

SINTEF Building and Infrastructure confirms that

Hunton wall

has been found to be fit for use in Norway and to meet the provisions regarding product documentation given in the regulation relating to the marketing of products for construction works (DOK) and regulations on technical requirements for building works (TEK), with the properties, fields of application and conditions for use as stated in this document

1. Holder of the approval

Hunton Fiber AS
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Norway
www.hunton.no

2. Product description

2.1 General

Hunton wall shall be assembled by the engaged craftsman on site for each single building project.

Components and their producers are shown with their specific product name in table 1, "*Material and specification of components for approved products*". Where similar products can be chosen from different producers are neutral product descriptions used.

Hunton wall is an exterior wall, based on framework of wood based I-beams and/or timber studs. Although insulation, wind barrier and inside gypsum-fibre-boards are a part of Hunton wall's approved material components. Approved components are shown in table 1.

Alternative material, needed for completing the exterior wall are shown in table 2. These materials shall in minimum satisfy requirements in shown Norwegian standard rules and/or European standard rules. In addition, shall the Norwegian requirements for material documentation (DOK) and environmental requirements be satisfied.

2.2 Exterior part of construction

Cladding and exterior battens. Hunton wall is a traditional wall system with either horizontal or vertical cladding. Different façade materials can also be used. Battening and ventilation back cladding have to follow principles in SINTEF Building Research Design Guides 542.101 *Stående trekledning* and 542.102 *Liggende trekledning*.

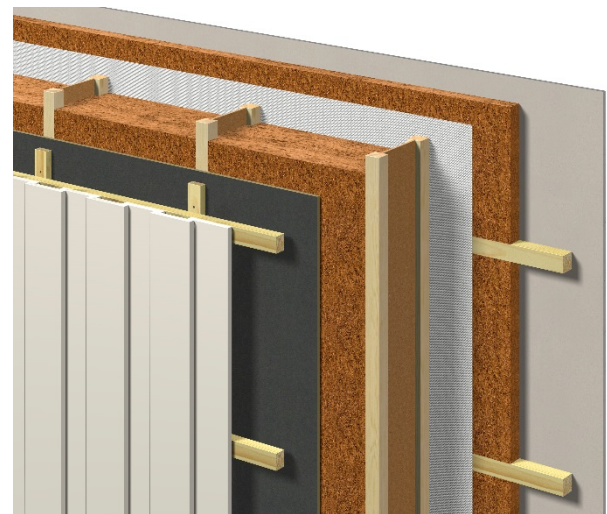


Fig. 1
Illustration of principle of Hunton wall

2.3 Core part of construction

Wind barrier, insulation/studs and vapour barrier. In due to the need of insulation for the different types of buildings Hunton wall can vary between 200 mm and 400 mm thickness.

2.4 Inside part of construction

Inside battens/insulation and gypsum-fibre-boards. Hunton wall can be used either with or without inside battens (installation layer) between vapour barrier and gypsum-fibre-boards. Installation layer can be insulated if needed.

3. Fields of application

The Hunton wall system can be used, regarding fire, in hazard class 1. Single residential buildings in purpose group 4 with three stories can be build in hazard class 1 if each story has direct access to terrain without need of evacuation through stairs or staircases. For other use, fire safety has to be documented by a technical analysis regarding fire.

Table 1
Hunton wall – Material and specification of components for approved products

Material / component	Specification (Not shown material dimensions have to be specified in each single building project)
Frame components	
Ground sill	Hunton I-beam Hunton I-beam w/ LVL flange Novel AS Straight Wooden studs
Studs	
Top sill	
Insulation	
Heat insulation of wooden fibre	Hunton Wood fibre insulation plates with declared heat conductivity λ_D 0,038 W/mK
Barriers	
Wind barrier	Hunton Vindtett / Hunton Bitroc Thicknesses: 12, 15, 19, 25 mm
Vapour barrier	A vapour barrier with SINTEF Technical Approval has to be used
Lining	
Inside lining	Fermacell gypsum-fibre-boards 12,5mm

Table 2
Hunton wall – Materials for completing of Hunton wall and alternative material which not is a part of this approval

Material / component	Specification (Not shown material dimensions has to be specified in each single building project. Materials have to follow Norwegian requirement defined by (DOK) regarding product documentation and environmental evaluation)
Frame components	
Ground sill	Construction timber with declared strength classes and max. humidity of 18 % Construction glue lam
Studs	
Top sill	
Insulation	
Heat insulation of wooden fibre	Hunton Wood fibre in-situ insulation with declared heat conductivity λ_D 0,038 W/mK
Heat insulation of glass fibre	Glass wool insulation, with declared heat conductivity λ_D 0,037 W/mK or λ_D 0,035 W/mK
Heat insulation of stone fibre	Stone wool insulation, with declared heat conductivity λ_D 0,037 W/mK
Cladding	
Exterior cladding	Min. 19mm wooden cladding
Inside lining	Gypsum plaster boards in different types and thicknesses Particle boards Wooden fibre plates (hard) Wooden fibre plates (medium hard) MDF plates OSB-plates Plywood plates Massive wooden plates
Fastener	
Nails and screws	Nails and screws

4. Properties

4.1 Load carrying capacity

Load carrying capacity has to be considerate for each single delivery. Design consideration for structural components shall be performed according EN 1995-1-1 and EN 1991-1 with eventually enclosed national appendices. See also chapter 6.1.

4.2 Safety in case of fire

Materials approved of SINTEF Building and Infrastructure and used in Hunton wall have fire-technical classifications according EN 13501-1 and are presented in table 3.

Table 3
Fire-technical classification for materials in Hunton wall

Material	Fire-technical class
Hunton Wood fibre insulation plates	E
Hunton Vindtett / Biroc	F
Fermacell gypsum-fibre-boards	A2-s1,d0

4.3 Fire resistance

Under condition, that Hunton wall is built like shown in fig. 2 and table 5 the construction has a fire resistance of REI 30 from inside as well as from outside according EN 13501-2. The design load capacity at ultimate limited state for case fire is limited to 3,0 m high walls and 15 kN/(m wall-length), with load, placed 1/3 of wall-thickness (stud-height) measured from inside. This fire-resistance is also valid for following changes in the construction:

- Reducing of the height of the wall
- Reducing the distances between the studs
- Increasing the dimension of the studs
- I-beams changed to timber studs C24, 45 x 200 mm
- Reducing distances of screws
- Thickness of wall increases
- Thickness of single components increase

Hunton wall with 12,5mm standard gypsum plate of type A according EN 520 (density of in minimum 600 kg/m³ and fire-technical classification of K₂10 A2-s1,d0 (EN 13501-1 and EN 13501-2)) and insulation of wooden fibre, glass fibre or stone fibre has a fire resistance of R 15 and can be used as main and secondary bearing construction in:

- Buildings in one story in risk group 2, 3 and 5 in hazard class 1
- Buildings in risk group 4 and hazard class 1, including single residential buildings up to three stories if each story has access to terrain without need of evacuation through stairs or staircases.

5.4 Heat insulation

Heat insulation coefficients for Hunton wall in table 6 are calculated for different thicknesses and different buildups.

- Distances of studs are calculated to c/c 600 mm.
- Wall height is calculated to be 2,4 m.
- The rate of wooden parts around windows are calculated within under condition that the windows represent ca. 20% of exterior walls.

The summed rate of wooden parts is calculated to 15,5 %

5.5 Durability

Tightness of Hunton wall and durability of the construction is evaluated to satisfy SINTEF Building and Infrastructure's recommendations.

Table 4¹⁾

Actual plates which give satisfying covering of Hunton wooden fibre insulation according guidelines of TEK 10 under condition that the cavity is completely filled with insulation.

Material	Product standard EN	Fire technical class ²⁾	Cover classification ²⁾	Min. material thickness [mm]	Min. density [kg/m ³]	Comment
Inside lining						
Fermacell gypsum fibre boards	15283-2	A2-s1, d0	K ₁ 10	12,5	≥ 1100	Assembling according producer's recommendations
Gypsum plates standard type A	520	A2-s1, d0 ³⁾	K ₂ 10 ³⁾	12,5	≥ 600	Assembling according producer's recommendations
Particle board	13986 312	D-s2, d0	K ₂ 10	12	≥ 600	^{4) 5)}
Wooden fibre plates hard	13986 622-2	D-s2, d0	K ₂ 10	10	≥ 800	^{4) 6)}
OSB-plate	13986 300	D-s2, d2	K ₂ 10	15	≥ 600	^{4) 5)}
Plywood plates	13986 636	D-s2, d0	K ₂ 10	12	≥ 450	^{4) 5)}
Massive wooden plates	13986 13353	D-s2, d0	K ₂ 10	12	≥ 450	^{4) 5)}
Exterior wind barrier						
Hunton Vindtett	13986 622-4	F		12	≥ 235	Based on a test for fire resistance

¹⁾ Basis for this table are following documents:

European law "COMMISSION DECISION of 17 January 2003 establishing the classes of reaction-to-fire performance for certain construction products"

European law "COMMISSION DELEGATED REGULATION (EU) No 1291/2014 of 16 July 2014 on the conditions for classification, without testing, of wood-based panels under EN 13986 and solid wood panelling and cladding under EN 14915 with regard to their fire protection ability, when used for wall and ceiling covering"

²⁾ Under condition that these plates are produced according shown product standards and are used with minimum thickness and minimum density as shown, will these plates satisfy shown fire technical classification and cover classification without need of testing.

³⁾ Under condition that these classes are defined by producer.

⁴⁾ With and without tongue and groove.

⁵⁾ Fastener length min. 30 mm, distance max. 200 mm

⁶⁾ Fastener length min. 40 mm, distance max. 100 mm

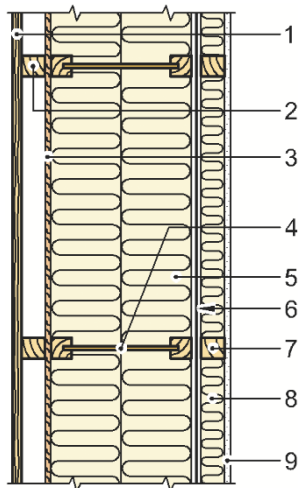


Fig. 2
Buildup of Hunton wall with declared fire resistance

Table 5
Buildup of Hunton wall with declared fire resistance

No.	Description outside - in over
1	19 mm wooden cladding
2	47 mm battens
3	12 mm Hunton Vindtett Fastener: screws 2,8 x 45 mm; c/c 100 mm along edges; c/c 250 mm middle of the plate
4	SW _L 45/200 Hunton I-beam; c/c 600 mm Flange of LVL 45 x 39 mm; web 6,7 mm hard wooden fiber plate
5	200 mm Hunton wood fiber insulation in-situ
6	Vapour barrier
7	48 x 48 mm battens
8	50 mm Hunton wood fiber insulation plates
9	12,5 mm Fermacell plates Fastener: screws 3,9 x 30 mm; c/c 250 mm along edges and in middle of the plate. Distance to edge min. 10 mm. Distance to corner min. 50 mm

5. Environmental aspects

Substances hazardous to health and environment

The product contains no hazardous substances with priority in quantities that pose any increased risk for human health and environment. Chemicals with priority include CMR, PBT or vPvB substances.

Effect on indoor environment

The product is not regarded as emitting any particles, gases or radiation that have a perceptible impact on the indoor climate, or to have any significant impact on health.

Table 6
Heat insulation coefficients, U values, calculated according EN ISO 6946 for Hunton wall

Core insulation thickness	Hunton Vindtett				Framework ¹⁾		Wood fibre insulation	Vapour barrier	without insul. installation layer	With insulated installation layer	Gypsum fibre or normal gypsum	Heat insulation coefficients [W/(m²K)]
	12 mm	15 mm	19 mm	25 mm	Timber 48 mm	I-Beam 45 mm						
200 mm	X			X	X		X	X	X		X	0,22
				X		X	X	X		X	X	0,17
220 mm	X			X	X		X	X	X		X	0,21
			X			X	X	X		X	X	0,16
Recommended standard thickness 250 mm	X				X		X	X	X		X	0,18
		X			X		X	X	X		X	0,18
			X		X		X	X	X		X	0,18
				X	X		X	X	X		X	0,17
	X					X		X	X		X	0,18
		X					X	X	X		X	0,18
			X				X	X	X		X	0,18
				X			X	X	X		X	0,17
	X				X		X	X		X	X	0,16
		X			X		X	X		X	X	0,16
			X		X		X	X		X	X	0,15
				X	X		X	X		X	X	0,15
	X				X		X	X		X	X	0,15
		X				X	X	X		X	X	0,15
			X			X	X	X		X	X	0,14
300 mm	X				X		X	X	X		X	0,16
			X			X	X	X		X	X	0,13
350 mm	X				X		X	X	X		X	0,14
			X			X	X	X		X	X	0,11

¹⁾ For avoiding aligning each Hunton wooden fibre insulation plate to the shape of the I beams this calculation is taking account to a Hunton wooden fibre plate, placed beside the I-beam web, what makes the section rectangular.

Waste treatment/recycling

The product shall be sorted as timber, gypsum, insulation, residual waste and other actual waste types on site or during disposal. The product shall be delivered to an authorized waste treatment plant for energy and material recovery.

Environmental declaration

No environmental declaration (EPD) has been worked out for the product.

6. Special conditions for use and installation*6.1 Design considerations for bearing*

Hunton wall shall be considered according Eurocodes 0 to 9. It has to be take in account the national Norwegian appendices.

Design consideration of Hunton wall can alternatively be done according SINTEF Building Research Design Guides 523.251 *Bindingsverk av tre i småhus. Dimensjonering og utførelse.*

Strength information given in the different SINTEF Technical Approvals for the different product have to be used.

6.2 Design consideration for fire characteristics

Hunton wooden fibre insulation plates shall always be covered on all surfaces for to avoid effect to fire spread. This regards also to all kind of cut-outs like for example windows and doors.

On inside and exterior surfaces has Hunton wooden fibre insulation always to be covered with lining plates or claddings which are classified as K₂10 D-s2,d0 (D-s3,d0 outside). I escape areas, shafts and cavities has the covering to fulfil classification for K₂10 B-s1,d0 (B-s3,d0 outside). Table 4 shows examples for plates which fulfil these requirements.

The performances of all kind of cut-outs have to have the same fire resistances like the wall itself.

6.3 Design consideration for heat insulation

In table 6 shown u-values are including thermal bridges of additional timber around window- and door openings. With other build-ups as shown in table 6 project specific U-values have to be calculated

Necessary heat insulation has to be calculated according energy loss calculation for the entire building. It has to be considered for each single project to satisfy requirements of energy-consumption according TEK 10.

Using I beams together with Hunton wooden fibre insulation plates should Hunton wooden fibre plates be used to fill up the I beam, that the different widths of flange and web are even. Insulation plates can then be used in rectangular shape.

6.4 Installation

Assembling, design details and installation shall follow principles in the SINTEF Building Research Design Guide.

6.5 Transport and storage

During transport, storage and assembling of Hunton wall shall all materials be protected for rain and snow, for example with wrapping, until the wall is build up and protected by the final cladding or roofing.

7. Factory production control

Regarding the products included in table 1, the manufacturers, mentioned in the single SINTEF Technical Approvals, are producing for Hunton Fiber AS.

The holder of the approval is responsible for the factory production control in order to ensure that the products are produced in accordance with the preconditions applying to this approval.

The manufacturing of the products is subject to continuous surveillance of the factory production control in accordance with the contract regarding SINTEF Technical Approval.

Hunton Fiber AS, Gjøvik has a quality management system certified by "Det Norske Veritas" according NS-EN 9001:2008, certificate nr. 18372-2008-AQ-NOR-NA.

8. Basis for the approval

The approval is based on following documents and reports:

- MFPA Leipzig GmbH, Report PB 3.2/13-170-1, dated 16.01.2014, Fire resistance
- MFPA Leipzig GmbH, Report PB 3.2/13-170-2, dated 16.01.2014, Fire resistance
- SP Fire Research AS, Evaluation report 103420.17, dated 28.05.2014, Fire technical assessment of replacing the loose Hunton Zell insulation with Hunton Flex insulation boards in load-bearing sectional wall, Brannmotstand
- SINTEF Building and Infrastructure, Report 102003983, dated 07.07.2014, Hunton Trefiberisolasjon (plate insulation and in-situ insulation) and Hunton Vindtett – Fire safety evaluation
- SINTEF Building and Infrastructure, Internal Notice, dated 29.07.2015, Calculation of U-values for the system

9. Marking

Descriptions and marketing documents of Hunton wall can be marked with approval mark for SINTEF Technical Approval TG 20441. The other materials, approved by SINTEF Building and Infrastructure, can be marked with their own approval mark.



Approval mark

10. Liability

The holder/manufacturer has sole product responsibility according to existing law. Claims resulting from the use of the product cannot be brought against SINTEF beyond the provisions of Norwegian Standard NS 8402

for SINTEF Byggforsk

A handwritten signature in blue ink that reads "Marius Kvalvik".

Marius Kvalvik
Godkjenningsleder