



**ENVIRONMENTAL AND SANITARY DECLARATION SHEET OF THE WOOD-CEMENT
BLOCK HDIII 38/14 WITH INTEGRATED CORK INSULATION LAYER**

NF EN 15804+A1 and NF EN 15804/CN compliant

**March 2019
Registration n°: 1-40:2019**

ISOTEX[®]
BLOCCHI E SOLAI IN LEGNO CEMENTO



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1. WARNING

The information contained in this declaration are provided under the responsibility of ISOTEX (producer of the FDES) according to the standards NF EN 15804+A1 and the national complement NF EN 15804/CN Any exploitation, total or partial, of the information provided in this document must at least be accompanied by the complete registration reference to the Environmental and Sanitary Declaration Sheet (FDES) and its producer who will be able to give a complete copy

2. READING GUIDE

The display of the inventory data complies with the requirements of NF EN 15804 + A1. In the following tables, 2.53E-06 should be read: 2.53x10⁻⁶ (simplified scientific writing). The units used are specified in front of each flow, they are:

- the kilogram "kg"
- the gram "g"
- the liter "l"
- the kilowatt hour "kWh"
- the megajoule "MJ".

Abbreviations:

LCA: Life Cycle Assessment

EPD: Environmental Product Declaration¹

FDES: Environmental and Health Product Declaration

LCIA: Life cycle impact assessment

LHV : Low Heating Value

PCR: Product category rules


FU: Functional unit

3. PRECAUTION IN USE OF FDES FOR PRODUCTS COMPARISON

FDES for construction products may not be comparable if they are not compliant with NF EN 15804+A1. Paragraph 5.3 of the standard NF EN 15804+A1 stipulates the requirements for the comparison of the environmental performance of construction products based on their FDES: A comparison of the environmental performance of construction products, based on their FDES, shall be based on the use of the products and their impacts on the building, and shall account for the entire life cycle of the product (i.e. include all information modules).

¹ The literally translation of EPD (Environmental Product Declaration) in French is DEP (Déclaration Environnementale de Produit). However, in France the term FDES (Fiche de Déclaration Environnementale et Sanitaire) is commonly used which group together the environmental declaration and the sanitary information for the product included in the present FDES.

4. GENERAL INFORMATION

| | |
|--------------------------------------|---|
| Name and address of the manufacturer | ISOTEX Srl Via D'Este, 5/7-5/842028 Poviglio (RE) www.blocchiisotex.com info@blocchiisotex.it |
| Production site | The FDES is representative of the wood cement blocks with integrated cork insulation layer manufactured in the ISOTEX plant at Poviglio (RE) – Italy according to 15498 standard. (block dimension (cm): 50x25x38 – thickness of the integrated insulation layer in cork: 14 cm) |
| Declaration type | <input type="checkbox"/> Cradle to factory gate <input checked="" type="checkbox"/> Cradle to grave <input checked="" type="checkbox"/> Individual <input type="checkbox"/> Collective |
| Verifier name | Marcel Gómez Ferrer Marcel Gómez Consultoría Ambiental www.marcelgomez.com , info@marcelgomez.com |
| Programme Operator | FDES-INIES Association HQE 4, avenue du Recteur Poincaré 75016 PARIS http://www.inies.fr/en/  |
| Publication date | March 2019 |
| Expiration date | 5 years |
| Name of commercial reference | ISOTEX® wood-cement block HDIII 38/14 with cork insulation layer |
| Geographical scope | Europe (destination in France) |

| |
|--|
| La norme EN 15804 du CEN sert de RCP ^{a)} |
| Vérification indépendante de la déclaration, conformément à l'EN ISO 14025:2010 <input type="checkbox"/> Interne <input checked="" type="checkbox"/> Externe |
| (Selon le cas ^{b)}) Vérification par tierce partie : Marcel Gómez Ferrer |
| ^{a)} Règles de définition des catégories de produits ^{b)} Facultatif pour la communication entre entreprises, obligatoire pour la communication entre une entreprise et ses clients (voir l'EN ISO 14025:2010, 9.4) |

This information is available at the following website: www.inies.fr

5. FUNCTIONAL UNIT AND PRODUCT DESCRIPTION

5.1. DESCRIPTION OF THE FUNCTIONAL UNIT

"To ensure the load-bearing wall function (structure and interior wall) on 1 m² of wall, while ensuring a thermal insulation (thermal resistance of 4.03 m²K / W ⁽²⁾) in addition to the external thermal insulation coating) and an acoustic insulation R_w (C, Ctr) = 54 (-2, -5) dB⁽³⁾) for 100 years. "

5.2. PRODUCT DESCRIPTION

The wood-cement block HDIII 38/14 - with insulation in cork produced by ISOTEX Srl is an element used for the construction of load-bearing wall systems. It is produced starting from fir wood grinded and refined, and bonded by cement Portland. The wood in input is recycled wood exclusively from pallets at end-of-life, selected and not treated, whereas the insulation layer in cork is inserted for improving the thermal performance.

The block dimension (in cm) is 50x25x38.

5.3. DESCRIPTION OF THE USE OF THE PRODUCT (SCOPE)

The wood-cement block is used for the construction of wall systems.

5.4. OTHER TECHNICAL FEATURES NOT INCLUDED IN THE FUNCTIONAL UNIT

Blocks are compliant with the standard UNI EN 15498 "Precast concrete products - Wood-chip concrete shuttering blocks - Product properties and performance". The main technical characteristics are reported in Table 1.

Table 1: main technical characteristics of the ISOTEX® wood-cement block HDIII 38/14 with cork

| Technical Characteristics | Value |
|---|-------|
| Maximum indicative load $R_{ck} \geq 30 \text{ N/mm}^2$ inter-floor h: 3,00 m [t/m] | 35 |
| Thermal transmittance U of finished wall (with plaster), including surfaces resistances (Three-dimensional method) [W/m ² K] ¹⁾ | 0.24 |
| Thermal transmittance U of finished wall (with plaster), including surfaces resistances (Two-dimensional method) [W/m ² K] ²⁾ | 0.21 |
| Periodic Thermal Transmittance Y_{IE} [W/m ² K] | 0.008 |

² Thermal resistance of the bare wall, without external cladding (without coating or other) and without internal finishing (without external thermal insulation coating), and not taking into account the surface resistances of walls.

³ Sound attenuation of the wall with a coating layer on the exterior façade, without external thermal insulation coating on the internal façade

| | |
|--|-----------------------|
| Summer phase shifts values | 14H06 |
| Acoustic insulation R_w [dB] of finished wall (with plaster) ³⁾ | 54 |
| Filling concrete [l/m^2] | 130 |
| Thickness of shells [cm] | 4.5 |
| Thickness filling concrete [cm] | 15 |
| Thickness of thermal insulation (cork) | 14 |
| Fire resistance REI class for concrete filled wall (without plaster) ⁴⁾ | 120 |
| Reaction to fire | Euroclass B-s1, d0 |

1) reference standards UNI EN 10355 and UNI EN ISO 6946

2) reference standards UNI EN ISO 6946, UNI EN 13788, UNI 10355 and UNI EN 10351

3) from Laboratory test in compliance with UNI EN ISO 10140 and UNI EN ISO 717;

4) from Laboratory test in compliance with NF EN 1365-1 and NF EN 13501-2.

5.5. DESCRIPTION OF MAIN COMPONENTS AND MATERIALS OF THE PRODUCT

The product's composition referred to 1 m² is reported in Table 2.

Table 2: Description of the main components and materials of the ISOTEX® wood-cement block HDIII 38/14 with cork (referred to 1 m² of product)

| Parameter | Unit | Value |
|---|-------------------|-------|
| % Wood-cement | % | 84.13 |
| of which % Recycled wood | % | 33.6 |
| % Insulation layer (cork) | % | 15.87 |
| Packaging for distribution (PP strap) | kg/m ² | 0.08 |
| Weight of finished product (at the factory gate) | Kg/m ² | 94 |
| Filling concrete (auxiliary product during installation) | kg/m ² | 307 |
| Weight for 1 m ² of functional unit (installation phase) | Kg/m ² | 401 |

5.6. SUBSTANCE IN THE CANDIDATE LIST OF THE REACH REGULATION

The product does not contain substances from the candidate list under the REACH regulation to more than 0.1% in mass.

5.7. DESCRIPTION OF THE LIFETIME

| Parameter | Value |
|---|--|
| Reference lifetime | 100 years The products are manufactured to be embedded in buildings, and as a such their lifetime is limited by the service life of the building (assumed to be equal to 100 years) |
| Declared product properties (when leaving the production site) and finishing, etc. | The products' performances are compliant with the EN15489 |
| Theoretical application parameters (if imposed by the producer), including references to the appropriate use practices | The ISOTEX® wood-cement blocks must be laid in accordance with the best practices in the manufacturer's implementation manual and the CSTB Technical Application Document 16 / 14-695_V1 |
| Presumed quality of work | The quality of work must meet the requirements of the above-mentioned documents. |
| Exterior environment (for exterior applications) | Under normal conditions of use, the blocks are not in direct contact with external environment |
| Interior environment (for interior applications) | Under normal conditions of use, the blocks are not in direct contact with indoor air. |
| Use conditions | The use of products is assumed complaint with the recommendations of the manufacture's implementation manual as well as the Technical Application Document 16 / 14-695_V1. Also compliant with the use in earthquake zones (as compliant with EN 1998-1) |
| Maintenance | Under normal conditions of use, any maintenance activity for masonry is required. |

6. LIFE CYCLE STAGES

The system boundaries are “from cradle to grave” as represented in Figure 1 and Table 3.

Figure 1: System boundary of the study for the wood cement blocks for wall systems

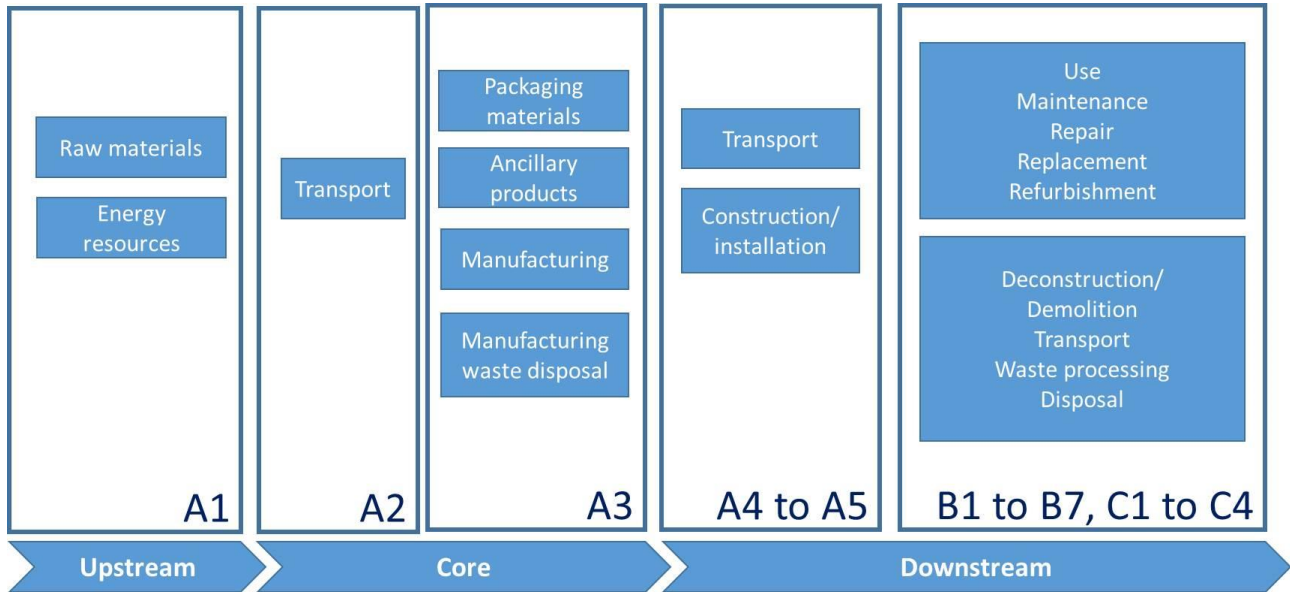


Table 3: Life cycle stages included in the study for wood cement blocks for wall systems

| PRODUCT STAGE | | | CONSTRUCTION PROCESS STAGE | | USE STAGE | | | | | END-OF-LIFE STAGE | | | | BENEFITS and LOADS BEYOND SYSTEM BOUNDARY |
|---------------------|-----------|---------------|----------------------------|---------------|-----------|-------------|--------|-------------|---------------|-------------------|-----------|------------------|----------|---|
| A1 | A2 | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | C1 | C2 | C3 | C4 | D |
| Raw Material Supply | Transport | Manufacturing | Transport from the | Construction, | Use | Maintenance | Repair | Replacement | Refurbishment | Deconstruction, | Transport | Waste processing | Disposal | Reuse, Recycling potential |
| x | x | x | x | x | x | x | x | x | x | x | x | x | x | Mnd* |

* Module Not Declared

6.1. PRODUCT STAGE - A1-A3

The product stage includes the following phases:

Raw Material supply (A1). Production of raw materials used in the products, as well as the production of energy carriers used in the production process.

Transport of raw materials to the factory and internal handling (A2)

Manufacturing of the blocks (A3). It includes:

- Collection and storage of (recycled) wood
- Grinding and refining of wood
- Creation of the mixture of wood-cement
- Moulding of blocks and check on semi-finished products
- Aging of blocks
- Milling of blocks
- Inserting of insulation (cork)
- Final check on finished products and packaging.

Moreover, in module A3, the production of primary packaging and of the ancillary materials and the treatment of waste generated from the manufacturing processes are accounted for.

The purchased electricity used in the manufacturing processes is from a specific supplier from Italy.

The reference year of the study is 2017.

6.2. CONSTRUCTION PROCESS STAGE - A4-A5

Transport to the construction site (A4)

| Parameter | Value/description |
|--|---|
| Fuel type and vehicle fuel consumption or type of vehicle used for transportation | Truck-trailer, Euro 5, 28 - 34t gross weight / 22t payload capacity (diesel driven) |
| Average distance to the installation site | 666 km |
| Utilisation ratio (including an empty return) | 0.9 % |
| Volumetric mass density of transported products | See Table 2 |
| Coefficient of utilization of the volume capacity | < 1 |

Construction/Installation (A5). In this stage the production of filling concrete (class 25/30) and the disposal of primary packaging as well as the construction waste are accounted for. For all the waste, it has been assumed a disposal in landfill, as conservative approach.

| Parameter | Value/description |
|--|--|
| Auxiliary inputs for installation (kg) | Filling concrete 307 kg/m ² |
| Water consumption (m ³) | N/A |
| Use of other resources | N/A |
| Quantitative description of the energy (type and amount) used during the installation process | N/A |
| Waste produced onsite prior to the treatment of waste generated by the product installation | 0,08 plastic strap (primary packaging) |
| Materials (specified by type) produced by waste treatment on construction site (ex : collect for recycling, ...) | 3% of product weight (wood-cement and cork insulation layer) sent to inert material landfill |
| Direct emissions to air, soil and water | N/A |
| Scenario description | The installation of the blocks is performed manually and does not require any specific tool. |

6.3. USE STAGE – B1-B7

No maintenance and replacement should be considered under normal condition of use of ISOTEX® wood cement blocks, therefore it has been assumed that those modules are negligible.

Due to the product characteristics, no carbonatation process occurs in the use stage.

6.4. END OF LIFE STAGE – C1-C4

Demolition (C1). In this phase the diesel consumption of a demolition machine and the emissions related to the diesel combustion are accounted for.

Transport (C2). In this phase the transport of the mixed waste generated during the demolition to disposal is accounted for.

Waste processing (C3): This module has been assumed as negligible as, based on the information provided by the company, the wood cement blocks are usually disposed as inert materials to landfill, therefore a preliminary waste process would not be necessary.

Disposal (C4): A landfill disposal as inert material for wood-cement (including the embedded concrete and the insulation material) has been assumed, based on the product characteristics.

| Parameter | Value/description |
|---------------------------------------|---|
| Waste collection by waste type | Mixed collection with deconstruction waste for landfilling (401 kg) |
| Disposal specified by type | All the waste generated during the demolition of the blocks (wood-cement, insulation layer and embedded concrete) are sent to landfill (as conservative approach) |
| Scenario description | A transport of 100 km with a truck Euro 4, more than 32t gross weight / 24.7t payload capacity (diesel driven) and an utilization ratio of 0.61% has been considered. |

7. INFORMATION FOR THE LIFE CYCLE CALCULATION

EN 15804+A1 standard of the CEN is used as Product Category Rule (PCR) for the present FDES.

The system boundaries are from cradle to grave.

Regarding the exclusion of product life cycle stages and processes, the capital goods, the primary packaging of the cork have not been accounted for.

The allocation of the total consumptions of energy and ancillary materials for the manufacturing (site level data) are based on the mass of wood cement, as well as waste, with the exception of:

- insulation waste, which are allocated based on insulation content;
- PE film from the packaging of the purchased polypropylene strap, which is allocated based on the strap used for the packaging of the finished products.

For the majority of the raw materials as well as for the packaging for the finished products an European production is assumed.

A default mean of transportation (truck Euro 4 > 32 t) with an utilisation ratio of 0.61 has been assumed when primary data on transport were not available.

All the impacts related to the on-site production of energy have been allocated to the manufacturing process as conservative approach.

For modelling the specific electricity mix purchased by ISOTEX from an Italian electricity supplier, the Guarantee of Origin (GO) certificate was used as reference for the composition of the energy sources, more in detail the last GO available at the moment of the development of the present FDES, i.e. 2016.

Primary data from the company have been collected for modules A2, A3 and A4. For the other modules, secondary data retrieved from GaBi software (version 8.0.6.0.20) have been used. The latter are not older than 5 years. LCIA method used in the study is CML 2001 version 4.1 (October 2013)

8. LCA RESULTS

Table 4: Environmental impacts for 1 m² of ISOTEX® wood cement HDIII 38/14 NS (cork)

| Impact category | HDIII 38/14 NS cork | | | | | | | | | | | | | | | | | |
|---|---------------------|----------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|----------|----------|----------|-----------|----------|
| | Module | | | | | | | | | | | | | | | | | |
| | tot A1-A3 | A4 | A5 | tot A4-A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | tot B1-B7 | C1 | C2 | C3 | C4 | tot C1-C4 | TOT |
| Abiotic Depletion (ADP elements) [kg Sb-Equiv.] | 1.31E-05 | 2.48E-07 | 1.55E-06 | 1.79E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.29E-08 | 2.17E-07 | 0.00E+00 | 8.78E-07 | 1.13E-06 | 1.60E-05 |
| Abiotic Depletion (ADP fossil) [MJ] | 3.03E+02 | 4.14E+01 | 1.52E+02 | 1.94E+02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.25E+00 | 3.62E+01 | 0.00E+00 | 8.26E+01 | 1.22E+02 | 6.19E+02 |
| Acidification Potential (AP) [kg SO ₂ -Equiv.] | 7.78E-02 | 6.52E-03 | 5.96E-02 | 6.61E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.19E-04 | 1.12E-02 | 0.00E+00 | 3.75E-02 | 4.96E-02 | 1.94E-01 |
| Eutrophication Potential (EP) [kg Phosphate-Equiv.] | 1.40E-02 | 1.56E-03 | 9.55E-03 | 1.11E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.16E-04 | 2.80E-03 | 0.00E+00 | 5.15E-03 | 8.17E-03 | 3.33E-02 |

| | | | | | | | | | | | | | | | | | | |
|--|-----------------|----------|----------|-----------------|----------|----------|----------|----------|----------|----------|----------|-----------------|----------|----------|----------|----------|-----------------|-----------------|
| Global Warming Potential (GWP 100 years) [kg CO2-Equiv.] | 4.76E+01 | 2.97E+00 | 2.97E+01 | 3.27E+01 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.50E-01 | 2.57E+00 | 0.00E+00 | 6.07E+00 | 8.89E+00 | 8.92E+01 |
| Ozone Layer Depletion Potential (ODP, steady state) [kg R11-Equiv.] | 7.58E-10 | 1.26E-13 | 2.91E-11 | 2.93E-11 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.87E-14 | 1.11E-13 | 0.00E+00 | 1.45E-12 | 1.59E-12 | 7.89E-10 |
| Photochem . Ozone Creation Potential (POCP) [kg Ethene-Equiv.] | 8.44E-03 | 5.88E-04 | 6.11E-03 | 6.70E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.98E-05 | 7.12E-04 | 0.00E+00 | 3.10E-03 | 3.90E-03 | 1.90E-02 |
| Water pollution [m3/UF] | 2.11E+00 | 2.81E-01 | 1.48E+05 | 1.48E+05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.57E-02 | 2.46E-01 | 0.00E+00 | 8.52E-01 | 1.12E+00 | 1.48E+05 |
| Air pollution [m3/UF] | 2.13E+06 | 2.97E+04 | 4.95E+05 | 5.24E+05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.19E+03 | 2.58E+04 | 0.00E+00 | 5.56E+05 | 5.83E+05 | 3.24E+06 |

8.1. INDICATORS OF RESOURCES USE, WASTE AND OUTPUT FLOWS

Table 5: Indicators of resources use for 1 m² of ISOTEX® wood cement block HDIII 38/14 NS (cork)

| Indicators of resources use | HDIII 38/14 NS cork | | | | | | | | | | | | | | | | TOT | | |
|------------------------------------|---------------------|-----------------|----------|----------|-----------------|----------|----------|----------|----------|----------|----------|----------|-----------------|----------|----------|----------|----------|-----------------|-----------------|
| | Module | tot A1-A3 | A4 | A5 | tot A4-A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | tot B1-B7 | C1 | C2 | C3 | | C4 | tot C1-C4 |
| PERE [MJ, net calorific value] | | 3.62E+02 | 2.17E+00 | 2.40E+01 | 2.62E+01 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.70E-01 | 1.90E+00 | 0.00E+00 | 1.06E+01 | 1.28E+01 | 4.01E+02 |
| PERM [MJ, net calorific value] | | 3.71E+02 | 0.00E+00 | 1.11E+01 | 1.11E+01 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.82E+02 |
| PERT [MJ, net calorific value] | | 7.33E+02 | 2.17E+00 | 3.52E+01 | 3.73E+01 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.70E-01 | 1.90E+00 | 0.00E+00 | 1.06E+01 | 1.28E+01 | 7.83E+02 |
| PENRE [MJ, net calorific value] | | 3.33E+02 | 4.16E+01 | 1.68E+02 | 2.10E+02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.30E+00 | 3.64E+01 | 0.00E+00 | 8.57E+01 | 1.25E+02 | 6.68E+02 |
| PENRM [MJ, net calorific value] | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| PENRT [MJ, net calorific value] | | 3.33E+02 | 4.16E+01 | 1.68E+02 | 2.10E+02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.30E+00 | 3.64E+01 | 0.00E+00 | 8.57E+01 | 1.25E+02 | 6.68E+02 |

| | | | | | | | | | | | | | | | | | | |
|--------------------------------|-----------------|----------|----------|-----------------|----------|----------|----------|----------|----------|----------|----------|-----------------|----------|----------|----------|----------|-----------------|-----------------|
| SM [kg] | 3.04E+01 | 0.00E+00 | 9.12E-01 | 9.12E-01 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.13E+01 |
| NRSF [MJ, net calorific value] | 4.01E+01 | 3.11E-27 | 1.20E+00 | 1.20E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.58E-28 | 2.72E-27 | 0.00E+00 | 1.53E-20 | 1.53E-20 | 4.13E+01 |
| RSF [MJ, net calorific value] | 7.44E-15 | 2.05E-28 | 2.23E-16 | 2.23E-16 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.01E-29 | 1.79E-28 | 0.00E+00 | 1.30E-21 | 1.30E-21 | 7.67E-15 |
| FW [m3] | 3.27E-01 | 4.79E-02 | 1.38E-01 | 1.86E-01 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.07E-03 | 4.19E-02 | 0.00E+00 | 4.35E-01 | 4.84E-01 | 9.97E-01 |

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; NRSF = Use of non-renewable secondary fuels; RSF = Use of renewable secondary fuels; FW = Net use of fresh water

Table 6: Indicators of waste for 1 m² of ISOTEX® wood cement block HDIII 38/14 NS cork

| Indicator s of waste | HDIII 38/14 NS cork Module | | | | | | | | | | | | | | | | | |
|--|-------------------------------|----------|----------|-----------------|----------|----------|----------|----------|----------|----------|----------|-----------------|----------|----------|----------|----------|-----------------|-----------------|
| | tot A1- A3 | A4 | A5 | tot A4- A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | tot B1- B7 | C1 | C2 | C3 | C4 | tot C1- C4 | TOT |
| Hazardous waste disposed [kg] | 3.50E-06 | 2.19E-06 | 2.55E-06 | 4.75E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.22E-07 | 1.92E-06 | 0.00E+00 | 1.47E-06 | 3.72E-06 | 1.20E-05 |
| Non-hazardous waste disposed [kg] | 3.51E-01 | 3.34E-03 | 1.25E+01 | 1.25E+01 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.69E-04 | 2.92E-03 | 0.00E+00 | 4.02E+02 | 4.02E+02 | 4.15E+02 |
| Radioactive waste disposed [kg] | 1.16E-02 | 8.69E-05 | 6.20E-03 | 6.28E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.85E-05 | 7.61E-05 | 0.00E+00 | 1.24E-03 | 1.33E-03 | 1.92E-02 |

Table 7: Indicators of output flows for 1 m² of ISOTEX® wood cement block HDIII 38/14 NS cork

| HDIII 38/14 NS cork | | | | | | | | | | | | | | | | | | |
|---|-------------|----------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|----------|----------|----------|-----------|----------|
| Output flows | Module | | | | | | | | | | | | | | | | | TOT |
| | tot A1-A3 | A4 | A5 | tot A4-A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | tot B1-B7 | C1 | C2 | C3 | C4 | tot C1-C4 | |
| Components for reuse [kg] | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Materials for recycling [kg] | 2.56E+00 | 0.00E+00 | 1.30E-05 | 1.30E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Materials for energy recovery [kg] | 5.27E-04 | 0.00E+00 | 1.58E-05 | 1.58E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Exported energy (by energy vector) [MJ] | Electricity | 2.02E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| | Vapour | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

| | | | | | | | | | | | | | | | | | | |
|-------------|--------------|-------|-------|--------------|-------|-------|-------|-------|-------|-------|-------|--------------|-------|-------|-------|-------|--------------|--------------|
| Process gas | 0.00E | 0.00E | 0.00E | 0.00E | 0.00E | 0.00E | 0.00E | 0.00E | 0.00E | 0.00E | 0.00E | 0.00E | 0.00E | 0.00E | 0.00E | 0.00E | 0.00E | 0.00E |
| | +00 | +00 | +00 | +00 | +00 | +00 | +00 | +00 | +00 | +00 | +00 | +00 | +00 | +00 | +00 | +00 | +00 | +00 |

9. CONTRIBUTION OF THE PRODUCT TO THE HEALTH RISK ASSESSMENT AND TO LIFE QUALITY WITHIN THE BUILDING

9.1. CONTRIBUTION OF THE PRODUCT TO THE HEALTH RISK ASSESSMENT

Under normal conditions of use, the products are not into direct contact with the indoor air and as such the evaluation of parameters concerning the sanitary quality is not pertinent.

The product has no impact on the sanitary quality of the water since it is not in contact with rainwater or runoff.

9.2. CONTRIBUTION OF PRODUCTS TO LIFE QUALITY WITHIN BUILDING

As far as the comfort is concerned, performances against relevant parameters are reported in Table 8.

Table 8: Comfort performance of ISOTEX[®] wood cement block HDIII 38/14 (cork)

| Comfort parameter | Performance |
|---|-------------------------|
| THERMAL COMFORT | |
| Thermal transmittance U of finished wall (with plaster), including surfaces resistances (Three-dimensional method) | U: 0.21 |
| Thermal transmittance U of finished wall (with plaster), including surfaces resistances (Two-dimensional method) [W/m ² K] | U: 0.24 |
| Periodic Thermal Transmittance Y _{IE} [W/m ² K] | Y _{IE} : 0.008 |
| ACOUSTIC COMFORT - Acoustic insulation R_w [dB] of finished wall (with plaster)** | 54 dB |
| VISUAL COMFORT | Not applicable |
| OLFACTIVE COMFORT | Not applicable |

10. ADDITIONAL INFORMATION

Additional information on the company and on the products covered by the present EPD are available at <https://www.blocchiisotex.com/>

The LCA study and the present FDES have been issued with the technical scientific support of Ecoinnovazione S.r.l., spin-off ENEA (<http://ecoinnovazione.it/?lang=en>).



11. REFERENCE

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