

# Technical Specifications



## PRODUCT DESCRIPTION

The EcoCocon® Panel is a load-bearing twin-stud timber frame panel with homogenous straw infill, designed for constructing highly energy-efficient external walls. Each panel is custom-made to fit the architectural design. Panel types include standard panels, braced panels, lintels, sills, columns, and inclined gable wall elements.

The EcoCocon® Straw Wall System comprises additional layers applied to the EcoCocon panel. On the interior side, the system is certified with a 25-30 mm thick clay plaster applied directly onto the straw. An integral part of the system is the use of an airtight breather membrane on the exterior side of the panels. A 60 mm wood fibre board covers the membrane and can be finished with a diffusion-open render or ventilated facade.

EcoCocon® Straw Wall Variations include different combinations of tested layers and finishes applied to the EcoCocon Panel, providing different fire ratings thermal performance, and design solutions.

## DESCRIPTION OF USE

EcoCocon Panels are used for the construction of load-bearing external walls in low- to mid-rise residential and non-residential buildings, or for facade infill of skeleton frame buildings.

The EcoCocon Straw Wall System can be used in all climates, except for areas with permafrost.

## CUSTOM-MADE PRODUCTION

Production of EcoCocon Panels is project-based. A Panel Project outlining all the panel types and measurements is created based on 2D drawings or a 3D model of the building plans. It also serves as a site assembly plan for the building.

## PACKAGING, TRANSPORT AND STORAGE

Panels usually come in packages of 6 to 12 pieces strapped together. One package can weigh up to 1,000 kg. They can be transported by a lorry with a curtainside trailer protecting the panels from rain, or in a shipping container. A standard lorry can take around 140 m<sup>2</sup> of EcoCocon panels or 130 m<sup>2</sup> when accompanied by wood fibre boards.

For unloading, it is recommended to use a forklift, hydraulic fork positioner, or crane. EcoCocon panels must to be fully protected from any water or precipitation during unloading, storage and assembly. For handling and storage instructions, see the Warranty and the Assembly Guide.

## WALL ASSEMBLY

Each panel is specifically labelled according to its position in the Panel Project. The instructions outlined in the Assembly Guide must be followed during the assembly process as well as during the installation of subsequent layers.

For increased efficiency, it is possible to pre-assemble multiple panels before lifting them to a higher floor or to pre-assemble entire wall segments off-site.



# Benefits

## EXCELLENT THERMAL INSULATION



The EcoCocon Straw Wall System is a [Passive House certified component](#) and provides outstanding thermal insulation properties with no thermal bridges and easy to install airtightness system. The certificate provides U-values for PHPP calculation as well as pre-calculated thermal bridges.

## SMART AIRTIGHT AND DIFFUSION-OPEN CONCEPT

Airtightness is easily achieved by installing a breather membrane between the panel and the protective fibre board.

## QUICK AND PRECISE ASSEMBLY

Precision-cut prefabricated panels allow for simple and rapid installation on site. The average construction speed is 60 m<sup>2</sup> of wall per day for a team of 3 people, or 120 m<sup>2</sup> with the help of a crane.

## MADE TO MEASURE FOR ANY DESIGN

Panels are custom-made to fit any building design – residential, commercial, and public.

## NATURAL AND CIRCULAR



Composed of 98% natural, renewable materials with no additives, EcoCocon panels use wood and straw, a byproduct of wheat production. The panel production is zero waste, does not consume any water and uses little primary energy. The panels are Cradle to Cradle Certified®, ensuring responsible production and circularity in both biological and technical material cycles.

[Cradle to Cradle Certificate](#)

## CARBON SEQUESTRATION

Wood and straw in EcoCocon panels naturally capture and store atmospheric carbon dioxide through photosynthesis during the growth phase. The biogenic carbon content of the EcoCocon panel is 25.75 kg C per m<sup>2</sup> (equivalent to 94.6 kg sequestered CO<sub>2</sub>/m<sup>2</sup>).

[Environmental Product Declaration](#)

## FIRE RESISTANCE

The bare EcoCocon panel with a membrane on the exterior surface assures a fire resistance of 30 minutes, while the complete EcoCocon Straw Wall System provides 120 minutes fire resistance.

## EFFECTIVE SEISMIC PERFORMANCE

The panels exhibit good seismic resistance. The EVDR value, determined from tests, can aid in calculating EcoCocon panels for use in different seismic zones.

## OPTIMAL THERMAL PHASE SHIFTING

The high thermal mass of compressed straw in EcoCocon panels helps prevent overheating during summer and maintains warmth during cool nights, providing a comfortable living environment year-round.



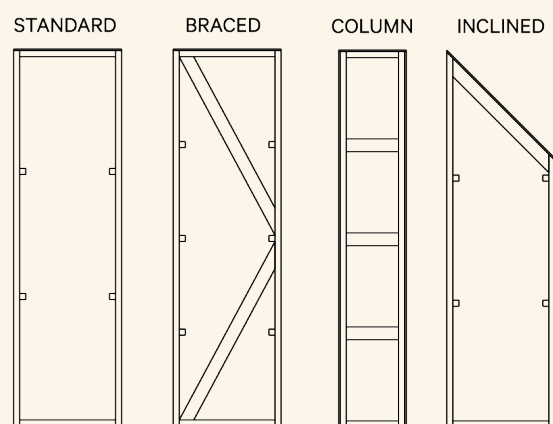
# Panel

The EcoCocon panel is made of a load-bearing twin stud frame with a straw infill with a homogenous density of 115 kg/m<sup>3</sup>.

## PRODUCTION SIZES

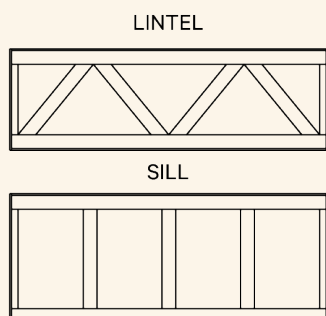
### Standard, braced, column & inclined panels

Thickness:	300 - 400 mm*
Width:	400 - 850 mm
Height:	400 - 3000 mm



### Lintel and sills

Thickness:	300 - 400 mm*
Width:	400 - 3000 mm
Height:	400 - 850 mm



\* Panels are certified according to NTA for thickness 400 mm only

## PANEL PERFORMANCE (400 mm thick)

Characteristic	Declared value
Reaction to fire classification	E
Resistance to fire*	REI 30
Thermal resistance R	6.6 (m <sup>2</sup> K)/W
Heat transfer coefficient U	0.15 W/(m <sup>2</sup> K)
Thermal conductivity λ	0.0645 W/mK
Phase shift	18 hours
Airborne sound insulation indicator R <sub>w</sub> (C;C <sub>tr</sub> ;C <sub>100-5000</sub> )	N/A
Water vapour resistance factor μ	N/A
Water impermeability	Ensured on building site
Impact resistance	N/A
Air permeability	Ensured
Durability	Class 2
Formaldehyde emission class	E1

\* Panel covered with an airtight membrane on the exterior side

## LOAD-BEARING CAPACITY

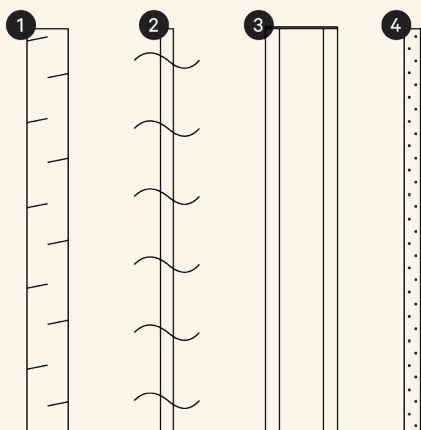
Panel type	Characteristic vertical load-bearing capacity (kN/m)
Standard panel	60.0
Braced panel	38.5

Panel type	Vertical design load-bearing capacity (kN/m) under horizontal load q (kN/m <sup>2</sup> )		
Horizontal load	0.8	1.2	1.6
Standard panel	54.5	52.5	50.0
Braced panel	33.5	30.5	28.0



The EcoCocon Straw Wall System includes these specific layers:

1. Protective wood fibre board
2. Airtight breather membrane
3. EcoCocon panel
4. 30 mm interior clay plaster



Characteristic	Declared value
Reaction to fire classification	B-s1, d0
Resistance to fire	REI 120 RElef 120
Thermal resistance R*	8.1 (m <sup>2</sup> K)/W
Heat transfer coefficient U*	0.12 W/(m <sup>2</sup> K)
Phase shift	25 hours
Airborne sound insulation indicator R <sub>W</sub> (C;C <sub>tr</sub> ;C <sub>100-5000</sub> )	54 (-1;-3;0)
Water vapour resistance factor μ	1.4
Water impermeability	Ensured on building site
Impact resistance	Ensured
Air permeability	Ensured
Durability	Class 2
Formaldehyde emission class	E1

## SYSTEM PERFORMANCE

The declared performance characteristics are based on the National Technical Assessment NTJ-01-061:2020 and are valid for 400 mm thick EcoCocon panel covered with an airtight membrane Sd<0.2 m and a 60 mm Steico Protect wood fibre board on the external surface and plastered with a 30 mm thick layer of clay plaster on the internal surface.

The load-bearing capacity of the EcoCocon Straw Wall System is based on the load-bearing capacity of the EcoCocon panel.

Sample Declaration of Performance:  
[Declaration of Performance](#)

\* Applied thermal conductivity values λ:  
30 mm clay 0.521 W/mK  
400 mm EcoCocon panel 0.060 W/mK  
60 mm wood fibre board 0.049 W/mK



# Wall Variations

## THERMAL PERFORMANCE

Increasing the thickness of the added fibre board enhances the thermal performance of the EcoCocon Straw Wall System.

Thickness of added fibre board	Passive House certified U-value	Calculated U-value
60 mm	0.131 W/m <sup>2</sup> K	0.129 W/m <sup>2</sup> K
80 mm	0.125 W/m <sup>2</sup> K	0.122 W/m <sup>2</sup> K
100 mm	0.119 W/m <sup>2</sup> K	0.116 W/m <sup>2</sup> K
140 mm	0.109 W/m <sup>2</sup> K	0.106 W/m <sup>2</sup> K
Applied thermal conductivity value $\lambda$	Clay 0.910 W/mK EcoCocon panel 0.0645 W/mK Wood fibre board 0.048 W/mK	Clay 0.700 W/mK Straw (90%) 0.060 W/mK Wood (10%) 0.130 W/mK Wood fibre board 0.048 W/mK

## RESISTANCE TO FIRE

Numerous tests were carried out on wall segments composed of EcoCocon straw panels, defined as load-bearing walls with a fire separating function. The tests showed that any additional layers improve the fire resistance of EcoCocon panels.

All the tests were carried out with an airtight membrane on the exterior side of the EcoCocon panel and under load of 70.0 kN/m.

For complete wall configurations and test results refer to the test report.

[Classification of fire resistance](#)

Internal wall face	Thickness	Fire resistance classification:	Variation
with clay plaster	25-30 mm	RE 120 / REI 120 / REW 120	A
without surface treatment (bare panel)		RE 30 / REI 30 / REW 30	B
with gypsum boards Knauf KGBi (H2)	12.5 mm	RE 30 / REI 45 / REW 30	D
with gypsum fibre boards Fermacell	12.5 mm	RE 30 / REI 45 / REW 30	E
with gypsum plaster Knauf MP75	25 mm	RE 90 / REI 90 / REW 90	F
External wall face	Thickness	Fire resistance classification:	Variation
with wood fibre boards Steico Protect H (bulk density of 265 kg/m <sup>3</sup> )	60 mm	RE 120-ef / REI 120-ef / REW 120-ef	A
with FireStop A2 membrane		RE 90-ef / REI 90-ef / REW 90-ef	C
with straw boards VestaEco PROTECT (bulk density of 180 kg/m <sup>3</sup> )	60 mm	RE 90-ef / REI 90-ef / REW 90-ef	G

## FIRE PROTECTION ABILITY

Certificate K<sub>1</sub> 10 and K<sub>2</sub> 10 ensure 10 minutes integrity of the EcoCocon panel covered by the following materials with fire protection ability:

- Clay 25 mm - see [Classification Report](#)
- Gypsum fibre board (Fermacell) 12.5 mm - see [Classification Report](#)



# Additional Information

## HYGROTHERMAL CONDITIONS

The analysis of hygrothermal moisture vapour movement and heat flow through the EcoCocon Wall System over time has been verified by WUFI calculation and on-site measurements.

The EcoCocon Straw Wall System can be used in cold, hot and humid climates, but not in climates with permafrost. Airtight construction and verification by a Blower Door Test is absolutely necessary.

[WUFI Report Miami](#)

[WUFI Report Vienna](#)

[WUFI Report Scotland \(Perth\)](#)

[WUFI Report Ireland](#)

[WUFI Report Scandinavia](#)

[WUFI Report Denmark](#)

## AIRTIGHTNESS

Airtightness of the EcoCocon Wall System is achieved by installing an airtight breather membrane between the panel and the wood fibre board. The membrane must be connected to the airtight layer of the foundation, roof, and windows. An airtight connection must be ensured for all the elements penetrating the EcoCocon Wall System.

## PRODUCTION

Manufacturer:

ECOCOCON UAB, Gedimino 30E, Kybartai, Vilkaviskis district, Lithuania

## INFORMATION VALIDITY

August 2023: The given information is valid during the period of issue of the technical sheet. The manufacturer reserves the right to update this data.