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ETAG 016

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GUIDELINE FOR EUROPEAN TECHNICAL APPROVAL
of
SELF-SUPPORTING COMPOSITE
LIGHTWEIGHT PANELS

PART 4:

**Specific aspects relating to Self-supporting
Composite Lightweight Panels for use in internal
walls and ceilings**

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Section one : INTRODUCTION

1. PRELIMINARIES

1.1. Legal basis

The legal basis of the ETA Guidelines is given in ETAG 016 Part 1, General - clause 1.1.
No existing ETA-Guideline is superseded.

1.2. Status of ETAG

The status of the ETA-Guidelines is given in ETAG 016 Part 1, General - clause 1.2 .

2. SCOPE

2.1 Scope

This Part 4 shall be used in conjunction with Part 1, General.

This complementary Part (ETA Guideline Part 4) "Specific aspects relating to self-supporting composite lightweight panels for use in internal walls and ceilings" specifies the terminology, definitions, methods and the specific criteria for the assessment of the panels.

This part only covers self-supporting composite lightweight panels intended to be used as components of an internal partition or of a ceiling, or as a lining product.

Panels can have a supporting framework (see figure 1-2) or can be fixed at the edges by punctual fixing devices to the supporting wall (see figure 3).

Fully bonded (glued) uses are not covered by this ETA Guideline (see figure 4).

Panels used as linings for external walls are not covered by this ETA Guideline.

With reference to the ETAG 003 "internal partition kits", this ETA-Guideline is intended to be used to issue ETAs, where the product under assessment is a composite panel alone. However, in some cases the ETA-applicant will refer to other "auxiliary" components required to assemble the product into an assembly, e.g. fixings, supporting frame and joint material, identified by reference to detailed specifications or to minimum performance characteristics, to which these generic products have to conform.

If a manufacturer wishes to put his product on the market with a very specific intended use, then the Approval Body should verify the relevant ETAG for more specific assessments.

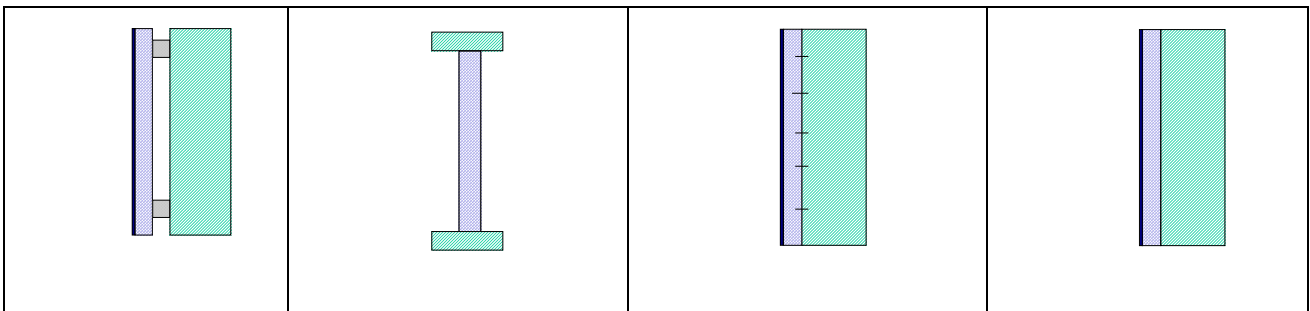


Figure 1

Figure 2

Figure 3

Figure 4

2.2 Use category

2.2.1 ceilings

use categories	Level of accessibility	Explanation
A1*	Not accessible ceilings (not even for installation)	These panels are considered not accessible**.
A2	Ceiling, accessible for installation and maintenance only (always with protective measures)	The accessibility of ceiling panels depends both on the impact resistance of the panel assembly and on the walkability characteristics of the ceiling panels. However, access should always be limited to a single person, taking due care. The frequency should be limited to approximately once a month.
A3	Ceiling, accessible with protective measures	The accessibility of ceiling panels depends both on the impact resistance of the panel assembly and on the walkability characteristics of the ceiling panels. The access on ceiling panels with protective measures however should always be limited to a single person, taking due care.
A4	Ceiling, accessible without protective measures	The accessibility of ceiling panels depends both on the impact resistance of the panel assembly and on the walkability characteristics of the ceiling panels. If no protective measures are foreseen, the ceiling panels should be favourably assessed with reference to walkability. However, access on ceiling panels should always be limited to a single person, taking due care.

* This use category shall be used, both for ceiling panels which were not assessed (NPD) and those that do not meet the criteria for accessible ceiling.

** See also § 7.1.4

2.3. Assumptions

See ETAG 016 Part 1, General.

3. TERMINOLOGY

3.1. Common terminology and abbreviations

For the purpose of this Complementary Part of the ETA Guideline the common terminology and abbreviations as stated in ETAG 016 Part 1 - Annex A, apply.

3.2. Terminology and abbreviations specific to this ETAG

For the purpose of this ETA-Guideline Part 4, the following definitions apply:

Backing boards

Calcium silicate panel used to back the specimen that can be placed directly against a free-standing test specimen or at a distance from it.

Section two :

GUIDANCE FOR THE ASSESSMENT OF THE FITNESS FOR USE

4 REQUIREMENTS

The performance requirements shall be in accordance with ETAG 016 Part 1 - chapter 4.

5. SPECIFIC METHODS OF VERIFICATION

5.0 General

The methods of verification given in ETAG 016 Part 1 - chapter 5 shall be applied, except where identified below.

5.1 Mechanical resistance and stability

5.1 Mechanical resistance

As the panels are non-loadbearing parts of the work, mechanical resistance is considered under ER4.
See §5.4.1.

5.2 Safety in case of fire

5.2.1 Reaction to fire

See Annex C1 for specific details.

5.2.2 Fire resistance

See ETAG 016 Part 1, General.

5.3 Hygiene, health and environment

5.3.1 Water permeability

The water permeability is not relevant.

This aspect may be considered for serviceability purposes.

5.3.2 Vapour permeability

See ETAG 016 Part 1, General.

5.3.3 Release of dangerous substances

See ETAG 016 Part 1, General.

5.3.4 Dimensional variation (related to water penetration)

The dimensional variation is not relevant.

This aspect may be considered for serviceability purposes.

5.4 Safety in use

5.4.1 Mechanical resistance

The test shall be carried out in the most onerous condition (e.g. asymmetrical panels).

5.4.1.1 Test to determine the mechanical strength of a simply supported panel subject to positive¹ load

See ETAG 016 Part 1, General.

¹ Positive is used with the meaning of downwards load

5.4.1.2 Test to determine the mechanical strength of a fixed panel subject to negative load

The test is not relevant, except when the panel is subjected to relevant pressure differences; in this case see ETAG 016 Part 1, General.

5.4.1.3 Thermal effect

The thermal effect is not relevant.

5.4.2 Impact resistance

5.4.2.1 Resistance to impact from soft body

See EOTA TR 01 “ *Determination of Impact Resistance of panels and panel assemblies*”.

5.4.2.2 Resistance to impact from hard body

See EOTA TR 01 “ *Determination of Impact Resistance of panels and panel assemblies*”.

5.4.3 Resistance to fixings

5.4.3.1 Resistance of the panels at fixing devices and joints

The test is relevant, when the panel is subjected to related and relevant pressure differences; in this case see ETAG 016 Part 1, General.

5.4.3.2 Resistance to eccentric loads due to objects fixed to the panel

5.4.3.2.1 Internal walls

The resistance to the point loads acting parallel or perpendicular to the surface of the panel shall be determined in accordance with Annex C2.

5.4.3.2.2 Ceilings

The point loads represent the action from light objects, such as lighting devices hanging from the panel. The test shall be carried out by applying a point load of 100N perpendicular to the surface of the panel. The fixing system and the way in which it is being used shall conform to the manufacturer specification.

5.4.4 Walkability (for ceiling panels only)

See Annex C3 for specific details on the test method.

5.5 Protection against noise

5.5.1 Direct airborne sound insulation

See ETAG 016, Part 1 General.

5.5.2 Sound absorption

See ETAG 016, Part 1 General.

5.6 Energy economy and heat retention

5.6.1 Thermal insulation properties

See ETAG 016 Part 1 General.

5.6.2 Air permeability

The air permeability test is relevant when the panel has specific intended use with related and relevant pressure differences (e.g. cold rooms)); in this case see ETAG 016 Part 1, General.

5.7 Aspects of durability, serviceability and identification of the products

5.7.1 Durability

Where the durability of the specific materials is not covered by harmonised European standards or European Technical Approvals, it shall be precisely verified, when relevant, in accordance with appropriate CEN, EOTA, ISO or accepted international (such as UEAtc, RILEM) test methods as far as they exist.

5.7.1.1 Creep (for ceiling panels only)

See Annex C4 for specific details of the test method.

5.7.1.2 Thermal Agents

5.7.1.2.1 Climatic testing cycles.

The test is not relevant.

5.7.1.2.2 Thermal shock

The test is not relevant.

5.7.1.2.3 Hygrothermal test.

See annex C5 for specific details of the test methods.

5.7.1.3 Biological agents

The conditions for attack by biological agents of wood-based panels, in general shall be defined according to EN 335-1.

5.7.1.4 Finishes

The durability of coil coated metal finishes, as far as relevant, shall be established in accordance with the following test methods:

- Resistance to humidity in accordance with EN 13523-10
- Resistance to immersion in accordance with EN 13523-9
- Resistance to ageing in accordance with EN 13523-13

Other similar tests shall be used for other finishes.

5.7.2 Serviceability

5.7.2.1 Resistance to impact from hard body

See EOTA TR 01 “ *Determination of Impact Resistance of panels and panel assemblies*”.

5.7.2.2 Resistance to impact from soft body

See EOTA TR 01 “ *Determination of Impact Resistance of panels and panel assemblies*”.

5.7.2.3 Finishes

The serviceability of coil coated metal finishes, as far as relevant, shall be established in accordance with the following test methods:

- Coating hardness in accordance with EN 13523-4
- Resistance to cracking on bending in accordance with EN 13523-7
- Impact resistance in accordance with EN 13523-5
- Adhesion in accordance with EN 13523-6
- Resistance to staining in accordance with EN 13523-18
- Resistance to chalking in accordance with EN 13523-14
- Pencil hardness with EN 13523-4.

Other similar test shall be used for other finishes.

5.7.3 Aspects of identification of materials and products

See ETAG 016 Part 1, General.

6. ASSESSING AND JUDGING THE FITNESS OF PRODUCTS FOR INTENDED USE.

6.0 General

The requirements given in ETAG 016 Part 1 - chapter 6 shall be applied, except where identified below, or where the test has been identified as being not required in chapter 5 of this Complementary Part.

6.1 Mechanical resistance and stability

As the panels are non-loadbearing parts of the works, mechanical resistance is considered under ER4.

6.2 Safety in case of fire

6.2.1 Reaction to fire

See ETAG 016 Part 1, General.

6.2.2 Fire resistance

See ETAG 016 Part 1, General.

6.3 Hygiene, health and the environment

6.3.1 Water permeability

The assessment is not relevant.
 The results of the tests may be declared for serviceability purposes.

6.3.2 Vapour permeability
 See ETAG 016 Part 1, General.

6.3.3 Release of dangerous substances:
 See ETAG 016 Part 1, General.

6.3.4 Dimensional variations
 The assessment is not relevant.
 The results of the tests may be declared for serviceability purposes.

6.4 Safety in use

6.4.1 Mechanical resistance

6.4.1.1 Test to determine the mechanical strength of a simply supported panel subject to positive load
 See ETAG 016 Part 1, General.

6.4.1.2 Test to determine the mechanical strength of a fixed panel subject to negative load
 The assessment is not relevant , except when the panel is subjected to relevant pressure differences; in this case see ETAG 016 Part 1, General.

6.4.1.3 Thermal effect
 The assessment is not relevant.

6.4.2 Impact resistance

The Approval Body shall take into account the following criteria relating to the level accessibility of the ceiling.

Use categories	Level of accessibility ¹	Impact resistance		Walkability
		Hard body impact	Soft body impact	
A1	Not accessible ceilings (not even for installation)	None	NPD or Fail	NPD or fail
A2	Ceilings, accessible for installation and maintenance only (always with protective measures)	ER4: - Serv.: 1 x 5N m	ER4:1x1200N.m Serv.:1x700N.m	NPD or fail (visible damage)
A3	Ceilings, accessible with protective measures	ER4: - Serv: 1 x 10N m	ER4:1x1200N.m Serv.:5x700N.m	NPD or fail (visible damage)
A4	Ceilings, accessible without protective measures	ER4: - Serv.:1 x 10N m	ER4:1x1200N.m Serv.:5x700N.m	Pass

Table1: Criteria relating to the level accessibility of the ceiling

Note 1: For the definition of "accessibility" see §2.2

6.4.2.1 Resistance to impact from soft body

The Approval Body shall take into account the criteria for the evaluation as described in EOTA TR 01 “*Determination of Impact Resistance of panels and panel assemblies*”.

When the panels are intended to be fixed to a continuous support, the criteria “no penetration” and “no projection” shall not be considered.

The results of the tests shall be declared in the ETA. The NPD Option is allowed.

6.4.2.2 Resistance to impact from hard body

The Approval Body shall take into account the criteria for the evaluation as described in EOTA TR 01 “*Determination of Impact Resistance of panels and panel assemblies*”.

When the panels are intended to be fixed to continuous support the criteria “no penetration” and “no projection” shall not be considered.

The results of the tests shall be declared in the ETA. The NPD Option is allowed.

6.4.3 Resistance to fixings

6.4.3.1 Resistance of the panels at fixing devices and joints

The assessment is relevant, when the panel is subjected to relevant pressure differences; in this case see ETAG 016 Part 1, General.

6.4.3.2 Resistance to eccentric loads due to objects fixed to the panel

The Approval body shall check the influence of the fixing system on the other performance characteristics (e.g. fire resistance, etc.). The solution shall be indicated in the ETA.

6.4.4 Walkability (for ceiling panels only)

Table 1 defines the classification criteria relating to the level accessibility of the ceiling.

The approval Body shall take into account the possible outcomes of the walkability test (see Table 2).

Outcomes from the test	Classification
The panel carries the applied load without permanent visible damage	Pass
The panel supports the load but with permanent visible damage	Fail, with permanent visible damage
The panel fails to support the load	Fail

Table 2: Classification based on the walkability test results

The result of the test shall be declared.

6.5 Protection against noise

6.5.1 Direct airborne sound insulation

See ETAG 016 Part 1, General.

6.5.2 Sound absorption

See ETAG 016 Part 1, General.

6.6 Energy economy and heat retention

6.6.1 Thermal insulation

See ETAG 016 Part 1, General.

6.6.2 Air permeability

The assessment is relevant, when the panel has a specific intended use with related and relevant pressure differences (e.g. cold rooms)); in this case see ETAG 016 Part 1, General.

6.7 Aspects of durability, serviceability and identification of the products

6.7.1 Aspects of durability

6.7.1.1 Creep (for ceiling panels only)

See ETAG 016 Part 1, General.

6.7.1.2 Thermal Agents

6.7.1.2.1 Climatic testing cycle

The assessment is not relevant.

6.7.1.2.2 Thermal shock

The assessment is not relevant.

6.7.1.2.3 Hygrothermal test

Under the conditions specified in annex C5, the deflection shall not exceed 1/500 of the height of the sample. The classification criteria with reference to the working life shall be as follows (see Table 3).

	Working life
Hygrothermal test Pass	25
Hygrothermal test Fail	10

Table 3: Working life classification

If a panel with a declared working life of 25 years does not pass the hygrothermal test, the working life indicated in the ETA shall be 10 years.

If a panel has a declared working life of 10 years, the assessment through an hygrothermal test is not relevant but the ETA applicant shall indicate an appropriate maintenance plan and/or present significant and

well documented experience to confirm working life, to be laid down in the evaluation report accompanying the draft ETA.

6.7.1.3 Biological agents

According to EN 335-1, the conditions for attack by biological agents of wood-based panels, in general may be regarded as in hazard class 1. This means that no treatment of such components is necessary. Certain wood or wood-based components, e.g. when fitted in independent linings for exterior walls, may be exposed to conditions as in hazard class 2 and, therefore, should be treated accordingly.

6.7.1.4 Finishes

The results of the tests, as far as relevant, shall be declared.

6.7.2 Aspects of serviceability

6.7.2.1 Resistance to impact from hard body

The test results, according to EOTA TR 01 "*Determination of Impact Resistance of panels and panel assemblies*", shall be declared in the ETA.

6.7.2.2 Resistance to impact from soft body

The test results, according to EOTA TR 01 "*Determination of Impact Resistance of panels and panel assemblies*", shall be declared in the ETA.

6.7.2.3 Finishes

The results of the tests, as far as relevant, shall be declared.

6.7.3 Aspects of identification of materials and products

See ETAG 016 Part 1, General.

Auxiliary components, required to assemble the product into an assembly, e.g. fixings, supporting frame and joint material, shall be identified by reference to detailed specifications or to minimum performance characteristics, to which these products have to conform.

7. ASSUMPTIONS AND RECOMMENDATIONS UNDER WHICH THE FITNESS FOR USE OF THE PRODUCTS IS ASSESSED

This chapter sets out the assumptions and recommendations for design, installation and execution, packaging, transport and storage, use, maintenance and repair under which the assessment of the fitness for use according to the ETAG can be made (only when necessary and where they have a bearing on the assessment or on the products).

7.1 Design of works

7.1.1 General assumptions

The design of a self-supporting lightweight composite panel, in many important respects, will be specific to the works in which it is to be used.

7.1.2 Assumptions regarding the substrate, support or supporting frame

The assessment of the self-supporting lightweight composite panels shall be carried out under the presumption that the substrate, support or the supporting frame will not jeopardise any of the ERs in an assembled system.

7.1.3 Assumptions regarding auxiliary products

7.1.3.1 General

Auxiliary products need to fulfil specifications for the panel, used in an assembly, to meet the performance characteristics as specified in the ETA-Guideline.

7.1.3.2 Verification methods for fixings

See ETAG 016 Part 1, General.

7.1.3.3 Verification methods for jointing materials (sealants and gaskets)

See ETAG 016 Part 1, General.

7.1.4 Ceiling access

In case of a not accessible ceiling, it will be necessary to provide an external structure with appropriate walkways, completely independent from the ceiling, to allow a safe installation of the panels.

Even when the impact resistance and walkability requirements in this ETA-Guideline have been met, most self-supporting composite ceiling panels will deteriorate when subjected to repeated foot traffic.

When regular traffic is to be expected, it is advisable to provide walkways, either secured to the upper face of the ceiling panel or even completely independent from the ceiling.

7.2 Packaging, transport and storage

See ETAG 016 Part 1, General.

7.3 Execution of works

See ETAG 016 Part 1, General.

7.4 Maintenance and repair

See ETAG 016 Part 1, General.

Section three :

ATTESTATION AND EVALUATION OF CONFORMITY (AC)

8. ATTESTATION AND EVALUATION OF CONFORMITY

8.1 EC decision

The decision is given in ETAG 016 Part 1, General.

8.2 Responsibilities

See ETAG 016 Part 1, General.

8.3 Documentation

See ETAG 016 Part 1, General.

8.4 CE-marking and information

This Complementary Part of the ETA Guideline gives no additional or different information and/or requirements for CE marking as detailed in ETAG 016 Part 1, General.

Section four: THE ETA CONTENT

9.

9.1 Exceptions

There are no exceptions to the conditions mentioned in Part 1, General.

Annex A COMMON TERMINOLOGY

See ETAG 016 Part 1, General.

Annex B LIST OF REFERENCE DOCUMENTS (STANDARDS)

Reference documents used for the ETAG:

EN 335: Durability of wood and derived materials – Definition of hazard classes of biological attacks
Part 1: 1992 General

EOTA TR 01: 2003 Determination of impact resistance of panels and panel assemblies

ISO DIS 8413: 1990 Performance standards in buildings – Partitions made from components test for ability to withstand suspended static loads

Annex C Test methods

C1 Additional information for tests to determine the fire performance

1.1 Test arrangement for reaction to fire test [Single Burning Item]

All panels shall be tested vertically in the test rig with a vertical panel-to-panel joint on the long wing.

The dimensions of the specimens shall be:

Short wing:	Panel size:	(495 ± 5)mm	x 1.5m ± 5mm (height)
Long wing:	Panel sizes	a) (200 +t ±5)mm	x 1.5m ± 5mm (height)
		b) (800-t ± 5)mm	x 1.5m ± 5mm (height)

Where t = thickness of panel

Maximum thickness that can be accommodated in the rig is 145 mm. This is measured at the thickest point of the panel and allows for a gap and backing board behind the panel.

1.1.2 Preparation and mounting of test specimens

The assembly and corner detail shall be as close as possible to the end use conditions as specified by the manufacturer. In case of different possible configurations, the Approval Body shall carry out the test on the most onerous one. The ETA applicant has the possibility to test additional assemblies if he claims better performance.

Ceiling panels shall be tested in vertical position.

In case of corner flashing (e.g. steel, aluminium, plastic, etc.) one possible configuration is shown in Figure 5 with the guidance notes.

The type of materials, dimensions, fixing centres, coatings etc shall be recorded in the test report.

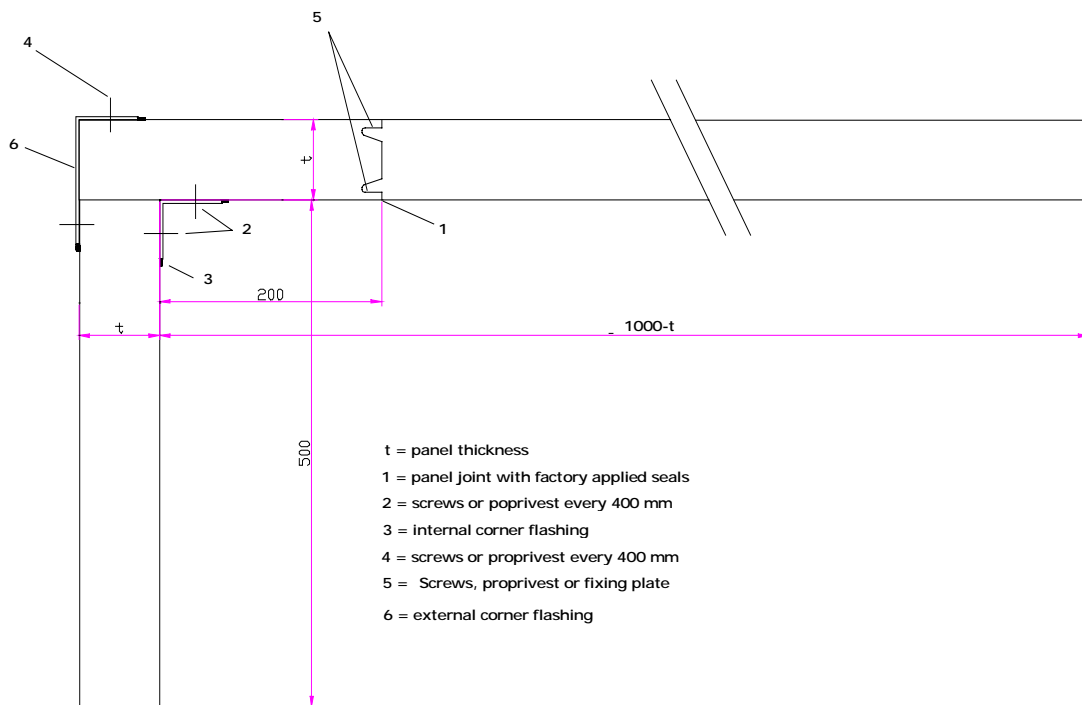


Figure 5: Assembly and corner detail

The following principles shall apply when securing the panel joint on the long wing:

panels in end use fixed to a structural framework shall be mounted in one of the following way:

- by using rivets or screws to hold the panel joint in place. This represents the tight joint achieved in end use. Fixings shall be placed 40mm from the top and bottom of the specimen.

- Both internal and external facings shall be secured. The internal face shall be fixed first (see Figure 6).

For panels where the joint design does not allow a screw type of fixing to be used, a thin plate of 100mmx20mmx2mm (max) may be used (see Figure 3).

Panels that are normally held together with an internal locking system, (e.g. some cold store panels), shall be fixed together using the locking method.

Note: If the locking system does not hold the joint together over the whole length of the specimen, an additional fixing as in Figure 6 and Figure 7 above may be used at either the top or bottom of the specimen.

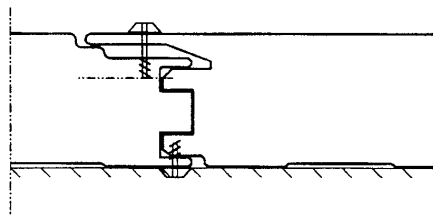
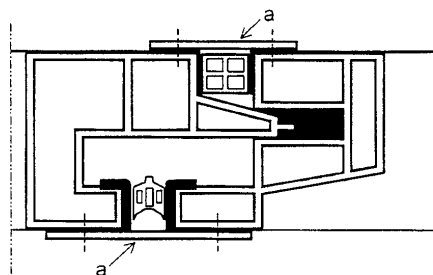


Figure 6: Example joint fixing using screws



key: a= thin plate fixing

Figure 7: Example joint fixing using thin plates

1.1.3 Assembly

The two panels forming the long wing shall be assembled with the joint secured as follows:

- The cut edge of the short wing panel shall be placed against the long wing assembly to form an internal corner so that the vertical joint on the long wing is 200mm from the internal corner. The two wings shall then be secured at 90° to each other using internal and external corner flashings, if relevant, and screws or 'pop' type rivets at 400mm spacing (see Figure 5).
- The corner flashings shall have the following dimensions:
 - Internal flashing: 50 x 50mm x 0.5mm or 0.6 mm thickness
 - External flashing: 50 x [t+50]mm x 0.5mm or 0.6 mm thickness
- The internal corner flashing shall have the same coating as the panel specimen.
- The cut panel edges at the top and sides of the specimen shall not be covered by flashings, foil or other materials.

Backing boards shall be placed in accordance with EN13823 with a minimum 40mm distance between board and the panel sample using a spacer bar at top and bottom. The frame between backing board and specimen shall be open at the sides to allow ventilation into the gap.

1.1.4 Direct field of application with respect to the Single Burning Item (EN13823)

The field of application in the following clauses covers composite panels of the same family, i.e. which have the same:

- thickness and profile of facings
- type and thickness of coating (when colours are considered to have different properties, the test shall be carried out on the most onerous colour)

- of panel to panel joint design (shape and configuration)
- core material.

1.1.4.1 Thickness

Where panels of the same family are produced with different thicknesses, the maximum and minimum thickness at least shall be tested.

When the testing on the maximum thickness is not possible, the Approval Body shall work in consultation with a notified fire laboratory, for the definition of the test assembly.

The ETA shall contain at least both classifications, with related thickness

1.1.4.2 Density

Where panels of the same family are produced with different core densities the maximum and minimum densities shall be tested.

The ETA shall contain at least both classifications, with related core density.

1.1.4.3 Sealant

Where sealants are incorporated during the manufacture of the sandwich panel they shall be tested as part of the product under EN 13823.

Tests on an assembly incorporating additional sealant (e.g. cold store vapour sealant) are representative for that assembly only and the classification shall be accompanied by the test report reference giving the restricted application for that classification.

1.2 Test arrangement for reaction to fire test EN ISO 11925-2 [Ignitability Test]

The flame shall be applied both to the end (cut edge) representing all applications, and to the surface of the specimen representing the majority of end use applications where the cut edge is protected with site applied flashings.

C2 Resistance to fixings (suspended loads)

2.1 Principle of the test

The test consists in submitting the panel to eccentric or non-eccentric loads fixed to the interior face of a test specimen, recording the deformations measured and any damage observed

2.2 References

ISO 7892:1988 Vertical Building Components - Impact Resistance - Impact Bodies and general Test Procedures

ISO DIS 8413: 1990 Performance standards in buildings – Partitions made from components test for ability to withstand suspended static loads.

2.3 Test apparatus

The test apparatus shall comprise the following:

- Rigid frame conforming to ISO 7892 suitably equipped to enable the attachment of the proposed fixings and adaptable to the characteristic dimensions of the specimen. This frame shall be able to reproduce the permitted deviations in the dimensions of actual structures, both horizontally and vertically.
- Devices for measuring the frontal displacements of the specimen to the nearest 0,1 mm (reversible frontal displacements in the direction of impact and in the opposite direction and any permanent deformation) and means for allowing the positioning of these devices and for ensuring their stability during the test.

2.4 Test specimen

2.4.1 Preparation and composition of the specimen for testing

Specimen shall comprise the number of components necessary to represent the joints in current use and all the devices in current use for fixing the element onto the structure and onto adjacent components.

As an example, since there are numerous possible combinations, and if a panel is a component or an assembly of components constituting one complete functional part of the facade (e.g. a basement, a window and an overpanel) the specimen might comprise the following:

- one panel, if it is intended to be inserted on all four sides (Figure 8)
- three panels, if they are intended to be inserted between floors (Figure 9)

All transparent or opaque filling components shall comply with the supplier's specifications regarding type, their composition and how they are to be fixed.

2.4.2 Fixing of the specimen

The specimen shall be fixed onto the frame so as to reproduce operating conditions, particularly with respect to the nature, type and position of the fixings and the distance between them. The devices which ensure that the specimen is fixed shall be adjusted so that it is in a vertical plane and its constituent elements are assembled in the appropriate planes.

The devices ensuring the facade is properly fixed shall be assembled so as to make maximum use of their adjustment capacity, i.e. the deviations on the load-bearing frame shall be the maximum permitted ones. If the panels includes expansion joints or devices to compensate for deviations of the fixings, these joints and devices shall be included in the specimen.

Note. where re permitted deviations are fixed in standards, the adjustment capacity of the fixings shall correspond to the -values fixed; where there are no relevant standards available, these values must be fixed in the test instruction.

2.5 Test Procedure

2.5.1 Horizontal loads

The Loading point shall be Selected according to the manufacturer specifications

A load of 250N acting at right angles to the plane of the assembly shall be applied and maintained over a period of 24h. Any reversible deformations and those still in evidence after 24h and any deterioration shall be recorded.

The load shall then be increased gradually by stages of 50 N at intervals of one minute until failure.

The manufacturer has the possibility to test assemblies with higher loads, if he claims better performance.

2.5.2 Vertical loads

The Loading point shall be Selected according to the manufacturer specifications.

A load of 100 N acting parallel to the plane of the assembly shall be applied and maintained over a period of 24 h. Any reversible deformations and those still in evidence after 24h and any deterioration shall be recorded.

The load shall then be increased gradually by stages of 50 N at intervals of 5 minutes until failure.

The manufacturer has the possibility to test assemblies with higher loads, if he claims better performance.

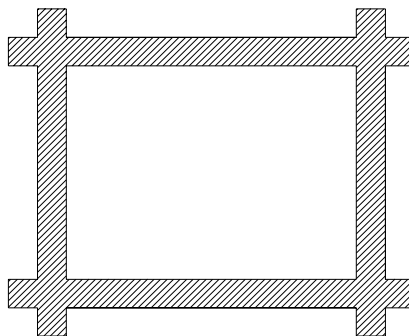


Figure 8: Panel inserted on four sides

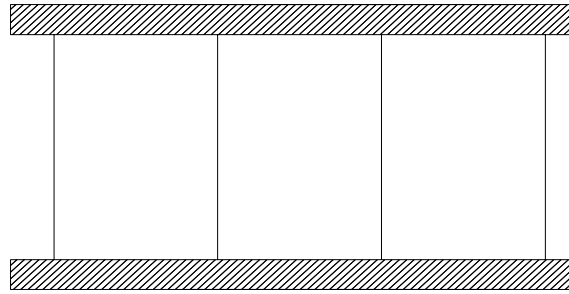


Figure 9: Panel inserted between floors

2.6 Test report

The test report shall include the following information:

- reference to this EOTA ETA-Guideline, Annex C2
- the name of the testing laboratory
- the name of the ETA-applicant (and manufacturer of the composite panel)
- date of the test
- description of the test instruments
- identification of the product tested (designation, dimensions and any relevant identification characteristic)
- surface structure (e.g. smooth, profiled, structured, ...)
- description of the sample tested, and reference to its marking
- description of conditioning and preparation of the sample (if any)
- description of test conditions (temperature and RH)
- results of the test, including the deformations and the failure load.

C3 Walkability

3.1 Principle

This test provides information regarding the safety in use of ceiling panels with respect to a single person walking.

3.2 Test specimen

The tests shall be carried out on simply supported single span panels of full width. The span shall be the largest envisaged in practice.

3.3 Test procedure

The load shall be applied through a timber block measuring 100 x 100 mm. In order to avoid local stresses, a 10 mm thick layer of rubber or felt shall be placed between the timber block and the top skin of the panel. A load of 1.2 kN shall be applied at mid-span on the edge rib or on the edge of a flat panel.

3.4 Test report

- Reference to this EOTA Guideline – Annex C3
- The name of the testing laboratory
- The name of the ETA applicant (and manufacturer of the panel)
- Date of the test
- Description of test instruments
- Product identification
- Description of conditioning and preparation (if any)
- Description of test conditions (temperature and RH)
- Result of the test, including any damage (if any)

C4 Creep

A single test shall be usually sufficient to determine the creep coefficient for a particular core material.

The Approval Body shall carry out the test on a complete panel on a single span on the most onerous composition, which is in most cases the longest span and the maximum thickness.

The load to be applied is 30 % of the failure load.

The test shall be carried out under a constant load which shall be sustained undisturbed for a minimum of 2000 hours. During this time, the deflection shall be regularly monitored to give a continuous relationship between deflection and time.

The test shall be carried out by subjecting a simply-supported panel to uniformly distributed dead load. During the placing of the load, the panel shall be propped from below in such a way that the propping can be removed quickly and smoothly in order to initiate the test. Deflection measurements should commence the instant that the full load is applied.

The creep coefficient for the core of a panel shall be determined using the expression:

$$\phi_t = \frac{w_t - w_0}{w_0 - w_b}$$

where w_t = the deflection measured at time t,
 w_0 = the initial deflection at the time t = 0 and
 w_b = the deflection caused by the elastic extension of the faces.

C5 Hygrothermal test

5.1 Principle

The difference in atmospheric conditions in the test described hereafter represents those likely to occur due to different uses of panels and the effect of adjacent spaces with different conditions separated by the panel. The product specification shall be examined and the materials used assessed for hygrothermal performance primarily in respect of movement.

5.2 Test apparatus

The test shall be performed using the following equipment:

- A climatic chamber (see figure 10)
- 2 deflection transmitters (one per each side of the panel)

5.3 Test specimen

The panel shall have the following dimension:

- height 50 cm (minimum) and the W/H ratio is to be respected
- minimum thickness
- minimum thickness of facing(s)

The support width shall be about 50 mm. The support conditions shall be such as to apply no restraint to the rotation of the sample about the line of support.

5.4 Test method

The sample shall be exposed for 7 days to the following conditions:

- one side at an atmosphere of 20-25 °C and 50±5 % RH
- the other side at an atmosphere of 0-5 °C and 90±5 % RH

The deflection of the sample is measured (at least once per day)

5.5 Test report

The test report shall include the following information:

- Reference to this EOTA Guideline, Annex C5
- The name of the testing laboratory
- The name of the ETA applicant (and manufacturer of the panel)
- Date of the test
- Description of test instruments
- Product identification
- Identification of the sample tested

- Markings related to sampling, if any
- Description of conditioning and preparation (if any)
- Result of the test, including:
 - the deflection of the sample and the ratio between the maximum value and the span of the sample

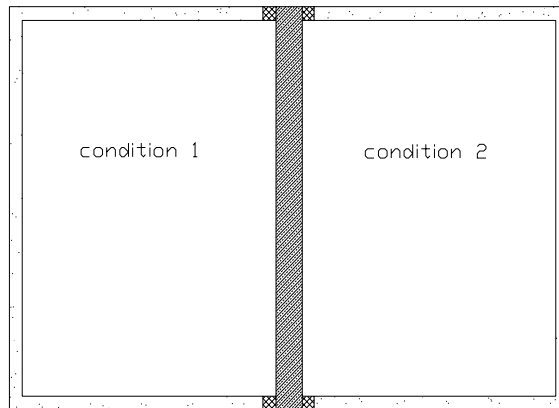


Figure 10: schematic drawing of the test arrangement