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Rakennustuotedirektiivin (89/106/EEC) artiklan 10,  
neuvoston direktiivi 21. joulukuuta 1988,  
mukaisesti notifioitu tuotehyväksyntälaitos

EOTAN JÄSEN

## Eurooppalainen tekninen hyväksyntä ETA-08/0306 European Technical Approval

### **Kauppanimi:**

Trade name

### **Hyväksynnän haltija:**

Holder of approval:

### **Tuotetyyppi ja sen käyttötarkoitus:**

Generic type and use of construction  
product:

### **Voimassaoloaika:**

Validity from/to

**Tämä versio korvaa:** This version  
replaces:

### **Valmistuspaikka:**

Manufacturing plants:

### **Tiilipintainen ulkoinen eristysjärjestelmä**

**External insulation system coated with brick tiles**

### **RAKE AS**

Pärnu Mnt 153

11624 TALLINN, ESTONIA

### **RAKENNUKSEN JULKISIVUN ULKOPUOLINEN ERISTYSJÄRJESTELMÄ**

**EXTERNAL INSULATION SYSTEM FOR FACADES**

From March 25, 2013 to March 24 2018

ETA-08/0306 valid from August 3, 2009 to August 2, 2014

### **RAKE AS**

Tootevälja 1, Kohatu Küla, Kernu Vald

76303 HARJUMAA, ESTONIA

### **Tämä hyväksyntä sisältää**

This European Technical Approval  
contains

sivuja/liitteitä

pages/annexes

11 sivua sisältäen 3 liitettä

11 pages including 3 annexes



Eurooppalainen tekninen hyväksyntäorganisaatio  
European Organisation for Technical Approvals

## I LEGAL BASES AND GENERAL CONDITIONS

1. This European Technical Approval is issued by the Technical Research Centre of Finland (VTT) in accordance with:
  - Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products<sup>1</sup>, modified by the Council Directive 93/68/EEC of 22 July 1993<sup>2</sup>; and regulation (EC) N<sup>o</sup> 1882/2003 of the European Parliament and of the Council.<sup>3</sup>
  - Laki rakennustuotteiden hyväksynnästä (230/2003) luvut 3 ja 10, Ympäristöministeriön asetus rakennustuotteiden hyväksynnästä 3 § sekä Ympäristöministeriön 18.12.2009 antama valtuutus päätös (19/629/2009).
  - Common Procedural Rules for Requesting, Preparing and the Granting of European Technical Approvals set out in the Annex of Commission Decision 94/23/EC<sup>3</sup>;
  - Commonly agreed assessment method of March 2008.
2. VTT Expert Services Oy is authorised to check whether the provisions of this European Technical Approval are met. Checking may take place in the manufacturing plant (for example concerning the fulfilment of assumptions made in this European Technical Approval with regard to manufacturing). Nevertheless, the responsibility for the conformity of the products with the European Technical Approval and for their fitness for the intended use remains with the holder of the European Technical Approval.
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<sup>1</sup> Official Journal of the European Communities N<sup>o</sup> L 40, 11.2.1989, p. 12  
<sup>2</sup> Official Journal of the European Communities N<sup>o</sup> L 220, 30.8.1993, p. 1  
<sup>3</sup> Official Journal of the European Communities N<sup>o</sup> L 284, 31.10.2003, p. 25  
<sup>3</sup> Official Journal of the European Communities N<sup>o</sup> L 17, 20.1.1994, p. 34

## II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

### 1. Definition of the product and intended use

External thermal insulation system consist of elements made of PUR-EPS mixture thermal insulation, thickness 36 mm, into which external brick surface, thickness 10 – 14 mm, jointed with mortar and internal glass fibre net reinforcing layer are fastened in the hardening process of the insulation. The elements form the facade external surface. Joints between the elements are hidden during the installation by covering them with bricks and/or grout. The dimensions of the elements are:

Ceramic tile/ Brick size, mm	Element length, mm	Element width, mm	Element thickness, mm	Thickness of the insulation, mm	Element weight, kg/m <sup>2</sup>
240x71x10	1262 ±1,5	570±1,5	46	36	27
240x71x14	1262±1,5	570±1,5	50	36	32
285x85x10	1199±1,5	599±1,5	46	36	27
285x85x14	1199±1,5	599±1,5	50	36	32

Additionally system includes preformed mechanical fasteners for fastening elements on to timber or metal frame (appendix 3). Other fasteners are not part of the system but must have defined pull out and corrosion resistance strength properties for defined substrates.

Elements are fastened on to timber or metal frame substrate with preformed mechanical fasteners (clamps) (Appendix 3), and additional fastening screws with reinforced plastic sockets in the middle of the element (Appendix 2). The screws to be used in fastening the fasteners to frame structure are timber screws made of galvanized steel (minimum Ø 4,2 mm). The diameter length and shape of the screws have to be selected to guarantee pull out strength  $\geq 0,9$  kN from the substrate.

Elements are fastened on the brick or concrete wall (Appendix 1) with screws and plugs (in the middle) and with screws plugs and washers (element edges). The screws used in fastening to concrete or brick structures are galvanized steel screws with plastic plugs (minimum Ø 8 mm). The diameter, length and shape of the screws and plugs have to be selected to guarantee pull out strength  $\geq 0,9$  kN from the substrate. The thickness of steel washers to be used must be at least 1 mm and the surface area of the washer shall be at least 500 mm<sup>2</sup>. Two reinforced plastic sockets installed into middle of the panels by the manufacturer conform to these requirements as well.

The thermal insulation consists of EPS filler glued together with PUR glue with defined compositions. The edges of the thermal insulation part of the elements are grooved.

External thermal insulation system is intended to be used as external insulation system on new or old brick, concrete or timber framed facades. Fastening of the elements can be done directly on to the existing wall or on to the first installed timber frames.

The suitability of the system into the building shall be evaluated in each case taking into account the water vapour transmission properties of the external thermal insulation system and the old construction, the straightness of the facade and the strength of the substrate

The details and drawings of the system are presented in the Annexes 1.and 2.

The provisions made in this ETA are based on an assumed intended working life for an external thermal insulation system of 25 years provided that the kit is subjected to appropriate installation, use and maintenance. The provisions are based upon the current state of the art and available knowledge and experience.

The indications given on the working life cannot be interpreted as a guarantee given by the product manufacturer or his representative or the approval body issuing the ETA, but are regarded only as means for choosing the appropriate products in relation to the expected economically reasonable working life of the works.

## 2. Characteristics of product and assessment

Characteristics of the system and its components are presented in the tables 2.1, 2.2, 2.3 and 2.4.

### 2.1 Characteristics of the assembled system

CUAP paragraph	Characteristic	Assessment of the characteristic
	<b>2.1 Mechanical resistance and stability</b>	Not relevant
	<b>2.2 Safety in case of fire</b>	
2.4.1	* Reaction to fire	* The brick tiles coated insulation kit is classified to Euroclass B-s1,d0 The insulation is classified to Euroclass E
	<b>2.3 Hygiene, health and environment</b>	
2.4.2	Release of dangerous substances	No dangerous materials **) Manufacturers declaration
2.4.3	Dampness	
	- Rig test	Water tight, no damages
	- Water vapour permeability	$1,9 \times 10^{-12}$ kg/(m s Pa) (whole kit) or $\mu$ value 105
	<b>2.4 Safety in use</b>	
2.4.4	Resistance to structural damage from impact loads	No damages
2.4.5	Wind load resistance ( ***according to the option 2 of the CUAP)	
	Bond strength between insulation and bricks	> 0,2 MPa
	Pull through strength of the fastenings	> 0,9 kN
	- Calculation method of wind load resistance	$N_w/A < R_d$ where: $N_w$ is accepted maximum wind load (design value), A is area and $R_d$ is calculated resistance of the material; $R_d = n \times N_s/\gamma_M$ where n is number of fastenings/m <sup>2</sup> , (8,33/m <sup>2</sup> ), $N_s$ is pull through strength of one fastening (> 0,9 kN) and $\gamma_M$ is safety factor (= in this example 2 which can be used if there is no other national regulations) $R_d = (8,33 \times 0,9)/2 > 3,74$ kN/m <sup>2</sup>
6.4.2	Safety against personal injury by contact	When properly installed, the wall system does not contain sharp or abrasive components liable to cause personal injury
	<b>2.5 Protection against noise</b>	
2.4.6	Sound insulation , $R_w$	$R_w$ value of the whole wall with Rake elements together with background structure shall be evaluated in each case separately.
	<b>2.6 Energy economy and heat retention</b>	
2.4.7	Thermal resistance of the element	0.87 m <sup>2</sup> K/W (supporting clamps taken into account)
	U-value of the element	0,96 W/m <sup>2</sup> K
	Air permeability at 100 Pa pressure difference	0,13 m <sup>3</sup> /m <sup>2</sup> h
	<b>2.7 Related aspects of serviceability</b>	
2.4.8	<b>Freeze thaw resistance</b>	No change in adhesion of tiles or appearance in rig test. Some cracks in tile joints after 50 freeze thaw cycles
	Thermal expansion of the element	< $9 \times 10^{-6}$ 1/°C
	Displacement	NPD

\*An European reference fire scenario for façades has not been laid down. In some Member States, the classification of **external insulation kit** according to EN 13501-1:2002 might not be sufficient for the use in façades. An additional assessment of **external insulation kit** according to national provisions (e.g. on the basis of a large scale test) might be necessary to comply with Member State regulations, until the existing European classification system has been completed

\*\*In addition of the specific clauses relating to dangerous substances contained in this European Technical Approval, 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 Construction Products directive, these requirements need also to be compiled with, when and where they apply.

\*\*\*It has to be stated if option 1 or 2 was used in determination of the wind load resistance of the kit.

## 2.2 Characteristics of the thermal insulation

CUAP paragraph	Characteristic	Assessment of the characteristic
	<b>2.1 Mechanical resistance and stability</b>	Not relevant
2.5.1.7	<b>2.2 Safety in case of fire</b> Reaction to fire	Euroclass E
	<b>2.3 Hygiene, health and environment</b>	
2.5.1.2	Water absorption	< 4 vol-%
2.4.3	Water vapour permeability	$1,75 \times 10^{-12}$ kg/(m s Pa) or $\mu$ value 113
	<b>2.4 Safety in use</b>	Not relevant, NPD
	<b>2.5 Protection against noise</b>	Not relevant, NPD
	<b>2.6 Energy economy and heat retention</b>	
2.5.1.1	Thermal conductivity, $\lambda_{\text{DECLARED}}$	0,038 W/mK (aged value)
	<b>2.7 Related aspects of serviceability</b>	
2.5.1.4	Compression strength, at 10 % deformation	> 250 kPa
2.5.1.5	Tensile strength	> 200 kPa
2.5.1.6	Shear strength	> 100 kPa
2.5.1.8	Dimensional stability	NPD
	Density	> 60 kg/m <sup>3</sup>

## 2.3 Characteristics of the preformed mechanical fastenings

CUAP paragraph	Characteristic	Assessment of the characteristic
	<b>2.1 Mechanical resistance and stability</b>	Not relevant
2.5.1.7	<b>2.2 Safety in case of fire</b> Reaction to fire	Euroclass A
	<b>2.3 Hygiene, health and environment</b>	Not relevant
	<b>2.4 Safety in use</b>	
2.5.2.1	Pull out resistances of fastenings	
	Pull through strength of fastening	> 0,9 kN
2.5.2.2.	Shear strength	> 2,5 kN
	<b>2.5 Protection against noise</b>	Not relevant
	<b>2.6 Energy economy and heat retention</b>	Not relevant
	<b>2.7 Related aspects of serviceability</b>	
2.5.2.3	Corrosion resistance	Zinc coating Z275 (without air gap behind the wall and Rake-element) and stainless steel X2CrNi18-9 or better with vent between the wall and Rake element

## 2.4 Characteristics of the brick tiles and jointing mortar

CUAP paragraph	Characteristic	Assessment of the characteristic
	<b>2.1 Mechanical resistance and stability</b>	Not relevant
2.5.1.7	<b>2.2 Safety in case of fire</b> Reaction to fire	Not relevant
	<b>2.3 Hygiene, health and environment</b>	Not relevant
2.5.3.1	<b>2.4 Safety in use</b> Tile adhesion to substrate	> 0,2 MPa
	<b>2.5 Protection against noise</b>	Not relevant
	<b>2.6 Energy economy and heat retention</b>	Not relevant
	<b>2.7 Related aspects of serviceability</b>	
2.5.3.2	Frost resistance (bricks)	no damages
2.5.3	Capillarity(bricks)	> 5 %
2.5.3.4	Water absorption of the mortar	0,35 kg/m <sup>2</sup> h <sup>0,5</sup>
	Bending strength of the mortar	6,5 - 8 MPa

## 3. Evaluation of conformity and CE marking

### 3.1 Attestation of conformity system

The attestation of conformity applied to this product specified by the European Commission in decision 97/556/EC and commission letter dated 24.4.2006 the system of attestation of conformity is 1, since the bricks coating processed on the insulation cause the improvement of the reaction to fire classification..

### 3.2 Responsibilities

#### 3.2.1 Tasks for the manufacturer

##### **3.2.1.1 Factory production control**

The manufacturer continues to operate a factory production control system. Quality control checks are made on incoming materials and finalized products, and at regular stages throughout the production sequence to ensure the quality and fitness for use.

The quality control on the components includes checking of:

- Checking of the incoming materials, Each batch
- Ready made elements (dimensions, insulation density, thermal conductivity, bending strength, frost resistance with the control plan defined intensity))

VTT Expert Services Oy maintains a file describing the tasks and tests imposed on ETA holder and the component manufacturers by the approval holder.

The file includes information of the main components of the kit, i.e. brick tiles, insulation material, fastenings, and mortar. The file include also the control plan which include the type and frequency of the control agreed between VTT Expert Services Oy and approval holder. The control plan is a confidential part of the ETA and only handed over to the approved (notified) bodies involved in the procedure of attestation of conformity<sup>1</sup>.

### **3.2.1.2 Initial type testing of the product**

For initial type testing the results of the tests performed as part of the assessment for this European Technical Approval shall be used unless there are changes in the production line or plant. In such cases the necessary type testing has to be agreed between VTT Expert Services Oy and the manufacturer.\*

### **3.2.2. Tasks for the approved bodies**

'The approved body (bodies) shall perform

- initial type–testing of the product (if there is changes in product or production plant)
- initial inspection of factory and of factory production control;
- continuous surveillance, assessment and approval of factory production control.

'The approved certification body involved by the manufacturer shall issue an EC certificate of conformity stating the conformity with the provisions of this European Technical Approval.'

### **3.3 CE-marking**

The CE-marking shall be affixed to each delivery of partition kit and accompanying commercial documents.

The symbol “CE” shall be accompanied by the following information:

- Name of the product: Commercial trade name as indicated in this ETA
- Name of the ETA holder and manufacturer(s) ( both/all if they are separate)
- The last two digits of the year in which the CE marking was affixed
- The number of the EC certificate for the factory production control
- Number of the European Technical Approval, ETA-08/0306

## **4. Assumptions under which the fitness of the product for the intended use was favourably assessed**

### **4.1 Manufacturing**

The kits are manufactured in accordance with the provisions laid down in the European technical Approval.

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\* In cases mentioned in paragraph 2.1 footnote \* additional national full scale fire test may be necessary

'In cases where the provisions of the European Technical Approval and its 'control plan' are no longer fulfilled the certification body shall withdraw the certificate of conformity and inform VTT Expert Services Oy without delay.'

All materials shall be manufactured by producer or subcontractors under the responsibility of the manufacturer /ETA holder.

The European technical approval is issued for the product on the basis of agreed data/information, deposited with VTT Expert Services Oy (approval body), which identifies the product that has been assessed and judged. Changes to the product or production process, which could result in this deposited data/information being incorrect, should be notified to VTT Expert Services Oy before the changes are introduced. VTT Expert Services Oy will decide whether or not such changes affect the approval and consequently the validity of the CE marking on the basis of the approval and if so whether further assessment or alterations to the approval shall be necessary.

## **4.2 Installation and design rules**

### **4.2.1 Design rules**

The kits are installed taking into account the installation instructions of the manufacturer and precautions given in this ETA paragraph 1.

### **4.2.2 Installation**

The kit will be installed according to the separate installation instructions of the manufacturer dated on 01.08.2007.

It is important that contractors are advised how the elements shall be handled and installed and how the penetrations and fastenings to the wall should be made and maintained.

### **4.2.3 Responsibility of the manufacturer**

It is the responsibility of the ETA holder to ensure that the information of the kit and related component requirements and their fabrication is given to the persons concerned. This information may be made by reproduction of the respective parts of the European Technical Approval. In addition all installation data shall be shown clearly on the package and/or on an enclosed instruction sheet.

## **4.3 Maintenance and repair**

The assessment of the fitness for use is based on the assumption that abrasion and minor impact damage are inevitable and shall be easy to repair. In case of damage, repair can be made according to the instructions of the manufacturer. Annual visual inspection of the façade is recommended by the manufacturer.

On behalf of VTT Expert Services Oy

Espoo March 25. 2013



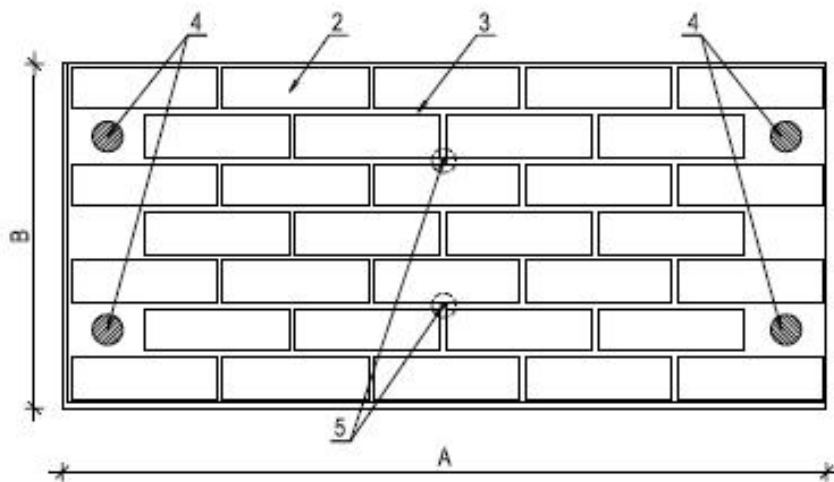
Lina Markelin-Rantala  
Team Manager



Liisa Rautiainen  
Assessment Manger



Appendix 1



1. Concrete / brick / block wall
2. Facade panel
3. Grouting joint mortar
4. Fastening plug with screw and washer
5. Fastening plug with screw through sockets
6. Additional sheet of EPS or PUR

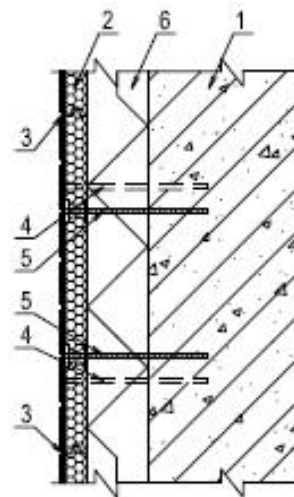
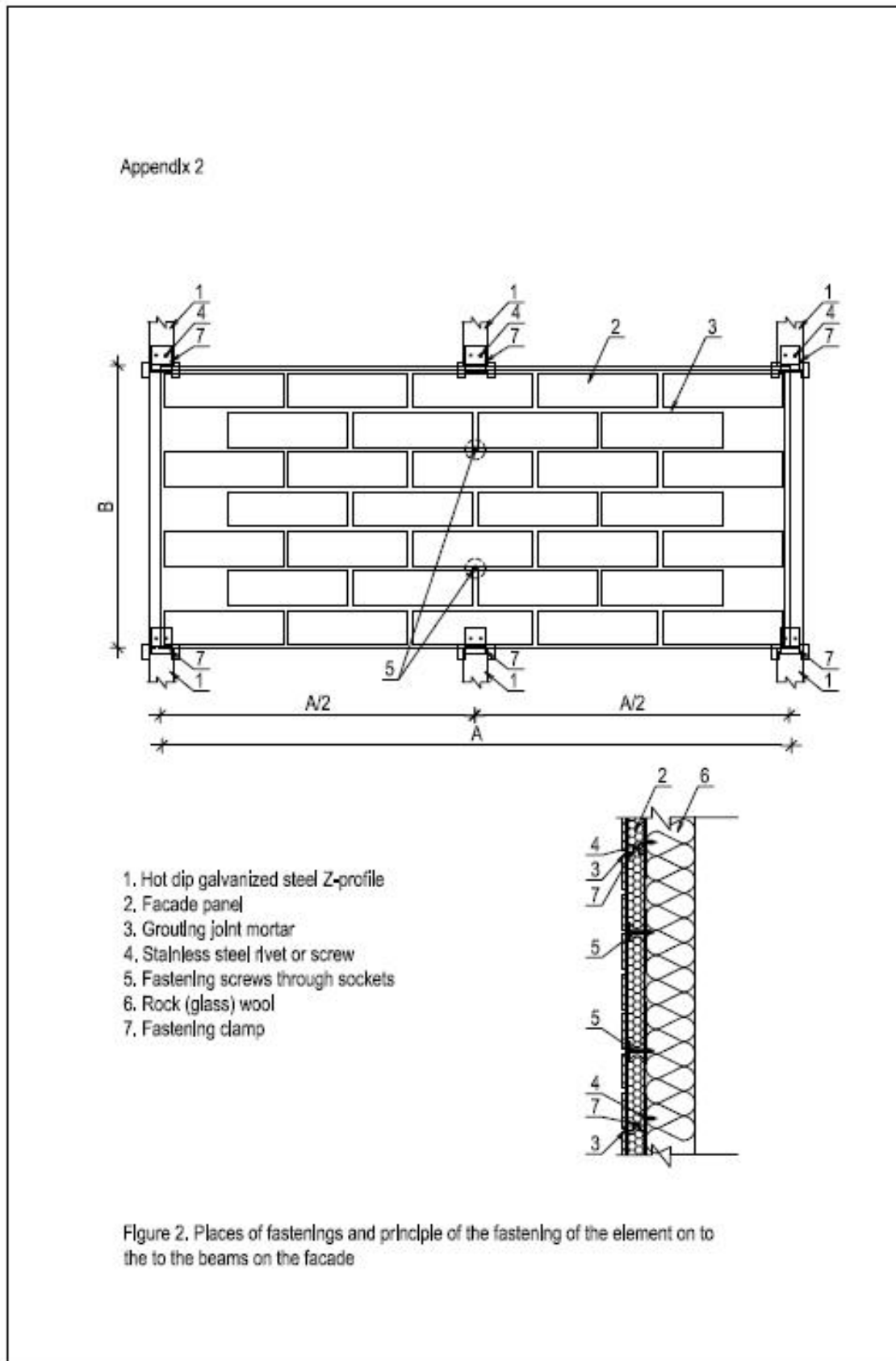


Figure 1. Places of fastenings and principle of the fastening of the element on to the concrete or brick or block wall

Appendix 2



Appendix 3

