TECHNICAL DOCUMENT

Built-up cladding products, veture, cladding products and soffit products

Technical document 15-03

Normative management and test method

The English version is provided for information. In case of doubt or dispute, the French version only is valid

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CHANGE HISTORY

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00	28/02/2018	Creation
01	04/08/2023	Addition of the historical table of modifications and editorial revision

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Part 1
Built-up cladding products and cladding products

1.1. Flexural strength of rigid composite panels

Test procedures

Field of application

This procedure describes the method for determining the force per unit of width causing a deformation of the panel of 1/200 of the span (or force causing breakage if this takes place before obtaining the deformation of 1/200 of the span).

Principle

Determine the average value of the bending force of a series of five test specimens cut out of a panel and subjected to a load at two points.

Apparatus

A) Test machine

The tests are carried out using a test machine, suitable to the force and movement range, enabling an increasing load to be exerted so that the limit deflection or breakage is obtained after 60 s ± 30 s.

B) Calliper gauge

Calliper gauge with the maximal tolerated error of 0.1 mm (for measuring the thickness and width of the samples).

C) Test device

The bending device is the so-called "4 bearing surfaces" device with a major span between bearing surfaces of 240 mm (see *diagram below*).

The vertical stress is applied with the aid of two load heads on each test specimen positioned on the device.

Positioning of a strain gauge at half-span with a maximum tolerated error of 0.1 mm.

Samples

The tests are carried out on five test specimens cut to format 300 mm x b mm in the panel. The standard width b is 100 mm+/-10 mm, it can be adapted according to the composition of the panel (recesses, etc.).

Operating procedure

- Set the load application speed;
- Place the test specimen on the bending device;
- Apply the load at constant speed throughout the entire test;
- For each test specimen, record the maximum load;
- Record the deformation of each test specimen during the test;
- Continue the test until a critical threshold specified by the manufacturer is reached, recording the stresses and deformations.

Expressing the results

F (in Newtons) is the load corresponding to a deformation of 1/200 of the span or corresponding to the breaking load.

p, b, e and d are expressed in mm.

p: span between bearing surfaces.

b: width of the test specimen.

e: thickness of the test specimen (for information).

d: deformation during test (recorded continuously).

- For each test specimen i, calculate the force per unit of width equal to Vri=Fi / bi;
- For reference value Vr, take the arithmetic mean of the reference values Vri of five test specimens;
- The minimum interval of confidence of the mean is calculated under the conditions of ISO 2602

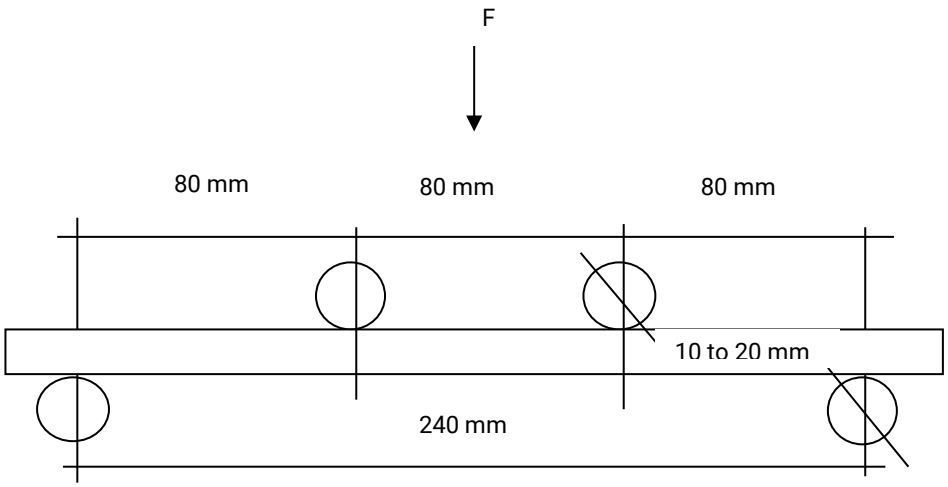
Special instructions

Depending on the product tested, the application blocks can be positioned to avoid puncturing the test specimen perpendicular to the loads.

The tests are carried out once the product's components have reached their chemical and mechanical maturities.

Depending upon the heterogeneous character of the product, the test may be carried out in two directions and/or Back/Front (series of 5 tests for each configuration)

Test device diagram



1.2. Pull-off strength of clay slips on polyurethane

Test procedures

Field of application

This procedure describes the method to determine the pull-off force and/or strength of clay slips constituting the facing of a cladding product.

Principle

Determine the average value of the pull-off force and/or strength of a series of five test specimens taken from a cladding product and subjected to a force perpendicular to the faces of the clay slips.

Apparatus

A) Test machine

The tests are carried out using a test machine appropriate to the force range enabling an increasing load to be exerted at a constant speed of 10 mm/min.

B) Calliper gauge

Calliper gauge with the maximum tolerated error of 0.1 mm (for measuring the test specimens).

C) Test specimens (see *diagrams of the set-up on the following page)*

The clay slips are combined with a panel of polyurethane foam during its casting and expansion.

Test specimens of cross-section 50 mm x 50 mm are cut out of the slips with a diamond saw. Aluminium plates of the same cross-section are then bonded with an appropriate adhesive on the surface of the slips and of the insulation.

Operating procedure

- Set the load application speed;
- Clamp the test specimen to be tested onto an undeformable aluminium plate and apply tensile stress using the tensioning device until the pull-off force is reached;
- Apply the load at constant speed throughout the entire test;
- For each test specimen, record the pull-off force.

Expressing the results

- Determine the pull-off strength of the slips in (MPa) using the formula below:

  Fmax/a . b

  Fmax is the pull-off force

  a and b are the length and width of the sample in millimetres

- The arithmetic mean of the certified value is calculated on the five test specimens;
- The standard deviation on the certified value is calculated on the five test specimens;
- The minimum interval of confidence of the mean is calculated under the conditions of ISO 2602.

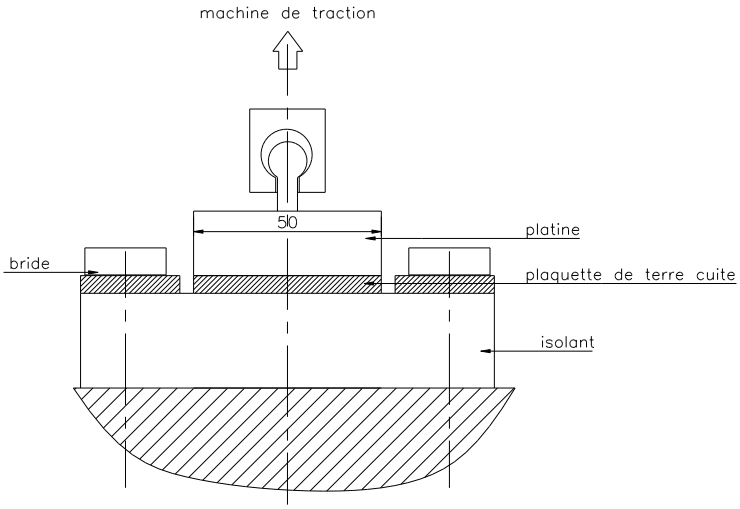
Internal inspection

Verify the cutting out of the test specimens and the gluing of the aluminium plate before the test.

Special instructions

Record the failure mode for each test specimen.

Diagram of the device



1.3. Pull-off strength of clay slips on cement mortar

Test procedures

Field of application

This procedure describes the method for determining the pull-off strength of clay slips on cement mortar.

Principle

Determine on 5 test specimens of 220*64*65 (L*w*th) (mortar poured on the perforated face), the average value of the resistance to pull-off by perpendicular tensile stress.

Test conditions and speed

Reference standard: NF EN 1015-12.

Perpendicular tensile stress.

The mortar coat thickness shall be 10 mm ± 1 (§ 7.2. of the standard).

Conditioning carried out by the manufacturer: 7 days in polyethylene bags, sealed and airtight.

Performance of the test after a minimum of 28 days.

Size of the cut-out of the mortar disk of the test specimens subjected to perpendicular tensile stress, diameter 50 mm (§ 7.3.1. of the standard).

The real values of the diameter are to be recorded.

Test set-up and conditions

Undeformable rigid support.

The test specimen is solidly clamped to the support so as to subject the mortar disk to a single tensile stress.

Use of the PRS10 programme.

Tests carried out at a speed of 5 mm/min.

Breakage should occur between 20 and 60 s. The force at breakage and failure mode are to be recorded (§ 8. of the standard).

Analysing the results

For each test specimen:

- The measured diameter of the disk is expressed in mm;
- The force at breakage (in N) and failure mode are recorded;
- The perpendicular tensile stress at breakage (in MPa) is calculated (force at breakage / surface area).

For the batch tested:

- The arithmetic mean of the certified value is calculated on the five test specimens;
- The standard deviation on the certified value is calculated on the five test specimens;
- The minimum interval of confidence of the mean is calculated under the conditions of ISO 2602

1.4. Flexural strength of flexible composite panels

Test procedures

Field of application

This procedure describes the method used to determine the ultimate flexural stress of flexible composite panels.

Principle

Determine the average value of the ultimate flexural stress on a series of five test specimens cut out of a plate and subjected to mid-span loading.

Depending upon the heterogeneous character of the product, the test may be carried out in two directions and/or Back/Front.

Apparatus

A) Test machine

The tests are carried out using a test machine suitable for the stress and displacement ranges, allowing a gradually increasing load application at a constant speed of 10 mm/min.

B) Calliper gauge

Calliper gauge with the maximum tolerated error of 0.1 mm (for measuring the thickness and width of the samples).

C) Test device

The flexural device is referred to as a "3 bearing surface device" with a 240-mm span between supports (see *diagram below*).

The vertical load is applied with the aid of a central load head on each test specimen positioned on the device, with the surface taut.

Samples

The tests are carried out on five specimens cut in a 300 mm x 100 mm ± 10 mm format in every direction of the plate.

Operating procedure

- Set the load application speed;
- Place the test sample on the bending device;
- Apply the load at constant speed throughout the entire test;
- Record for each test specimen the maximum load at breakage and the load-deflection curve;
- Measure the thickness and width of each specimen at the location of the break.

Expressing the results

- For each test specimen, calculate the flexural stress at breakage and flexural modulus of elasticity using the following formulae;

$$\sigma = \frac{3FD}{2bh^2}$$ (Flexural stress at breakage in MPa)

$$E = \frac{D^3}{4bh^3} \times \frac{F}{Y}$$ (Flexural modulus of elasticity in MPa)

- (for stress calculation)

  F (in Newtons) corresponds to the breaking load

- (for modulus of elasticity calculation)

  F (in Newtons) corresponds to the load applied on the right side of the load-deflection curve

  D, b, h are expressed in mm

  D: span between bearing surfaces

  b: width of the test specimen

  h: measured thickness of the test specimen (for smooth plates) or, by convention, the nominal thickness of the plate without aggregate (for gravel plates)

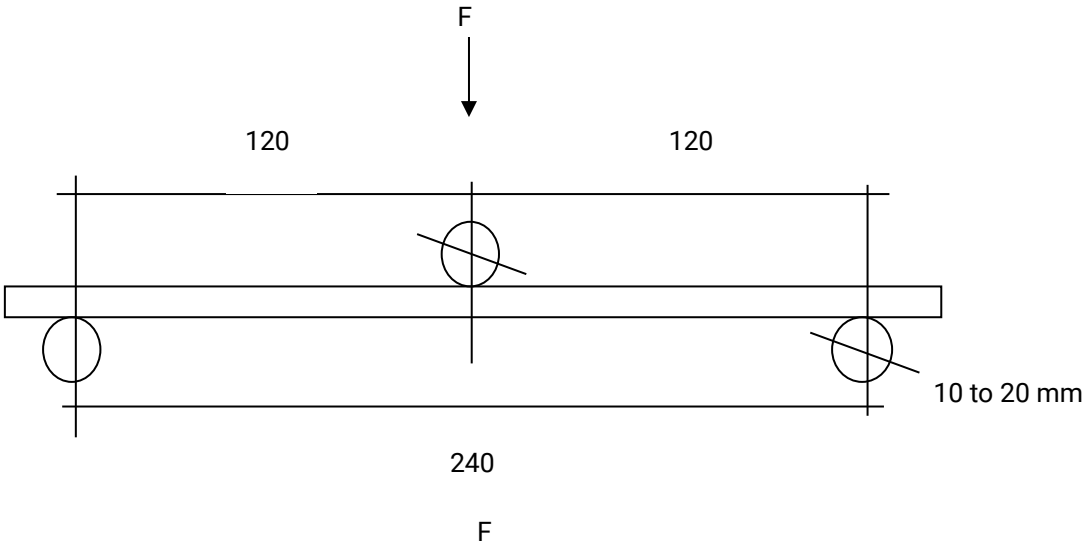
  Y: deflection corresponding to the load taken to calculate the flexural modulus of elasticity

- Take as value for flexural stress at breakage and flexural modulus of elasticity;
- The arithmetic mean of the certified value is calculated on the five test specimens;
- The standard deviation on the certified value is calculated on the five test specimens;
- The minimum interval of confidence of the mean is calculated under the conditions of ISO 2602

Special instructions

Check that the test specimen is centred on the device.

Test device diagram



N.B. If the matrix shows significant difference between the flexural properties in the two main directions, the test specimens will be tested in both directions.

1.5. Adherence of the cement or hydraulic mortar facing to the built-up cladding or cladding panel

Field of application

This procedure describes the method for determining the perpendicular tensile strength of the facing of a built-up cladding or cladding composite element.

The facing may consist of cement or hydraulic mortar, glass fibre reinforced cement or cement-fibre panels.

Principle

Determine the average value of the force and tensile strength of a series of five samples taken out of a built-up cladding or cladding element and subjected to a force perpendicular to the element facing.

Apparatus

A) Test machine

Dynamometer or mechanical test machine, suitable for the force range enabling the application of a load increasing at constant speed.

Depending on the element's vulnerability to cutting, one of the following cases is implemented.

Case no. 1

The samples are 50 mm x 50 mm. A metal plate is bonded to each side before testing.

Case no. 2

A 50 mm x 50 mm indentation is set into the facing layer of the samples. A metal plate is bonded onto this square. A flange arranged to form a 55 mm x 55 mm square opening is fitted around this indentation in order to minimise in-test deformation of the flexible composite built-up cladding or cladding element.

Expressing the results

Determine the perpendicular tensile strength of the facing in (MPa) of a series of five test specimens according to the following formula:

Fmax/a . b

a and b, the length and width of the test specimen, are taken as 50 millimetres.

- Fmax is the pull-off force (in Newtons) for each test specimen;
- Record the failure mode for each test specimen;
- The arithmetic mean of the certified value is calculated on the five test specimens;
- The standard deviation on the certified value is calculated on the five test specimens;
- The minimum interval of confidence of the mean is calculated under the conditions of ISO 2602;

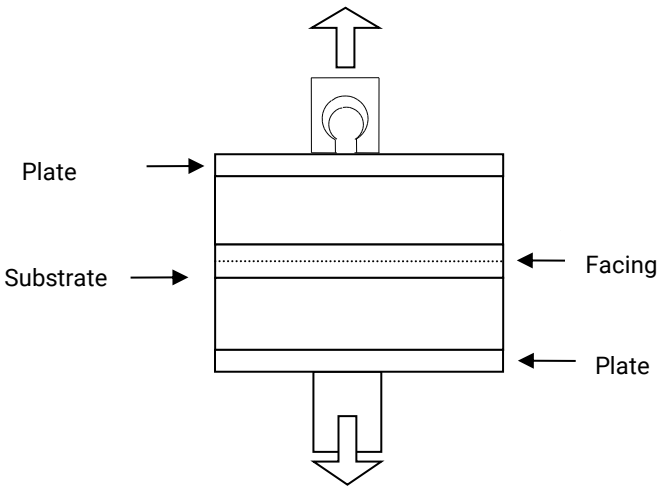
Special instructions

Verify the cutting out of the test samples and the pre-test bond strength of the aluminium plates.

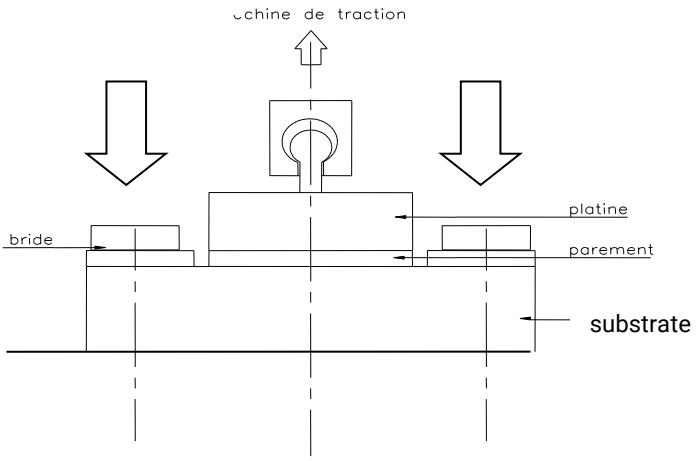
Test speed: 10 mm/min (for a mechanical test machine).

No conditioning of the test specimens.

Diagram of the device



Case no. 1



Case no. 2

1.6. Methods of characterising the attachment of the product

1.6.1. TENSILE STRENGTH OF THE FASTENER HEADS FOR PVC CLADDING STRIPS OR BOARDS (SNAP-OFF)

Test procedures

Field of application

This procedure describes the method to determine the strength under head of the fasteners on the PVC cladding strips or boards.

Principle

Determine the average value of the pull-out force of the fasteners of a series of five test specimens of profiles.

Apparatus (see *figure below*)

A) Test machine

The tests are carried out with the aid of a test machine appropriate to the force range enabling increasing load to be applied on the fastener.

B) Test device

The test specimen is clamped to an undeformable support.

The screw defined in the fitness for use assessment (ATEC, DTA, ATEx, etc.) is inserted into the fastening edge profile.

The force exerted by the fasteners on the strip is transmitted to the screw at a constant speed of 10 mm/min with a tolerance of ± 20%.

Samples

The tests are carried out on five test specimens, approximately 200 mm long, cut out of cladding strips.

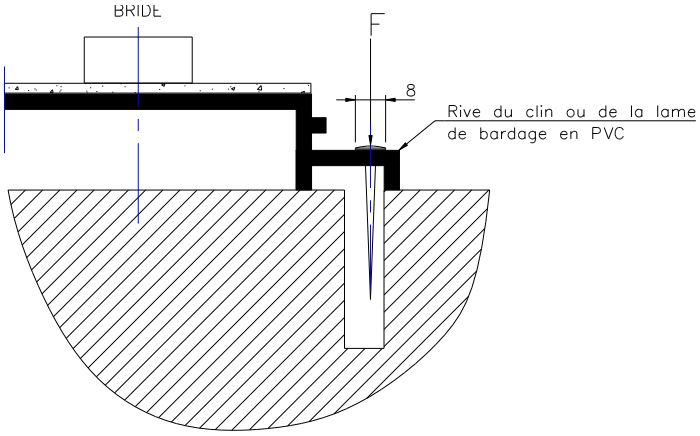
Operating procedure

- Position the test specimen, fitted with the screw on the support of the test machine;
- Set the load application speed;
- Apply the load at a constant speed during the whole duration of the test until a snap-off is obtained;
- Record the pull-out force (snap-off).

Expressing the results

- Record the pull-out force of the fasteners (in Newtons) for each test specimen;
- The arithmetic mean of the certified value is calculated on the five test specimens;
- The standard deviation on the certified value is calculated on the five test specimens;
- The minimum interval of confidence of the mean is calculated under the conditions of ISO 2602.

Diagram of the device



1.7. Compressive strength of the fastening indentations on a cladding element

Test procedures

Field of application

This procedure describes the method to determine the compressive strength of a cladding panel at the fastening indentations.

Principle

Determine the average value of the force at breakage, taken at five locations on a veture panel.

Apparatus (see *figure below*)

A) Test machine

The tests are carried out with the aid of a test machine appropriate to the force range enabling increasing load to be applied on the pre-drilling indentation.

B) Test device

It is composed of a rigid plastic punch of with dimensions defined in the fitness for use assessment (ATec, DTA, ATEx, etc.) reproducing the head of a fastening plug.

The force on the indentations is transmitted by pressure of the punch on the panel at a constant speed of 10 mm/min with a tolerance of ± 20%.

Samples

The tests are carried out on five test specimens, 100 mm x 100 mm, cut out of a veture element and containing a fastening indentation in their middles.

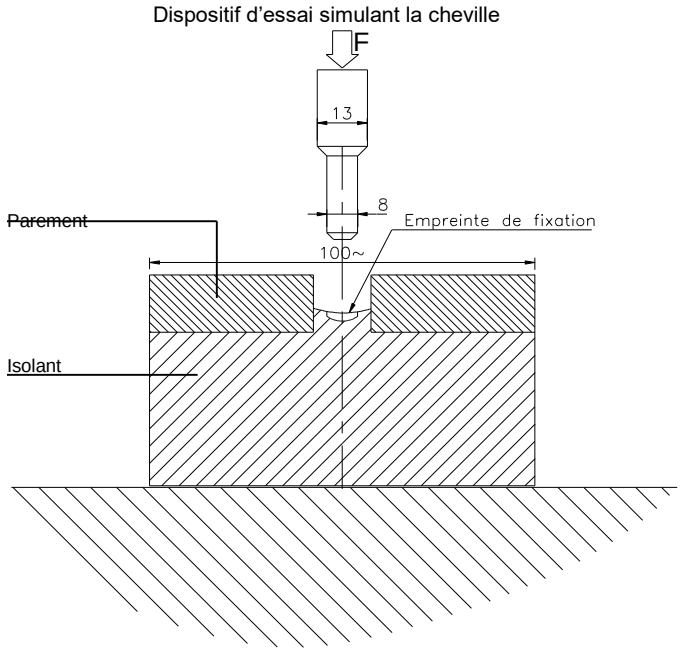
Operating procedure

- Place the test specimen on the undeformable support of the test machine;
- Set the load application speed;
- Apply the load at a constant speed throughout the duration of the test until the indentations break and the maximum force is obtained;
- Record the maximum force.

Expressing the results

- For each test specimen, record the breaking force in Newtons;
- The arithmetic mean of the certified value is calculated on the five test specimens;
- The standard deviation on the certified value is calculated on the five test specimens;
- The minimum interval of confidence of the mean is calculated under the conditions of ISO 2602.

Diagram of the device



1.8. Pull-out strength of inserts in a built-up cladding or cladding panel

Test procedures

Field of application

This procedure describes the method for determining the pull-out strength of the inserts in the built-up cladding panels.

Principle

Determine the average value of the force at pull-out of the inserts of a series of five samples taken from a built-up cladding panel.

Apparatus

A) Test machine

Mechanical test machine or dynamometer appropriate to the force range enabling the application of a load increasing at a constant speed and perpendicular to the panel.

Samples

The tests are carried out on five test specimens with inserts, cut to 225 x 225 mm format from a panel (case of a mechanical test machine). If a dynamometer is used, the tests can be carried out on a whole panel.

Test device

The blocking and centring of the test specimens with the test machine are done with the aid of a steel plate (see *diagrams below*).

Operating procedure

- Set the load application speed;
- Centre and fix the plate with the aid of steel clamps;
- Apply the load at constant speed throughout the entire test;
- Record the pull-out force and failure mode of the insert for each test specimen.

Expressing the results

- Determine the pull-out force (in Newtons) of the insert for each test specimen;
- The arithmetic mean of the certified value is calculated on the five test specimens;
- The standard deviation on the certified value is calculated on the five test specimens;
- The minimum interval of confidence of the mean is calculated under the conditions of ISO 2602.

Special instructions

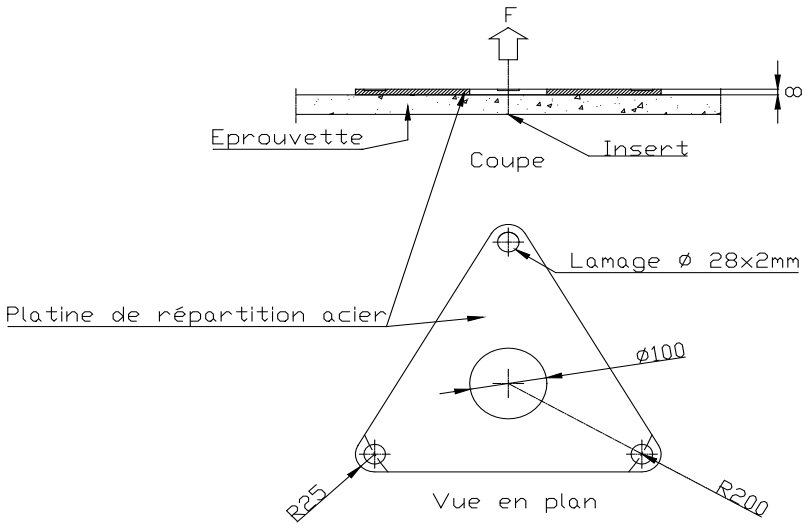
Verification of the positioning and of the centring of the steel distribution plate in relation to the insert with the aid of a rule before testing.

Test speed: 5 mm/min (for a mechanical test machine).

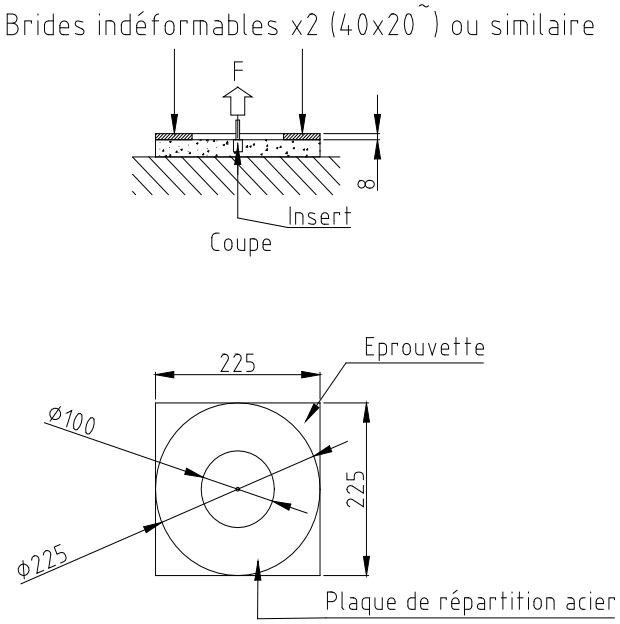
Record the breaking mode of the insert for each test specimen.

Diagrams of devices

Case 1 (Dynamometer)



Case 2 (test machine)



1.9. Tensile strength of a groove catch in a built-up cladding or cladding panel

Reference texts

ETAG 34: Guideline for European Technical Approval of cladding kits (Chapter 5.4.2.3.1.).

Test procedures

Field of application

This procedure describes the method for determining the strength of a groove or of a facing lip, making it possible to hang or support the panel by means of a profile.

Principle

Determine the average value of the pull-out force of a groove or of a suspension lip of a series of five test specimens of profiles.

Apparatus (see *figure below*)

A) Test machine

The tests are carried out with the aid of a test machine appropriate to the force range enabling increasing load to be applied on the fastener.

B) Test device

The force is exerted by an undeformable metal L-piece, positioned in the groove or in the lip, cut with a rotary saw at 100 mm. The L-piece is also 100 mm long.

The speed is constant at 5 mm/min.

Samples

The tests are carried out on five test specimens of 200 mm length minimum x 100 mm (on groove side), cut from the panel.

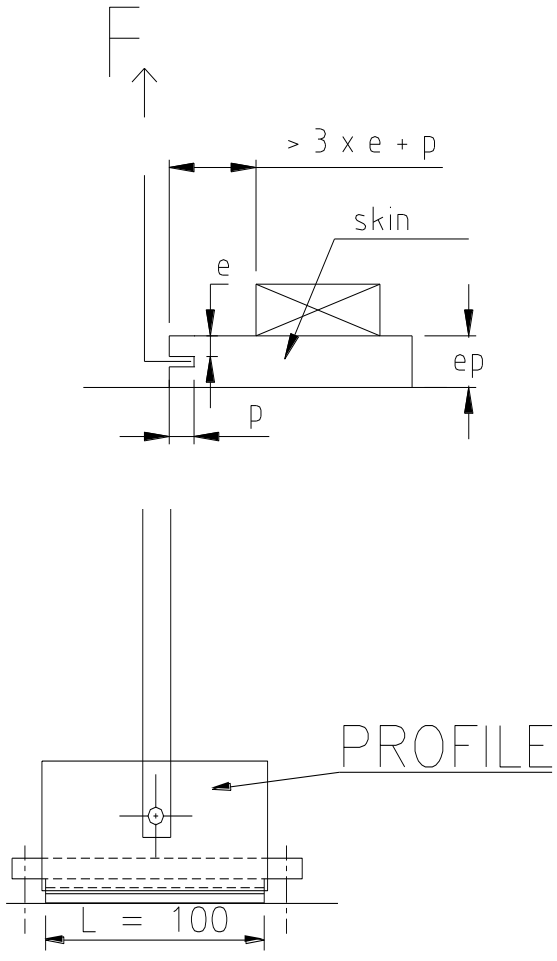
Operating procedure

- The test specimen is clamped to an undeformable support;
- Set the load application speed;
- Apply the load at a constant speed throughout the duration of the test until breakage of the groove or lip

Expressing the results

- Fmax is the pull-out force (in Newtons) for each test specimen;
- Record the failure mode for each test specimen;
- The arithmetic mean of the certified value is calculated on the five test specimens;
- The standard deviation on the certified value is calculated on the five test specimens;
- The minimum interval of confidence of the mean is calculated under the conditions of ISO 2602

Diagram of the device



1.10. Pull-out strength of the fastening lips in a clay cladding panel

Reference texts

ETAG 34: Guideline for European Technical Approval of cladding kits (Chapter 5.4.2.3.1.).

Test procedures

Field of application

This procedure describes the method for determining the resistance of a fastening lip of the facing used to suspend or support the cladding by means of a profile or a clip.

Principle

Determine the average value of the pull-out force of an upper lip and lower suspension lip on a series of five test specimens in each case.

Apparatus (see *figure below*)

A) Test machine

The tests are carried out using a test machine suitable for the force range enabling the application of an increasing load on the lip.

B) Test device

The force is exerted by an undeformable L-piece measuring 100 mm positioned on the edge of the sample and at the bottom of the fastening lip.

The speed is constant at 5 mm/min.

Samples

The tests are carried out on two times five test specimens of dimensions 220 x 220 mm, cut out of the cladding. Five test specimens incorporate a section of upper lip; five test specimens incorporate a section of lower lip. The intermediate lips are tested during product admission.

Operating procedure

- The test specimen is clamped to an undeformable support;
- Set the load application speed;
- Apply the load at constant speed during the whole duration of the test until the fastening lip breaks.

Expressing the results

- Fmax is the pull-out force (in Newtons) for each test specimen;
- Record the failure mode for each test specimen;
- The arithmetic mean of the certified value is calculated on the five test specimens;
- The standard deviation on the certified value is calculated on the five test specimens;
- The minimum interval of confidence of the mean is calculated under the conditions of ISO 2602

The results obtained on the upper lip and the results obtained on the lower lip are processed separately.

Test characteristics

The test is based on the groove resistance test for products of family C, as defined in § 5.4.2.3.1. of ETAG 34 concerning built-up cladding.

The test is carried out on 220 x 220 square test specimens cut out of the cladding elements.

All the lips can be used during the set-up and are tested during product admission.

During the corroboration tests for product inspection, five samples are tested. For each sample, a test is carried out on the top lip and a test is carried out on the bottom lip.

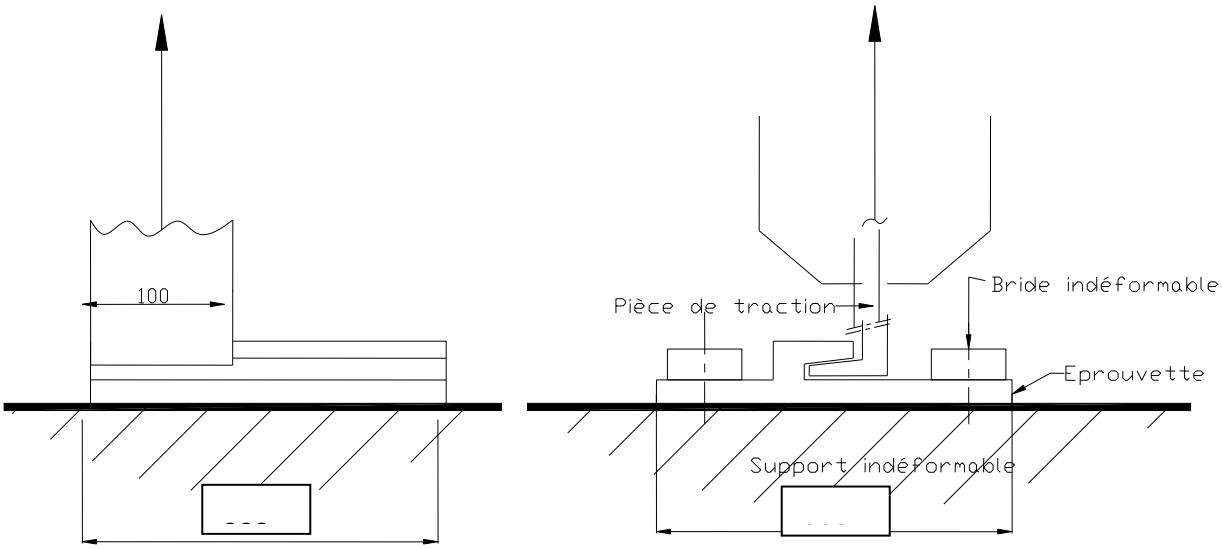
The lip is tested at the edge of the test specimen (the tension part flush with the edge of the test specimen during the test).

The lips are tested with the pulling part pushed to the bottom of the lip.

The drawing below indicates the area where the lip pull-out test is carried out. The number and the shape of the cladding's continuous fastening lips vary:

- from one width of cladding to another;
- from one model to the other for a single manufacturer;
- from one manufacturer to another.

Diagram of the device



1.11. Pull-out strength of the fastening sockets in a clay cladding panel

Test procedures

Field of application

This procedure describes the method for determining the resistance of a fastening socket of the facing used to suspend or support the cladding by means of a profile or a clip.

Principle

Determine the average value of the resistance of a fastening socket on a series of five test specimens by bending test with mid-span loading.

Apparatus (see *figure below*)

A) Test machine

The tests are carried out using a test machine suitable for the stress, allowing a gradually increasing load application at a constant speed of 10 mm/min.

B) Test device

The flexural device is referred to as a "3-bearing surfaces" device with a 300-mm span between supports (see diagram below).

Characteristics of the fastening socket supports: rigid, undeformable, width 14 mm and length 30 mm, thickness 5 mm at 2 points on the frame.

The vertical stress is applied using a 30 mm diameter central load head on each test specimen positioned on the device.

Samples

The tests are carried out on five test specimens, approximately 300 mm long and a maximum of 150 mm wide, cut out of cladding. The width must incorporate a fastening socket in the centre.

Operating procedure

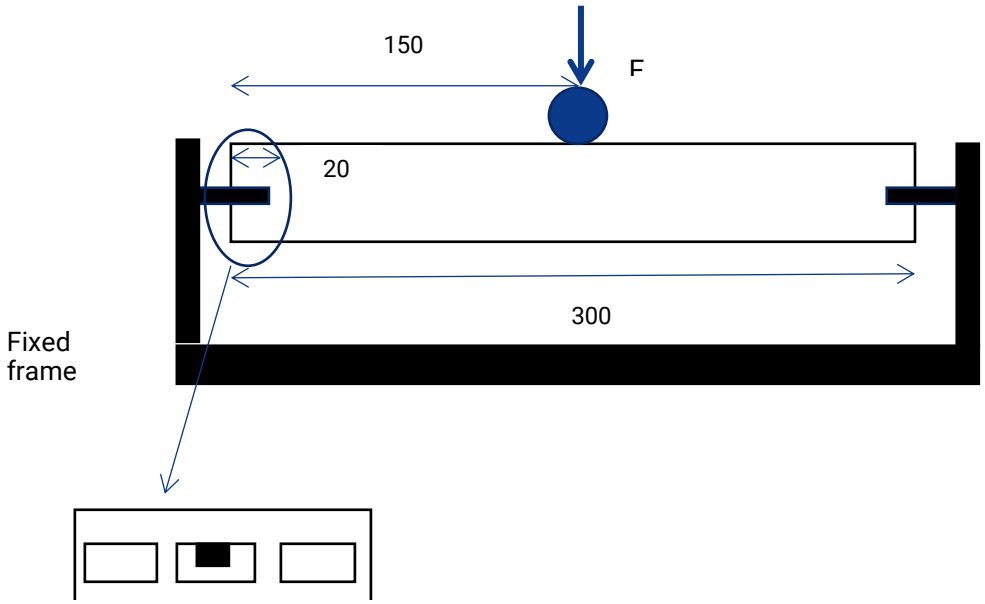
- Place the test specimen on the flexural device;
- Set the load application speed;
- Apply the load at constant speed during the whole duration of the test until the fastening socket breaks.

Expressing the results

- Fmax is the breaking force (in Newtons) for each test specimen.
- Record the failure mode for each test specimen;
- The arithmetic mean of the certified value is calculated on the five test specimens;
- The standard deviation is calculated on the five test specimens;
- The minimum interval of confidence of the mean is calculated under the conditions of ISO 2602

Diagram of the device

Force applied to the visible face.



Zoom – cross-section, view of the fastening sockets

Part 2
Veture products

2.1. Flexural strength of rigid composite panels

Test procedures

Field of application

This procedure describes the method for determining the flexural strength by calculating the maximum moment of the veture panel calculated for the unit of width. This value is calculated in relation to a span (L) and a width that may vary according to the veture.

Principle

Performance of the 4-point bending tests.

For each test specimen, determine the value of the maximum moment calculated for the unit of width.

Determine the average value of a series of five test specimens.

Apparatus

A) Test machine

The tests are carried out using a test machine, suitable for the force and movement range, enabling the application of a load, increasing at a constant speed of 10 mm/min.

B) Calliper gauge

Calliper gauge with the maximal tolerated error of 0.1 mm (for measuring the thickness and width of the samples).

C) Test device

The flexural device is the so-called "4 bearing surfaces" device with a span L between bearing surfaces defined according to the product (see *diagram below*).

The vertical stress is applied with the aid of two load heads on each test specimen positioned on the device.

Positioning of a strain gauge at half-span with a maximum tolerated error of 0.1 mm.

Samples

The tests are carried out on five test specimens cut to format 300 mm x b mm in the panel.

Width b depends on the constitution of the veture. For a given panel, width b is constant and varies by 100 mm +/-10 mm.

Operating procedure

- Set the load application speed;
- Place the test specimen on the bending device;
- Apply the load at constant speed throughout the entire test;
- For each test specimen, record the maximum load F;
- Record the deformation of each test specimen during the test.

Expressing the results

F Maximal load in Newtons

M (in Newtons x m) is the maximum bending moment and is equal to F X L/6

L, b, e and d are expressed in mm

L: span between bearing surfaces

b: width of the test specimen

e: thickness of the test specimen

d: deformation during test (recorded continuously)

- For each test specimen i, calculate the maximum bending moment for the unit of width, i.e. Vri: Mi/bi;
- The arithmetic mean of the certified value is calculated on the five test specimens;
- The standard deviation on the certified value is calculated on the five test specimens;
- The minimum interval of confidence of the mean is calculated under the conditions of ISO 2602

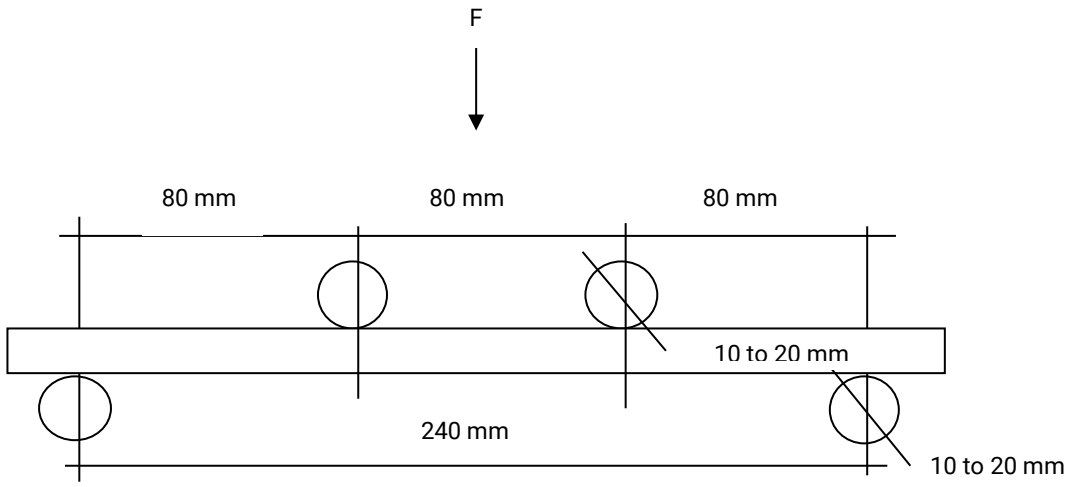
Special instructions

Depending on the product tested, the application blocks can be positioned to avoid puncturing the test specimen perpendicular to the loads.

The tests are carried out once the product's components have reached their chemical and mechanical maturities.

Depending upon the heterogeneous character of the product, the test may be carried out in two directions and/or Back/Front.

Test device diagram



2.2. Adherence of the facing of veture panels

2.2.1. REFERENCE TEXTS

ETAG 17: European Guideline for European Approval of Veture Kits (Chapter 5.4.2.1.)

Field of application

This procedure describes the method for determining the perpendicular tensile strength of the facing of a veture element.

The facing may consist of cement or hydraulic mortar, glass fibre reinforced cement or fibre/cement panels.

Principle

Determine the average value of the force and of the tensile strength of a series of five samples, taken from a veture element, and subjected to a force perpendicular to the facing of the veture element.

Apparatus

A) Test machine

Dynamometer or mechanical test machine, suitable for the force range enabling the application of a load increasing at constant speed.

Expressing the results

Determine the perpendicular tensile strength of the facing in (MPa) of a series of five test specimens according to the following formula:

Fmax/a . b

a and b, i.e. the length and width of the test specimen, are between 20 and 200 mm.

- Fmax is the pull-out force (in Newtons) for each test specimen;
- Record the failure mode for each test specimen;
- The arithmetic mean of the certified value is calculated on the five test specimens;
- The standard deviation on the certified value is calculated on the five test specimens;
- The minimum interval of confidence of the mean is calculated under the conditions of ISO 2602

Internal inspection

Verification of the cutting out of the samples and of the bonding of the metal plate onto the facing before the test.

Special instructions

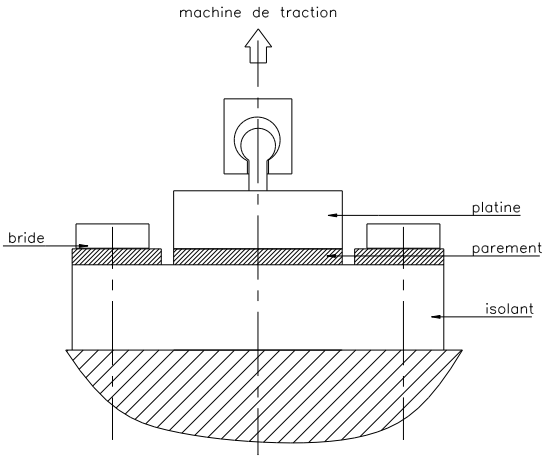
Test speed: 10 mm/min (for a mechanical test machine)

Record the failure mode for each test specimen.

Waivers

No conditioning of the test specimens.

Diagram of the device



2.3. Pull-off strength of clay slips on polyurethane foam

Test procedures

Field of application

This procedure describes the method for determining the pull-off force and/or strength of clay slips constituting the facing of a veture element.

Principle

Determine the average value of the pull-off force and/or strength of a series of five test specimens, taken from a veture element and subjected to a perpendicular force at the faces of the clay slips.

Apparatus

A) Test machine

The tests are carried out using a test machine appropriate to the force range enabling an increasing load to be exerted at a constant speed of 10 mm/min.

B) Calliper gauge

Calliper gauge with the maximum tolerated error of 0.25 mm (for measuring the test specimens).

C) Test specimens (see *diagrams of the set-up on the following page)*

Case A:

The clay slips are combined with a panel of polyurethane foam during its casting and expansion.

Test specimens of cross-section 50 mm x 50 mm are cut out of the slips with a diamond saw. Aluminium plates of the same cross-section are then bonded with an appropriate adhesive on the surface of the slips and of the insulation.

Case B:

The facing tiles are combined by mate fitting and bonding with an extruded polystyrene panel.

Aluminium plates, cross-section 280 mm x 30 mm are bonded with an appropriate adhesive to the surface of the slips.

N.B. the plates are centred in relation to the points where the slips are fastened to the polystyrene insulation.

Operating procedure

- Set the load application speed;
- Clamp the test specimen to be tested onto an undeformable aluminium plate and apply a tensile stress with the aid of the tensioning device until the pull-off force is reached;
- Apply the load at constant speed throughout the entire test;
- For each test specimen, record the pull-off force.

Expressing the results

Case A:

Determine the pull-off force of the slips (in Newtons) of a series of five test specimens and calculate the mean and the standard deviation.

Determine the pull-off strength of the slips in (MPa) for each test specimen, using the formula below:

Fmax/a . b

Fmax is the pull-off force

a and b are the length and width of the sample in millimetres

- The arithmetic mean of the certified value is calculated on the five test specimens;
- The standard deviation on the certified value is calculated on the five test specimens;
- The minimum interval of confidence of the mean is calculated under the conditions of ISO 2602

Case B:

Determine the pull-off force of the slips (in Newtons) for each test specimen:

Fmax is the pull-off force.

- The arithmetic mean of the certified value is calculated on the five test specimens;
- The standard deviation on the certified value is calculated on the five test specimens;
- The minimum interval of confidence of the mean is calculated under the conditions of ISO 2602

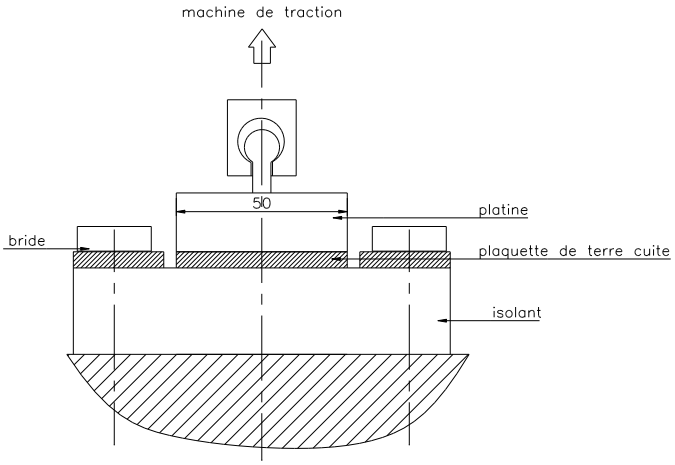
Internal inspection

Verify the cutting out of the test specimens and the gluing of the aluminium plate before the test.

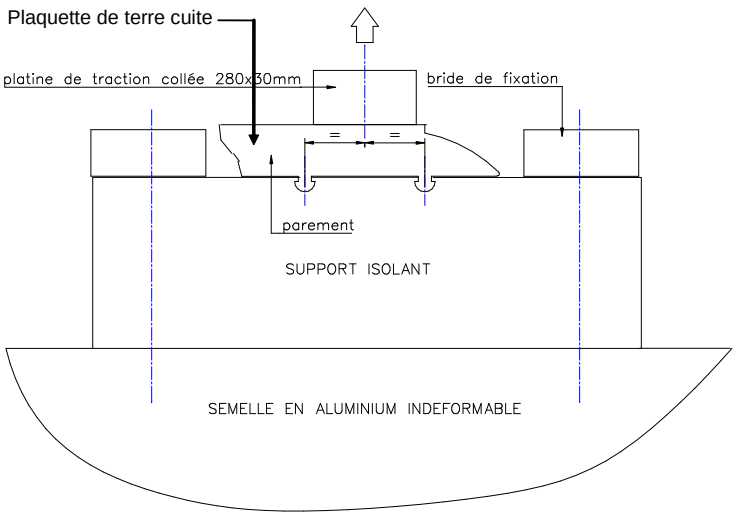
Special instructions

Record the failure mode for each test specimen.

Diagrams of the device



Case A



Case B

2.4. Methods of characterising the attachment of the product

2.4.1. COMPRESSIVE STRENGTH OF THE FASTENING INDENTATIONS ON A VETURE PANEL

Test procedures

Field of application

This procedure describes the method for determining the compressive strength of a veture panel, at the fastening indentations.

Principle

Determine the average value of the breaking force, taken at 5 locations on a veture panel.

Apparatus (see figure below)

A) Test machine

The tests are carried out with the aid of a test machine appropriate to the force range enabling increasing load to be applied on the pre-drilling indentation.

B) Test device

The test device consists of a rigid plastic punch, ∅ 8 mm, countersunk head ∅ 13 mm, reproducing the head of a fastening plug.

The force on the indentations is transmitted by pressure of the punch on the panel at a constant speed of 10 mm/min with a tolerance of ± 20%.

Samples

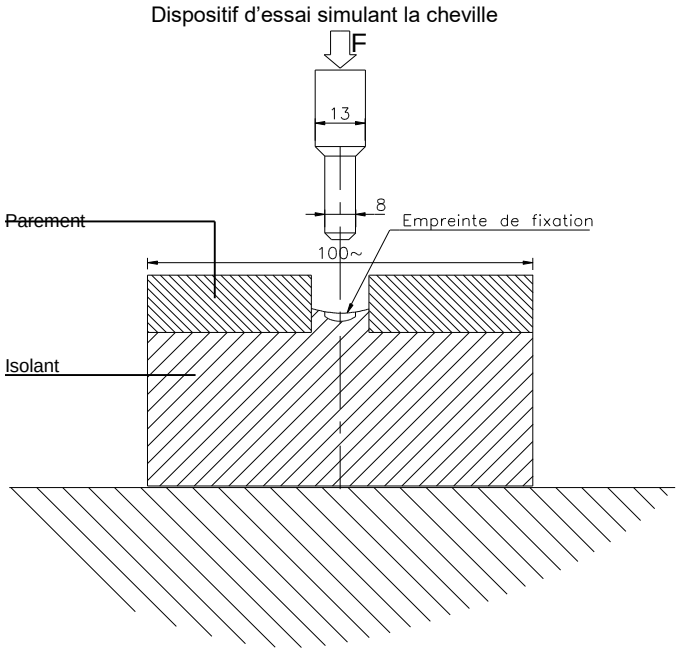
The tests are carried out on 5 test specimens measuring 100 mm x 100 mm cut out of a veture element and containing a fastening indentation in their middle.

Operating procedure

- Place the test specimen on the undeformable support of the test machine;
- Set the load application speed;
- Apply the load at a constant speed during the whole duration of the test until the indentations break and the maximum force is obtained;
- Note the maximum force.

Expressing the results

- For each test specimen, record the breaking force in Newtons;
- The arithmetic mean of the certified value is calculated on the five test specimens;
- The standard deviation on the certified value is calculated on the five test specimens;
- The minimum interval of confidence of the mean is calculated under the conditions of ISO 2602
- **Diagram of the device**



2.5. Strength of a groove in the insulation of the veture

Reference texts

ETAG 17: Guideline for European Technical Approval of veture kits (Chapter 5.4.2.2.4.).

Test procedures

Field of application

This procedure describes the method for determining the strength of a groove in the insulation enabling the veture to be supported by a profile.

Principle

Determine the average value of the pull-out force of a groove in a series of five test specimen profiles.

Apparatus (see *figure below*)

A) Test machine

The tests are carried out with the aid of a test machine appropriate to the force range enabling increasing load to be applied on the fastener.

B) Test device

The force is exerted by the kit's metal profile, arranged in the groove, length 100 mm.

The speed is constant at 5 mm/min.

Samples

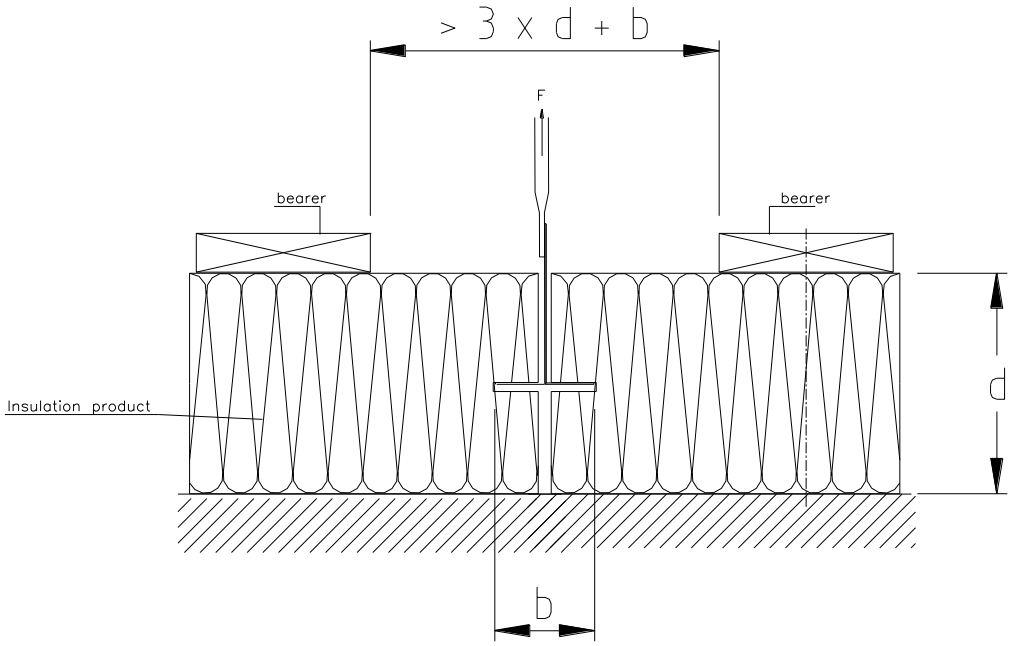
The tests are carried out on five test specimens, cut out of the veture. The length of the test specimens depends on their thickness. The width is 100 mm.

Operating procedure

- The test specimen is clamped to an undeformable support;
- Set the load application speed;
- Apply the load at a constant speed throughout the duration of the test until the groove breaks or the profile becomes deformed.

Expressing the results

- Fmax is the pull-out force (in Newtons) for each test specimen;
- Record the failure mode for each test specimen;
- The arithmetic mean of the certified value is calculated on the five test specimens;
- The standard deviation on the certified value is calculated on the five test specimens;
- The minimum interval of confidence of the mean is calculated under the conditions of ISO 2602



Part 3
The standards and supplementary specifications

For the references that indicate a date of implementation or an index, only the version cited is applicable. For references that do not indicate a date of implementation or index, the most recent version of the reference document applies (including any amendments).

Test standards for internal inspections on finished products carried out by the manufacturer (current version applies)	
NF EN 14617-2	Agglomerated Stone: Flexural strength
NF EN ISO 178	Plastics: Flexural strength
NF EN ISO 179	Plastics: Charpy impact strength
NF EN ISO 10352	Fibre-reinforced plastics: Mass Per Unit Area
NF EN ISO 584 Or NF EN 12114	Plastics: Reactivity at 80°C Thermal performance of buildings: Hardening characteristics
NF EN ISO 1172	Textile-glass-reinforced plastics: Glass content
NF P 57-106	Reinforced plastics: Barcol hardness
NF EN ISO 14125	Textile-glass-reinforced plastics: Flexural strength
NFT 54-405-1	Unplasticised poly (vinyl chloride) (PVC-U) extruded or coextruded profiles for outside use. Specifications and test methods.
ISO 1183-1	Plastics: Density at 23°C
NF EN ISO 60	Plastics: Determination of apparent density
NF EN ISO-3451-5	Plastics: Ash content
NF EN 306	Plastics: Vicat softening temperature
NF EN 13245-1	Plastics: Blunt-impact strength for rigid PVC-U
NF EN 13245-2	Plastics: Blunt-impact strength for expanded PVC-U
NF EN ISO 527-2	Plastics: Tensile strength
NF EN 438-2	High-Pressure Decorative Laminates: Specifications and test methods
NF EN ISO 4892-2	Plastics: Methods of exposure to Xenon-arc sources
NF EN 310	Wood-based panels: Flexural strength of fibreboards
NF EN 317	Determination of swelling in thickness after immersion in water
NF EN 319	Particleboards and fibreboards: Pull-out strength of fibre-boards
EN 1087-1	Particleboard: Determination of moisture resistance - Boil test methods
NF EN 323	Particleboards and fibreboards: Determination of density
NF EN 324-1 & 2	Wood-based panels: Determination of the dimensions of the panels
NF EN 1170-5	Glass-fibre reinforced cement: Flexural strength

Test standards for internal inspections on finished products carried out by the manufacturer (current version applies)	
NF EN 538	Clay roofing tiles: Flexural strength test
NF EN 539-2	Clay roofing tiles: Frost resistance
NF EN 10545-3	Ceramic tiles: Water absorption
NF EN 10545-4	Ceramic tiles: Flexural strength
NF EN 10545-12	Ceramic tiles: Determination of frost resistance
NF EN 12467	Fibre-cement flat sheets: Product specifications and test methods
NFP 08-301	Vertical building elements: Resistance to impact from a soft body
NF EN 1015-12	Mortar for masonry: Adhesive strength of hardened rendering and plastering mortars on substrates
ASTM D 1781	Polyethylene and aluminium composites: Climbing drum peel for adhesives
ASTM D 1876	Polyethylene and aluminium composites: Peeling strength
NF EN 1936	Natural stone: Determination of apparent density and total and open porosity
NF EN 12372	Natural stone: Flexural strength
NF EN 14509	Self-supporting double-skin metal-faced insulating panels. Flexural shear strength (Appendix A3)
ISO 4859	Wood: Determination of radial and tangential swelling
NF EN 408	Timber structures: Flexural strength and density
NF EN ISO 19712-2	Decorative solid surfacing materials - Determination of properties
NF EN 14915	Solid wood panelling and cladding - Characteristics, requirements and markings

Comment: For manufacturers located outside the European Economic Area, other test procedures (e.g. ASTM) can be adopted insofar as they are pertinent production monitoring indicators to warn of non-compliance of the product or of deviation of the production process. Proof of the correlation of the results obtained by the two operating procedures are established by the applicant, recorded and kept available for consultation.