ACTIS

INNOVER POUR MIEUX ISOLER

ENVIRONMENTAL PRODUCT DECLARATION

HYBRIS 90 mm honeycomb insulation

Compliant with the NF EN 15804+A1 standard and its national NF EN 15804/CN supplement

EPD Checked as part of INIES program registration #: 3-471:2021
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Following the purchase order from:

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verso

I. Warning

The information contained in this declaration is provided under the responsibility of ACTIS Isolation (EPD producer) as per the NF EN 15804+A1 standard and its national supplement NF EN 15804/CN.

Any use of the information contained in this document, whether partial or complete, must at least contain a full reference to the original EPD as well as to its producer, who will be able to provide a complete copy.

For the record, the assessment results are based on facts, circumstances and assumptions submitted to the author by the order giver. If those facts, circumstances and assumptions differ, the results are likely to change.

The CEN EN 15804+A1 standard is used to define the Product Category Rules (PCR).

II. Reading guide

The inventory data is given in a format that complies with the NF EN 15804+A1 standard.
The values are given using simplified scientific notation: 0.0163 = $1.63.10^{-2}$ = 1.63E-2. To improve document legibility, there may be exceptions for zero, indicated as "0", meaning exactly zero.

Abbreviations used:

- LCA: Life Cycle Analysis
- VOC: Volatile Organic Compounds
- EPD: Environmental Product Declaration
- RPL: Reference Product Life
- RM: Raw Materials
- NC: Not Concerned
- LCV: Lower Calorific Power
- LDPE: Low Density Polyethylene
- FU: Functional Unit

III. Precautions when using the EPD to compare products

EPDs for building products cannot be compared if they do not comply with the NF EN 15804 standard.

The NF EN 15804 standard defines *the conditions in which building products can be compared based on information produced in the EPD in its section 5.3 EPD comparability for building products:*

"*A comparison of building product environmental performances using information from EPDs must be based on product use and its impacts on the building, and must take the entire lifecycle into account (all the information modules).*"

Contents

IV. General information

1. Manufacturer names and addresses

ACTIS Isolation
30, Avenue de Catalogne
11300 Limoux

2. The manufacturer or group of manufacturer site(s) or those of their representatives for which the EPD is representative

Film production: La Bastide de Bousignac, 09500 La Bastide de Bousignac site Production of the alveolar foam and product assembly: Flassian, 11300 Limoux site

3. EPD type: cradle to grave

4. EPD type: individual

5. Verification:

Monsieur Thomas Peverelli, an accredited verifier, has checked this declaration in compliance with the FDES INIES verification program. http://www.inies.fr/

6. Publication date: April 2021

7. End of validity date: April 2026

8. Commercial reference/product identification by its name: Hybris

V. Description of the functional unit and product

10. Description of the functional unit (or declared unit)

The assessed function unit (FU) is to provide the heat insulation, airtightness and vapour shield function on 1 m² of wall for a reference life of 50 years, using a thickness of de 90 mm and a thermal resistance R of 3.30 m_2.K/W (Rcore of 2.70 + non-ventilated air space of 0.60).

Hybris is a product of which the external surface is low emissivity, of which the emissivity is certified by the ACERMI organisation ("ACERMI certificate n° 15/189/1047 - HYBRIS" 2018)[1] at 0.06. The thermal resistance of the unventilated air space in direct contact with the product is determined using this hemispheric emissivity value. Furthermore, the TAD ("Technical Application Document 20/15-349 V2 - Wall insulation or additional insulation in panels or rolls of reflective products" 2017: Technical Application Document 20/16-373 - Attic space thermal insulation" 2016)$_1$ validates the systematic addition of an additional resistance to the thermal resistance of the Hybris product alone, corresponding to the thermal resistance of an air space adjacent to the Hybris® thermal resistance. This air space is systematically present through the presence of frames (timber or metal) used to support an interior finishing panel (plasterboard for example). The TAD therefore confirms that the installed resistance is certified.

11. Product description

Hybris insulation is next generation PE foam alveolar insulation. It is composed of a honeycomb structure that uses the thermal properties of highly effective natural insulation: air. The foam's alveolar geometry creates many inert air spaces separated by low emissivity, airtight reflective films that contribute to the insulation's thermal performances. Hybris has CE marking as per ETA (European Technical Assessment) n°18/0357 in compliance with EAD n°040007-00-1201.

[1] 1 http://www.actis-isolation.com/telechargements.html#certificats

12. Product use description (field of application)

Hybris insulation is a 3 in 1 product that provides winter/summer heat insulation, sound insulation and airtightness. It also includes the vapour shield function without any addition of further membranes Hybris panels are ACERMI certified (certificate n°15/189/1047 issued by the French National Test Laboratory certifying their thermal conductivity value (lambda = 0.033 W/m.K), their emissivity value (epsilon= 0.06) and their use profile (J1S1O2L2E5) - which validates its use for roofing, walls and attic floors. It has other certifications valid in other European countries:

- Q-MARK/LABC (Great Britain)[2]
- VTT (Finland)[3]
- DIT (Spain)[4]

The insulation is applied conventionally, behind or between the metal plasterboard frame, depending on whether the wall is masonry or timber frame. The frame is not taken into account in the EPD. The insulation firstly is easier to install due to its low density. Furthermore, it requires no eye and breathing protection equipment as it releases no irritant fibres or dust.

13. Other technical specifications not included in the functional unit

Hybris insulation has other specifications that are not part of the functional unit:

- Fire behaviour (EN 13501-1): F
- Seismic properties: zone 1 to 4
- Acoustic performance: measurements taken on a roof complex with 125 mm thick Hybris insulation[5] show an acoustic transmission loss of Rw: 44 (-2; -8) dB. No measurements have been made on 90 mm thick Hybris
- Summer comfort:
    - Optimised summer thermal resistance due to the unventilated air spaces,
    - Cool and dry interiors due to the water vapour leak tightness,
    - Protection from very high temperatures by metallised films tat reflect up to 95% of infra-red thermal radiation.

In terms of the installation environment, Hybris insulation can be installed anywhere in continental France, on all types of buildings, on walls, roofs and attic floors.

Finally in terms of interior decoration, Hybris insulation is compatible with all types of internal and external coverings. It is installed in the same way as conventional mineral wool.

14. Description of the product's main components and/or materials

Quantity of product for 1m$_2$ of wall: 736 g of Hybris® insulation, of which 710 g of PE.
The waste rates are the following:

- Production waste rates: 9% by weight and surface area
- Waste during installation: 2% by weight and surface area

[2] http://www.insulation-actis.com/files/actis/pdfs/en/certificates/LABC/LABC-LABSS-certificate-EWS462-ACTIS-Insulation-HYBRIS-042017.pdf
[3] http://www.actis-isolation.com/documentations/123pdf3.pdf
[4] http://www.aislamiento-actis.com/files/actis/pdfs/es/certificado/ACTIS-certificado-DIT-628-17-SISTEMA-HYBRID-07-07-22.pdf
[5] http://www.actis-isolation.com/files/actis/pdfs/fr/certificats-rapports%20d-essais/Isolants/HYBRIS%20-%20PV%20acoustique%20FCBA%20404-15-254-1.pdf

15. Indicate whether the product contains substances on the REACH regulation candidate list (if in excess of 1% by weight): None

16. Description of the reference product life (if applicable and compliant with 7.2.2 of NF EN 15804)

Parameter	Value
Reference product life	50 years A reference product life of 50 years corresponding to the default building life value is used because the product is PE based, an inert, inalterable material regardless of the temperature and humidity conditions that could be encountered in a wall or on the roof of a building.
Declared product properties (on exit from the factory) and finishes, etc.	ACERMI certification n°15/189/1047[6] : Thermal conductivity lambda = 0.033 W/m.K, Emissivity epsilon= 0.06 Use profile I1S1O2L2E5 CE marking as per ETA (European Technical Assessment) n°18/0357 in compliance with EAD n°040007-00-1201
Theoretical application parameters (if imposed by the manufacturer), including reference to the appropriate practices Works quality presumed when the installation is compliant with the manufacturer's instructions	Installation must comply with Technical Application Documents[6]: Walls: Technical Application Document reference 20/15-349_V2 Roofs: Technical Application Document reference 20/16- 373
Exterior environment (for external applications), for example bad weather, pollutants, UV exposure and wind, building orientation, shade, temperature Interior environment (for indoor applications), for example temperature, humidity, exposure to chemicals	The product has been installed in all types of building all over continental France.
Use conditions, for example frequency of use, mechanical exposure	The use of the product is considered compliant with the product technical document recommendations.
Maintenance, for example required frequency, type and quality of replaceable component replacements.	None

VI. Lifecycle stages

The following figure shows the product lifecycle.

[6] http://www.actis-isolation.com/telechargements.html#certificats

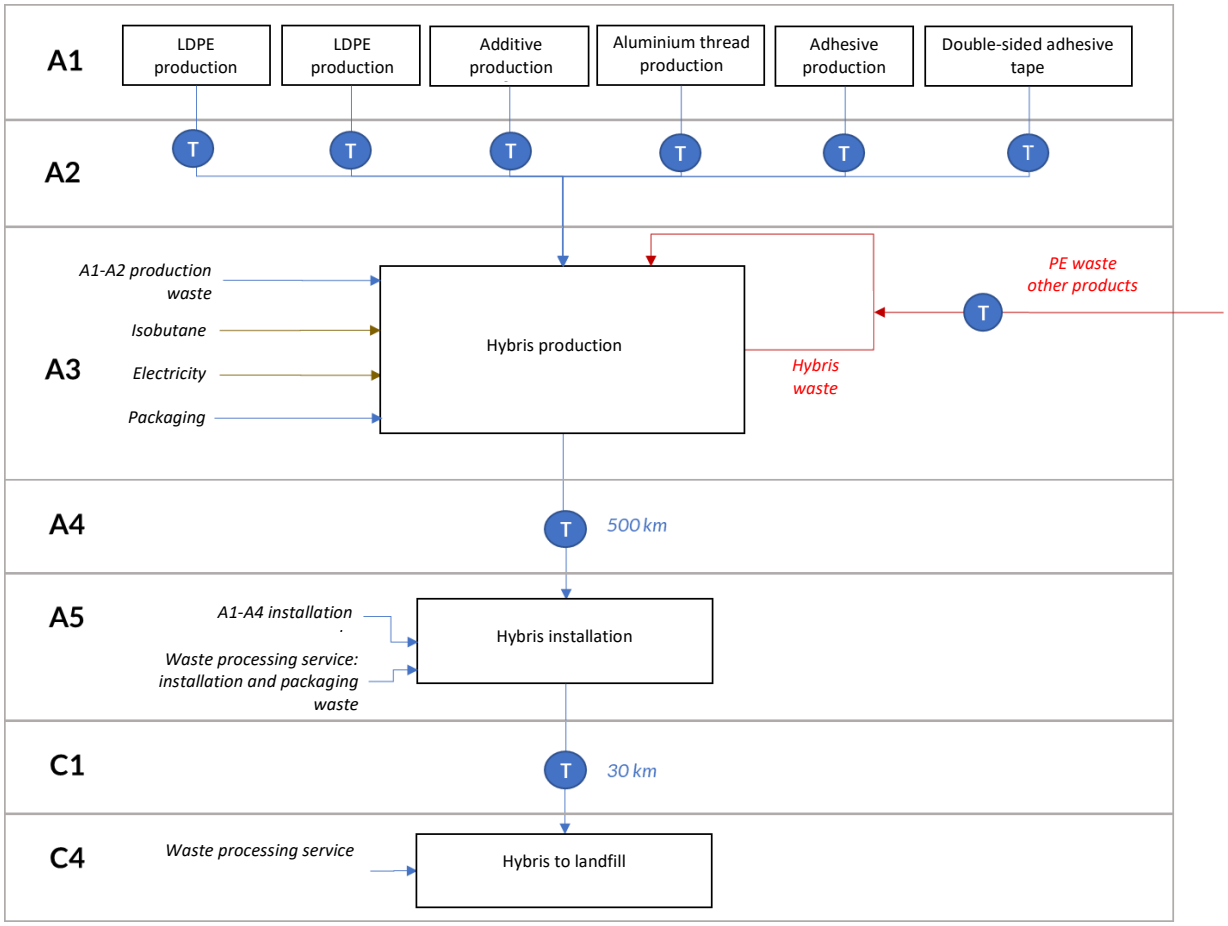
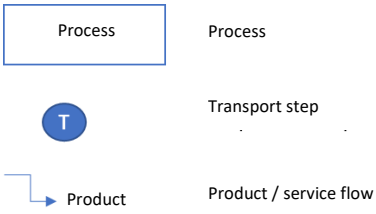


Figure 1: Hybris Lifecycle

Key:



VI.1. Production stage, A1-A3

The production stage includes:

- Raw material (RM) production: PE, additives and aluminium.
- The transport of those RMs to the Hybris® production site
- The production of Hybris including energy consumption, transport of production waste (closed loop recycling) and packaging.

VI.2. Building stage, A4-A5

Transport to the installation site:

Parameter	Value
Vehicle fuel type and consumption or vehicle type used for transport, for example long-haul truck, ship, etc.	Semi-trailer with an authorised total load of 44 tonnes running on diesel.
Distance to the installation site	500 km (average weighted distance to Hybris weight sold in 2019 and 2020)
Use of capacity (including empty return trips)	2.1 tonnes of goods per truck on the outward journey (use of 100% volume capacity), variable but not nil weight on the return journey. Diesel consumption and the associated CO_2 emissions of the generic set of ecoinvent data (which considers an average load of 15.96 tonnes) have been increased to take into account the actual load. This adjustment was made based on the COPERT method.
Bulk density of transported products	9.13 kg/m_3

Installation in the building:

Parameter	Value
Auxiliary inputs for installation (indicated by material)	None
Water use	0 m_3
Other resource use	None
Quantitative description of the energy type (regional mix) and consumption during the installation process	0 kWh
Waste produced on site before the processing of the waste generated by the product installation (indicated by type)	0.02 m_2 of Hybris / m_2 of insulation
Materials (by type) produced by the processing of waste on the construction site, for example collection for recycling, energy production, disposal (indicated by channel)	The waste is inert waste sent to landfill Packaging waste is sent for incineration.
Direct emissions into ambient air, the ground and water	None

VI.3. Use stage (exclusion of potential savings), B1-B7

Hybris is neutral when used and no maintenance or use of water or energy are required during the Hybris® use life.

Maintenance:

Parameter	Value/description
Maintenance process	Not Concerned (NC)
Maintenance cycle	NC
Auxiliary inputs for maintenance (cleaning products for example, indicate the materials)	NC
Product waste during maintenance (indicate by material)	NC
Net fresh water consumption during maintenance	NC

Energy inputs during maintenance (for example cleaning using a vacuum cleaner), type of energy vector, for example electricity, and quantity, if applicable and relevant	NC

Repairs:

Parameter	Value/description
Repair process	NC
Inspection process	NC
Repair cycle	NC
Auxiliary inputs (lubricant for example, indicate the materials)	NC
Product waste during repairs (indicate the materials)	NC
Net fresh water consumption during repairs	NC
Energy inputs during repairs (for example crane use), type of energy vector, for example electricity, and quantity	NC

Replacement:

Parameter	Value/description
Replacement cycle	NC
Energy inputs during rehabilitation (for example use of a crane), type of energy vector, for example electricity, and quantity, if applicable and relevant	NC
Wear part replacement during the product lifecycle, indicate the materials	NC

Rehabilitation:

Parameter	Value/description
Rehabilitation process	NC
Rehabilitation cycle	NC
Material inputs for rehabilitation (bricks, for example) including auxiliary inputs for the rehabilitation process (lubricant, for example, indicate the materials)	NC
Product waste during rehabilitation (indicate the materials)	NC
Energy inputs during rehabilitation (for example use of a crane), type of energy vector, for example electricity, and quantity, if applicable and relevant	NC
Other assumptions used to define scenarios (frequency and duration of use, number of occupants, for example)	NC

Energy and water use:

Parameter	Value/description
Auxiliary inputs indicated by material	NC
Net fresh water consumption	NC
Energy vector type (electricity, natural gas, urban heating, for example)	NC
Equipment output power	NC
Characteristic performance (energy efficiency, performance variations depending on capacity use, for example)	NC

Other assumptions used to define scenarios (frequency and duration of use, number of occupants, for example)	NC

VI.4. End of life stage C1-C4

End of life:

Parameter	Value/description
Collection process indicated by type	0.736 kg collected with mixed construction waste
Recovery process indicated by type	NC
Elimination indicated by type	0.736 kg of product or material for final elimination
Assumptions for the definition of scenarios (transport, for example)	C1: Hybris can be separated from the construction system during the removal of partition walls and uprights. It is neither bonded nor mechanically fixed to the system and can therefore be removed by hand. Therefore, no impacts are assigned to this stage. C2: The transport distance considered from the demolition site to the storage site is 30 km. C3/4: Hybris insulation is in the non-inert and non-hazardous waste category. It is 100% recyclable subject to having been sorted and when the waste is sent to a specialised processing facility. According to (Chateau 2016) and ("Work site waste - the answers to your questions" 2014), non hazardous and non-inert waste is most often sent to a non-hazardous class II waste storage facility. This is the scenario used for the C4 module in this study. No impacts are assigned to module C3

VI.5. Recycling/reuse/recovery potential, D

The recycling / reuse / recovery potential is currently unknown.

VII. Information for the lifecycle analysis calculation

PCR used	NF EN 15804+A1: 2014 and NF EN 15804/CN: 2016
System boundaries	From cradle to grave in compliance with the PCR rules
Assignments	Based on physical criteria except in cases of major revenue differences, in compliance with the PCR rules Generic data from the ecoinvent 3.6 database (*allocation of recycled content*).
Geographical representativeness and time representativeness of the primary data	The specific data for modules A1, A2 and A3 was collected from ACTIS in 2020, estimated based on an average of 2019 data. It especially covers the declared product production and installation technology. The activity data for modules A1, A2 and A3 was generated based on information provided by the ACTIS management control department. The specific data for the other modules was collected from ACTIS in 2020 estimated as valid in 2020 for distribution in continental France.
Result variability	Not applicable.

VIII. Lifecycle analysis results

VIII.1. Impacts on the environment

Impacts on the environment	Production stage			Installation stage		Use stage							End of life stage				
	A1 Raw material supply	A2 Transport	A3 production	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repairs	B4 Replacement	B5 Rehabilitation	B6 Energy use	B7 Water use	C1 Deconstruction/ demolition	C2 Transport	C3 Waste processing	C4 Elimination	D Benefits and loads beyond the system boundaries
Global warming kg CO_2 eq/FU	1.26	0.098	0.43	0.17	0.045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.004	0.0	0.082	0.0
Ozone layer depletion kg CFC 11 eq/FU	5.5E-08	1.8E-08	1.6E-07	1.8E-08	5.3E-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.7E-10	0.0	1.9E-09	0.0
Ground and water acidification kg SO_2 eq/FU	4.5E-03	3.1E-04	1.6E-03	3.7E-04	1.6E-04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2E-05	0.0	5.2E-05	0.0
Eutrophication kg $(PO_4)^{3-}$ eq/FU	1.5E-03	7.2E-05	5.5E-04	8.0E-05	3.1E-04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7E-06	0.0	3.8E-03	0.0
Photochemical ozone formation kg C_2H_4eq/FU	7.2E-04	1.3E-05	2.6E-02	1.6E-05	5.3E-04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.9E-07	0.0	1.6E-05	0.0
Abiotic resource depletion (elements) kg Sb eq/FU	1.2E-05	2.7E-06	3.6E-06	6.2E-07	4.0E-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0E-07	0.0	8.4E-08	0.0
Abiotic resource depletion (fossil) MJ/FU	45.2	1.6	12.6	1.6	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.0
Water pollution m^3/FU	47.8	10.6	44.9	9.0	3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	16.3	0.0
Air pollution m^3/FU	79.9	8.6	799.2	5.6	18.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.8	0.0

VIII.2. Resource use

Resource use	Production stage			Installation stage		Use stage							End of life stage				
	A1 Raw material supply	A2 Transport	A3 production	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repairs	B4 Replacement	B5 Rehabilitation	B6 Energy use	B7 Water use	C1 Deconstruction/ demolition	C2 Transport	C3 Waste processing	C4 Elimination	D Benefits and loads beyond the system boundaries
Use of renewable primary energy excluding renewable primary energy resources used as raw materials MJ/ FU	0.8	0.0	1.2	0.0	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Use of renewable primary energy resources as raw materials MJ/FU	0.7	0.0	2.0	0.0	0.1	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) MJ/ FU	1.5	0.0	3.2	0.0	0.1	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials MJ/ FU	22.9	1.6	25.7	1.6	1.1	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.0
Use of non-renewable primary energy resources as raw materials MJ/FU	26.3	0.0	3.6	0.0	0.6	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) MJ/ FU	49.2	1.6	29.4	1.6	1.7	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.0
Use of secondary materials kg/FU	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Use of secondary renewable fuels MJ/FU	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Use of secondary non-renewable fuels MJ/FU	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net fresh water use m^3/FU	2E-02	2E-04	9E-03	7E-05	7E-04	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	6E-06	0.0	2E-04	0.0

VIII.3. Waste categories

Waste category	Production stage			Installation stage		Use stage							End of life stage				
	A1 Raw material supply	A2 Transport	A3 production	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repairs	B4 Replacement	B5 Rehabilitation	B6 Energy use	B7 Water use	C1 Deconstruction/ demolition	C2 Transport	C3 Waste processing	C4 Elimination	D Benefits and loads beyond the system boundaries
Eliminated hazardous waste kg/FU	2.6E-02	9.6E-04	1.3E-02	4.7E-04	1.8E-03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Eliminated non-hazardous waste kg/FU	0.18	0.08	0.15	0.05	0.05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Eliminated radioactive waste kg/FU	3.9E-05	1.0E-05	2.4E-04	1.0E-05	6.0E-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8E-07	0.0	1.1E-06	0.0

VIII.4. *Outgoing* flows

Waste category		Production stage			Installation stage		Use stage							End of life stage				
		A1 Raw material supply	A2 Transport	A3 production	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repairs	B4 Replacement	B5 Rehabilitation	B6 Energy use	B7 Water use	C1 Deconstruction/ demolition	C2 Transport	C3 Waste processing	C4 Elimination	D Benefits and loads beyond the system boundaries
Components for reuse kg/FU		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Materials for recycling kg/FU		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Materials for energy recovery kg/FU		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Energy supplied externally (per energy vector) MJ/FU	Electricity	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Steam	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Process gas	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

IX. Impacts / flows relating to the entire lifecycle

Impact / flow category		Production total	Installation total	Use total	End of life total	Lifecycle total	Module D
Global warming	kg CO_2 eq/FU	1.79	0.21	0.00	0.09	2.09	0.0
Ozone layer depletion	kg CFC 11 eq/FU	2.4E-07	2.4E-08	0.0	2.6E-09	2.6E-07	0.0
Ground and water acidification	kg SO_2 eq/FU	6.4E-03	5.4E-04	0.0	6.3E-05	7.0E-03	0.0
Eutrophication	kg $(PO_4)^{3-}$ eq/FU	2.1E-03	3.9E-04	0.0	3.9E-03	6.3E-03	0.0
Photochemical ozone formation	kg C_2H_4eq/FU	2.6E-02	5.5E-04	0.0	1.7E-05	2.7E-02	0.0
Abiotic resource depletion (elements)	kg Sb eq/FU	1.9E-05	1.0E-06	0.0	1.8E-07	2.0E-05	0.0
Abiotic resource depletion (fossil)	MJ/FU	5,9E+01	2,8E+00	0.0	2.5E-01	6,2E+01	0.0
Water pollution	m_3/FU	1,0E+02	1,3E+01	0.0	1,7E+01	1,3E+02	0.0
Air pollution	m_3/FU	8,9E+02	2,4E+01	0.0	1,2E+00	9,1E+02	0.0
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ/FU	2,0E+00	4.7E-02	0.0	3.0E-03	2,1E+00	0.0
Use of renewable primary energy resources as raw materials	MJ/FU	2,7E+00	5.7E-02	0.0	1.0E-03	2.8E+00	0.0
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ/FU	4,7E+00	1.0E-01	0.0	4.1E-03	4,8E+00	0.0

Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ/FU	5,0E+01	2,6E+00	0.0	2.6E-01	5,3E+01	0.0
Use of non-renewable primary energy resources as raw materials	MJ/FU	3,0E+01	6.0E-01	0.0	2.6E-06	3,1E+01	0.0
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ/FU	80.2	3.2	0.0	0.3	83.7	0.0
Net fresh water use	m_3/FU	3.1E-02	7.6E-04	0.0	2.0E-04	3.2E-02	0.0
Eliminated hazardous waste	kg/FU	4.1E-02	2.3E-03	0.0	2.7E-04	4.3E-02	0.0
Eliminated non-hazardous waste	kg/FU	0.4	0.1	0.0	0.7	1.3	0.0
Eliminated radioactive waste	kg/FU	2.9E-04	1.6E-05	0.0	1.5E-06	3.0E-04	0.0
Components for reuse	kg/FU	0,0E+00	0,0E+00	0.0	0,0E+00	0,0E+00	0.0
Materials for recycling	kg/FU	0,0E+00	0,0E+00	0.0	0,0E+00	0,0E+00	0.0
Materials for energy recovery	kg/FU	0,0E+00	0,0E+00	0.0	0,0E+00	0,0E+00	0.0
Energy supplied externally (electricity) MJ/FU	MJ/FU	0,0E+00	0,0E+00	0.0	0,0E+00	0,0E+00	0.0
Energy supplied externally (steam)	MJ/FU	0,0E+00	0,0E+00	0.0	0,0E+00	0,0E+00	0.0
Energy supplied externally (gas)	MJ/FU	0,0E+00	0,0E+00	0.0	0,0E+00	0,0E+00	0.0

X. Additional information on the release of hazardous substances into interior air, the ground and water during the use stage

X.1. Interior air

The product is not exposed to interior air once installed in the building.

Substances / gas / radiation potentially released	**Product information**
Volatile Organic Compounds (VOC)	The measurement of volatile organic compounds (VOC) for the Hybris® insulation as per the NF EN ISO 16000 standard for indoor air quality (Report N°G1686JA, March 2013) shows a level below the 2 µg/m3 detection threshold knowing that 1000 µg/m3 is the maximum threshold for the A+ classification (very low emissions). It therefore has undetectable emissions that are well below the very low emissions threshold. See result table taken from the report in the figure under the table.
Viable particles, including micro-organisms such as small insects, protozoa, mould, bacteria and viruses	NC
Non-viable particles (including fibres), such as fibres and particles in suspension whether inhalable or non inhalable, dust	NC
Radon and other gases (CO, CO_2, Nox, SOx, hydrocarbons)	NC
Radiation	NC

Figure 2: VOC emission measurement result table (Report N°G1686JA, March 2013)

	Concentration after 28 days µg/m³	C	B	A	A+
VOC	<2	>2000	<2000	<1500	<1000
Formaldehyde	<4	>120	<120	<60	<10
Acetaldehyde	<4	>400	<400	<300	<200
Toluene	<2	>600	<600	<450	<300
Tetrachloroethylene	<2	>500	<500	<350	<250
Ethylbenzene	<2	>1500	<1500	<1000	<750
Xylene	<2	>400	<400	<300	<200
Styrene	<2	>500	<500	<350	<250
2-Butoxyethanol	<2	>2000	<2000	<1500	<1000
Trimethylbenzene	<2	>2000	<2000	<1500	<1000
1,4-Dichlorobenzene	<2	>120	<120	<90	<60

X.2. Ground and water

Not concerned. The material is neither in contact with water for human consumption, nor with run-off water, infiltration water, the water table, ground water.

XI. Product's contribution to quality of life inside buildings

XI.1. Product specifications contributing to the creation of hygrothermal comfort conditions inside the building

Contribution of the insulation to thermal comfort and the reduction of thermal bridges

By its design and physical properties, the Hybris alveolar insulation is both lightweight and vertically rigid. It does not settle over time compared to heavier insulating materials.

This data is important for the long-term reduction of thermal bridges once the insulation has been installed. It has a positive impact on thermal comfort in winter by preventing cold wall effects and on the reduction of energy consumption by long-term insulating performance. The specifications are significant in the context of Energy Performance Diagnoses, in particular used to value assets after several years.

Contribution of the insulation to summer thermal and hygrometric comfort

Through its reflective properties, the alveolar insulation contributes to very effective summer thermal insulation. Its reflective films reflect up to 95% of infra-red thermal radiation. Considering the reversed thermal flows in summer, when Hybris is installed on sloping surfaces, the unventilated air space (between the insulation and the finish covering) provides even higher additional thermal resistance to that calculated in winter. This gain compensates the deterioration of thermal conductivity found in all insulation in summer to keep thermal conductivity in summer as good as that in winter.

A thermal study of the Conventional Indoor Temperature (CIT) taken into account in RT 2012 and carried out by an independent body using the Th-BCE2012 calculation method showed a gain of -1.4°C with Hybris compared to traditional insulation. By its summer performances, the Hybris alveolar insulation makes it possible to reduce the number of days of discomfort due to hot spells; data taken into account in RT 2012.

The American ASHRAE-55:2013 standard shows that a temperature of 25°C at a humidity rate higher than 50% leads to severe discomfort. Hybris insulation is airtight and vapour tight on both sides. It stops hot air saturated in water vapour migrating from the outside to the inside of the building, making it possible to keep the inside air cool and dry, and contributes to the occupants' thermal comfort.

XI.2. Product specifications contributing to the creation of acoustic comfort conditions inside the building

The Hybris alveolar insulation was designed to optimise its thermal and acoustic performances. Its "honeycomb" structure creates a network of closed absorbent foam cells that each act as sound traps. Noise is a wave that spreads through the air (300 m/s): airtightness is also a major criterion contributing to the Hybris® insulation's acoustic performance. Measurements taken on a roof complex with 125 mm thick Hybris insulation[7]show an acoustic transmission loss of Rw: 44 (-2; -8) dB.

XI.3. Product specifications contributing to the creation of visual comfort conditions inside the building

The product is compatible with all types of indoor covering making it possible to adapt the light reflection coefficient in walls and thus optimise natural and artificial light.

XI.4. Product specifications contributing to the creation of olfactory comfort conditions inside the building

No specific measurements have been made. The product does not participate in the building's olfactory comfort in normal use conditions.

XII. Positive environmental contribution

The Hybris alveolar insulation is technically fully recyclable thanks to its polyethylene based composition. It can be collected, crushed and re-granulated into polyethylene beads. Furthermore, the insulation production is part of an approach in which all residue (waste, scrap) is recycled in a "zero waste" production process. HYBRIS sales are currently not significant enough to justify the creation of a product recycling sector for the end of its life. Nevertheless, ACTIS has noted that a major part of site waste is plastic LDPE based film that could be recycled in ACTIS processes: studies are ongoing at ACTIS to develop an offer on the subject for its partners. In parallel, its customers - traders and distributors - must dispose of large quantities of plastic film and packaging (LDPE) and collecting this waste to process it has resulted in the recruitment of an engineer and the creation of an internal recycling department.

7 http://www.actis-isolation.com/files/actis/pdfs/fr/certificats-rapports%20d- essais/Isolants/HYBRIS%20-%20PV%20acoustique%20FCBA%20404-15-254-1.pdf

HYBRIS alveolar technology is based on the use of air's natural insulating properties (λ26) by trapping it between low emissivity film. The honeycomb structure creates a multitude of inert air cavities. As a result, HYBRIS insulation requires less RM and energy resources (water, electricity, etc.) for its production.

The lightness of the HYBRIS alveolar insulation also contributes to reduced fuel consumption for transport in addition to its very compact (patented) packaging on pallets.