EUROPEAN ASSESSMENT DOCUMENT

EAD 040049-01-0502

March 2020

POLYURETHANE (PU) FOAM MAT OR POLYES-TER FIBRE MAT TO BE USED FOR IMPACT SOUND INSULATION

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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).

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1 SCOPE OF THE EAD

1.1 Description of the construction product

The construction product is a polyurethane (PU) foam mat or polyester fibre mat to be used for impact sound insulation (in the following referred to as impact sound insulating mat). The impact sound insulating mats can have a profiled surface and optional layers (e.g., foil) on one or both sides. The impact sound insulating mats can contain an admixture of other materials (e.g., rubber fibres or rubber granulate), which can consist of recycled material.

The impact sound insulating mats made of polyester fibres are manufactured of thermally bonded polyester staple fibres and can be laminated single-sided with a polyethylene-foil, possibly with an overlap.

This EAD covers only products with a reaction to fire class not better than class E.

The product is not fully covered by EN 13165 [1] and EN 16069. Details with regard to the deviations are given in clauses 2.2.1 to 2.2.13. This version covers products not yet fully covered by EAD 040049-00-0502.

Note: Compared with the previous version of this EAD, the following clauses of this present EAD have been modified:

- *General, minor editorial changes have been introduced and normative references have been dated.*
- *Where relevant, reference has been made to the harmonised standards this EAD deviates from, i.e., EN 13165 and EN 16069.*
- *The scope of this EAD has been enlarged by adding mats made of polyester fibre.*
- *Clause 1.2.1 (Intended use): Detailed installation rules have been deleted.*
- *Clause 2.2.1 (Reaction to fire): Mounting and fixing provisions have been introduced.*
- *Clause 2.2.2.4 (Content, emission and/or release of dangerous substances – Expression of performances): The expression of performance has been further elaborated.*
- *Clause 2.2.3 (Dynamic stiffness): The 3rd paragraph has been clarified.*
- *Clause 2.2.5 (Airborne sound insulation): This characteristic has been introduced.*
- *Clause 2.2.9 (Compressive creep): The number of specimens has been clarified.*
- *Clause 2.2.12 (tensile strength perpendicular to faces): This characteristic has been introduced.*
- *Clause 2.2.13 (thermal conductivity and thermal resistance): This characteristic has been introduced.*
- *Table 3.2.1: The characteristics 'airborne sound insulation', 'tensile strength perpendicular to faces' and 'thermal conductivity and thermal resistance' and footnotes 1 and 5 have been introduced.*
- *Table 3.2.1: The factory production control (FPC) regarding BWR 3 has been amended.*
- *Clause 4: Normative references have been introduced as a consequence of introducing the characteristics 'airborne sound insulation', 'tensile strength perpendicular to faces' and 'thermal conductivity and thermal resistance'.*

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 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.

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

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

1.2.1 Intended use(s)

The impact sound insulating mats are used for the improvement of impact sound insulation of floors. The impact sound insulating mats are installed under floating screeds on solid slabs without contact to soil, ground- and surface water.

The assessment methods as provided for in this EAD only apply when the product is used in structures of buildings where it is protected from wetting and weathering.

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 impact sound insulating mats for the intended use of 25 years when installed in the works, provided that the impact sound insulating mats are subject to appropriate installation (see clause 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.

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 the working life referred to above.

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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 impact sound insulating mats 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	2.2.1	Class
Basic Works Requirement 3: Hygiene, health and the environment			
2	Content, emission and/or release of dangerous substances	2.2.2	Level/Description
Basic Works Requirement 5: Protection against noise			
3	Dynamic stiffness	2.2.3	Level
4	Impact sound reduction	2.2.4	Level
5	Airborne sound insulation	2.2.5	Level
6	Deviations from length, width and squareness	2.2.6	Level/Description
7	Thickness and compressibility	2.2.7	Level
8	Mass per unit area or Density	2.2.8	Level/ Description
9	Compressive creep	2.2.9	Level
10	Compressive stress/strength	2.2.10	Level
11	Deformation under specified load and temperature	2.2.11	Level
12	Tensile strength	2.2.12	Level
Basic Works Requirement 6: Energy economy and heat retention			
13	Thermal conductivity and thermal resistance	2.2.13	Level

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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.

The test specimens shall be chosen in order to cover the dimensions, density and thickness range of the product.

2.2.1 Reaction to fire

2.2.1.1 General

Note: This clause corresponds with EN 13165, clause 4.2.6. However, given that these products are intended to be used as floor insulation, specific test assembly provisions have been added.

The product shall be tested, using the test method(s) according to EN ISO 11925-2 being relevant for the corresponding reaction to fire class according to EN 13501-1. The product shall be classified according to the Commission Delegated Regulation (EU) No 2016/364[3] in connection with EN 13501-1.
When testing according to EN ISO 11925-2, the product shall be tested directly exposed to the thermal attack with surface and edge exposure.

2.2.1.2 Dimensions of the test specimens and preparation

The dimension of the test specimens shall be as prescribed in EN ISO 11925-2, clauses 5.2 and 5.4.

2.2.1.3 Substrate

The test specimen shall be tested free-hanging, without consideration of a substrate, and, additionally, loose-laid on a plywood standard substrate according to EN 13238. If the results of tests for both test configurations are positive, the test results are valid for the use of the impact sound insulating mats on any kind of substrate of at least class E/E_{fl}, according to EN 13501-1.

If only tests on specimens loos-laid on a plywood standard substrate according to EN 13238 are positive, the test results are valid for the use of the impact sound insulating mats on any wood-based substrates of at least class E/E_{fl}, according to EN 13501-1 and any substrates of classes A1 and A2-s1, d0 according to EN 13501-1, each with a minimum density of at least 340 kg/m³ and a minimum thickness of at least 9 mm.

2.2.1.4 Test specimens

The following parameters shall be considered when preparing the test specimens:

- Chemical composition: As far as applicable, each different composition shall be taken into account;
- Colour: As far as applicable, if there is a range of different colours, but no difference in the chemical composition itself, tests with a light, a dark and a medium colour (e.g., white, black and red) shall be performed;
- Assembly – as far as applicable, each assembly (e.g., additional layers, profiled surfaces, etc.) shall be taken into account;
- Thickness: the highest and lowest thickness shall be tested;
- Density / weight per unit area – the highest and lowest nominal density, in particular of homogenous products, as well as the highest and lowest nominal weight per unit area, in case of multi-layered products, shall be tested; and
- Orientation: As far as relevant, the specimen shall be mounted and tested with lengthwise as well as with crosswise orientation.

[3] OJEU, L 68, 15.3.2016, p. 4

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The results of tests taking into consideration the aforementioned parameters are valid for:
- the chemical composition as tested;
- the complete range of colours;
- the tested assembly only;
- the thickness range between those values tested and also for any higher thickness, if 60 mm thick specimens were tested;
- The total range of nominal densities and nominal weights per unit area between those values tested; and
- any orientation.

2.2.2 Content, emission and/or release of dangerous substances

Note: This clause corresponds with EN 13165, clause 4.3.11. However, more detail has been added.

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

The identified intended release scenario for this product and intended use with respect to dangerous substances is:

IA 2: Product with indirect contact to indoor air (e.g., covered products) but possible impact on indoor air.

The use of recycled material shall be indicated to the Technical Assessment Body. If recycled rubber is used and for the addition of polycyclic aromatic hydrocarbons (PAH) containing extender oils or PAH containing carbon black the additional assessment methods following clause 2.2.2.1 are to be performed. The assessment following clause 2.2.2.2 are to be performed for the case recycled rubber and/or nitrosamine forming agents are used.

2.2.2.1 Specific organic compounds PAH and B[a]P

If recycled rubber is used and for the addition of polycyclic aromatic hydrocarbons (PAH) containing extender oils or PAH containing carbon black the additional assessment method for the content of specific organic compounds (PAH and B[a]P) has to be determined based on the raw materials according to the testing method described in the document AfPS GS 2014:01 PAK[5] (Annex: Testing instructions, ´Harmonised method for the determination of polycyclic aromatic hydrocarbons (PAH) in polymers´).

The test sample is a composite one of at least four incremental samples collected from different areas of a batch to represent the raw material as good as possible.

The product performance to be stated in the ETA take into account the concentration of single PAH and/or the sum of PAH in mg/kg, as applied for by the client.

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4 The manufacturer may be asked to provide to the TAB the REACH related information which he must accompany the DoP with (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
- to 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.

Any information provided by the manufacturer regarding the chemical composition of the products may not be distributed to EOTA or to TABs.

5 Currently, a European harmonized test procedure for PAHs is being developed. Until the publication of this test procedure (deadline 31.12.2022), the GC method according to ISO 18287 is optional.

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2.2.2.2 Nitrosamines

If recycled rubber is used or nitrosamine forming agents are added to the product the additional assessment method for the content of nitrosamines has to be determined based on the raw materials following the method published by DIK (Deutsches Institut für Kautschuktechnologie e.V. in Hannover, Germany).

The test sample is a composite one taking at least four incremental samples collected from different areas of a batch to represent the raw material as good as possible.

Immediately before analysis, the raw material rubber sample is cut into pieces of about 1 mm^3 particle size. About 2 g of sample are transferred to a 30 mL extraction thimble used for Soxhlet-extraction. Subsequent, extraction is performed for 24 hours at 65°C using 75 mL N-nitrosamine-free methanol with 0,1 %wt ascorbic acid in a 100 mL round bottom flask containing two boiling stones made of glass.

After cooling down, 2 mL of N-nitrosodiisopropylamine (NDiPA, approx. 0,2 µg/mL) are added as internal standard. Following, the extract is evaporated with approximately 3,5 mL/min to about 5 mL using a rotary evaporator with a 40 °C water bath and 220±10 mbar.

The resulting pre-concentrate is transferred to a test tube using a Pasteur pipette. The round bottom flask is rinsed twice with 1 mL N-nitrosamine-free methanol and the rinse solution is pooled with the pre-concentrate.

By treatment with a nitrogen stream (0,05 mL/min) the solution is adjusted to 2 mL. Extracts with high oil content need chromatographic purification. The test specimen shall be analysed within 48 hours using packed columns.

The analysis of extracted N-nitrosamines is achieved by gas chromatography using a thermal energy analyzer (TEA) as detector. The conditions for gas chromatographic analysis are shown in Table 2.2.2.2.1.

Table 2.2.2.2.1: Conditions for gas chromatographic analysis of N-nitrosamines

Nitrosamine	NDMA, NDEA, NDPA, NDBA, NPIP, NPYR, NMOR, NDiPA	NMPA, NEPA
column	silanzed glass column (l = 2 m, ID = 1 mm)	
Stat. phase	10 % Carbowax 20 M, 2 % KOH on Chromosorb HAW 80/100 mesh	10 % OV 101 on Chromosorb HAW 80/100 mesh
Carrier gas	helium	
Carrier gas flow	30 mL/min	
Specimen injection	on column	
Injector temperature	200 °C	
Temperature program	125 °C 2 min isothermal 125 °C – 175 °C (10 °C/min) 175 °C 5 min isothermal	100 °C – 200 °C (10 °C/min)
Specimen volume	5 µL	5 µL

The stated product performance in the ETA shall take into account the concentration of the relevant N-nitrosamines [µg/kg], certain limits of determination and detection limits, as applied for by the client.

2.2.2.3 SVOC and VOC

Semi-volatile organic compounds (SVOC) and volatile organic compounds (VOC) have to be determined in accordance with EN 16516. The loading factor 0,4 m^2/m^3 is to be used for emission testing.

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Testing is performed with proportionally open edges calculated as follows:

Open edge [m] = 1,2 [m/m^2] x area of test specimen [m^2]

The edges of the product should be sealed with self-adhesive, VOC-free aluminium foil or by the use of a suitable frame. It has to be ensured that no emission derives from the back side.

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

The test results have to be recorded for the relevant parameters (e.g., chamber size, temperature and relative humidity, air exchange rate, loading factor, size of test specimen, edge sealing, conditioning, production date, arrival date, test period, test result etc.).

The determination of Benzothiazole is performed substance specific.

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

2.2.2.4 Expression of performance

The relevant product performance, as applied for by the client, or correspondence with the limit values specified in Member States' regulations, shall be expressed in [mg/m³ or µg/m³] and stated in the ETA.

2.2.3 Dynamic stiffness

Note 1: This clause corresponds with EN 16069, clause 4.3.9. However, in case the product is intended to be used under a heated screed, additional provisions apply. In addition, the expression of performance in the ETA have been specified.

The determination of dynamic stiffness s' or s'$_t$ shall be carried out according to EN 29052-1.

In case of use under heated screed, the dynamic stiffness shall be determined before and after the test of the deformation according to clause 2.2.10.

The mean dynamic stiffness s' or s'$_t$ (if need be, for different thicknesses) shall be given in the ETA using levels in steps of 1 MN/m³. If an individual measurement exceeds this mean dynamic stiffness by more than 10 % the mean value of the dynamic stiffness shall be adjusted accordingly.

2.2.4 Impact sound reduction

Note 1: This characteristic is not covered by EN 13165 and EN 16069.

The impact sound reduction ΔL by floating screeds on a heavyweight standard floor (e.g., ceiling according to Annex H of EN ISO 10140-1, clause H.2.1) using the impact sound insulating mat shall be determined according to EN ISO 10140-1, EN ISO 10140-3, EN ISO 10140-4 and EN ISO 10140-5, as appropriate using the provisions of category II according to Annex H, clause H.2.2.2 of EN ISO 10140-1. Using this data the weighted impact sound reduction ΔL_w shall be calculated according to EN ISO 717-2.

The test shall be performed with the floor build-up representing the worst case for impact sound reduction (e.g., minimum mass per unit area of the floating screed and thinnest impact sound insulating mat covered by the ETA). The impact sound reduction for other floor build-ups (e.g., thickest impact sound insulating mat covered by the ETA) can be determined with further tests using the same test procedure.

The weighted impact sound reduction ΔL_w (if need be, for different build-ups) shall be given in the ETA considering a reduction of 2 dB to take influence of ageing into account.

Assessed $\Delta L_{w\ assessed} = \Delta L_w - 2$ dB

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The assessed floor build-up shall be described in detail in the ETA. It shall be stated clearly to which floor build-up the given impact sound reduction applies. In particular the minimum mass per unit area of the screed is given in the ETA.

Note 2: The reduction of 2 dB for ageing can be reduced if the ageing behaviour of the product is known, e.g., by measurements in buildings or laboratory (as part of the product assessment) as follows.

To determine the influence of ageing measurements in line with the EN ISO 10140 series shall be carried out in a laboratory or in at least one building executed to determine the impact sound reduction. Here, the impact sound reduction shall be determined immediately after installation of (each) floor build-up and after at least two years of use by using the following procedure:

1) *Measurement of the impact sound insulation of the floor slab (without floor build-up)*
2) *Measurement of the impact sound insulation of the complete floor (including floor build-up) immediately after installation and determination of the weighted impact sound reduction according to EN ISO 717-2*
3) *Measurement of the impact sound insulation of the complete floor (including floor build-up) after at least two years of use and determination of the weighted impact sound reduction according to EN ISO 717-2*

2.2.5 Airborne sound insulation

Note: This characteristic is not covered by EN 13165 and EN 16069.

The airborne sound insulation of the system in which the product is used shall be assessed by tests according to EN ISO 10140-2 and EN ISO 10140-5 and the result(s) classified according to EN ISO 717-1. The weighted sound reduction index, R_w-value, shall be specified in the ETA, together with a detailed description of the assembled system(s) in which the product was tested (including indication of, e.g., thickness and mass per unit area of the assembly layers).

The following test arrangements shall apply:
- The impact sound insulating mat shall be fixed or bonded to other parts of the assembly in accordance with the installation requirements of the manufacturer; and
- The impact sound insulating mat shall have a thickness of approx. 20 mm or shall be the thinnest product within the range covered by the ETA; and
- The testing area shall be approx. 12 m²; and
- EN ISO 10140-1, Annex G, and EN ISO 10140-2, clause 6, apply. The assembly is composed of the reference floor, a reinforced concrete slab of 140 mm in accordance with EN ISO 10140-5, Annexes B and C, a steel mesh reinforced screed, with a thickness of 70 mm, a PE-foil of 150 µm and the impact sound insulating mat.

In addition to the provisions specified above, additional different assemblies, comprising the impact sound insulating mat with other thicknesses and other assembly components, using different test areas, may be assessed and the results thereof specified in the ETA. In such cases, the composition of the assembly and the test area shall also be specified.

2.2.6 Deviations from length, width and squareness

Note: This clause corresponds with EN 16069, clause 4.2.2, for length and width, and with EN 16069, clause 4.2.4, for squareness.

The length and width of the impact sound insulating mat shall be determined on at least three test specimens in accordance with EN 822.

The squareness shall be determined on at least three test specimens in accordance with EN 824.

The deviation from nominal width and nominal length are given in the ETA using the classes according to EN 16069, Table 1.

The deviation from the squareness in the direction of length and width shall not exceed 5 mm/m according to EN 16069, clause 4.2.4.

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2.2.7 Thickness and compressibility

Note: This clause corresponds with EN 16069, clause 4.3.10. However, the expression of performance in the ETA has been specified and deviates from the one specified in the standard.

The determination of thickness d_L and d_B shall be carried out according to EN 12431, with at least 3 test specimens. The thickness d_B shall be determined with a pause of 300 s before measuring. The determination shall be performed for each nominal thickness of the product or at least for the maximum nominal thickness covered by the ETA.

The compressibility c is defined as follows: $c = d_L - d_B$

The nominal thickness d_L shall be given in the ETA as a minimum level. The maximum compressibility c shall be given in the ETA.

2.2.8 Mass per unit area or density

Note: This clause corresponds with EN 13165, Annex E.7. However, the specimens used in the test and the expression of performance in the ETA deviate from those specified in the standard.

The mass per unit area or the density is to be determined on all test specimens on which the thickness d_L was determined (at least 3 test specimens, see clause 2.2.7). EN 1602 shall be used to determine the apparent density.

The mass per unit area or the density including the tolerances shall be given in the ETA.

2.2.9 Compressive creep

Note 1: This clause corresponds with EN 13165, clause 4.3.6. However, the expression of performance in the ETA deviates from the one specified in the standard.

Note 2: The test is only relevant, if the intended use covers a load on the screed exceeding 5 kPa (see also EN 1991-1-1 and EN 16069, clause 4.3.10.5)

The compressive creep and the total thickness reduction shall be determined after 122 days of testing with at least the imposed load (e.g., 5 kPa) plus self-weight of the screed in accordance with EN 1606 and extrapolated 30 times, corresponding to 10 years. The test shall be performed with at least 2 test specimens of 200 mm x 200 mm.

The compressive creep, the total thickness reduction and the stress used during testing are given in the ETA.

2.2.10 Compressive stress / strength

Note: This clause corresponds with EN 13165, clause 4.3.4. However, another number of test specimens and another test specimen size compared with the standard have been specified and the expression of performance in the ETA deviates from the one specified in the standard. In addition, the EAD provides for the possibility of specifying the performance at 20% deformation, which is not foreseen in the standard.

The compressive stress at 10 % deformation or compressive strength shall be determined according to EN 826, with at least 5 test specimen of 200 mm x 200 mm.

In addition and optional, the compressive stress at 20 % deformation may be determined exceptionally deviating from EN 826.

The minimum level is given in the ETA.

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2.2.11 Deformation under specified load and temperature

Note: This clause corresponds with EN 13165:2012+A1:2016, clause 4.3.3. However, a specific test specimen size has been specified in the EAD and different conditions from those specified in the standard are to be used. Rather than the clauses specified in the standard, the maximum change of the relative deformation in % shall be specified in the ETA.

a) Reference method

Deformation in thickness under specified load and temperature shall be determined on the basis of EN 1605, with at least 3 test specimens of at least 150 mm x 150 mm. Deviating from EN 1605, clause 7.2, the following test conditions shall be used:

in case of an unheated screed: - compressive load: 20 kPa
- temperature and time: step A: (23 ± 5)°C / (48 ± 1) h
step B: (35 ± 1)°C / (48 ± 1) h

in case of a heated screed: - compressive load: 20 kPa
- temperature and time: step A: (23 ± 5)°C / (48 ± 1) h
step B: (60 ± 1)°C / (48 ± 1) h

The maximum change of the relative deformation in % (difference between the relative deformation ε_1 after step A and ε_2 after step B) shall be given in the ETA.

b) Alternative method

Deformation in thickness under specified load and temperature shall be determined on the basis of EN 1605, with at least 3 test specimens of at least 150 mm x 150 mm.

The normative test conditions 1, 2 or 3 according to EN 1605 are used depending on the intended use. The used condition shall be given in the ETA.

The maximum change of the relative deformation in % (difference between the relative deformation ε_1 after step A and ε_2 after step B) shall be given in the ETA.

2.2.12 Tensile strength perpendicular to faces

Note: This clause corresponds with EN 13165, clause 4.3.5.

The tensile strength perpendicular to faces shall be determined according to EN 1607, on at least 3 test specimens of 50 mm x 50 mm, and classified in accordance with EN 13165, Table 9. The class shall be given in the ETA.

2.2.13 Thermal conductivity and thermal resistance

Note: This clause corresponds with EN 13165, clause 4.2.1.

Thermal resistance and thermal conductivity shall be based upon measurements carried out in accordance with EN 12667 or, for thick products, EN 12939.

The thermal conductivity and thermal resistance shall be determined according to the following:
- The reference mean temperature shall be 10°C;
- The measured values shall be expressed with three significant figures;
- For products of uniform thickness, the thermal resistance, R_D, shall be specified in the ETA. The thermal conductivity, λ_D, shall be specified where possible;
- The declared thermal resistance, R_D, and the declared thermal conductivity, λ_D, shall be given as limit values representing at least 90% of the production, determined with a confidence level of 90%;

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- The statistical value of thermal conductivity, $\lambda_{90/90}$, shall be rounded upwards to the nearest 0,001 W/(m.K) and specified as λ_D in levels with steps of 0,001 W/(m.K);
- The declared thermal resistance, R_D, shall be calculated from the nominal thickness, d_N, and the corresponding thermal conductivity $\lambda_{90/90}$, unless measured directly;
- The statistical value of thermal resistance, $R_{90/90}$, when calculated from the nominal thickness, d_N, and the corresponding thermal conductivity, $\lambda_{90/90}$, shall be rounded downwards to the nearest 0,05 m².K/W, and specified as R_D in levels with steps of 0,05 m².K/W;
- The statistical value of thermal resistance $R_{90/90}$, for those products for which only the thermal resistance is measured directly, shall be rounded downwards to the nearest 0,05 m².K/W and specified as R_D in levels with steps of 0,05 m².K/W.

The declared thermal conductivity and resistance shall be given at a mean temperature of 10°C and with a moisture content equal to the one in equilibrium with air at 23°C and relative humidity of 50% (cf. EN ISO 10456, clause 5, Table 1). They shall be determined using the principles as detailed in EN 13165, Annex A, clauses A.2, A.3.2 and A.3.3.

The assessed thermal conductivity and, where relevant, thermal resistance shall be specified in the ETA.

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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 2000/273/EC[6], as amended, by Commission Decision 2001/596/EC[7].

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

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

Due to the limitations stated in clauses 1.1 and 2.2.1, only the AVCP systems 3 and 4 are relevant.

3.2 Tasks of the manufacturer

The corner stones of the actions to be undertaken by the manufacturer of the impact sound insulating mat in the procedure of assessment and verification of constancy of performance are laid down in Table 3.2.1.

6 See OJEU, L 86, 7.4.2000, p. 15

7 Commission Decision 2001/596/EC, OJEU, L 209, 2.8.2001, p. 33

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Table 3.2.1: Control plan for the manufacturer; cornerstones

No	Subject/type of control	Test or control method(1)	Criteria, if any	Minimum number of specimens	Minimum frequency of control (2)
Factory production control (FPC) [including testing of samples taken at the factory in accordance with a prescribed test plan]					
1	Reaction to fire	EN ISO 11925-2	2.2.1	1	Once per week
2	Specific organic compounds PAH and B[a]P, if recycled rubber is used and/or if PAH containing extender oils or PAH containing carbon black are added	2.2.2.1	See control plan		Every 10th batch (3)
	Nitrosamines, if recycled rubber and/or nitrosamine forming agents are used	2.2.2.2			Every 10th batch (3)
	SVOC and VOC	2.2.2.3			Once per year
3	Dynamic stiffness	2.2.3		See test standard	Once per week
4	Impact sound reduction	2.2.4		1	Once per year
5	Airborne sound insulation	2.2.5			Once every 2 years
6	Geometry	2.2.6			Once per day
7	Thickness d_L	2.2.7		3	Once per day
8	Compressibility	2.2.7			Once per week
9	Mass per unit area or density	2.2.8			Once per day
10	Compressive stress / strength	2.2.10			Once per week
11	Deformation under specified load and temperature	2.2.11			Twice per year
12	Tensile strength perpendicular to faces	2.2.12			Once per month
13	Thermal conductivity	2.2.13			Once per year, indirect testing 1 per 24h for the density (4)

(1) The TAB and the manufacturer may agree to alternative tests or control methods or, where none exist, these parties may agree on the method, as long as the method permits to verify whether that the product's assessed performance may be maintained

(2) In case of discontinuous production these minimum frequencies should be adapted to an equivalent frequency.

(3) A batch is considered to be the portioned raw material of defined particle size fraction in a maximum 3000 kg, which is then processed into the respective product.

(4) Indirect verification / testing is done via determination of the density

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4 REFERENCE DOCUMENTS

EN 822:2013 Thermal insulating products for building applications - Determination of length and width

EN 824:2013 Thermal insulating products for building applications - Determination of squareness

EN 826:2013 Thermal insulating products for building applications - Determination of compression behaviour

EN 1602:2013 Thermal insulating products for building applications - Determination of the apparent density

EN 1605:2013 Thermal insulating products for building applications - Determination of deformation under specified compressive load and temperature conditions

EN 1606:2013 Thermal insulating products for building applications - Determination of compressive creep

EN 1607:2013 Thermal insulating products for building applications - Determination of tensile strength perpendicular to faces

EN 1991-1-1:2002 + AC:2009 Eurocode 1: Actions on structures – Part 1-1: General actions – Densities, self-weight, imposed loads for buildings

EN 12431:2013 Thermal insulating products for building applications - Determination of thickness for floating floor insulating products

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 13165:2012+A2:2016 Thermal insulation products for buildings - Factory made rigid polyurethane foam (PU) products – 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 data from reaction to fire tests

EN 16069:2012+A1:2015 Thermal insulating products for buildings – Factory made products of polyethylene foam (PEF) - Specification

EN 16516:2017 Construction products – Assessment of release of dangerous substances – Determination of emissions into indoor air

EN 29052-1:1992 Acoustics; Determination of dynamic stiffness; Part 1: Materials used under floating floors in dwellings

EN ISO 717-1:2013 Acoustics - Rating of sound insulation in buildings and of building elements - Part 1: Airborne sound insulation

EN ISO 717-2:2013 Acoustics - Rating of sound insulation in buildings and of building elements - Part 2: Impact sound insulation

EN ISO 10140-1:2016 Acoustics - Laboratory measurement of sound insulation of building elements- Part 1: Application rules for specific products

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EN ISO 10140-2:2010 Acoustics - Laboratory measurement of sound insulation of building elements - Part 2: Measurement of airborne sound insulation

EN ISO 10140-3:2010+A1:2015Acoustics - Laboratory measurement of sound insulation of building elements - Part 3: Measurement of impact sound insulation

EN ISO 10140-4:2010 Acoustics - Laboratory measurement of sound insulation of building elements - Part 4: Measurement procedures and requirements

EN ISO 10140-5:2010+A1:2014Acoustics - Laboratory measurement of sound insulation of building elements - Part 5: Requirements for test facilities and equipment

EN ISO 10456:2007 Building materials and products. Procedures for determining declared and design thermal values (ISO 10456:1999)

EN ISO 11925-2:2020 Reaction to fire tests for building products - Part 2: Ignitability when subjected to direct impingement of flame

ISO 18287:2006 Soil quality — Determination of polycyclic aromatic hydrocarbons (PAH) — Gas chromatographic method with mass spectrometric detection (GC-MS)

EAD 040049-00-0502 Polyurethane (PU) foam mat to be used for impact sound insulation

AfPS GS 2014:01 PAK – Testing and assessment of polycyclic aromatic hydrocarbons (PAHs) in the course of awarding the GS mark; Annex: Testing instructions, ´Harmonised method for the determination of polycyclic aromatic hydrocarbons (PAH) in polymers´

Kautschuk Gummi Kunststoffe, 1991, 44, pp. 514-521: 'Methods for the determination of N-nitrosamines in air, vulcanizates and vulcanization fumes', Liekefeld, R. et al.

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