0	0	0	0	0	0.00E+00
Exported heat	MJ	0	0	0	0	0	0	0.00E+00

**No radioactive waste is produced during Rolan® operation.*

6.4 Additional environmental information.

Rolan® has a quality management system in place, which has been certified according to ISO 9001 by Bureau Veritas.

Rolan® thermoacoustic boards have been certified under the following standards:

- The Mexican Official Standard for Energy efficiency in industrial thermal insulation (NOM-009 ENER).
- The Mexican Official Standard for Thermal insulation for buildings – Characteristics and test methods (NOM-018 ENER).
- ASTM International Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing (ASTM C-665).

Rolan® is committed to protect the environment and work towards sustainability and has implemented an environmental management

system that helps the company control and monitor the consumption of materials, energy and water and the emissions to air and water discharges. Rolan® complies with the national standards of emissions to air (maximum permissible levels of emission from solid particle stationary sources NOM-043-SEMARNAT-1993) and to water (Requirements and regulation for waste water discharge NMX-AA-003-1980).

Rolan® products help to achieve thermal efficiency in buildings due to the following characteristics:

- ◆ Noncombustible.
- ◆ High R value for energy savings and outstanding thermal performance.
- ◆ Chemically inert, (they do not contribute to indoor air pollution).
- ◆ Asbestos free.
- ◆ Resistant to mold, fungal and bacterial growth.
- ◆ Excellent fire resistance.
- ◆ CFC and HCFC free.

7. Verification and registration

CEN standard EN 15804 served as the core PCR CEN	
Programme	International EPD® System www.environdec.com  EPD registered through the fully aligned regional programme/hub: EPD Latin America www.epdlatinamerica.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-00532
Date of publication (issue):	2021-12-15
Date of validity:	2026-12-15
Date of revision:	2021-12-15
Reference year of data:	2017
Geographical scope:	Mexico
Central product classification:	37990
PCR:	PCR 2012:01 Construction products and construction services Version 2.3 (2018-11-15) Sub-PCR EN 16783:2017 Thermal insulation product
PCR review was conducted by:	The Technical Committee of the International EPD® System. Chair: Massimo Marino. Contact via info@environdec.com

CEN standard EN 15804 served as the core PCR CEN	
Independent verification of the declaration data, according to ISO 14025:2006.	EPD process certification (Internal) <input checked="" type="checkbox"/> EPD verification (External)
Third-party verifier:	Rubén Carnerero Acosta, Approved EPD verifier r.carnerero@ik-ingenieria.com
Approved by:	The International EPD® System
Procedure for follow-up of data during EPD validity involves third-party verifier:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

8. Contact information

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LCA Study: Life Cycle Assessment (LCA)
methodology of Stone Wool Thermoacoustic
Boards

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