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European Assessment Document for

Non-load-bearing polyvinyl chloride panels for internal and external walls

This European Assessment Document (EAD) has been developed taking into account up-to-date technical and scientific knowledge at the time of issue and is published in accordance with the relevant provisions of Regulation (EU) 305/2011 as a basis for the preparation and issuing of European Technical Assessments (ETA).

Contents

1 SCOPE OF THE EAD

1.1 Description of the construction product

This EAD specifies assessment methods for factory-made hollow panels formed by extrusion of polyvinyl chloride (PVC) raw material (hereafter called PVC panels). The PVC panels are intended to form outer walls, outer leaves of outer walls, inner leaves of outer walls, internal walls or ceilings, offering an airtight finished surface which does not require cladding or rendering. The PVC panels are non-loadbearing and may be used as permanent shuttering components to contain fresh concrete during the construction of walls (outer walls, outer leaves of outer walls, inner leaves of outer walls or internal walls).

The PVC panels may be produced at any length, with a maximum length depending on the rigidity of the PVC panel.

The edges of the PVC panels may be of various sorts (e.g., tongue and groove, dovetail, click system) on its longitudinal sides to facilitate assembly (see figure 1.1.1).

Figure 1.1.1 – Example of PVC panel with edges facilitating assembly

The PVC panels may be assembled on site upright (vertically juxtaposed) and/or lying (horizontally stacked) with or without a supporting framework.

The PVC panels may be supplied with a factory-applied protective finishing layer.

The minimum data for describing PVC panels are: the material and profile type identification, the intended application, the Vicat softening temperature, the modulus of elasticity in flexure, the nominal linear mass, the heat reversion at 100 °C, the impact resistance and the use of reprocessable and recyclable material in accordance with EN 13245-1[1].

The minimum data for describing the shape of the PVC panels are: width, height, length, wall thicknesses, spacer thicknesses, flatness and straightness deviation.

Ancillary components (e.g., edge profiles, panel end caps, fixing elements, mastics, temporary structures to maintain the verticality of the panels during construction), which may be subject to installation provisions or needed in the framework of determining performances, are not subject of assessments and are not covered by this EAD. Nevertheless, as far as they might have an influence on the product performance, they shall be taken into account and described in the ETA as conditions under which the performance of the PVC panels has been assessed.

The product is not covered by harmonised European standard EN 13245-2 and is not fully covered by EAD 210005-00-0505 nor EAD 340309-00-0301:

- EN 13245-2 covers products intended for use as wall finishes, not products intended to form the walls itself nor intended to be used as shuttering;
- EAD 210005-00-0505 covers kits for internal, non-loadbearing partition walls including their fixings and accessories, not to be used as shuttering, whereas this EAD covers PVC panels intended to be used in different types of walls (both outer walls and outer leaves of outer walls; this in addition to partition walls), ceilings or permanent shuttering components for airtight walls; and
- EAD 340309-00-0301 only covers stacked hollow blocks or panels of thermal insulating material and, sometimes, concrete for construction of external walls, internal walls above or below ground, and partitions, each of which require finishing (cladding, rendering or otherwise) on faces exposed to the exterior and interior, whereas this EAD covers airtight interlocking PVC panels which offer a finished surface which does not require finishing, thus possibly exposed to indoor air, and which may be, but not necessarily, used as shuttering panels.

1 All undated references to standards in this EAD are to be understood as references to the dated versions listed in chapter 4.

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

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

Relevant manufacturer's stipulations, e.g., with regard to the intended end use conditions, having influence on the performance of the product covered by this European Assessment Document shall be considered for the determination of the performance and detailed in the ETA as long as the details of the assessment methods as laid down in this EAD are respected.

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

1.2.1 Intended use(s)

In case the PVC panels are not used as permanent shuttering components, the PVC panels are intended to be used for the construction of non-loadbearing walls and immoveable and relocatable internal walls, with or without fire separating capabilities and/or acoustic insulation and/or thermal insulation.

In case the PVC panels are used as permanent shuttering components, fresh concrete is poured in the PVC panel during the construction of walls. In those cases, the mechanical resistance of the PVC panels shall be neglected after hardening of the concrete and shall not be taken into account for dimensioning the wall to carry loads, including eccentric vertical loads.

This EAD does not assess the reinforced or un-reinforced concrete infill.

1.2.2 Working life/Durability

The assessment methods included or referred to in this EAD have been written based on the manufacturer's request to take into account a working life of the PVC panels for the intended use of 25 years when installed in the works (provided that the PVC panels are subject to appropriate installation (see 1.1)). These provisions are based upon the current state of the art and the available knowledge and experience.

When assessing the product, the intended use as foreseen by the manufacturer shall be taken into account. The real working life may be, in normal use conditions, considerably longer without major degradation affecting the basic requirements for works[2].

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

1.3 Specific terms used in this EAD

1.3.1 Specific terms

1.3.1.1 Wall

A wall is a vertical construction that bounds or subdivides a space and usually fulfils a loadbearing or retaining function, which may be loadbearing or non-loadbearing and, in case of internal uses, which may not extend fully from floor to ceiling and may be immoveable or relocatable.

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

1.3.1.2 Non-loadbearing or non-structural

Indicating a product does not transfer vertical forces from the works and whose contribution to the stability of the works is not taken into account.

1.3.1.3 Internal partition walls

Non-structural wall, intended to separate identical or different internal environments, including the use as an independent lining for an external or internal wall.

1.3.1.4 Internal wall

Structural or non-structural wall, intended to separate identical or different internal environments

1.3.1.5 External wall

Structural or non-structural wall, intended to separate an internal environment from a changing external environment; external walls protect the internal environment from weather effects.

1.3.1.6 Immoveable

Installed with no intention of later repositioning and in such a way that it cannot be dismantled without being demolished.

1.3.1.7 Relocatable

Installed with a view to possible later repositioning, i.e., capable of being dismantled and reinstalled without loss of performances and without substantial repair other than replacement of ancillary components, such as seals and fixings. In general, the process itself requires a certain amount of skill and the use of tools.

1.3.1.8 Reprocessable and recyclable material

PVC compound prepared from pre- or post-consumer PVC products.

1.3.1.9 Pouring height

Distance from the pouring spout to the bottom of shuttering.

1.3.1.10 Filling height

(Part of the) height of shuttering to be filled.

2 ESSENTIAL CHARACTERISTICS AND RELEVANT ASSESSMENT METHODS AND CRITERIA

2.1 Essential characteristics of the product

Table 2.1.1.a shows how the performance of PVC panels used in internal partition walls are assessed in relation to the essential characteristics.

Table 2.1.1.b shows how the performance of PVC panels used as outer walls, outer leaves of outer walls or ceilings whilst not used as permanent shuttering components are assessed in relation to the essential characteristics.

Table 2.1.1.c shows how the performance of PVC panels used as permanent shuttering components are assessed in relation to the essential characteristics.

Table 2.1.1.a Essential characteristics of PVC panels used in internal partition walls and methods and criteria for assessing the performance of the product in relation to those essential characteristics

No	Essential characteristic	Assessment method	Type of expression of product performance
Basic Works Requirement 2: Safety in case of fire			
1	Reaction to fire	EAD 210005-00-0505, clause 2.2.1	Class
2	Resistance to fire	EAD 210005-00-0505, clause 2.2.2	Class
Basic Works Requirement 3: Hygiene, health and the environment			
3	Content, emission and/or release of dangerous substances	2.2.7	Description, level
4	Water vapour permeability	EAD 210005-00-0505, clause 2.2.4	Level
Basic Works Requirement 4: Safety and accessibility in use			
5	Sill height	EAD 210005-00-0505, clause 2.2.5	Level
6	Resistance to damage and functional failure from horizontal loads	EAD 210005-00-0505, clause 2.2.6	Level
7	Resistance to damage and functional failure from eccentric vertical loads	EAD 210005-00-0505, clause 2.2.7	Level
8	Resistance to horizontal linear static loads	EAD 210005-00-0505, clause 2.2.8	Level
9	Resistance to functional failure from point loads parallel or perpendicular to the surface	EAD 210005-00-0505, clause 2.2.9	Description
10	Rigidity of partitions to be used as a substrate for ceramic tiling	EAD 210005-00-0505, clause 2.2.10	Description
11	Safety against personal injuries by contact	EAD 210005-00-0505, clause 2.2.11	Description
12	Resistance to deterioration caused by: – Physical agents – Chemical agents – Biological agents	EAD 210005-00-0505, clause 2.2.12	Level, description
Basic Works Requirement 5: Protection against noise			
13	Airborne sound insulation	EAD 210005-00-0505, clause 2.2.13	Level
14	Sound absorption	EAD 210005-00-0505, clause 2.2.14	Level

No	Essential characteristic	Assessment method	Type of expression of product performance
Basic Works Requirement 6: Energy economy and heat retention			
15	Thermal resistance	EAD 210005-00-0505, clause 2.2.15	Level
16	Thermal inertia	EAD 210005-00-0505, clause 2.2.16	Level
17	Airtightness	2.2.13	Level
Aspects of durability			
18	Resistance to deterioration	EAD 340309-00-0305, clause 2.2.18	Description

Table 2.1.1.b Essential characteristics of the PVC panels used as outer walls, outer leaves of outer walls, or ceilings whilst not used as permanent shuttering components and methods and criteria for assessing the performance of the product in relation to those essential characteristics

No	Essential characteristic	Assessment method	Type of expression of product performance
Basic Works Requirement 2: Safety in case of fire			
1	Reaction to fire	2.2.4	Class
2	Resistance to fire	2.2.5	Class
3	Façade fire performance (3)	2.2.6	Description / Class / Level (as relevant)
Basic Works Requirement 3: Hygiene, health and the environment			
4	Content, emission and/or release of dangerous substances	2.2.7	Description, level
Basic Works Requirement 4: Safety and accessibility in use			
5	Safety against personal injuries by contact	2.2.9	Description
Basic Works Requirement 5: Protection against noise			
6	Airborne sound insulation	2.2.10	Level
7	Sound absorption	2.2.11	Level
Basic Works Requirement 6: Energy economy and heat retention			
8	Thermal transmittance	2.2.12	Level
9	Airtightness	2.2.13	Level
10	Parameters needed to calculate the thermal inertia	2.2.14	Level
Aspects of durability			
11	Resistance to deterioration	EAD 340309-00-0305, clause 2.2.18	Description

3 applicable only to outer walls.

Table 2.1.1.c Essential characteristics of PVC panels used as permanent shuttering components and methods and criteria for assessing the performance of the product in relation to those essential characteristics

No	Essential characteristic	Assessment method	Type of expression of product performance
Basic Works Requirement 1: Mechanical resistance and stability			
1	Resulting structural pattern	2.2.1	Description
2	Efficiency of filling	2.2.2	Description
3	Possibility of steel reinforcement	2.2.3	Description
Basic Works Requirement 2: Safety in case of fire			
4	Reaction to fire	2.2.4	Class
5	Resistance to fire	2.2.5	Class
6	Façade fire performance (3)	2.2.6	Description / Class / Level (as relevant)
Basic Works Requirement 3: Hygiene, health and the environment			
7	Content, emission and/or release of dangerous substances	2.2.7	Description, level
Basic Works Requirement 4: Safety and accessibility in use			
8	Resistance to filling pressure	2.2.8	Description
9	Safety against personal injuries by contact	2.2.9	Description
Basic Works Requirement 5: Protection against noise			
10	Airborne sound insulation	2.2.10	Level
11	Sound absorption	2.2.11	Level
Basic Works Requirement 6: Energy economy and heat retention			
12	Thermal transmittance	2.2.12	Level
13	Airtightness	2.2.13	Level
14	Parameters needed to calculate the thermal inertia	2.2.14	Level
Aspects of durability			
15	Resistance to deterioration	EAD 340309-00-0305, clause 2.2.18	Description

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

This chapter is intended to provide instructions for TABs. Therefore, the use of wordings such as “shall be stated in the ETA” or “it has to be given in the ETA” shall be understood only as such instructions for TABs on how results of assessments shall be presented in the ETA. Such wordings do not impose any obligations for the manufacturer, and the TAB shall not carry out the assessment of the performance in relation to a given essential characteristic when the manufacturer does not wish to declare this performance in the Declaration of Performance.

If for any components covered by harmonised standards or European Technical Assessments the manufacturer of the component has included the performance regarding the relevant essential characteristic in the Declaration of Performance, retesting of that component for issuing the ETA under the current EAD is not required.

The PVC panels shall be described in the ETA in accordance with the minimum data for each component as indicated in clause 1.1.

2.2.1 Resulting structural pattern

The type and the dimensions of the voids determining the structural pattern of the concrete in-fill shall be determined on the basis of drawings of the PVC panels and tolerance specifications of the product.

The resulting structural pattern shall be determined in accordance with the terminology provided in EAD 340309-00-0305, clause 2.2.1.

Compatibility of different types of PVC panels (e.g., corners etc...) shall be checked to ensure they maintain the structural pattern.

From the resistance to filling pressure test (see 2.2.8), the resulting verticality of the wall shall be determined in accordance with EN 13670, clause 10.4; deviations “Δ” as defined in EN 13670, figure 2, shall be recorded.

The resulting structural pattern and deviations shall be specified in the ETA.

2.2.2 Efficiency of filling

The efficiency of filling shall be determined by erection of a trial structure, according to the manufacturer’s product installation instructions (MPII) or (in absence of such instructions) according to the usual practice of building professionals, preferably on site, for inspection.

The trial structure shall include as many typical details as possible, for example, if appropriate:

- window openings and/or door openings;
- corners;
- junctions with internal walls;
- lintels;
- floor and roof junctions (e.g., timber, precast or in-situ concrete as prescribed for the system);
- incorporation of horizontal and vertical reinforcement up to the maximum percentage prescribed for the system;
- site made cuts and joints of PVC panels;
- services passing through the wall.

When selecting the shuttering samples, the effects of production tolerances shall be considered. Products from different batches and production lines shall be mixed to ensure compatibility.

The trial structure is filled with concrete according to the MPII or (in absence of such instructions):

- If a filling speed is not provided, a filling speed of 1 m height per hour shall be used;
- If a pouring height is not provided, a pouring height of 1 m above the PVC panel height shall be used;

- If a filling height is not provided, the full height of the PVC panel shall be filled.

If multiple filling executions are provided, the most onerous shall be selected (e.g., the highest filling speed, greatest pouring height, lowest concrete strength, greatest aggregate size).

The trial structure shall be inspected for:

- tightness: joints and details shall be inspected to determine any loss of fines;
- completeness of fill: an indication of completeness of fill may be obtained by observing the presence of laitance at joints.

The shuttering shall be removed to observe the soundness of the hardened concrete, and any adverse reaction caused by the capillarity of the shuttering faces. Positions to be inspected include:

- lintel bearing areas;
- corners, as the geometric pattern may be different;
- around the openings;
- bearing areas for floors and roofs;
- at reinforcement;
- at spacers.

The concrete shall be inspected for full compaction, voids or segregation. Alternatively, cores shall be taken and examined to check correct compaction if the removal of the shuttering leaves a poor surface and at the internal ribs. Compressive strength of the concrete taken from such places or cores shall be assessed in accordance with EN 206 and be compared to the strength of plain, correctly compacted areas of wall to determine any effects on assessed properties.

The concrete shall be inspected for correct setting and hardening which, for example, may be influenced by the capillarity of the shuttering.

The following observations shall be recorded:

- the loss of fines at joints and details;
- the completeness of filling in corners;
- the occurrence of non-fully compacted concrete, voids or segregation;
- any adverse effect of the capillarity of the shuttering.

The description in the ETA shall specify the type of concrete used during the test in accordance with EN 206 (at least: consistency class, strength development class, maximum aggregate size D_{max} [expressed in mm]), the filling parameters and the result of the above inspections.

2.2.3 Possibility of steel reinforcement

The possibility of incorporating steel reinforcement in the PVC panels shall be assessed by visual inspection of the PVC panels, technical drawings thereof or the erection of a trial structure, according to the manufacturer's instructions or (in absence of such instructions) according to the usual practice of building professionals, preferably on site.

This inspection shall consider any available construction detail, for example, when appropriate:

- the reinforcement of walls;
- the ring anchor at every floor or ceiling;
- the reinforcement of lintels;
- the reinforcement of the parapets;
- the interconnection of walls at corners or junctions.

The ETA shall state for each available construction detail the possibility of incorporating steel reinforcement, including the maximal steel reinforcement bar size.

If the PVC panels provide components to ensure reinforcement cover (e.g., cover spacers), the ETA shall specify the reinforcement cover (the distance between the outer surface of the concrete and the surface of the reinforcement, expressed in mm).

2.2.4 Reaction to fire

The product shall be tested, using the test method(s) relevant for the corresponding reaction to fire class in accordance with EN 13501-1. The product shall be classified in accordance with the Commission Delegated Regulation (EU) No 2016/364 in connection with EN 13501-1.

Mounting and fixing provisions for SBI shall be in accordance with EAD 210005-00-0505, Annex D.

The reaction to fire class shall be stated in the ETA.

2.2.5 Resistance to fire

Assemblies comprising the PVC panels (used as outer walls, outer leaves of outer walls, ceilings, or shuttering components) shall be tested in accordance with EN 13501-2, using the test method relevant for the corresponding fire resistance class, in order to be classified in accordance with Commission Delegated Regulation (EU) 2024/1681.

The resistance to fire class, field of application and comprehensive description of the tested assemblies (type and thickness of the panel tested, height of the tested assembly, use of concrete and if so, description of the concrete used in accordance with EN 206 (consistency class, strength development class, maximum aggregate size D_{max} [expressed in mm]), density of concrete filling, filling parameters, use of rebar and if so, description of rebar diameters, spacing and reinforcement cover, fixing to surrounding rigid constructions and if so, fixing and accessories used) shall be stated in the ETA.

2.2.6 Façade fire performance

If the manufacturer intends to declare the façade fire performance of the product, in absence of a European assessment approach, the ETA shall state the assessment method(s) and results of the product assessment(s) according to the assessment method(s) required by the regulatory provisions of those countries, in which the manufacturer intends to make the product available on the market, in accordance with the table given in Annex A.

2.2.7 Content, emission and/or release of dangerous substances

2.2.7.1 General

The performance of the product regarding the emissions and/or release and, where appropriate, the content of dangerous substances shall be assessed on the basis of the information provided by the manufacturer[4] after identifying the release scenarios taking into account the intended use(s) of the product and the Member States where the manufacturer intends his product to be made available on the market.

The identified intended release scenarios for this product and intended use with respect to dangerous substances are:

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4 The manufacturer may be asked to provide to the TAB the REACH related information which shall accompany the DoP (cf. Article 6(5) of Regulation (EU) No 305/2011).

The manufacturer is **not** obliged to:
- provide the chemical constitution and composition of the product (or of constituents of the product) to the TAB, or
- provide a written declaration to the TAB stating whether the product (or constituents of the product) contain(s) substances which are classified as dangerous according to Directive 67/548/EEC and Regulation (EC) No 1272/2008 and listed in the "Indicative list on dangerous substances" of the SGDS, taking into account the installation conditions of the construction product and the release scenarios resulting from there.

Any information provided by the manufacturer regarding the chemical composition of the products is not to be distributed to EOTA, to other TABs or beyond.

IA1: Product with direct contact to indoor air

IA2: Product with indirect contact to indoor air (e.g., covered products) but possible impact on indoor air

S/W2: Product with indirect contact to soil, ground- and surface water

2.2.7.2 SVOC and VOC

For the intended use covered by the release scenario IA1 and/or IA2 semi-volatile organic compounds (SVOC) and volatile organic compounds (VOC) shall be determined in accordance with EN 16516. The loading factor [m^2/m^3] used for emission testing shall be taken from the Table 2.2.7.2.1.

Table 2.2.7.2.1 Loading factor L, depending on the product type (in accordance with EN 16516)

Intended use	Loading factor L [m^2/m^3]
Walls	1,0
Floor, ceiling	0,4

The preparation of the test specimen shall be performed by using a representative specimen of the product installed in accordance with the MPII or, in absence of such instructions, the usual practice of the product installation.

Once the test specimen has been produced, as described above, it shall immediately be placed in the emission test chamber. This time is considered the starting time of the emission test.

The test results shall be reported for the relevant parameters (e.g., chamber size, temperature and relative humidity, air exchange rate, loading factor, size of test specimen, conditioning, production date, arrival date, test period, test result) after 3 and/or 28 days testing.

The product performance shall be stated in the ETA [unit mg/m^3].

2.2.7.3 Test on solids and leaching test

For the intended use covered by the release scenario S/W1 the total content and the leachable substances of the PVC panels shall be determined.

For the following parameters, the total content shall be determined on three representative specimens after aqua regia digestion in accordance with EN 17196:

Antimony (Sb), arsenic (As), barium (Ba), lead (Pb), cadmium (Ca), selenium (Se).

The analysis of the parameters shall be carried out in accordance with EN 17201. The average of the measured values of each parameter shall be expressed in mg/kg and stated in the ETA.

Three representative specimens of the PVC panels shall be eluted in accordance with EN 12457-4. The following parameters in the eluate shall be determined using the methods for analysis in accordance with EN 17195:

1. Antimony (Sb), arsenic (As), barium (Ba), lead (Pb), cadmium (Ca), selenium (Se) and
2. pH value, electrical conductivity.

The average of the measured values of each substance mentioned in No. 1 shall be expressed in µg/L, or mg/l and stated in the ETA. The average of the measured pH value shall be expressed in dimensionless units, rounded to 0,1 unit and stated in the ETA. The average of the measured electrical conductivity shall be expressed in mS/m and stated in the ETA.

2.2.7.4 Leachable substances

The performance of the PVC panels concerning leachable substances shall be assessed by performing a leaching test with subsequent eluate analysis, in duplicate. Leaching tests of the PVC panels shall be conducted in accordance with EN 16637-2. The leachant shall be pH-neutral demineralised water and the ratio of liquid volume to surface area shall be (80 ± 10) l/m².

Test specimens shall be prepared in accordance with EN 16637-2.

In eluates of "6 hours" and/or "64 days", the following biological tests shall be conducted:

- TOC in accordance with EN 1484;
- Acute toxicity test with Daphnia magna Straus in accordance with EN ISO 6341;
- Toxicity test with algae in accordance with EN ISO 15799;
- Luminescent bacteria test in accordance with EN ISO 11348-1, EN ISO 11348-2 or EN ISO 11348-3. The test method in accordance with EN ISO 11348-1 is the reference method.

For each biological test, EC20-values shall be determined for dilution ratios 1:2, 1:4, 1:6, 1:8 and 1:16.

If the parameter TOC is higher than 10 mg/l, the following biological tests shall be conducted with the eluates of "6 hours" and/or "64 days" eluates: Biological degradation in accordance with OECD Test Guideline 301, parts A, B or E. Determined toxicity in biological tests shall be expressed as EC20-values for each dilution ratio. Maximum determined biological degradability shall be expressed as "…% within …hours/days". The respective test methods for analysis shall be indicated in the ETA.

2.2.8 Resistance to filling pressure

The resistance to filling pressure refers to the required behaviour of the shuttering elements (concerning, e.g., stability, resistance to internal pressure) when subjected to the pouring of fresh concrete.

The resistance to filling pressure shall be determined by erection of a trial structure, according to the manufacturer’s instructions or (in absence of such instructions) according to the usual practice of building professionals, preferably on site, for inspection.

The trial structure shall include, if appropriate:

- a PVC panel of one-story height or maximum PVC panel length, whichever is higher;
- panel end caps;
- structures to maintain the verticality.

When selecting the shuttering samples, the effects of production tolerances shall be considered. Products from different batches and production lines shall be mixed to ensure compatibility.

The trial structure is filled with concrete according to the manufacturer’s instructions or (in absence of such instructions):

- If a filling speed is not provided, a filling speed of 1 m height per hour shall be used;
- If a pouring height is not provided, a pouring height of 1 m above the PVC panel height shall be used;
- If a filling height is not provided, the full height of the PVC panel shall be filled.

If multiple filling executions are provided, the most negative shall be selected (e.g., the highest filling speed, greatest pouring height, lowest concrete strength, greatest aggregate size).

During the pouring the PVC panels of the trial structure shall be visually inspected for failures.

The following observations shall be recorded:

- the appearance of cracks or other similar failures;
- the appearance of irreversible bowing or other similar deformations.

The description in the ETA shall specify the type of concrete used during the test, in accordance with EN 206 (at least: consistency class, strength development class, maximum aggregate size D_{max} [expressed in mm]), the filling parameters and the result of the above inspections.

2.2.9 Safety against personal injuries by contact

2.2.9.1 Existence of sharp or cutting edges

For the assessment of the presence of sharp or cutting edges which are inaccessible when panels are mounted, no tests are necessary. The product specification, the product itself and trial installations shall be assessed to confirm that sharp or cutting edges are not present at, for example, corners, protrusions, joints or trims, after mounting.

For the assessment of the presence of sharp or cutting edges which are accessible when panels are mounted, the edges are assessed according to EN 71-1, clause 8.11.

The treatment of the edges as per the MPII, or (in absence of such instructions) the usual practice of PVC panel installation shall be considered when assessing the edges.

The ETA shall state the presence of sharp or cutting edges accessible when panels are mounted, their nature and location and the result of their assessment and assessment method. Any treatment of the edges as per the MPII or usual practice of PVC panel installation shall be comprehensively described.

2.2.9.2 Nature of surfaces

Assessment of the nature of the surface does not require instrumented testing. The product shall be visually inspected for the presence of cracks, burrs, surface defects posing risk of abrasion or cutting to people or people's clothing. The visual inspection shall be performed in accordance with EN 13245-1, clause 5.6.3.3.

The treatment of the surfaces as per the MPII, or (in absence of such instructions) the usual practice of PVC panel installation shall be considered when assessing the surface.

The ETA shall state the presence of cracks, burrs or surface defects posing a risk of abrasion or cutting, their nature and location and the result of their assessment and assessment method. Any mandatory treatment of the surfaces as per the MPII or usual practice of PVC panel installation shall be comprehensively described.

2.2.9.3 Impact resistance

The impact resistance shall be assessed in accordance with EN 13245-1, clause 5.5.

The ETA shall state the impact resistance, expressed in accordance with EN 13245-1 clause 5.5.

2.2.9.4 Durability of impact resistance

The durability of impact resistance shall be assessed in accordance with EN 13245-1, clause 5.6.

The ETA shall state the durability of impact resistance, expressed in accordance with EN 13245-1 clause 5.6.

2.2.10 Airborne sound insulation

The airborne sound insulation shall be assessed by tests in accordance with EN ISO 10140-2 and the result classified in accordance with EN ISO 717-1. The $R_w(C,C_{tr})$ value shall be specified in the ETA, together with a detailed description of the specimen for which the value is valid.

2.2.11 Sound absorption

The sound absorption coefficient shall be assessed in accordance with EN ISO 354. The test specimen shall be mounted or placed directly against the floor of the reverberation room. The ETA shall specify a comprehensive description of the specimen (e.g., the panel type used, its length, width, thickness, mass,

the use of concrete and, if so, the specification of the concrete in accordance with EN 206, its mounting in the reverberation room by means of drawings) and, if relevant, the fasteners and their location or the method of surface preparation and the adhesive used to retain the specimen, how the joints between adjacent specimen and the perimeter edge have been covered and other additional information required in accordance with EN ISO 354.

2.2.12 Thermal transmittance

The thermal transmittance shall be assessed by calculation in accordance with EN ISO 6946, using thermal transmittance of the PVC panel and, when used as shuttering, of the concrete obtained from EN ISO 10456, or from testing in accordance with EN 12667, EN 12939 or EN 12664 when the materials correspond with the scope of these standards.

The calculation in accordance with the detailed calculation method of EN ISO 6946 (EN ISO 6946, clause 5.3) using thermal transmittance of the PVC panels and, when used as shuttering, of the concrete obtained from EN ISO 10456, table 3, is the preferred method. Only if this calculation is not possible, the thermal transmittance shall be determined by testing in accordance with EN ISO 8990.

If there is any discontinuity in assembled PVC panels, the effect of thermal bridging shall be assessed by calculation in accordance with EN ISO 10211.

At least the following shall be assessed:

- the PVC panel not used as shuttering with the lowest thermal resistance (the PVC panel with the lowest overall thickness), or
- the PVC panel used as shuttering with the lowest thermal resistance (the PVC panel with the lowest overall thickness in which concrete can be poured).

The ETA shall state

- the thermal transmittance U of the PVC panel,
- the overall thickness, the thickness of the faces and webs,
- the use of the PVC panel (as shuttering or not),
- if used as shuttering: the type of concrete (dry density of the concrete and percentage of reinforcement),
- the orientation of the panel (vertical, as a wall or horizontal, as a ceiling),
- the exposure of the panel (which sides are external or internal), and
- the assessment method used.

2.2.13 Airtightness

The assessment of the airtightness of element joints shall be performed by testing in accordance with EN 12114. The specimen shall contain at least two adjoined panels, as to obtain at least one joint between adjoined panels. The joints between the specimen and the test rig shall be made airtight. The corrected air flow rate at reference conditions shall be divided by the total length of the joints between panels of the specimen. The result shall be expressed as an air flow per meter of joint length [$m^3/h.m$] at 50 Pa pressure difference.

The results are applicable to all panels using the same edge detail.

The ETA shall state the air flow per meter of joint length with a graphic representation of the specimen containing a detailed drawing of the panel joint.

2.2.14 Parameters needed to calculate the thermal inertia

The assessment of the thermal inertia shall be performed by determining from the mass, heat capacity and thermal transmittance of materials using the following parameters:

- total mass per unit area P (in kg/m^2) for the PVC panel, in accordance with EN 13245-1, Annex A;

- total volume of concrete (in m^3/m^2), by determining internal length, height and width of cavities, related to the length and width of the PVC panel;
- heat capacity c_p (in J/kgK) of materials used, in accordance with EN ISO 10456, table 3;
- thermal transmittance of materials used U (in W/m^2K), in accordance with clause 2.2.12.

The ETA shall state the above parameters for determining the thermal inertia.

3 ASSESSMENT AND VERIFICATION OF CONSTANCY OF PERFORMANCE

3.1 System(s) of assessment and verification of constancy of performance to be applied

For the products covered by this EAD the applicable European legal acts are:

- For PVC panels covered by this EAD, used in internal partition walls (see Table 2.1.1.a), the applicable European legal act is Commission Decision 98/213/EC, as amended by Commission Decision 2001/596/EC and Commission Implementing Decision 2012/201/EU. The applicable AVCP system is 4 for all uses, except:
  - for fire compartmentation (resistance to fire): system 3,
  - for uses liable to present "safety-in-use" risks and subject to such regulations: system 3,
  - for uses subject to regulations on dangerous substances: system 3,
  - for uses subject to regulations on reaction to fire: systems 1, 3, or 4, depending on the conditions defined in the said Decisions.

- For PVC panels covered by this EAD, used as external wall and ceiling finishes (see Table 2.1.1.b), the applicable European legal act is Commission Decision 98/437/EC, as amended by Commission Decision 2001/596/EC. The applicable AVCP system is 4 for any use, except
  - for uses for fire protection of walls or ceilings: system 3,
  - for uses subject to regulations on safety in use or dangerous substances: system 3,
  - for uses subject to regulations on reaction to fire: systems 1, 3, or 4, depending on the conditions defined in the said Decisions.

- For PVC panels covered by this EAD, used as permanent shuttering systems (see Table 2.1.1.c), to be filled with normal concrete and, where relevant, with reinforcement, the applicable European legal act is Commission Decision 98/279/EC, as amended by Commission Decision 2001/596/EC.

  The applicable AVCP system is 2+ for all characteristics of the shuttering systems (except reaction to fire).

  In addition, with regards to reaction to fire

  - system 1 is applicable if the intended use for the construction of external and internal walls is subject to fire regulations in buildings and for products/materials for which the reaction to fire classes A1, A2, B or C can only be achieved based on a clearly identifiable stage in the production process which results in an improvement of the reaction to fire classification (e.g., an addition of fire retardants or a limiting of organic material),
  - system 2+ is applicable in any other cases.

3.2 Tasks of the manufacturer

The cornerstones of the actions to be undertaken by the manufacturer of the PVC panels in the procedure of assessment and verification of constancy of performance are laid down in Table 3.2.1.

The manufacturer (regarding the components he buys from the market with DoP) shall take into account the Declaration of Performance issued by the manufacturer of that component. No retesting is necessary.

Table 3.2.1 Control plan for the manufacturer; cornerstones

No	Subject/type of control	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
Factory production control (FPC) [including testing of samples taken at the factory in accordance with a prescribed test plan]					
1	Incoming materials	Control of the conformity of supplier's declaration with manufacturer's requirement.	According to Control Plan	According to Control Plan	Each delivery
	Dimensions				
2	Width and height	According to Control Plan	According to Control Plan	According to Control Plan	Once / production batch
3	Panel thickness	According to Control Plan	According to Control Plan	According to Control Plan	Once / production batch
4	Straightness	According to Control Plan	According to Control Plan	According to Control Plan	Once / production batch
5	Flatness	According to Control Plan	According to Control Plan	According to Control Plan	Once / production batch
6	Vicat softening temperature (VST)	EN 13245-1 clause 5.1	According to Control Plan	According to Control Plan	Once / production batch
7	Modulus of elasticity in flexure	EN 13245-1 clause 5.2	According to Control Plan	According to Control Plan	Once / year
8	Linear mass or density	EN 13245-1 clause 5.3	According to Control Plan	According to Control Plan	Once / production batch
9	Heat reversion at 100°C	EN 13245-1 clause 5.4	According to Control Plan	According to Control Plan	Once / year
10	Impact resistance	EN 13245-1 clause 5.5	According to Control Plan	According to Control Plan	Once / production batch
11	Reaction to fire: PCS value (for class B to D)	EN ISO 1716	According to Control Plan	According to Control Plan	According to Control Plan

3.3 Tasks of the notified body

The cornerstones of the actions to be undertaken by the notified body in the procedure of assessment and verification of constancy of performance of the PVC panels are laid down in Table 3.3.1.

Table 3.3.1 Control plan for the notified body; cornerstones

No	Subject/type of control	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
Initial inspection of the manufacturing plant and of factory production control *(for system 2+ only)*					
1	Notified Body will ascertain that the factory production control with the staff and equipment are suitable to ensure a continuous and orderly manufacturing of the PVC panels.	Verification of the complete FPC as described in the control plan agreed between the TAB and the manufacturer	According to Control plan	According to Control plan	When starting the production or a new line
Continuous surveillance, assessment and evaluation of factory production control *(for system 2+ only)*					
1	The Notified Body will ascertain that the system of factory production control and the specified manufacturing process are maintained taking account of the control plan.	Verification of the controls carried out by the manufacturer as described in the control plan agreed between the TAB and the manufacturer with reference to the raw materials, to the process and to the product as indicated in Table 3.2.1	According to Control plan	According to Control plan	1/year

The intervention of the notified body under AVCP system 1 is only necessary for reaction to fire for products/materials for which a clearly identifiable stage in the production process results in an improvement of the reaction to fire classification (e.g., an addition of fire retardants or a limiting of organic material).

In this case the cornerstones of the actions to be undertaken by the notified body under AVCP system 1 are laid down in Table 3.3.2

Table 3.3.2 Control plan for the notified body; cornerstones

No	Subject/type of control	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
Initial inspection of the manufacturing plant and of factory production control carried out by the manufacturer regarding the constancy of performance related to reaction to fire *(for system 1 only)*					
1	Where the intervention of the Notified Body is necessary only because the conditions for the applicability of system 1 are fulfilled for reaction to fire, the notified body will consider especially the clearly identifiable stage in the production process which results in an improvement of the reaction to fire classification (e.g., an addition of fire retardants or a limiting of organic material).	Verification of the complete FPC as described in the control plan agreed between the TAB and the manufacturer	As defined in the control plan agreed between the TAB and the manufacturer	As defined in the control plan agreed between the TAB and the manufacturer	When starting the production or a new line
Continuous surveillance, assessment and evaluation of factory production control carried out by the manufacturer regarding the constancy of performance related to reaction to fire *(for system 1 only)*					
2	Where the intervention of the Notified Body is necessary only because the conditions for the applicability of system 1 in the Decisions regarding reaction to fire are fulfilled, the notified body will consider especially the clearly identifiable stage in the production process which results in an improvement of the reaction to fire classification (e.g., an addition of fire retardants or a limiting of organic material)	Verification of the controls carried out by the manufacturer as described in the control plan agreed between the TAB and the manufacturer with reference to the raw materials, to the process and to the product as indicated in Table 3.2.1	As defined in the control plan agreed between the TAB and the manufacturer	As defined in the control plan agreed between the TAB and the manufacturer	1/year

4 REFERENCE DOCUMENTS

EAD 040005-00-1201	Factory-made thermal and/or acoustic insulation products made of vegetable or animal fibres
EAD 210005-00-0505	Internal partition kits for use as non-loadbearing walls
EAD 340309-00-0305	Non load-bearing permanent shuttering kits/systems based on hollow blocks or panels of insulating materials and sometimes concrete
EN 71-1:2014+A1:2018	Safety of toys - Part 1: Mechanical and physical properties
EN 206:2013+A2:2021	Concrete - Specification, performance, production and conformity
EN 1484:1997	Water analysis - Guidelines for the determination of total organic carbon (TOC) and dissolved organic carbon (DOC)
EN 12114:2000	Thermal performance of buildings - Air permeability of building components and building elements - Laboratory test method
EN 12457-4:2002	Characterisation of waste - Leaching - Compliance test for leaching of granular waste materials and sludges - Part 4: One stage batch test at a liquid to solid ratio of 10 l/kg for materials with particle size below 10 mm (without or with size reduction)
EN 12664:2001	Thermal performance of building materials and products - Determination of thermal resistance by means of guarded hot plate and heat flow meter methods - Dry and moist products of medium and low thermal resistance
EN 12667:2001	Thermal performance of building materials and products - Determination of thermal resistance by means of guarded hot plate and heat flow meter methods - Products of high and medium thermal resistance
EN 12939:2000	Thermal performance of building materials and products - Determination of thermal resistance by means of guarded hot plate and heat flow meter methods - Thick products of high and medium thermal resistance
EN 13245-1:2010	Plastics - Unplasticized poly(vinyl chloride) (PVC-U) profiles for building applications - Part 1: Designation of PVC-U profiles
EN 13245-2:2008/AC:2009	Plastics - Unplasticized poly(vinyl chloride) (PVC-U) profiles for building applications - Part 2: PVC-U profiles and PVC-UE profiles for internal and external wall and ceiling finishes
EN 13501-1:2018	Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests
EN 13670:2009	Execution of concrete structures
EN 16516:2017+A1:2020	Construction products: Assessment of release of dangerous substances - Determination of emissions into indoor air
EN 16637-2:2023	Construction products: Assessment of release of dangerous substances - Part 2: Horizontal dynamic surface leaching test
EN 17195:2023	Construction products: Assessment of release of dangerous substances - Analysis of inorganic substances in eluates
EN 17196:2023	Construction products: Assessment of release of dangerous substances - Digestion by aqua regia for subsequent analysis of inorganic substances
EN 17201:2023	Construction products: Assessment of release of dangerous substances - Content of inorganic substances - Methods for analysis of aqua regia digests
EN ISO 354:2003	Acoustics - Measurement of sound absorption in a reverberation room
EN ISO 717-1:2020	Acoustics - Rating of sound insulation in buildings and of building elements - Part 1: Airborne sound insulation
EN ISO 846:2019	Plastics - Evaluation of the action of microorganisms

EN ISO 1716:2018	Reaction to fire tests for products - Determination of the gross heat of combustion (calorific value)
EN ISO 6341:2012	Water quality - Determination of the inhibition of the mobility of Daphnia magna Straus (Cladocera, Crustacea) - Acute toxicity test
EN ISO 6946:2017	Building components and building elements - Thermal resistance and thermal transmittance - Calculation methods (ISO 6946:2017, Corrected version 2021-12)
EN ISO 8990:1996	Thermal insulation - Determination of steady-state thermal transmission properties - Calibrated and guarded hot box
EN ISO 10140-2:2021	Acoustics - Laboratory measurement of sound insulation of building elements - Part 2: Measurement of airborne sound insulation
EN ISO 10456:2007/AC:2009	Building materials and products - Hygrothermal properties - Tabulated design values and procedures for determining declared and design thermal values
EN ISO 10211:2017	Thermal bridges in building construction - Heat flows and surface temperatures - Detailed calculations
EN ISO 11348-1:2008/A1:2018	Water quality - Determination of the inhibitory effect of water samples on the light emission of Vibrio fischeri (Luminescent bacteria test) - Part 1: Method using freshly prepared bacteria
EN ISO 11348-2:2008/A1:2018	Water quality - Determination of the inhibitory effect of water samples on the light emission of Vibrio fischeri (Luminescent bacteria test) - Part 2: Method using liquid-dried bacteria
EN ISO 11348-3:2008/A1:2018	Water quality - Determination of the inhibitory effect of water samples on the light emission of Vibrio fischeri (Luminescent bacteria test) - Part 3: Method using freeze-dried bacteria
EN ISO 15799:2022	Soil quality - Guidance on the ecotoxicological characterization of soils and soil materials
EN ISO 26987:2012	Resilient floor coverings - Determination of staining and resistance to chemicals
OECD (1992), Test No. 301	Ready Biodegradability, OECD Guidelines for the Testing of Chemicals, Section 3, OECD Publishing, Paris, https://doi.org/10.1787/9789264070349-en

ANNEX A: ASSESSMENT METHODS APPLIED IN EU/EFTA MEMBER STATES FOR ASSESSING THE FIRE PERFORMANCE OF FACADES

Country	Assessment method
Austria	ÖNORM B 3800-5
Belgium	• BS 8414-1 • BS 8414-2 • DIN 4102-20 • LEPIR 2
Czech Republic	ČSN ISO 13785-1
Denmark, Sweden, Norway	SP Fire 105
Finland	• SP Fire 105 • BS 8414
France	LEPIR 2
Germany	• DIN 4102-20 Complementary reaction-to-fire test for claddings of exterior walls, • Technical regulation A 2.2.1.5
Hungary	MSZ 14800-6:2020 Fire resistance tests. Part 6: Fire propagation test for building façades
Ireland	BS 8414 (BR 135)
Poland	PN-B-02867:2013
Switzerland, Liechtenstein	• DIN 4102-20 • ÖNorm B 3800-5 • Prüfbestimmung für Aussenwandbekleidungssysteme