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European Technical Assessment ETA-24/1137 of 28.10.2025

General Part

Technical Assessment Body issuing the European Technical Assessment	SINTEF AS by its institute SINTEF Community
Trade name of the construction product	Moelven Modul
Product family to which the construction product belongs	Structural Timber Product Elements and Ancillaries Timber frame building kits
Manufacturer	Moelven Byggmodul AS Industrivegen 12 2390 Moelv Norway
Manufacturing plant(s)	Moelven Byggmodul AS Industrivegen 12, 2390 Moelv, Norway
This European Technical Assessment contains	29 pages including 4 Annexes which form an integral part of this assessment Annex B contains confidential information and is not included in the European Technical Assessment when that assessment is publicly disseminated
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of	EAD 340308-00-0203 Timber Building Kits

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Specific parts

1. Technical description of the product

The purpose of this assessment for Moelven Byggmodul AS is to obtain European Technical Assessment (ETA) for building kits of prefabricated building modules with the following product name: “Moelven Modul”. The module is recognized as a construction product within the product area “Building Kits, Units, and Prefabricated Elements” – product area code (PAC) 34, according to the Construction Product Regulation (EU) No 305/2011 (CPR). Henceforth within the document, the kit shall be referred to as, “Moelven Modul”.

Moelven Modul are kits made of prefabricated building modules with timber frame structures in floors, walls and roof. The basic design of wall, floor and roof construction, including the detailed design specifications (connections between components / elements and assembly details) are presented in Annex A1 and Annex B[1]. The material and component specifications are given in Annex A2, Table A2-1 of this ETA.

Module size is custom made for each delivery, but maximum dimensions are 4.2 m width, 3.5 m height and 13.2 m length.

This assessment covers the standard design of the module structure, i.e. external and internal walls, floors and roofs, including external envelope with timber cladding and fibre cement boards, the wet rooms, and the connection between several modules mounted together as a building.

The assessment does not cover foundations of the building, external or internal surface finishes, windows, doors, roofing materials such as roof tiles, supplementary components like stairs, balconies etc, or technical installations for water, heating and ventilation systems. These products are specified case by case, and their performance must be verified specifically for each project.

The modules shall be installed according to the relevant construction details in Annex B, together with a special installation manual worked out by the manufacturer for each project. The installation manual shall cover all installation aspects for the modules, including construction system and equipment, temporary bracing, permanent anchoring to foundations and between modules, weather protection during installation, materials and components which are necessary supplements to the modules as well as standard assembly joints and special joint designs for individual modules.

The modules shall be fully protected from weather exposure and mechanical damage during storage, transport and installation.

Package, transport, storage, construction and maintenance of the kits are laid down in manufacturer technical documentation.

[1] Annex B contains confidential information and is not included in the European Technical Assessment when that assessment is publicly disseminated.

2. Specification of the intended use(s) in accordance with the applicable European Assessment Document (hereinafter EAD)

“Moelven Modul” is intended for low rise or multi-storey houses, with vertical and horizontal separations between house units and within limitations of regulations valid on the place of use. The modules may also be used for non-residential buildings where the performance requirements are more or less the same as for residential houses.

The intended use shall be evaluated for each individual project depending on the climatic and geographic conditions.

The modules are designed to accommodate climatic conditions where humidity predominantly flow from the building’s interior to its exterior for a major part of the year. This essential aspect should be taken into careful consideration when deploying the building kits in the southern regions of Europe.

The kits are intended to be placed on all types of ordinary foundations like concrete slabs on ground, masonry or concrete basement walls, or strip foundations. The modules shall be placed on a foundation that meets the manufacturer's specified requirements concerning dimensions, tolerances (± 3 mm) and loadbearing capacity. A vapour-proof barrier or equivalent must prevent moisture uptake in the modules from foundations.

No special assessment of structural resistance related to seismic actions has been performed.

The use of kit in regions where termite attack can occur is impermissible without additional chemical treatment.

The provisions made in this ETA are based on an assumed working life of 50 years for load bearing and non-accessible construction components and materials, and 25 years for reparable or replaceable components and materials, provided that building kits are subject to appropriate installation, use and maintenance. The indications given on the working life cannot be interpreted as a guarantee given by the producer but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the construction.

The design process and complete construction must comply with the procedures foreseen in the Member State in which the building kit will be established.

3. Performance of the product and references to the methods used for its assessment

The assessment is performed according to EAD 340308-00-0203, Timber Building Kits edition January 2019. The latest release of all referenced standards should always be taken into consideration. Product characteristics used in calculations are based on proved data provided by producers or by appropriate standard. Relevance of defined product characteristics is related to validity of standard / reports used in preparation of ETA.

Table 1 shows the characteristics for which the product performances are declared in this ETA. The characteristics corresponds to the Moelven Modul design specified in Annex A1 and B.

Table 1

Product name: Moelven Modul		Intended use: Low rise and multi-storey residential, institutional, commercial and industrial buildings	
Basic Work Requirements (BWR)	Essential characteristics of construction product	Assessment method	Product performance
BWR 1: Mechanical Resistance and stability	Resistance, stiffness and stability of wall, floor and roof elements and their connections against vertical and horizontal loads	Clause 3.1.1	See cl. 3.1.1 and Annex A1 and Annex A2, table A2-1
	Shear resistance in plane direction against horizontal loads	Clause 3.1.2	No Performance Assessed (NPA)
	Corrosion protection of metal fasteners	Clause 3.1.3	Clause 3.1.3 and Annex A2, table A2-2
BWR 2: Safety in case of fire	Reaction to fire	Clause 3.2.1	See cl. 3.2.1 and Annex A2, table A2-1
	Fire resistance	Clause 3.2.2	See cl. 3.2.2 and Annex A3, table A3-1
	External fire performance of roof covering	Clause 3.2.3	See cl. 3.2.3
BWR 3: Hygiene, health and the environment	Vapour permeability and moisture resistance	Clause 3.3.1	See cl.3.3.1
	Watertightness - External envelope - Internal surfaces	 - Clause 3.3.2.1 - Clause 3.3.2.2	 - See cl. 3.3.2.1 - See cl. 3.3.2.2
	Durability class / Use class	Clause 3.3.3	See cl. 3.3.3
	Content and release of dangerous substances	Clause 3.3.4	No performance assessed (NPA)
BWR 4: Safety and accessibility in use	Impact resistance	Clause 3.4.1	See cl. 3.4.1
BWR 5: Protection against noise	Airborne sound insulation of walls, floors and roof structures	Clause 3.5.1	No Performance Assessed (NPA)
	Impact sound insulation of floors	Clause 3.5.2	No Performance Assessed (NPA)

	Sound absorption	Clause 3.5.3	No Performance Assessed (NPA)
BWR 6: Energy economy and heat retention	Thermal resistance	Clause 3.6.1	See cl. 3.6.1 and Annex A4, table A4-1
	Air permeability	Clause 3.6.2	See cl. 3.6.2
	Thermal Inertia	Clause 3.6.3	No Performance Assessed (NPA)
BWR 7: Sustainable use of natural resources	Sustainable use of natural resources	Clause 3.7	No Performance Assessed (NPA)

3.1 Mechanical resistance and stability (BWR 1)

3.1.1 Resistance, stiffness and stability of wall, floor and roof elements and their connections against vertical and horizontal loads

Indication of geometrical data of the components and elements and their properties related to mechanical resistance and stability are used as an expression of resistance, stiffness and stability of wall, floor and roof elements and their connections against vertical and horizontal loads.

The components of the kit – wall, floor and roof elements – are listed in Annex A1 and described regarding their composition, including relevant fasteners for their assembling and for connections between components. Detailed material specifications (components and fasteners) are given in Annex A2, table A2-1. Typical connection details between the components are given in Annex B.

Information given for each project are calculated according to EN 1990, EN 1991, EN 1995-1-1 and EN 1998-1 taking into consideration respective requirements of the Member States regarding ultimate limit state and serviceability limit state.

3.1.2 Shear resistance in plane direction against horizontal loads

No performance assessed (NPA) option is applied.

3.1.3 Corrosion protection of metal fasteners

Corrosion protection of metal fasteners corresponds to the requirements of the intended service class according to EN 1995-1-1 (Service classes 1-3) and it's expressed as Service class, material type (stainless steel) or as type / thickness of corrosion protection (zinc coating). Corrosion protection of metal fasteners is given in Annex A2, table A2-2.

3.2 Safety in case of fire (BWR 2)

3.2.1 Reaction to fire

Reaction to fire classification according to EN 13501-1+A1 is shown for each individual material and component in Annex A2.

A European reference fire scenario has not been established for facades. In some Member States, a classification according to EN 13501-1 might not be sufficient for the use in facades, an additional assessment of Moelven Modul according to national provisions (e.g. based on large-

scale fire test) might be necessary to comply with Member State regulations, until a European classification system has been completed.

3.2.2 Fire resistance

For basic module designs, as shown in Annex A1, the resistance to fire classified according to EN 13501-2+A1 is tabulated in Annex A3, table A3-1.

3.2.3 External fire performance of roof covering

The roof covering shall be tested using the test method relevant for the corresponding external fire performance roof class and be classified according to EN 13501-5.

Reaction to fire classification for roof coverings used in Moelven Modul is shown in Annex A2, table A2-1.

3.3 Hygiene, health and the environment (BWR 3)

3.3.1 Vapour permeability and moisture resistance

Vapour permeability and moisture resistance of the module construction using the material properties defined in Annex A2, have been assessed on the bases of calculations according to EN ISO 13788 to be acceptable for the intended use indicated in clause 2. The overall design of the kit's external envelope has been assessed to provide adequate moisture control for the intended use.

A report regarding the requirements defined in chapter 2.2.9 in EAD 340308-00-0203 Timber Building Kits has been made. The document presents a qualitative analysis of the risk for interstitial condensation and internal surface condensation. The risk for interstitial condensation or internal surface condensation for European climate is considered to be small.

3.3.2 Watertightness

3.3.2.1 External envelope

The typical design of the external envelope structures in "Moelven Modul" consists of well-known technical solutions and has been assessed based on engineering evaluations and relevant experience[1]

3.3.2.2 Internal surfaces

The membrane system used to provide watertightness of zones with direct water exposure in internal wet room floors and walls has been tested and assessed according to the provisions in EAD 030352-00-0503 Watertight covering kits for wet room floors and/or walls.

The floors and walls classified as watertight face areas are shown in Annex 1, and membrane systems used in the kit are given in Annex 2, table A2.1.

[1] Knut Ivar Edvardsen og Trond Ramstad SINTEF Byggforsk (2014): Trehus Håndbok 5, Oslo ISBN 978-82-536-1391-8

3.3.3 Durability class / Use class

The timber species used in the modules are softwood in class 4 concerning natural durability and resistance to fungus attack according to EN 350-2. Structural components and internal linings are in hazard class 1 according to EN 335-1, and timber cladding is in hazard class 2.

Durability of wood-based panels is according to EN 13986 expressed as EN 335 use class (1 or 2).

Based on assessment of typical construction details, wood-based materials exposed to external climate have ability to dry between wet periods.

3.3.4 Content and release of dangerous substances

No performance assessed (NPA) option is applied.

Note: Manufacturer declares that only timber-based products with formaldehyde class E1 and wood-based panels with release of pentachlorophenol ≤ 5 ppm, are used.

3.4 Safety and accessibility in use (BWR 4)

3.4.1 Impact resistance

Impact resistance of module walls is assessed as adequate as well-known internal lining materials (OSB/3, gypsum fibre / plasterboard) with thickness (t ≥ 10 mm) and stud (≥C18) with spacing (≤ 0.65 m) are used in element composition.

This deemed to satisfy the conditions of EAD 340308-00-0203, clause 2.2.13.

3.5 Protection against noise (BWR 5)

3.5.1 Airborne sound insulation of walls, floors and roof structures

No performance assessed (NPA) option is applied.

3.5.2. Impact sound insulation of floors

No performance assessed (NPA) option is applied.

3.5.3 Sound absorption

No performance assessed (NPA) option is applied.

3.6 Energy economy and heat retention (BWR 6)

3.6.1 Thermal resistance

According to EN ISO 6946 thermal resistance is calculated as thermal resistance R_T and as corresponding thermal transmittance Ua, see table for actual construction in Annex A1. Thermal conductivities of insulation materials as declared in declaration of performance (DoP), are used in thermal calculations.

3.6.2 Air permeability

The assessment of air permeability in the external envelope is based on the examination of joints between various components within the kit and connections between the kit and other building elements. To ensure airtightness, foil overlapping is employed at these joints, utilizing methods such as clamping and the application of tape.

Standard construction details of the kit presented in the Annex A1 and B have been assessed to have adequate air tightness for the specified intended use based on the judgement of the construction details on the basis of the knowledge and experience.[1]

3.6.3 Thermal inertia

No performance assessed (NPA) option is applied.[2]

3.7 Sustainable use of natural resources (BWR 7)

No performance assessed (NPA) option is applied.

[1] Knut Ivar Edvardsen og Trond Ramstad SINTEF Byggforsk (2014): Trehus Håndbok 5, Oslo ISBN 978-82-536-1391-8

[2] Values for properties (density, specific heat capacity, and thermal resistance) of relevant component are provided in Annex A2, table A2-1. This information aids the designer in calculating the thermal inertia of the building for each building kit, also when it is required by relevant national legislation at the intended building site.

4. Assessment and verification of constancy of performance (hereinafter AVCP) system applied, with reference to its legal base

According to the Decision 1999/455/EU of the European Commission, the system of assessment and verification of constancy of performance (See Annex V of Regulation (EU) No 305/2011) to be applied is system 1.

5. Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

All relevant technical details necessary for the implementation of the AVCP system are laid down in the Control Plan deposited at SINTEF AS.

Issued in Oslo on 28.10.2025

By

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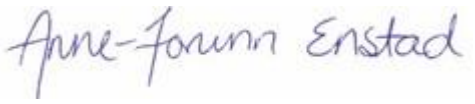


Anne-Jorunn Enstad

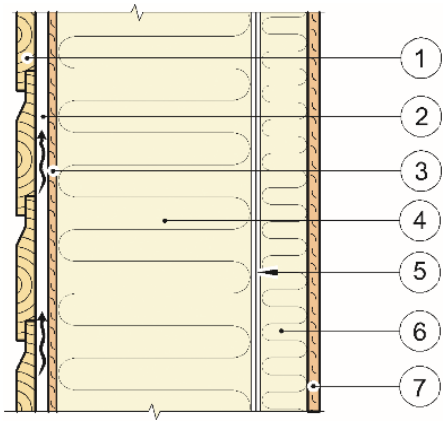
Certification Manager

Annexes

Annex A1	Basic module design / building elements
Annex A2	Material and component specifications
Annex A3	Resistance to fire
Annex B	Standard construction details (separate document, not included)

Annex A1 Basic module design / building elements

External Wall – YV1



Building physics characteristic:

Thermal resistance (Ch. 3.6.1):

$D_{insulation}$[mm]	U [W/m²K]	R [m²K]
175	0,22	4,72
200	0,20	5,33
200+50	0,16	6,49

Vapour permeability and moisture resistance (Ch. 3.3.1):

No condensation risk

Airborne sound insulation (Ch. 3.5.1):

NPA

Construction: (top down)

No.	Component	Type	Dimensions [mm]	Distance [mm]
1	External cladding (see External layers table)			
2	Ventilated space		19	
3	Wind barrier board	$S_d \leq 0.025$; E/ A2-s1,d0		
4.1	Solid timber frame	C24	36-48/173-198	600
4.2	Mineral wool Mineral glass wool	A1; λ_D= 0.032-0.038	175-200	
5	Water vapour barrier	$S_d \geq 40$; F	≥ 0.15	
6.1	Vertical battens	C24	48/48	600
6.2	Mineral wool Mineral glass wool	A1; λ_D= 0.032-0.038	50	
7	Internal lining (see internal lining table)			

Fasteners for construction

No.	Building material	Type / Dimensions [mm]	Spac. / Distance [mm]
3	Wind barrier board	According to producer manual	According to producer manual
4.1	Solid timber frame	Nail 3,1x90	Min. 2pcs/joint
6.1	Vertical battens	Nail 3,1x75	

External layers

Alt.	Building materials	Type	Dimensions [mm]	Spac. / Dist. [mm]
A	Vertical timber laths	Solid timber	19	e ≤ 600
	Horizontal timber cladding	Solid timber	≥ 19	
B	Vertical timber lath	Solid timber	19	e ≤ 600
	Horizontal timber laths	Solid timber	8	e ≤ 600
	Vertical timber cladding	Solid timber	≥ 19	
C	Vertical timber laths	Solid timber	19	e ≤ 600
	Fibre cement boards	A2-s1,d0	≥ 8	

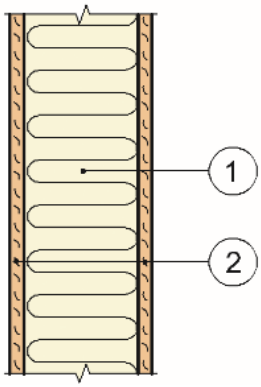
Fasteners for external layers

Alt.	Building material	Type / Dimensions [mm]	Spac. / Distance [mm]
A	Timber laths	Nail 2,5x50	
B	Timber cladding	Nail 2,5x50/65	Min. 1 pcs/joint
C	Fibre cement boards	According to producer manual	According to producer manual

Internal lining

Alt.	Building materials	Type	Dimensions [mm]
A	Foliated particleboard*	D-s2,d0	12
B	Gypsum board	A2-s1,d0	12,5
C	Gypsum board	A2-s1,d0	12,5
	Foliated particleboard*	D-s2,d0	12
D	Gypsum board	A2-s1,d0	15
	Gypsum board	A2-s1,d0	12
E	Gypsum board	A2-s1,d0	15
	Gypsum board	A2-s1,d0	12
	Watertight bathroom panel with ETA based on EAD 030352-00-0503	D-s1,d0	10
F	Gypsum board	A2-s1,d0	15
	MDF Fire resisting fibreboard	B-s1,d0	12
Wet rooms	Watertight bathroom panel with ETA based on EAD 030352-00-0503	D-s1,d0	10

Non-loadbearing internal wall



Building physics characteristic:

Airborne sound insulation (Ch. 3.5.1):

NPA

Construction: (top down)

	Component	Type	Dimensions [mm]	Distance [mm]
1.1	Solid timber frame	C24	36/48 x 68/98	600
1.2	Mineral wool Mineral glass wool Mineral stone wool	 A1; λD= 0.032-0.04 A1; λD=0.037	 70/100 70/100	
2	Internal lining (see internal lining table)			

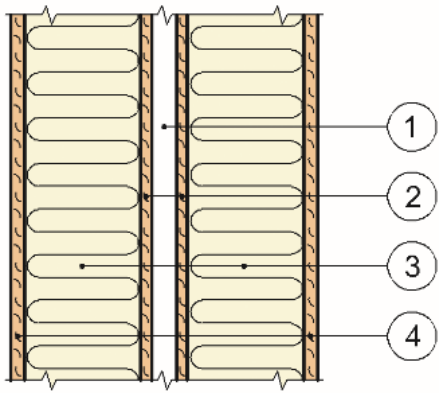
Fasteners for construction

Nr.	Building material	Type / Dimensions [mm]	Spac. / Distance [mm]
1.1	Solid timber frame	3,1x90	Min. 2 pcs/joint

Internal lining

Alt.	Building materials	Type	Dimensions [mm]
A	Foliated particleboard*	D-s2,d0	12
B	Gypsum board	A2-s1,d0	12,5
C	Gypsum board Foliated particleboard*	A2-s1,d0 D-s2,d0	12,5 12
Wet rooms	Watertight bathroom panel with ETA based on EAD 030352-00-0503	D-s1,d0	10

Load bearing double partition wall



Building physics characteristic:

Airborne sound insulation (Ch. 3.5.1):

NPA

Construction: (top down)

	Component	Type	Dimensions [mm]	Distance [mm]
1	Air gap		Min. 22	
2	9 mm wood-based board	OSB/3	9	
3.1	Solid timber frame	C24	36/48 x 98	600
3.2	Mineral wool Mineral glass wool	A1; λ_D= 0.032-0.038	100	
4	Internal lining (see internal lining table)			

Internal lining

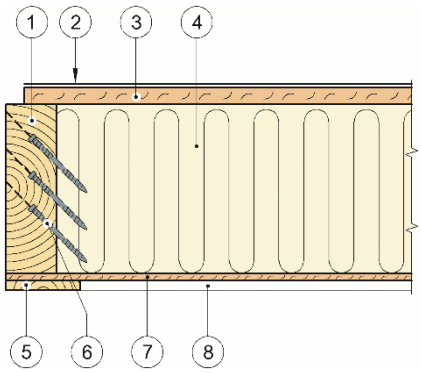
Alt.	Building materials	Type	Dimensions [mm]
A	Foliated particleboard*	D-s2,d0	12
B	Gypsum board	A2-s1,d0	12,5
C	Gypsum board Foliated particleboard*	A2-s1,d0 D-s2,d0	12,5 12
D	Gypsum board Gypsum board	A2-s1,d0 A2-s1,d0	15 12
E	Gypsum board Gypsum board Watertight bathroom panel with ETA based on EAD 030352-00-0503	A2-s1,d0 A2-s1,d0 D-s1,d0	15 12 10
F	Gypsum board MDF Fire resisting fibreboard	A2-s1,d0 B-s1,d0	15 12
Wet rooms	Watertight bathroom panel with ETA based on EAD 030352-00-0503	D-s1,d0	10

Fasteners

No.	Building material	Type / Dimensions [mm]	Spac. / Distance [mm]
3.1	Solid timber frame	3,1x90	Min. 2 pcs/joint

Building material	Type / Dimensions [mm]	Spac. / Distance [mm]
Foliated particleboard	Nail 1,6x32	
Gypsum board	Skrews 4,1x35/45	
MDF Fire resisting fibreboard	Nail 1,6x32	

Ground floor



Building physics characteristic:

Thermal resistance (Ch. 3.6.1):

$D_{insulation}$[mm]	U [W/m²K]	R [m²K]
225	0,18	5,78
225 + 36	0,16	6,50
270	0,15	6,91

Vapour permeability and moisture resistance (Ch. 3.3.1):

No condensation risk

Airborne sound insulation (Ch. 3.5.1):

NPA

Construction: (top down)

	Component	Type	Dimensions [mm]	Distance [mm]
1	Edge beam	C24/GL28c	2x36x223 / 72 x 225/270	
2	Floor covering*	Various		
3	Particleboard	P6	22/28	-
4.1	Mineral wool Mineral glass wool	A1; λ_D= 0.032-0.038	175+50 / 200+70	-
4.2	Solid timber frame/Glulam joist frame	C24/GL28c	36/48x223/225/270	e ≤ 600**
5	Laths		13 x 98 mm	
6	Construction screws for end beam	ET-T	2-4x6,5x90	33
7	Wind barrier board / framed floor	Gypsum, wood-based	9	
8	Laths		13	e ≤ 600

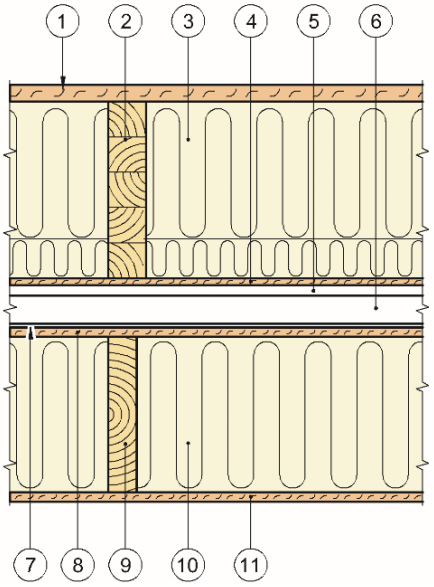
*Floor covering used in wet room shall have passed test according to EAD 030352-00-0503. A leveling MDF-board is installed between the floor covering and the particle board for floors used in wet room.

**Spacing in wet room shall be 300 mm if tiles is mounted over the floor covering without casted concrete

Fasteners

No.	Building material	Type / Dimensions [mm]	Spac. / Distance [mm]
3	Particleboard	Nail 2,5x65	
4.2	Solid timber frame/Glulam joist frame	Nail 3,1x90	Min. 2 pcs/joint
5	Laths	Nail 2,1x50	
7	Wind barrier board / framed floor	Nail 1,6x32/ Skrew 3,9x45	

Separating floor – REI 30



Building physics characteristic:

Airborne sound insulation (Ch. 3.5.1):

NPA

Impact sound insulation (Ch. 3.5.2):

NPA

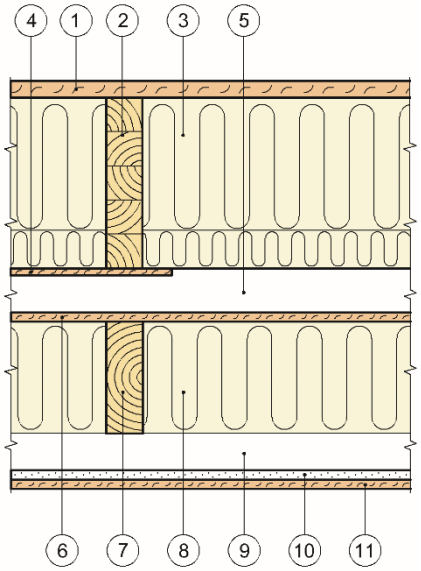
Construction: (top down)

	Building materials	Type	Dimensions [mm]	Distance [mm]
1	Particleboard	P6	22	
2	Solid timber frame/Glulam joist frame	C24/GL28c	36/48x223/225/270	e ≤ 600
3	Mineral wool Mineral glass wool	A1; λ_D= 0.032-0.038	150+70/175+100	
4	Moisture resistant particleboard	P5	9	
5	Battens		13x36	e ≤ 600
6	Sill installed on site	C24	36	
7	PVC transport membrane (may be kept permanent in finished building) Particleboard			
8	Particleboard	P5	12	
9	Solid timber frame + battens	C24	36/48x148+48x48	e ≤ 600
10	Mineral wool with steel net under Mineral glass wool	A1; λ_D= 0.032-0.038	150+50	
11	Foliated particleboard/Gypsum board	D-s2,d0/A2-s1,d0	12/12,5	

Fasteners

Nr.	Building material	Type / Dimensions [mm]	Spac. / Distance [mm]
1	Particleboard	Nail 2,5x65	
2, 9	Solid timber frame/Glulam joist frame	Nail 3,1x90	Min. 2 pcs/joint
5	Battens	Nail 2,1x50	
8, 11	Foliated particleboard	Nail 1,6x32	
11	Gypsum board	Skrew 3,9x45	

Separating floor – REI 60



Building physics characteristic:

Airborne sound insulation (Ch. 3.5.1):

NPA

Impact sound insulation (Ch. 3.5.2):

NPA

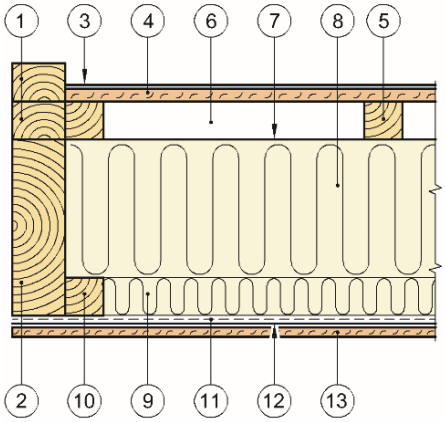
Construction: (top down)

	Component	Type	Dimensions [mm]	Distance [mm]
1	Particleboard	P6	22	
2	Glulam joist frame	GL28c	48x225/270	e ≤ 600
3	Mineral wool Mineral glass wool	A1; λ_D= 0.032-0.038	150+70/175+100	
4	OSB/Wind barrier (roll product)			
5	Spacing		25	
6	Particle board	P5	12	
7	Solid timber frame	C24	48x148	e ≤ 600
8	Mineral wool Mineral glass wool	A1; λ_D= 0.032-0.038	150	
9	Battens	C24	48x48	e ≤ 300
10	Gypsum board	A2-s1,d0	12,5	
11	Foliated particleboard/Gypsum board	D-s2,d0/A2-s1,d0	12/12,5	

Fasteners

No.	Building material	Type / Dimensions [mm]	Spac. / Distance [mm]
1	Particleboard	Nail 2,5x65	
2, 7	Solid timber frame/Glulam joist frame	Nail 3,1x90	Min. 2 pcs/joint
9	Battens	Nail 3,1x75	
8, 11	Particleboard	Nail 1,6x32	
11	Gypsum board	Skrew 3,9x45	

Ventilated roof REI 30



Building physics characteristic:

Thermal resistance (Ch. 3.6.1):

$D_{insulation}$[mm]	U [W/m²K]	R [m²K]
225	0,18	5,86
270	0,15	7,00
325	0,13	8,28

Vapour permeability and moisture resistance (Ch. 3.3.1):

No condensation

Airborne sound insulation (Ch. 3.5.1):

NPA

Construction: (top down)

	Component	Type	Dimensions [mm]	Distance [mm]
1	Battens	C24	2 x 67x48	
2	Edge beam	C24/GL 28 C		
3	PVC roofing membrane		1,2	
4	Moisture resistant particleboard	P7	16	
5	Roof slope battens	C24	48x20/70	
6	Ventilated space			
7	Wind barrier, roll product			
8.1	Solid timber frame/Glulam joist frame	C24/GL 28 C	36/48x173/270	
8.2	Mineral wool Mineral glass wool Mineral stone wool	 A1; λ_D= 0.032-0.038 A1; λ_D= 0.032-0.038	 175/175+100 175/175+100	
9	Mineral wool Mineral glass wool Mineral stone wool	 A1; λ_D= 0.032-0.038 A1; λ_D= 0.032-0.038	 50 50	
10	Battens	C24	48x48	
11	Steel net			
12	Water vapour barrier		0,15/0,20	
13	Internal lining(see internal lining table)			

Fasteners

No.	Building material	Type / Dimensions [mm]	Spac. / Distance [mm]
1	Battens	Nail 3,1x75	
2	Edge beam	ET-T Skrew 6,5x90	33
4	Moisture resistant particleboard	Nail 1,6x32	
5	Roof slope battens	Nail 3,1x75/90	
8.1	Solid timber frame/Glulam joist frame	Nail 3,1x90	Min. 2 pcs/joint
10	Battens	Nail 3,1x75	
11	Steel net	Staple 55	

Internal lining

	Building materials	Type	Dimensions [mm]
A	Foliated particleboard	D-s2,d0	12
B	Gypsum board	A2-s1,d0	12,5
C	Gypsum board	A2-s1,d0	15
D	MDF Fire resistant fibreboard	B-s1,d0	12

Boards A-D can be used in combination

Annex A2 Material and component specifications

Table A2-1 – Material and component specifications “Moelven Modul”

Material Group	Product	Standard	Main dimensions [mm]	Characteristics				
				Mechanical	Building physics			Reaction to fire
				ρ [kg/m³]	λ [W/mK]	μ [-]	c [J/kgK]	Euroclass [EN 13501-1]
Structural timber								
Strength graded timber, Spruce, C24		EN 14081-1	≥ 22 mm	420	0.12	50	1600	D-s2,d0 (2003/693/EC)
Glued laminated timber, Spruce GL28c		EN 14080	≥ 22 mm	≥ 450	0.12	40	1600	D-s2,d0 (2005/610/EC)
Structural laminated veneer lumber, Spruce		EN 14374	≥ 18 mm	≥ 400	0.12	-	-	D-s2,d0 ((EU) 2017/2293)
Light composite wood-based beams		ETA based on EAD 130367-00-0304[1]	Various	-	0.13	-	-	D-s2,d0 (ETA)
Non-structural Timber								
Solid timber		Defined criteria in FPC for Moelven Modul	Various	≥ 450	0.12	40	-	-
Finger jointed timber		-	Various	-	0.12	-	-	-
Internal Paneling and Cladding								
Wood-based boards	OSB/3	EN 13986	9	≥ 600	0.13	50	1700	D-s2,d0 (2007/348/EC)
	Particleboard, P1	EN 13986	12	≥ 600	0.13	50	1700	D-s2,d0 (2007/348/EC)
	Particleboard, P5	EN 13986	9-12	≥ 600	0.13	50	1700	D-s2,d0 (2007/348/EC)
	Particleboard, P6	EN 13986	22	≥ 600	0.13	50	1700	D-s2,d0, Dfl-s1 (2007/348/EC)
	Particleboard, P7	EN 13986	≥ 16	≥ 600	0.13	50	1700	D-s2,d0 (2007/348/EC)
	Plywood	EN 13986	≥ 9	≥ 600	0.13	200	1600	D-s2,d0 (2007/348/EC)
	Woodfibre board	EN 13986	≥ 9	≥ 600				D-s2,d0 (2007/348/EC)
	MDF	EN 13986	≥ 10	≥ 600				D-s2,d0 (2007/348/EC)
Gypsum boards	Gypsum board, type A	EN 520	12.5	≥ 600	0.21-0.25	10	1000	A2-s1,d0 (2006/673/EC)
	Gypsum board, type F	EN 520	15	≥ 600	0.25	10	1000	A2-s1,d0 (2006/673/EC)
	Gypsum board, type EH2	EN 520	9.5	≥ 600	0.25	10-15	1000	A2-s1,d0 (2006/673/EC)
	Gypsum fibre board, type GM-H1	EN 15283-1	10-12.5	≥ 600	0.25	10	1000	A2-s1,d0 (2006/673/EC)
External Panelling and cladding								

[1] Light Composite Wood-based Beams and Columns. Various ETAs; ETA number is specified in the quality system of “Moelven Modul”. ETA is only valid if it’s accompanied with a CPR-certificate issued for the same ETA.

Wood cladding	EN 14915	≥ 19	450	0.13	50	1600	D-s2,d0 (2006/213/EC)
Thermal insulation							
Mineral glass wool	EN 13162	50-200	≥ 15	0.032	1	-	A1 (EN 13162)
	EN 13162	50-200	≥ 15	0.034	1	-	A1 (EN 13162)
	EN 13162	50-200	≥ 15	0.038	1	-	A1 (EN 13162)
Mineral stone wool	EN 13162	Various	≥ 28	0.035-0.039	1	-	A1 (EN 13162)
Membranes							
Vapour barrier	EN 13984	≥ 0.15	-	-	$S_d \geq 40$	-	NPD
Vapour permeable membrane	EN 13859-2	-	-	-	$S_d \leq 0.2$	-	B-s1,d0
Watertight covering kits for wet room floor and/or walls	ETA based on EAD 030352-00-0503[1]	-	-	-	$S_d \geq 10$	-	-
Sealing materials							
Fire resistance acrylic sealant	-	-	-	-	-	-	E
Elastic assembly adhesive	-	-	-	-	-	-	Technical data sheet
Silicone sealant	EN 15651	-	-	-	-	-	-
Acrylic sealant	EN 15651	-	-	-	-	-	-
Airtight sealing tape	-	-	-	-	-	-	Technical data sheet
Door / Window interior tape	-	-	-	-	-	-	Technical data sheet
Door / Window exterior tape	-	-	-	-	-	-	Technical data sheet
Screed material and floor screeds	EN 13813	-	-	-	-	-	-
Fasteners							
Screws / nails / staples for interior and exterior applications	EN 14592, ETA based on EAD 130186-00-0603[2]	Various	-	-	-	-	A1 (96/603/EC)
Screws for the fixing of gypsum boards	EN 14566	Various	-	-	-	-	A1 (96/603/EC)
Joist hangers	EN 14592, ETA based on EAD 130186-00-0603[2]	Various	-	-	-	-	A1 (96/603/EC)
Angle brackets	EN 14592, ETA based on EAD 130186-00-0603[2]	Various	-	-	-	-	A1 (96/603/EC)

[1] Various ETAs: ETA number is specified in the quality system of Moelven Modul. ETA is only valid if it's accompanied with CPR-certificate based on the same ETA. The products that have SINTEF Technical Approval are assessed and approved in accordance with provisions in EAD 030352-00-0503. The valid approvals are found at www.sintefcertification.no and are specified in the quality system of "Moelven Modul".

[2] Various ETAs: ETA number is specified in the quality system of Moelven Modul. ETA is only valid if it's accompanied with CPR-certificate based on the same ETA.

Roofing materials							
Flexible sheet for waterproofing – Bitumen	EN 13707[1]	2.5-5.0	-	-	-	-	B_{ROOF}(t2) (EN 13707)
Flexible sheet for waterproofing – PVC	EN 13956[1]	1.6	-	-	-	-	B_{ROOF}(t2) (EN 13956)
Windows and external doors							
Windows and external doors	EN 14351-1	Uw ≤ 1.4 ([W/m^{2}K]		R_W ≥ 35 [dB]			DoP
Internal doors	EN 14351-2	-		-			.

[1] The products shall be classified as watertight inn accordance with relevant harmonised standard (EN) and have a valid CPR-certificate, or a valid SINTEF Technical Approval (www.sintefcertification.no)

Table A2-2 – Corrosion protection of fasteners used in “Moelven Modul”.

Product	Technical specification	Main dimensions [mm]	Corrosion protection [Service class]
Staples	EN 14592+A1	See Annex 1	1 and 2
Corrugated staples	EN 14592+A1, ETA based on EAD 130033-00-0603[1]	See Annex 1	1 and 2
Screws	EN 14592+A1, ETA based on EAD 130033-00-0603[1]	See Annex 1	1, 2 and 3(outdoor)
Screws (gypsum board)	EN 14566+A1	See Annex 1	1 and 2
Nails	EN 14592+A1, ETA based on EAD 130033-00-0603[1]	See Annex 1	1, 2 and 3(outdoor)
Connectors / Punched metal plate fasteners	EN 14545	Acc. to predefined solutions / structural calculations	1 and 2
Three-dimensional nailing plates (joist hangers, hold downs, angle brackets)	ETA based on ETAG 015 used as EAD and EAD 130186-00-0603[1]	Acc. to predefined solutions / structural calculations	1 and 2

[1] Various ETAs: ETA number is specified in the quality system of Moelven Modul

Annex A3 Resistance to fire

The fire resistance for the building components is given in table A3-1. The fire resistance is determined by tests, and calculations according to the manual Brandsäkra Trähus version 3 and EN 1995-1-2.

Design load capacity for limit state fire is given by maximum centric axial load per meter wall (kN/m with c/c 600 mm between the studs). Design load capacity for limit state fire for single spanned floors and roof is given by maximum bending moment (kNm) per beam. “No reduction” means that boards materials protect the structural timber components from charring during the fire exposure period, and the design capacity determined for ultimate and serviceability limit states can be applied.

For basic module designs as shown in the Annex A1, the resistance to fire classified according to EN 13501-2 is as follows for fire exposure from the inside on external walls, one-sided on internal walls and from below on separating floors and roofs. The drawings are shown in Annex A1.

Table A3-1

Structure	**Fire resistance[1]**	**Design load capacity at fire[2]**
External walls – shown in Annex A1	REI 45	15 kN per meter wall length
Drawing no.: YV1, YV2 and YV3		
- 12 mm Forestia Ferdigvegg / 11 mm Huntonit fibreboard - 36 x 173/198/(198+48) mm studs C18 - 175/200/250 mm Glava mineral glass wool with density min. 16 kg/m^3 - Glava Vindsperre Max wall height 3.0 m		
Non-loadbearing internal wall in Annex A1	EI 30	-
Drawing no.: IBV1		
- 12 mm foliated particle board - 48x68 mm studs grade C24 - 70 mm stone wool - 12 mm foliated particle board Max wall height 2.4 m		
Non-loadbearing internal wall, shown in annex A1	EI 30	-
Drawing no.: IBV2, IBV3 and IBV4		
- 12 mm Forestia 3 Vegg Standard P2 / 12,5 mm gypsum board type A - 36x68 mm studs grade C24 - 100 mm Glava Økonomi 38 insulation - 12 mm Forestia 3 Vegg Standard P2 Max wall height 3.0 m		

Structure	Fire resistance[1]	Design load capacity at fire[2]
Double partition wall: – shown in Annex A1 Drawing no.: BIV1, BIV2 and BIV3 - 12 mm Arbor Standard Vegg particleboard / 12 mm Forestia 3 Vegg Standard P2 / 12,5 mm gypsum board type A - 36/48 mm x 98 mm studs grade C24 - 100 mm Glava Proff 34 insulation - 9 mm OSB-board density min. 550 kg/m³ - Wall spacing, etc. Max wall height 3.0 m	REI 30	36 x 98 mm studs: 8 kN per meter wall length[3] 48 x 98 mm studs: 18 kN per meter wall length[3]
Double partition wall– shown in Annex A1 Drawing no.: BIV4 - 12 mm particleboard or 11 mm fibreboard, min. density 680 kg/m^3 - 12.5 mm gypsum board type A - 48 x 98 mm studs C24, 48 x 98 mm top- and bottom sills - 100 mm mineral glass wool with min. density 15 kg/m^3 - Wall spacing, etc. Max wall height 2.5 m	REI 30	32 kN per meter wall length[3]
Double partition wall – shown in Annex A1 Drawing no.: BIV5 and BIV6 - 11 mm Huntonit Bygningsplate / 12,5 mm gypsum board type A - 15 mm Gyproc GF 15 Protect F - 68x98 mm studs grade C24 (sills grade C24) - 100 mm Glava Proff 34 Plate - 9 mm OSB/3-board with density min. 600 kg/m³ - 22 mm wall spacing, etc. Wall height maximum 2.7 m	REI 60	25 kN per meter wall length[3]
Separating floor, shown in Annex A1 Drawing no. E1, E2, E3 and E6 - 12 mm particleboard with density min. 680 kg/m³ - Chicken wire - 200 mm glass wool with density min. 15 kg/m³ - 36 mm x 198 mm joists grade C24 - 12 mm particleboard with density min. 500 kg/m³ - Spacing - 9 mm particleboard with density min. 500 kg/m³ - 36 mm x 223 mm joists grade C24 - 175+50 mm glass wool with density min. 12 kg/m³ - 22 mm particleboard with density min. 500 kg/m³	REI 30 R 30	6,0 kNm per joist in floor (compression or tension on fire exposed side)[4]

Structure	Fire resistance[1]	Design load capacity at fire[2]
Separating floor, shown in annex A1 Drawing no.: E4, E5 and E7 - 12 mm Forestia Ferdigvegg, or 12,5 mm gypsum board type A - 15 mm Gyproc GF15 Protect - 48 mm x 48 mm battens, grade C24, c/c 300 mm - 150 mm Glava Proff 34 - 48 mm x 148 mm joists grade C24, c/c 600 mm - 12 mm Forestia Vegg Standard - Spacing - 175+50 mm Glava Økonomi 38 - 48 mm x 225 mm BN-glued laminated beam, c/c 600 mm - 22 mm Forestia Gulv Standard	REI 60 R 60	Full capacity
Ceiling towards attic, shown in annex A1 Drawing no.: T4 - 12 mm particleboard with density min. 680 kg/m³ - Chicken wire, fasteners with min. 50 mm length - 50 mm stone wool with density min. 50 kg/m³ - 150 mm glass wool with density min. 15 kg/m³ - 36 mm x 198 mm structural timber grade C24 - 12 mm particleboard with density min. 500 kg/m³	REI 15 EI 15	7,4 kNm per beam[4]
Ventilated roof, shown in annex A1 Drawing no.: T1 - 12 mm s particleboard with density min. 680 kg/m³ - Chicken wire - 100 mm stone wool with density min. 50 kg/m³ - 125 mm glass wool with density min. 15 kg/m³ - 36 mm x 223 mm structural timber grade C24, c/c 600 mm - Wind barrier	REI 30 EI 30	5,8 kNm per beam[4]
Ventilated roof Drawing no.: T1 - 12 mm particleboard with density min. 680 kg/m³ - 15 mm gypsum board type F - Chicken wire - 225 mm glass wool with density min. 15 kg/m³ - 36 mm x 223 mm structural timber grade C24, c/c 600 mm - Wind barrier	REI 30 EI 30	4,8 kNm per beam[4]

[1] Fire resistance equivalent to classification according to EN 13501-2. Separating property (EI) and loadbearing property (R) expressed in minutes
[2] Residual load capacity in accidental limit state fire. Full capacity means the structural capacity is not reduced in comparison with capacity in ultimate and serviceability limit states
[3] Capacity for each single wall part
[4] Insulation must be secured to stay in place during a fire