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European Technical Assessment

ETA 15/0634
01/07/2017

General Part

Technical Assessment Body issuing the ETA: Kiwa Nederland B.V.	
Trade name of the construction product	SINH™ Board
Product family to which the construction product belongs	Product area code: 35 Fire stopping, fire sealing and fire protective products
Manufacturer	SINH Building Solutions B.V. Saturnusstraat 60 unit 67 2516 AH Den Haag
Manufacturing plant(s)	SINH Ningbo Construction Material Co. Ltd. Room 12B03, Shangdong Int'l Bldg 1 No. 1926 Canghai Road 315041 Ningbo, China
This European Technical Assessment contains	18 pages including 3 Annexes which form an integral part of this assessment
This European Technical Assessment is issued in accordance with regulation (EU) No 305/2011, on the basis of	ETAG 018, part 1, edition November 2004 and part 4, edition December 2011, used as European Assessment Document (EAD)
This European Technical Assessment replaces	European technical approval ETA 15/0634 issued on 01.06.2016

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Specific parts

1. Technical description of the product

1.1. General

SINH™ Board is a rigid, non textured mineral (MgO) bound matrix fire protective board for internal use. SINH™ Board can be used as the final interior layer of a construction.

1.2. Dimensions

Standard[1)] nominal dimensions of large size SINH™ Board:

Length * Width : 2400 * 1200 mm; 2400 * 900 mm
2700 * 1200 mm; 2700 * 900 mm
3000 * 1200 mm; 3000 * 900 mm

[1)] Other dimensions up to a maximum of 3050 * 1220 mm are available on request.

Thickness : 9, 12, 18 and 20 mm.

Apparent densities, determined i.a.w. EN 12467 / as delivered conditions:

9 mm : 820 / 1000 kg/m³ ± 2,5%
12 mm : 800 / 1030 kg/m³ ± 2,5%
18 mm : npa / 960 kg/m³ ± 2,5%
20 mm : npa / 940 kg/m³ ± 2,5%

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

2.1. Intended use

SINH™ Board is a fire protective board, in accordance with ETAG 18-1/4 to be classified as:

- Type 2 : Fire protective product to be used as vertical membrane protection;
- Type 8 : Fire protective product that contributes to the fire resistance of fire separating assemblies with no loadbearing requirements;
- Z_2 : Fire protective board intended for internal use only, where more than accidental wetting and/or frost is not to be expected.

SINH™ Board is suitable for indoor constructions where it is intended to be added as fire protective board for fire compartmentalisation or to building services to enhance and/or preserve their resistance to fire performance.
Described (auxiliary) components as used in the tested non-loadbearing wall partitions and/or finishings have not been assessed.

2.2. Intended working life

The provisions made in this ETA are based on an assumed working life of 25 years, provided that:

- The indoor works are properly designed and built. The maximum acceptable deflection of the supporting constructions of the non-loadbearing wall partitions shall be 10 mm.
- Installation of the SINH™ Board is performed as per installation guide, under normal site conditions, by adequately trained installers.
- Minor damages are repaired (for example damage caused by impact).
  Minor damages can be repaired with magnesium oxide paste with traditional plastering techniques. If the fracture damage of the SINH™ Board is significant, this board should be replaced.
- SINH™ Board and the indoor works are properly used and maintained.
- More than accidental wetting and/or frost is not to be expected.
  The buildings where the indoor constructions are used shall have a mean air temperature in the range from 5 °C to 35 °C and a mean daily air relative humidity (RH) in the range of 20 %RH to 75 %RH. Maximum air relative humidity may only exceed 85 %RH for short periods of time.

The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded as a means for choosing the right product in relation to the reasonable expected working life of the works.

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

3.1. BWR 1 – Mechanical resistance and stability

This Basic Work Requirement is considered to be not relevant for fire protective products.

3.2. BWR 2 – Safety in case of fire

3.2.1. Reaction to fire

SINH™ Board, in relation to its reaction of fire behaviour is tested in accordance with EN ISO 1182 and EN ISO 1716 and classified according to EN 13501-1.

Product characteristic	Performance			
	9 mm	12 mm	18 mm	20 mm
Reaction to fire	Class A1			

3.2.2. Resistance to fire

Construction with timber frame

The resistance to fire of SINH™ Board is tested as a fire separating assembly with no load-bearing requirements . Resistance to fire is tested in accordance with EN 1364-1:2015 and classified according to EN 13501-2+A1:2009.

Description	Performance
Non-loadbearing wall partition with wooden studs, up to 3 m *Remark:* *The construction may be applied up to a height of 4 m, provided that the expansion possibilities are increased proportionally.*	EI 60, EW 90, E 90
Composition of partition The frame of vertical wooden studs (38x70 mm), centre to centre ≤ 600 mm and horizontal wooden profiles (38x70 mm). The wooden profiles have been mounted on ceiling and floor with 6x60 mm nailing plugs at 400-500 mm centre to centre distance. At the wall the nailing plugs have been mounted with 6x60 mm nailing plugs at ≤ 1000 mm centre to centre distance and a minimum of 3. Between ceiling, floor and walls and the studs and profiles, 50 mm sealing tape was used. On both sides of studs and profiles, a 150 mm wide strip of 6 mm SINH™ Board has been mounted with 3,5 x 35 mm drywall screws ≤ 600 mm centre to centre distances. The 6x150 mm SINH™ Board strips are mounted at the center of the intermediate studs and profiles. The cavities of the frame have been filled with 70 mm rock wool insulation ≥ 35 kg/m³. On both sides of the timber frame including the 6x150 mm SINH™ Board strips, 9 mm (or 12 mm) SINH™ Board has been mounted with 3,5 x 55 mm drywall screws at ≤ 250 mm centre to centre distances. The joints between the 9 mm (or 12 mm) SINH™ Boards are blunt and just like the drywall screws where left unfinished. Seams at the ceiling, floor and walls are sealed with fire resistant silicone adhesive. See Annex 1 for the overview of products and annex 2 for details.	

Construction with metal frame

The resistance to fire of SINH™ Board is tested as a fire separating assembly with no load-bearing requirements . Resistance to fire is tested in accordance with EN 1364-1:2015 and classified according to EN 13501-2+A1:2009.

Description	Performance
Non-loadbearing wall partition with metal frame, up to 3 m	EI 60, EW 60, E 60
Non-loadbearing wall partition with metal frame, up to 4 m *Remark:* *The test was carried out on a partition with a height of 3 m. The construction may be applied up to a height of 4 m, provided that the expansion possibilities are increased proportionally.*	EI 30, EW 30, E 30
Composition of partition The metal frame of vertical steel C studs (50/70), centre to centre ≤ 600 mm and horizontal steel U profiles (50/70). The steel profiles have been mounted on ceiling and floor with 6x60 mm nailing plugs at 400-500 mm centre to centre distance. At the wall the steel studs have been mounted with 6x60 mm nailing plugs at ≤ 1000 mm centre to centre distance and a minimum of 3. Between ceiling, floor and walls and the studs and profiles, 50 mm sealing tape was used. On both sides of studs and profiles, a 150 mm wide strip of 6 mm SINH™ Board has been mounted with 3,5 x 35 mm drywall screws ≤ 600 mm centre to centre distances. The 6x150 mm SINH™ Board strips are mounted at the center of the intermediate steel C studs and U profiles. The cavities of the frame have been filled with 70 mm rock wool insulation ≥ 35 kg/m³. On both sides of the frame with the 6x150 SINH™ Board strips, 9 mm (or 12 mm) SINH™ Board has been mounted with 3,5 x 45 mm drywall screws at ≤ 250 mm centre to centre distances. The joints between the 9 mm (or 12 mm) SINH™ Boards are blunt and just like the drywall screws where left unfinished. Seams at the ceiling, floor and walls are sealed with fire resistant silicone adhesive. See Annex 1 for the overview of products and annex 3 for details.	

3.3. BWR 3 – Hygiene, health and environment

3.3.1. Air and water permeability

Air permeability is not assessed.

Water permeability is tested in accordance with EN 12467, clause 7.3.3 and assessed with based on the requirement: traces of moisture may appear under surface of the sheet but there shall be no formation of drops of water.

Product characteristic	Performance			
	9.0 mm	12.0 mm	18.0 mm	20.0 mm
Air permeability	NPA			
Water permeability	Meets requirements			

3.3.2. Content and/or release of dangerous substances

SINH™ Board does not contain dangerous substances.
In addition there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the EU Construction Products Directive, these requirements need also to be complied with, when and where they apply.

3.4. BWR 4 – Safety in use

3.4.1. Flexural strength

Flexural strength is tested in accordance with EN 12467, clause 7.3.2, category C.

Thickness	Product characteristic	Performance dry	Performance wet
9,0 mm	Bending strength/ modulus of rupture (*MOR*)	Avg: 13.40 MPa *min. Long.: ≥ 13.03 MPa* *min. Trans.: ≥ 11.25 MPa*	Avg: 11.44 MPa *min. Long.: ≥ 9.29 MPa* *min. Trans.: ≥ 8.83 MPa*
	Modulus of elasticity (*MOE*)	Avg: 4599 MPa *min. Long.: ≥ 3479 MPa* *min. Trans.: ≥ 4200 MPa*	Avg: 3766 MPa *min. Long.: ≥ 3525 MPa* *min. Trans.: ≥ 3414 MPa*
12,0 mm	Bending strength/ modulus of rupture (*MOR*)	Avg: 20.67 MPa *min. Long.: ≥ 22.42 MPa* *min. Trans.: ≥ 16.02 MPa*	Avg: 13.49 MPa *min. Long.: ≥ 12.93 MPa* *min. Trans.: ≥ 12.11 MPa*
	Modulus of elasticity (*MOE*)	Avg: 4317 MPa *min. Long.: ≥ 3745 MPa* *min. Trans.: ≥ 3991 MPa*	Avg: 2752 MPa *min. Long.: ≥ 2390 MPa* *min. Trans.: ≥ 2369 MPa*
18,0 mm	Bending strength/ modulus of rupture (*MOR*)	Avg: 8.02 MPa *min. Long.: ≥ 8.39 MPa* *min. Trans.: ≥ 6.96 MPa*	Avg: 7.11 MPa *min. Long.: ≥ 7.67 MPa* *min. Trans.: ≥ 5.85 MPa*
	Modulus of elasticity (*MOE*)	Avg: 4228 MPa *min. Long.: ≥ 3812 MPa* *min. Trans.: ≥ 3845 MPa*	Avg: 3257 MPa *min. Long.: ≥ 2861 MPa* *min. Trans.: ≥ 2852 MPa*
20,0 mm	Bending strength/ modulus of rupture (*MOR*)	Avg: 7.05 MPa *min. Long.: ≥ 7.42 MPa* *min. Trans.: ≥ 6.08 MPa*	Avg: 6.21 MPa *min. Long.: ≥ 6.22 MPa* *min. Trans.: ≥ 5.29 MPa*
	Modulus of elasticity (*MOE*)	Avg: 2893 MPa *min. Long.: ≥ 2707 MPa* *min. Trans.: ≥ 2734 MPa*	Avg: 2598 MPa *min. Long.: ≥ 2595 MPa* *min. Trans.: ≥ 2220 MPa*

3.4.2. Dimensional stability

Dimensional stability is tested in accordance with EN 318.

Thickness	Product characteristic		Performance
9,0 mm	Moisture content:	20 °C, 30 %	≤ 12.5 %
		20 °C, 65 %	≤ 15.5 %
		20 °C, 85 %	≤ 20.9 %
	Change in length:	20 °C, 65 % RH ~ 20 °C, 85 % RH	≤ 0.4 mm/m
		20 °C, 65 % RH ~ 20 °C, 30 % RH	≤ - 1.6 mm/m
	Change in thickness:	20 °C, 65 % RH ~ 20 °C, 30 % RH	≤ 0.4 %
		20 °C, 65 % RH ~ 20 °C, 30 % RH	≤ - 0.7 %

Thickness	Product characteristic		Performance
12,0 mm	Moisture content:	20 °C, 30 %	≤ 14.9 %
		20 °C, 65 %	≤ 18.1 %
		20 °C, 85 %	≤ 27.4 %
	Change in length:	20 °C, 65 % RH ~ 20 °C, 85 % RH	≤ 0.4 mm/m
		20 °C, 65 % RH ~ 20 °C, 30 % RH	≤ - 0.9 mm/m
	Change in thickness:	20 °C, 65 % RH ~ 20 °C, 30 % RH	≤ 0.3 %
		20 °C, 65 % RH ~ 20 °C, 30 % RH	≤ - 0.5 %

3.5. BWR 5 – Protection against noise

3.5.1. Airborne sound insulation

The airborne sound insulation is not assessed and classified NPA.

3.5.2. Sound absorption

The sound absorption is not assessed and classified NPA.

3.5.3. Impact sound insulation

The impact sound insulation is not assessed and classified NPA.

3.6. BWR 6 – Energy economy and heat retention

3.6.1. Thermal resistance

The thermal conductivity (λ) is determined in accordance with EN 12667.

Product characteristic	Performance in W/(m·K)			
	9.0 mm	12.0 mm	18.0 mm	20.0 mm
Thermal conductivity (λ)	≤ 0.213	≤ 0.231	NPA	NPA

3.6.2. Water vapour permeability

The water vapour transmission coefficient is determined in accordance with EN ISO 12572.

Product characteristic	Performance in W/(m·K)			
	9.0 mm	12.0 mm	18.0 mm	20.0 mm
Water vapour resistance factor, μ	48	22	NPA	NPA

3.7. Aspects of durability, serviceability and identification

3.7.1. Durability and serviceability

3.7.1.1. Complete durability assessment

Assessment is based on a working life of 25 years. A complete durability assessment is carried out for the intended use of type Z_2: internal use only where more than accidental wetting or frost is not to be expected.

Product characteristic	Performance			
	9.0 mm	12.0 mm	18.0 mm	20.0 mm
Resistance to deterioration caused by water	NPA			
Resistance to soak/dry	NPA			
Resistance to freeze/thaw	NPA			
Resistance to heat/rain	NPA			

3.7.1.2. Basic durability assessment

Thickness	Product characteristic	Performance
9,0 mm	Flexural strength i.a.w. EN 12467, clause 7.3.2	See ETA, clause 3.4.1
	Dimensional stability i.a.w. EN 318	See ETA, clause 3.4.2
	Tensile strength perpendicular to the plane of the board i.a.w. EN 319	Avg: 1.62 MPa *min.: ≥ 1.45 MPa*
	Tensile strength parallel with the plane of the board i.a.w. EN 789	f_t : 2.61 N/mm² E_t : 3247 N/mm²
	Compressive strength of the board i.a.w. EN 789: - Compressive strength, f_c	 Avg: 10.58 N/mm² *min.: ≥ 9.91 N/mm²*
	- Compressive modulus of elasticity, E_c	Avg: 3188 N/mm² *min.: ≥ 2877 N/mm²*
	- Compressive stiffness, E_cA	Avg: 5998 kN *min.: ≥ 5315 kN*
12,0 mm	Flexural strength i.a.w. EN 12467, clause 7.3.2	See ETA, clause 3.4.1
	Dimensional stability i.a.w. EN 318	See ETA, clause 3.4.2
	Tensile strength perpendicular to the plane of the board i.a.w. EN 319:	Avg: 1.71 Mpa *min.: ≥ 1.21 MPa*
	Tensile strength parallel with the plane of the board i.a.w. EN 789:	f_t : 2.80 N/mm² E_t : 401 N/mm²
	Compressive strength of the board i.a.w. EN 789: - Compressive strength, f_c	 Avg: 10.06 N/mm² *min.: ≥ 8.08 N/mm²*
	- Compressive modulus of elasticity, E_c	Avg: 3296 N/mm² *min.: ≥ 2922 N/mm²*
	- Compressive stiffness, E_cA	Avg: 8187 kN *min.: ≥ 7285 kN*
18,0 mm	Flexural strength i.a.w. EN 12467, clause 7.3.2	See ETA, clause 3.4.1
	Dimensional stability i.a.w. EN 318	See ETA, clause 3.4.2
	Tensile strength perpendicular to the plane of the board i.a.w. EN 319:	Avg: 1.34 Mpa *min.: ≥ 0.92 MPa*
	Tensile strength parallel with the plane of the board i.a.w. EN 789:	f_t : 2.95 N/mm² E_t : 5736 N/mm²
	Compressive strength of the board i.a.w. EN 789: - Compressive strength, f_c	 Avg: 14.36 N/mm² *min.: ≥ 13.77 N/mm²*
	- Compressive modulus of elasticity, E_c	Avg: 3729 N/mm² *min.: ≥ 3447 N/mm²*
	- Compressive stiffness, E_cA	Avg: 13988 kN *min.: ≥ 12968 kN*

Thickness	Product characteristic	Performance
20,0 mm	Flexural strength i.a.w. EN 12467, clause 7.3.2	See ETA, clause 3.4.1
	Dimensional stability i.a.w. EN 318	See ETA, clause 3.4.2
	Tensile strength perpendicular to the plane of the board i.a.w. EN 319:	Avg: 1.02 Mpa *min.: ≥ 0.41 MPa*
	Tensile strength parallel with the plane of the board i.a.w. EN 789:	f_t : 2.14 N/mm^2 E_t : 3898 N/mm^2
	Compressive strength of the board i.a.w. EN 789: - Compressive strength, f_c	Avg: 9.29 N/mm² *min.: ≥ 8.29 N/mm²*
	- Compressive modulus of elasticity, E_c	Avg: 2630 N/mm² *min.: ≥ 2389 N/mm²*
	- Compressive stiffness, E_cA	Avg: 11681 kN *min.: ≥ 10646 kN*

3.7.1.3. Adhesion of finishings

Adhesion of finishings is not assessed and classified NPA.

3.7.2. Identification of materials and products

Characteristics of SINH™ Board as mentioned in this clause are determined in accordance with EN 12467.

Nominal dimensions:

Length * Width : 2400 * 1200 mm; 2400 * 900 mm
2700 * 1200 mm; 2700 * 900 mm
3000 * 1200 mm; 3000 * 900 mm

[1)] Other dimensions up to a maximum of 3050 * 1220 mm are available on request.

Thickness : 9, 12, 18 and 20 mm.
Apparent density : 9 mm : 820 kg/m³ ± 2,5%.
12 mm : 800 kg/m³ ± 2,5%.

Tolerances in dimensions determined in accordance with EN 12467:
Length : level II (± 8 mm)
Width (a) : level II (± 0,5 % a mm)
Thickness (e) : ± 10 % of nominal thickness e
Straightness of edges : level II (0,3 %)
Squareness of edges : level II (4,0 mm/m)

3.7.2.1. Finishings

This ETA concerns SINH™ Board only. Characteristics and influence of finishing have not been assessed and classified NPA.

The ETA is issued for the products on the basis of the information deposited to Kiwa Nederland B.V. which identifies the products that have been assessed and judged. Identification tests have been carried out on components, which confirm that the product under assessment conforms to its declared characteristics.

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

According to the decision 1999/454/EC, published in the Official Journal of the European Union (OJEU) L178 of 14/07/1999) of the European Commission, the systems of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011) given in the following table apply:

Product	Intended use	Levels or classes	Systems
Fire protective products	For fire compartmentation and/or fire protection or fire performance	Any	1

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

The manufacturing process of the products is in accordance with the process that is agreed between SINH Building Solutions B.V. and Kiwa.
Changes to the product/production process, which could result in this deposited data / information being incorrect, should be notified to the approval body before the changes are introduced. The approval body will decide whether or not such changes affect the ETA and consequently the validity of the CE marking on the basis of the ETA and so whether further assessment / alterations to the ETA, is necessary.

Issued in Rijswijk on 01/07/2017

By E. Hendriks, assessment engineer

Kiwa Nederland B.V.

Annex 1, Overview of products used for non-loadbearing wall partitions

	Description	Product standard	Reaction to fire	Standard
	Metal framework	EN 14195:2014	A1	CWFT
	Timber framework	n.a.		
A	Rock wool insulation, ≥ 35 kg/m³	EN 13162: 2012	A1	EN 13501-2
B	Rock wool insulation, ≥ 45 kg/m³	EN 13162: 2012	A1	
C	elastic fire resistant silicone adhesive	ISO 11600: 2003	A1	EN 13501-2
D	sealing tape	not applicable		

Annex 2, Overview of products used for non-loadbearing wall partitions with timber frame

Wall composition

- 9 mm SINH™ Board.
- 150 mm wide strips of SINH™ Board (6mm) fastened individually to timber profiles.
- timber studs and profiles 38x70 mm filled with panel (A) 70 mm thick.
- 150 mm wide strips of SINH™ Board (6 mm) fastened individually to timber studs and profiles.
- 9 mm SINH™ Board.

Mounting of the wall

- SINH™ Board mounted with drywall screws TN of sufficient length.
- (3,5x35 mm screws in strips and 3,5x55mm screws in panels).
- Distance between screws smaller than 250 mm centre to centre.

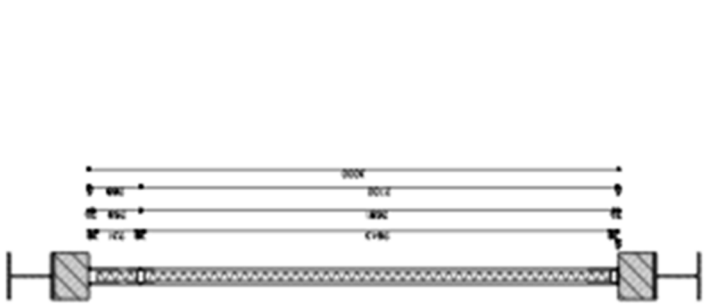
Edges testing frame

- top & bottom edge:
  - elastic fire resistant silicone adhesive (C) adhered to front and back
  - sealing tape (D) min. 50 mm wide
- left side edge:
  - elastic fire resistant silicone adhesive (C), adhered to front and back
  - sealing tape (D) min. 50 mm wide
- right side (with a free edge of 20 mm):
  - cavity filled with panel (B) squeezed between stud and concrete edge.

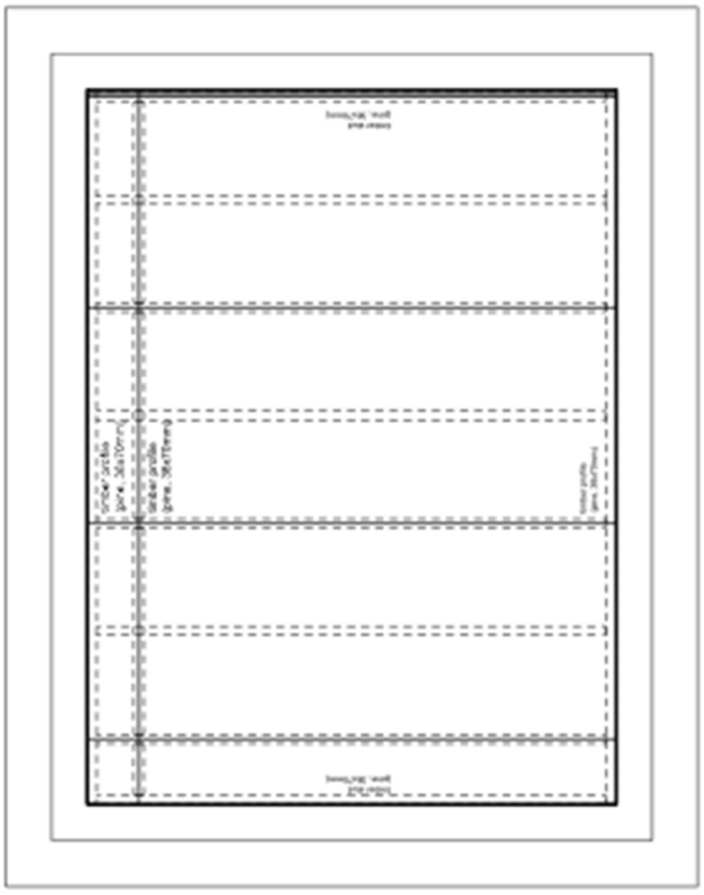
Mounting of the edges

- The timber frame is mounted to the testing frame with nail plugs, 6 x 60 mm.
- Nail plugs along top and bottom edges are positioned between 400 and 500 mm (centre to centre).
- Nail plugs along side edges are positioned max. 1m apart, with a minimum of 3 plugs.

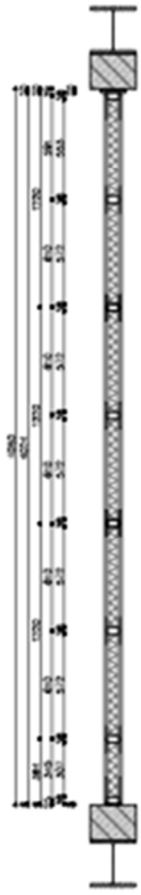
Drawings / details



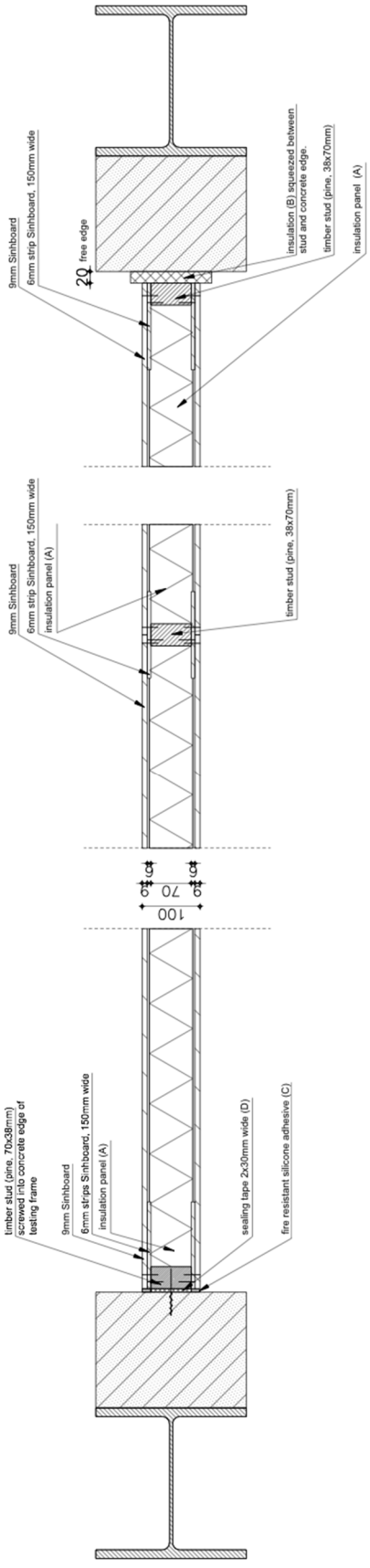
VERTICAL SECTION



ELEVATION



HORIZONTAL SECTION



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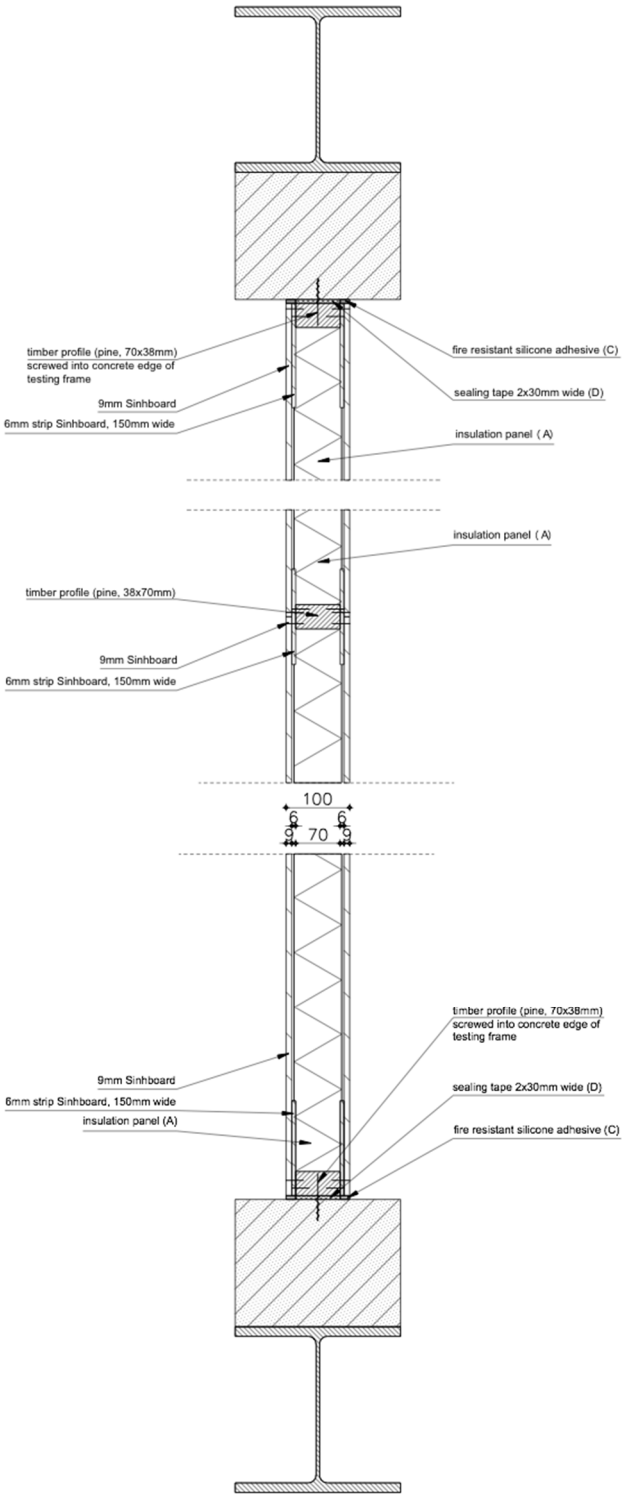


VERTICAL SECTION

Annex 3, Overview of products used for non-loadbearing wall partitions with metal frame

Wall composition

- 9 mm SINH™ Board.
- 150 mm wide strips of SINH™ Board (6mm) fastened individually to metal profiles.
- Metal C (vertical) and U(horizontal) profiles 50x70 mm filled with panel (A) 70 mm thick.
- 150 mm wide strips of SINH™ Board (6 mm) fastened individually to metal profiles.
- 9 mm SINH™ Board.

Mounting of the wall

- SINH™ Board mounted with drywall screws TN of sufficient length.
- (3,5x35 mm screws in strips and 3,5x45 mm screws in panels)
- Distance between screws smaller than 250mm centre to centre.

Edges testing frame

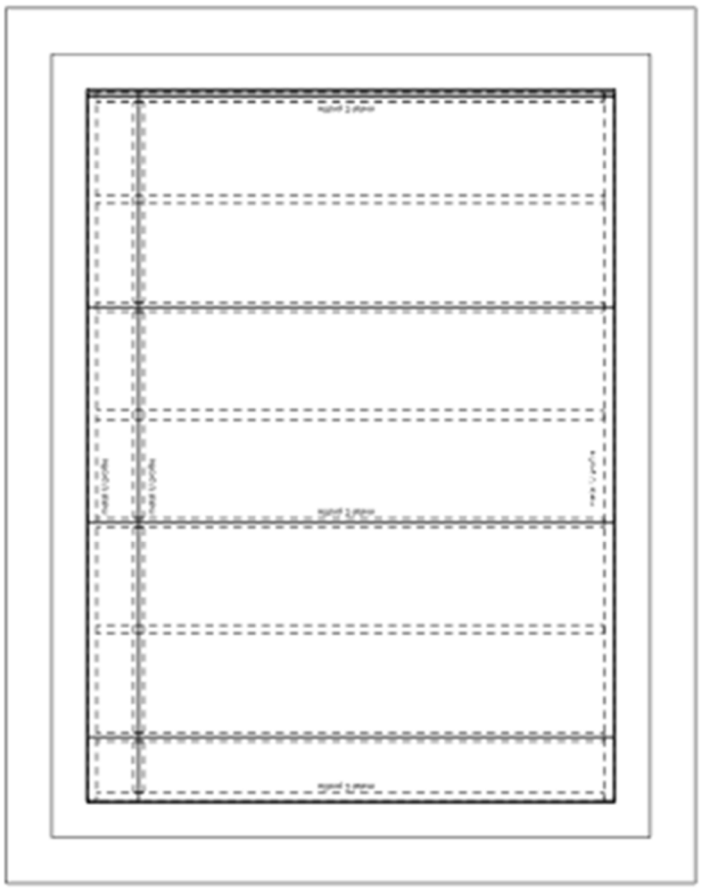
- top & bottom edge:
  - elastic fire resistant silicone adhesive (C) adhered to front and back
  - sealing tape (D) min. 50 mm wide
- left side edge:
  - elastic fire resistant silicone adhesive (C), adhered to front and back
  - sealing tape (D) min. 50 mm wide
- right side (with a free edge of 20 mm):
  - cavity filled with panel (B) squeezed between stud and concrete edge.

Mounting of the edges

- Steel profile frame is mounted to the testing frame with nail plugs, 6x60 mm.
- Nail plugs along top and bottom edges are positioned between 400 and 500 mm (centre to centre).
- Nail plugs along side edges are positioned max. 1m apart, with a minimum of 3 plugs.

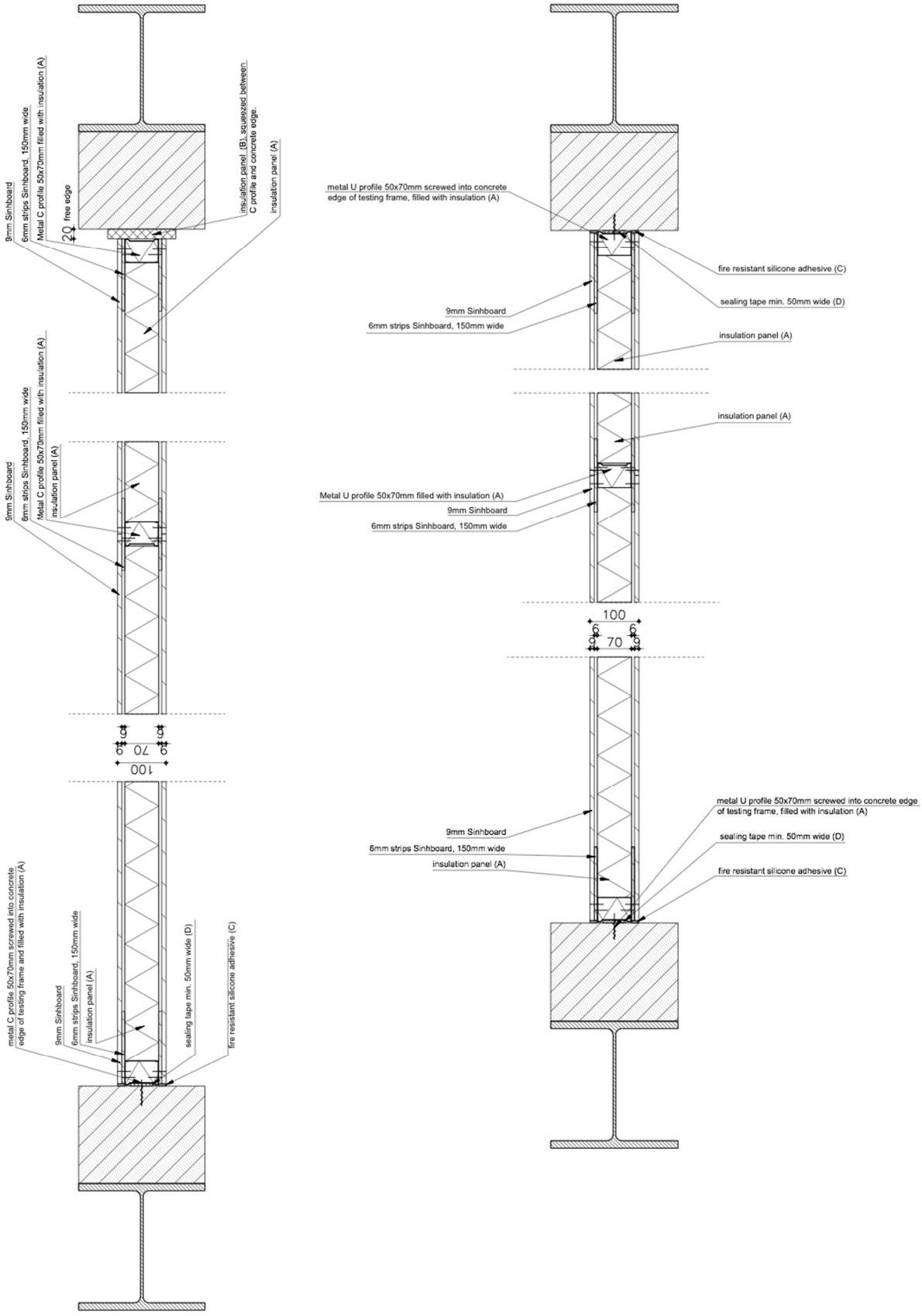
Drawings / details

VERTICAL SECTION



ELEVATION

HORIZONTAL SECTION



HORIZONTAL SECTION

VERTICAL SECTION