CLASSIFICATION OF FIRE RESISTANCE
FIRES-CR-174-24-AUPE

Loadbearing wall composed of EcoCocon v02 twin-stud timber frame panels with straw insulation infill covered from external face with vapour barrier

FIRES
The Experts on Fire Safety

SNAS
Reg. No. 041/S-159

CLASSIFICATION OF FIRE RESISTANCE IN ACCORDANCE WITH EN 13501-2: 2023

with direct field of application

FIRES-CR-174-24-AUPE

Name of the product: Loadbearing wall composed of EcoCocon v02 twin-stud timber frame panels with straw insulation infill covered from external face with vapour barrier

Sponsor:
UAB EcoCocon
Odminiu str. 10-10
Vilnius
Lithuania

Prepared by:
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Notified Body No. 1396
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1. INTRODUCTION

This classification report defines the resistance to fire classification assigned to element loadbearing wall composed of EcoCocon v02 twin-stud timber frame panels with straw insulation infill covered from external face with vapour barrier in accordance with the procedures given in EN 13501-2: 2023.

2. DETAILS OF CLASSIFIED PRODUCT

2.1 GENERAL

The element, loadbearing wall composed of EcoCocon v02 twin-stud timber frame panels with straw insulation infill covered from external face with vapour barrier, is defined as a load-bearing wall with fire separating function.

2.2 PRODUCT DESCRIPTION

Dimensions

Overall dimensions of the tested product	3000 x 3000 x 250 mm (height x width x thickness)
Modules dimensions	2900 x 850 x 250 mm (height x width x thickness)
	2900 x 450 x 250 mm (height x width x thickness)

Construction of the module

The double front frame construction of each module consists of studs and transoms made from C24 spruce profiles 45 x 95 mm. The top and bottom edges of the modules are covered with 12,0 mm thick plywood. Each stud is fixed to the plywood with two 8,0 x 100 mm TX40 washer head screws. The transoms at the top and bottom of the module edge are fixed to the plywood with 4,5 x 50 mm TX20 countersunk head screws 65 mm from the edges and at maximum 240 mm centres. The transoms within the module are positioned 970 mm from the top and bottom edges of the module and are fixed between the studs with two 4,5 x 50 mm TX20 countersunk head screws.

The opposing transoms within the module are joined together with two 150 mm wide by 12,0 mm thick plywood strips positioned 80 mm from the studs and fixed to the transoms with a 4,5 x 50 mm TX20 countersunk head screw. In the case of the 450 mm wide module, the transoms within the module are joined together with only one plywood strip positioned at the mid-width of the transoms.

The core of the module is compressed straw with a nominal bulk density of 100 kg.m^{-3}.

A 0,45 mm thick SOLITEX MENTO 3000 diffusion-open membrane (manufacturer: Pro Clima) is fixed to the external surface with 45 mm wide and 6 mm thick plywood strips and 4,5 x 50 mm TX20 countersunk head screws at maximum 280 mm centres on the horizontal edges of the module and 400 mm centres on the vertical edges of the module.

Joining of the modules

The modules are fixed together along the vertical edges with 8,0 x 120 mm TX40 washer head screws positioned just above/below the top and bottom transoms and next at maximum 476 mm centres.

Two 100 x 100 mm C24 timber profiles are placed at the top of the wall along the front and rear edges and fixed to the modules with 8,0 x 120 mm TX40 washer head screws at maximum 400 mm centres.

More detailed information about product construction is shown in the drawings.

3. TEST REPORTS IN SUPPORT OF CLASSIFICATION

3.1 TEST REPORTS

No.	Name of laboratory	Name of sponsor	Test report No.	Date of the test	Test method	Type of the test
[1]	FIRES, s.r.o., Batizovce, SR	UAB EcoCocon, Vilnius, LT	FIRES-FR-257-24-AUNE	30. 10. 2024	EN 1365-1: 2012/ AC:2013	Accredited

3.2 TEST SPECIMENS

Test report No.	Samples information	Conditioning	Pre-fire tests
[1]	-	The test specimen was stored in the hall of the testing laboratory and was conditioned according to EN 1363-1.	-

3.3 TEST RESULTS

No./ Test method	Parameter		Results
[1] EN 1365-1: 2012/AC: 2013	applied load		axial load 83,0 kN/m
	temperature curve		standard temperature/time curve
	loadbearing capacity (R)	vertical contraction [mm]	49 minutes
		rate of vertical contraction [mm/min]	49 minutes
	integrity (E)	cotton pad	49 minutes
		gap gauges	49 minutes
		sustained flaming	49 minutes
	thermal insulation (I)	average temperature (140 K)	49 minutes
		maximal temperature (180 K)	49 minutes
	thermal radiation (W) - 15 $kW.m^{-2}$		49 minutes
	mechanical action		-
	specimen orientation		Internal face of the wall exposed to fire - SOLITEX MENTO 3000 diffusion-open membrane on the external wall face

The performance criteria of insulation (I) and integrity (E) shall automatically be assumed not to be satisfied when the loadbearing capacity (R) criterion ceases to be satisfied (according to cl. 11.4.1 of EN 1363-1: 2020).

[1] The test was discontinued in 50th minute because of the specimen collapse.

4. CLASSIFICATION AND FIELD OF APPLICATION

4.1 REFERENCE OF CLASSIFICATION

This classification has been carried out in accordance with clause 7.3.2 of EN 13501-2: 2023.

4.2 CLASSIFICATION

The element, **Loadbearing wall composed of EcoCocon v02 twin-stud timber frame panels with straw insulation infill covered from external face with vapour barrier**, is classified according to the following combinations of performance parameters and classes as appropriate.

Fire resistance classification:

Note: valid only for fire action on the internal face of the wall – SOLITEX MENTO 3000 diffusion-open membrane on the external wall face.

RE 45 / REI 45 / REW 45

4.3 FIELD OF APPLICATION

This classification is valid according to EN 1365-1: 2012/AC: 2013 for the following end use applications:

Height	– increase in the height above 3000 mm is not allowed, – decrease in the height is allowed,
Width	– change in the wall width is allowed, – extension in the width of wall is allowed only as a replication of modules as tested, – decrease in the module width is allowed, but not increase, – maximum width of module is 850 mm,
Thickness of wall and materials	– increase in the thickness of the wall and individual component materials is allowed,
Fixation of materials	– decrease in distance of fixing centres is allowed,
Size and method of loading	– maximum load 83,0 kN/m,
	– decrease in the applied load is allowed,
	– method of loading - axial loading is not allowed to be change for eccentric loading.

5. LIMITATIONS

This classification document does not represent type approval or certification of the product.

The classification is valid provided that the product, field of application and standards and regulations are not changed.

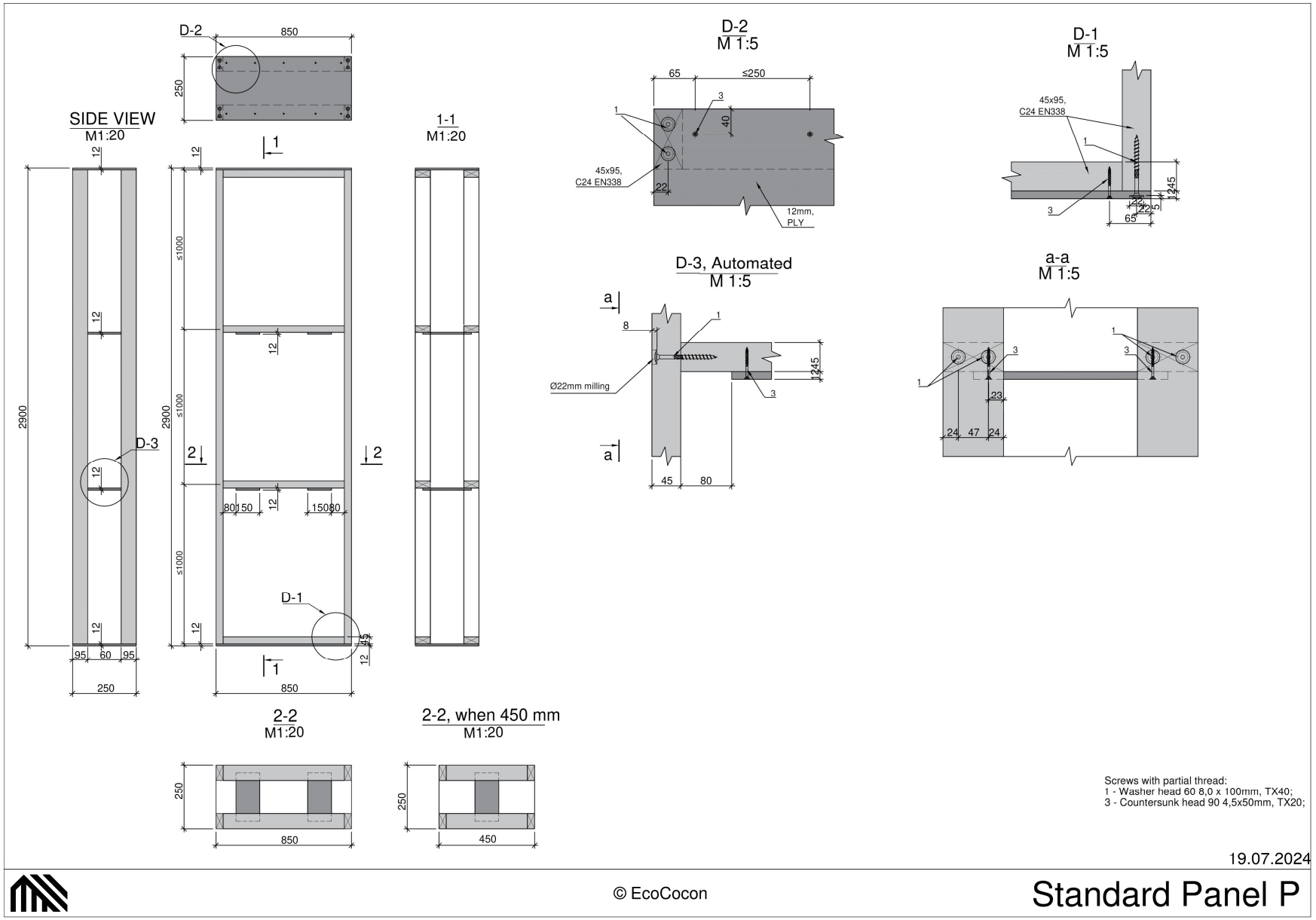
Approved by:

Ing. Marek Gorlický
Head of the Testing Laboratory

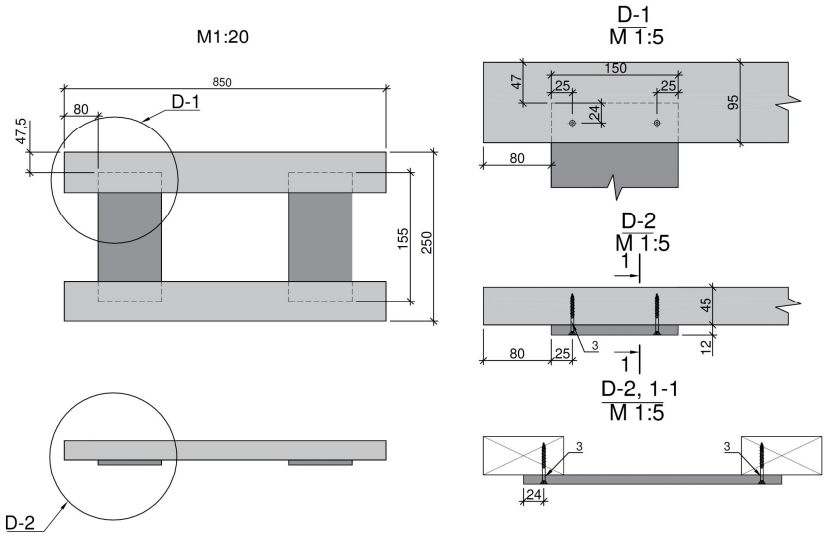
Prepared by:

Dávid Šubert
Technician of the Testing Laboratory

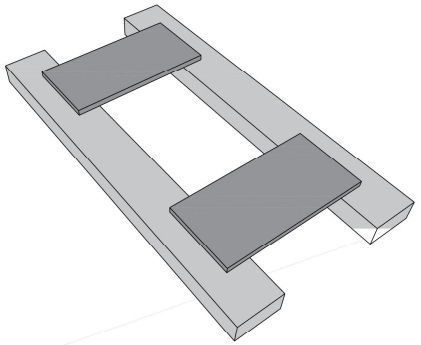
APPENDIX 1: DRAWINGS OF THE PRODUCT CONSTRUCTION



APPENDIX 1: DRAWINGS OF THE PRODUCT CONSTRUCTION



EcoCocon Panel's Cross upside down
M1:20

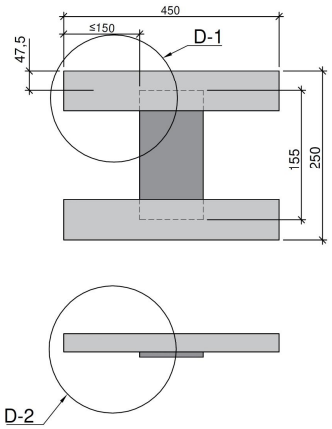


19.07.2024

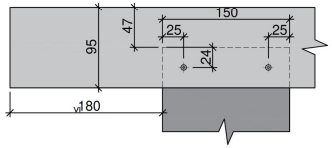
EcoCocon Cross for Panels 850mm

APPENDIX 1: DRAWINGS OF THE PRODUCT CONSTRUCTION

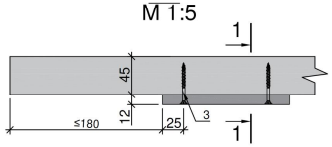
M1:20



D-1
M 1:5

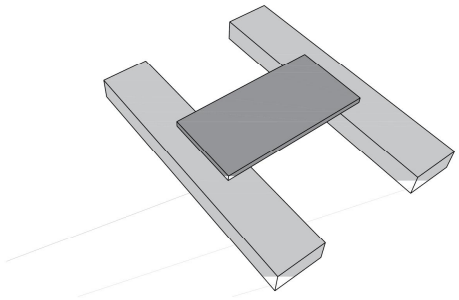


D-2
M 1:5



D-2, 1-1
M 1:5

EcoCocon Panel's Cross upside down
M1:20



19.07.2024

EcoCocon Cross for Panels 450 mm

FIRES, s.r.o., Osloboditeľov 282, Batizovce 059 35, Slovakia
Notified Body No. 1396, Approved Body No. SK01 and TP01, Technical Assessment Body, EGOLF Member

reference no. Su-008-24 (PR-24-0249/01)
contact Dávid Šubert
email subert@fires.sk
phone +421 902 364 429
web www.fires.sk
date 22. 11. 2024

TO
UAB EcoCocon
Odminiu str. 10-10
Vilnius
Lithuania

SUBJECT Application of fire resistance classification from EcoCocon v01 modules to EcoCocon v02

This statement allows to apply fire resistance classification classes obtained from the fire resistance tests of walls made of EcoCocon v01 modules to walls made of EcoCocon V02 modules also with additional layers in accordance with the variants specified in the classification report.

This application is permitted based on the comparison of the results of the fire resistance tests of the specimens made of bare modules (without surface treatment) covered on the external side with a diffusion-open membrane. The results are shown in the tables below:

No./ Test method	Parameter		Results
[1] EN 1365-1: 2012/AC: 2013 **Wall made of EcoCocon V01 modules**	applied load		axial load 70,0 kN/m
	temperature curve		standard temperature/time curve
	loadbearing capacity (R)	vertical contraction [mm]	39 minutes no failure
		rate of vertical contraction [mm/min]	39 minutes no failure
	integrity (E)	cotton pad	39 minutes no failure
		gap gauges	39 minutes no failure
		sustained flaming	39 minutes
	thermal insulation (I)	average temperature (140 K)	39 minutes
		maximal temperature (180 K)	39 minutes
	thermal radiation (W) - 15 kW.m^{-2}		39 minutes no failure
	mechanical action		-
	specimen orientation		Internal face of the wall exposed to fire - diffusion-open membrane on the external wall face
[2] EN 1365-1: 2012/AC: 2013 **Wall made of EcoCocon V02 modules**	applied load		axial load 83,0 kN/m
	temperature curve		standard temperature/time curve
	loadbearing capacity (R)	vertical contraction [mm]	49 minutes
		rate of vertical contraction [mm/min]	49 minutes
	integrity (E)	cotton pad	49 minutes
		gap gauges	49 minutes
		sustained flaming	49 minutes
	thermal insulation (I)	average temperature (140 K)	49 minutes
		maximal temperature (180 K)	49 minutes
	thermal radiation (W) - 15 kW.m^{-2}		49 minutes
	mechanical action		-
	specimen orientation		Internal face of the wall exposed to fire - diffusion-open membrane on the external wall face

reference no. Su-008-24 (PR-24-0249/01)
contact Dávid Šubert
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web www.fires.sk
date 22. 11. 2024

More detailed information is given in the test reports no. FIRES-FR-017-21-AUNE (date of the test 03. 02. 2021) and FIRES-FR-257-24-AUNE (date of the test 30. 10. 2024).

The statement has been issued at the request of the sponsor and is only valid with the classification report FIRES-CR-015-18-AUPE Edition 2, issued by FIRES, s.r.o. on 26. 05. 2021.

Dávid Šubert
Technician of the testing laboratory

CLASSIFICATION OF FIRE RESISTANCE
FIRES-CR-015-18-AUPE Edition 2

Loadbearing wall composed of EcoCocon straw modules

FIRES
The Experts on Fire Safety

ilac-MRA

SNAS
Reg. No. 041/S-159

CLASSIFICATION OF FIRE RESISTANCE IN ACCORDANCE WITH EN 13501-2: 2016

with direct field of application

FIRES-CR-015-18-AUPE Edition 2

Name of the product: Loadbearing wall composed of EcoCocon straw modules

Sponsor:
UAB EcoCocon
Odminiu str. 10-10
Vilnius
Lithuania

Prepared by:
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Notified Body No. 1396
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Slovak Republic

Task No.: PR-21-0015
Date of issue: 26. 05. 2021 (date of issue of 1st Edition: 23. 02. 2018)

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Notified Body No. 1396, Approved Body No. SK01, Member of EGOLF

1. INTRODUCTION

This classification report defines the resistance to fire classification assigned to element Loadbearing wall composed of EcoCocon straw modules in accordance with the procedures given in EN 13501-2: 2016.

This document is 2nd edition of Classification of fire resistance in accordance with EN 13501-2: 2016 No. FIRES-CR-015-18-AUPE, issued by FIRES, s.r.o., Batizovce on 23. 02. 2018. Into 2nd edition alternative wall coverings stated in clause 2.2 of this report were added. The constructional changes were added to the classification on the basis of test reports [3] - [8] according to clause 3.1 of this document. This edition of the document supersedes previous editions of classification report.

2. DETAILS OF CLASSIFIED PRODUCT

2.1 GENERAL

The element, Loadbearing wall composed of EcoCocon straw modules, is defined as a loadbearing wall with fire separating function.

2.2 PRODUCT DESCRIPTION

Product is the Loadbearing wall composed of EcoCocon straw modules.

Dimensions of individual modules	(2900 x 1000 x 250) mm (height x width x thickness) (2900 x 1200 x 250) mm (height x width x thickness) (2900 x 800 x 250) mm (height x width x thickness)

Construction of wall
The wall is assembled of EcoCocon straw modules.

Construction of the module
Double front frame construction of each module is made of timber spruce profiles 45 x 95 mm. Modules 1000 mm and 1200 mm wide includes two additional vertical profiles placed at mid-width of module. Top and bottom module edge is covered by 12,0 mm thick plywood plate. Individual components of frame are fixed together at the top and bottom horizontal edge by timber screws 8 x 120 mm (two at each module corner and one at each mid-width profile) and 4,5 x 50 mm (two screws to each frame profile in distance of 65 mm from module edges and next each ≤ 200 mm).

Modules are reinforced by transverse timber spruce profiles 45 x 45 mm placed on both vertical module edges and between vertical reinforcement profiles at maximum distance of 1000 mm from bottom and top module edge. Transverse profiles are fixed to frame profiles by two screws 8 x 80 mm to each profile and to mid-width profiles by screws 6 x 120 mm. Spruce boards 20,0 mm thick and 200 mm wide are fixed between vertical edges to transverse profiles by two screws 8 x 80 mm to each profile. Boards are located in the thirds of the frame height.

Individual modules are fixed together at the vertical module edges by screws 8 x 100 mm placed in maximum spacing of 470 mm. Two additional timber C24 profiles 100 x 100 mm are placed on the top wall edge to ensure balanced loading of wall.

Core of the wall is pressed straw with nominal bulk density of 100 kg.m^{-3}.

Covering of the wall face

Variant A:
External face of wall is covered with airtight membrane type Tyvek Solid (manufacturer: DuPont) fixed to timber profiles by plywood strips 8 x 45/90 mm with 20 mm long steel staples. A wood fibre boards Steico Protect H (producer: Steico) with dimensions 535 x 1300 x 60 mm and bulk density of 265 kg.m^{-3} are fixed to timber construction by steel staples 90,0 mm long spaced each 150 mm. The wood fibre boards are joined together by tongue-groove joints on edges.

Internal face of wall is covered with clay base plaster applied two layers of total thickness 20 – 25 mm with a reinforced glass fibre mesh (producer: Vertex). An additional fine clay plaster approx. 5,0 mm thick is added as a finish. The clay plaster is applied directly on the straw surface and timber studs.

Variant B:
External wall face is covered by airtight membrane type Tyvek Solid (manufacturer: DuPont) fixed to timber profiles by 6 mm thick and 80 mm wide plywood stripes and 63 mm long steel staples spaced each 150 mm.

Internal wall face is without surface treatment (bare wall panels).

Variant C:
External wall face is covered by airtight membrane type FireStop A2 (manufacturer: Fassawall) fixed to timber profiles by 6 mm thick and 80 mm wide plywood stripes and wood screws 4,0 x 40 mm spaced each 200 mm.

Internal wall face is covered by horizontally oriented gypsum boards type Knauf KGBi (H2) (manufacturer: Knauf) with dimensions 3000 x 1200 x 12,5 mm fixed to timber profiles by screws TN 3,5 x 50 mm spaced each 200 mm. Joints of the boards are covered by glass-laminated tape Knauf and filler Knauf Uniflott. Two layers of 4,8 mm thick and 80 mm wide wood fibre underlayment stripes (manufacturer: Steico) are placed between gypsum boards and timber profiles. Stripes are fixed to timber profiles by 14 mm long steel staples.

Variant D:
External wall face is covered by airtight membrane type Tyvek Solid (manufacturer: DuPont) fixed to timber profiles by 6 mm thick and 80 mm wide plywood stripes and 63 mm long steel staples spaced each 150 mm.

Internal wall face is covered by horizontally oriented gypsum boards type Knauf KGBi (H2) (manufacturer: Knauf) with dimensions 3000 x 1200 x 12,5 mm fixed to timber profiles by screws TN 3,5 x 50 mm spaced each 200 mm. Joints of the boards are covered by glass-laminated tape Knauf and filler Knauf Uniflott. Two layers of 4,8 mm thick and 80 mm wide wood fibre underlayment stripes (manufacturer: Steico) are placed between gypsum boards and timber profiles. Stripes are fixed to timber profiles by 14 mm long steel staples.

Variant E:
External wall face is covered by airtight membrane type Tyvek Solid (manufacturer: DuPont) fixed to timber profiles by 6 mm thick and 80 mm wide plywood stripes and 63 mm long steel staples spaced each 150 mm.

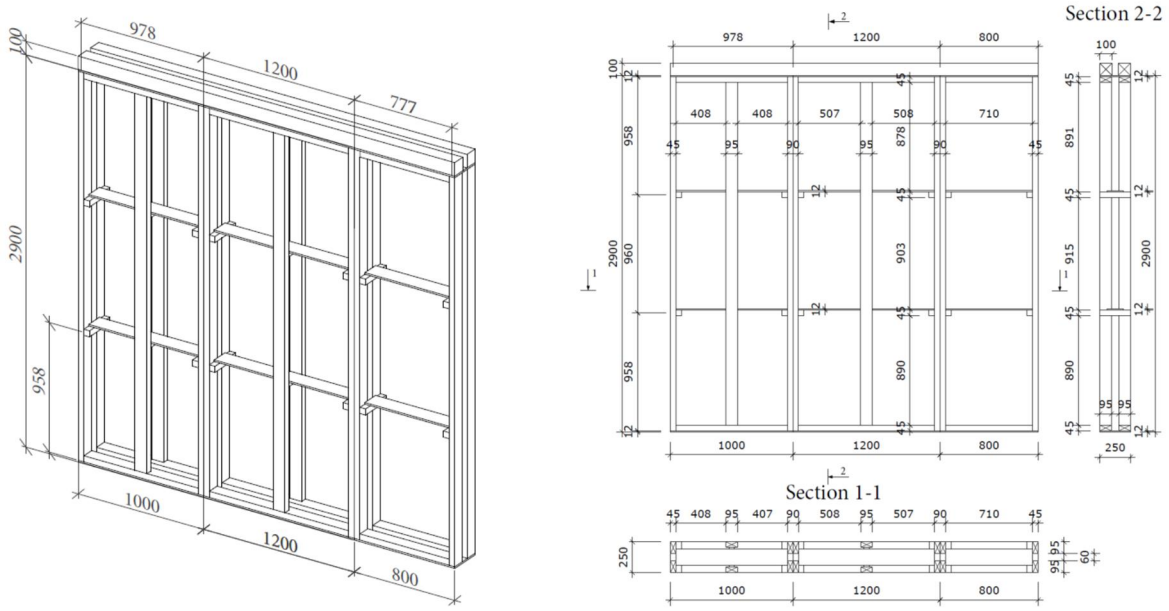
Internal wall face is covered by horizontally oriented gypsum fibre boards (manufacturer: Fermacell) with dimensions 2500 x 1250 x 12,5 mm fixed to timber profiles by screws TN 3,5 x 50 mm spaced each 150 mm. Two layers of 4,8 mm thick and 80 mm wide wood fibre underlayment stripes (manufacturer: Steico) are placed between gypsum boards and timber profiles. Stripes are fixed to timber profiles by 14 mm long steel staples.

Variant F:
External wall face is covered by airtight membrane type Tyvek Solid (manufacturer: DuPont) fixed to timber profiles by 6 mm thick and 80 mm wide plywood stripes and 63 mm long steel staples spaced each 150 mm.

Internal wall face is covered by gypsum plaster type MP75 (manufacturer: Knauf) in two layers with total thickness of 25 mm. Stripes of 4,8 mm thick and 80 mm wide wood fibre underlayment stripes (manufacturer: Steico) are stapled to timber profiles under the gypsum plaster by 14 mm long steel staples.

Variant G:
External wall face is covered by airtight membrane type Tyvek Solid (manufacturer: DuPont) fixed to timber profiles by 6 mm thick and 80 mm wide plywood stripes and 63 mm long steel staples spaced each 150 mm. Straw boards type VestaEco PROTECT (manufacturer: VestaEco COMPOSITES Sp. z o.o.) with dimensions 1200 x 800 x 60 mm and bulk density of 180 $kg.m^{-3}$ are fixed to timber frame construction by steel staples 25 x 100 mm spaced each 70 mm at the perimeter of wall and each 150 mm at wall surface to vertical timber profiles of modules. Boards are joined together by tongue-groove joints on the board edges.

Internal wall face is covered by horizontally oriented gypsum boards type Knauf KGBi (H2) (manufacturer: Knauf) with dimensions 3000 x 1200 x 12,5 mm fixed to timber profiles by screws TN 3,5 x 50 mm spaced each 200 mm. Joints of the boards are covered by glass-laminated tape Knauf and filler Knauf Uniflott. Two layers of 4,8 mm thick and 80 mm wide wood fibre underlayment stripes (manufacturer: Steico) are placed between gypsum boards and timber profiles. Stripes are fixed to timber profiles by 14 mm long steel staples.



More detailed information about product construction is shown in drawings in appropriate test reports [1 - 8].

3. TEST REPORTS IN SUPPORT OF CLASSIFICATION

3.1 TEST REPORTS

No.	Name of laboratory	Name of sponsor	Test report No.	Date of the test	Test method
[1]	FIRES, s.r.o., Batizovce, SR	UAB EcoCocon, Vilnius, Lithuania	FIRES-FR-021-18-AUNE	29. 01. 2018	EN 1365-1: 2012 / AC: 2013
[2]			FIRES-FR-022-18-AUNE	30. 01. 2018	
[3]			FIRES-FR-017-21-AUNE	03. 02. 2021	
[4]			FIRES-FR-018-21-AUNE	04. 02. 2021	
[5]			FIRES-FR-019-21-AUNE	04. 02. 2021	
[6]			FIRES-FR-051-21-AUNE	15. 03. 2021	
[7]			FIRES-FR-052-21-AUNE	16. 03. 2021	
[8]			FIRES-FR-111-21-AUNE	19. 05. 2021	

[1 – 8] Test specimens were conditioned according to EN 1363-1 before the fire resistance test

3.2 TEST RESULTS

No./ Test method	Parameter		Results
[1] EN 1365-1: 2012/AC: 2013 Variant A	surface treatment (interior / exterior)		clay base plaster / boards Steico Protect H
	applied load		axial load 70,0 kN/m
	temperature curve		standard temperature/time curve
	loadbearing capacity		121 minutes no failure
	integrity	cotton pad	121 minutes no failure
		gap gauges	121 minutes no failure
		sustained flaming	121 minutes no failure
	thermal insulation	average temperature (140 K)	121 minutes no failure
		maximal temperature (180 K)	121 minutes no failure
	radiation		121 minutes no failure
	mechanical action		-
	specimen orientation		Internal face of wall (clay plaster) exposed to fire
[2] EN 1365-1: 2012/AC: 2013 Variant A	surface treatment (interior / exterior)		clay base plaster / boards Steico Protect H
	applied load		axial load 70,0 kN/m
	temperature curve		**external fire exposure curve**
	loadbearing capacity		121 minutes no failure
	integrity	cotton pad	121 minutes no failure
		gap gauges	121 minutes no failure
		sustained flaming	121 minutes no failure
	thermal insulation	average temperature (140 K)	121 minutes no failure
		maximal temperature (180 K)	121 minutes no failure
	radiation		121 minutes no failure
	mechanical action		-
	specimen orientation		External face of wall (boards Steico Protect H) exposed to fire
[3] EN 1365-1: 2012/AC: 2013 Variant B	surface treatment (interior / exterior)		bare panel / membrane Tyvek Solid
	applied load		axial load 70,0 kN/m
	temperature curve		standard temperature/time curve
	loadbearing capacity		39 minutes no failure
	integrity	cotton pad	39 minutes
		gap gauges	39 minutes no failure
		sustained flaming	39 minutes
	thermal insulation	average temperature (140 K)	39 minutes
		maximal temperature (180 K)	39 minutes
	radiation		39 minutes no failure
	mechanical action		-
	specimen orientation		Internal face of wall (bare panel) exposed to fire

No./ Test method	Parameter		Results
[4] EN 1365-1: 2012/AC: 2013 Variant C	surface treatment (interior / exterior)		gypsum boards Knauf KGBi (H2) / membrane FireStop A2
	applied load		axial load 70,0 kN/m
	temperature curve		**external fire exposure curve**
	loadbearing capacity		90 minutes no failure
	integrity	cotton pad	90 minutes no failure
		gap gauges	90 minutes no failure
		sustained flaming	90 minutes no failure
	thermal insulation	average temperature (140 K)	90 minutes no failure
		maximal temperature (180 K)	90 minutes no failure
	radiation		90 minutes no failure
	mechanical action		-
	specimen orientation		External face of wall (membrane FireStop A2) exposed to fire
[5] EN 1365-1: 2012/AC: 2013 Variant D	surface treatment (interior / exterior)		gypsum boards Knauf KGBi (H2) / membrane Tyvek Solid
	applied load		axial load 70,0 kN/m
	temperature curve		standard temperature/time curve
	loadbearing capacity		55 minutes no failure
	integrity	cotton pad	55 minutes
		gap gauges	55 minutes no failure
		sustained flaming	55 minutes
	thermal insulation	average temperature (140 K)	55 minutes
		maximal temperature (180 K)	55 minutes
	radiation		55 minutes no failure
	mechanical action		-
	specimen orientation		Internal face of wall (gypsum boards) exposed to fire
[6] EN 1365-1: 2012/AC: 2013 Variant E	surface treatment (interior / exterior)		boards Fermacell / membrane Tyvek Solid
	applied load		axial load 70,0 kN/m
	temperature curve		standard temperature/time curve
	loadbearing capacity		58 minutes no failure
	integrity	cotton pad	58 minutes
		gap gauges	58 minutes no failure
		sustained flaming	58 minutes
	thermal insulation	average temperature (140 K)	58 minutes
		maximal temperature (180 K)	58 minutes
	radiation		58 minutes no failure
	mechanical action		-
	specimen orientation		Internal face of wall (boards Fermacell) exposed to fire

No./ Test method	Parameter		Results
[7] EN 1365-1: 2012/AC: 2013 Variant F	surface treatment (interior / exterior)		gypsum plaster MP75 / membrane Tyvek Solid
	applied load		axial load 70,0 kN/m
	temperature curve		standard temperature/time curve
	loadbearing capacity		107 minutes no failure
	integrity	cotton pad	107 minutes
		gap gauges	107 minutes no failure
		sustained flaming	107 minutes
	thermal insulation	average temperature (140 K)	107 minutes
		maximal temperature (180 K)	107 minutes
	radiation		107 minutes no failure
	mechanical action		-
	specimen orientation		Internal face of wall (gypsum plaster MP75) exposed to fire
[8] EN 1365-1: 2012/AC: 2013 Variant G	surface treatment (interior / exterior)		gypsum boards type Knauf KGBi (H2) / straw boards VestaECO PROTECT
	applied load		axial load 70,0 kN/m
	temperature curve		**external fire exposure curve**
	loadbearing capacity		91 minutes no failure
	integrity	cotton pad	91 minutes no failure
		gap gauges	91 minutes no failure
		sustained flaming	91 minutes no failure
	thermal insulation	average temperature (140 K)	91 minutes no failure
		maximal temperature (180 K)	91 minutes no failure
	radiation		91 minutes no failure
	mechanical action		-
	specimen orientation		External face of wall (boards VestaECO PROTECT) exposed to fire

The performance criteria of insulation are automatically assumed not to be satisfied when the criterion of integrity ceases to be satisfied (acc. to clause 11.4.2 of EN 1363-1).

Regarding to low temperatures on unexposed specimen surface below 300°C the performance criteria of radiation is to be complied as satisfied.

[1], [2] The fire test was terminated in the 122nd minute upon request of test sponsor

[3] The test was discontinued in 41st minute because of the specimen integrity failure

[4] The test was discontinued in 91st minute upon request of test sponsor

[5] The test was discontinued in 56th minute because of the specimen integrity failure

[6] The test was discontinued in 59th minute because of the specimen integrity failure

[7] The test was discontinued in 108th minute because of the specimen integrity failure

[8] The test was discontinued in 92nd minute upon request of test sponsor

4. CLASSIFICATION AND FIELD OF APPLICATION

4.1 REFERENCE OF CLASSIFICATION

This classification has been carried out in accordance with clause 7.3.2 of EN 13501-2: 2016.

4.2 CLASSIFICATION

The element, **Loadbearing wall composed of EcoCocon straw modules covered from external face with wood fibre boards Steico Protect H and from internal face with clay base plaster (Variant A)**, is classified according to the following combinations of performance parameters and classes as appropriate.

Fire resistance classification:
(Valid for fire action on internal wall face covered with clay base plaster)

RE 120 / REI 120 / REW 120

Fire resistance classification:
(Valid for fire action on external wall face covered with wood fibre boards Steico Protect H)

RE 120-ef / REI 120-ef / REW 120-ef

The element, **Loadbearing wall composed of EcoCocon straw modules covered from external face with airtight membrane Tyvek Solid and internal face is without surface treatment (Variant B)**, is classified according to the following combinations of performance parameters and classes as appropriate.

Fire resistance classification:
(Valid for fire action on internal wall face without surface treatment)

RE 30 / REI 30 / REW 30

The element, **Loadbearing wall composed of EcoCocon straw modules covered from external face with FireStop A2 membrane and from internal face with gypsum boards Knauf KGBi (H2) (Variant C)**, is classified according to the following combinations of performance parameters and classes as appropriate.

Fire resistance classification:
(Valid for fire action on external wall face covered with FireStop A2 membrane)

RE 90-ef / REI 90-ef / REW 90-ef

The element, **Loadbearing wall composed of EcoCocon straw modules covered from external face with airtight membrane Tyvek Solid and from internal face with gypsum boards Knauf KGBi (H2) (Variant D)**, is classified according to the following combinations of performance parameters and classes as appropriate.

Fire resistance classification:

(Valid for fire action on internal wall face covered with gypsum boards Knauf KGBi (H2))

RE 30 / REI 45 / REW 30

Standard EN 13501-2: 2016, clause 7.3.2 does not define classes RE 45 and REW 45, but classified product satisfies loadbearing capacity (R), integrity (E) and heat radiation (W) performance criterion for classification time 45 minutes

The element, **Loadbearing wall composed of EcoCocon straw modules covered from external face with airtight membrane Tyvek Solid and from internal face with gypsum fibre boards Fermacell (Variant E)**, is classified according to the following combinations of performance parameters and classes as appropriate.

Fire resistance classification:

(Valid for fire action on internal wall face covered with gypsum fibre boards Fermacell)

RE 30 / REI 45 / REW 30

Standard EN 13501-2: 2016, clause 7.3.2 does not define classes RE 45 and REW 45, but classified product satisfies loadbearing capacity (R), integrity (E) and heat radiation (W) performance criterion for classification time 45 minutes

The element, **Loadbearing wall composed of EcoCocon straw modules covered from external face with airtight membrane Tyvek Solid and from internal face with gypsum plaster Knauf MP75 (Variant F)**, is classified according to the following combinations of performance parameters and classes as appropriate.

Fire resistance classification:

(Valid for fire action on internal wall face covered with gypsum plaster Knauf MP75)

RE 90 / REI 90 / REW 90

The element, **Loadbearing wall composed of EcoCocon straw modules covered from external face with straw boards VestaEco PROTECT and from internal face with gypsum boards Knauf KGBi (H2) (Variant G)**, is classified according to the following combinations of performance parameters and classes as appropriate.

Fire resistance classification:

(Valid for fire action on external wall face covered with straw boards VestaEco PROTECT)

RE 90-ef / REI 90-ef / REW 90-ef

4.3 FIELD OF APPLICATION

This classification is valid for the following end use applications:

Height	– increase in the height above 3000 mm is not allowed; – decrease in the height is allowed;
Width	– change in the wall width is allowed; – extension in the width of wall is allowed only as a replication of modules as tested; – decrease in the module width is allowed, but not increase; – maximum width of module is 1200 mm;
Thickness of wall and materials	– increase in the thickness of the wall and individual component materials is allowed;
Linear dimensions of boards	– it is allowed to decrease the linear dimensions of boards, but not thickness;
Fixation of materials	– decrease in distance of fixing centres is allowed;
Size and method of loading	– maximum load 70,0 kN/m;
	– decrease in the applied load is allowed;
	– method of loading - axial loading is not allowed to be change for eccentric loading;

5. LIMITATIONS

This classification document does not represent type approval or certification of the product.

The classification is valid provided that the product, field of application and standards and regulations are not changed.

Approved by:

Ing. Štefan Rástocký
Head of the testing laboratory

Prepared by:

Dávid Šubert
Technician of the testing laboratory

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