

EUROPEAN ASSESSMENT DOCUMENT

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**PREFABRICATED COMPRESSED
MINERAL WOOL BOARDS WITH
ORGANIC OR INORGANIC FINISH AND
WITH SPECIFIED FASTENING SYSTEM**

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This European Assessment Document (EAD) has been developed taking into account up-to-date technical and scientific knowledge at the time of issue and is published in accordance with the relevant provisions of Regulation (EU) No 305/2011 as a basis for the preparation and issuing of European Technical Assessments (ETA).

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1 SCOPE OF THE EAD

1.1 Description of the construction product

Prefabricated compressed mineral wool boards with thermo-setting synthetic binders. The boards are a maximum (width/length) of 1530 mm x 3050 mm. The thickness range is 6 – 10 mm. The density range is 900 – 1400 kg/m³. A primer and a finish in the form of paint in multiple layers or a layer of crushed aggregate have been applied on one side. Also mineral wool boards without finish can be used.

The boards are mechanically fastened (by corrosion resistant nails, screws or rivets) or bonded to the subframe. Mechanical fasteners, silicone based adhesive, gaskets and aluminium profiles are specified by the ETA-holder. The adhesive system (such as cleaner, primer, adhesive tapes) has to be defined as part of the kit.

For bonded cladding kits the size of the board shall be limited to a maximum width of 1200 mm and fixed to at least three profiles with a distance of ≤ 600 mm.

The kit is not fully covered by ETAG 034 used as EAD: Kits for external wall claddings, since ETAG 034 covers only cladding kits with mechanical fixings; the cladding kit to be considered by this EAD may be mechanical fixed or bonded to the subframe.

In addition the prefabricated compressed mineral wool boards are not covered by the harmonized standard EN 13162, since the boards are made from prefabricated compressed mineral wool with thermo-setting synthetic binders.

The requirements made by the manufacturer for ventilated and non-ventilated uses differ.

- For non-ventilated use, the substrate shall be airtight.
- The boards are in general mounted with a joint width of between 5 and 8 mm.
- In certain cases the mechanical fixing of the boards with rivets (e.g. on alu-profiles) requires predrilled holes in the boards which have a greater diameter than the rivet, to allow thermal expansion of the profiles. The heads of the rivets shall have a clearance of 0.3 mm to the surface of the boards.
- If the joints are to be sealed, only durable sealants should be used with a good adhesion on the edges of the boards and a good UV-stability. To prevent sticking to the substrate, a PE-film or tape can be used.
- The boards for external cladding shall not be fixed over building or settlement joints. Where settlement joints are located in the building the same movements of the building and substructure shall be possible in the external cladding.
- It must be possible to attach fixtures (down pipes, etc) into the substrate (substrate: external wall) without damaging the integrity of the installed cladding system to a degree likely to reduce the overall performance.
- It must be checked, that the fixings allow relative movements between the cladding elements and the subframe without damage.
- The design of the external wall construction (including the external wall cladding) should be established on the hygrothermal point of view in order to determine the susceptibility of interstitial condensation.
- A circular saw with hardpoint teeth is used for cutting of the boards. For special shapes a jig-saw with wolfram grid can be used. Edge painting after cutting for durability reasons is not necessary; edge painting has only an aesthetic function. The repainting is generally considered not to have any influence on the reaction to fire performance of the boards. Otherwise possible repainting has to be considered within the fire tests and has to be described in the issued European Technical Assessment.
- If the product is used in a not ventilated construction, repainting is only allowed with a vapour permeable finish with an s_d - value no more than 0,2 m; in general waterborne acrylic paint meets this requirement.

The product is not covered by a harmonised European standard (hEN).

Concerning product packaging, transport, storage, maintenance, replacement and repair it is the responsibility of the manufacturer to undertake the appropriate measures and to advise his clients on the transport, storage, maintenance, replacement and repair of the product as he considers necessary.

It is assumed that the product will be installed according to the manufacturer's instructions or (in absence of such instructions) according to the usual practice of the building professionals.

Relevant manufacturer's stipulations having influence on the performance of the product covered by this European Assessment Document shall be considered for the determination of the performance and detailed in the ETA.

1.2 Information on the intended use(s) of the construction product

1.2.1 Intended use(s)

The boards are intended for external cladding. The cladding can be carried out with or without ventilated cavities at the back See drawing in Annex 1. The sub-frame can be wood, steel or aluminium.

The boards can be mechanically fixed to timber sub-frame by nails or screws or to steel subframe both by self-drilling screws or by stainless steel rivets, to aluminium subframe both by self-drilling screws, by stainless steel rivets or by aluminium rivets. For uses with adhesives, the boards can be either bonded directly to the metal profiles of the sub-frame or bonded to linear strips (made of the same material as the boards) which are mechanically fixed to the timber frame by nails or screws.

The structural adhesive transfers all actions, including the self-weight of the panel, to the adhesive support frame and from there to the structure. No devices are used to reduce danger in the event of bond failure.

Devices to reduce danger in the event of bond failure may be required by national regulations.

This EAD does not cover an assessment of such security features.

1.2.2 Working life/Durability

The assessment methods included or referred to in this EAD have been written based on the manufacturer's request to take into account a working life of the boards for the intended use of 50 years for boards with finish and 25 years for boards without finish when installed in the works (provided that the board is subject to appropriate installation (see 1.1)). These provisions are based upon the current state of the art and the available knowledge and experience.

When assessing the product the intended use as foreseen by the manufacturer shall be taken into account. The real working life may be, in normal use conditions, considerably longer without major degradation affecting the basic requirements for works¹.

The indications given as to the working life of the construction product cannot be interpreted as a guarantee neither given by the product manufacturer or his representative nor by EOTA when drafting this EAD nor by the Technical Assessment Body issuing an ETA based on this EAD, but are regarded only as a means for expressing the expected economically reasonable working life of the product.

¹ The real working life of a product incorporated in a specific works depends on the environmental conditions to which that works is subject, as well as on the particular conditions of the design, execution, use and maintenance of that works. Therefore, it cannot be excluded that in certain cases the real working life of the product may also be shorter than referred to above.

2 ESSENTIAL CHARACTERISTICS AND RELEVANT ASSESSMENT METHODS AND CRITERIA

2.1 Essential characteristics of the product

Certain of the below mentioned essential characteristics applicable to this EAD can appropriately be assessed with methods and criteria already established ETA Guidelines no. 034 referred to in Article 66(3), and have been incorporated as parts of this European Assessment Document.

Table 1 shows how the performance of the boards is assessed in relation to the essential characteristics.

Table 1 Essential characteristics of the product and methods and criteria for assessing the performance of the product in relation to those essential characteristics

No	Essential characteristic	Method of verification and assessment	Type of expression of product performance <i>(level, class, description)</i>
Basic Works Requirement 2: Safety in case of fire			
	Reaction to fire	2.2.1	Class
Basic Works Requirement 3: Hygiene, health and the environment			
	Content, emission and/or release of dangerous substances	2.2.2	Description
	Water vapour permeability	2.2.3	Level
	Water tightness of joints	2.2.4	Level
	Drainability	2.2.5	Description
Basic Works Requirement 4: Safety and accessibility in use			
	Wind load resistance	2.2.6	Level
	Mechanical resistance	2.2.7	Level
	Impact resistance	2.2.8	Level
	Hygrothermal behaviour <small>(includes Resistance to deterioration caused by physical agents)</small>	2.2.9	Level
	Resistance to Xenon Arc Exposure	2.2.10	Level

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

Characterisation of products to be assessed shall be done in accordance with available specifications as described in Annex 8.

2.2.1 Reaction to fire

Reaction to fire of the board in its intended use as a cladding kit:

The cladding kit and its components shall be tested, using the tests methods relevant for the corresponding reaction to fire class, in order to be classified according to EN 13501-1. Tests shall be conducted to simulate its end-use situation. Annex E of ETAG 034 Part 1, gives specific information about the SBI-Testing. Additional information in Annex 2 figure 2A and 2B.

The external surface of the product used in the test assembly shall always include all facings and/or coatings that are applied to the product, as placed on the market. Each facing and/or coating shall be considered.

To determine the facings and/or coatings with the highest content of organic material the PCS-value per unit area or the Q_{PCS} - value according to EN ISO 1716 shall be confirmed. The facings and/or coatings with the highest PCS-value per unit area or Q_{PCS} - value shall then be used for testing.

Materials or components satisfying the requirements for the fire reaction class A1, without the need for testing, e.g. metal or aluminium sub-frames:

The materials or components are considered to satisfy the requirements for performance class A1 of the characteristic reaction to fire, in accordance with the provisions of EC decision 96/603/EC (as amended) without the need for testing on the basis of their listing in that decision.

Materials or components classified without the need for further testing (CWFT), e.g. timber sub-frames:

The materials or components are considered to satisfy the requirements for performance class of the characteristic reaction to fire, in accordance with the relevant EC decision without the need for further testing on the basis of their conformity with the specification of the materials or components detailed in that decision and their intended end use application being covered by that decision.

Small components, e.g. gaskets or seals

These components shall be considered on the basis of EOTA Technical Report no. 21 on Reaction to fire requirements for small components.

Reaction to fire on back side:

Bonded panels on aluminium profiles have to be tested additionally for assessing the adhesives, in a free-hanging arrangement with the flame impingement to the rear side in accordance with EN 13823 (test arrangement without open joints between the cladding elements and without insulation layer on A1 or A2 substrate, so that the distance between the substrate and the cladding elements amounts to at least 80 mm). Additional information can be found in Annex 2 fig. 2C.

The product shall be classified according to EN 13501-1 and adopting the possible extended application rules indicated in ETAG 034 part 1 annex E.

In addition, for products intended to be used for façades:

Note: A European reference fire scenario has not been laid down for façades. In the following Member States, the classification of the product as above might not be sufficient for the use in façades. An additional assessment according to national provisions (e.g. on the basis of a large scale test) might be necessary to demonstrate the compliance with Member State regulations or administrative provisions.

2.2.2 Content and/or release of dangerous substances

The performance of the product related to the emissions and/or release and, where appropriate, the content of dangerous substances will be assessed on the basis of the information provided by the manufacturer using the methods and criteria given in EOTA TR 034.

2.2.3 Water vapour permeability

Testing is carried out in accordance with EN 12572 test condition B

The water diffusion resistance of the boards is declared as a means for the designer to decide whether they are sufficiently vapour permeable, especially when used for cladding without ventilated cavities at the back. The designer can then establish that condensation in the entire wall as a result of water vapour diffusion will not occur or will occur only to an extent where damage is not caused during the condensation period and the wall will dry out again during the evaporation period. The condensation shall not reach a critical moisture level for microbiological growth and the critical moisture level shall not be exceeded in any of the integrated materials.

2.2.4 Water tightness of joints

Cladding kits contribute to the water tightness of the wall. The degree of water tightness of a cladding kit is generally assessed by appraisal of design, taking account of the characteristics of the materials used and the geometry of external cladding element and joints.

If the joints are not watertight the insulation layer shall be made of cellular plastic or mineral wool (WS or WL(P) in accordance with EN 13162, depending on the national regulations) according to EN standards.

If water tightness of closed joints is needed, an artificial rain test may be carried out on the cladding kit in accordance with ETAG 034, Part 1, clause 5.3.1.

For ventilated intended use, testing and assessment of the water permeability is superfluous.

For non-ventilated intended use, the pressure level preceding the pressure level where leakage occurs, is declared as a means for the designer to decide on the necessity of the use of a vapour control membrane.

2.2.5 Drainability

The drainability of a cladding kit is generally assessed by appraisal of design taking into account of the characteristics of materials used and geometry of external cladding and joints.

The cladding kit shall be designed and installed so that water which penetrates in the air space or condensation water shall be drained out of the installed kit without accumulation or moisture damage or leakage into the substrate or the wall cladding kit.

The drainability of water in the kit shall be visually assessed.

2.2.6 Wind load resistance

A control of the mechanical properties of the products used for the tests has to be performed.

If the test results according to 2.2.6.1.1 are better than the mechanical properties to be declared in the ETA, so an appropriate reduction of the test results according to 2.2.6.1.3, proportional to the characteristic value thickness and the characteristic value of bending strength is necessary (e.g. for thickness : ratio of square value).

In cases where for the resistance to wind pressure may be lower than the resistance to wind suction, supplementary tests with a wind pressure load have to be performed. Otherwise the wind pressure is equal to the wind suction resistance.

2.2.6.1 Pull-out and pull-through resistance of fasteners and mechanical resistance of boards.

For mechanically fastened kits the assessment of the pull-through resistance shall be carried out in accordance with Annex 3.

Pull out resistance of self-drilling screws for steel and rivets for aluminium are declared by the manufacturer according to relevant standards.

Axially loaded nails shall be calculated in accordance with EN 1995-1-1 para. 8.3.2. Combined laterally and axially loaded nails shall be calculated in accordance with EN 1995-1-1 para. 8.3.3.

Axially loaded screws shall be calculated in accordance with EN 1995-1-1 para. 8.7.2. Combined laterally and axially loaded screws shall be calculated in accordance with EN 1995-1-1 para. 8.7.3.

For each test series the failure loads should be submitted to a statistical analysis and the characteristic values should be determined according to the ETAG 034, Part 1, Annex D.

Characteristic withdrawal parameter for nails and screws according to EN 14592, table ZA.1 point b: Value $f_{ax,k}$ (in N/mm²) declared, together with characteristic timber density (ρ_k) (in kg/m³), after tested according to EN 1382 or calculated according to EN 1995-1-1 (for screws only)

Minimum tensile load of the aluminium rivets in accordance with EN-ISO 15977 para. 5 'Mechanical properties'.

Minimum tensile load of the stainless steel rivets in accordance with EN-ISO 15979 para. 5 'Mechanical properties'.

2.2.6.2 Pull-off resistance and mechanical resistance of the board for glued kits

Testing is carried out as described in Annex 5. Also considered as part of the durability testing.

For each test series the failure loads should be submitted to a statistical analysis and the characteristic values should be determined according to the ETAG 034, Part 1, Annex D

2.2.6.3 Wind suction and pressure resistance

The wind load resistance shall be assessed in accordance with Annex 3 for mechanically fastened systems and bonded systems.

The test procedure for the wind pressure test is similar to Annex 3, only the wind action is reversed.

The assessment is based on data from the wind suction and wind pressure tests and mechanical tests.

If mechanical tests are used, the calculation of the characteristic wind resistance Q5% from characteristic value of resistance of the components shall be defined in the ETA.

Wind suction:

The load Q for which the test specimen fails, the type of failure and the value of maximum deflection, must be indicated in the ETA.

In addition, the points of measurement shall be indicated on a drawing of the test specimen and the deflections at each measurement point shall be tabulated for each depressure step.

2.2.7 Mechanical resistance

2.2.7.1 Initial tensile and shear properties of bonded kits

The tensile and shear property of the adhesive is tested as described in ETAG 002, art. 5.1.4.1 (-20°C, +23°C and +80°C). The test is carried out on samples of aluminium and strips and also on samples bonded only by the foam tape (+23°C).

Sample dimension in accordance with Annex 4 figure 7 and 8.

For each test series the failure loads should be submitted to a statistical analysis and the characteristic values should be determined according to ETAG 034, Part 1, Annex D.

Deformation due to shear load is declared.

The creep factor γ_c under long term shear according to ETAG 002 clause 5.1.4.6.8 shall be ≥ 10 .

The shear design stress under permanent load Γ_∞ shall be calculated as

$$\Gamma_\infty = \Gamma_{des} / \gamma_c$$

$$\Gamma_{des} = F_{u,5} / \gamma_{tot}$$

γ_{tot} = total safety factor; γ_{tot} = nationally determined parameter (6 can be used)

2.2.7.2 Shear resistance mechanical fixing

For mechanically fastened kits the assessment of the pull-through resistance under shear load shall be carried out in accordance with Annex 4 (principle test in accordance with para. 5.4.2.1.2 in ETAG 034 part 1).

The deformation and failure load due to shear loads are declared as characteristic values.

The mean and characteristic value shall be indicated in the ETA.

2.2.8 Impact resistance

Testing is carried out in accordance with ETAG 034 part 1, clause 5.4.4 with the 1 kg steel ball and an energy level of 10 Nm.

Indication of use category in accordance with ETAG 034 part 1.

2.2.9 Hygrothermal behaviour (incl. Resistance to deterioration caused by physical agents)

2.2.9.1 Resistance to hygro-thermal cycles

The board is exposed to hygro-thermal cycles as described in Annex 6. Alternatively, the test can be carried out in accordance with ETAG 034 part 1, clause 5.4.6.

The kit shall not show any deterioration after the hygro-thermal cycles.

2.2.9.2 Dimensional stability

The dimensional stability to elevated temperature and humidity is determined in accordance with EN 438-2:2005 clause 17.

The dimensional stability shall be declared.

2.2.9.3 Immersion in water without UV

The tensile property of the adhesive is tested as described in ETAG 002, art. 5.1.4.2.1. The test is carried out on samples with all contact surfaces.

For each test series the failure loads should be submitted to a statistical analysis and the characteristic values should be determined according to ETAG 034, Part 1, Annex D.

2.2.9.4 Humidity and NaCl

The tensile property of the adhesive is tested as described in ETAG 002, art. 5.1.4.2.2. The test is only applicable for metal substrates (like aluminium and steel).

For each test series the failure loads should be submitted to a statistical analysis and the characteristic values should be determined according to the ETAG 034, Part 1, Annex D.

2.2.9.5 Humidity and SO₂

The tensile property of the adhesive is tested as described in ETAG 002, art. 5.1.4.2.3. The test is only applicable for metal substrates (like aluminium and steel).

For each test series the failure loads should be submitted to a statistical analysis and the characteristic values should be determined according to the ETAG 034, Part 1, Annex D.

2.2.10 Resistance to Xenon Arc exposure

The coating is exposed to Xenon Arc in accordance with EOTA TR 010 using Climate Class S and a radiant exposure equivalent to 5 years.

The coating shall not show any physical deterioration after the Xenon Arc exposure.

The change in colour of the coating shall be at least class 3 on a grey scale in accordance with EN 20105-A02.

3 ASSESSMENT AND VERIFICATION OF CONSTANCY OF PERFORMANCE

3.1 System(s) of assessment and verification of constancy of performance

For the products covered by this EAD the applicable European legal act is: 2003/640/EC

The system to be applied is: 2+

In addition, with regard to e.g. reaction to fire for products covered by this EAD the applicable European legal act is: 2003/640/EC

The systems to be applied are: 1, 3 and 4

3.2 Tasks of the manufacturer

The cornerstones of the actions to be undertaken by the manufacturer of the product in the procedure of assessment and verification of constancy of performance are laid down in Table 2.

Table 2 Control plan for the manufacturer; cornerstones

No	Subject/type of control (product, raw/constituent material, component - indicating characteristic concerned)	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
Factory production control (FPC)					
The below mentioned controls are carried out by or under responsibility of the manufacturer of the board					
1	Board thickness	EN 325	average and individual: maximum $\pm 0,5$ mm [b]	40 [a]	One board for every 200 boards produced
2	Density	EN 323	average density $\rho \geq$ nominal density; individual maximum tolerance: ± 150 kg/m ³ [b]	40 [a]	One board for every 200 boards produced
3	Bending strength dry parallel and perpendicular to the production direction	EN 310	f_{05} in accordance with EN 1058; declared by the manufacturer after an external audit inspection and external testing of the samples	20 (length) + 20 (width) [a]	One board for every 200 boards produced
4	Bending strength after ageing parallel and perpendicular to the production direction	EN 310 Ageing in accordance with description in 3.4.1	lowest individual strength $\geq 80\%$ of the characteristic strength f_{05}	3 (length) + 2 (width)	One board for every 200 boards produced
5	Water absorption after 4 days	see 3.4.2	≤ 2 weight % after 4 days; if sample fails, the 2 nd sample must be tested.	1 (2 in the case of fail)	One board for every 200 boards produced
6	Organic material content (resin binder)	Glowing at 650° for at least 60 min. <i>Remark: time depends on the type of oven</i>	Average declared by the manufacturer after an external audit inspection and external testing of the samples. Deviation average maximum $\pm 1,5$ weight % [b]	40 [a]	One board for every 200 boards produced
7	Reaction to fire	EN 13501-1	Same classification as reference	1	Every 2 years

No	Subject/type of control (<i>product, raw/constituent material, component - indicating characteristic concerned</i>)	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
The below mentioned controls are carried out by the sub-supplier and the documentation is maintained by the board manufacturer as part of his FPC					
8	Dowel-type fasteners for timber structures	EN 14592, Annex ZA.2 Procedure for attestation of conformity			Every 3 years
9	Rivets and self-drilling screws for metal structures	Conformity by means of manufacturers declaration			Every 3 years
10	Adhesive [c]	Verification method of the structural sealant in accordance with ETAG 002 § 6.2.1 [d]			Every 2 years
		Evaluation of conformity	ETAG 002 para. 8.1 for Type IV		
11	Primers and the foam tape [c]	Manufacturers declaration			Every 2 years
12	EPDM foam gasket	Manufacturers declaration			Every 3 years

[a]: amount of samples from four different boards

[b]: in the specific product ETA the property may be within smaller tolerances

[c]: part of the bonding system

[d]: Test for the thermogravimetric analysis ISO 11358 shall be used

3.3 Tasks of the notified body

The cornerstones of the actions to be undertaken by the notified body in the procedure of verification of constancy of performance for boards are laid down in Table 3.

Table 3 Control plan for the notified body; cornerstones

No	Subject/type of control (<i>product, raw/constituent material, component - indicating characteristic concerned</i>)	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
Initial inspection of the manufacturing plant and of factory production control (<i>for systems 1+, 1 and 2+ only</i>)					
...	See table 2				
Continuous surveillance, assessment and evaluation of factory production control (<i>for systems 1+, 1 and 2+ only</i>)					
...	See table 2				
...					

3.4 Special methods of control and testing used for the verification of constancy of performance

3.4.1 Bending strength after ageing

Ageing of the 5 test pieces in (tap)water from 70°C (with surface tension changing additives : for instance 0,5 ml Triton per litre) for 30 minutes.

Determination of the bending strength in accordance with EN-310 within 20 minutes after the ageing period in a test room with an air temperature between 17 and 23°C.

3.4.2 Water absorption

The water absorption by the edges must be determined on test pieces W1 in the size 50*400 mm.

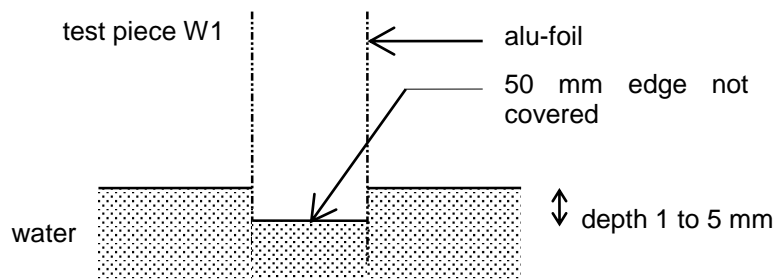
The dimensions and the weight of the test pieces is determined.

The sample is wrapped with aluminium foil with the exception of one 50 mm edge.

The test pieces are vertically placed in a bucket with tap water, with the 50 mm size without aluminium foil horizontally in the water. The edge must be 1 to 5 mm in the water (without additives).

Test conditions:

Water temperature	17 - 23 °C
Room temperature	17 - 23 °C



4 REFERENCE DOCUMENTS

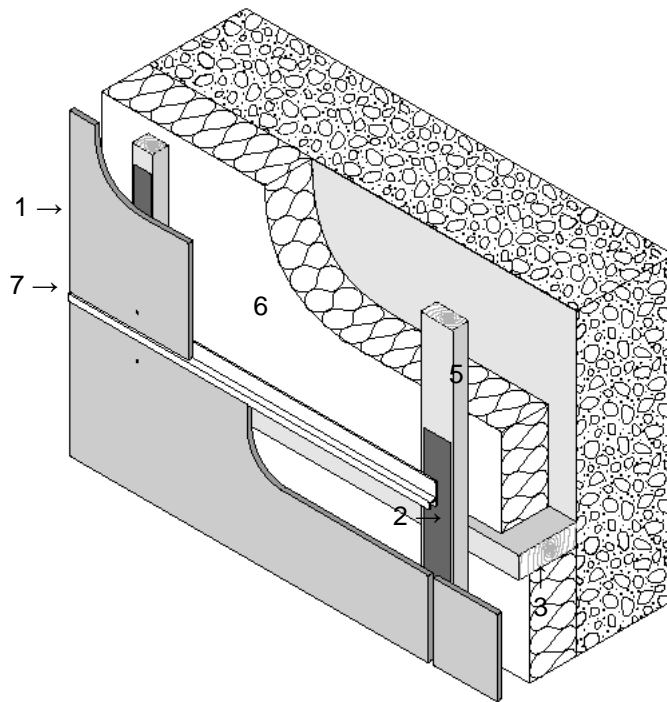
As far as no edition date is given in the list of standards thereafter, the standard in its current version at the time of issuing the European Technical Assessment, is of relevance.

EC decision 96/603/EC	Establishing the list of products belonging to Classes A 'No contribution to fire' provided for in Decision 94/611/EC implementing Article 20 of Council Directive 89/106/EEC on construction products
Decision 2003/640/EC	Kits for external wall claddings Product family : Kits for external wall claddings (2/2)
EN 310: 1993	Wood-based panels — Determination of modulus of elasticity in bending and of bending strength
EN 323: 1993	Wood-based panels – Determination of density
EN 325: 2012	Wood-based panels – Determination of dimensions of test pieces
EN 338:2009	Structural timber - Strength classes
EN 438-2:2005	High-pressure decorative laminates (HPL) – Sheets based on thermosetting resins (usually called Laminates) – Part 2: Determination of properties
EN 755-2:2013	Aluminium and aluminium alloys - Extruded rod/bar, tube and profiles - Part 2: Mechanical properties
EN 1058:2009	Wood-based panels – Determination of characteristic 5-percentile values and characteristic mean values
EN 1382:1999	Timber structures – Test methods – Withdrawal capacity of timber fasteners
EN ISO 1716:2010	Reaction to fire tests for building products – Determination of the gross heat of combustion (calorific value)
EN 1995-1-1 /A1:2008/AC:2006/A2:2014	Eurocode 5: Design of timber structures — Part 1-1: General — Common rules and rules for buildings
EN ISO 11358-1:2014	Plastics - Thermogravimetry (TG) of polymers – Part 1: General principles
EN ISO 12572:2001	Hygrothermal performance of building materials and products – Determination of water vapour transmission properties
EN 13162:2012+A1:2015	Thermal insulation products for buildings – Factory made mineral wool (MW) products - Specification
EN 13501-1:2007+ A1:2009	Fire classification of construction products and building elements – Part 1: Classification using data from reaction to fire tests
EN 13823:2010+A1:2014	Reaction to fire tests for building products – Building products excluding floorings exposed to the thermal attack by a single burning item.
EN 13986:2004	Wood-based panels for use in construction – Characteristics, evaluation of conformity and marking
EN 14592:2008+ A1:2012	Timber structures - Dowel-type fasteners - Requirements
EN-ISO 15977:2002	Open end blind rivets with break pull mandrel and protruding head — A/A/St
EN-ISO 15979:2002	Open end blind rivets with break pull mandrel and protruding head — St/St
EOTA TR010, May 2004	Exposure procedure for artificial weathering
EOTA TR021, June 2005	Reaction to fire requirements for small components
EOTA TR034, March 2012	General ER 3 Checklist for ETAGs/CUAPs/ETAs- Content and or release of dangerous substances in products/kits

ETAG 002, May 2012	GUIDELINE FOR EUROPEAN TECHNICAL APPROVAL FOR STRUCTURAL SEALANT GLAZING KITS (SSGK) Part 1: SUPPORTED AND UNSUPPORTED SYSTEMS
ETAG 034, April 2012	GUIDELINE FOR EUROPEAN TECHNICAL APPROVAL of KITS FOR EXTERNAL WALL CLADDINGS Part 1: VENTILATED CLADDING KITS COMPRISING CLADDING COMPONENTS AND ASSOCIATED FIXINGS

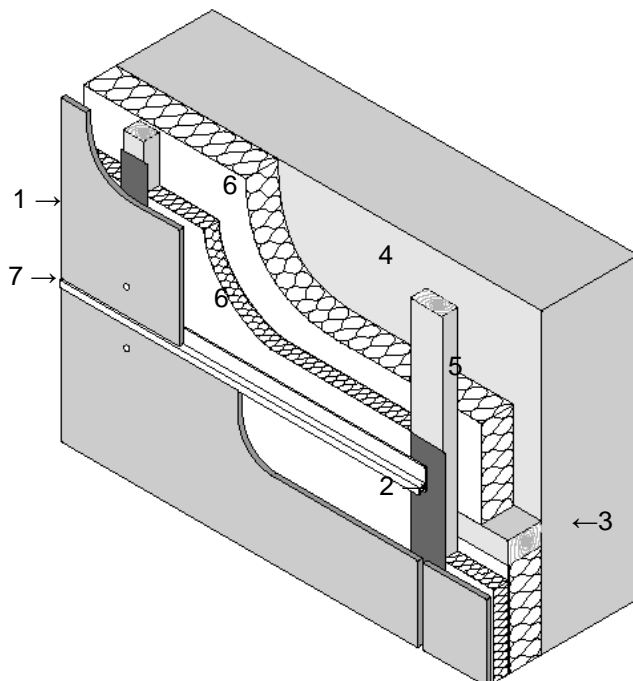
ANNEX 1 - PRE-FABRICATED COMPRESSED MINERAL WOOL BOARDS WITH ORGANIC OR INORGANIC FINISH

Figure 1. Ventilated intended use



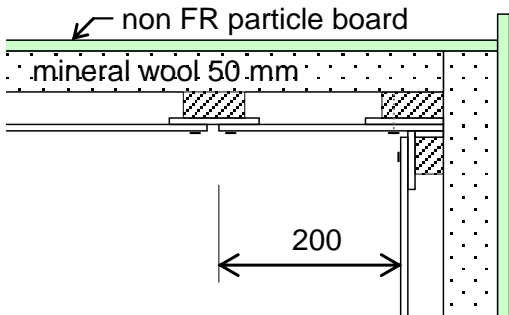
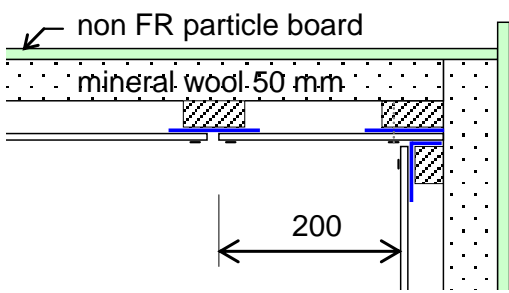
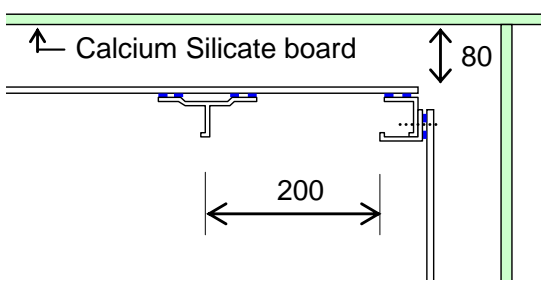
1. Compressed mineral wool board with organic or inorganic finish
2. Gasket
3. Timber beam
4. Vapour barrier
5. Batten
6. Insulation
7. Aluminium chairprofile

Figure 2. Non-ventilated intended use



ANNEX 2 - REACTION TO FIRE TESTING OF THE ENTIRE KIT

Additional information to Annex E of ETAG 034 part 1.

<p>2A</p> 	<p>Example of internal corner of a ventilated construction with Rockpanel strips on non fire-retardant timber</p>
<p>2B</p> 	<p>Example of internal corner of a ventilated construction with gaskets on non fire-retardant timber.</p> <p>In the case of a non ventilated construction the cavity is filled with mineral wool.</p>
<p>2C</p> 	<p>Example of an asymmetrically composed construction with the flame impingement to the rear side</p>

ANNEX 3 -TEST METHOD FOR PULL-THROUGH RESISTANCE

Testing:

The test method is based on the guideline ETAG 034 Part 1 para.5.4.2.1.1.

Three fixing positions must be examined:

- in the middle of a specimen
- at the edge of a specimen
- at the corner of a specimen.

Testing is done both for single tests of small samples and in a wind test rig.

During the test the specimen must be supported by a ring with a diameter of about 30%, 45% and 60% of the span in the 1:1 test. For instance 180, 270 and 350 mm for 600 mm span.

The diameter of the predrilled hole in the specimen shall be as in the 1:1 test. The results of the tests are also valid for smaller hole diameters for the same board composition and same thickness. Edge and corner distances in the specimen shall be identical with the 1:1 test.

Single tests

The testing is carried out for each fixing position for 10 samples with a square size of at least the ring diameter + 50 mm.

Wind test rig

A 1:1 construction is made and tested 3 times for each fixing position.

This means that:

- for the '**middle**' a double-span board is fixed with three fixings per batten or profile (see fig. 5)
- for the '**edge**' a single-span board is fixed with three fixings per batten or profile (see fig. 4)
- for the '**corner**' a single-span board is fixed with two fixings (see fig. 3).

The battens or profiles are fixed to a rigid substrate and the single- or double-span boards are fixed to 2 or 3 battens or profiles, respectively, as described above. Wind suction test in accordance with ETAG 034 Part I, para. 5.4.1.1

The failure may be in the form of pull-through of the fastener or other breakage of the board.

Calculation:

For the small samples the characteristic pull-through resistance is calculated in accordance with ETAG 034 Part I, Annex D. Results shall be decreased in ratio with the declared f_{05} (Table 2) and the actual f_{05} .

The average results found in the 1:1 test shall be decreased in ratio with the declared f_{05} (Table 2) and the actual f_{05} .

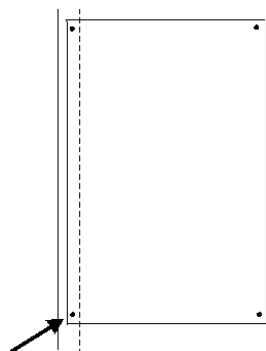


Figure 3

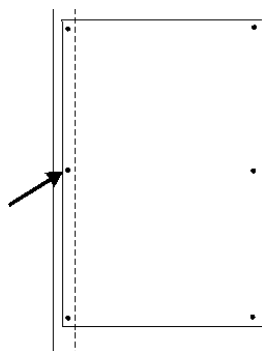


Figure 4

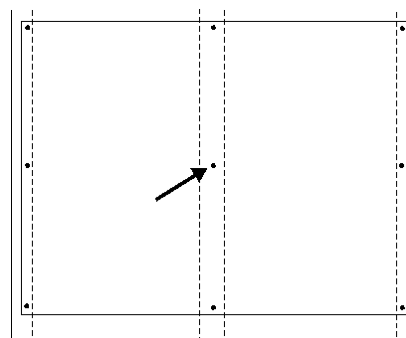


Figure 5

ANNEX 4 - TEST METHOD FOR PULL-THROUGH RESISTANCE UNDER SHEAR LOADS

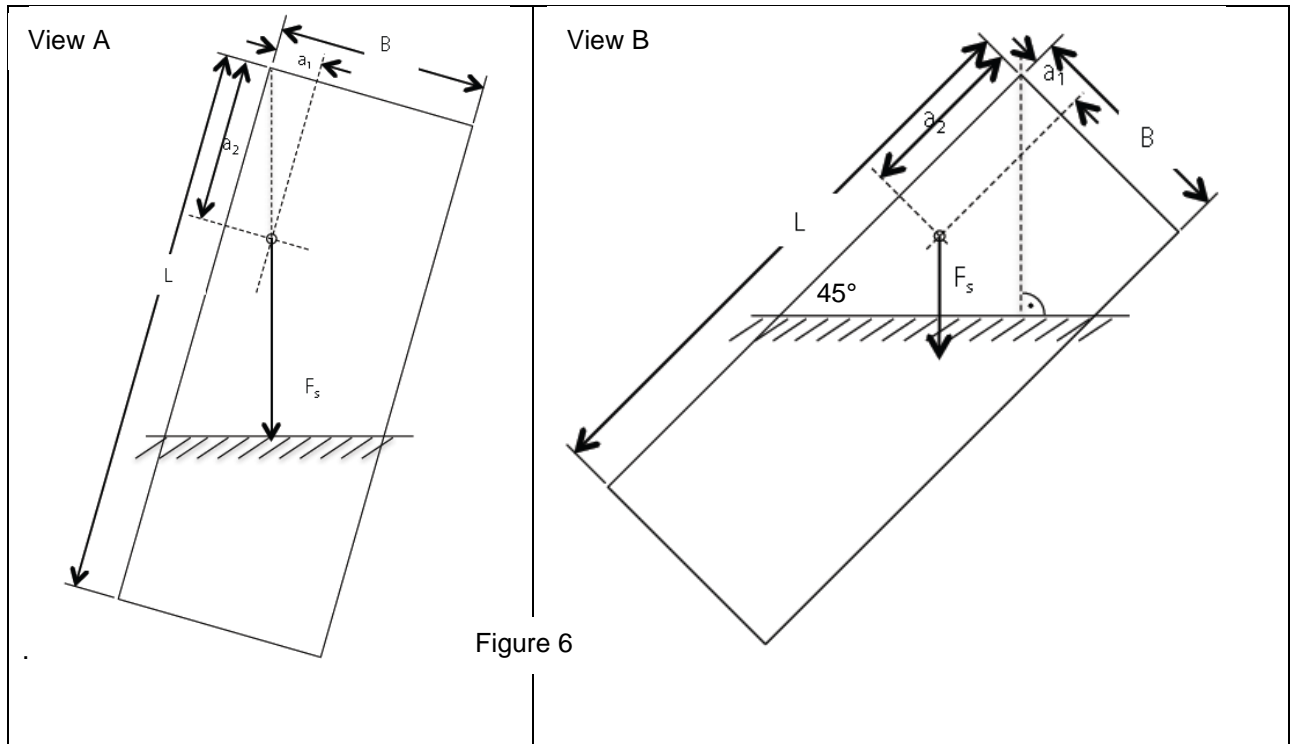


Figure 6

7 Sample strips shall be tested in accordance with view A and 7 in accordance with view B.
 Sub-frame and fixing identical with the 1:1 test Annex 3.
 Sample length $L = a_2 + 150$ mm and $B = a_1 + 50$ mm.
 The a_1 and a_2 size and the hole diameter shall be identical with the corner distances in 1:1 test Annex 3.
 The speed rate is adjusted to 5 mm/min.
 The failure load in N and the deformation at failure is measured.

AND TEST METHOD FOR SHEAR LOAD FOR BONDING SYSTEM

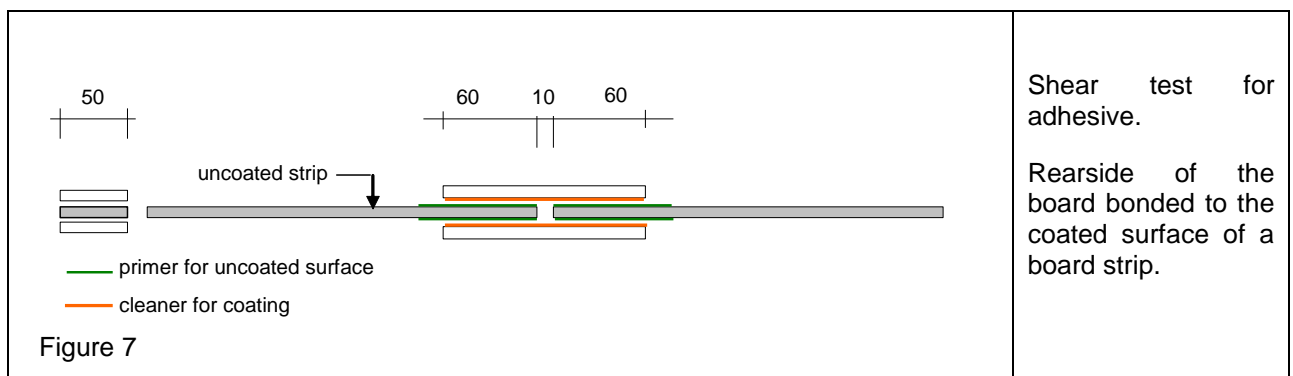
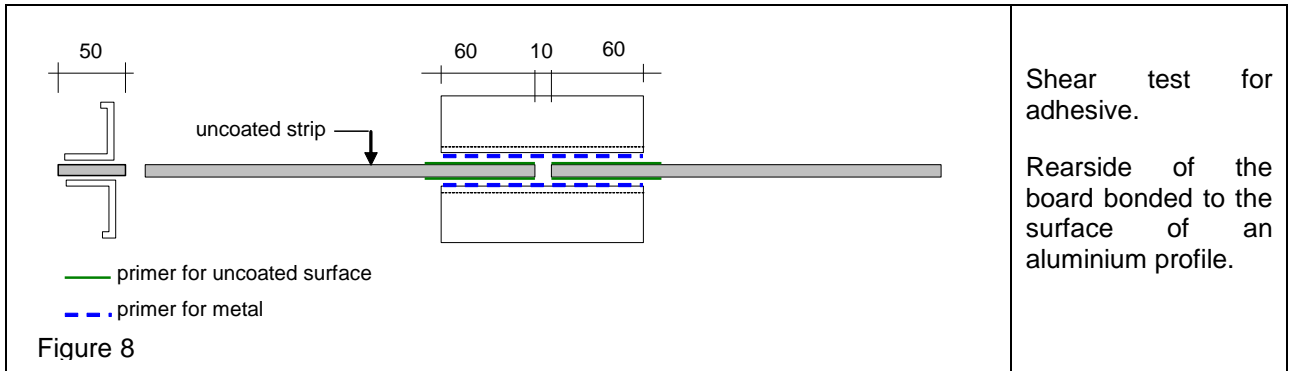


Figure 7



ANNEX 5 - TEST METHOD FOR PULL-OFF RESISTANCE

The pull-off resistance is measured for five test specimens with dimension 100 x 120 mm for the panel and a profile length of 150 mm, cut from the test rig after the hygrothermal cycles (Annex 6). Figure 8 shows the cutted samples with the intended load and supports.

Afterwards, the bond strength is measured at a tensioning speed of 5 mm/min.

The failure load may be in the form of pull-off or delamination of the board.

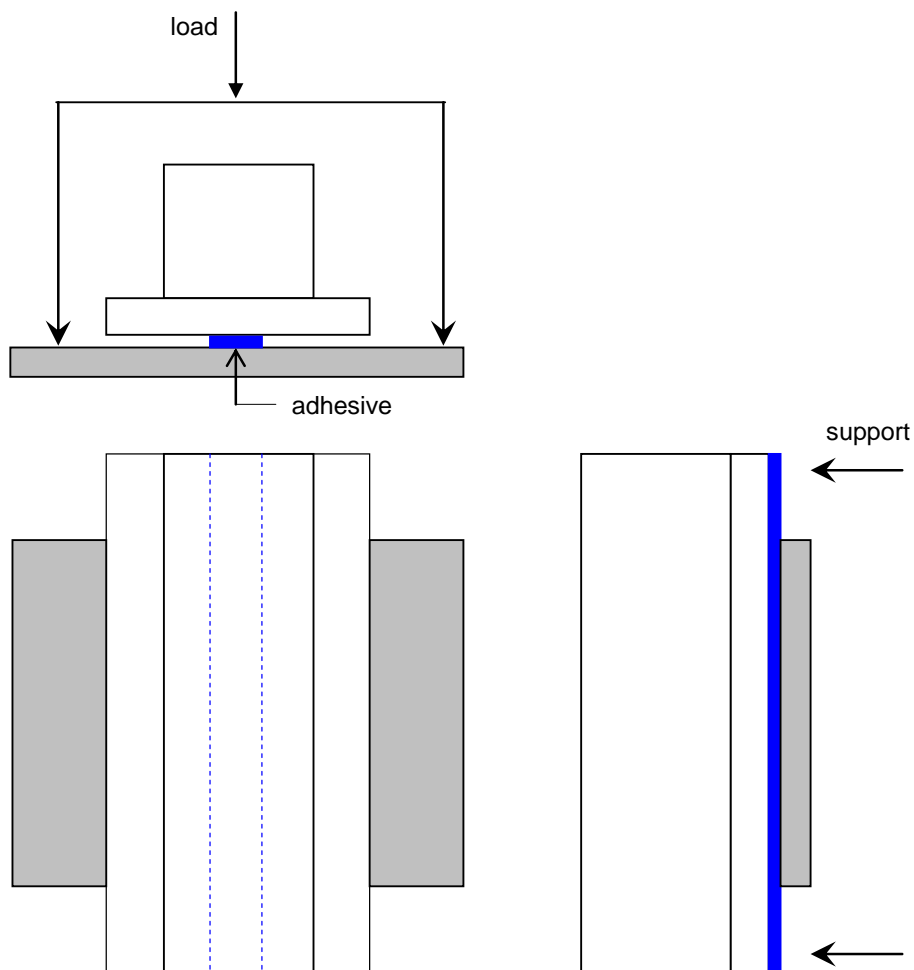


Figure 8

ANNEX 6 - HYGROTHERMAL CYCLES (THE CARROUSEL METHOD)

Test equipment

In a test opening of approx. 1,35 x 1,35 m the cladding kit is installed. The kit consists of the panel in the specific composition, the subframe and fixing method. About 0,15 m from the top of the kit an open horizontal joint of 6 to 10 mm has to be used to allow the sprayed water to moisten the rear of the boards.

At the bottom of the kit the panels must be fixed to the subframe with mechanical fixings without a tolerance between the hole and the shaft of the fixing assuring that the movement between the subframe and the panels is over the length of the panel. The other fixing points should have moving points in accordance with the manufacturer instructions.

The kit is exposed to the following conditions:

a. Heating

A battery of heating lamps are placed at a distance of 0.80 m from the wall plane. The thirteen 250 W matted lamps expose the element surface equally to an amount of radiation that corresponds to the maximum amount of solar radiation on mid European latitude.

b. Frost

The freezing equipment is usually set to maintain an air temperature of -15 °C in front of the wall surface. The relative air humidity at these low temperatures amounts to about 95%.

c. Rain

Water is sprayed on to the surface by means of 4 nozzles, with a capacity of 0,25 l/min. each.

Test sequence

The elements are exposed sequentially to the following cycles:

1. rain for 1,5 hours
2. heating for 5 hours
3. rest for 4 hours
4. heating for 5 hours
5. rain for 4 hours
6. frost for 4,5 hours.

The cycle is repeated 24 times.

During the course of the test cycling the temperature at the back of the elements is maintained at room temperature.

ANNEX 7 - WATER ABSORPTION TEST VIA THE EDGES (WATER REPELLENCY)

The water absorption via a cut edge is established for two sets of three test specimens of dimension 50 x 400 mm, The specimens are conditioned at 20°C / 65 % RH until the weight is stable. Three test specimens are exposed to each of the following two conditions:

- 20°C / 65 % RH; the complete surface of the specimen is covered with alu-foil, with the exception of one 50 mm edge, which is placed in water with a depth of 5 mm for 4 days

- 20°C / 90 % RH; the surface of the specimen is not covered with alu-foil; the 50 mm edge is placed in water with a depth of 5 mm for 4 days.

The water absorption is measured and indicated in mass % after removal of excess water.

ANNEX 8 - CHARACTERIZATION PARAMETERS

The sample of the product which is the subject of the European Technical Assessment has been identified by the following identification parameters.

Dimensions	EN 325
Density	EN 323
Bending strength and E-modulus	EN 310
f_{05} -value of bending strength	EN 1058

Water absorption test via the edges (water repellency), see Annex 7.

Dimensional change	EN 438-2
Reaction to fire	EN 13501-1

In addition, the following information of all components has been given in accordance with ETAG 034, part 1 annex C:

- freeze-thaw sensitivity: result of hygro-thermal test clause 2.2.9
- strength class of wooden sub-frame in accordance with EN 338
 - the generic type of the screw and the pull-out resistance of screws in accordance with the applicable European standard, e.g. EN 14592
 - the generic type of the nail and the pull-out resistance of nails in accordance with the applicable European standard, e.g. EN 14592
- the type of aluminium in accordance with EN 755-2
- the minimum thickness of the aluminium sub-frame: declared
- the pull-out resistance of rivets: manufacturers declaration
 - the composition of the adhesive: declared. Identification in accordance with ETAG 002 clause no 6.2.1
 - the characteristic initial tensile strength and the characteristic initial shear resistance of the adhesive: EAD Annex 4 and 5
 - the characteristic aged tensile strength and the characteristic aged shear resistance: EAD Annex 4 and 5; for all contact surfaces ETAG 002 art. 5.1.4.2.1 (without solar radiation); for metal contact surfaces additional ETAG 002 art. 5.1.4.2.2 and 5.1.4.2.3
- declaration of the initial characteristic tensile strength of the foam tape: EAD Annex 5
 - the characteristic shear resistance of the foam tape after constant shear loading during the time expected for cross-linking of the adhesive: EAD Annex 4
 - the composition of the gasket declared and in accordance with TR021