Technical Specification

EcoCocon® Straw Panel

Version 2.2 - Updated 04.06.2026

General

PRODUCT DESCRIPTION	The EcoCocon® Straw Panel is a load-bearing twin-stud timber frame panel with homogenous straw infill for thermal insulation, 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, inclined and inclined braced gable wall elements. The EcoCocon® Wall System consists of panels assembled into a wall, with additional layers applied to panels. An integral part of the system is ensuring airtightness while maintaining vapour permeability on the exterior, as well as achieving the required fire resistance, thermal and acoustic performance. EcoCocon wall build-ups include various tested combinations of layers and finishes applied to the EcoCocon Straw Panel, offering different fire ratings, thermal performance, and design solutions.
CE MARKING & COMPLIANCE	The EcoCocon® Straw Panel is CE marked. Performance is declared via Declaration of Performance (DoP) under European Technical Assessment ETA-26/0071, issued by TZÚS Prague on 13/04/2026.
DESCRIPTION OF USE	Panels are used for the construction of load-bearing external walls in low residential and non-residential buildings, or for facade infill or wrapping for skeleton-frame structures in mid- to high-rise buildings. They can also function as load-bearing partition walls with good sound insulation. The EcoCocon Straw Wall System can be used in all climates, except for areas with permafrost.
CUSTOM-MADE PRODUCTION	Production of 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 panel layout plan for assembly.
PACKAGING, TRANSPORT AND STORAGE	Panels are supplied in colour-coded, numbered packages of 6–12 pieces (up to 1 000 kg), transported by curtainside lorry (~140 m²) or shipping container, and unloaded by forklift, fork positioner, or crane. Panels must be fully protected from water ingress during unloading, storage and assembly. See the Warranty and 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.
PRE-ASSEMBLY OF WALL SEGMENTS	For increased efficiency, multiple panels can be pre-assembled before lifting them to a higher floor, or entire wall segments can be pre-assembled off-site.
WARRANTY	EcoCocon provides a 50-year warranty on the structural integrity and a 25-year warranty on the straw insulation of EcoCocon panels, subject to correct handling, installation and maintenance in accordance with the manufacturer's instructions. Full warranty conditions are set out in the Warranty document supplied with the panels.

Benefits

EXCELLENT THERMAL INSULATION 	The EcoCocon Wall System with an airtight breather membrane and wood fibre board on the outside is a Passive House certified component. The certificate provides U-values for PHPP calculation as well as pre-calculated thermal bridges and Passive House certified details.
SMART AIRTIGHT AND DIFFUSION-OPEN CONCEPT	Airtightness is typically easily achieved by installing a breather membrane between the panel and the protective fibre board. Other options are possible.
QUICK AND PRECISE ASSEMBLY	Panels manufactured to precise dimensions allow for simple and rapid installation on site. See Assembly Guide. The average construction speed is up to 60 m^2 of wall per day for a team of 3 people (depending on design complexity), or 120 m^2 with the help of a crane. Both on-site and off-site pre-assembly are possible; however, they are not carried out by the producer but by an independent building company.
MADE TO MEASURE FOR ANY DESIGN	EcoCocon Straw Panels are custom-made to fit mostly any building design – residential, commercial, and public.
NATURAL AND CIRCULAR	EcoCocon Straw Panels are made from 98% natural, renewable materials with no additives, using wood and straw, where straw is a byproduct of agricultural production. Panels are available as PEFC Certified or FSC® Mix Credit upon request. The panel production process is low-waste, with no water use and low primary energy consumption, supporting circularity in both biological and technical material cycles. A high-level environmental certification is currently in progress.
CARBON SEQUESTRATION	Wood and straw in EcoCocon Straw Panels naturally capture and store atmospheric carbon dioxide through photosynthesis during the growth phase. The biogenic carbon content of the EcoCocon panel is 31.5 kg C per m^2 (equivalent to 115.5 kg sequestrated CO_2/m^2). See EPD.
FIRE RESISTANCE	An uncovered EcoCocon Straw Panel with a membrane on the exterior surface assures a fire resistance of minimum 45 minutes, while the complete EcoCocon Straw Wall System can provide up to 120 minutes fire resistance.
EFFECTIVE SEISMIC PERFORMANCE	The panels exhibit good seismic resistance. The EVDR value (Equivalent Viscous Damping Ratio), determined from tests, can aid in calculating EcoCocon panels for use in different seismic zones.
THERMAL MASS - LONGER PHASE SHIFTING	The high thermal mass of compressed straw in EcoCocon panels provides an 18-hour thermal phase shift. It reduces summer overheating and helps retain warmth during cooler nights, ensuring a comfortable indoor climate year-round.
HEALTHY INDOOR AIR QUALITY	Independently tested for low VOC emissions, verified by an accredited laboratory (Eurofins) to meet strict international indoor air quality standards. No glues or fire retardants are added; panels are made from natural, non-harmful materials.

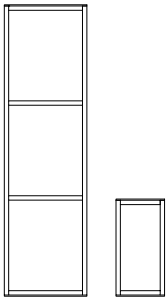
Panel

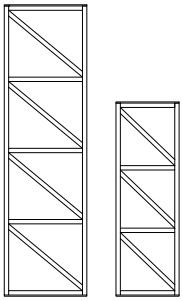
The EcoCocon Straw Panel is custom-made and consists of a load-bearing twin-stud timber frame with a straw infill of homogeneous density (98-127) kg/m³, on average 115 kg/m³.
Panels are produced to specified dimensions in 1 mm increments, with a manufacturing tolerance of ±2 mm per panel in all directions.

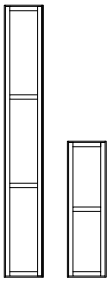
PRODUCTION TYPES & SIZES

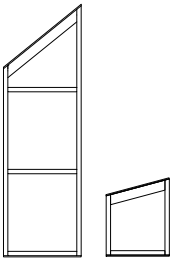
Standard, braced, column & inclined panels

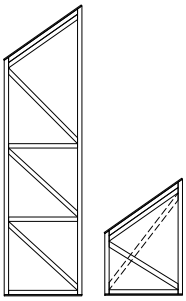
Thickness: from 300 to 400 mm*
Width: from 400 (424 column) to 850 mm
Height: from 400 to 3000 mm


Standard - P


Braced - B

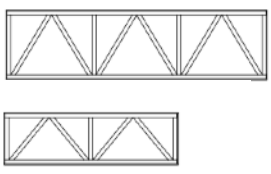

Column - C

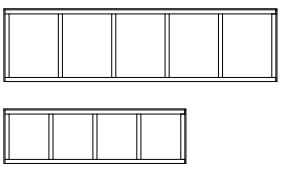

Inclined - I


Inclined Braced - IB

Lintel and sills

Thickness: from 300 to 400 mm
Width: from 400 (600 sill) to 3000 mm
Height: from 424 to 850 mm


Lintel - L


Sill - S

Characteristic	Declared value
Reaction to fire classification	E
Fire resistance	REI 45
Thermal resistance R	6.558 (m^2K)/W*
Heat transfer coefficient U	0.152 W/(m^2K)*
Thermal conductivity (panel) λ	0.0645 W/mK**
Phase shift	18 hours*
Airborne sound insulation indicator R_W ($C;C_{tr}$)	30 dB (-1; -5)*
Water vapour resistance factor μ	3.34
Water impermeability	Ensured on building site
Air permeability	Ensured
Durability	Class 2
Formaldehyde emission class	E1

* Valid for 400 mm thick panel
**Certified 400 mm panel by the Passive House Institute, Darmstadt

CE marked — Declaration of Performance (DoP) based on ETA-26/0071 (EAD 040146-00-1201)

LOAD-BEARING CAPACITY

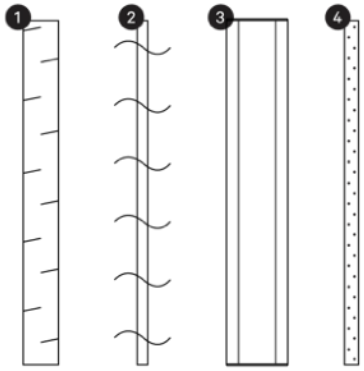
Panel type & dimensions	Vertical design load-bearing capacity Ned (kN/m) under horizontal design wind load qed (kN/m^2)			
Horizontal wind load (kN/m^2)	**No wind**	**± 0.8**	**± 1.2**	**± 1.6**
	kN/m			
Standard panel 0.85 m x 3.00 m	25	24	18	12
Standard panel 0.40 m x 3.00 m	53	53	53	53

The table presents values determined under the following assumptions:
- Only one layer is loaded; the effect of additional layers is not taken into account.
- Values are provided only when a timber beam is installed above the panel and is assumed to behave as a simply supported beam between studs.

Wall System

ECOCOCON WALL SYSTEM

The EcoCocon Wall System consists of panels assembled into a complete wall with specific layers that ensure required performance, and durability. Various tested layer combinations are available, meeting different requirements. In general, the wall system includes the following layers:



1. Exterior protective vapour permeable layer (can be used to increase thermal performance)
2. Airtight layer
3. EcoCocon panel
4. Interior layers

AIRTIGHTNESS

The airtightness of the EcoCocon Wall System is typically achieved by installing an airtight breather membrane (Sd < 0.2 m) on the exterior of the panel, secured with 6 mm plywood strips fixed to the studs. (A taped diffusion-open facade gypsum fibre board may be used as an alternative.)
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.
A blower-door test is recommended to verify airtightness.

THERMAL PERFORMANCE

Passive House certified EcoCocon panel has an independently verified declared thermal conductivity for the whole panel, including the timber structure. The calculated U-value is based on standard calculations, using SK-TP declared thermal conductivity values of the straw infill and timber structure. For U-values of different wall configurations refer to EcoCocon U-value Calculator on website.

EcoCocon Straw Panel without finishes	**Passive House Certified***	**Calculated U-value****
300 mm (with 14% timber)	Not applicable	0.205 W/m²K
400 mm (with 10% timber)	0.152 W/m²K	0.150 W/m²K
EcoCocon Straw Panel 400 mm + Wood fibre board		
60 mm	0.129 W/m²K	0.127 W/m²K
80 mm	0.122 W/m²K	0.120 W/m²K
100 mm	0.116 W/m²K	0.115 W/m²K
140 mm	0.106 W/m²K	0.105 W/m²K

*Applied λ values:
EcoCocon Straw Panel λ = 0.0645 W/mK
Wood fibre board λ = 0.049 W/mK

**Applied λ values:
Straw (90%) λ = 0.0568 W/mK
Wood (10%) λ = 0.130 W/mK
Wood fibre board λ = 0.049 W/mK

REACTION TO FIRE

The reaction-to-fire ratings shown in the table apply to materials only when they are used on an EcoCocon Straw Panel. These ratings may differ from the fire classifications of the individual finishing materials when used separately.

Test results - Reaction to fire (EN 13823 + EN 13501-1)

Layer	Test results
Uncovered straw	E
Clay Plaster	B-s1, d0
Membrane + Steico Protect H 60 mm + mineral plaster finish	B-s1, d0
Gypsum Board 12.5 mm	B-s1, d0
Gypsum Plaster 25 mm	B-s1, d0

* Tests were carried out by testing laboratory Fires, a member of EGOLF (European group of official fire testing laboratories)

RESISTANCE TO FIRE

An uncovered panel (height 3.0 m) with a breather membrane on the exterior side under load of 83 kN/m has a fire resistance of minimum 45 minutes.
For complete wall configurations and test results refer to the test report: Classification of Fire Resistance.

Test results - Resistance to fire (EN 1365-1)*

Tests were conducted on EcoCocon wall segments made of 250 mm straw panels under load of 83 kN/m. These results apply to EcoCocon Straw Panels defined as load-bearing walls with a fire-separating function and are valid for panel thicknesses from 300 to 400 mm. Any additional layers shall not reduce tested fire resistance performance of the panels.

Tested Interior Layer	Exterior layer	Test result
N/A (Uncovered)	Membrane	REI 45
12.5 mm Gypsum Board	Membrane	REI 45
Fermacell board 12.5 mm	Membrane	REI 45
Gypsum Plaster 25 mm	Membrane	REI 90
25 mm Clay Plaster	Membrane + Steico Protect H 60 mm	REI 120
Tested Exterior layer	**Interior layer**	**Test result**
FireStop A2 Membrane	12.5 mm Gypsum Board	REI 90-ef
Membrane + Vesta Protect 60 mm	12.5 mm Gypsum Board	REI 90-ef
Membrane + Steico Protect H 60 mm	25 mm Clay Plaster	REI 120-ef

* Tests were carried out by testing laboratory Fires, a member of EGOLF (European group of official fire testing laboratories)

FIRE PROTECTION ABILITY

Certificate K_1 10 and K_2 10 ensure 10 minutes integrity of the EcoCocon Straw Panel covered by the following materials with fire protection ability:

- Clay 25 mm
- Gypsum fibre board (Fermacell) 12.5 mm

See Classification Reports for details

HYGROTHERMAL PERFORMANCE

The analysis of hygrothermal performance of the EcoCocon Wall System has been verified by WUFI calculation and on-site measurements across a range of climates: Miami, Vienna, Scotland (Perth), Ireland, Scandinavia, and Denmark.
The WUFI tests verify that the system effectively manages heat and moisture transfer, preventing condensation risks and ensuring material longevity.
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 reccommended.

ACOUSTIC PERFORMANCE

Acoustic tests show that EcoCocon Straw Panels reduce airborne sound, and performance can be further improved with additional layers to meet acoustic standards for residential, commercial, and public buildings.

Test results - Airborne Sound Insulation (EN ISO 10140-2 + EN ISO 717-1)

Interior layers	Panel thickness	Exterior layers	Test results
Clay plaster 30 mm	400 mm	Membrane + SteicoProtect 60 mm	54 (-1;-3;0) dB
2x 12.5 mm Gypsum board (standard screws)	300 mm	Membrane + 2x 12.5 mm Gypsum board (standard screws)	52 (-1;-4) dB
2x 12.5 mm Gypsum board (acoustic screws)	300 mm	Membrane + 2x 12.5 mm Gypsum board (acoustic screws)	65 (-2;-7) dB
Uncovered straw	300 mm	Membrane	30 (-1;-5) dB
Fermacell board 12.5 mm	300 mm	Membrane + SteicoProtect H 60 mm	53 (-3;-10) dB
2x Fermacell board 12.5 mm	300 mm	Membrane + 2x Fermacell board 12.5 mm	52 (-2;-5) dB
Clay Plaster 25 mm + Steico ProtectH 60 mm	300 mm	Membrane + Steico Protect H 60 mm + Clay Plaster 25 mm	61 (-2;-9) dB
2x 12.5 mm Gypsum board (standard screws)	300 mm	Membrane + 2x 12.5 mm Gypsum board (standard screws)	52 (-1;-4) dB

LOW EMISSION / VOC PERFORMANCE

EcoCocon Straw Panel has been independently tested (accredited test lab Eurofins) for indoor air quality according to strict standards (CDPH Section 01350).
The results show that all chemical emissions are well below safety limits; the product is safe for use and meets VOC international standards for low emissions and healthy indoor air.

Wall Build-up Example

THE MOST COMMON BUILD-UP:

Interior Clay plaster, Exterior Wood Fibre Board with Finish

Interior:
- 25 mm thick layer of clay plaster

Core:
- 400 mm thick EcoCocon panel

Exterior:
- Breather membrane (Sd<0.2 m)
- 60 mm Steico Protect H wood fibre board
- Render (or Ventilated facade).

PERFORMANCE OF THE BUILD-UP

The declared performance characteristics are based on SK-TP-25/0007-V02.
The load-bearing capacity of this build-up is based on the load-bearing capacity of the EcoCocon panel.

Characteristic	**Declared value**
Reaction to fire (interior)	B-s1, d0 (Clay plaster)
Reaction to fire (exterior)	B-s1, d0 (Render)
Resistance to fire	REI 120 REI 120-ef
Thermal resistance R*	7.935 (m^2K)/W
Heat transfer coefficient U*	0.126 W/(m^2K)
Phase shift	25 hours
Airborne sound insulation indicator R_W ($C;C_{tr};C_{100-5000}$)	54 (-1;-3;0) dB
Water impermeability	Ensured on building site
Impact resistance	Ensured
Air permeability	Ensured
Durability	Class 2
Formaldehyde emission class	E1

*Applied thermal conductivity values λ:
Clay 0.700 W/mK
Straw (90%) 0.056 W/mK
Wood (10%) 0.130 W/mK
Wood fibre board 0.049 W/mK

Additional Information

PRODUCTION

Manufacturer in Slovakia:
EcoCocon s.r.o., Priemyselná zóna 615, 919 42 Voderady, Slovakia

Production certified:
Declaration of Performance (SK-DoP) based on SK-TP-25/0007-V02 of 31/03/2026, Slovak Technical Assessment issued by Slovak Technical Assessment Body (TAB).

Declaration of Performance (DoP) based on European Technical Assessment ETA-26/0071 of 13/04/2026, issued by Technical and Test Institute for Construction Prague (TZÚS).

The EcoCocon Straw Panel carries CE marking (since 2026) in accordance with EU Construction Products Regulation (CPR No. 305/2011).

Third party verification:
TSUS - Technický a skúšobný ústav stavebný, n.o. (Building Testing and Research Institute). Conformity according to Slovak national system (System I), incl. third-party FPC assessment.

INFORMATION VALIDITY

June 2026: The given information is valid during the period of issue of the technical sheet. The manufacturer reserves the right to update this data.