Deutsches Institut für Bautechnik

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General Part

Technical Assessment Body issuing the European Technical Assessment:	Deutsches Institut für Bautechnik
Trade name of the construction product	fermacell flooring systems
Product family to which the construction product belongs	Thermal and sound insulating dry screed systems with prefabricated flooring elements
Manufacturer	James Hardie Europe GmbH Bennigsen Platz 1 40474 Düsseldorf DEUTSCHLAND
Manufacturing plant	Plant 1; Plant 3; Plant 4; Plant 5
This European Technical Assessment contains	20 pages including 4 annexes which form an integral part of this assessment
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of	EAD 190013-00-0502
This version replaces	ETA-18/0723 issued on 22 March 2019

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Specific Part

1 Technical description of the product

This European Technical Assessment applies to the thermal and sound insulating dry screed systems consisting of prefabricated flooring elements and additional layers forming a kit.

The prefabricated flooring elements are made of two homogeneous gypsum fibre boards according to EN 15283-2 with a density of 1000 - 1250 kg/m³ glued together with a 50 mm (± 1 mm) overlap. An insulation layer according to EN 13162, EN 13163 or EN 13171 respectively a fibre fleece layer can be glued under the gypsum fibre boards. The fibre fleece can be made of synthetic and / or natural fibres.

The gypsum fibre boards have the following characteristics according to EN 15283-2:

- Tolerance in length: 0 mm / - 5 mm
- Tolerance in width: 0 mm / - 4 mm
- Tolerance in thickness: Class C1 (± 0,2 mm)
- Squareness: 2,5 mm/m
- Bending strength: ≥ 4 N/mm²
- Thermal conductivity: λ_D = 0,32

The insulation layers have the following characteristics:

	Mineral wool according to EN 13162	Wood fibre according to EN 13171	EPS according to EN 13163
length	± 2 %	± 2 %	L(3)
width	± 1,5 %	± 1,5 %	W(3)
thickness	T7	T5 (-1 mm; +3 mm)	T(2)
squareness	5 mm/m (length and width)	5 mm/m (length and width)	S(5)
Compressive stress/strength	-	CS(10)150	CS(10)100
Compressibility	CP2 (≤ 2 mm)	-	-
Thermal conductivity	λ_D = 0,040	λ_D = 0,046	λ_D = 0,038

The following additional layers are covered:

- loose dry levelling compound made of aerated concrete with a bulk density of 430 ± 40 kg/m³
- loose fill honeycomb infill made of limestone split filled in a honeycomb board (mass per unit area: 42 – 48 kg/m² for a 30 mm layer, 84 – 96 kg/m² for a 60 mm layer)
- bonded levelling compound made of expanded polystyrene (EPS) granules and cement-based binders acc. to European Assessment Document 040635-00-1201 with a bulk density of the dry mixuture of 280 kg/m³ ± 5 %, a density of the bound material of 390 kg/m³ ± 10 %, a compressive stress at 10 % strain of 500 kPA and a reaction to fire class A2 – s1,d0[1]

[1] To be used on wood-based boards with a density ≥ 680 kg/m³ and a board thickness ≥ 12 mm or on substrates of classes A1 or A2 – s1,d0 according to EN 13501-1 with a board density ≥ 700 kg/m³ and a board thickness ≥ 10 mm

- self-levelling compound (screed material and floor screeds with gypsum based binders) acc. to EN 13813 with a compressive strength of Class C 25, a bond strength of Class B 1.5, a bending strength of Class F 6 and a reaction to fire class A1.

The prefabricated flooring elements covered by this European Technical Assessment are described in Table 1.

Table 1 Prefabricated flooring elements covered by the ETA

Prefabricated flooring elements		Mass per unit area
Type 1	- 25 mm prefabricated flooring element (2 x 12,5 mm gypsum fibre board)	29 kg/m² ± 5 %
Type 2	- 30 mm or 35 mm prefabricated flooring element (2 x 10 mm or 2 x 12,5 mm gypsum fibre board) with 10 mm wood fibre insulation layer (s' ≤ 120 MN/m³)	30 mm flooring element: 25 kg/m² ± 5 % 35 mm flooring element: 31 kg/m² ± 5 %
Type 3	- 30 mm or 35 mm prefabricated flooring element (2 x 10 mm or 2 x 12,5 mm gypsum fibre board) with 10 mm mineral wool insulation layer (s' ≤ 55 MN/m³)	30 mm flooring element: 25 kg/m² ± 5 % 35 mm flooring element: 30 kg/m² ± 5 %
Type 4	- 45 mm prefabricated flooring element (2 x 12,5 mm gypsum fibre board) with 20 mm mineral wool insulation layer (s' ≤ 35 MN/m³)	33 kg/m² ± 5 %
Type 5	- 50 mm prefabricated flooring element (2 x 10 mm gypsum fibre board) with 30 mm expanded polystyrene insulation layer (s' ≤ 55 MN/m³)	24 kg/m² ± 5 %
Type 6	- 20 mm prefabricated flooring element (2 x 10 mm gypsum fibre board)	23 kg/m² ± 5 %
Type 7	- 45 mm prefabricated flooring element (2 x 12,5 mm gypsum fibre board) with 20 mm wood fibre insulation layer (s' ≤ 70 MN/m³)	33 kg/m² ± 5 %
Type 8	- 40 mm prefabricated flooring element (2 x 10 mm gypsum fibre board) with 20 mm expanded polystyrene insulation layer (s' ≤ 50 MN/m³)	24 kg/m² ± 5 %
Type 9	- 29 mm or 34 mm prefabricated flooring element (2 x 10 mm or 2 x 12,5 mm gypsum fibre board) with 9 mm fibre fleece layer (s' ≤ 45 MN/m³)	29 mm flooring element: 25 kg/m² ± 5 % 34 mm flooring element: 30 kg/m² ± 5 %

The flooring elements have the following dimensions:

Nominal lenghth: 1200 mm to 1500 mm

Nominal width: 500 mm to 600 mm

The thickness tolerance of the flooring elements amounts to ± 3 mm.

The kits covered by the ETA are formed by the prefabricated flooring elements according to Table 1 and one of the additional layers underneath the flooring elements according to Table 2.

Table 2: Kits covered by the ETA

Type of the prefabricated flooring element according to Table 1 [2]	Additional layers[3]
1	- 10 – 100 mm loose dry levelling compound or
	- ≥ 10 mm bonded levelling compound
2	- No additional layer or
	- 10 – 100 mm loose dry levelling compound or
	- ≥ 10 mm bonded levelling compound or
	- 30 mm loose fill honeycomb infill in a honeycomb board or
	- 60 mm loose fill honeycomb infill in a honeycomb board
3	- No additional layer or
	- 10 – 100 mm loose dry levelling compound or
	- 60 mm loose fill honeycomb infill in a honeycomb board
4	- No additional layer or
	- 10 – 100 mm loose dry levelling compound or
	- 30 mm loose fill honeycomb infill in a honeycomb board or
	- 60 mm loose fill honeycomb infill in a honeycomb board
5	- No additional layer
6	- 10 – 100 mm loose dry levelling compound
7	- No additional layer
8	- No additional layer
9	- No additional layer

The European Technical Assessment has been issued for the product on the basis of agreed data/information, deposited with Deutsches Institut für Bautechnik, which identifies the product that has been assessed. The European Technical Assessment applies only to products corresponding to this agreed data/information.

[2] On all types of the prefabricated flooring elements an additional gypsum fibre board according to EN 15283-2 can be applied in accordance with section 1 of the ETA.

[3] The self-levelling compound can be part of the kit for levelling out uneven floors (e. g. on a heavyweight reinforced concrete floor) without influencing the sound insulation performance

2 Specification of the intended use in accordance with the applicable European Assessment Document

The thermal and sound insulating dry screed systems are intended to be used for thermal and / or sound insulation on floors inside buildings. The insulating dry screed systems can also be used for raising the height of floors or levelling out uneven floors.

For levelling out uneven floors the additional layers mentioned in section 1 are used. The insulating dry screed systems are only exposed to static loads.

The insulating dry screed systems are always used with a floor covering. In wet rooms the insulating dry screed systems are lined with a waterproof floor covering.

The insulating dry screed systems are laid completely supported on an even floor structure (if necessary unevenness is leveled off). Cross joints are avoided.

The flooring elements are laid with edges tightly abutted in such a way that no gaps will occur in the joint area. The joints are glued and fastened with flooring screws or staples.

Appropriate edge insulating strips are used at the boundary area on rising walls in order to avoid sonic bridges.

In case of using a loose dry levelling compound / loose fill honeycomb infill a trickle protection sheet can be laid before the insulating dry screed system will be built in.

The performance according to section 3 only applies if the insulating dry screed system is installed according to the manufacture's installation instructions and if it is protected from precipitation, wetting or weathering during transport, storage and installation.

The design value of the thermal conductivity shall be laid down according to relevant national provisions.

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the insulating dry screed system of at least 25 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

3 Performance of the product and references to the methods used for its assessment

For sampling, conditioning and testing the provisions of the EAD No 190013-00-0502 "Thermal and sound insulating dry screed systems with prefabricated flooring elements" apply.

3.1 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire prefabricated flooring elements type 1, 3, 4 and 6 test acc. to EN ISO 9239-1:2010 test acc. to EN ISO 1716:2010	Class $A2_{fl}$ – s1[4] acc. to EN 13501-1:2007 + A1:2009
Reaction to fire prefabricated flooring elements type 2, 5, 7, 8 and 9 test acc. to EN ISO 9239-1:2010 test acc. to EN ISO 11925-2:2010	Class B_{fl} – s1[5] acc. to EN 13501-1:2007 + A1:2009
Reaction to fire loose dry levelling compound in accordance with Commission Decision 96/603/EC	Class A1 acc. to EN 13501-1:2007 + A1:2009
Reaction to fire Honeycomb boards with loose fill honeycomb infill (limestone split)	No performance assessed

3.2 Hygiene, health and the environment (BWR 3)

Essential characteristic	Performance
Water vapour permeability	No performance assessed
Water absorption of the gypsum fibre boards	No performance assessed

3.3 Safety and accessibility (BWR 4)

Essential characteristic	Performance
Surface hardness of the gypsum fibre boards	No performance assessed
Resistance to functional failure from concentrated load test according to Annex 1 of the EAD 190013-00-0502	see Annex D

3.4 Protection against noise (BWR 5)

Essential characteristic	Performance
Impact sound reduction of the kit on a heavyweight standard floor test according to the relevant parts of EN ISO 10140 (category II according to EN ISO 10140-1, Annex H) rating according to EN ISO 717-2	see Annex A

[4] Thickness of the gypsum fibre layer ≥ 20 mm, thickness of the mineral wool layer ≥ 10 mm, to be used on wood or substrates of classes $A1_{fl}$ and $A2_{fl}$ according to EN 13501-1

[5] Thickness of the gypsum fibre ≥ 20 mm, thickness of the expanded polystyrene layer ≥ 20 mm, thickness of the wood fibre layer ≥ 10 mm, to be used on wood of class C_{fl} – s1 or substrates of classes $A1_{fl}$ and $A2_{fl}$ and a density ≥ 480 kg/m³ according to EN 13501-1

Essential characteristic	Performance
Airborne sound insulation of the floor in which the kit is used test according to the relevant parts of EN ISO 10140 rating according to EN ISO 717-1	see Annex B
Impact sound insulation of the floor in which the kit is used test according to the relevant parts of EN ISO 10140 (category II according to EN ISO 10140-1, Annex H) rating according to EN ISO 717-2	see Annex C

3.5 Energy economy and heat retention (BWR 6)

Essential characteristic	Performance
Thermal resistance	No performance assessed

4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

In accordance with EAD No. 190013-00-0502, the applicable European legal act is: 2000/273/EC.

The system to be applied is:

3 for any use except for uses subject to regulations on reaction to fire

For reaction to fire the system to be applied is:

1

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

Issued in Berlin on 29 March 2022 by Deutsches Institut für Bautechnik

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beglaubigt:
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ANNEX A

On all types of the prefabricated flooring elements an additional gypsum fibre board according to EN 15283-2 can be applied in accordance with section 1 of the ETA without negatively affecting the weighted impact sound reduction.

Table A.1 Impact sound reduction of the kit on a heavyweight standard floor

Type of the flooring element	**Additional layers**	**Weighted impact sound reduction of the kit on a heavyweight standard floor[1]: ΔL_w [dB]**
1	- ≥ 20 mm loose dry levelling compound	20
	- ≥ 60 mm loose dry levelling compound	22
	- 100 mm loose dry levelling compound	24
	- ≥ 40 mm bonded levelling compound	22
	- ≥ 100 mm bonded levelling compound	21
2	- No additional layer	20
	- ≥ 20 mm loose dry levelling compound	24
	- ≥ 60 mm loose dry levelling compound	25
	- 100 mm loose dry levelling compound	27
	- ≥ 40 mm bonded levelling compound	24
	- ≥ 100 mm bonded levelling compound	25
3	- No additional layer	22
	- ≥ 20 mm loose dry levelling compound	29
	- ≥ 60 mm loose dry levelling compound	31
4	- No additional layer	27
	- ≥ 20 mm loose dry levelling compound	31
5	- No additional layer	19
6	- ≥ 20 mm loose dry levelling compound	17
7	- No additional layer	21

[1] Reinforced concrete ceiling with a mass per unit area m' = 400 kg/m²

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Type of the flooring element	Additional layers	Weighted impact sound reduction of the kit on a heavyweight standard floor[1]: ΔL_w [dB]
8	- No additional layer	18
9	- No additional layer	21

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ANNEX B

On all types of the prefabricated flooring elements an additional gypsum fibre board according to EN 15283-2 can be applied in accordance with section 1 of the ETA without negatively affecting the weighted sound reduction.

Table B.1 Floor build-ups used to measure the airborne sound insulation of the kit (from the top down)

 **Floor build-up a)** - 22 mm spanning wood-based board - 220 mm joist (laminated timber or solid timber; center distance ≥ 625 mm)	 **Floor build-up b)** - 22 mm wood-based board - 220 mm joist (laminated timber or solid timber; center distance ≥ 625 mm) - 50 mm cavity insulation - 30 mm wood-based batten (center distance 333 mm) - 10 mm gypsum fibre board **Floor build-up b2)** - as b) but with 100 mm cavity insulation	 **Floor build-up c)** - 22 mm wood-based board - 220 mm joist (laminated timber or solid timber; center distance ≥ 625 mm) - 50 mm cavity insulation - 30 mm resilient bar Protektor TPS (center distance 333 mm) - 10 mm gypsum fibre board **Floor build-up c2)** - as c) but with 100 mm cavity insulation
 **Floor build-up d)** - 24 mm wood-based board - 220 mm joist (laminated timber or solid timber; center distance ≥ 625 mm) - Insertion 80 kg/m³ - 24 mm wood-based board - 60 mm wood-based batten - 18 mm wood-based board - 24 mm plaster	 **Floor build-up e)** - 220 mm joist (laminated timber or solid timber; center distance ≥ 625 mm) - 60 mm bonded levelling compound - Insertion 80 kg/m³ - 24 mm wood-based board - 60 mm wood-based batten - 18 mm wood-based board - 24 mm plaster	 **Floor build-up f)** - 220 mm joist (laminated timber or solid timber; center distance ≥ 625 mm) - 110 mm bonded levelling compound - 24 mm wood-based board - 60 mm wood-based batten - 18 mm wood-based board - 24 mm plaster

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Floor build up g) - 160 mm reinforced concrete (mass per unit area m' ≥ 400 kg/m²)	**Floor build up h)** - 148 mm cross laminated timber (mass per unit area m' ≥ 66 kg/m²)	**Floor build up i)** - 148 mm cross laminated timber (mass per unit area m' ≥ 66 kg/m²) - 27 mm metal framing component for gypsum board systems (resilient bar) with mineral fiber thermal insulation felt (center distance 415 mm) - 2 or 3 x 12,5 mm gypsum fibre board

Table B.2 Airborne sound insulation of the prefabricated flooring elements type 1 with the additional layers described in column 1 on floor build-ups b) and g) according to table B.1

Additional layers	**Floor build-up**	
	b)	**g)**
	weighted sound reduction R_w and spectrum adaptation terms C and C_{tr} [dB] ($R_w(C_{100\text{-}3150}; C_{tr,100\text{-}3150})$)	
- ≥ 20 mm loose dry levelling compound	52 (-4;-12)	63 (-2;-7)
- ≥ 60 mm loose dry levelling compound	54 (-3;-10)	64 (-3;-8)
- 100 mm loose dry levelling compound	54 (-3;-9)	62 (-2;-7)
- ≥ 40 mm bonded levelling compound	-	63 (-3;-9)
- ≥ 100 mm bonded levelling compound	52 (-4;-11)	66 (-3;-8)

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Table B.3 Airborne sound insulation of the prefabricated flooring elements type 2 with the additional layers described in column 1 on the floor build-ups a) to g) according to table B.1

Additional layers	**Floor build-up**						
	a)	**b)**	**c)**	**d)**	**e)**	**f)**	**g)**
	weighted sound reduction R_w and spectrum adaptation terms C and C_{tr} [dB] ($R_w(C_{100-3150}; C_{tr,100-3150})$)						
- No additional layer	43 (-2;-6)	48 (-3-11)	63 (-5;-13)	65 (-3;-10)	71 (-4;-11)	63 (-5;-13)	61 (-3;-9)
- ≥ 20 mm loose dry levelling compound	47 (-3;-9)	51 (-4;-11)	65 (-5;-13)	66 (-4;-11)	68 (-4;-12)	65 (-5;-12)	66 (-3;-8)
- ≥ 60 mm loose dry levelling compound	-	54 (-4;-11)	-	67 (-3;-10)	-	-	65 (-4;-9)
- 100 mm loose dry levelling compound	50 (-2;-9)	55 (-5;-11)	-	68 (-4;-10)	-	-	65 (-2;-8)
- ≥ 40 mm bonded levelling compound	-	49 (-4;-11)	-	66 (-5;-12)	-	-	65 (-3;-8)
- ≥ 100 mm bonded levelling compound	-	52 (-5;-12)	-	68 (-6;-13)	-	-	69 (-3;-9)
- 30 mm loose fill honeycomb infill	58 (-5;-13)	56 (-5;-12)	73 (-8;-17)	72 (-6;-14)	-	-	-
- 60 mm loose fill honeycomb infill	61 (-3;-10)	59 (-4;-11)	77 (-7;-15)	75 (-5;-12)	-	-	-

Table B.4 Airborne sound insulation of the prefabricated flooring elements type 3 with the additional layers described in column 1 on floor build-ups a) to d) and g) according to table B.1

Additional layers	**Floor build-up**				
	a)	**b)**	**c)**	**d)**	**g)**
	weighted sound reduction R_w and spectrum adaptation terms C and C_{tr} [dB] ($R_w(C_{100-3150}; C_{tr,100-3150})$)				
- No additional layer	42 (-1;-6)	47 (-3;-10)	62 (-4;-12)	65 (-3;-10)	61 (-4,-10)
- ≥ 20 mm loose dry levelling compound	47 (-3;-9)	50 (-4;-11)	-	-	66 (-3,-9)
- ≥ 60 mm loose dry levelling compound	55 (-5;-11)	56 (-5;-12)	-	69 (-5;-12)	68 (-4;-9)
- 60 mm loose fill honeycomb infill	63 (-4;-11)	-	77 (-8;-16)	73 (-4;-11)	-

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Table B.5 Airborne sound insulation of the prefabricated flooring elements type 4 with the additional layers described in column 1 on floor build-ups g), h) and i) according to table B.1

Additional layers	**Floor build-up**		
	g)	**h)**	**i)**
	weighted sound reduction R_w and spectrum adaptation terms C and C_{tr} [dB] ($R_w(C_{100-3150}; C_{tr,100-3150})$)		
- No additional layer	67 (-3;-8)	-	-
- ≥ 20 mm loose dry levelling compound	69 (-3;-9)	-	-
- 30 mm loose fill honeycomb infill	-	64 (-4;-11)	-
- 60 mm loose fill honeycomb infill	-	66 (-3;-10)	74(-9;-18)[1)] 75(-7;-16)[2)]

1) 2 x 12,5 mm gypsum fibre board

2) 3 x 12,5 mm gypsum fibre board

Table B.6 Airborne sound insulation of the prefabricated flooring elements type 5 with the additional layers described in column 1 on floor build-up g) according to table B.1

Additional layers	**Floor build-up**
	g)
	weighted sound reduction R_w and spectrum adaptation terms C and C_{tr} [dB] ($R_w(C_{100-3150}; C_{tr,100-3150})$)
- No additional layer	58 (-4;-9)

Table B.7 Airborne sound insulation of the prefabricated flooring elements type 6 with the additional layers described in column 1 on floor build-up g) according to table B.1

Additional layers	**Floor build-up**
	g)
	weighted sound reduction R_w and spectrum adaptation terms C and C_{tr} [dB] ($R_w(C_{100-3150}; C_{tr,100-3150})$)
- ≥ 20 mm loose dry levelling compound	65 (-3;-9)

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Table B.8 Airborne sound insulation of the prefabricated flooring elements type 7 with the additional layers described in column 1 on floor build-up g) according to table B.1

Additional layers	**Floor build-up**
	g)
	weighted sound reduction R_w and spectrum adaptation terms C and C_{tr} [dB] ($R_w(C_{100\text{-}3150}; C_{tr,100\text{-}3150})$)
- No additional layer	66 (-3;-9)

Table B.9 Airborne sound insulation of the prefabricated flooring elements type 8 with the additional layers described in column 1 on floor build-up g) according to table B.1

Additional layers	**Floor build-up**
	g)
	weighted sound reduction R_w and spectrum adaptation terms C and C_{tr} [dB] ($R_w(C_{100\text{-}3150}; C_{tr,100\text{-}3150})$) *
- No additional layer	60 (-3;-8)
* on a reinforced concrete raw floor with a weighted sound reduction of Rw ≥ 60 dB	

Table B.10 Airborne sound insulation of the prefabricated flooring elements type 9 with the additional layers described in column 1 on floor build-ups g), b2) and c2) according to table B.1

Additional layers	**Floor build-up**		
	g)	**b2)**	**c2)**
	weighted sound reduction R_w and spectrum adaptation terms C and C_{tr} [dB] ($R_w(C_{100\text{-}3150}; C_{tr,100\text{-}3150})$)		
- No additional layer	35 (0;-3)	50 (-3;-10)	60 (-3;-9)

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ANNEX C

The floor build-ups mentioned in Annex B, table B.1 where also used to measure the impact sound insulation of the kit.

On all types of the prefabricated flooring elements an additional gypsum fibre board according to EN 15283-2 can be applied in accordance with section 1 of the ETA without negatively affecting the weighted normalized impact sound pressure level.

Table C.1 Impact sound insulation of the prefabricated flooring elements type 1 with the additional layers described in column 1 on floor build-ups b) and g) according to table B.1

Additional layers	**Floor build-up**	
	b)	**g)**
	weighted normalized impact sound pressure level $L_{n,w}$ and spectrum adaptation term C_I [dB] ($L_{n,w}(C_{I,100\text{-}2500})$)	
- ≥ 20 mm loose dry levelling compound	71(2)	58(0)
- ≥ 60 mm loose dry levelling compound	68(1)	55(1)
- 100 mm loose dry levelling compound	66(1)	53(1)
- ≥ 40 mm bonded levelling compound	-	56(1)
- ≥ 100 mm bonded levelling compound	68(2)	57(0)

Table C.2 Impact sound insulation of the prefabricated flooring elements type 2 with the additional layers described in column 1 on floor build-ups a) to g) according to table B.1

Additional layers	**Floor build-up**						
	a)	**b)**	**c)**	**d)**	**e)**	**f)**	**g)**
	weighted normalized impact sound pressure level $L_{n,w}$ and spectrum adaptation term C_I [dB] ($L_{n,w}(C_{I,100\text{-}2500})$)						
- No additional layer	81(-3)	72(1)	53(-1)	52(0)	47(2)	57(2)	58(0)
- ≥ 20 mm loose dry levelling compound	72(-1)	69(1)	50(1)	49(1)	47(2)	54(2)	54(0)
- ≥ 60 mm loose dry levelling compound	-	67(1)	-	47(1)	-	-	53(1)
- 100 mm loose dry levelling compound	67(0)	64(1)	-	48(1)	-	-	51(0)
- ≥ 40 mm bonded levelling compound	-	70(2)	-	51(1)	-	-	54(1)

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Additional layers	Floor build-up						
	a)	b)	c)	d)	e)	f)	g)
	weighted normalized impact sound pressure level $L_{n,w}$ and spectrum adaptation term C_I [dB] ($L_{n,w}(C_{I,100\text{-}2500})$)						
- ≥ 100 mm bonded levelling compound	-	67(2)	-	52(2)	-	-	52(1)
- 30 mm loose fill honeycomb infill	63(-1)	63(2)	42(1)	44(2)	-	-	-
- 60 mm loose fill honeycomb infill	61(-1)	61(2)	39(1)	42(3)	-	-	-

Table C.3 Impact sound insulation of the prefabricated flooring elements type 3 with the additional layers described in column 1 on floor build-ups a) to d) and g) according to table B.1

Additional layers	Floor build-up				
	a)	b)	c)	d)	g)
	weighted normalized impact sound pressure level $L_{n,w}$ and spectrum adaptation term C_I [dB] ($L_{n,w}(C_{I,100\text{-}2500})$)				
- No additional layer	77(0)	71(1)	54(0)	51(0)	55(0)
- ≥ 20 mm loose dry levelling compound	71(0)	68(1)	-	-	49(1)
- ≥ 60 mm loose dry levelling compound	64(1)	63(2)	-	46(2)	47(0)
- 60 mm loose fill honeycomb infill	55(1)	-	38(2)	41(3)	--

Table C.4 Impact sound insulation of the prefabricated flooring elements type 4 with the additional layers described in column 1 on floor build-ups g), h) and i) according to table B.1

Additional layers	Floor build-up		
	g)	h)	i)
	weighted normalized impact sound pressure level $L_{n,w}$ and spectrum adaptation term C_I [dB] ($L_{n,w}(C_{I,100\text{-}2500})$)		
- No additional layer	50(0)	-	-
- ≥ 20 mm loose dry levelling compound	46(1)	-	-
- 30 mm loose fill honeycomb infill	-	52(1)	-
- 60 mm loose fill honeycomb infill	-	51(0)	42(2)[1)] 39(2)[2)]

1) 2 x 12,5 mm gypsum fibre board

2) 3 x 12,5 mm gypsum fibre board

Table C.5 Impact sound insulation of the prefabricated flooring elements type 5 with the additional layers described in column 1 on floor build-up g) according to table B.1

Additional layers	**Floor build-up**
	g)
	weighted normalized impact sound pressure level $L_{n,w}$ and spectrum adaptation term C_I [dB] ($L_{n,w}(C_{I,100\text{-}2500})$)
- No additional layer	59(1)

Table C.6 Impact sound insulation of the prefabricated flooring elements type 6 with the additional layers described in column 1 on floor build-up g) according to table B.1

Additional layers	**Floor build-up**
	g)
	weighted normalized impact sound pressure level $L_{n,w}$ and spectrum adaptation term C_I [dB] ($L_{n,w}(C_{I,100\text{-}2500})$)
- ≥ 20 mm loose dry levelling compound	54(1)

Table C.7 Impact sound insulation of the prefabricated flooring elements type 9 with the additional layers described in column 1 on floor build-up a), b2) ans c2) according to table B.1

Additional layers	**Floor build-up**		
	a)	**b2)**	**c2)**
	weighted normalized impact sound pressure level $L_{n,w}$ and spectrum adaptation term C_I [dB] ($L_{n,w}(C_{I,100\text{-}2500})$)		
- No additional layer	79(-1)	68(1)	52(0)

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ANNEX D

On all types of the prefabricated flooring elements an additional gypsum fibre board according to EN 15283-2 can be applied in accordance with section 1 of the ETA without negatively affecting the average deformation. If the performances are improved, they are shown separately.

Table D.1 Resistance to functional failure from concentrated load

Flooring elements	Additional layers	Category[1]	Concentrated load [kN]								Maximum load [kN]
			0,8	1,0	1,5	2,0	2,5	3,0	3,5	4,0	
			Average deformation [mm]								
Type 1	according to table 2 of the ETA	1	1,1	1,2	1,7	2,3	3,4	-	-	-	2,5
		2	0,9	1,1	1,5	1,8	2,0	2,3	2,6	3,1	5,0
		3	0,5	0,5	0,7	0,8	0,9	1,0	1,2	1,3	8,9
Type 2	≥ 30 mm loose dry levelling compound or bonded levelling compound or honeycomb infill in a honeycomb board	1	1,2	1,4	2,0	2,5	3,1	-	-	-	2,8
		2	1,1	1,3	1,6	1,9	2,2	2,6	3,0	3,3	6,6
		3	0,4	0,5	0,7	0,9	1,0	1,2	1,5	1,8	7,7
	additional gypsum fibre board	1	0,8	0,9	1,6	2,0	2,4	3,0	3,7	-	4,2
		2	1,0	1,2	1,4	1,8	2,1	2,4	2,8	2,9	9,0
		3	0,3	0,4	0,6	0,8	0,9	1,2	1,3	1,8	10,8
Type 3	≥ 30 mm loose dry levelling compound or honeycomb infill in a honeycomb board	1	2,6	3,1	4,5	5,8	-	-	-	-	2,0
		2	1,6	1,9	2,5	3,1	3,8	4,6	5,5	6,5	4,0
		3	0,7	0,8	1,1	1,4	1,7	2,0	2,4	2,8	5,6
	additional gypsum fibre board	1	2,5	3,1	4,4	5,8	-	-	-	-	2,8
		2	1,6	1,9	2,5	3,1	3,8	4,6	5,4	6,5	5,4
		3	0,7	0,8	1,1	1,4	1,7	2,0	2,4	2,8	9,4

[1] 1: Edges of the floor area
2: Border of the floor area
3: Middle of the floor area

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Flooring elements	Additional layers	Category[1]	Concentrated load [kN]								Maximum load [kN]
			0,8	1,0	1,5	2,0	2,5	3,0	3,5	4,0	
			Average deformation [mm]								
Type 5	according to table 2 of the ETA	1	1,0	1,2	1,9	3,1	-	-	-	-	2,2
		2	1,1	1,3	1,6	2,0	2,5	3,0	3,8	4,7	4,1
		3	0,7	0,9	1,4	1,7	2,0	2,3	2,5	2,8	6,7
	additional gypsum fibre board	1	1,2	1,4	1,9	2,5	3,3	-	-	-	3,0
		2	0,7	0,8	1,1	1,4	1,7	2,0	2,4	2,9	5,6
		3	0,3	0,4	0,5	0,7	0,9	1,0	1,2	1,4	9,4