FAÇADES

TECHNICAL DOCUMENT

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

# Technical document DT15-01

Concerning built-up cladding products, cladding products and soffit products

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

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le futur en construction

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# MODIFICATION HISTORY

| Revision no. | Application date | Modifications |
|---|---|---|
| **00** | **28/02/2018** | **Creation.** |
| **01** | **22/06/2020** | **Paragraph E, addition of family E5 honeycomb core aluminium facing** |
| **02** | **04/08/2023** | **integration of the «C5 fibre + cement» family**<br>**Transfer of the transformer requirements of the C3-A1-E2-E5 families to the H Transformer family and addition of requirements for the TF+ level**<br>**Update of insert removal frequency for family H Transformers** |

# Part 1
# Organisation

For each product or process, this technical document presents:

- The certified characteristics;
- The product assessment method,
- The classification of the standard;
- The list of standards available.

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

Certified characteristics:

- Dimensions;
- Composition;
- Mechanical strength against instantaneous actions according to the product family (flexural, tensile, compressive, etc.);
- Mechanical strength associated with product installation (pulling out of inserts, strength of fastening sockets, etc.).

Complementary characteristics appearing in the technical file of the Suitability for Use Assessment (ATEC, DTA, ATEx, etc.) may also be covered in the certificate.

The holder shall run a statistical analysis once a year or between each audit for certified characteristics including at least the number of quality operations completed, the arithmetic mean, the standard deviation and the mean with a confidence level of at least 95% calculated as per standard ISO 2602.

The records over a period equal to the time between two audits and of at least 1 year shall be available the day of the audit in order to be sampled.

The records of the certified characteristics are archived for a minimum of 10 years.

## INFORMATION RELATIVE TO CE MARKING

### Reference documents

- Reports of the type testing that have been used for corroborating the CE marking by the standards-related method;
- Valid European Technical Approval or European Technical Assessment issued for the product and its assessment report;
- Conformity certificate issued by an authorised body or attestation of conformity prepared by the manufacturer.

### Class required by the Harmonised Standard

If a class is required by the Harmonised Standard for applications of the product on the outside (such as built-up cladding, cladding or soffits), this requirement is re-stated in the admission procedures.

In no case may the product have certified characteristics less than the characteristics required for the declared use as part of the CE marking.

### Product covered under a European Assessment Document (EAD)

For products not coming under a Harmonised Standard, the implementation of the CE marking is equivalent to European Technical Approval Guideline (ETAG) 34 for the outside wall cladding kits or an EAD.

Test standards are listed for the relevant products in Appendix B of ETAG 34.

Introduction of a European Technical Assessment application for products coming under an opt-in European Assessment Document procedure.

**Non-certified complementary characteristics**

These characteristics are selected to corroborate the suitability for use of the product in a system of built-up cladding, cladding or soffits.

These tests and the minimal frequencies concern, for all the product families:

- Dimensional inspections; at each production run start or change, once per station minimum;
- Functional inspections; at each production run start or change, once per station minimum;
- Visual appearance inspections (colour, surface state compliance); on all the elements; other ways and means can be used at frequencies defined by the manufacturer to check the colour, the gloss or the relief of the facing;
- Specific inspections; the checks are defined with relation to the normative reference system of the product family and are indicated in its family-specific appendix. The test frequencies are also indicated therein.

The functional inspections cover the geometrical aspects for a satisfactory installation of the product (squareness, flatness, straightness of the edges, profiles of the element, mate fitting, dimensions and groove position, etc.); at each production run start-up or change, once per station minimum.

The specific inspections are physical-chemical quality assurance operations (water absorption, resistance to freezing, etc.) or durability quality assurance operations (heat shrinkage, resistance to boiling water) to detect any abnormal deviation in the behaviour of the finished product.

Additional specific tests or internal procedure document examination are required for the following situations:

- The element is equipped with a surface covering, applied by the manufacturer, that may contain risks of breakaway: inspection of the stability of the bond strength to the substrate; at each production run start-up or change, once per station minimum; this inspection is proposed by the manufacturer given the latter’s experience in the field;
- The skill in installing the anti-fragmenting system;
- The skill in painting the elements.

These aspects (the list of which is not exhaustive) are covered by the audit.

# Part 2
# Technical File by built-up cladding, cladding and soffit product family

## A. Wood/Thermosetting resins

### A1. LAMINATES/THERMOSETTING RESINS

Reference system: NF EN 438-6 STANDARD

**Classification according to the standard**

| First letter | Second letter | Third letter |
|---|---|---|
| E (quality for use outside) | G (moderate use) or D (severe use) | S (standard quality) or F (quality with improved reaction to fire) |

**Dimensional tolerances**

| Characteristics | Test method (EN 438-2, Article No.) | Requirements | |
|---|---|---|---|
| | | Thickness t | Maximal variation |
| Thickness | 5 | 5.0 ≤ t ≤ 8.0 mm<br>8.0 ≤ t ≤ 12.0 mm<br>12.0 ≤ t ≤ 16.0 mm | ± 0.40 mm<br>± 0.50 mm<br>± 0.60 mm |
| Flatness | 9 | 6.0 ≤ t ≤ 10.0 mm<br>10.0 mm ≤ t | 5.0 mm/m<br>3.0 mm/m |
| Length and width | 6 | + 10 mm/- 0 mm | |
| Straightness of the edges | 7 | Maximal deviation 1.5 mm/m | |
| Squareness | 8 | Maximal deviation 1.5 mm/m | |

## General requirements

| Characteristics | Test method (EN 438-2 Article No., unless stated otherwise) | Property or attribute | Unit (max. or min.) | Quality of laminate | |
|---|---|---|---|---|---|
| | | | | EGS & EDS | EGF & EDF |
| Flexural modulus | NF EN ISO 178:2003 | Stress | MPa (min.) | 9,000 | 9,000 |
| Bending strength | NF EN ISO 178:2003 | Stress | MPa (min.) | 80 | 80 |
| Tensile strength | NF EN ISO 527-2:1996 | Stress | MPa (min.) | 60 | 60 |
| Density | NF EN ISO 1183-1:2004 | Density | g/cm$^3$ (min.) | 1.35 | 1.35 |
| Resistance to impact of a large diameter ball (resistance to breakage) | 21 | Height of fall | t ≥ 6 (where t = nominal thickness) | 1,800 | 1,800 |
| Moisture resistance | 15 | Increase in mass - Appearance | Thickness t % (max) t ≥ 5 Class (min.) | 5 4 | 8 4 |
| Dimensional stability at high temperatures | 17 | Accumulated dimensional variation | % (max.) t ≥ 5 mm Longitudinal Transversal | 0.30 0.60 | 0.30 0.60 |

## Requirements in relation to resistance to weather conditions

| Characteristics | Test method (EN 438-2, article No.) | Property or attribute | Unit (max. or min.) | Quality of laminate | |
|---|---|---|---|---|---|
| | | | | EGS & EGF | EDS & EDF |
| Resistance to thermal stress | 19 | Appearance<br>Index of resistance to bending $D_S$<br>Flexural modulus $D_m$ | Rating (min)<br>(min.)<br>(min.) | 4<br>0.95<br>0.95 | 4<br>0.95<br>0.95 |
| Resistance to ultraviolet radiation | 28 | Contrast<br>Appearance | Value on the grey scale (not worse than)<br>Classification (min.) | No requirement<br>No requirement | 3 (after 1,500 h of exposure)<br>4 (after 1,500 h of exposure) |
| Resistance to artificial ageing (including the solidity of the colour) | 29 | Contrast<br>Appearance | Value on the grey scale (not worse than)<br>Classification (min.) | 3 (after energy exposure of 325 MJ/m$^2$)<br>4 (after energy exposure of 325 MJ/m$^2$) | 3 (after energy exposure of 650 MJ/m$^2$)<br>4 (after energy exposure of 650 MJ/m$^2$) |

**Consistency of factory production self-inspection of panels**

| § | Inspections | Frequencies |
|---|---|---|
| A1.0. | Resistance to light under xenon arc lamp after 3,000 h of exposure (650 MJ/m$^2$) under the conditions set out in Standard NF EN 438-2 (Part 29): assessment based on greyscale (Standard EN 20105-A02) ≥ 3 | At each new colour |
| A1.1. | Dimensional inspections (length, width)<br>Functional inspections (flatness, squareness, etc.) | At each change and random sampling once per station |
| A1.2. | Inspection of visual appearance | Each panel |
| A1.3. | Density according to Standard ISO 1183<br>Checking the resistance to immersion in boiling water according to Standard NF EN 438-2 (Part 12)<br>or<br>Check of dimensional stability at 70°C according to Standard NF EN 438-2 (Part 17)<br>or<br>Resistance in damp environments according to Standard NF EN 438-2 (Part 15)<br>Check of resistance to impacts of large diameter ball according to Standard NF EN 438-2 (Part 21) | Once a month |
| A1.4. | **Certified characteristics** | |
| | Composition<br>Thickness<br>Resistance and flexural modulus according to Standard NF EN ISO 178<br>Resistance to pull-out by perpendicular tensile stress of inserts according to TD 15-03 method 1.8 (machining > 500 m$^2$) | Once a week with recording |
| A1.5. | **Pre-cut plates** | |
| | Functional inspections (machining, groove, inserts) | At each change once per shift |

## A2. WOOD PARTICLES/THERMOSETTING RESINS

Reference system: EN 622-2 STANDARD

**Classification according to the standard**

| Product class | Product name |
|---|---|
| HB.E | Hardboard panel intended for outside use as a non-structural component |

**Standards available**

- Formaldehyde content according to Standard NF EN 120;
- Flexural strength and modulus of elasticity in bending according to Standard NF EN 310;
- Swelling in thickness after immersion in water according to Standard NF EN 317;
- Boil test according to Standard NF EN 1087-1;
- Perpendicular tensile strength according to Standard NF EN 319;
- Determination of density according to Standard NF EN 323;
- Specifications for paints and varnishes for exterior wood according to Standard EN 927-2.

**General requirements**

| Characteristics | Test method | Unit | Nominal thickness ranges (mm) | | |
|---|---|---|---|---|---|
| | | | ≤ 3.5 | > 3.5 to < 5.5 | ≥ 5.5 |
| Swelling in thickness 24 h | EN 317 | % | 12 | 10 | 8 |
| Internal cohesion | EN 319 | $N/mm^2$ | 0.70 | 0.60 | 0.50 |
| Bending strength | EN 310 | $N/mm^2$ | 40 | 35 | 32 |
| Modulus of elasticity in bending | EN 310 | $N/mm^2$ | 3,600 | 3,100 | 2,900 |
| Internal cohesion after the boiling water test* | EN 319 EN 1087-1 | $N/mm^2$ | 0.50 | 0.42 | 0.35 |
| ** EN 1087-1:1995 is used with the modified procedure given in Appendix B* | | | | | |

**Consistency of self-inspection of production in the factory**

| § | Inspections | Frequencies |
|---|---|---|
| A2.1. | Dimensional inspections (length, width)<br>Functional inspections (flatness, squareness, etc.) | At each change and random sampling once per station |
| A2.2. | Inspection of visual appearance | Each panel |
| A2.3. | Moisture content<br>Density<br>Swelling in thickness at 24 h according to Standard EN 317<br>Or<br>Internal cohesion after the boiling water test according to standards EN 319 + EN 1087-1 | Once a month |
| A2.4. | **Certified characteristics** | |
| | Composition<br>Thickness according to Standard NF EN 324-1 or weight per linear metre<br>Bending strength according to Standard NF EN 310 | Once a week with recording |

## A3. WOOD PARTICLES/THERMOSETTING RESINS

### Standards available

- Long oriented strand boards, definition, classifications and specification EN 300;
- Formaldehyde content according to Standard NF EN 717-1;
- Flexural strength and modulus of elasticity in bending according to Standard NF EN 310;
- Swelling in thickness after immersion in water according to Standard NF EN 317;
- Boil test according to Standard NF EN 1087-1;
- Perpendicular tensile strength according to Standard NF EN 319;
- Particleboard, characteristics, conformity assessment and marking EN 13986;
- Determination of density according to Standard NF EN 323;
- Specifications for paints and varnishes for exterior wood according to Standard EN 927-2;
- Particleboard, Initial type testing and Production quality assurance operations EN 326-2.

### General requirements

| Characteristics | Test method | Unit | Requirements |
|---|---|---|---|
| | | | Nominal thickness ranges (mm) |
| | | | 11 |
| Flexural strength – lengthways | EN 310 | N/mm² | 35 |
| Flexural strength – widthways | EN 310 | N/mm² | 20 |
| Modulus of elasticity in bending – lengthways | EN 310 | N/mm² | 4,850 |
| Modulus of elasticity in bending – widthways | EN 310 | N/mm² | 1,950 |
| Internal cohesion | EN 319 | N/mm² | 0.6 |
| Swelling in thickness- 24 h immersion | EN 317 | % | 9 |
| Internal cohesion/boiling water test | EN 319 | N/mm² | 0.19 |

**Consistency of self-inspection of production in the factory**

| § | Inspections | Frequencies |
|---|---|---|
| A3.1. | Dimensional inspections (length, width)<br>Functional inspections (flatness, squareness, etc.) | At each change and random sampling once per station |
| A3.2. | Inspection of visual appearance | Each panel |
| A3.3. | Moisture content<br>Density<br>Internal cohesion as per EN 319<br>Internal cohesion after test cycling to EN321+EN319<br>or<br>Internal cohesion after the boiling water test according to standards EN 319 + EN 1087-1 | Once per station |
| A3.4. | **Certified characteristics** | |
| | Composition<br>Thickness according to Standard NF EN 324-1 or weight per linear metre<br>Bending strength according to Standard NF EN 310 | Once per station with recording |

## A4. WOOD PARTICULATE/THERMOSETTING RESINS

### Standards available

- Particleboard – Requirements EN 312;
- Formaldehyde content according to Standard NF EN 717-1;
- Flexural strength and modulus of elasticity in bending according to Standard NF EN 310;
- Swelling in thickness after immersion in water according to Standard NF EN 317;
- Boil test according to Standard NF EN 1087-1;
- Perpendicular tensile strength according to Standard NF EN 319;
- Determination of density according to Standard NF EN 323;
- Particleboard, Initial type testing and Production quality assurance operations EN 326-2;
- Particleboard, characteristics, conformity assessment and marking EN 13986;
- Specifications for paints and varnishes for exterior wood according to Standard EN 927-2.

### General requirements

| Characteristics | Test method | Unit | Requirements |
|---|---|---|---|
| | | | Nominal thickness ranges (mm) |
| | | | 6 - 13 |
| Bending strength | EN 310 | N/mm² | 15 |
| Modulus of elasticity in bending | EN 310 | N/mm² | 2,050 |
| Internal cohesion | EN 319 | N/mm² | 0.6 |
| Swelling in thickness- 24 h immersion | EN 317 | % | 7 |
| Internal cohesion after boiling water test | EN 1087-1 | N/mm² | 0.15 |
| Water absorption | EN 317 | % | 15 |

**Consistency of self-inspection of production in the factory**

| § | Inspections | Frequencies |
|---|---|---|
| A4.1. | Dimensional inspections (length, width)<br>Functional inspections (flatness, squareness, etc.) | At each change and random sampling once per station |
| A4.2. | Inspection of visual appearance | Each panel |
| A4.3. | Moisture content<br>Density<br>Internal cohesion as per EN 319<br>Water absorption<br>Internal cohesion and swelling after cyclic testing<br>or<br>Internal cohesion after the boiling water test according to Standards EN 319 + EN 1087-1 | Once per station |
| A4.4. | Certified characteristics | |
| | Composition<br>Thickness according to Standard NF EN 324-1 or weight per linear metre<br>Bending strength according to Standard NF EN 310 | Once per station with recording |

## A5. THERMOPLASTIC-BASED AND CELLULOSE OR NATURAL FIBRE-BASED COMPOSITES

### Standards available

- Boards for WPC and NFC cladding, EN 15534-5 specifications
- Boards for WPC and NFC cladding, EN 15534-1 test method
- Flexural strength and modulus of elasticity in bending according to Standards NF EN 310 and ISO 178
- Swelling in thickness after immersion in water according to Standard NF EN 317;
- Boil test according to Standard NF EN 1087-1;
- Artificial ageing behaviour ISO 4892-2
- Termite damage EN 117
- Specifications for paints and varnishes for exterior wood according to Standard EN 927-2.

### General requirements

| Characteristics | Test method | Unit | Requirements |
|---|---|---|---|
| Bending on compound | ISO 178 | N/mm² | Declared value |
| Bending on finished product<br>20°C and 65% RH | EN 15534-1 | N/mm² | Declared value by profile.<br>The moment of inertia for each profile to be provided |
| Bending at -18°C | EN 15534-1 | N/mm² | Δ strength and modulus ≤ 50% compared to normal conditions |
| Bending at +60°C | EN 15534-1 | N/mm² | strength and modulus ≤ 45% compared to normal conditions |
| Creep behaviour | EN 15534-1 | % | Creep coefficient, rate of elastic recovery < 10% |
| Impact resistance normal state and < 0°C | EN 477 | % | Maximum 1 break in 10 samples |
| Resistance to boiling water | EN 1087-1 | % | Individual value<br>Length ≤ 0.6% - width ≤ 1.5% Thickness ≤ 4%<br>Mass ≤ 7% |
| Water absorption | EN 317 | % | 15 |
| Resistance to artificial weathering | EN 15534-1 | | Declared by the manufacturer |

**Consistency of self-inspection of production in the factory**

| § | Inspections | Frequencies |
|---|---|---|
| A5.1. | Dimensional inspections (length, width, thickness, etc.)<br>Functional inspections (flatness, squareness, assembly, etc.)<br>Brinell hardness | At each change and random sampling once per station |
| A5.2. | Inspection of visual appearance | Each panel |
| A5.3. | Density<br>Heat shrinkage<br>Moisture resistance – boiling test | Once per station |
| A5.4 | Snap-off check<br>Impact resistance (energy ≥ 5 Joules, t ≤ 0°C) | Once a week |
| A5.5. | Certified characteristics | |
| | Composition<br>Flexural strength and modulus of elasticity in bending according to Standard EN 15534-5 on the finished product<br>and/or<br>Flexural strength and modulus of elasticity in bending of the compound according to ISO 178 | Once per station with recording |

# B. Resin mortar and resin compound/filler

## B1. STONES AGGLOMERATED BY POLYESTER OR ACRYLIC RESIN

Reference system: STANDARD NF EN 15286

**Standards available**

- Flexural strength and modulus of elasticity in bending according to Standard NF EN 14617-2;
- Bulk density and water absorption coefficient according to Standard 14617-1;
- Freeze–thaw resistance according to Standard NF EN 14617-5;
- Thermal shock resistance according to Standard NF EN 14617-6;
- Linear thermal expansion coefficient according to Standard NF EN 14617-11;
- Dimensional stability EN 14617-1;
- Determination of dimensions, geometric characteristics and surface quality of tiles according to Standard EN 15286 class A.

**Consistency of self-inspection of production in the factory**

| § | Inspections | Frequencies |
|---|---|---|
| B1.1. | Dimensional inspections (length, width)<br>Functional inspections (flatness, squareness, etc.)<br>Inspection of machining the groove (according to the installation)<br>Inspection of positioning the fasteners or inserts (according to the installation) | At each change and random sampling once per station |
| B1.2. | Inspection of visual appearance | Each panel |
| B1.3. | Certified characteristics | |
| | Composition<br>Thickness<br>Flexural strength according to Standard NF EN ISO 178<br>or<br>Flexural strength according to Standard NF EN 14617-2<br>or<br>Resistance to tearing of fasteners or inserts according to TD 15-03 method 1.8 | Once a week with recording |

## B2. POLYESTER RESIN LAMINATE

### Product assessment method

The European Standard or the EAD defining the minimal requirements is not available at this time.

Product family comes under an opt-in European Technical Assessment certification procedure.

The European Guideline ETAG 34 concerning exterior cladding kits can be used as one of the test reference documents.

### Standards available

- Flexural strength according to Standard NF EN ISO 14125;
- Mass per unit area according to Standard NF EN ISO 10352;
- Glass content according to Standard NF EN ISO 1172;
- Hardening characteristics according to Standard NF EN ISO 584 or NF EN ISO 12114;
- BARCOL hardness according to Standard NF T 57-106;
- Method of exposure to natural ageing according to Standard ISO 4607;
- Method of exposure to Xenon-arc sources according to Standards NF EN ISO 4892-1 and 2.

### Consistency of self-inspection of production in the factory

| § | Inspections | Frequencies |
|---|---|---|
| B2.0. | Glass content<br>Reactivity | Twice a year* |
| B2.1. | Dimensional inspections (length, width)<br>Functional inspections (flatness, squareness, mate fitting, etc.)<br>Checking BARCOL hardness according to Standard NF T 57-106 or impact resistance (D0.5,1 J) according to in-house method | At each change and random sampling once per station |
| B2.2. | Inspection of visual appearance | Each panel |
| B2.3. | **Certified characteristics** | |
| | Composition<br>Thickness or weight per m²<br>Flexural strength according to Standard NF EN ISO 14125 | Once a week with recording |

** Tests that can be carried out by the supplier if the manufacturer of the cladding elements purchases the raw material from a supplier that, at the manufacturer's request, makes the compound to order.*

## B3. POLYESTER RESIN COMPOUND

**Product assessment method**

The European Standard or the EAD defining the minimal requirements is not available at this time.

Product family comes under an opt-in European Technical Assessment certification procedure.

The European Guideline ETAG 34 concerning exterior cladding kits can be used as one of the test reference documents.

**Standards available**

- Flexural strength according to Standard NF EN ISO 14125;
- Mass per unit area according to Standard NF EN ISO 10352;
- Glass content according to Standard NF EN ISO 1172;
- Hardening characteristics according to Standard NF EN ISO 584 or NF EN ISO 12114;
- BARCOL hardness according to Standard NF T 57-106;
- Method of exposure to natural ageing according to Standard ISO 4607;
- Method of exposure to Xenon-arc sources according to Standards NF EN ISO 4892-1 and 2.

**Consistency of self-inspection of production in the factory**

| § | Inspections | Frequencies |
|---|---|---|
| B3.0. | Glass content<br>Reactivity | Twice a year* |
| B3.1. | Dimensional inspections (length, width)<br>Functional inspections (flatness, squareness, mate fitting, etc.)<br>BARCOL hardness check according to Standard NF T 57-106 or<br>Impact resistance (D0.5, 1 J) using internal method | At each change and random sampling once per station |
| B3.2. | Inspection of visual appearance | Each panel |
| B3.3. | Certified characteristics | |
| | Composition<br>Thickness or weight per m²<br>Flexural strength according to Standard NF EN ISO 14125<br>or<br>Maximal moment of the panel related to unit of width according to TD 15-03 method 2.1 on the vetures. | Once a week with recording |

** Tests that can be carried out by the supplier if the manufacturer of the cladding elements purchases the raw material from a supplier that, at the manufacturer's request, makes the compound to order.*

## B4. PVC-U RIGID RESIN COMPOUND

Reference system: EN 13245-2 STANDARD

**Classification according to the standard**

| Characteristics | Test method | Property or attribute<br>Unit | Class |
|---|---|---|---|
| Impact resistance | EN 13245-2 | Temperature (T), °C<br>and<br>Energy (J), Joules | (T, J)<br>min. code (23, 01) |
| Resistance to artificial ageing<br>(A for artificial)<br>or<br>Resistance to natural ageing<br>(N for natural) | Method A of Standard EN ISO 4892-2:1999<br>or<br>In listed sites, at 45° facing south | Total radiation GJ/m² (n) and Temperature (T), °C<br>or<br>Total radiation GJ/m² (n) and Temperature (T), °C | A, n, T<br>or<br>N, n, T |
| Impact strength after artificial ageing<br>or<br>Impact strength after natural ageing | EN 13245-2 | Temperature (T), °C and Duration (h), hour<br>or<br>Total radiation GJ/m² (n) and Temperature (T), °C | A, h, T<br>min. code (A, 2, 23)<br>or<br>N, n<br>min. code (N, 2) |

**Standards available**

- 23°C density according to Standard NF EN ISO 1183;
- Ash content according to Standard NF EN ISO 3451-5;
- Bending strength and modulus of elasticity in bending according to Standard NF EN ISO 527-2;
- Impact resistance according to Appendix A to Standard EN-13245-1;
- Method of exposure to natural ageing according to Standard ISO 4607;
- Method of exposure to Xenon-arc sources according to Standards NF EN ISO 4892-1 and 2.

**Consistency of self-inspection of production in the factory**

| § | Inspections | Frequencies |
|---|---|---|
| B4.0. | 23°C density<br>Ash content | Twice a year* |
| B4.1. | Dimensional inspections (length, width)<br>Functional inspections (flatness, squareness, mate fitting, etc.) | At each change and random sampling once per station |
| B4.2. | Inspection of visual appearance | Each panel |
| B4.3 | Impact resistance (energy ≥ 5 Joules, t ≤ 0°C) | Once a week |
| B4.4. | **Certified characteristics** | |
| | Composition<br>Thickness or weight per linear metre<br>Stress at creep threshold and elongation at rupture % according to Standard NF EN ISO 527-2 | Once a week with recording |

** Tests that can be carried out by the supplier if the manufacturer of the cladding elements purchases the raw material from a supplier that, at the manufacturer's request, makes the compound to order.*

## B5. EXPANDED OR CO-EXTRUDED PVC-UE RESIN COMPOUND

Reference system: NF EN 13245-2 STANDARD

**Classification according to the standard**

| Characteristics | Test method | Property or attribute<br>Unit | Class |
|---|---|---|---|
| Impact resistance | EN 13245-2<br>Appendix B | Temperature (T), °C<br>and Energy (J), Joules | (T, J)<br>mini code (23, 01) |
| Resistance to artificial ageing (A for artificial)<br>or<br>Resistance to natural ageing (N for natural) | Method A<br>of Standard<br>EN ISO 4892-3-1999 method 3<br>exposure no. 1<br>or<br>In listed sites,<br>at 45° facing south | Duration (h), hour and Temperature (T), °C<br>or<br>Total radiation GJ/m² (n)<br>and Temperature (T), °C | A, h, T<br>or<br>N, n, T |
| Impact strength after artificial ageing<br>or<br>Impact strength after natural ageing | EN 13245-2<br>Appendix B | Temperature (T), °C<br>and Duration (h), hour<br>or<br>Total radiation GJ/m² (n)<br>and Temperature (T), °C | A, h, T<br>min. code (A, 2, 23)<br>or<br>N, n, T<br>min. code (N, 2, 23) |

**Standards available**

- 23°C density according to Standard NF EN ISO 1183;
- Ash content according to Standard NF EN ISO 3451-5;
- Bending strength and modulus of elasticity in bending according to Standard NF EN ISO 178;
- Impact resistance according to Appendices B and D to Standard EN-13245-2;
- Method of exposure to natural ageing according to Standard ISO 4607;
- Method of exposure to Xenon-arc sources according to Standards NF EN ISO 4892-1;
- Artificial ageing: Method A of Standard EN ISO 4892-3:1999.

**Consistency of self-inspection of production in the factory**

| § | Inspections | Frequencies |
|---|---|---|
| B5.0. | 23°C density (core and skin)<br>Ash content (core and skin) | Twice a year* |
| B5.1. | Dimensional inspections (length, width)<br>Functional inspections (flatness, squareness, mate fitting, etc.)<br>Thickness of the skin (for coextruded) | At each change and random sampling once per station |
| B5.2. | Inspection of visual appearance | Each panel |
| B5.3 | Impact resistance (energy ≥ 5 Joules, t ≤ 0°C) | Once a week |
| B5.4. | **Certified characteristics** | |
| | Composition<br>Thickness or weight per linear metre<br>Flexural modulus according to Standard NF EN ISO 178 | Once a week<br>with recording |

** Tests that can be carried out by the supplier if the manufacturer of the cladding elements purchases the raw material from a supplier that, at the manufacturer's request, makes the compound to order.*

## B6. ROCKWOOL/THERMOSETTING RESINS

**Product assessment method**

The European Standard or the EAD defining the minimal requirements is not available at this time.

Product family comes under an opt-in European Technical Assessment certification procedure.

The European Guideline ETAG 34 concerning exterior cladding kits can be used as one of the test reference documents.

**Standards available: No applicable reference system**

**Consistency of self-inspection of production in the factory**

| § | Inspections | Frequencies |
|---|---|---|
| B6.0. | Resistance to light under xenon arc lamp after 3,000 h of exposure (6 MJ/m$^2$) under the conditions set out in Standard NF EN 438-2 (Part 28), assessment based on greyscale (Standard EN 20105-A02) ≥ 3 | At each new manufactured colour |
| B6.1. | Dimensional inspections (length, width)<br>Functional inspections (flatness, squareness, mate fitting, etc.)<br>Checking fire loss (internal method) | At each change and random sampling once per station |
| B6.2. | Inspection of visual appearance | Each panel |
| B6.3. | Checking water absorption (internal method)<br>Checking swelling after immersion according to Standard NF EN 317<br>or<br>Checking transverse tensile strength after immersion in boiling water according to Standard NF EN 1087-1, then Standard NF EN 319 | Per production run and sampling once a month |
| B6.4. | **Certified characteristics** | |
| | Thickness<br>Checking apparent density according to Standard NF EN 323<br>Checking flexural strength according to Standard NF EN 310 | Per production run and random sampling once a week |

## B7. POLYESTER RESIN LAMINATE + CEMENT OR HYDRAULIC MORTAR

### Product assessment method

The European Standard or the EAD defining the minimal requirements is not available at this time.

Product family comes under an opt-in European Technical Assessment certification procedure.

The European Guideline ETAG 34 concerning exterior cladding kits can be used as one of the test reference documents.

### Standards available

- Flexural strength according to Standard NF EN ISO 14125;
- Mass per unit area according to Standard NF EN ISO 10352;
- Glass content according to Standard NF EN ISO 1172;
- Reactivity according to Standard NF EN ISO 584 or NF EN ISO 12114.

### Consistency of self-inspection of production in the factory

| § | Inspections | Frequencies |
|---|---|---|
| B7.0. | Glass content in the polyester laminate<br>Reactivity of the polyester laminate | Twice a year* |
| B7.1. | Dimensional inspections (length, width)<br>Functional inspections (straightness of edges, squareness, etc.) | At each change in dimensions and/or raw material, and random sampling once per station |
| B7.2. | Inspection of visual appearance | Each panel |
| B7.3. | Flexural strength according to method A4 of TD 15-03 | Once a month |
| B7.4. | **Certified characteristics** | |
| | Composition<br>Thickness or weight per m²<br>Pull-out strength of the facing on a built-up cladding or cladding composite element according TD 15-03 method 1.5 | Once a week with recording |

** Tests that can be carried out by the supplier if the manufacturer purchases the raw material from a supplier that, at the manufacturer's request, makes the compound or composite panel to order.*

## B8. RESIN MORTAR - GLASS FACING

**Product assessment method**

The European Standard or the EAD defining the minimal requirements is not available at this time.

Product family comes under an opt-in European Technical Assessment certification procedure.

The European Guideline ETAG 34 concerning exterior cladding kits can be used as one of the test reference documents.

**Standards available**

- Flexural strength according to Standard NF EN ISO 178;
- Mass per unit area according to Standard NF EN ISO 10352;
- Glass content according to Standard NF EN ISO 1172;
- BARCOL hardness according to Standard NF T 57-106;
- Reactivity according to Standard NF EN ISO 584 or NF EN ISO 12114;
- Evaluation of conformity of soda lime silicate safety glass according to EN 12150-2.

**Consistency of self-inspection of production in the factory**

| § | Inspections | Frequencies |
|---|---|---|
| B8.0. | Glass content of the mortar<br>Reactivity<br>CE mark conformity certificate of the glass facing | Once every six months |
| B8.1. | Testing dimensional quality of the mortar-on-insulation (length, width, thickness)<br>Testing BARCOL hardness of mortar-on-insulation according to Standard NF T 57-106 or other means<br>Testing functional quality of mortar-on-insulation (flatness, squareness, etc.)<br>Testing the position of the fixings on the mortar-on-insulation<br>Testing the bonding glue (reactivity, hardness and ratio)<br>Testing the bonding (thickness and spread)<br>Testing functional and dimensional quality on finished products (length, width, total thickness and component thicknesses, flatness, squareness, position of the fixing system) | At each change and random sampling once per station |
| B8.2. | Flexural strength of the mortar-on-insulation according to Standard NF EN ISO 178 | Once a week with recording |
| B8.3. | Inspection of visual appearance | Each panel |
| B8.4. | **Certified characteristics** | |
| | Composition<br>Total and per-component thicknesses<br>Pull-out strength of the facing according TD 15-03 method 1.5. | Once a week with recording |

# C. Hydraulic mortar

## C1. HYDRAULIC MORTAR

**Product assessment method**

The European Standard or the EAD defining the minimal requirements is not available at this time.

Product family comes under an opt-in European Technical Assessment certification procedure.

The European Guideline ETAG 34 concerning exterior cladding kits can be used as one of the test reference documents.

**Standards available**

- Flexural strength and modulus of elasticity in bending according to Standard NF EN 14617-2;
- Bulk density and water absorption coefficient according to Standard 14617-1;
- Freeze–thaw resistance according to Standard NF EN 14617-5;
- Thermal shock resistance according to Standard NF EN 14617-6;
- Linear thermal expansion coefficient according to Standard NF EN 14617-11;
- Determination of dimensions, geometric characteristics and surface quality of modular tiles according to Standard NF EN 14617-16.

**Consistency of self-inspection of production in the factory**

| § | Inspections | Frequencies |
|---|---|---|
| C1.1. | Dimensional inspections (length, width)<br>Functional inspections (flatness, squareness, etc.)<br>Inspection of machining the groove (according to the installation)<br>Inspection of positioning the fasteners or inserts (according to the installation) | At each change and random sampling<br>once per station |
| C1.2. | Inspection of visual appearance | Each panel |
| C1.3. | **Certified characteristics** | |
| | Composition<br>Thickness<br>Flexural strength according to Standard NF EN 14617-2<br>and<br>Pull-out strength of fasteners or inserts | Once a week with recording |

## C2. COMPOSITE CEMENT GLASS MORTAR

**Product assessment method**

The European Standard or the EAD defining the minimal requirements is not available at this time.

Product family comes under an opt-in European Technical Assessment certification procedure.

The European Guideline ETAG 34 concerning exterior cladding kits can be used as one of the test reference documents.

**Standards available**

- Consistency of the matrix, 'Slump test' method according to Standard NF EN 1170-1;
- Fibre content according to Standard NF EN 1170-2;
- Flexural strength according to Standard NF EN 1170-4 and 5;
- Dry density and water absorption according to Standard NF EN 1170-6;
- Extreme variations due to moisture content according to Standard NF EN 1170-7;
- Cycling weathering test method according to Standard NF EN 1170-8;
- Freeze–thaw resistance according to Standard NF EN 14617-5;
- Thermal shock resistance according to Standard NF EN 14617-6;
- Linear thermal expansion coefficient according to Standard NF EN 14617-11;
- Determination of dimensions, geometric characteristics and surface quality of modular tiles according to Standard NF EN 14617-16.

**Consistency of self-inspection of production in the factory**

| § | Inspections | Frequencies |
|---|---|---|
| C2.1. | Dimensional inspections (length, width)<br>Functional inspections (flatness, squareness, etc.)<br>Inspection of machining the groove (according to the installation)<br>Inspection of positioning the fasteners or inserts (according to the installation) | At each change and random sampling once per station |
| C2.2. | Inspection of visual appearance | Each panel |
| C2.3. | **Certified characteristics** | |
| | Composition<br>Thickness<br>Flexural strength according to Standard NF EN 1170-5<br>and<br>Pull-out strength of fasteners or inserts | Once a week with recording |

## C3. FIBRE CEMENT

Reference system: STANDARD NF EN 12467

### Classification according to the standard

The mechanical strength class is defined in Standard EN 12467 and applies to a finished product ready for delivery.

Weather resistance category: A for severe outside grade.

Category of tolerances on the nominal dimensions: Level 1.

Note: The 'QB' mark of fibre-cement flat panels applies, on the date of approval of this reference system, to NT type products only, due to decree no. 96-1133 of 24 December 1996 on the asbestos ban.

### Standards available

- Geometric inspections according to Standard NF EN 12467;
- Functional inspections according to Standard NF EN 12467;
- Wet density and flexural strength in the wet state according to Standard NF EN 12467;
- Dry density and water tightness according to Standard NF EN 12467;
- Climatic performance testing according to Standard NF EN 12467.

### Consistency of self-inspection of production in the factory

| § | Inspections | Frequencies |
|---|---|---|
| C3.1. | Dimensional inspections (length, width)<br>Functional inspections (flatness, squareness, etc.)<br>Inspection of positioning the fasteners or inserts (according to the installation) | At each change and random sampling once per station |
| C3.2. | Inspection of visual appearance | Each panel |
| C3.3. | Apparent dry density according to Standard NF EN 12467 or wet density (according to internal method) | Once a week |
| C3.4. | **Certified characteristics** | |
| | Composition<br>Thickness<br>Flexural strength in the wet state according to Standard NF EN 12467<br>and<br>Pull-out strength of fasteners or inserts according to TD 15-03 method 1.8 | Once a week with recording |

## C4. CEMENT MORTAR AND TERRA-COTTA SLIP

### Product assessment method

The European Standard or the EAD defining the minimal requirements is not available at this time.

Product family comes under an opt-in European Technical Assessment certification procedure.

The European Guideline ETAG 34 concerning exterior cladding kits can be used as one of the test reference documents.

### Standards available

- Specifications and test methods according to Standard NF P 13-307;
- Principle and general test procedures for impact resistance tests according to Standard NF P 08-301;
- Adhesive strength of hardened rendering and plastering mortars on clay units according to Standard NF EN 1015-12.

### Consistency of self-inspection of production in the factory

| § | Inspections | Frequencies |
|---|---|---|
| C4.0 | Checking the colour and appearance of the tiles | At each delivery |
| C4.1. | Dimensional inspections (length, width)<br>Functional inspections (flatness, squareness, etc.) | At each change and random sampling once per station |
| C4.2. | Inspection of visual appearance | Each panel |
| C4.3. | Resistance to impact from a soft body (M50-130J) on an element according to Standard NF P 08-301 | Once a month |
| C4.4. | **Certified characteristics** | |
| | Composition<br>Thickness<br>Adhesive strength of hardened rendering and plastering mortars on clay units according to Standard NF EN 1015-12 | Once a week with recording |

## C5. CEMENT WOOD COMPOSITE

**Applicable standard: NF EN 634-2**

Classification according to the standard

| Modulus of elasticity in minimum bending | |
|---|---|
| **CLASSE 1** | **CLASSE 2** |
| 4500 MPa | 4000 MPa |

**Available Standards:**

- Cement-related particle board, specific requirements EN 634-1
- Particle board related to cement definition and classification EN 633
- Wood-based panels sampling, cutting and control EN 326-2
- Wood based panels moisture determination EN 322
- Wood-based panels for construction, Characteristics, conformity assessment and marking EN 13986

**Dimensional tolerances**

| **Caractéristique** | **Exigence** |
|---|---|
| Thickness | +/- 0.3 mm |
| Length, width | +/- 5mm |
| Edge straightness | 1.5 mm/m |
| squarness | 2 mm/m |

**Specific requirement**

| **Caractéristique** | **Méthode d'essai** | **Unité** | **Exigences** |
|---|---|---|---|
| Density | EN 323 | $Kg/m^3$ | 1000 |
| Bending strength | EN 310 | $N/mm^2$ | 9 |
| Modulus of elasticity | EN 310 | $N/mm^2$ | Classe 1 : 4500<br>classe 2 : 4000 |
| Internal cohesion | EN 319 | $N/mm^2$ | 0.5 |
| Swelling in thickness 24h | EN 317 | % | 1.5 |
| Internal cohesion after moisture cycle | EN 321 + EN 319 | $N/mm^2$ | 0.3 |
| Swelling in thickness after moisture cycle | EN 321 + EN 317 | % | 1.5 |

**Requirements for resistance to climatic conditions**

| features | **Méthode of test** | **Propriété ou attribut** | **Unité** (max. ou mini.) | **Spécification** |
|---|---|---|---|---|
| Resistance to ultraviolet light | EN 438-2, article n°28 | Contrast<br>Aspect | value on gray scale (no worse than) Ranking (min.)<br>Ranking (min.) | 3 (after 1 500 h exposition)<br>4 (après 1 500 h d'exposition) |
| Resistance to artificial aging (including color fastness) | EN 438-2, article n°29 | Contrast<br>Aspect | value on gray scale (no worse than) Ranking (min.)<br>Ranking (min.) | 3 (after exposition, energy 650 MJ/m$^2$)<br>4 (after exposition, energy 650 MJ/m$^2$)) |

**Consistency of self-inspection of production in the factory**

| **§** | **Contrôles** | **Fréquences** |
|---|---|---|
| C5.0. | Resistance to light under xenon arc lamp after 3000 h of exposure (650 MJ/m2) according to NF EN 438-2 (part 29): evaluation according to the gray scale (standard EN20105-A02) 3 3 | Each new color, product change |
| C5.1 | Dimensional controls (length, width, thickness)<br>Functional controls (flatness, squareness, straightness, etc.) | At each change and random sampling 1 time every 2 hours |
| C5.2. | Visual control | Each panel |
| C5.3. | Internal cohesion EN 319<br>Swelling in thickness EN 317 | 1 per day |
| C5.4. | Internal cohesion after moisture cycle EN 321 + EN 319<br>Swelling thickness after moisture cycle EN 321 + EN 317 | 1 fois par semai1 per week |

| | **Caractéristiques certifiées** | |
|---|---|---|
| C5.5 | Composition<br>density<br>Bending resistance and modulus according to EN 310 | 1 per shift |

## D-Terra-cotta and ceramic

Reference system: STANDARD NF EN 1304 (terra-cotta wall cladding)
or Standard NF EN 14411 (ceramic tiles and panels)

**Classification according to the standard**

The product class is defined in Standard EN-1304:

- Level for waterproofing of the products: level 1.

The product class for exterior use according to Standard EN-14411 is defined in § ZA.1.:

- The product can be made by drawing (Group A) or by pressing (Group B);
- Drawn ceramic tiles and panels of Group A Ia or A Ib (E ≤ 3%);
- Pressed ceramic tiles and panels of Group B Ia or B Ib (E ≤ 3%).

For applications in built-up cladding or in cladding, the products coming from the classes indicated below can be admitted if the behaviour under freezing of the product has been corroborated by a test of bending strength after freezing/thawing cycle:

| **Production method** | **Group $II_a$**<br>**3% < E ≤ 6%** | **Group $II_b$**<br>**6% < E ≤ 10%** |
|---|---|---|
| **A - Drawn** | A $II_a$-part 1 | A $II_b$-part 1 |
| **B – Dry pressed** | B $II_a$ | B $II_b$ |

**Standards available**

- Geometric characteristics according to Standard NF EN 1024;
- Flexural strength according to Standard NF EN 538;
- Water absorption according to Appendix B to Standard NF EN 539-2;
- Freeze resistance according to Method C of Standard NF EN 539-2;
- Dimensional characteristics according to Standard NF EN ISO 10545-2;
- Water absorption, apparent porosity and density according to Standard NF EN ISO 10545-3;
- Flexural strength according to Standard NF EN ISO 10545-4;
- Moisture expansion according to Standard NF EN ISO 10545-10;
- Frost and thaw resistance according to Standard NF EN ISO 10545-12.

**Consistency of production self-inspection at the factory and/or at the reprocessor**

| § | Inspections | Frequencies |
|---|---|---|
| D1. | Dimensional inspections (length, width)<br>Functional inspections (flatness, squareness, straightness of edges, etc.)<br>Edge profile, dimensions of the fastening lips and the insert notching<br>Water absorption (according to internal method)<br>Skill in installing the anti-fragmenting system for the tiles: quality assurance checks on bond-glue reactivity, hardness, ratio and quantity<br>Strength test on the anti-fragmentation mesh according to internal method | At each change and random sampling once per station |
| D2. | Inspection of visual appearance (bursting and cracking, bloom, crazing, etc.) | Each panel |
| D3. | Water absorption according to Appendix B to Standard NF EN 539-2<br>or<br>Water absorption, apparent porosity and apparent relative density according to Standard NF EN ISO 10545-3<br>Freeze resistance according to method C of Standard NF EN 539-2, followed by:<br>Bending strength according to Standard NF EN 538<br>or<br>Freeze and thaw resistance according to Standard NF EN ISO 10545-12 followed by:<br>Flexural strength according to Standard NF EN ISO 10545-4 | Once every quarter |
| D4. | **Certified characteristics** | |
| | Composition<br>Thickness or weight per linear metre<br>Bending strength according to Standard NF EN 538<br>or<br>Flexural strength according to Standard NF EN 10545-4<br>Pull-out strength of fastening lips according to TD 15-03 method 1.10<br>or<br>Pull-out strength of fastening sockets according to TD 15-03 method 1.11<br>or<br>Pull-out strength of inserts according to TD 15-03 method 1.8 | Once a week with recording |

# D. Composite panels and composite panels with metal facing

## E1. COMPOSITE PANEL OF ALUMINIUM SHEET AND POLYURETHANE LAYER

### Product assessment method

The European Standard or the EAD defining the minimal requirements is not available at this time.

Product family comes under an opt-in European Technical Assessment certification procedure.

The European Guideline ETAG 34 concerning exterior cladding kits can be used as one of the test reference documents.

### Standards available

- Dimensional tolerances: Appendix D to Standard NF EN 14509;
- Material characteristics: Appendix A3 to Standard NF EN 14509, Appendices C3 and C4 of European Technical Approval Guideline no. 16;
- Mechanical properties of aluminium and aluminium alloy sheets, strips and plates according to Standard EN 485-2;
- Chemical composition of the aluminium and aluminium alloy according to Standard EN 573;
- Specifications for coil coated aluminium and aluminium alloy sheets and strips according to Standard EN 1396.

### Consistency of self-inspection of production in the factory

| § | Inspections | Frequencies |
|---|---|---|
| E1.0. | For the sheet metal: acceptance certificate 3.1. A according to Standard EN 10204 | At each delivery |
| E1.1. | Dimensional inspections (length, width)<br>Functional inspections (flatness, squareness, mate fitting, straightness of edges, etc.) | At each change and random sampling once per station |
| E1.2. | Inspection of visual appearance | Each panel |
| E1.3. | Certified characteristics | |
| | Composition<br>Thickness or mass per unit area<br>Bending shear strength according to Standard NF EN 14509 | Once a week with recording |

## E2. COMPOSITE PANEL OF ALUMINIUM SHEET AND POLYETHYLENE

**Product assessment method**

The European Standard or the EAD defining the minimal requirements is not available at this time.

Product family comes under an opt-in European Technical Assessment certification procedure.

The European Guideline ETAG 34 concerning exterior cladding kits can be used as one of the test reference documents.

**Standards available**

- Dimensional tolerances: Appendix D to Standard NF EN 14509;
- Characteristics of the material: peel resistance according to Standard ASTM D-1781, ASTM D-903 or ASTM D-1876;
- Mechanical properties of aluminium and aluminium alloy sheets, strips and plates according to Standard EN 485-2;
- Chemical composition of the aluminium and aluminium alloy according to Standard EN 573;
- Specifications for coil coated aluminium and aluminium alloy sheets and strips according to Standard EN 1396.

**General requirements**

**Minimum peel value according to ASTM 903: PE core: 4 N/mm – FR: 4 N/mm – A2: 3 N/mm**

**Consistency of factory production self-inspection of manufactured panels**

| § | Inspections | Frequencies |
|---|---|---|
| E2.0. | For the sheet metal: acceptance certificate 3.1 A according to Standard EN 10204 | At each delivery |
| | HHV testing for FR and A2 core | Rolls: Once every 5 rolls<br>Granules (external or internal) once every 5 batches |
| E2.1. | Dimensional inspections (length, width)<br>Functional inspections (flatness, squareness, mate fitting, straightness of edges, etc.)<br>Dimensional inspections of cassettes and catches (making cassettes using panels) | At each change and random sampling once per station |
| E2.2. | Inspection of visual appearance | Each panel |

| | | |
|---|---|---|
| E2.3 | 4-point bending tests according to method A4 of TD 15-03 | Once every quarter |
| E2.4. | Peel resistance according to Standard ASTM D 1781, ASTM D 903 or ASTM D 1876 after heat conditioning (6 hours in boiling water – Test on samples at ambient temperature) – Unchanged performance. | Once a month |
| E2.4. | **Certified characteristics** | |
| | Composition<br>Thickness or mass per unit area<br>Peel resistance according to Standard ASTM D 903 after 24 h.* | Once a week<br>with recording |

***If the manufacturer would like to use another method, they must produce a scatter plot with the ASTM D 903 method for each type of core and thickness.**

**The mark laboratory will use only the ASTM D903 standard for corroboration tests for all types of cores.**

**The current certificates will be revised before December 2018 to indicate the certified peel value only according to ASTM D 903.**

**The bending test (internally or subcontracted) shall be implemented by the holder prior to December 2018.**

**Consistency of self-inspection for reprocessing the cassettes**

| § | Inspections | Frequencies |
|---|---|---|
| E2.5. | Project review, technical files. Placing of component orders | At each project.<br>Establish whether the project is covered by the Technical Appraisal |
| E2.6. | Internal procedures and documented quality assurance checks on in-bound deliveries of the elements to be reprocessed, the components and the accessories | At each delivery |
| E2.27 | Inspection of visual appearance | Each element |
| E2.8 | **Certified characteristics** | |
| | Functional and dimensional inspection: width, length, catch position and size, flatness, straightness, assembled kit test.<br>Machining inspection: angle, depth, residual thickness. | At start-up, at every change in reference produced and every 50 elements |

**For stiffeners with structural adhesive:**

**Examination must be formalised in agreement with the adhesive supplier**
**The batches for each component must be recorded.**
**Temperature and humidity recorded at each station**
**Suitability tests on each side of the stiffener, may be completed by the putty supplier.**
**Frequency: Once per project and after each change in adhesive, stiffener and facing batch**

peeling on anodised:
• 3 specimens initially 100% cohesive
• 3 specimens after 7 days at 23°C in water 100% cohesive
• 3 specimens after 7 days in a dry heat oven at 100°C 100% cohesive

peeling on lacquered:
• 3 specimens initially 100% cohesive
• 3 specimens after 7 days at 23°C + in water 100% cohesive
• 3 specimens after 7 days at 23°C in water + 7 days at 55°C in water. 100% cohesive

## E3. COMPOSITE PANEL OF STEEL SHEETS AND VARIOUS CORES

**Product assessment method**

The European Standard or the EAD defining the minimal requirements is not available at this time.

Product family comes under an opt-in European Technical Assessment certification procedure.

The European Guideline ETAG 34 concerning exterior cladding kits can be used as one of the test reference documents.

**Standards available**

- Dimensional tolerances: Appendix D to Standard NF EN 14509;
- Material characteristics: Appendix A3 to Standard NF EN 14509, Appendices C3 and C4 of European Technical Approval Guideline no. 16.

**Consistency of self-inspection of production in the factory**

| § | Inspections | Frequencies |
|---|---|---|
| E3.0. | For the sheet metal: acceptance certificate 3.1. A according to Standard EN 10204 | At each delivery |
| E3.1. | Dimensional inspections (length, width)<br>Functional inspections (flatness, squareness, mate fitting, straightness of edges, etc.) | At each change and random sampling once per station |
| E3.2. | Inspection of visual appearance | Each panel |
| E3.3. | **Certified characteristics** | |
| | Composition<br>Thickness or mass per unit area<br>Bending force causing a deformation of 1/200 of the span according to TD 15-03 method 2.1<br>and<br>Strength of inserts according to TD 15-03 method 1.8 | Once a week with recording |

## E4. COMPOSITE PANEL OF STONE AND VARIOUS CORES

### Product assessment method

The European Standard or the EAD defining the minimal requirements is not available at this time.

Product family comes under an opt-in European Technical Assessment certification procedure.

The European Guideline ETAG 34 concerning exterior cladding kits can be used as one of the test reference documents.

### Standards available

- Requirements for stone used as a façade finish according to Standard EN 1469;
- Density and porosity according to Standard NF EN 1936;
- General prescriptions for use of natural stones according to Standard NF B 10-601;
- Bending strength according to Standard NF EN 12372;
- Freeze resistance according to Standard NF EN 12371;
- Breaking load at dowel hole according to Standard NF EN 13364.

**Consistency of self-inspection of production in the factory**

| § | Inspections | Frequencies |
|---|---|---|
| E4.0. | Documented internal procedure for acceptance inspection of stones | At each delivery |
| | Porosity and apparent density according to Standard NF EN 1936 | Once every two years |
| | Flexural strength according to Standard NF EN 12372 | Once every two years |
| E4.1. | Dimensional inspections (length, width)<br>Functional inspections (flatness, squareness, mate fitting, straightness of edges, etc.)<br>Checking the positioning of the inserts | At each change and random sampling once per station |
| E4.2. | Inspection of visual appearance and defects (of the stone) | Each panel |
| E4.3. | Bending force causing a deformation of 1/200 of the span according to TD 15-03 method 2.1<br>or<br>Resistance to perpendicular tensile force according to TD 15-03 method 2.27 | Once a month |
| E4.4. | **Certified characteristics** | |
| | Thickness<br>Pull-out strength by perpendicular tensile stress of inserts according to TD 15-03 method 1.8 | Once a week<br>with recording |

## E5. HONEYCOMB CORE ALUMINIUM FACING

### Product assessment method

Product family comes under an opt-in European Technical Assessment certification procedure.

The European Guideline ETAG 34 concerning exterior cladding kits and TR 39 on ventilated façade systems with composite panels can be used as test reference systems.

### Standards available

- ASTM 1781-1 peeling
- EN 826 determining compression behaviour of insulating products
- EN 1607 determining tensile strength of insulating products
- EN 14509 sandwich panel standard

### General requirements, type testing

- Thermal shock resistance according to TR 39
- Compression according to TR 39
- Tensile strength according to TR 39 initial state
- Tensile strength after conditioning, §E.4 of TR 39
- Bending according to TR 39
- Corrosion according to Standard NF EN 1396
- 2000 h UV ageing according to method A cycle 1 of ISO 16474-2 for each type of covering and colour

**Consistency of self-inspection of production in the factory**

| § | Inspections | Frequencies |
|---|---|---|
| E5.0. | For the sheet metal: acceptance certificate 3.1 A according to Standard EN 10204 or equivalent.<br>Adhesive test report<br>Honeycomb | At each delivery |
| E5.1 | Adhesive quantity during production<br>HHV on the adhesive | Once every quarter<br>Once a month |
| E51. | Dimensional inspections (length, width, thickness)<br>Functional inspections (flatness, squareness, mate fitting, straightness of edges, thickness, etc.)<br>Checking the positioning of the inserts | At each change and random sampling once per station |
| E5.1. | Inspection of visual appearance and defects (of the stone) | Each panel |
| E5.2 | Salt spray 4000 h according to EN 1396 | Once a year, verification of appearance |
| E5.3 | 4-point bending test according to method 1.1 of TD 15-03 after boiling in water for 6 h - Test on samples at ambient temperature with edges closed and sealed edges - No change in performance | Once a month |
| E5.4. | **Certified characteristics** | |
| | Thickness<br>Weight per m²<br>Pull-out testing according to method 1.8 TD 15-03<br>Peel resistance according to ASTM 1781<br>4-point bending tests according to method 1.1 TD 15-03 | Once a week<br>with recording |

**Consistency of self-inspection for reprocessing**

| § | Inspections | Frequencies |
|---|---|---|
| E5.6 | Project review, technical files. Placing of component orders | At each project.<br>Establish whether the project is covered by the Technical Appraisal |
| E5.7 | Internal procedures and documented quality assurance checks on in-bound deliveries of the elements to be reprocessed, the components and the accessories | At each delivery |
| E 5.8 | Inspection of visual appearance | Each element |
| E5.9 | **Certified characteristics** | |
| | Functional and dimensional inspection: width, length, size, squareness | At start-up, at every change in reference produced and every 50 elements |
| | Pull-out strength by perpendicular tensile stress of inserts according to TD 15-03 method 1.8 (every 500 m²). Can be carried out by the panel or insert manufacturer | Once a week<br>with recording |

## E. Thermally modified natural wood

Reference system: NF EN 14915

**Classification according to the standard**

The standard does not define the product class for outside use.

**Standards available**

- Moisture content, density and flexural strength according to Standard NF EN 408;
- Principles of testing and classification of the natural durability of wood according to Standard EN 350-1;
- Dimensional tolerances according to Standard NF EN 13647;
- Moisture content according to Standard EN 13183-1;
- Dimensional stability according to Standard EN 1910;
- Radial and tangential swelling according to Standard ISO 4859.

**Consistency of self-inspection of production in the factory**

| § | Inspections | Frequencies |
|---|---|---|
| F.0. | Documented internal procedure for acceptance inspection of the wood | At each delivery |
| F.1. | Dimensional inspections (length, width)<br>Functional inspections (flatness, squareness, mate fitting, straightness of edges, etc.) | At each change and random sampling once per station |
| F.2. | Inspection of visual appearance | Each panel |
| F.3. | Moisture content according to Standard NF EN 408<br>Determination of radial and tangential swelling according to Standard ISO 4859 | At each loading and random sampling<br>once per station |
| F.4. | **Certified characteristics** | |
| | Species<br>Thickness or linear density<br>Bending force according to Standard NF EN 408 | Once a week with recording |

## F. NATURAL STONE

Reference system: NF EN 1469 (wall cladding in natural stone slips)

**Requirements**

| Characteristics | Classes | Tolerances |
|---|---|---|
| Nominal thickness in mm | 12< to ≤ 30 mm | ± 10% |
| | 30< to ≤ 80 mm | ± 3 mm |
| Length and width | th ≤ 50 mm and dimensions < 600 mm | ± 1 mm |
| | th ≤ 50 mm and dimensions < 600 mm | ± 1.5 mm |
| Location of the stud holes | With relation to an edge | ± 2 mm |
| | With relation to the exposed face | ± 1 mm |
| | In depth | + 3 mm/- 1 mm |
| | Diameter | + 1 mm/- 0.5 mm |

Requirements on surface finish: defined under § 4.1.8.

Flexural strength, water absorption, apparent density and porosity: no level or class required.

**Standards available**

- Requirements for stone used as a façade finish according to Standard EN 1469;
- Water absorption by capillarity according to Standard NF EN 1925;
- Density and porosity according to Standard NF EN 1936;
- General prescriptions for use of natural stones according to Standard NF B 10-601;
- Permeability to water vapour according to Standard NF EN 12524;
- Freeze resistance according to Standard NF EN 12371;
- Bending strength according to Standard NF EN 12372;
- Breaking load at dowel hole according to Standard NF EN 13364;
- Thermal shock resistance according to Standard NF EN 14066;
- Water absorption at atmospheric pressure according to Standard NF EN 13755.

**Consistency of self-inspection of production in the factory**

| § | Inspections | Frequencies |
|---|---|---|
| G.0. | Documented internal procedure for acceptance inspection of stones | At each delivery |
| | Porosity and apparent density according to Standard NF EN 1936 | Once every two years |
| | Bending strength according to Standard NF EN 12372 | Once every two years |
| G.1. | Dimensional inspections (length, width)<br>Functional inspections (flatness, squareness, mate fitting, straightness of edges, etc.) | At each change and random sampling once per station |
| G.2. | Inspection of visual appearance | Each panel |
| G.3. | **Certified characteristics** | |
| | Thickness<br>Geometrical inspection of the groove (if taken in continuous rabbet)<br>Strength of catches according to TD 15-03 method 1.9<br>or<br>Pull-out strength of inserts according to TD 15-03 | Once a week with recording |

## H TRANSFORMATEURS

**Experience required of 10,000 m² minimum or 5 references sites for any new request and per product family.**

**Self-control consistency for transformers performing cutting and machining for invisible fasteners of families:**
- **A1 laminates/thermosetting resins**
- **C3 Fibre Cement**

| Controls | Fréquency |
|---|---|
| Project review, technical files | At each project |
| Component Controls | Determine if the project is covered by the Technical Opinion |
| Internal procedures and documented control of approvals of elements to be transformed, components and accessories | At each reception |
| Visual control | Each element |
| **Certified values** | |
| Dimensional and functional controls: width, length, dimensional, flatness, straightness<br>Dimensional control of the fastening system<br>Assembly test<br>Pull-out resistance by perpendicular traction of inserts according to DT 15-03 method 1.8 Can be realized by the plate or insert manufacturer | At startup, with each change of reference and each 50 element<br><br>1 time per week if more than 500 m² and at least 1 time per quarter |

**Consistency of self-control for the transformation of the family**
- **E5 Ame honeycomb aluminum siding**

| Controls | Fréquency |
|---|---|
| Project review, technical files | At each project |
| Component Controls | Determine if the project is covered by the Technical Opinion |
| Internal procedures and documented control of approvals of elements to be transformed, components and accessories | At each reception |
| Visual control | Each element |
| **Certified values** | |

| | |
|---|---|
| Dimensional and functional controls: width, length, dimensional, flatness, straightness<br>Dimensional control of the fastening system<br>Assembly test | At startup, with each change of reference and each 50 element |
| Pull-out resistance by perpendicular traction of inserts according to DT 15-03 method 1.8 Can be realized by the plate or insert manufacturer | 1 time per week if more than 500 m² and at least 1 time per quarter |

- **Consistency of self-control for the transformation of the family**
- **E2 Composite panel aluminium face and core polyethylenne**

| **Controls** | **Fréquency** |
|---|---|
| Project review, technical files | At each project |
| Component Controls | Determine if the project is covered by the Technical Opinion |
| Internal procedures and documented control of approvals of elements to be transformed, components and accessories | At each reception |
| Visual control | Each element |
| **Certified values** | |
| Dimensional and functional control: width, length, dimensional and notch position, flatness, straightness, assembly test.<br>Milling control: angle, depth, residual thickness | At startup, with each change of reference and each 50 element |

**Case of stiffeners with structural bonding:**
**An instruction must be formalised in agreement with the glue supplier.**
**Batches of each component must be recorded.**
**Temperature and humidity recording at each station**
**Suitable test on each side of the stiffener, can be performed by the mastic supplier or external laboratory.**
**Frequency: 1 time per project and each batch change glue, stiffener and siding**
**coat on anodized:**
**• 3 initial 100% cohesive specimens**
**• 3 specimens after 7 days at 23°C in the water**
**• 3 specimens after 7 days in a dry oven at 100 °C100 % cohesive**

**Coat on lacquer::**
**• 3 initial 100% cohesive specimens**
**• 3 specimens after 7 days at 23°C + in the water**
**• 3 test pieces after 7 days at 23°C in water + 7 days at 55°C in water. 100% cohesive**

## For all families the processor must have:

**- Knowledge of Technical Opinions**
**- Site project review**
**- A 10-year guarantee**
**- A maintenance contract with an external company for the maintenance of its machinery and implement preventive maintenance of 1st level**
**- The system delivered must comply with the Technical Notice and be ready to be installed, the cassettes in particular must be assembled on the production site and not delivered flat.**
**- The certificate does not cover systems outside Technical Advice and on-site operations**
**- Nominal list of qualified production operators with training registration**

## Additional requirements for TF+ level:

**- ISO 9001 certification in force**
**- At least one representative must have completed a qualifying training at the CSTB to provide proof of technical assistance, example TEC 80**
**- Technical assistance and knowledge of Technical Opinions will be verified during audits**
**- Have a design office: a minimum of 2 people – software for calculation according to the specifications in force: 3194-3747-3316 and DTU 45.4, Robot preferably-software for operating 3D digital model**
**- Organized for structural bonding of stiffeners in collaboration with Technical Opinion holder**
**- Organized to perform site start-ups**
**- Project Technical Brief**