EUROPEAN TECHNICAL ASSESSMENT

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Technical Assessment Body issuing the European Technical Assessment: UBAtc.

UBAtc has been designated according to Article 29 of Regulation (EU) No 305/2011 and is member of EOTA (European Organisation for Technical Assessment)

Trade name of the construction system:	SISMO®
Product family to which the construction product belongs:	Permanent insulating shuttering kit for whole buildings
Manufacturer:	SISMO N.V. Drapstraat 1 B - 9270 Kalken – Laarne Belgium
Manufacturing plant :	SISMO N.V. Drapstraat 1 B - 9270 Kalken – Laarne Belgium
Website:	http://www.sismo.eu
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of:	European Assessment Document (EAD): N° 340024-00-0103
This version replaces	ETA 01/0001, valid from 10/01/2011 until 09/01/2016.
This European Technical Assessment contains:	17 pages including 2 annexes which form an integral part of this ETA.

European Organisation for Technical Assessment

I. Legal bases and general conditions

1 This European Technical Assessment is issued by UBAtc (Union belge pour l'Agrément technique de la construction, i.e. Belgian Union for technical Approval in construction), in accordance with:

- Regulation (EU) N° 305/2011[1] of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC;
- Commission Implementing Regulation (EU) N° 1062/2013[2] of 30 October 2013 on the format of the European Technical Assessment for construction products;
- European Assessment Document (EAD): 340024-00-0103

2 Under the provisions of Regulation (EU) No 305/2011, UBAtc is not authorized to check whether the provisions of this European Technical Assessment are met once the ETA has been issued.

3 The responsibility for the conformity of the performances of the products with this European Technical Assessment and the suitability of the products for the intended use remains with the holder of the European Technical Assessment.

4 Depending on the applicable Assessment and verification of constancy of performance (AVCP) system, (a) notified body(ies) may carry out third-party tasks in the process of assessment and verification of constancy of performance under this Regulation once the European Technical Assessment has been issued.

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6 CE marking should be affixed to all construction products for which the manufacturer has drawn up a declaration of performance.

7 This European Technical Assessment is not to be transferred to other manufacturers, agents of manufacturers, or manufacturing plants other than those indicated on page 1 of this European Technical Assessment.

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9 According to Article 11(6) of Regulation (EU) No 305/2011, when making a construction product available on the market, the manufacturer shall ensure that the product is accompanied by instructions and safety information in a language determined by the Member State concerned which can be easily understood by users. These instructions and safety information should fully correspond with the technical information about the product and its intended use which the manufacturer has submitted to the responsible Technical Assessment Body for the issuing of the European Technical Assessment.

10 Pursuant to Article 11(3) of Regulation (EU) No 305/2011, manufacturers shall adequately take into account changes in the product-type and in the applicable harmonised technical specifications. Therefore, when the contents of the issued European Technical Assessment do not any longer correspond to the product-type, the manufacturer should refrain from using this European Technical Assessment as the basis for their declaration of performance.

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13 Subject to the application introduced, this European Technical Assessment is issued in English and may be issued by the UBAtc in its official languages. The translations correspond fully to the English reference version circulated in EOTA.

14 This European Technical Assessment, ETA 01/0001, replaces European Technical Approval 01/0001, issued on 10/01/2011 and valid until 09/01/2016. Compared with the replaced version, the following significant changes have been introduced: not only expanded polystyrene (EPS), but also mineral wool (MW), phenolic foam (PF), extruded polystyrene (XPS), rigid polyurethane foam (PU), cellular glass (CG) and fibre cement board (FCB) strips may be kit components. Wood based panel (HDF) are no more part of this ETA.

[1] OJ, L 88 of 2011/04/04

[2] OJ, L 289 of 2013/10/31

II. Technical provisions

1 Technical description of the product

1.1 General

The shuttering kit[3] is composed of:

- Modules of 3-dimensional network of steel wires;
- Steel rings to bind the modules together;
- Strips of appropriate dimensions, ready to be inserted in the modules. Additional strips can be added on the slabs, or on the modules (externally), in order to increase the thermal resistance ;

The assembled system comprises in addition with the kit:

- Concrete (reinforced or not);
- Exterior finishing (claddings, rendering systems or finishing walls, roofing systems);
- Interior finishing (rendering systems, floorings, ceilings);
- Ancillaries to fix walls, windows and doors.

Figures are available in Annex 1.

1.2 The steel wire network modules

The module:

- is the frame of the shuttering;
- keeps the strips together;
- defines the dimensions and the composition of the wall or floor.

Each module consists of a 3-dimensional frame of wires, Ø (2,20 ± 0,03) mm, made of galvanised or stainless steel. The tolerances on the dimensions of the modules is ± 0,5 cm on the width, height and thickness of the modules.

Identification of the steel wire:

- According to "steel products manual of the iron and steel society (USA)" or EN 10016-1.
- Stainless steel: according to EN 10088-1.

The wires are welded together to obtain a succession of wires vertically and horizontally, parallel as well as perpendicular to the wall face (Annex1, Figure 2).

The dimensions 1 and 4 cm (Annex1, Figure 1) just as 7,5, 10 and 15 cm (Annex1, Figure 2) are constant.

Table 1

Dimensions of the module (Annex 1, Figure 2)		Maximum (cm)
Width	Multiple of 10 cm	120
Height	Multiple of 15 cm	1200
Thickness	Depends on the type of wall, floor, roof	50

The standard width (horizontal in the plane of the wall, floor, roof) is 120 cm.

1.3 The rings

The rings are made of the same steel wires as in § 1.2: Ø 2,2 mm; they bind the modules together (Annex1, Figure 2). They are only needed until the concrete is hardened.

1.4 The strips

The function:

- Thermal insulation (when made of insulating material);
- Temporary support of the fresh concrete;
- Permanent support of the rendering (external and/or internal).

When the strips are used externally, they will be called in the following "*panels*". When used to create a one or two-way girder-slab floor, they will be called "*interjoists*".

The materials used for the strips are mainly: expanded polystyrene (EPS), phenolic foam (PF), mineral wool (MW), cellular glass (CG), rigid polyurethane foam (PU) and, extruded polystyrene (XPS). Alternatively, strips may be made out of fibre cement board (FCB). One or more layers of strips may be applied in the system (Annex1, Figure 1).

The dimensions of the strips are specified in Table 5 and Table 6.

2 Specification of the intended use(s) in accordance with the applicable EAD

2.1 General

Permanent insulating shuttering kit for buildings (walls including basement walls, floors, roofs and their connections), to be filled on site with concrete (reinforced or not).

The result is a continuous monolithic concrete system. The concrete infill structural pattern is continuous. The kit (shuttering) is a non-loadbearing part of the assembled system.

The stability of the building (the assembled system) will depend entirely on the concrete structure.

The assembled system on site can be an *internal and external loadbearing or non-loadbearing wall* (straight or curved) or a *floor or elements in slanted position* (in housing, industrial buildings, low and high rise buildings, ...).

The components added on site: concrete, reinforcement, pipes and conduits, doors and windows, anchors, internal and external finishings (rendering systems, floorings, ceilings and claddings, rendering systems or finishing walls, roofing systems). These components are not part of the kit.

For the overall design a particular building is *split up into modules of 120 cm width (120 cm horizontally)*, taking into account all the particularities of the individual project such as doors and windows, concrete reinforcements, etc.

[3] The kit allows to vary the thickness of the insulation, and of the loadbearing elements (concrete infill) (See examples in Annex 1: Figure 1). The network modules are defined in their material but not in all their dimensions: the number of layers of insulation strips and the thickness of the concrete infill depend on the design calculations.

The steel wire modules may be:

- cut to appropriate dimensions;
- provided with openings cut within the modules, adopting any form;
- curved to form curved planes (r ≥ 80 cm);
- assembled under angles (See Annex1, figures 2, 4, 5 and 7)

Modules are put together on site following a sequence adapted to the optimal filling procedure and using the appropriate connecting rings (Annex1, Figure 2) and instruments, and the appropriate temporary scaffolding (Annex1, Figure 3) developed by the manufacturer.

Concrete is poured in, according to a procedure that is part of the system, after having included all necessary local or general reinforcements.

Pipes and ducts may be installed within the modules before pouring the concrete, or afterwards within the insulating layers.

Strips made of FCB are not intended for application below the ground and on the outside.

Format being used for:

- Walls: SX1_X2X3_X4X3+X8X9_X5_X6_X7
- Floors: FX10

With:

- X1 = thickness of the steel lattice in cm = 6, 8, 10, 15, 20, 25, 30, 35, 40, 45 or 50;
- X2 = thickness of internal insulation in cm = 4 or no indication in case of the use of board strips;
- X3 = type of shuttering material;
- X4 = thickness of external insulation in cm = 4 up to 35 or no indication in case of the use of board strips;
- X5 = HP (High Performance) when stainless steel is used for the 2-dimensional cross wires;
- X6 = SS for an external stainless steel grid, FSS for a steel lattice made out of stainless steel;
- X7 = SW (single wire) or 2SW when absence of 1cm protruding wire on respectively inside and both sides of the panels ;
- X8 = thickness of the outside Plus insulation panel in cm;
- X9 = material used for the Plus insulation panel = EPS, CG;
- X10 = thickness of the floor measured from the 1 cm protruding wire up to the top of the interjoist in cm = from 15 up to 40;

- Example = S35_4EPS_14EPS_HP_SW = SISMO® panel made out of a 35 cm thick 3-dimensional steel lattice. The panel has an inside insulation of 4 cm expanded polystyrene and an outside insulation of 14 cm as shuttering material. The 2-dimnesional cross wires are made of stainless steel. On the inside the steel lattice protrudes 1 cm, on the outside it protrudes the diameter of the steel wire.

The provisions made in this European Technical Assessment are based on an assumed intended working life of 50 years, provided that the assembled product is subject to appropriate use and maintenance, in accordance with this ETA.

The working life of the insulation is assumed to be at least 50 years. The working life of the finishing should be at least 25 years on condition of maintenance. Maintenance of the finishing may also be necessary to prevent deterioration of the wires.

Indications given regarding the working life cannot be interpreted as a guarantee given by the producer or the UBAtc, but are to be regarded only as a means for choosing the appropriate product(s) in relation to the expected economically reasonable working life of the construction works.

2.2 Provisions related to manufacturing, packaging, transportation and storage

The kit is assembled, packaged, transported and stored according to the procedure laid down in the technical file deposited with the UBAtc.

2.3 Packaging, transportation and storage

The information on packaging, transport and storage is given in the manufacturer's technical documentation. It is the responsibility of the ETA-holder to ensure that this information is made known to the concerned people.

2.4 Provisions related to the design and use of the product

The installation instructions including special installation techniques and provisions for the qualification of the personnel are given in the manufacturer's technical documentation.

2.5 Recommendations

2.5.1 Recommendations to the designer and the installer

Building constructions made with this system shall be carried out by qualified personnel and under the supervision of a technically qualified person responsible for technical matters of the building site.

2.5.2 Recommendations on packaging, transport and storage

Materials shall be handled and stored with care, protected from accidental damage.

It is the responsibility of the manufacturer of the product to ensure that the information on these provisions is given to those concerned.

2.5.3 Recommendations on use, maintenance and repair

It is always necessary to make a reinforcement plan and an erection plan of the modules and of the provisional supports.

It is the responsibility of the manufacturer of the product to ensure that the information regarding these provisions is given to those concerned.

3 Methods and criteria for assessing the performance of the product in relation to essential characteristics of the products

3.1 Characterization

3.1.1 The strips

The dimensions and squareness of the strips are detailed in Table 5 and Table 6.

3.1.2 Resistance to filling pressure

The filling of the space between the strips is carried out in well-designed places (i.e. horizontally, maximum 2 to 4 m from each other, depending of the plasticity of the concrete) to obtain maximal efficiency without segregation of the concrete.

Depending on the technique of concrete filling (e.g. by pumping) of the wall and on the part of the building, it is possible to fill up the space between the strips to a height of 6 m per day.

The beams of the inclined roof slabs are always horizontally (Figure 5).

The composition of the concrete and its plasticity has been studied accordingly.

The width of the space to be filled between the strips is at least 10 cm.

During the concrete filling the verticality of the wall shall be checked and corrected if necessary.

During hardening of the concrete, no rectification is permitted.

The module shall not move nor deflect (from the theoretical vertical and horizontal position) more than a half percent horizontally and vertically, when concrete is poured to the height of 6 m, taking into account wind load.

The maximum deviation on the verticality is 20 mm in the height of the storey or 50 mm in the total height of the building (construction).

During the concrete pouring formwork elements for floor or roof slabs are kept in place by appropriate scaffolding, e.g. wooden beams.

To be sure that all gaps are completely filled, a control shall be carried out e.g. to confirm the penetration of the cement laitance in the joints between the strips. Cores may be taken through the insulation at critical positions, such as below windows and at corners, to establish integrity of the concrete.

Type testing has proven that the quality of the concrete as specified in § 3.1.6, is sufficient for adequate filling.

There is no significant irreversible bowing (absolute deflexion value do not exceed 5 mm, see § 3.1.3)

3.1.3 The network modules

Deformation of the wires between the welding points have been determined by calculation of ultimate and serviceability limit state, and by an appropriate type testing on a model of real dimensions.

Concrete pressure needs to be limited to 62 kN/m².

Taking into account the following:

- Temperature during setting: 20 °C;
- Temperature during pouring: 20 °C;
- Reference wall height: 3 m;
- Concrete pressure: 62 kN/m²,

the speed of filling shall be as specified in Table 2.

Table 2

Consistency class	End of setting (h)	Speed of filling (m/h)
F3	5	3.14
F4		2.65
F5		1.23
F6		0.97
SCC		1.12

Table 3

Class Flow Diameter	Flow Diameter	Consistence
F1	≤ 340	earth dry
F2 / F38	350 - 410	semi plastic
F3 / F45	420 - 480	plastic
F4 / F52	490 - 550	very plastic
F5 / F59	560 - 620	flowable
F6 / F66	≥ 630	very flowable
SVB / SCC	≥ 700	self compacting

An appropriate type testing on a model of real dimensions has been done on real construction.

3.1.4 Bond strength between the kit and the finishing

The shuttering is capable of supporting external and internal render finishes adhering to the insulation. The characteristics of the insulation shall be taken into account for the choice of the rendering system.

3.1.5 Impact resistance

The system resist the hard body impact test, as described in ETAG 004, § 5.1.3.2.1 and § 6.1.3.2.1. Impact resistance classes depend on the wall configurations.

3.1.6 Mechanical resistance and stability

The stability of the works (the assembled system) depends entirely on the monolithic concrete structure.

The shuttering enables the concrete structure to be correctly achieved without affecting the required properties of the concrete and reinforcement designed as a result of separate stability studies.

Specifications of concrete filling of wall, floor and inclined (with strips on lower and upper side) formwork: (plasticity and composition, minimum and maximum limits of concrete consistence) according to EN 206-1: flow value ≥ F3.

For inclined formwork without a strip on the upper side the incline is limited to 15°; the flow value is F2.

The size of the aggregates is function of:

- the thickness of the concrete slabs,
- the reinforcement,
- the pump device.

The maximum aggregate size is assumed to be at least 8 mm.

The concrete cover of reinforcement is in accordance with EN 1992-1-1:2005, clause 4.4.1, and has to be anchoraged in accordance with EN 1992-1-1:2005, clauses 8.4 to 8.6.

Stability studies shall take into account the particularity of the system in designing the reinforcement scheme.

The reinforcement is limited to the placing of individual bars, fixed on site on the wires of the modules, and to traditional concrete reinforcement in open spaces made for this purpose.

The design of the project shall take into account the local requirements regarding earthquakes.

Test and design according to EN 1991 (actions), EN 1992 (concrete) and EN 1998 (earthquake resistant structures) or the requirements of the national, regional or local authorities.

Table 4

Minimum dimension of the filling section	Concrete properties according to EN 206
section <12 cm	Maximum aggregate size 8 mm Class of slump ≥ F5
12 cm ≤ section < 14 cm	Maximum aggregate size 16 mm, Class of slump ≥ F3
section ≥ 14 cm	Maximum aggregate size 32 mm, Class of slump ≥ F2

3.1.7 Watertightness

Requirements regarding the watertightness of walls are relevant only where walls are used in environments where they are exposed directly to external water (e.g. rain or snow or water from the ground) or internal water (e.g. in bathrooms, washrooms) and when there are risks of harmful water accumulation or condensation.

The achievement of adequate watertightness by the wall shall be assessed (in the case of an incorporated finish) on the basis of the specification for the finish and its application (e.g. means of achieving watertightness of joints between finish components according to installation instructions).

When special internal environment protection is necessary (e.g. rooms with splashing water and/or high humidity), it shall be assessed that finishes providing adequate watertightness may be properly applied.

When the use for underground walls is stated as possible by the installation instructions, it shall be assessed that incorporated finishes and their joints are able to provide by themselves adequate watertightness, if watertightness is needed.

Where relevant, the assembled system shall be assessed in relation to the practical incorporation of conventional moisture resisting measures.

3.2 Essential characteristics

3.2.1 Modules, steel wires and rings

3.2.1.1 Tensile strength of the steel wires

The tensile strength of the wire: ≥ 680 N/m² according to EN 10002-1.

3.2.1.2 Corrosion resistance of the steel wires

The galvanisation according to EN 10244-1 and -2: Minimum 45 g/m² (class D).

3.2.1.3 Welding strength of the network modules

The shear strength of the welding: rupture > 1400 N, according to EN ISO 15630.

3.2.1.4 Reaction to fire

The steel wires and rings composing the steel network modules are classified as Class "A1", according to decision 96/603/EC[4] of the 4th of October 1996 of the European Commission, as amended by decision 2000/605/EC[5] and decision 2003/424/EC[6].

3.2.1.5 Content and/or release of dangerous substances

See § 3.2.3.3.

3.2.2 The strips

3.2.2.1 General

Table 5 specifies the performances of the strips, made of the different materials listed in § 1.4.

Table 6 specifies the performances of the strips when used externally (*panels*), and when used on slabs (*interjoists*).

Given the large number of wall possibilities (strip materials and thicknesses), ranges or upper/lower limits for the performance values of the strips are detailed in Table 5 and Table 6.

3.2.2.2 Apparent density

See performances listed in Table 5 and Table 6.

3.2.2.3 Compression strength

See performances listed in Table 5 and Table 6.

3.2.2.4 Bending strength

See performances listed in Table 5 and Table 6.

3.2.2.5 Tensile strength

See performances listed in Table 5 and Table 6.

3.2.2.6 Dimensional stability

See performances listed in Table 5 and Table 6.

3.2.2.7 Reaction to fire

See performances listed in Table 5 and Table 6.

3.2.2.8 Thermal resistance

See performances listed in Table 5 and Table 6.

[4] OJ L 267, 19.10.1996, p.23
[5] OJ L 258, 12.10.2000, p.36
[6] OJ L 144, 12.6.2003, p. 9

3.2.2.9 *Water vapour permeability*

See performances listed in Table 5 and Table 6.

3.2.2.10 *Content and/or release of dangerous substances*

See § 3.2.3.3.

Table 5: Characteristics of the strips

Material characteristics	Expanded polystyrene	Extruded polystyrene	Fibre cement board	Mineral wool	Polyurethane foam
Dimensions (length x width x thickness) (cm)	120,0 x 14,8 x 3,8 up to 34,8 Tolerances (EN 822 & EN 823): Length: ± 5 mm, Width: -1 mm Thickness: -1 mm	120,0 x 14,8 x 3,8 up to 23,8 Tolerances (EN 822 & EN 823): Length: ± 5 mm, Width: -1 mm Thickness: -1 mm	120,0 x 14,8 x 0,3 Tolerances (EN 822 & EN 823): Length: 2 mm/m and maximum ± 5 mm, Width: -1 mm Thickness: ± 10%	120,0 x 14,8 x 3,8 up to 7,8 Tolerances (EN 822 & EN 823): Length: ± 2%, Width: -1 mm Thickness: -1 mm	120,0 x 14,8 x 3,8 up to 15,8 Tolerances (EN 822 & EN 823): Length: ± 5 mm, Width: -2 mm Thickness: T2 (EN 13165)
Squareness	≤ 5 mm/500 mm (EN 824)	≤ 5 mm/1000 mm (EN 824)	≤ 2,5 mm/1000 mm (EN 824)	≤ 5 mm/1000 mm (EN 824)	≤ 5 mm/1000 mm (EN 824)
Apparent density (kg/m³)	Walls ≥ 20 to 30 / Floors ≥ 15 (EN 1602)	≥ 30	≥1300 (EN 12467)	≥ 100 (EN 1602)	≥ 30
Tensile strength (10% deformation) – internal bond (N/mm²)	≥ 0,08 (EN 1607)		Not relevant	≥ 0,08 (EN 1607)	
Dimensional stability	≤ 0,5 % (EN 1604)	≤ 5 % (EN 1604)	3,5 mm/m (EN 1604)	≤ 0,5 % (EN 1604)	≤ 3 % (EN 1604)
Compression strength (10% deformation) (N/mm²)	Walls ≥ 0,10 / Floors ≥ 0,06 (EN 826)	≥ 0,20	Not relevant for board strips	0,02 (thickness < 50 mm) 0,04 (thickness ≥ 50 mm) (EN 826)	≥ 0,15 (EN 826)
Bending strength (N/mm²)	Walls ≥ 0,15 / Floors ≥ 0,1 (EN 12089)	≥ 0,15	≥ 13 (EN 12467)	≥ 0,15 (EN 12089)	≥ 0,15 (EN 12089)
Reaction to fire	E (EN 13501-1)	E (EN 13501-1)	A2-s2, d0 (EN 13501-1)	A1 (EN 13501-1)	E (EN 13501-1)
Thermal conductivity (W/m.K) (λ)	Walls ≤ 0,035 Floors ≤ 0,038 (EN 12667)	≤ 0,038 (EN 12667)	≤ 0,16 (EN ISO 10456)	≤ 0,045 (EN 12667)	≤ 0,023 (EN 12667)
Water vapour diffusion resistance index μ	30 to 70 (EN 12086)	50 to 200 (EN 12086)	≤ 80 (EN ISO 12572)	≤ 2 (EN 12086)	50 to 100 (EN 12086)
Water absorption	Walls ≤ 1,5 % / Floors ≤ 5 % (EN 12087)	≤ 0,7 % (EN 12087)	Not relevant	≤ 1,5 % (EN 12087)	≤ 1,5 % (EN 12087)

Material characteristics	Cellular glass	Phenolic foam
Dimensions (length x width x thickness) (cm)	120,0 x 14,8 x 4 up to 18 Tolerances (EN 822 & EN 823): Length: ± 5 mm, Width: -2 mm Thickness: ± 2 mm	120,0 x 14,8 x 3,8 up to 34,8 Tolerances (EN 822 & EN 823): Length: ± 5 mm, Width: -1 mm Thickness: T1
Squareness	≤ 5 mm/1000 mm (EN 824)	Length ≤ 10 mm/1000 mm Thickness ≤ 2 mm/ 1000 mm (EN 824)
Apparent density (kg/m^3)	≥ 100 to 115 (EN 1602)	≥ 35 (EN 1602)
Tensile strength (10% deformation) – internal bond (N/mm^2)	≥ 0,10 (EN 1607)	≥ 0,08 (EN 1607)
Dimensional stability	≤ 0,5 % DS (70, 90)	DS (70, 90) (EN 1604)
Compression strength (10% deformation) (N/mm^2)	≥ 0,4 (EN 826)	≥ 0,12 (EN 826)
Bending strength (N/mm^2)	≥ 0,15 (EN 12089)	≥ 0,15 (EN 12089)
Reaction to fire	E (EN 13501-1)	D (EN 13501-1)
Thermal conductivity (W/m.K) (λ)	≤ 0,041 (EN 12667)	≤ 0,022 (EN 12667)
Water vapour diffusion resistance index μ	∞ (EN 12086)	20 to 50 (EN 12086)
Water absorption	≤ 0,5 kg/m^2 (EN 12087)	≤ 3 kg/m^2 (EN 12087)

Table 6: Characteristics of the panels and interjoists

Material characteristics	Expanded polystyrene	Cellular Glass	Extruded polystyrene
Dimensions (length x width x thickness) (cm)	Panels: 120 x 50 x 6 up to 20 Interjoists: 120 x 45 x 10 up to 35 (EN 822, EN 823)	Panels: 120 x 60 x 4 up to 14 (EN 822, EN 823)	Panels: 120 (up to 250) x 45 (up to 65) x 2 up to 12
Squareness	≤ 3 mm/500 mm (EN 824)	≤ 5 mm/1000 mm (EN 824)	≤ 5 mm/1000 mm (EN 824)
Apparent density (kg/m³)	Panels: ≥ 20 to 30 Interjoists: ≥ 15 (EN 1602)	≥ 100 to 115 (EN 1602)	≥ 30 (EN 1602)
Tensile strength (10% deformation) – internal bond (N/mm²)	≥ 0,08 (EN 1607)	≥ 0,1 (EN 1607)	≥ 0,08 (EN 1607)
Dimensional stability	≤ 0,5 % (EN 1604)	≤ 0,5 % (EN 1604)	≤ 5 % (EN 1604)
Compression strength (10% deformation) (N/mm²)	Panels: ≥ 0,1 to 0,15 Interjoists: ≥ 0,06 (EN 826)	≥ 0,4 (EN 826)	≥ 0,20 (EN 826)
Bending strength (N/mm²)	Panels: ≥ 0,15 to 0,2 Interjoists: ≥ 0,1 (EN 12089)	Up to 0,45 (EN 12089)	Not relevant
Reaction to fire	E(EN 13501-1)	A1 (EN 13501-1)	E (EN 13501-1)
Thermal conductivity (W/m.K) (λ)	Panels: ≤ 0,035 Interjoists: ≤ 0,038 (EN 12667)	≤ 0,038 (EN 12667)	≤ 0,038 (EN 12667)
Water vapour diffusion resistance index μ	30 to 70 (EN 12086)	∞ (EN 12086)	50 to 200 (EN 12086)
Water absorption	≤ 1,5 % (EN 12087)	≤ 0,5 % (EN 12087)	≤ 0,7 % (EN 12087)

3.2.3 The kit

3.2.3.1 Thermal resistance

Some examples of thermal resistance are laid down in Table 7, and calculated according to EN ISO 6949.

Table 7: Some examples of thermal resistance and transmittance for finished SISMO walls

SISMO Wall	R_{TC} (m²K/W)	U_{TC} (W/m²K)	$R_{T,h}$ (m²K/W)	U (W/m²K)
S25_5EPS_10EPS_HP_2SW	4,60	0,22	5,02	0,20
S25_5EPS_10EPS_2SW	3,80	0,26	5,02	0,20
S25_5PF_10PF_HP_2SW	6,10	0,16	6,95	0,14
S30_5PF_15PF_HP_2SW	8,10	0,12	9,22	0,11
S30_5EPS_10EPS_HP_2SW	4,60	0,22	5,06	0,20
S35_5EPS_20EPS_HP_2SW	7,50	0,13	8,25	0,12
S45_5EPS_30EPS_HP_2SW	10,40	0,10	11,47	0,09

3.2.3.2 Resistance to fire

Examples of resistance to fire classifications are laid down in Table 8.

Table 8: Resistance to fire classification of SISMO walls

Minimal thickness of concrete (mm)	Example SISMO® wall	Resistance to fire load bearing wall	Resistance non load bearing wall
100	S20_4EPS_4EPS	REI 30	EI 90
110	S20_FC_8EPS	REI 60	EI 90
120	S30_4EPS_12EPS	REI 90	EI 120
150	S25_4EPS_4EPS	REI 120	EI 180
180	S20_FC_FC	REI 180	EI 240
230	S25_FC_FC	REI 240	EI 240

3.2.3.3 *Content and/or release of dangerous substances*

According to the written declaration on dangerous substances submitted by the ETA-holder to the Technical Assessment Body the kit does not contain any dangerous substances. In addition to the specific clauses relating to dangerous substances contained in this European Technical Assessment, there may be other requirements applicable to the kit falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Regulation (EU) No 305/2011, these requirements need also to be complied with, when and where they apply.

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

In accordance with Regulation (EU) N° 305/2011, Article 65, Directive 89/106/EEC is repealed, but references to the repealed Directive shall be construed as references to the Regulation.

For the products covered by this ETA the applicable European legal act is decision 98/279/EC[7], as amended by Commission Decision 2001/596/EC of 8 January 2001[8] and Commission Delegated Regulation (EU) 2016/364[9].

The systems to be applied have been specified in Table 9.

Table 9: Systems of assessment and verification of constancy of performance

Product(s)	Intended use(s)	Level(s) or class(es)	AVCP system(s) [a]
Non load-bearing permanent shuttering kits/systems, to be filled with normal concrete and, where relevant, with reinforcement	for the construction of external and internal walls subject to fire regulations, in buildings.	A1[b], A2[b], B[b], C[b]	1
		A1[c], A2[c], B[c], C[c], D, E, F A1[d], A2[d], B[d], C[d], D[d], E[d], F[d], NPD[e]	2+
	for the construction of external and internal walls not subject to fire regulations, in buildings	Any	2+

[a] See Annex V to Regulation (EU) N° 305/2011
[b] Products/materials for which a clearly identifiable stage in the production process results in an improvement of the reaction to fire classification (e.g. an addition of fire retardants or a limiting of organic material)
[c] Products/materials not covered by footnote (*)
[d] Products/materials that do not require to be tested for reaction to fire (e.g. Products/materials of class A1 according to Commission Decision 96/603/EC, as amended)
[e] 'No Performance Declared' in accordance with Regulation (EU) N° 305/2011, Article 6(f)

[7] OJ L 127, 29.4.1998, p. 26
[8] OJ L 209, 2.8.2001, p. 33
[9] OJ L 68, 15.3.2016, p. 4

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

5.1 Tasks of the ETA-holder

See EAD 340024-00-0103, clause 3.2.

5.2 Tasks for the Technical Assessment Body

See EAD 340024-00-0103, clause 3.3.

6 Other marking and/or information

Each delivery on site for a well-defined project or works is accompanied by a list of content of the components of the kit. Packaging of the kit shall at least be marked with product name and a traceability code. The components shall be marked as belonging to the kit SISMO.

UBAtc asbl is a non-profit organization according to Belgian law. It is a Technical Assessment Body notified by the Belgian notifying authority, the Federal Public Services Economy, SMEs, Self-Employed and Energy, on 17 July 2013 in the framework of Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC and is member of the European Organisation for Technical Assessment, EOTA (www.eota.eu).

This European Technical Assessment has been issued by UBAtc asbl on the basis of the technical work carried out by the Assessment Operator, BCCA

On behalf of UBAtc asbl,

Peter Wouters,

director

On behalf of the Assessment Operator, BCCA responsible for the technical content of the ETA,

Benny De Blaere,

director

The most recent version of this European Technical Assessment may be consulted on the UBAtc website (www.ubatc.be).

ANNEX 1

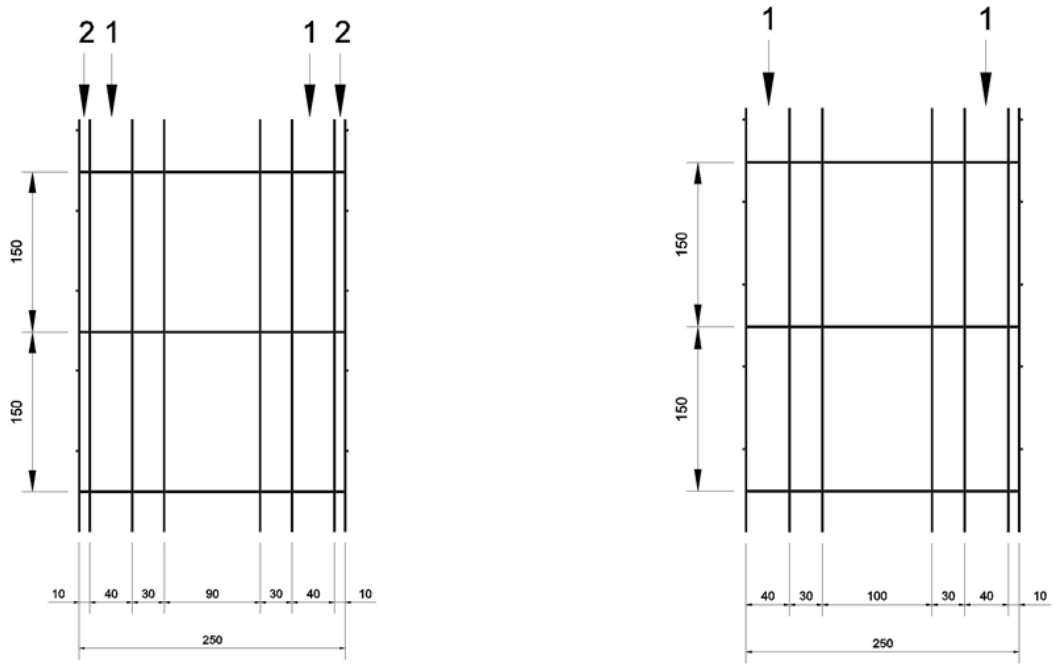


Figure 1: Vertical cross section of SISMO® steel wire lattice. Right figure one side without 1 cm protruding lattice (so called single wire frame on one side). 1 = position of insulation strips, 2 = position sheet strips

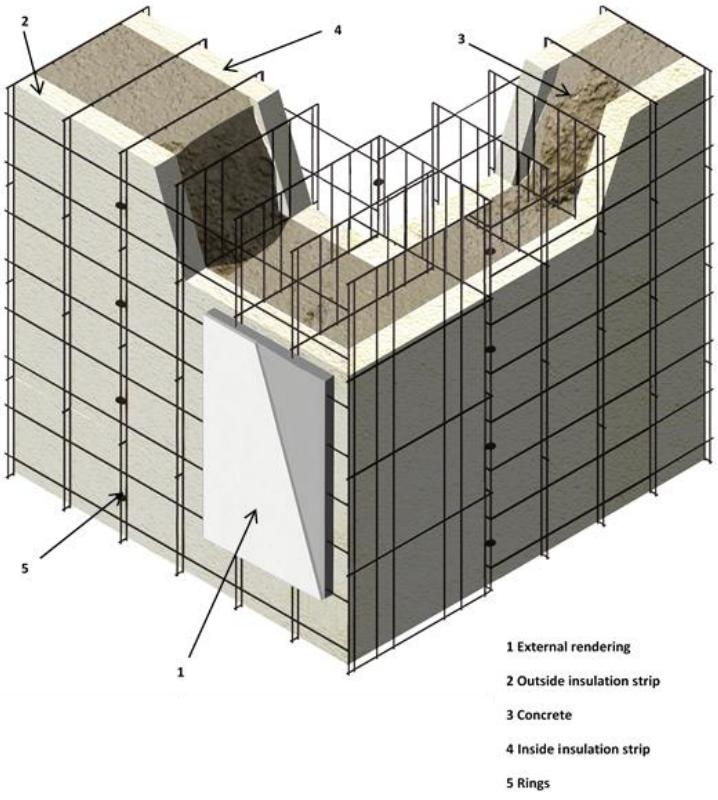


Figure 2

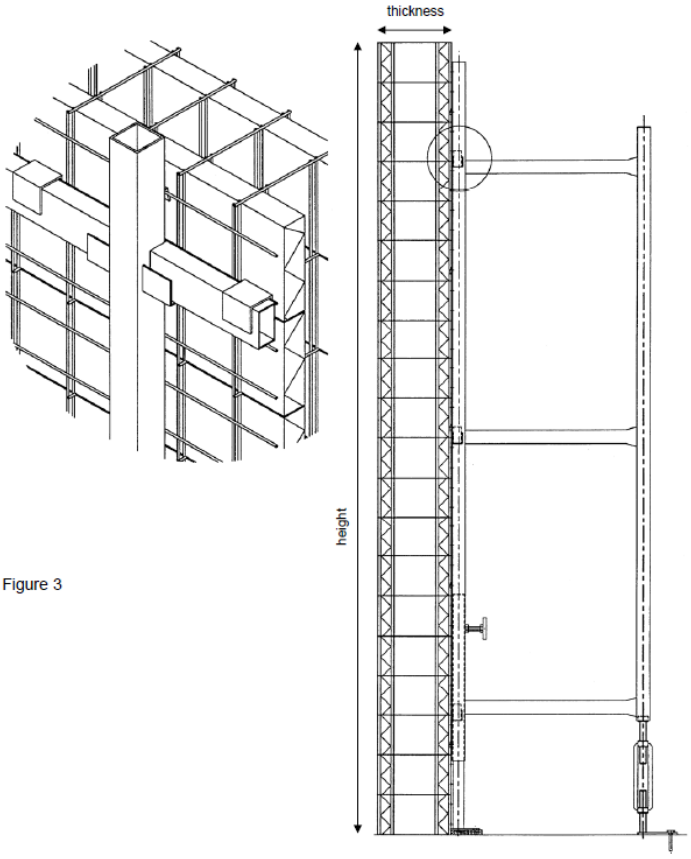
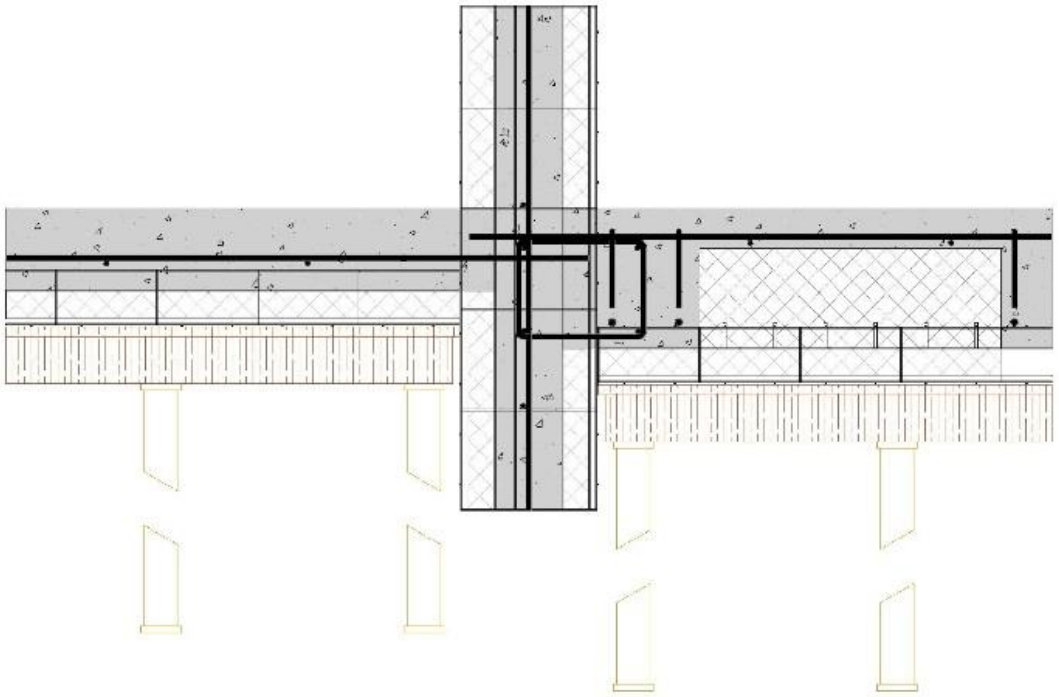


Figure 3



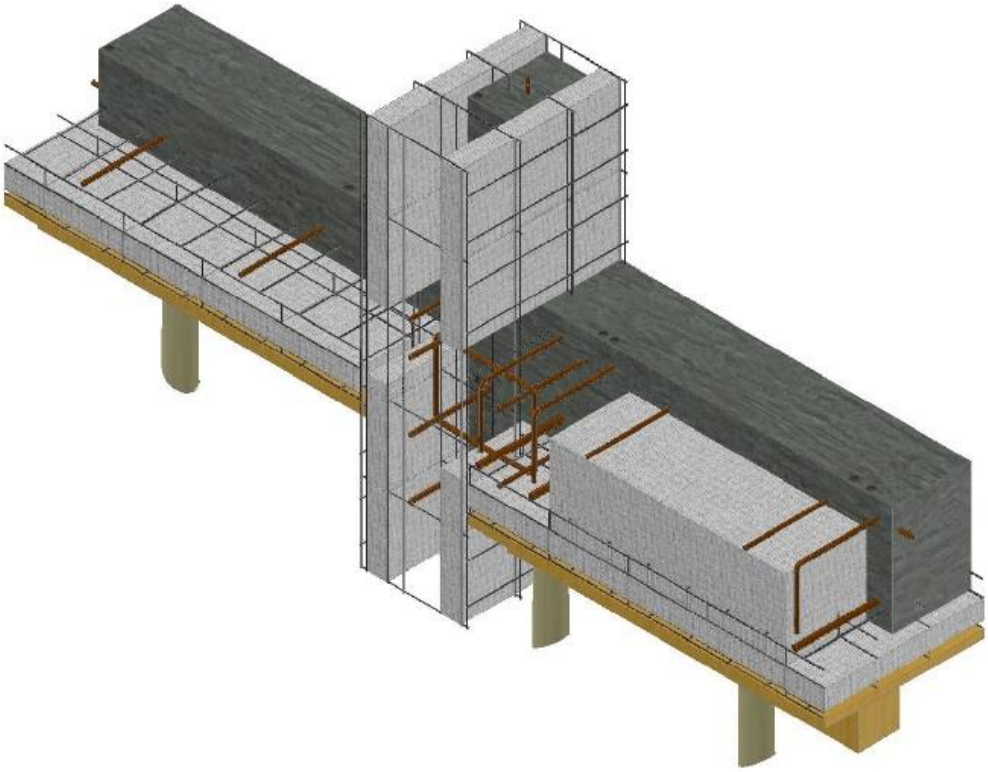


Figure 4

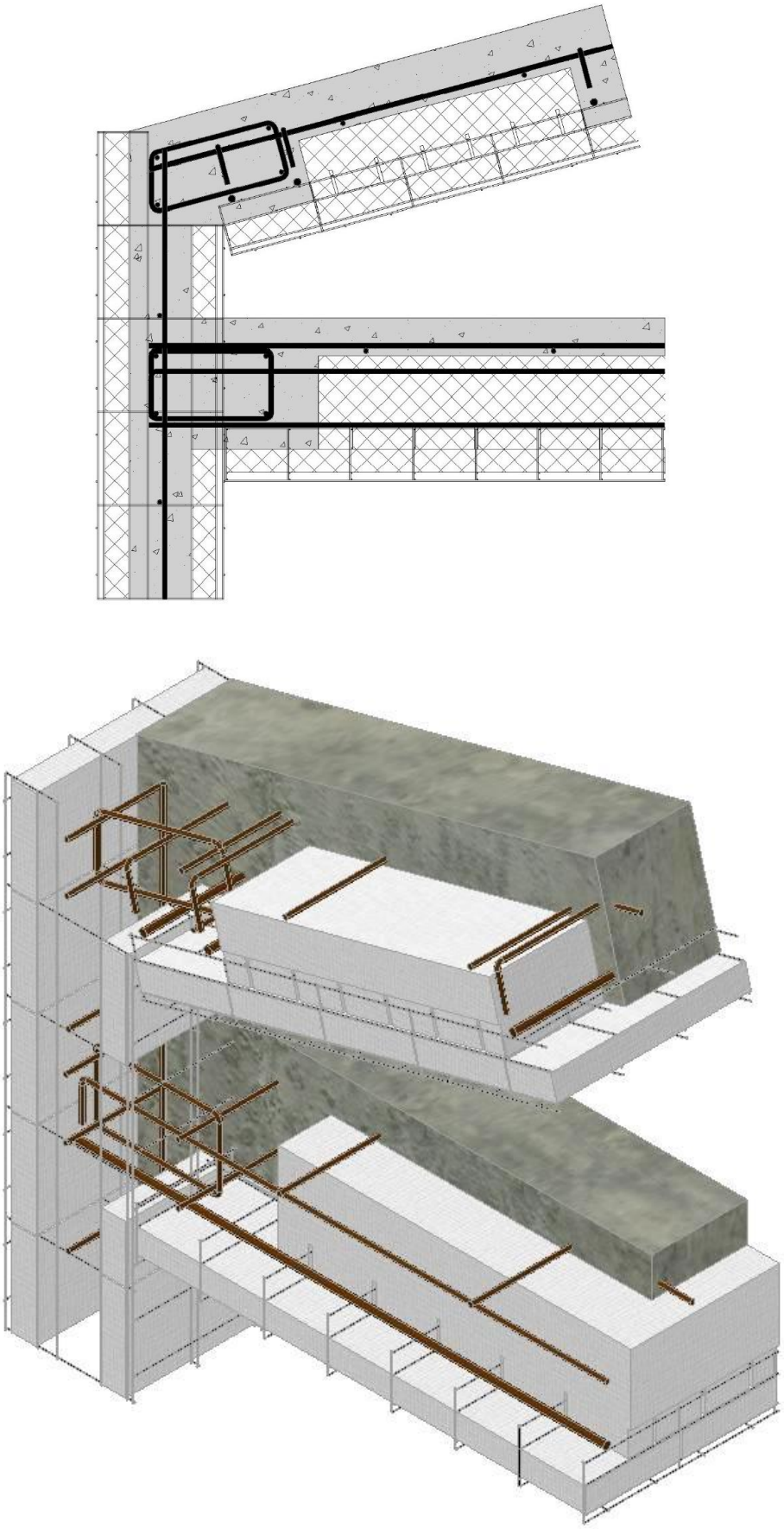


Figure 5

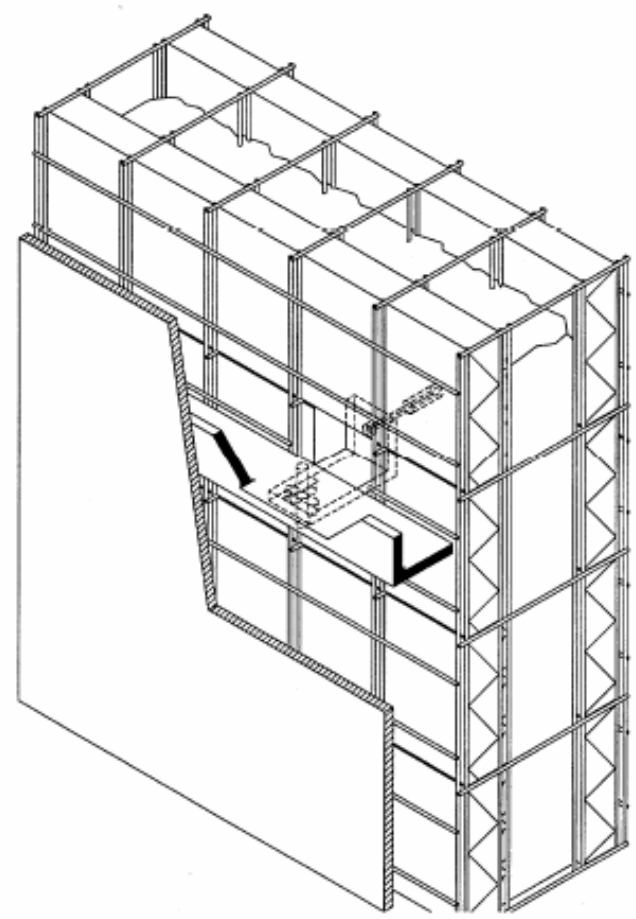


Figure 6

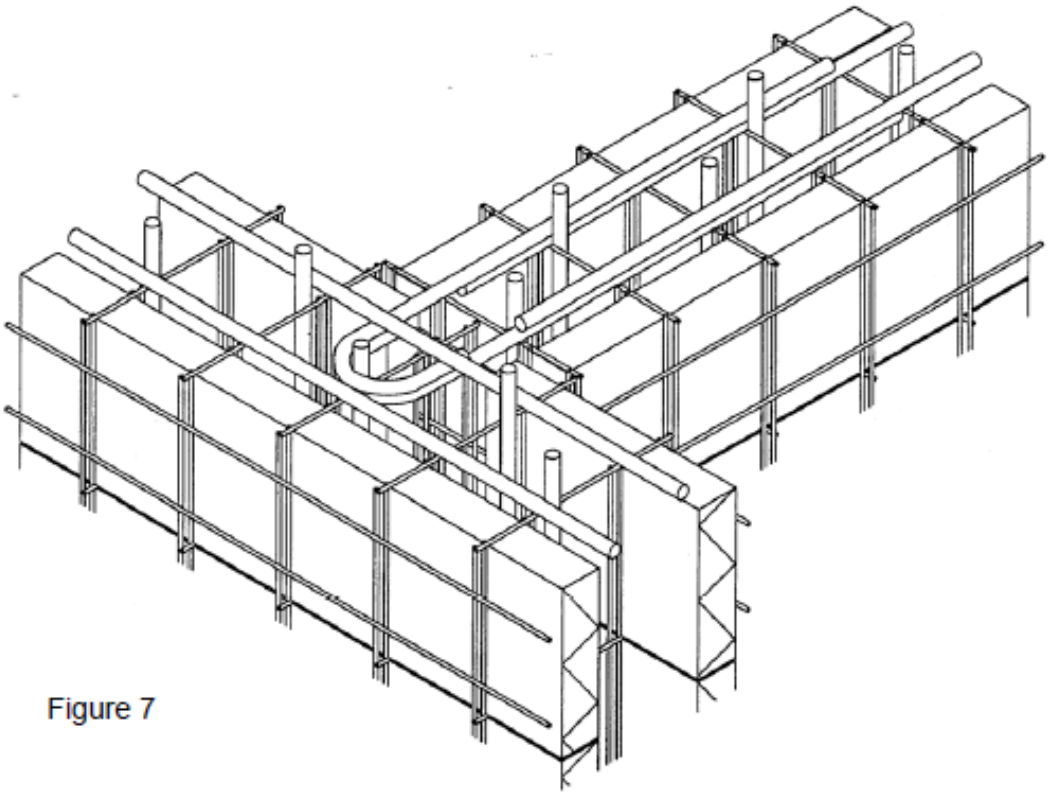


Figure 7

ANNEX 2

List of reference documents

EOTA TR 034	General checklist for EADs/EATGs – Content and/or release of dangerous substances in products
ETAG 004	External thermal insulation composite systems (ETICS) with renderings
ETAG 009	Non Load-bearing permanent shuttering kits/systems based on hollow blocks or panels of insulated materials and sometimes concrete
EN 206-1	Concrete – Part 1: Specification, performance, production and conformity
EN 822	Thermal insulating products for building applications - Determination of length and width
EN 823	Thermal insulating products for building applications - Determination of thickness
EN 826	Determination of Compression Behaviour of Thermal Insulation Products
EN 1602	Thermal insulating products for building applications - Determination of the apparent density
EN 1604	Thermal insulating products for building applications - Determination of dimensional stability under specified temperature and humidity conditions
EN 1607	Thermal insulating products for building applications - Determination of tensile strength perpendicular to faces
EN 1992-1-1	Eurocode 2: Design of concrete structures – Part 1-1: General rules and rules for buildings
EN 1992-1-2	Eurocode 2: Design of concrete structures - Part 1-2: General rules - Structural fire design
EN 10088-1	Stainless steels – Part 1: List of stainless steels
EN 10244-1	Steel wire and wire products - Non-ferrous metallic coatings on steel wire – Part 1: General principles
EN 10244-2	Steel wire and wire products - Non-ferrous metallic coatings on steel wire – Part 2: Zinc or zinc alloy coatings
EN 12086	Thermal insulating products for building applications - Determination of water vapour transmission properties
EN 12087	Thermal insulating products for building applications - Determination of long term water absorption by immersion
EN 12089	Thermal insulating products for building applications - Determination of bending behaviour
EN 12429	Thermal insulating products for building applications - Conditioning to moisture equilibrium under specified temperature and humidity conditions
EN 12467	Fibre-cement flat sheets - Product specification and test methods
EN 12664	Thermal performance of building materials and products - Determination of thermal resistance by means of guarded hot plate and heat flow meter methods - Dry and moist products of medium and low thermal resistance
EN 12667	Thermal performance of building materials and products - Determination of thermal resistance by means of guarded hot plate and heat flow meter methods - Products of high and medium thermal resistance
EN 12939	Thermal performance of building materials and products - Determination of thermal resistance by means of guarded hot plate and heat flow meter methods - Thick products of high and medium thermal resistance
EN 13162	Thermal insulation products for buildings - Factory made mineral wool (MW) products - Specification
EN 13163	Thermal insulation products for buildings - Factory made expanded polystyrene (EPS) products - Specification
EN 13164	Thermal insulation products for buildings - Factory made extruded polystyrene foam (XPS) products - Specification
EN 13165	Thermal insulation products for buildings - Factory made rigid polyurethane foam (PU) products - Specification
EN 13166	Thermal insulation products for buildings - Factory made phenolic foam (PF) products - Specification
EN 13501-1	Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests
EN ISO 1463	Metallic and oxide coatings -- Measurement of coating thickness -- Microscopical method
EN ISO 10456	Building materials and products. Hygrothermal properties - Tabulated design values and procedures for determining declared and design thermal values
EN ISO 1924-2	Paper and board -- Determination of tensile properties - Part 2: Constant rate of elongation method (20 mm/min)
EN ISO 6892-1	Tensile testing of metallic materials – Part 1: Method of test at ambient temperature
EN ISO 12572	Hygrothermal performance of building materials and products -- Determination of water vapour transmission properties
EN ISO 15630-2	Steel for the reinforcement and prestressing of concrete -- Test methods -- Part 2: Welded fabric
ISO 7892	Vertical building elements -- Impact resistance tests -- Impact bodies and general test procedures
ISO 9932	Paper and board -- Determination of water vapour transmission rate of sheet materials -- Dynamic sweep and static gas methods