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European Assessment Document for

Factory-made products of extruded, foamed polyethylene terephthalate for thermal insulation

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 covers factory-made boards of extruded foamed polyester terephthalate (PET) for thermal insulation, hereinafter referred to as “PET board(s)“. The material contains a certain percentage of virgin PET or no virgin PET and has a closed-cell structure.

Thin products come straight out of the extrusion (the sheets). Thicker products are created by thermal bonding without addition of any adhesive or additional layer. Different sheets are bonded together by heating the surface above the melting point and pressing together the PET boards to produce a block. PET boards are cut out of the block.

The PET boards can be supplied with or without a facing. The product is not covered by a harmonised European standard.

PET boards in accordance with this EAD are not harmonized by any standard for thermal insulation materials (EN 13162 – EN 13171). Compared to other insulation materials such as mineral wool, polyurethane foam, EPS or XPS, PET boards according to this EAD are most comparable with XPS (EN 13164). Both products are thermoplastic polymer foams and are produced by foam extrusion with physical blowing agents. Therefore, the same essential characteristics can be applied for both products and are included in this EAD.

Compared to XPS, the mechanical properties of extruded PET boards are on a lower level. Caused by the higher raw density of PET, PET foams require higher volume expansion ratios to achieve the same product density. Due to the higher volume expansion and the nature of PET itself, PET foams usually have lower weight specific mechanical properties.

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)

The intended use of the PET boards is the following.

- Thermal insulation, whether or not exposed to compression loads, to be used for walls (including cellar walls), ceilings (floors), roofs, between rafters and timber work.

All applications of PET boards are inside the building construction and therefore protected from direct sunlight and weather conditions to avoid long-term degradation.

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 PET boards for the intended use of 25 years when installed in the works (provided that the PET boards 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[1].

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 Board

Rigid extruded insulation product (continuously foamed and possibly thermally bonded) of rectangular shape and cross section in which the thickness is significantly smaller than the other dimensions. Boards may be of uniform thickness or tapered. The board edges may be of various sorts (e.g., square, half lapped, tongue and groove), see EN 13164, clause 3.1.4.

The boards may be supplied with or without facings.

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

2 ESSENTIAL CHARACTERISTICS AND RELEVANT ASSESSMENT METHODS AND CRITERIA

2.1 Essential characteristics of the product

Table 2.1.1 shows how the performance of the PET boards is assessed in relation to the essential characteristics.

Table 2.1.1 Essential characteristics of the product and methods and criteria for assessing the performance of the product in relation to those essential characteristics

No	Essential characteristic	Assessment method	Type of expression of product performance
Basic Works Requirement 2: Safety in case of fire			
1	Reaction to fire	Clause 2.2.1	Class
2	Propensity to undergo continuous glowing combustion	Clause 2.2.2	Description
Basic Works Requirement 3: Hygiene, health and the environment			
3	Water vapour transmission	Clause 2.2.3	Level
4	Release of dangerous substances	Clause 2.2.4	Level
Basic Works Requirement 4: Safety and accessibility in use			
5	Compressive strength or compressive stress	Clause 2.2.5	Level
6	Dimensional stability under constant normal laboratory conditions	Clause 2.2.6	Level
7	Dimensional stability under specified temperature and humidity conditions	Clause 2.2.7	Level
8	Bending strength	Clause 2.2.8	Level
9	Shear Strength	Clause 2.2.9	Level
Basic Works Requirement 5: Protection against noise			
10	Dynamic stiffness (for impact sound material only)	Clause 2.2.10	Level
Basic Works Requirement 6: Energy economy and heat retention			
11	Thermal resistance and thermal conductivity	Clause 2.2.11	Level
12	Thickness	Clause 2.2.12	Class
13	Short-term water absorption by partial immersion	Clause 2.2.13	Level
14	Long-term water absorption by total immersion	Clause 2.2.14	Level
15	Long-term water absorption by diffusion	Clause 2.2.15	Level
16	Freeze-thaw resistance	Clause 2.2.16	Level
17	Deformation under specified compressive load and temperature conditions	Clause 2.2.17	Level
18	Tensile strength perpendicular to the faces	Clause 2.2.18	Level
19	Compressive creep	Clause 2.2.19	Level

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.

For conditioning, and testing (dimensions of test specimens, minimum number of measurements, specific conditions), EN 13164 shall apply, unless otherwise is specified in the following clauses.
The level to be stated for each essential characteristic has to be representative for the range of thicknesses covered by the ETA. The test specimens shall be chosen accordingly (number and thickness of test specimens).

The percentage of virgin PET in the product shall be stated in the ETA.

The type of facing shall be stated in the ETA, i.e., material type (per layer) and thickness (per layer).

2.2.1 Reaction to fire

The product shall be tested using the method(s) relevant for the corresponding reaction to fire class in accordance with to 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.

Testing in accordance with EN 13823 shall be performed using the mounting and fixing rules as detailed in Annex A.

The classification of the product in accordance with EN 13501-1, shall be stated in the ETA.

Information about the field of application of the classification as stated in the reaction to fire classification report shall be given in the ETA.

2.2.2 Propensity to undergo continuous glowing combustion

The propensity to undergo continuous glowing combustion shall be determined in accordance with EN 16733.

The conditions and parameters which shall be considered within the test as well as the rules for the application of the test results are specified in Annex B.

The results of the tests shall be expressed and stated in the ETA in accordance with clause 11 of EN 16733.[2]

2.2.3 Water vapour transmission

The water vapour transmission properties, expressed as the water vapour diffusion resistance factor, μ, for products without facing, or as the water vapour resistance, Z, for faced products, shall be determined in accordance with EN 12086 / set A.

For products without facing the water diffusion resistance factor, μ, shall be stated in the ETA.
For faced products the water vapour resistance, Z, shall be stated in the ETA.

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[2] In order to permit the TAB to apply rules for the extended application of test results within the assessment, it is recommended that the manufacturer should provide (but he is not obliged to do so) sufficient information (e.g., on the basis of the composition of the products in question), allowing the TAB to determine which products or product variants should be submitted to testing and so to reduce the number of tests required.

2.2.4 Release of dangerous substances

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[3] 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 uses with respect to dangerous substances are:

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

IA3: Product with no contact to indoor air (e.g., boards intended for external insulation).

SVOC and VOC
For the intended use covered by the release scenario IA2 semi-volatile organic compounds (SVOC) and volatile organic compounds (VOC) shall be determined in accordance with EN 16516. The loading factor to be used for emission testing is taken from the following table, in accordance with the intended use stated in the ETA:

Table 2.2.4.1 Loading factor L, depending on the product type (in accordance with EN 16516)

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

The following product parameters shall be taken into account when testing the PET boards:

- The product with the highest thickness shall be considered.
- Each product with a different composition shall be tested separately.
- Products with a different facing shall be tested separately.
- The test specimen shall be prepared by covering the edges and the back of the board.

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

The test results in accordance with EN 16516 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, specimen preparation procedure, test result) after 3 and/or 28 days testing.

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3 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 in accordance with 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.

The product performance, in the form of SVOC and VOC, expressed in [µg/m³ or mg/m³], shall be stated in the ETA with regard to the intended use and respective loading factor used.

2.2.5 Compressive strength or compressive stress

The compressive stress σ_{10} at 10 % relative deformation or the compressive strength, σ_m, shall be determined in accordance with EN ISO 29469[4].

The test specimens shall be conditioned at (23 ± 2) ºC, (50 ± 5) % R.H. for 45 days after production before starting this test.

Number of test specimens and test specimens' length and width:

Product thickness ≤ 100 mm:	5 test specimens of 100 x 100 mm
Product thickness > 100 mm and ≤ 200 mm:	5 test specimens of 200 x 200 mm
Product thickness > 200 mm and ≤ 300 mm:	5 test specimens of 300 x 300 mm

Length and width shall be larger or equal to the thickness of the specimen.
The thickness of test specimens shall be the full-size product thickness.

The result, as a level in steps in accordance with EN 13164, clause 4.3.4, shall be stated in the ETA.

2.2.6 Dimensional stability under constant normal laboratory conditions

The dimensional stability under constant normal laboratory conditions (23 ºC, 50 % R.H.) shall be determined in accordance with EN 1603, method A.

The test specimens shall be conditioned at (23 ± 2) ºC, (50 ± 5) % R.H. for 45 days after production before starting this test.

The number of test specimens shall be 3.

The relative changes in length, $\Delta\varepsilon_l$ and in width, $\Delta\varepsilon_b$, shall be stated in the ETA.

2.2.7 Dimensional stability under specified temperature and humidity conditions

The dimensional stability under specified temperature and humidity conditions shall be conducted in accordance with EN 13164, clause 4.3.2, for the conditions 48 h, 70 ºC, 90 % R.H. The tolerance for temperature shall be ± 2 ºC and for R.H. ± 5 %
The test specimens shall be conditioned at (23 ± 2) ºC, (50 ± 5) % R.H. for 45 days after production before starting the test.

The number and dimensions of test specimens shall be as specified in EN 13164, table 9.

The relative changes in length, $\Delta\varepsilon_l$, in width, $\Delta\varepsilon_b$, and in thickness, $\Delta\varepsilon_d$, shall be stated in the ETA.

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4 EN test standards which are referred to in EN 13164:2012+A1:2015 have been replaced by EN ISO standards. The new standards can be considered equivalent as described in the foreword of the EN ISO standards. Some of the standards have been amended with minor changes that consider additional conditions like testing in hot climates which are not relevant for the scope of this EAD. It concerns the following standards: EN ISO 16534, EN ISO 16535, EN ISO 16536, EN ISO 16546, EN ISO 29466, EN ISO 29467, EN ISO 29469.

2.2.8 Bending strength

The bending strength, σ_b, shall be determined in accordance with EN 12089, method B.
The support span shall be 5 times the product thickness but ≥ 200 mm and ≤ 500 mm
The test specimens shall be conditioned at (23 ± 2) °C, (50 ± 5) % R.H. for 45 days after production before starting this test.

The number of test specimens in accordance with EN 13164 Annex E Table E.1 shall be 3.

Dimensions of test specimen shall be in accordance with EN 12089, method B, as covered in clause 6.1.2.

The result, as a level in steps in accordance with EN 13164, clause E.4., shall be stated in the ETA.

2.2.9 Shear strength

The shear strength, τ, shall be determined in accordance with EN 12090.

The test specimens shall be conditioned at (23 ± 2) °C, (50 ± 5) % R.H. for 45 days after production before starting this test.

The single and double specimen setup are considered equivalent. The number of specimens is 5 for the single specimen setup and 3 for the double specimen setup.

Number of test specimens and test specimens length and width:

Single specimen setup:	5 test specimens of 250 x 50 x thickness (max 50 mm thick).
Double specimen setup:	3 test specimens of 200 x 100 x thickness (max 50 mm thick).

The thickness of test specimens shall be the full-size product thickness for thickness of ≤ 50 mm
Products of higher thickness shall be cut to 50 mm.
The result, as a level in accordance with EN 13164, clause 4.3.13, shall be stated in the ETA.

2.2.10 Dynamic stiffness (for impact sound material only)

The dynamic stiffness, s', shall be determined in accordance with EN 29052-1.

No correction on the calculation of dynamic stiffness is required, since the closed-cell structure of PET foam has a high airflow resistivity of > 100 kPa.s/m^2.

Number of test specimens and test specimens length and width:

3 test specimens of 200 mm x 200 mm.

The thickness of test specimens shall be the full-size product thickness.

The the dynamic stiffness, s', for different thicknesses, shall be stated in the ETA.

2.2.11 Thermal resistance and thermal conductivity

The thermal resistance and thermal conductivity shall be determined in accordance with the procedure as detailed in clause 4.2.1 of EN 13164.

The measurements shall be carried out in accordance with EN 12667 or EN 12939 for thick products.

The thermal resistance and thermal conductivity determined in accordance with the procedures as detailed in clause 4.2.1, Annex A and Annex C of EN 13164 shall be stated in the ETA.

2.2.12 Thickness

The thickness, *d*, shall be determined in accordance with EN ISO 29466.

The thickness, *d*, with the class, shall be stated in the ETA in accordance with clause 4.2.3 of EN 13164.

2.2.13 Short-term water absorption by partial immersion

The short-term water absorption by partial immersion shall be determined in accordance with method A of EN ISO 29767.

Number of test specimens and test specimens length and width:

2 test specimens of 200 mm x 200 mm.

The thickness of test specimens shall be the full-size product thickness.

The value of the short-term water absorption by partial immersion, expressed as WS(*i*), whereby "*i*"is the value in kg/m^2, shall be stated in the ETA.

2.2.14 Long-term water absorption by total immersion

The long-term water absorption by total immersion, W_{lt}, shall be determined in accordance EN ISO 16535, method 2A.

Number of test specimens and test specimens length and width:

2 test specimens of 200 mm x 200 mm.

The thickness of test specimens shall be the full-size product thickness.

The result, as a level in accordance with EN 13164, clause 4.3.7.1, shall be stated in the ETA.

2.2.15 Long-term water absorption by diffusion

The long-term water absorption by diffusion W_{dV} shall be determined in accordance EN ISO 16536.

Number of test specimens and test specimens length and width:

2 test specimens of 500 x 500 mm.

The thickness of test specimens shall be the full-size product thickness.

The result, as a level in accordance with EN 13164, clause 4.3.7.2, shall be stated in the ETA.

2.2.16 Freeze-thaw resistance

Freeze-thaw resistance shall be determined in accordance with EN ISO 16546.

In accordance with EN 13164 and EN ISO 16546, prior to freeze-thaw cycling, the long-term water absorption test to be performed is water absorption by diffusion in accordance with EN 16536, to determine the long-term water absorption by diffusion W_{dv} in volume %.

The test specimen shall be conditioned in accordance with EN 16546.

The same specimen used to determine the water absorption by diffusion shall be used for the freeze-thaw cycling in accordance with EN ISO 16546.

Number of test specimens and test specimens length and width:

1 test specimen of 500 x 500 mm

The thickness of test specimens shall be the full-size product thickness.

After the freeze-thaw test the reduction in compressive stress at 10 % deformation, or the compressive strength, of the dry specimen, when tested in accordance with EN ISO 29469 shall not exceed 10 % of the initial value. If it does exceed 10% reduction of the initial value, the level in steps in accordance with EN 13164, clause 4.3.8, cannot be stated in the ETA.

The additional water absorption after freeze-thaw cycling W_V shall be determined as:

W_V = total water absorption after freeze-thaw – W_{dv}.

The result, as a level in steps in accordance with EN 13164, clause 4.3.8, shall be stated in the ETA.

NOTE: Freeze-thaw cycling tests are used to determine the durability of an insulation product when it is directly exposed to the combined action of water and freeze-thaw cycles.

2.2.17 Deformation under specified compressive load and temperature conditions

The deformation under specified compressive load and temperature conditions shall be determined in accordance with EN 13164, clause 4.3.3. The test condition shall be selected from EN 13164 table 4 based on the level to be stated in the ETA.

The test specimens shall be conditioned at (23 ± 2) °C, (50 ± 5) % R.H. for 45 days after production before starting this test.

Number of test specimens and test specimens length and width:

Product thickness ≤ 100 mm	3 test specimens of 100 x 100 mm
Product thickness > 100 mm	3 test specimens of 150 x 150 mm
Product thickness > 150 mm and ≤ 200 mm	3 test specimens of 200 x 200 mm
Product thickness > 200 mm and ≤ 300 mm	3 test specimens of 300 x 300 mm

Length and width shall be larger or equal to the thickness of the specimen.
The thickness of test specimens shall be the full-size product thickness.

The number and the dimensions of test specimens shall be as specified in EN 13164, table 9.

The result, as a level in accordance with EN 13164, clause 4.3.3, shall be stated in the ETA.

2.2.18 Tensile strength perpendicular to the faces

The tensile strength perpendicular to the faces, σ_{mt}, shall be determined in accordance with EN 1607.

The test specimens shall be conditioned at (23 ± 2) ^{o}C, (50 ± 5) % R.H. for 45 days after production before starting this test.

Number of test specimens and test specimens' length and width:

5 test specimens of 50 x 50 mm

The thickness of test specimens shall be the full-size product thickness.

The result, as a level in accordance with EN 13164, clause 4.3.5, shall be stated in the ETA.

2.2.19 Compressive creep

The compressive creep, X_{ct}, and the total thickness reduction, X_t , shall be determined in accordance with EN ISO 16534.

The test specimens shall be conditioned at (23 ± 2) ^{o}C, (50 ± 5) % R.H. for 45 days after production before starting this test.

Compressive creep, X_{ct}, and total thickness reduction, X_t, shall be determined after at least one hundred twenty-two days of testing, using a selected level of compressive stress, σ_c, given in steps of at least 1 kPa. Depending on the selected testing time, the result can be extrapolated 30 times. The minimum testing times and the correlating extrapolation times in years are given in the table in EN 13164 clause 4.3.6.

The requirements for compressive creep, X_{ct}, and total thickness reduction, X_t are defined in accordance with the intended use(s). The performance of the product in terms of the maximum compressive stress to fulfil these requirements shall be determined by iterative testing at different levels of compressive stress.

Number of test specimens and test specimens' length and width:

Product thickness ≤ 100 mm: 2 test specimens of 100 x 100 mm
Product thickness > 100 mm and ≤ 200 mm: 2 test specimens of 200 x 200 mm
Product thickness > 200 mm and ≤ 300 mm: 2 test specimens of 300 x 300 mm

The thickness of test specimens shall be the full-size product thickness.

The result, as a level in accordance with EN 13164, clause 4.3.6, shall be stated in the ETA.

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 act is Commission Decision 1999/91/EC amended by Commission Decision 2001/596/EC.

The applicable AVCP system is 3 for any use except for uses subject to regulations on reaction to fire.

For uses subject to regulations on reaction to fire the applicable AVCP systems regarding reaction to fire are 1, 3 or 4 depending on the conditions defined in the said Decision.

3.2 Tasks of the manufacturer

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

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]					
The PET content rPET(i) is declared by the manufacturer and production records are kept for inspection for a period of 5 years.					
1	Length and width	EN ISO 29465	According to control plan	1	1 per 2 h [a]
2	Thickness	See clause 2.2.14	According to control plan	1	1 per 2 h [a]
3	Squareness	See EN 13164 clause 4.2.2	According to control plan	1	1 per 4 h [a]
4	Flatness	EN ISO 29468	According to control plan	1	1 per 8 h [a]
5	Tensile strength perpendicular to the faces	See clause 2.2.20	According to control plan	1	1 per 12 h
6	Reaction to fire	See clause 2.2.1	According to control plan	1	See table B.2 in EN 13164
7	Thermal resistance or thermal conductivity	See clause 2.2.12	According to control plan	1	1 per 24 h
8	Compressive strength	See clause 2.2.6	According to control plan	3	1 per 8 h [a]
9	Deformation under specified compressive load and temperature	See clause 2.2.19	According to control plan	1	1 per 5 years
[a] When statistically proven that test results vary not more than 2 %, the testing frequency can be lowered to 1 per 24 h.					

3.3 Tasks of the notified body

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 3.3.1.

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 1 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 product.	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 1 only)*					
2	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

4 REFERENCE DOCUMENTS

EN 1603:2013	Thermal insulating products for building applications – Determination of dimensional stability under constant normal laboratory conditions (23 ºC / 50% relative humidity)
EN 1604:2013	Thermal insulating products for building applications – Determination of dimensional stability under specified temperature and humidity conditions
EN 1605:2013	Thermal insulating products for building applications – Determination of deformation under specified compressive load and temperature conditions
EN 1607:2013	Thermal insulating products for building applications – Determination of tensile strength perpendicular to the faces
EN 12086:2013	Thermal insulating products for building applications – Determination of water vapour transmission properties
EN 12089:2013	Thermal insulating products for building applications – Determination of determination of bending behaviour
EN 12090:2013	Thermal insulating products for building applications - Determination of shear behaviour
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 13164:2012 +A1:2015	Thermal insulation products for buildings – Factory made products of extruded polystyrene (XPS) – Specification
EN 13238:2010	Reaction to fire tests for building products – Conditioning procedures and general rules for selection of substrates
EN 13501-1:2018	Fire classification of construction products and building elements – Part 1: Classification using test data from reaction to fire tests.
EN 13823:2020 +A1:2022	Reaction to fire tests for building products – Building products excluding floorings exposed to the thermal attack by a single burning item
EN 15715:2009	Thermal insulation products – Instructions for mounting and fixing for reaction to fire testing – Factory made products
EN 16733:2016	Reaction to fire tests for building products – Determination of a building product's propensity to undergo continuous smouldering
EN 29052-1:1992	Acoustics – Determination of dynamic stiffness – Part 1: Materials used under floating floors in dwellings
EN 16516:2017+A1:2020	Construction products – Assessment of release of dangerous substances – Determination of emissions into indoor air
EN ISO 16534:2020	Thermal insulating products for building applications – Determination of compressive creep
EN ISO 16535:2019	Thermal insulating products for building applications – Determination of long-term water absorption by immersion
EN ISO 16536:2019	Thermal insulating products for building applications – Determination of long-term water absorption by diffusion
EN ISO 16546:2020	Thermal insulating products for building applications - Determination of freeze-thaw resistance
EN ISO 29465:2022	Thermal insulating products for building applications – Determination of length and width
EN ISO 29466:2022	Thermal insulating products for building applications – Determination of thickness
EN ISO 29468:2022	Thermal insulating products for building applications – Determination of flatness
EN ISO 29469:2022	Thermal insulating products for building applications - Determination of compression behaviour
EN ISO 29767:2019	Thermal insulating products for building applications - Determination of short-term water absorption by partial immersion
EN ISO 29770:2022	Thermal insulating products for building applications - Determination of thickness for floating-floor insulating products

NOTE EN ISO test standards replace EN test standards which are referred to in EN 13164:2012+A1:2015

ANNEX A: Mounting and fixing rules for reaction to fire testing in accordance with EN 13823

A.1 General

In accordance with EN 15715 Annex A table A.12, the test results obtained with mechanical fixing are also valid for the product as placed on the market.

A.2 Test specimen

- The PET board with the highest thickness and the highest density and the highest organic content (related to the mass in dried condition) has to be used for the preparation of the test specimen.
  The test result covers arrangements with PET boards of the same type, with thicknesses, densities and organic content equal or lower than those evaluated in the tests.

- The PET board used in the test assembly shall always include facings and/or coatings that are applied to the product in its end use condition. Each type of facing and/or coating requires new tests.
  Test results from PET boards with maximum facing or coating thickness are also valid for thinner coatings.

- Influences of different colours of facings or coatings can be determined by performing indicative SBI tests on a light and on a dark colour. If there is no difference in the test result, then the full scale SBI test is only conducted on one colour.

- The type and dimensions of materials and products used, the dimensions and the location of the fixing, etc., shall be recorded in the test report.

A.3 Mounting and fixing of the PET boards

A.3.1 Substrates

Standard substrates in accordance with EN 13238 shall be used.

A.3.2 Mounting by using an adhesive

The PET board shall be glued with the adhesive in accordance with the specifications of the manufacturer.

The influence of the type of adhesive is assumed to be negligible. Only the amount of organic content is considered to be important. Therefore, an adhesive with the highest amount of organic content shall be used for preparing the test specimens applied at the maximum thickness. The test result is valid for adhesives with a thickness and organic content lower than used in the test.

A.3.3 Mounting by using a mechanical fixing

The PET board shall be fixed to the substrate in accordance with the product installation instructions for mechanical fixing provided by the manufacturer.

If the manufacturer does not provide specific product installation instructions for mechanical fixing, the fixing scheme described in figure A.3.3.1 shall be used. The PET board is fixed by mechanical fixings to the substrate, the minimum number of fixings are 7 for the large wing and 6 for the small wing. These fixings shall be evenly distributed as shown in figure A.3.3.1.

The minimum fixing distance from any edge is 25 mm. No fixings are to be placed below the U profile of the EN 13823 test.

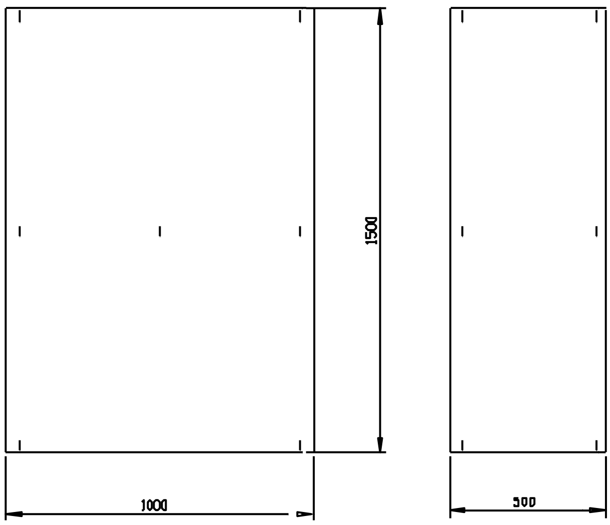

Figure A.3.3.1: Mechanical fixed PET boards in the SBI testing

ANNEX B: Determination of propensity to undergo continuous smouldering

B.1 Product and installation parameters

In addition to EN 16733, the following parameters shall be considered for choosing the type of product to be assessed:

- the product or product variant with the highest and lowest density;
- the product or product variant with the highest thickness;
- each different produced orientation, if relevant (i.e., lengthwise and crosswise to the length direction of the product);
- each face of the product, if relevant (e.g. different texture or granule size).

Moreover:

- one test for each product type (chemical composition, type of production process, etc.) shall be performed
- the product shall be assessed without any facings, coatings and suchlike.

The tests shall be done without consideration of end-use conditions, because propensity to undergo continuous smouldering is not affected by end-use conditions.

B.2 Preparation of test specimens

If clause 6.2.5 of EN 16733 applies, a permanent contact between the pieces shall be assured.

B.3 Extended application of test results

The results of tests considering the aforementioned parameters in full are also valid for products:

- of the same product type;
- with all densities between those evaluated;
- with all orientations and both faces, if all relevant orientations (lengthwise and crosswise) and different faces had been tested;
- for any end-use conditions.

The thickness giving the worst result shall be determined for the reaction to fire declaration. If the worst test result is not known, minimum and maximum thickness shall be fire tested.