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Laboratoire de résistance au feu
agréé par le ministère de l'Intérieur

Translation of « Procès-Verbal de Classement n° 020008B »

This document is an English version of the official document elaborated according to the decree of March 22, 2004 modified by the Ministry of the Interior

FIRE RESISTANCE of a non-load-bearing wall made of hemp concrete with a wood framework

Applicant : Construire en Chanvre
140 rue Chevaleret
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Period of validity: This procès-verbal de classement and its possible extensions are valid until November 20, 2024

Reference document : Laboratory assessment n° 020007B

Date : 16/06/2020

"This test report only attests to the characteristics of the test sample and does not prejudge the characteristics of similar products. It therefore does not constitute product certification within the meaning of article L115-27 of the Consumer Code and the law of August 4, 2008".
The conclusions of this Procès-verbal relate only to the fire resistance performance of the element which is the subject of this procès-verbal. In no case do they prejudge other performances linked to its incorporation into a work.
Classification extensions may relate to this Procès-Verbal. They can only be combined with each other after consultation with the laboratory.

This procès-verbal de classement contains 8 pages including 2 Appendix.
Its reproduction is only authorized in its complete form.

Revision index	Date	Review purpose	Editorial	Verification
A	11/20/2019	Initial version	CDL	BHT / CTR
B	06/16/2020	Cancels and replaces in version B – modification § 3.1.3 et 3.1.4 and update appendinx 1	BHT	CTR

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1 PURPOSE

This Procès-Verbal concerns the fire resistance of a non-load-bearing concrete wall made of hemp with a wood framework.

This document is an English version of the official document elaborated according to the decree of March 22, 2004 modified by the Ministry of the Interior.
This document is made by the fire resistance laboratory under the agreement by the French Ministry of interior.

2 TEXTS AND REFERENCE DOCUMENTS

This "Procès-Verbal" is established according to the following reference texts:

Amended decree of March 22, 2004		: "Fire resistance of products, construction elements and works";
JO CE 2000/367/CE	(May 2000)	: "Classification of fire resistance characteristics of construction products, construction works and parts thereof";
Standard NF EN 1363-1	(March 2013)	: "Fire resistance tests - Part 1 : General requirements"
Standard NF EN 1364-1	(January 2015)	: Fire resistance tests of load-bearing components - Part 1 : Walls" ;
	(2012)	: Professional Rules for the Execution of Works in Hemp Concrete - Hemp Concrete Walls
	(2012)	Professional Rules for the Execution of Works in Hemp Concrete - Mortar Coatings"

This Procès-Verbal is also based on laboratory assessment n° 020007B.

3 DESCRIPTION AND IMPLEMENTATION OF THE ELEMENTS

3.1 Wall description

3.1.1 Wood framework

The framework is composed of class 2 planed wood (for the studs, spacers, and top wall plate) and class 4 planed wood (for the bottom wall plate), in sections 45 x 145 mm^2. The wood species is spruce with a density of 450 kg/m^3.

The framework is assembled using 90 mm long screws.

3.1.2 Sealing strip

The lower edge is treated with a 300 mm wide COMPRIMOB PE strip positioned under the bottom wall plate.

3.1.3 Hemp concrete

The compositions of the hemp concrete of type "wall" concerned by this report comply with the following criteria :

- Binder/aggregate combination in accordance with the Professional Rules for the Execution of Hemp Concrete Structures 2012 - Hemp concrete walls ;

- Binder dosage between 180 kg/m^3 and 330 kg/m^3 ;
- Binder based of lime or natural quick cement ;
- Hemp concrete with a fire reaction classification of B,s1-d0 or higher.

See the binder/granulate combination accepted on November 20, 2019 in appendix 1.

Other binder/granulate combination may be accepted, subject to compliance with the above-mentioned criteria.

3.1.4 Interior finishes

The following interior finishes are allowed :

- Lime/hemp coatings provided that :
  - The binder/aggregate combination complies with the Professional Rules for the Execution of Hemp Concrete Structures 2012 - Mortar Coatings ;
  - The binder dosage is between 400 kg/m^3 and 880 kg/m^3 ;
  - The minimum coating thickness is 32 mm.
- Lime/sand coatings provided that :
  - The minimum binder dosage is 250 kg/m^3 ;
  - The minimum coating thickness is 18 mm.

The application of an interior finish is not compulsory.

3.1.5 Exterior finishes

Exterior finishes accepted are lime/sand coatings provided that :

- The minimum binder dosage is 250 kg/m^3 ;
- The minimum coating thickness is 18 mm.

The application of an exterior finish is not compulsory.

3.2 Wall installation

<table>
<tr><th>TYPE OF INSTALLATION HEMP CONCRETE</th><th>BY SPRAYING</th><th>BY WALL FORMING</th></tr>
<tr><td>FRAMEWORK ASSEMBLY</td><td colspan="2">After installation of the COMPRIMOB PE ground strap, the bottom wall plate is fixed to the lower beam of the frame. The first stud is fixed to the secured edge of the frame with 3 anchor bolts. The other vertical studs as well as the spacers are mounted on the extension and fixed to the bottom wall plate with 2 wood screws 90 mm long. A strip of mineral wool is interposed between the last stud and the test frame. The top wall plate is then slid between the closing beam of the frame and the top of the vertical studs before being fixed to the latter with 2 wood screws 90 mm long. The remaining space between the top side of the wall plate top and the underside of the closing beam is sealed with mortar.

The assembly of the wood framework is carried out in accordance with standards NF DTU 31.1 and NF DTU 31.2.</td></tr>
<tr><td>INSTALLATION OF THE PROVISIONAL FORMWORK</td><td>OSB panels covered with a polyane film are mounted on the side exposed to the fire to serve as a support for the hemp concrete spraying. To begin with, a first series of screws are distributed over the wooden framework to guarantee the 75 mm coating, then the panels are mounted and fixed to the framework by another series of screws (which come and fix the panels to the first series).</td><td>OSB panels covered with a polyane film are mounted on the side exposed to the fire. To begin with, a first series of screws are distributed over the wooden framework to guarantee the 75 mm coating, then the panels are mounted and fixed to the framework by another series of screws (which come and fix the panels to the first series). The other side of the wall is formworked in successive heights of 700 mm.</td></tr>
<tr><td>PREPARATION OF THE WATER/BINDER MIXTURE</td><td colspan="2">The binder "milk" is mixed in the concrete mixer integrated in the spraying machine before being poured into a tank with agitator from which it is pumped to the spray hose.</td></tr>
</table>

TYPE OF INSTALLATION HEMP CONCRETE	BY SPRAYING	BY WALL FORMING
INSTALLATION OF THE HEMP CONCRETE	The hemp concrete is then sprayed against the OSB boards using a spraying machine. The hemp aggregates are coated with the water/binder combination at the outlet of the spray hose. This is carried out from the side not exposed to fire, starting from the bottom of the wall across its entire width until the desired thickness is achieved. The face of the wall is sprayed in one go. The flatness of the wall on the side not exposed to fire is then adjusted using flat rulers until a constant hemp thickness of 295 mm is achieved.	The hemp concrete is applied in successive layers of 10 cm maximum (the material is distributed manually but not compacted). The material is then lightly packed along the frames and panels so that the wall surfaces are homogeneous.
FORMWORK REMOVAL	The OSB planks that have served as a support are removed by lateral sliding the day after the concrete is poured. The areas in line with the studs are possibly cleared and re-projected.	
WALL DIMENSIONS	3,960 x 3,000 x 295 mm3 (W x H x t)	
PLAN	See the wall layout plan in APPENDIX 2.	

4 COMPONENTS REPRESENTATIVENESS

By its materials from current manufacture, by its principle of in-situ mounting, the element used under the conditions observed by the laboratory which carried out the test, can be considered as representative of current existing production.

It supports the production of a **confirmed "Procès-Verbal".**

5 CLASSIFICATION AND DIRECT FIELD OF APPLICATION

The conclusions of this "Procès-Verbal" relate only to the fire resistance performance of the element which is the subject of this "Procès-Verbal". In no case do they prejudge other performances linked to its incorporation into a work.

CLASSIFICATION	
The elements, which are the subject of this procès-verbal, are classified according to the following combination of performance parameters. **No other classification is allowed.**	
EI	**240**

EXPOSURE DIRECTION
The wall is symmetrical. The direction of the fire is not relevant.

CONDITION OF VALIDITY OF THE CLASSIFICATION	
During manufacture and installation, the elements and their assembly must comply with the detailed description given in laboratory assessment no. 020007B, which can be requested without obligation to assign the document in the event of a dispute over the identification of the object.	
FIELD OF APPLICATION	
The results of the fire test are directly applicable to similar constructions when one or more of the following modifications have been made and the construction continues to comply with the corresponding design rules regarding its rigidity and stability.	
HEIGHT REDUCTION	Wall height ≤ 4 m
WALL THICKNESS INCREASE	Wall thickness ≥ 295 mm
THICKNESS OF CONSTITUTIVE MATERIALS INCREASE	Wood stud ≥ 45 x 145 mm² provided that a 75 mm hemp concrete coating is kept on the face exposed to the fire
SPACING BETWEEN STUDS REDUCTION	Stud spacing ≤ 600 mm
WIDTH INCREASE	Increasing the width of an identical construction is allowed

6 VALIDITY PERIOD OF FIRE RESISTANCE CLASSIFICATION

This procès-verbal is valid for 5 years from the date of issue of the laboratory assessment, that is until Novembre 20, 2024.

After this date, this procès-verbal is no longer valid, unless it is accompanied by a renewal issued by the laboratory.

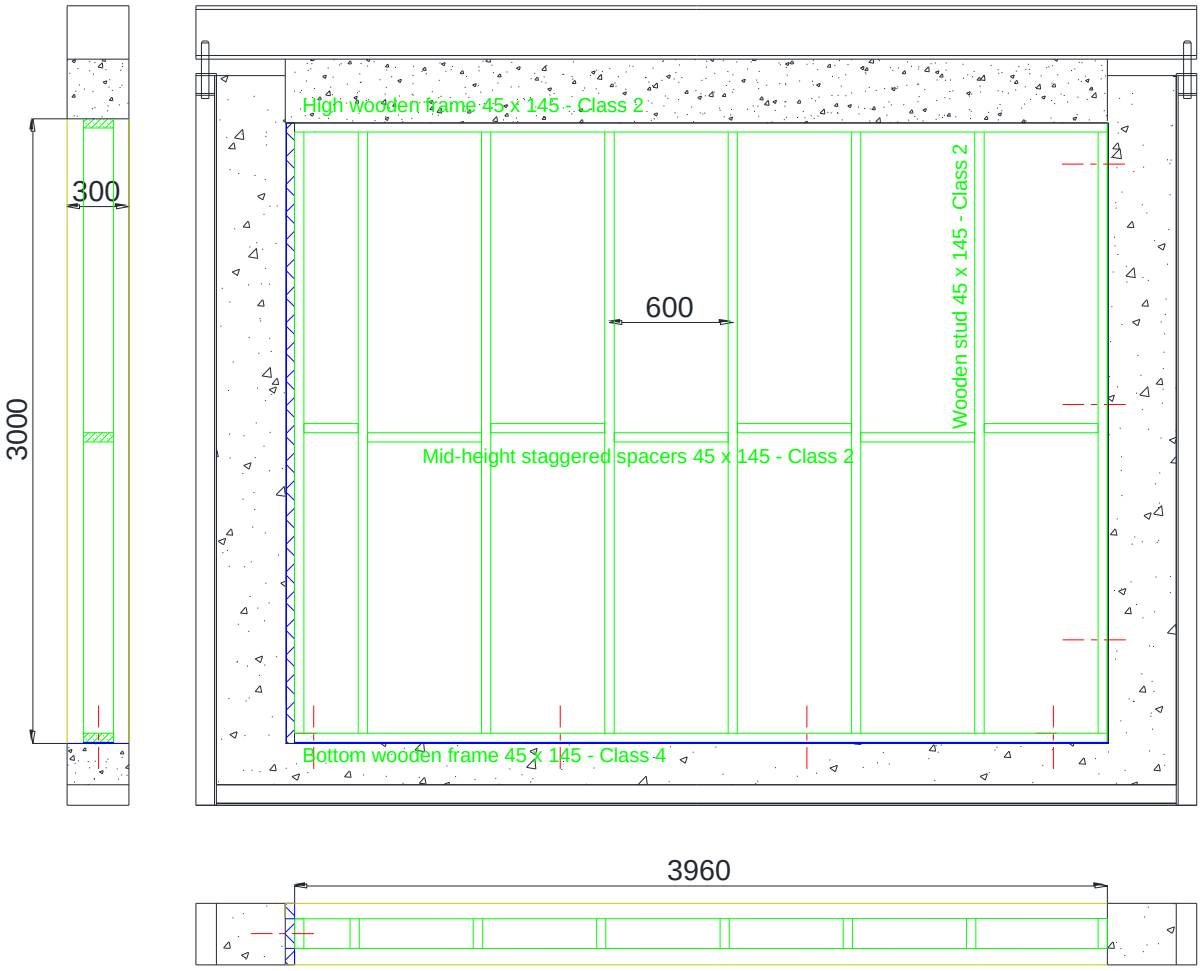
WARNING

This “Procès-Verbal” does not represent the approval of Type or the certification of the element.

APPENDIX 1 – BINDER/AGGREGATE COMBINATIONS VALID AS OF JUNE 16, 2020

BINDER	AGGREGATE LABELISED
Tradical® PF 70 (BCB)	CANA-GRANULA® Label n° 001/003/001 (Origine EUROCHANVRE)
BATICHANVRE® (CESA)	Biofibat' chènevotte Label n° 001/002/001 (CAVAC)
Tradical® THERMO FLA 3,5 CE (BCB)	Chanvribat® (BCB)
Tradical® PF 70 (BCB)	Chanvribat® (BCB)
Tradical® PF 70 (BCB)	Origine La Chanvrière Label n° 001/001/001
BATICHANVRE® (CESA)	KANABAT Label n° 001/001/001 (La Chanvrière)
BATICHANVRE® (CESA)	Origine Planète Chanvre Label n° 001/004/001
BATICHANVRE® (CESA)	CANA-GRANULA® Label n° 001/003/001 (Origine EUROCHANVRE)
i.pro CALIX HL 5 CE (SOCLI)	Biofibat' chènevotte Label n° 001/002/001 (CAVAC)
Nathural® NHL 3,5 CE (LAFARGE)	Origine La Chanvrière Label n° 001/001/001
Tradibat® 85 HL5CE(LAFARGE)	Biofibat' chènevotte Label n° 001/002/001 (CAVAC)
Nathural® NHL 3,5 CE (LAFARGE)	Biofibat' chènevotte Label n° 001/002/001 (CAVAC)
Ciment naturel prompt (VICAT)	KANABAT Label n° 001/001/001 (La Chanvrière)
Tradical® THERMO FLA 3,5 CE (BCB)	Origine Planète Chanvre Label n° 001/004/001
Tradibat® 85 HL5CE(LAFARGE)	KANABAT Label n° 001/001/001 (La Chanvrière)
BATICHANVRE® (CESA)	AGROCHANVRE CHENEVOTTE BATIMENT Label n° 001/005/001 (Origine AGROCHANVRE)
Tradical® THERMO FLA 3,5 CE (BCB)	AGROCHANVRE CHENEVOTTE BATIMENT Label n° 001/005/001 (Origine AGROCHANVRE)
Tradical® THERMO FLA 3,5 CE (BCB)	Biofibat' chènevotte Label n° 001/002/001 (CAVAC)
BATICHANVRE ISOL' ® HL 5 CE (CESA)	ISOCANNA® Label n° 001/001/001 (CESA)
Ciment naturel Prompt CNP PM NF (VICAT)	CANA-GRANULA® Label n° 001/003/001 (EUROCHANVRE)
BATICHANVRE ISOL' ® HL 5 CE (CESA)	ISOCANNA® Label n° 001/003/001 (CESA)
BATICHANVRE ISOL' ® HL 5 CE (CESA)	AGROCHANVRE CHENEVOTTE BATIMENT Label n° 001/005/001 (Origine AGROCHANVRE)

APPENDIX 2 – WALL LAYOUT PLAN



Fixation SPIT FIX3 8X100/50-40

Mineral Wool 50 mm compressed to 40 mm

Hemp concrete

Wood framework