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Scan Underlay ApS
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Dresden, 20th November 2017

Test Report
No. 2617089

Client:	Scan Underlay ApS Ursusvej 16 8464 Galten DENMARK
Assignment from:	23th March 2017
Assignment:	Determination of characteristic values in accordance with CEN/TS 16354: punctual conformability (PC), compressive strength (CS), thermal resistance (R), water vapour diffusion resistance (SD), impact sound reduction (IS), reflected walking sound (RWS), reaction-to-fire (RTF)
Contractor:	Entwicklungs- und Prüflabor Holztechnologie GmbH (EPH)
Person in Charge:	Dipl.-Phys. Heiko Kühne

Dipl.-Ing. Jens Gecks
Head of Laboratory for Material and Product Testing

The test report contains 10 pages. Copies of excerpts require the written approval of the EPH.
The test results relate exclusively to the materials tested.

1 Task

Entwicklungs- und Prüflabor Holztechnologie GmbH (EPH) was commissioned by Scan Underlay ApS to perform the following tests at one underlayment material:

- Determination of the punctual conformability in accordance with CEN/TS 16354 (PC),
- Determination of the compressive strength in accordance with CEN/TS 16354 (CS),
- Determination of the thermal resistance in accordance with CEN/TS 16354 (R),
- Determination of the water vapour diffusion resistance in accordance with CEN/TS 16354 (SD),
- Determination of the impact sound reduction by a ceiling lining in accordance with CEN/TS 16354 (IS),
- Determination of the reflected walking sound in accordance with CEN/TS 16354 and IHD-W 431 (RWS),
- Determination of the reaction-to-fire in accordance with CEN/TS 16354 (RTF value)

2 Test Material

The client provided the following material (flooring, underlayment for floorings):

Tab. 1: Material - underlayment

No.	Client designation	Client description
1	ACOUSTIC SILENCE 500 grip for LVT click	1,2 mm floor underlayment for click LVT and vinyl with grip, cross-linked rubber textile foam, foil coated at both sides, one side self-adhesive
2	ACOUSTIC SILENCE 700 STANDARD	2 mm floor underlayment for all types of floors, cross-linked rubber textile foam, fleece coated at both sides
3	ACOUSTIC SILENCE 702 MOISTURE-STOP	2 mm floor underlayment with moisture-stop for all types of floors, fleece coated at one side, other side coated with aluminised PET-foil
4	[redacted]	[redacted]

For IS and RWS tests the following setups were realised:

Tab. 2: Material for flooring system tests – underlayment and flooring

No.	Underlayment	Flooring
1	ACOUSTIC SILENCE 500 grip for LVT click	LVT, Moduleo Select click, 1316 x 191 x 4.5 mm³
2.1	ACOUSTIC SILENCE 700 STANDARD	laminate flooring, My Floor Lodge, 1380 x 193 x 8 mm³
2.2	ACOUSTIC SILENCE 700 STANDARD	parquet flooring, Boen, 2200 x 215 x 14 mm³

The contractor conditioned the test specimens.

3 Performing the Test

3.1 Determination of the punctual conformability in accordance with CEN/TS 16354 (PC value)

The punctual conformability of the underlayment was determined by measuring the thickness according to CEN/TS 16354 and the Shore-A-hardness according to EN ISO 868 plus the details defined in A.3.6 of CEN/TS 16354. To determine the Shore-A-hardness a type 'A' shore durometer mounted on a durometer stand with a mass of 1 kg was used.
The PC-value was calculated according to formula A.1 of CEN/TS 16354 using the thickness and the Shore-A-hardness. At least five samples were used to calculate an average value.

3.2 Determination of the compressive strength in accordance with CEN/TS 16354 (CS value)

The behaviour when exposed to compressive strength in accordance with CEN/TS 16354 (based on DIN EN 826) was investigated using a universal testing machine (manufacturer: Hegewald & Peschke Meß- and Prüftechnik GmbH, designation: inspect 10 kN). This involved preloading square test specimens (edge length 200 mm) with (100 ± 5) Pa using a load frame to ensure the flatness and central application of the load, which was subsequently compressed at a constant speed of (0.1 thickness)/min. The square test (edge length 100 mm) was mounted to the actuator of the test machine in an immobile position, plane-parallel to the machine table. The force/deformation curve was recorded and the CS value (compressive strength) was calculated in accordance with CEN/TS 16354 from the force for a deformation of 0.5 mm.
(Attention: The test and evaluation methods in CEN/TS 16354 and DIN EN 826 differ significantly, the results are not comparable).

3.3 Determination of the thermal resistance in accordance with CEN/TS 16354 (R value)

The thermal conductivity and thermal resistance were determined in accordance with DIN EN 12667. The underlay material was classified as perpendicular to the heat flow. The thermal resistance was determined in accordance with this classification. A one-plate device, type "lambda-Meter EP 500e", was used to determine the thermal resistance. The test specimens were stored in a normal climate at 23°C/50% rel. humidity. After storage, they were immediately installed in the test device and tested. Due to the minimum thickness required for measurements multiple specimens were placed on top of each other.

3.4 Determination of the water vapour diffusion resistance in accordance with CEN/TS 16354 (SD value)

This was determined in accordance with CEN/TS 16354 at Innoform GmbH Testservice (test report BA 20341). For the measurement 3 samples of an area of 50 cm^2 each were used. The test device Aquatran Model 1 by the manufacturer Mocon was applied.

3.5 Determination of the impact sound reduction in accordance with CEN/TS 16354 (IS value)

The impact sound reduction was determined in an IHD test bench on a concrete screed ceiling with a thickness of 14 cm in accordance with the provisions of ISO 10140-3. The test floor was installed in the transmission room (first floor) with a volume of 83.5 m^3 and a hammer system (Norsonic) was used to stimulate the floor in at least 5 positions. The sound measurement took place in the receiving room (ground floor), with a volume of 76.9 m^3. Measurement technology manufactured by Bruel & Kjaer (LAN-XI system) and a mobile microphone with pivot boom were used. Mean spectra from measurements with and without installed floor coverings where used to calculate the impact noise reduction according to DIN EN ISO 717-2.

3.6 Determination of reflected walking sound in accordance with CEN/TS 16354 and IHD-W 431 (RWS value)

The testing was performed in the acoustical laboratory of IHD (upper room) according to IHD-W 431 (version from 14 May, 2012). The volume of the test room has an amount of 83.5 m³. In the centre of the concrete screed ceiling with a thickness of 14 cm flooring samples (reference and test variants) were installed.
15 measurements each were taken of walking noise that was created by a test person who walked steadily over the flooring structure wearing high-heeled shoes (hard rubber soles). The noise emitted by the test person in her first step walking the test distance was used for characterizing the room-acoustic properties. The A-weighted total sound pressure level (unit: dB (A)) as well as the psycho-acoustic measure of perceived loudness were used as measuring parameters for the generated walking noise, which were determined according to the methods as described in the IHD Works Standard 431, Version from 14 May 2012, and in DIN 45631 (calculation of the sound volume level and loudness from the sound spectrum – approach by E. Zwicker).

3.7 Determination of the reaction-to-fire in accordance with CEN/TS 16354 (RTF value)

The test procedures were carried out in accordance with DIN EN ISO 11925-2 (Reaction to fire test – Ignitability of products subjected to direct impingement of flame – Part 2: Single-flame source test) issued in DIN EN 13501-1:2010.

The tests were carried out with 15 s flame exposure (20 s test duration) as follows:

Specimen		Kind of impingement	Surface	Orienting direction		Backing substrate
a)	1	Surface impingement	top surface	L1	lengthwise	9 mm plywood
	2			L2		
b)	3	Edge impingement		L1		
	4			L2		
c)	5	Worst case a) - b)		L3		
	6			Q1	crosswise	
	7			Q2		
	8			Q3		

4 Test Results

4.1 Punctual conformability in accordance with CEN/TS 16354 (PC value)

Tab. 3: PC value (mean, simple standard deviation, coefficient of variation)

	PC value [mm]		
Version	Mean $\bar{x}$ (n = 8)	Standard deviation s	Coefficient of variation v [%]
1	0.34	0.04	11.2
2	1.01	0.06	6.2
3	-	-	-
4	-	-	-

4.2 Compressive strength in accordance with CEN/TS 16354 (CS value)

Tab. 4: CS value (mean, simple standard deviation, coefficient of variation)

	CS value [kPa]		
Version	Mean $\bar{x}$ (n = 10)	Standard deviation s	Coefficient of variation v [%]
1	68.6	21.8	31.8
2	26.4	1.9	7.2
3	-	-	-
4	-	-	-

4.3 Determination of the thermal resistance in accordance with CEN/TS 16354 (R value)

Tab. 5: R value (thermal conductivity and thermal resistance)

Version	Thermal conductivity $\lambda^{24}_{23/50}$ [W/(m.K)]	R value - Thermal resistance $R^{24}_{23/50}$ [(m²K)/W]
1	0.0610	0.0192
2	0.0584	0.0317
3	0.0601	0.0305
4	0.0566	0.0843

4.4 Determination of the water vapour diffusion resistance in accordance with CEN/TS 16354 (SD value)

Tab. 6: Water vapour diffusion equivalent air layer thickness

	SD value - Water vapour diffusion equivalent air layer thickness s_d [m]		
Version	Mean $\bar{x}$ (n = 3)	Standard deviation s	Coefficient of variation v [%]
1	44.8	3.3	7.4
2	< 0.1	0	0
3	326	24.3	7.5
4	-	-	-

4.5 Impact sound reduction in accordance with CEN/TS 16354 (IS value)

The third-octave spectra measured under laboratory conditions in accordance with ISO 10140-3 were used to calculate the impact sound insulation and the spectrum-weighted value in accordance with DIN EN ISO 717-2.

Tab. 7: IS value and other parameters in accordance with DIN EN ISO 717-2

Version	IS value: Weighted impact sound reduction ΔL_w [dB]	Unweighted linear impact sound reduction ΔL_{lin} [dB]	Spectrum adaptation term for the impact sound reduction of the ceiling lining $C_{I\Delta}$ [dB]	Spectrum adaptation term for the reference ceiling with ceiling lining C_{Ir} [dB]
1 (loose laid)	19	8	-11	0
1 (glued)	19	8	-11	0
2.1 (loose laid)	18	7	-11	0
2.1 (glued)	18	8	-10	-1
2.2 (loose laid)	16	6	-10	-1
2.2 (glued)	16	6	-10	-1
3	-	-	-	-
4	-	-	-	-

4.6 Reflected walking sound in accordance with CEN/TS 16354 and IHD-W 431 (RWS value)

The test results according to IHD Works Standard 431, Version from 14 May 2012, are contained in Tables 8 and 9. The parameters were established after cancelling the highest and the lowest values measured (correction of outliers according to IHD Works Standard 431).

The result is shown as the respective difference of the total sound pressure level or perceived loudness, respectively, of the investigated variant in comparison with the reference flooring. The change of the linear parameter of perceived loudness (N) is determined in per cent with view of the reference as follows:

Change in per cent: $$\frac{(N_{ref} - N_j)}{N_{ref}} * 100\%$$

The ascertained characteristic value shows the increase in per cent (negative value) or decrease (positive value) of the loudness perceived.

Tab. 8: A-weighted total sound pressure level

Version	Reference [dB(A)]	Test flooring [dB(A)]	Difference [dB(A)]
1 (loose laid)	76.1	66.7	9.4
1 (glued)	75.8	60.4	15.4
2.1 (loose laid)	76.1	75.0	1.1
2.1 (glued)	75.6	71.9	3.6
2.2 (loose laid)	76.1	76.1	0.0
2.2 (glued)	75.5	73.9	1.7
3	-	-	-
4	-	-	-

Tab. 9: Loudness (RWS value)

Version	Reference [Sone]	Test flooring [Sone]	Difference of loudness [Sone], relative difference [%]	
1 (loose laid)	28.9	**14.7**	14.2	49
1 (glued)	28.6	**11.8**	16.7	58
2.1 (loose laid)	28.9	**25.1**	3.8	13
2.1 (glued)	28.3	**22.2**	6.2	22
2.2 (loose laid)	28.9	**29.6**	-0.7	-2
2.2 (glued)	28.3	**24.0**	4.2	15
3	-	-	-	-
4	-	-	-	-

4.7 Reaction-to-fire in accordance with CEN/TS 16354 (RTF value)

The following classification characteristics were determined for versions 1 and 2:

Version 1: Edge impingement			
Duration of flaming	**N**	**Parameter**	**Test result**
15 s (20 s)	**6**	Specimen ignition	Yes
		$F_s \leq 150$ mm max. extent of flame	No
		Flaming droplets/particles	No

N ... Number of tests

Requirement max. extent of flame ≤ 150 mm fulfilled → Fire class E_{fl}
not fulfilled → Fire class F_{fl}

The detailed results are described in annex 2617089/F1 - A and - B.

Version 2: Edge impingement			
Duration of flaming	**N**	**Parameter**	**Test result**
15 s (20 s)	**6**	Specimen ignition	Yes
		$F_s \leq 150$ mm max. extent of flame	Yes
		Flaming droplets/particles	No

N ... Number of tests

Requirement max. extent of flame ≤ 150 mm fulfilled → Fire class E_{fl}
not fulfilled → Fire class F_{fl}

The detailed results are described in annex 2617089/F2 - A and - B.

5 Evaluation

5.1 Punctual conformability in accordance with CEN/TS 16354 (PC value)

Tab. 10: PC class in accordance with table B.1 in CEN/TS 16354

Version	Class
1	PC0
2	PC1
3	-
4	-

5.2 Compressive strength in accordance with CEN/TS 16354 (CS value)

Tab. 11: CS class in accordance with table B.1 in CEN/TS 16354

Version	Class
1	CS2
2	CS1
3	-
4	-

5.3 Impact sound reduction in accordance with CEN/TS 16354 (IS value)

Tab. 12: IS class in accordance with table B.1 in CEN/TS 16354

Version	Class
1 (loose laid)	IS2
1 (glued)	IS2
2.1 (loose laid)	IS2
2.1 (glued)	IS2
2.2 (loose laid)	IS1
2.2 (glued)	IS1
3	-
4	-

A graphic representation of the determined impact sound reduction is included in the annex.

5.4 Reflected walking sound in accordance with IHD-W 431 and CEN/TS 16354 (RWS value)

Tab. 13: RWS class in accordance with table B.1 in CEN/TS 16354

Version	Class
1 (loose laid)	RWS3
1 (glued)	RWS3
2.1 (loose laid)	RWS1
2.1 (glued)	RWS2
2.2 (loose laid)	RWS1
2.2 (glued)	RWS2
3	-
4	-

A graphic presentation of the determined sound pressure level spectra and calculated single value ratings are contained in the annex.

Dipl.-Phys. Heiko Kühne
Person in Charge

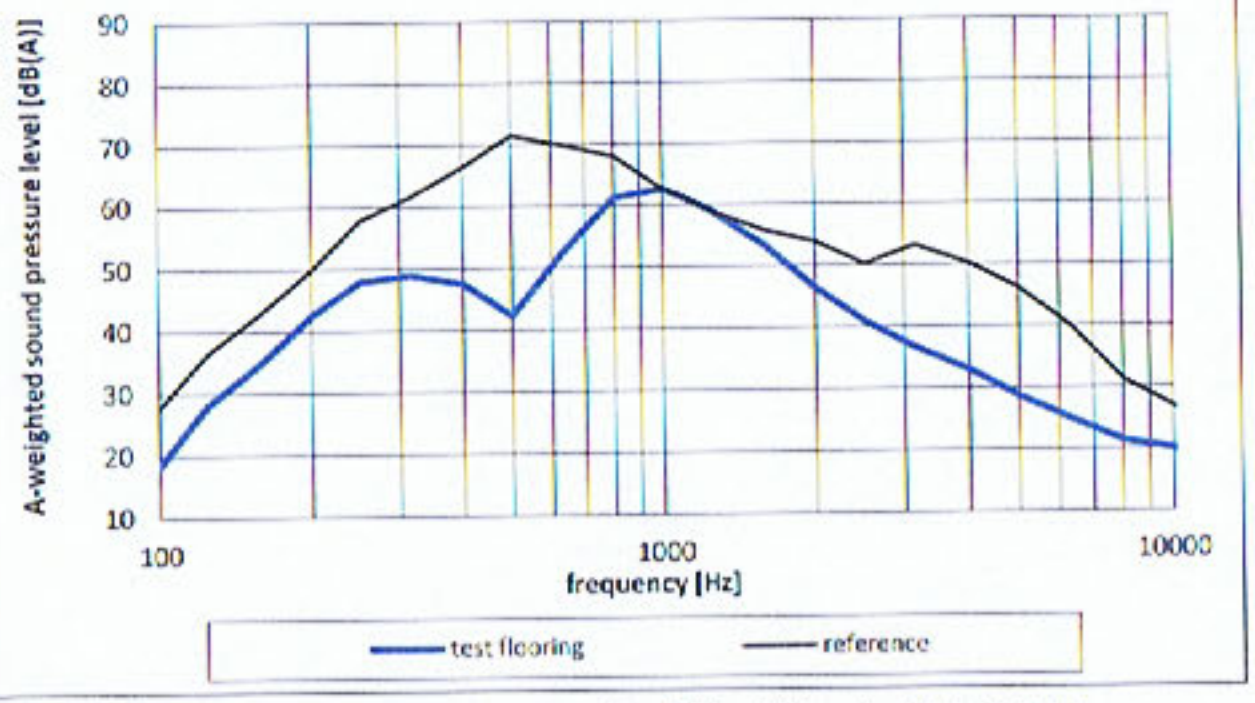
Analysis of walking noise emission according to IHD-W 431

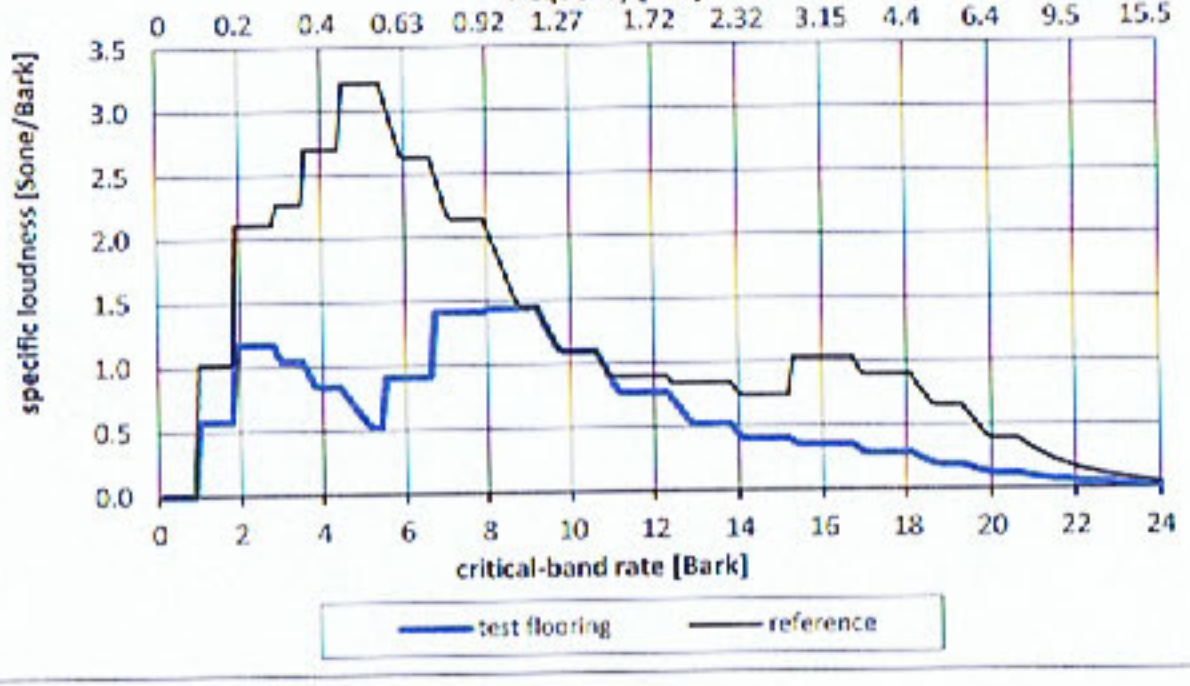
Noise excitation by means of a proband, calculation of the A-weighted total sound pressure level and the loudness from the sound pressure level spectrum (according to E. Zwicker, DIN 45 631)

EPH SUCCESS BY QUALITY

Client:	ScanUnderlay	Installation:	EPH	Test area [m²]:	10
Manufacturer:	ScanUnderlay	Product identification:	LVT Flooring 1316 x 191 x 4.5 mm Acoustic Silence 1.2 mm LVT/Grip 500	Date of test:	1 August 2017

Sound pressure level:	A-weighted total sound pressure level of the test flooring [dB(A)]:	66.7
	A-weighted total sound pressure level of the reference flooring [dB(A)]:	76.1
	Difference of the A-weighted total sound pressure levels of the reference and the test flooring [dB(A)]:	9.4
Loudness:	Loudness of the test flooring [Sone]:	14.7
	Loudness of the reference flooring [Sone]:	28.9
	Difference of the loudnesses of the reference and the test flooring [Sone]:	14.2
	Relative difference of the loudnesses of the reference and the test flooring [%]:	49





Name of testing institute:	Entwicklungs- und Prüflabor Holztechnologie GmbH	N° test report/variant:	2617089/Variant-1
Date:	1 August 2017	Signature:	Hauswald

Improvement of impact insulation according to ISO 10140-3

Laboratory measurement of the reduction of transmitted impact noise by floor coverings on a heavy standard floor

Client:	ScanUnderlay	Product identification:	Variant-1
Manufacturer:	ScanUnderlay	Test room identification:	Schalllabor 2 (OG)/Schalllabor 1 (EG)
Installation:	EPH	Date of test:	1 August 2017

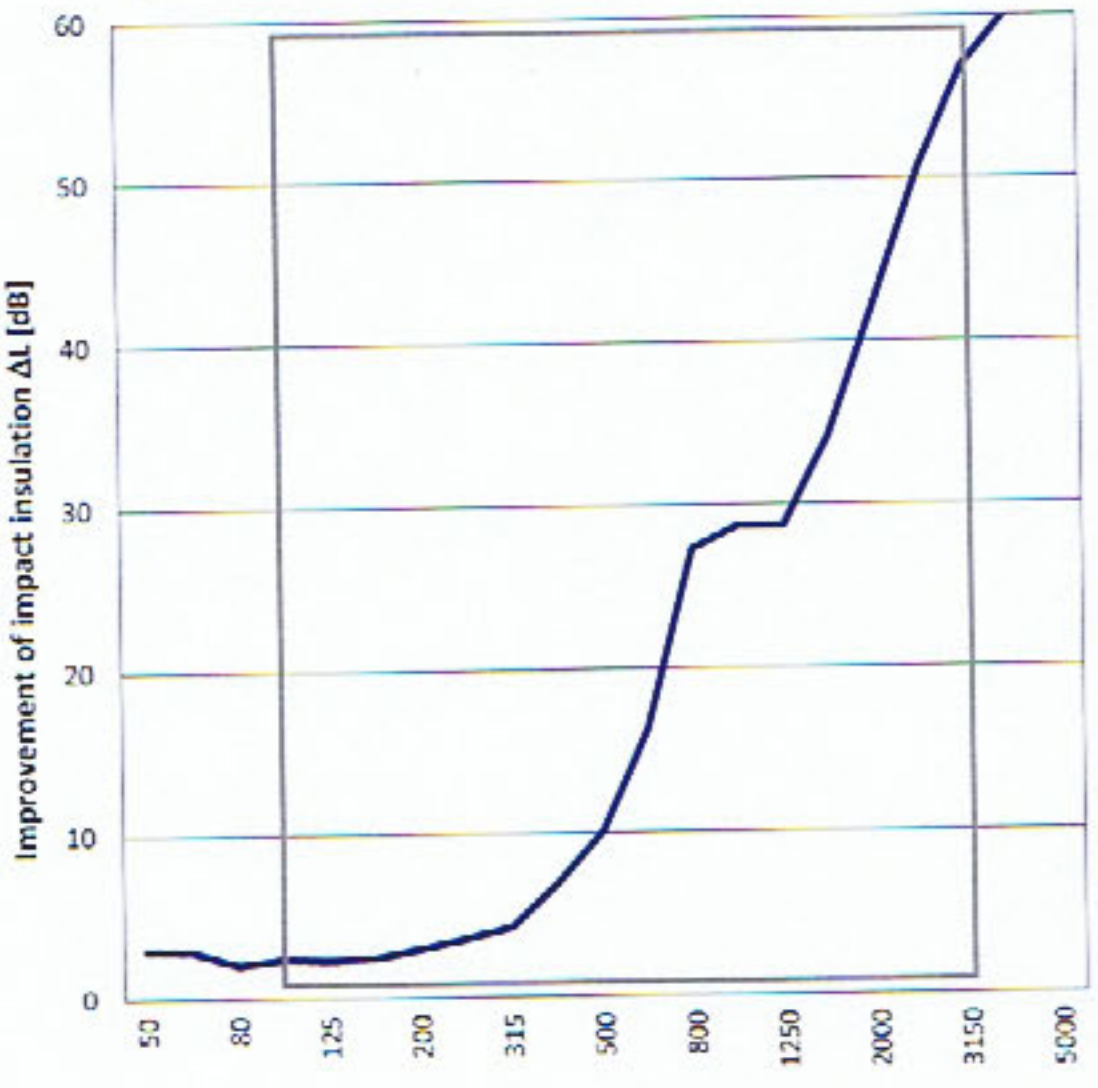
Description of the specimen/test set-up: (top down)

LVT Flooring moduleo Select click 1316 x 191 x 4.5 mm
(measured thickness: 4.4 mm);
Underlayment Acoustic Silence 1.2 mm LVT / Grip
(loosely laid; thickness: 1.2 mm);
Reinforced concrete floor (thickness: 140 mm)

Area-related mass [kg/m²]:	-
Curing time:	-
Temperature [°C]:	24.0
Relative Humidity [%]:	47.5
Volume of receiving room: [m³]:	76.9

Frequency [Hz]	$L_{n,0}$ 1/3 oct. [dB]	ΔL 1/3 oct. [dB]
50	54.1	3.0
63	61.7	2.9
80	61.1	2.0
100	57.3	2.4
125	63.9	2.3
160	63.8	2.4
200	68.7	2.9
250	69.4	3.6
315	73.2	4.2
400	72.1	6.9
500	72.8	10.1
630	75.6	16.4
800	77.4	27.3
1000	78.7	28.7
1250	77.3	28.8
1600	78.0	34.2
2000	77.3	42.2
2500	77.6	50.5
3150	76.5	56.9
4000	74.9	60.3
5000	72.3	60.5

Frequency range for the rating according to ISO 717-2 ☐



Rating according to ISO 717-2:

ΔL_w = 19 dB $L_{n,w}$ = 59 dB $L_{n,0,w}$ = 78 dB

$C_{I,\Delta}$ = -11 dB $C_{I,r}$ = 0 dB C_I = 0 dB

These results are based on tests made with an artificial source under laboratory conditions (third-octave band measurements).

Name of the testing institut: Entwicklungs- und Prüflabor Holztechnologie GmbH
No. test report/variant: 2617089/Variant-1

Date: 15 August 2017 Signature: Hauswald

EPH SUCCESS BY QUALITY

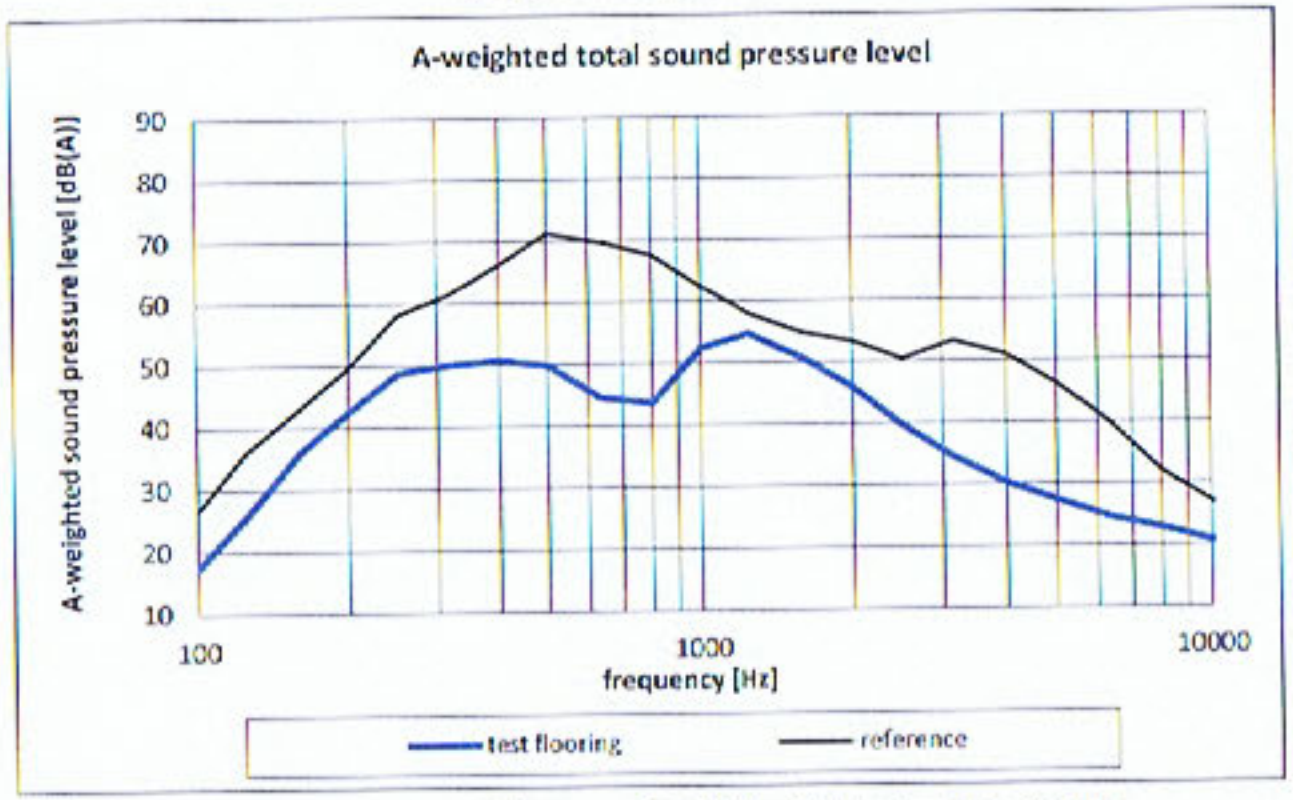
Analysis of walking noise emission according to IHD-W 431

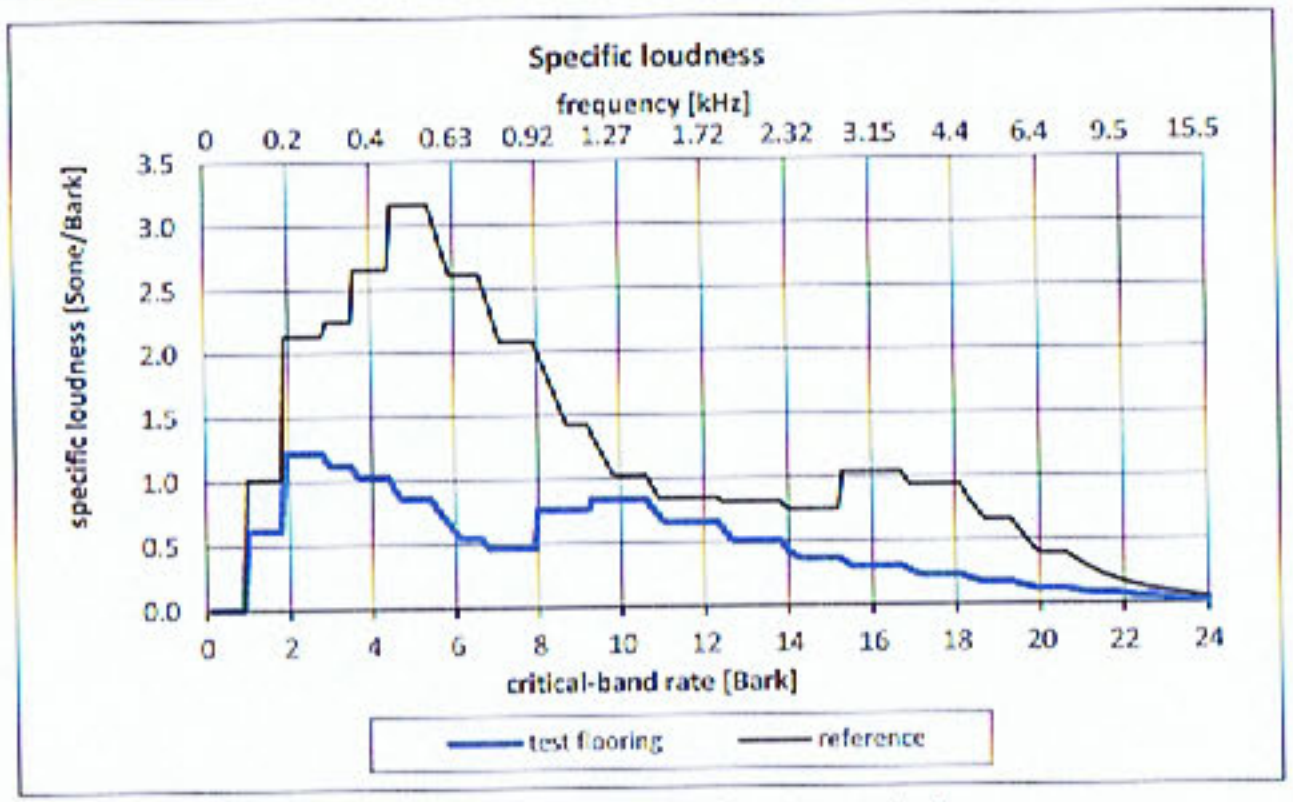
Noise excitation by means of a proband, calculation of the A-weighted total sound pressure level and the loudness from the sound pressure level spectrum (according to E. Zwicker, DIN 45 631)

EPH SUCCESS BY QUALITY

Client:	ScanUnderlay	Installation:	EPH	Test area [m²]:	10
Manufacturer:	ScanUnderlay	Product identification:	LVT Flooring 1316 x 191 x 4.5 mm Acoustic Silence 500 glued with Uzin KE 2000 S	Date of test:	14 August 2017

Sound pressure level:	A-weighted total sound pressure level of the test flooring [dB(A)]:	60.4
	A-weighted total sound pressure level of the reference flooring [dB(A)]:	75.8
	Difference of the A-weighted total sound pressure levels of the reference and the test flooring [dB(A)]:	15.4
Loudness:	Loudness of the test flooring [Sone]:	11.8
	Loudness of the reference flooring [Sone]:	28.6
	Difference of the loudnesses of the reference and the test flooring [Sone]:	16.7
	Relative difference of the loudnesses of the reference and the test flooring [%]:	58





Name of testing institute: Entwicklungs- und Prüflabor Holztechnologie GmbH

Date: 15 August 2017

N° test report/variant: 2617089/Variant-1 glued

Signature: Hauswald

Improvement of impact insulation according to ISO 10140-3

Laboratory measurement of the reduction of transmitted impact noise by floor coverings on a heavy standard floor

Client:	ScanUnderlay	Product identification:	Variant-1 glued
Manufacturer:	ScanUnderlay	Test room identification:	Schalllabor 2 (OG)/Schalllabor 1 (EG)
Installation:	EPH	Date of test:	14 August 2017

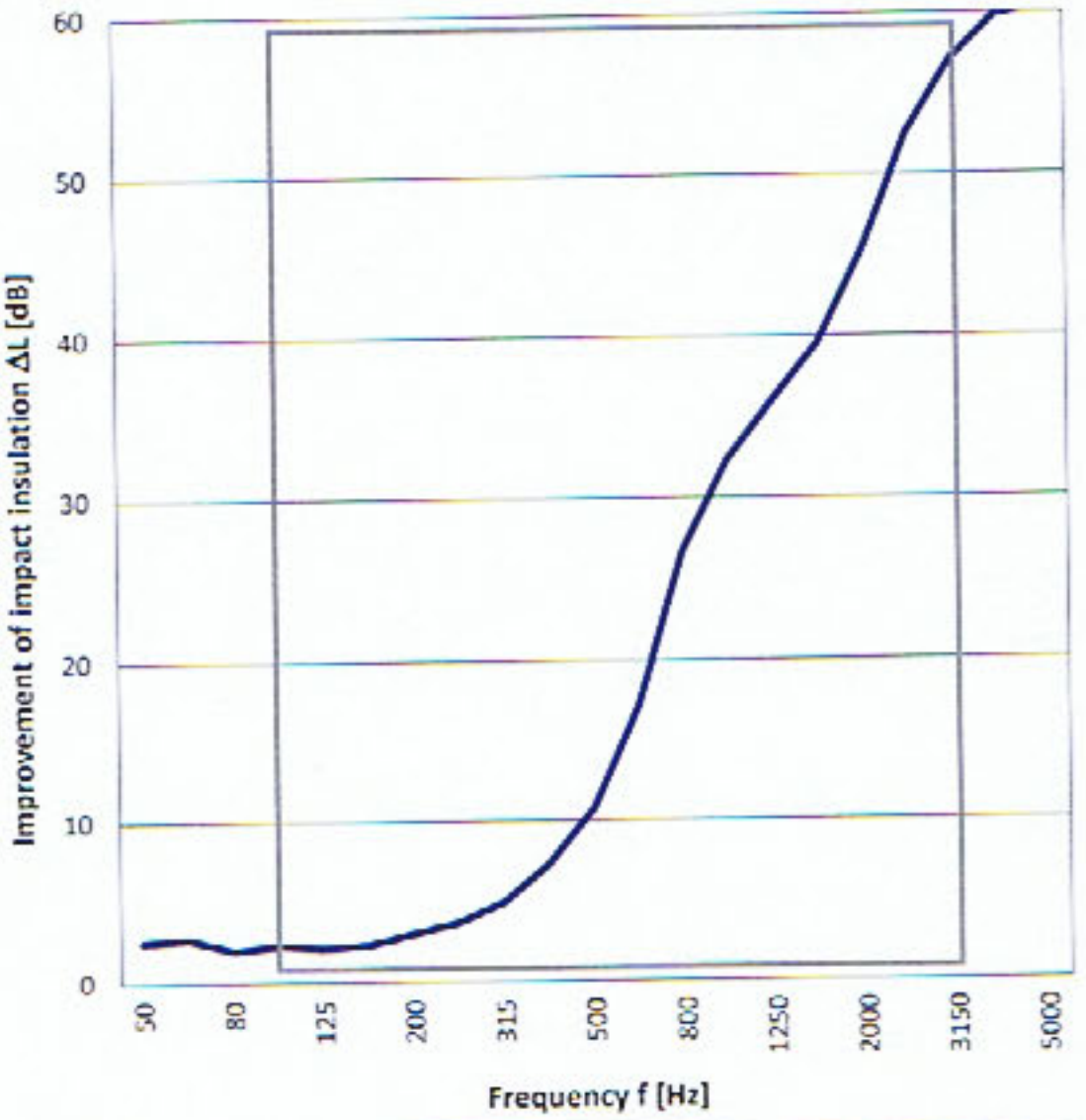
Description of the specimen/test set-up: (top down)

LVT Flooring moduleo Select click 1316 x 191 x 4.5 mm
(measured total thickness: 6.0 mm);
Underlayment Acoustic Silence 1.2 mm LVT / Grip
glued with Uzin KE 2000 S;
Reinforced concrete floor (thickness: 140 mm)

Area-related mass [kg/m²]:	-
Curing time:	-
Temperature [°C]:	23.0
Relative Humidity [%]:	48.6
Volume of receiving room: [m³]:	76.9

Frequency [Hz]	$L_{n,0}$ 1/3 oct. [dB]	ΔL 1/3 oct. [dB]
50	54.1	2.5
63	61.7	2.8
80	61.1	2.0
100	57.3	2.3
125	63.9	2.1
160	63.8	2.4
200	68.7	3.0
250	69.4	3.7
315	73.2	5.0
400	72.1	7.3
500	72.8	10.7
630	75.6	17.1
800	77.4	26.7
1000	78.7	32.3
1250	77.3	36.0
1600	78.0	39.5
2000	77.3	45.2
2500	77.6	52.5
3150	76.5	57.1
4000	74.9	59.9
5000	72.3	60.5

Frequency range for the rating according to ISO 717-2 ☐



Rating according to ISO 717-2:

ΔL_w = 19 dB $L_{n,w}$ = 59 dB $L_{n,0,w}$ = 78 dB

$C_{I,\Delta}$ = -11 dB $C_{I,r}$ = 0 dB C_I = 0 dB

These results are based on tests made with an artificial source under laboratory conditions (third-octave band measurements).

Name of the testing institut:	Entwicklungs- und Prüflabor Holztechnologie GmbH		
No. test report/variant:	2617089/Variant-1 glued		
Date:	15 August 2017	Signature:	Hauswald

EPH SUCCESS BY QUALITY

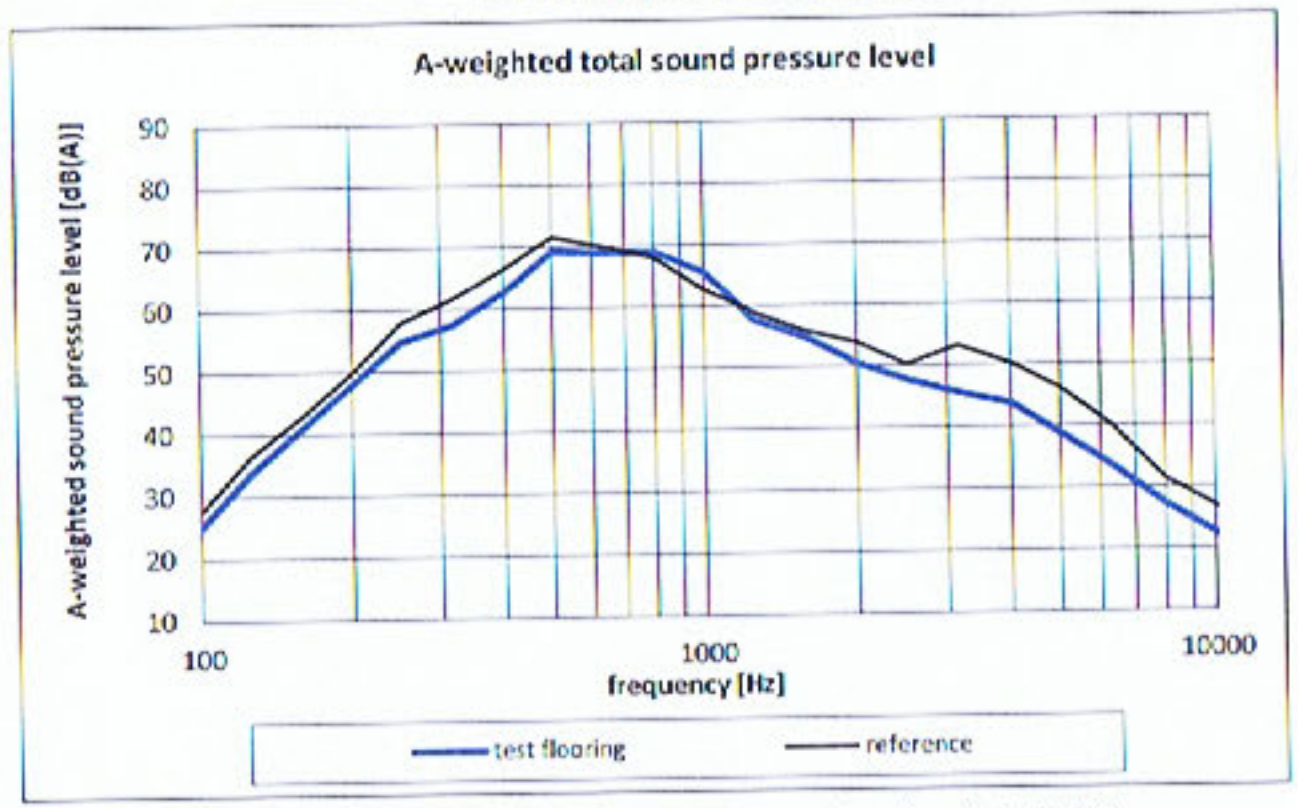
Analysis of walking noise emission according to IHD-W 431

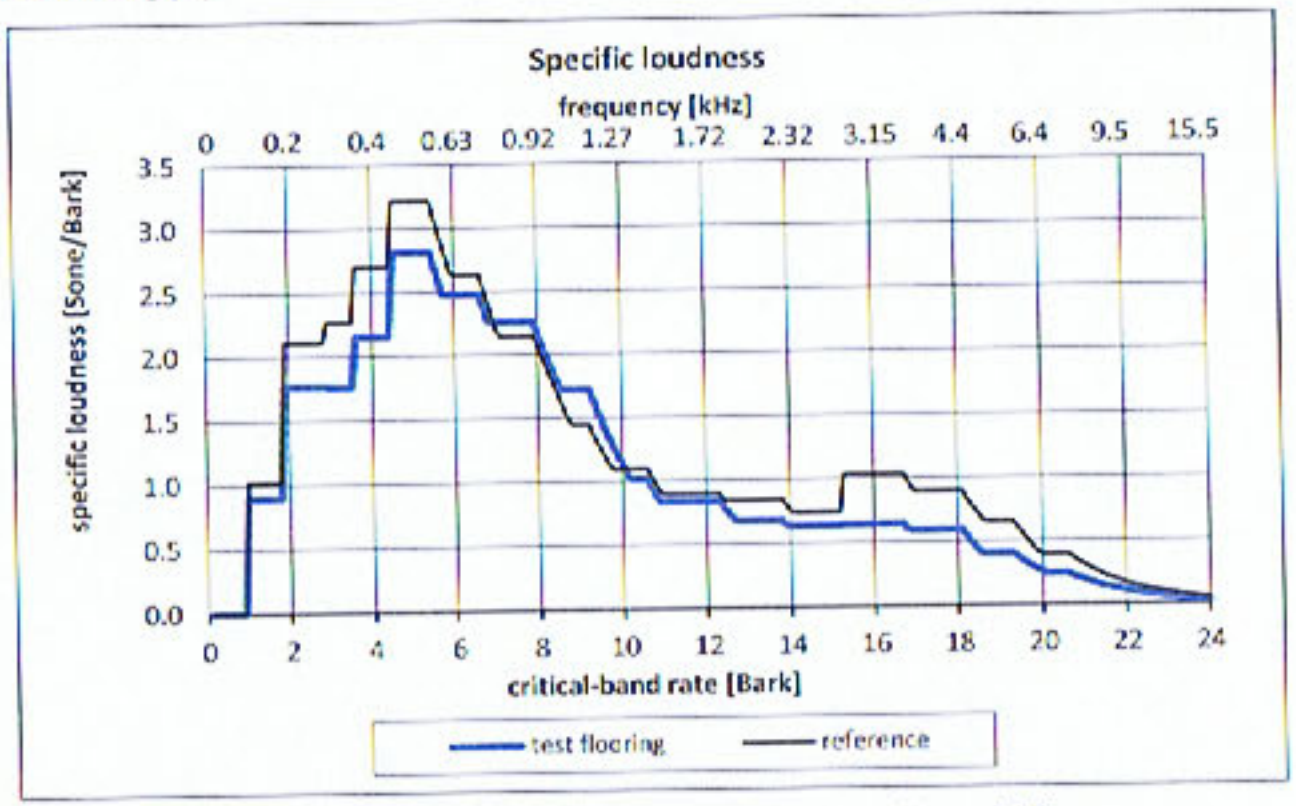
Noise excitation by means of a proband, calculation of the A-weighted total sound pressure level and the loudness from the sound pressure level spectrum (according to E. Zwicker, DIN 45 631)

EPH SUCCESS BY QUALITY

Client:	ScanUnderlay	Installation:	EPH	Test area [m²]:	10
Manufacturer:	ScanUnderlay	Product identification:	Laminat Flooring 1380 x 193 x 8 mm Acoustic Silence 2 mm 700	Date of test:	1 August 2017

Sound pressure level:	A-weighted total sound pressure level of the test flooring [dB(A)]:	75.0
	A-weighted total sound pressure level of the reference flooring [dB(A)]:	76.1
	Difference of the A-weighted total sound pressure levels of the reference and the test flooring [dB(A)]:	1.1
Loudness:	Loudness of the test flooring [Sone]:	25.1
	Loudness of the reference flooring [Sone]:	28.9
	Difference of the loudnesses of the reference and the test flooring [Sone]:	3.8
	Relative difference of the loudnesses of the reference and the test flooring [%]:	13





Name of testing institute:	Entwicklungs- und Prüflabor Holztechnologie GmbH	N° test report/variant:	2617089/Variant-2.1 (loose laid)
Date:	15 August 2017	Signature:	Hauswald

Improvement of impact insulation according to ISO 10140-3

Laboratory measurement of the reduction of transmitted impact noise by floor coverings on a heavy standard floor

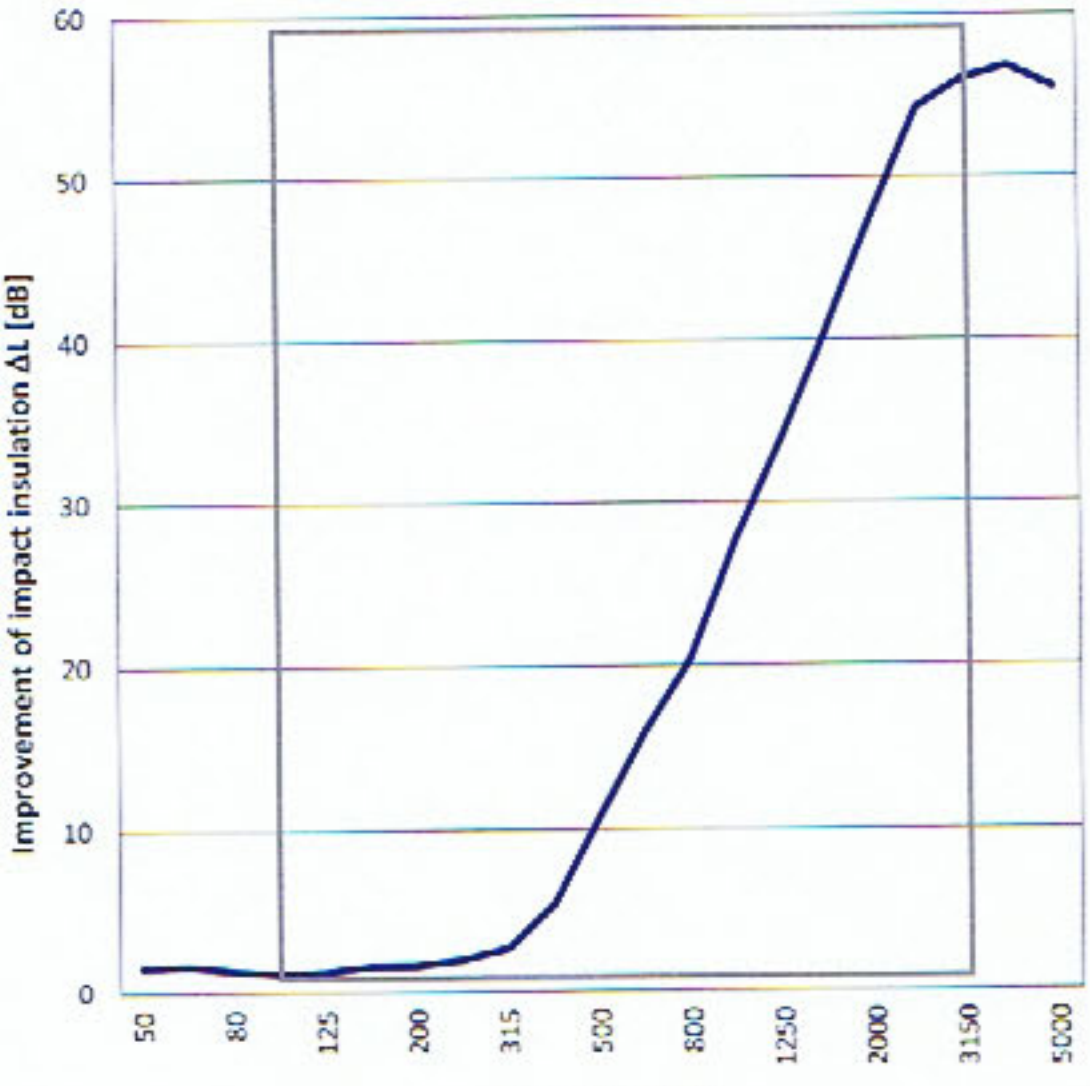
Client:	ScanUnderlay	Product identification:	Variant-2.1 (loose laid)
Manufacturer:	ScanUnderlay	Test room identification:	Schalllabor 2 (OG)/Schalllabor 1 (EG)
Installation:	EPH	Date of test:	1 August 2017

Description of the specimen/test set-up: (top down)

Laminat Flooring My Floor Lodge 1380 x 193 x 8 mm
(measured thickness: 7.8 mm);
Underlayment Acoustic Silence 2 mm 700
(loosely laid; thickness: 2.0 mm);
Reinforced concrete floor (thickness: 140 mm)

Area-related mass [kg/m²]:	-
Curing time:	-
Temperature [°C]:	24.0
Relative Humidity [%]:	47.5
Volume of receiving room: [m³]:	76.9

Frequency [Hz]	$L_{n,0}$ 1/3 oct. [dB]	ΔL 1/3 oct. [dB]
50	54.1	1.5
63	61.7	1.6
80	61.1	1.3
100	57.3	1.1
125	63.9	1.2
160	63.8	1.6
200	68.7	1.6
250	69.4	2.0
315	73.2	2.7
400	72.1	5.4
500	72.8	10.8
630	75.6	16.0
800	77.4	20.4
1000	78.7	27.7
1250	77.3	33.8
1600	78.0	40.6
2000	77.3	47.6
2500	77.6	54.3
3150	76.5	56.0
4000	74.9	56.8
5000	72.3	55.6



Frequency range for the rating according to ISO 717-2 ☐

Rating according to ISO 717-2:

ΔL_w =	18 dB	$L_{n,w}$ =	60 dB	$L_{n,0,w}$ =	78 dB
$C_{I,\Delta}$ =	-11 dB	$C_{I,r}$ =	0 dB	C_I =	0 dB

These results are based on tests made with an artificial source under laboratory conditions (third-octave band measurements).

Name of the testing institut: Entwicklungs- und Prüflabor Holztechnologie GmbH
No. test report/variant: 2617089/Variant-2.1 (loose laid)

Date: 15 August 2017 Signature: Hauswald

EPH® SUCCESS BY QUALITY

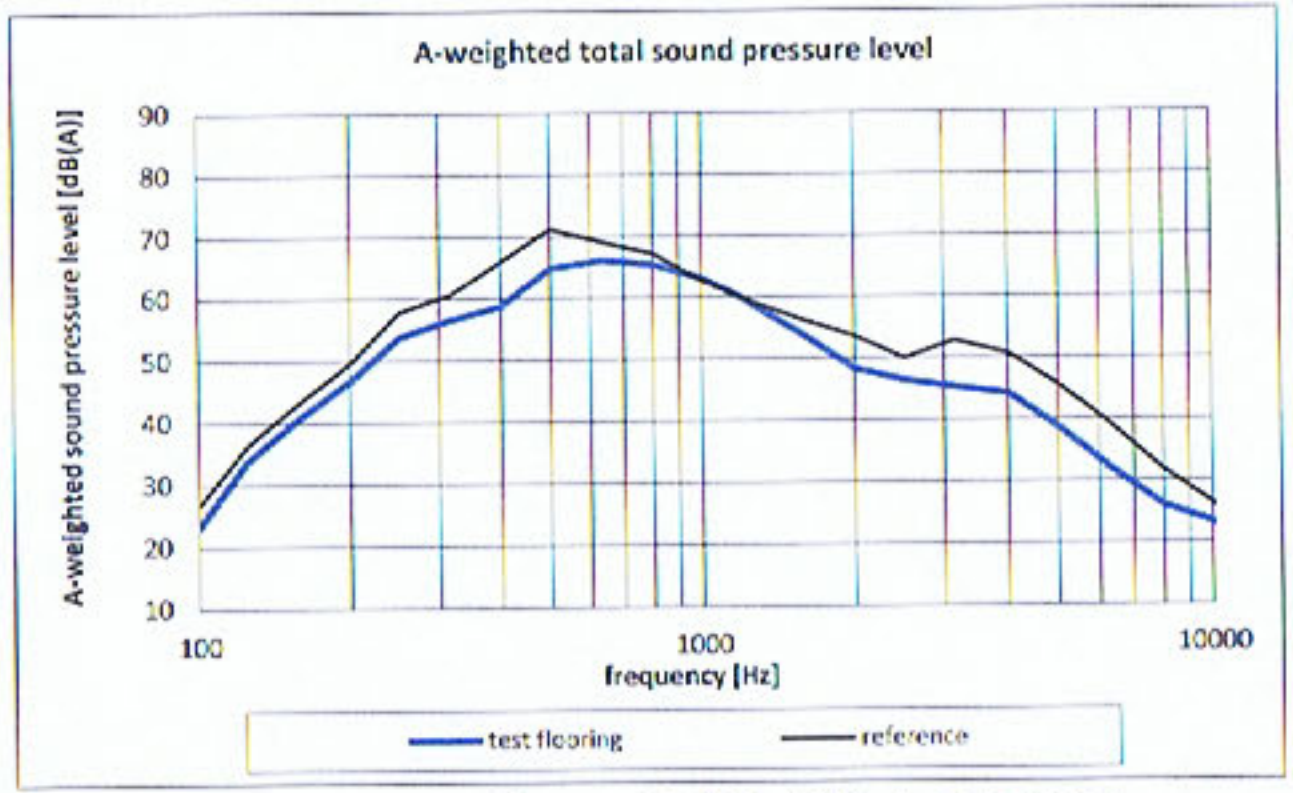
Analysis of walking noise emission according to IHD-W 431

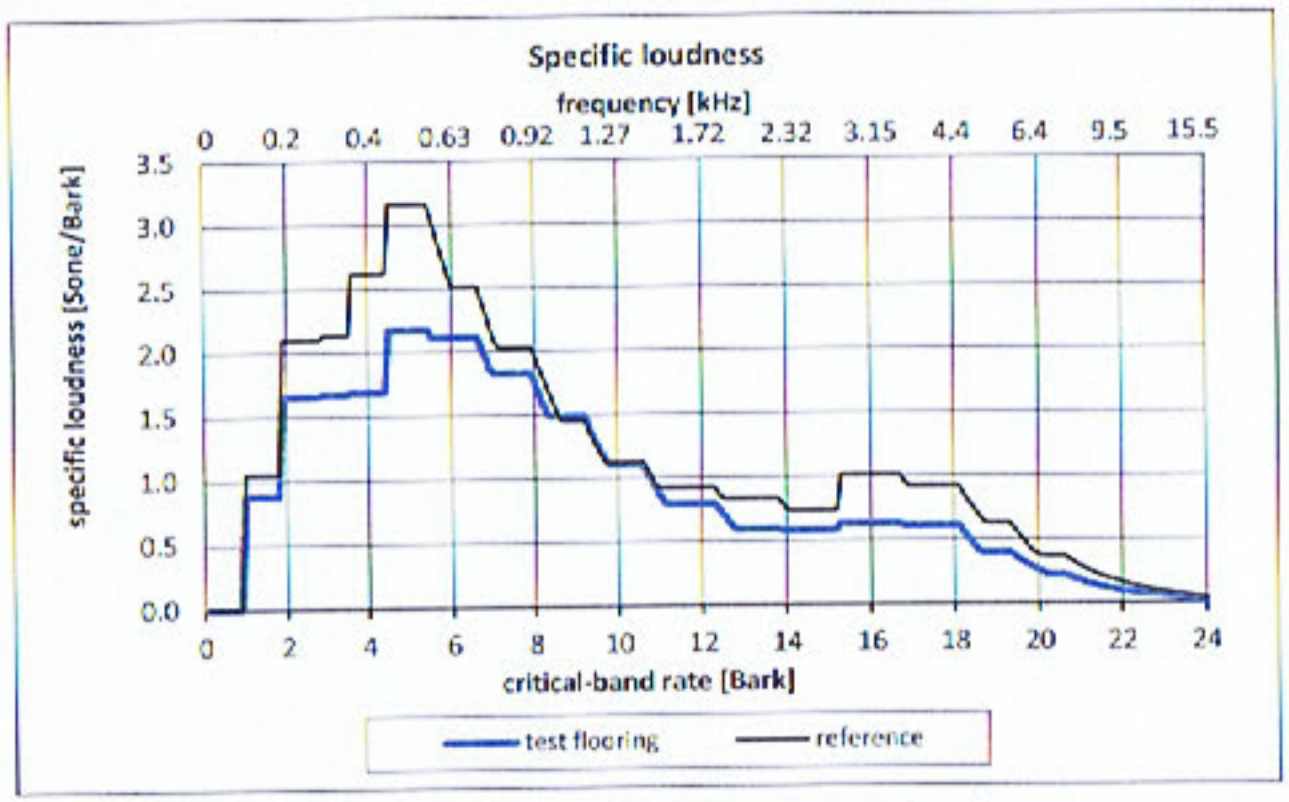
Noise excitation by means of a proband, calculation of the A-weighted total sound pressure level and the loudness from the sound pressure level spectrum (according to E. Zwicker, DIN 45 631)

EPH SUCCESS BY QUALITY

Client:	ScanUnderlay	Installation:	EPH	Test area [m²]:	10
Manufacturer:	ScanUnderlay	Product identification:	Laminat Flooring 1380 x 193 x 8 mm Acoustic Silence 700 glued with Uzin KE 2000 S	Date of test:	10 August 2017

Sound pressure level:	A-weighted total sound pressure level of the test flooring [dB(A)]:	71.9
	A-weighted total sound pressure level of the reference flooring [dB(A)]:	75.6
	Difference of the A-weighted total sound pressure levels of the reference and the test flooring [dB(A)]:	3.6
Loudness:	Loudness of the test flooring [Sone]:	22.2
	Loudness of the reference flooring [Sone]:	28.3
	Difference of the loudnesses of the reference and the test flooring [Sone]:	6.2
	Relative difference of the loudnesses of the reference and the test flooring [%]:	22





Name of testing institute:	Entwicklungs- und Prüflabor Holztechnologie GmbH	N° test report/variant:	2617089/Variant-2.1 (glued)
Date:	15 August 2017	Signature:	Hauswald

Improvement of impact insulation according to ISO 10140-3

Laboratory measurement of the reduction of transmitted impact noise by floor coverings on a heavy standard floor

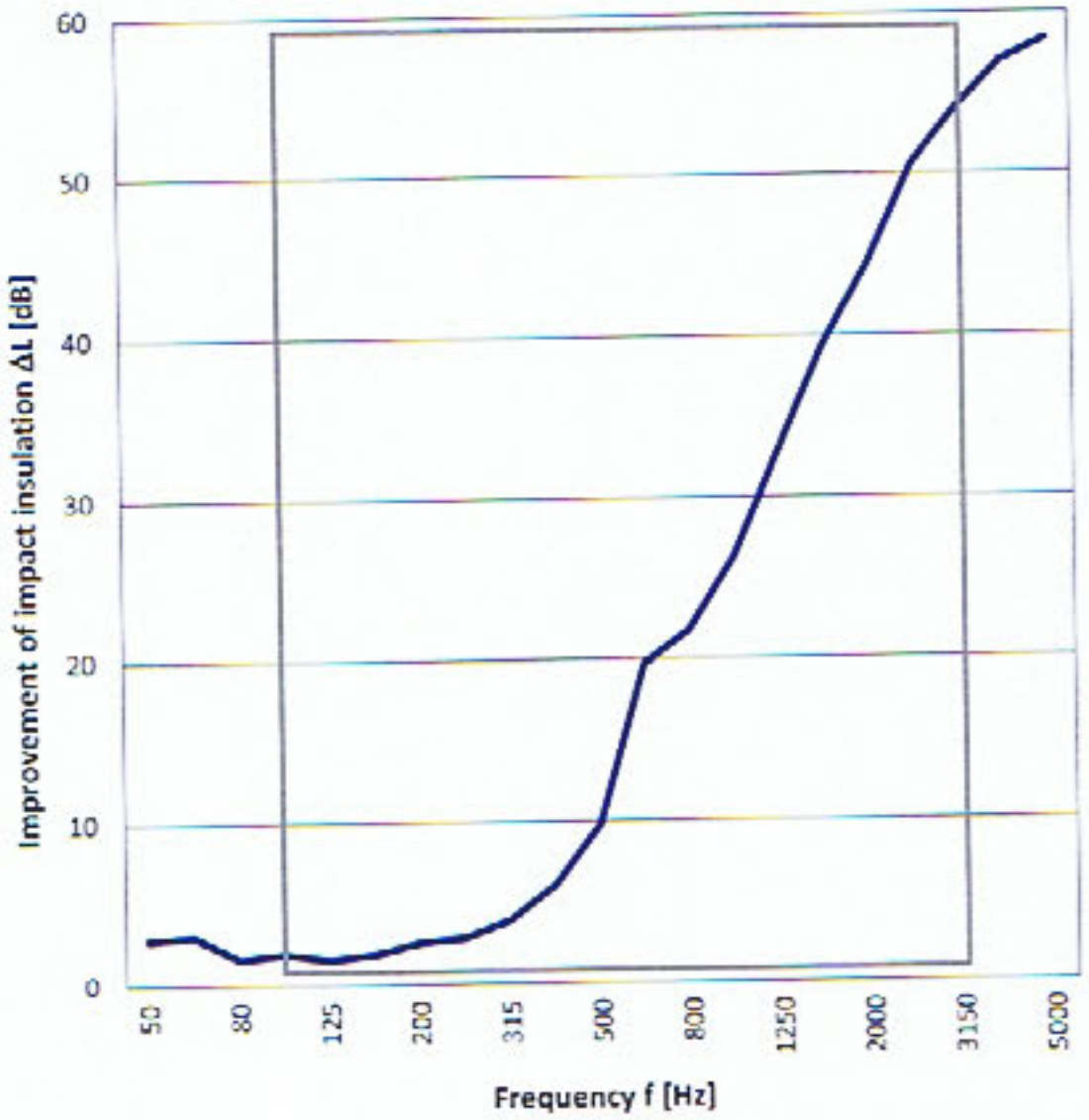
Client:	ScanUnderlay	Product identification:	Variant-2.1 (glued)
Manufacturer:	ScanUnderlay	Test room identification:	Schalllabor 2 (OG)/Schalllabor 1 (EG)
Installation:	EPH	Date of test:	10 August 2017

Description of the specimen/test set-up:
(top down)

Laminat Flooring My Floor Lodge 1380 x 193 x 8 mm
(measured total thickness: 10.0 mm);
Underlayment Acoustic Silence 2 mm 700
glued with Uzin KE 2000 S;
Reinforced concrete floor (thickness: 140 mm)

Area-related mass [kg/m²]: -
Curing time: -
Temperature [°C]: 23.0
Relative Humidity [%]: 53.0
Volume of receiving room: [m³]: 76.9

Frequency [Hz]	$L_{n,0}$ 1/3 oct. [dB]	ΔL 1/3 oct. [dB]
50	54.1	2.9
63	61.7	3.0
80	61.1	1.7
100	57.3	1.9
125	63.9	1.6
160	63.8	1.9
200	68.7	2.6
250	69.4	2.9
315	73.2	3.9
400	72.1	6.1
500	72.8	9.8
630	75.6	19.7
800	77.4	21.7
1000	78.7	26.3
1250	77.3	32.9
1600	78.0	39.3
2000	77.3	44.4
2500	77.6	50.5
3150	76.5	54.1
4000	74.9	57.0
5000	72.3	58.4



Frequency range for the rating according to ISO 717-2 ☐

Rating according to ISO 717-2:

ΔL_w = 18 dB $L_{n,w}$ = 60 dB $L_{n,0,w}$ = 78 dB

$C_{I,\Delta}$ = -10 dB $C_{I,r}$ = -1 dB C_I = -1 dB

These results are based on tests made with an artificial source under laboratory conditions (third-octave band measurements).

Name of the testing institut: Entwicklungs- und Prüflabor Holztechnologie GmbH
No. test report/variant: 2617089/Variant-2.1 (glued)

Date: 15 August 2017 Signature: Hauswald

EPH ®
SUCCESS BY QUALITY

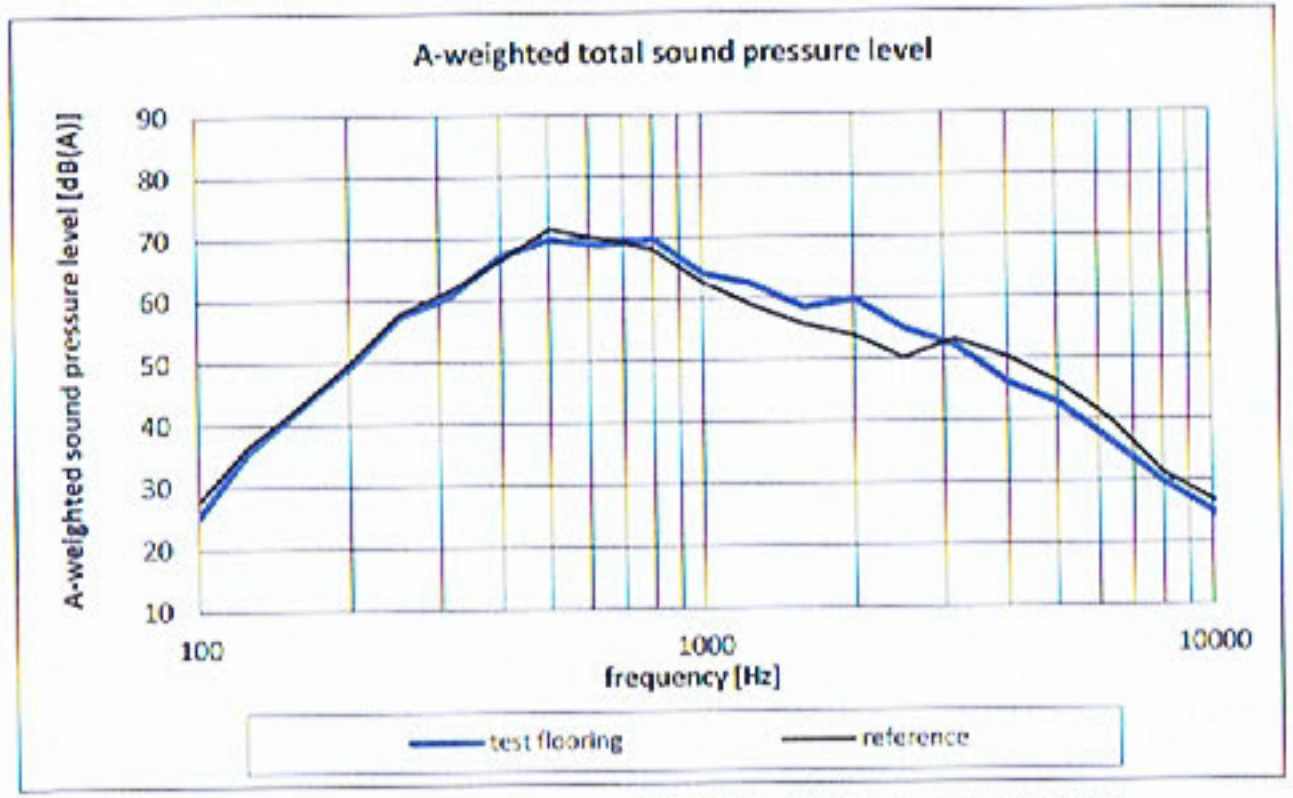
Analysis of walking noise emission according to IHD-W 431

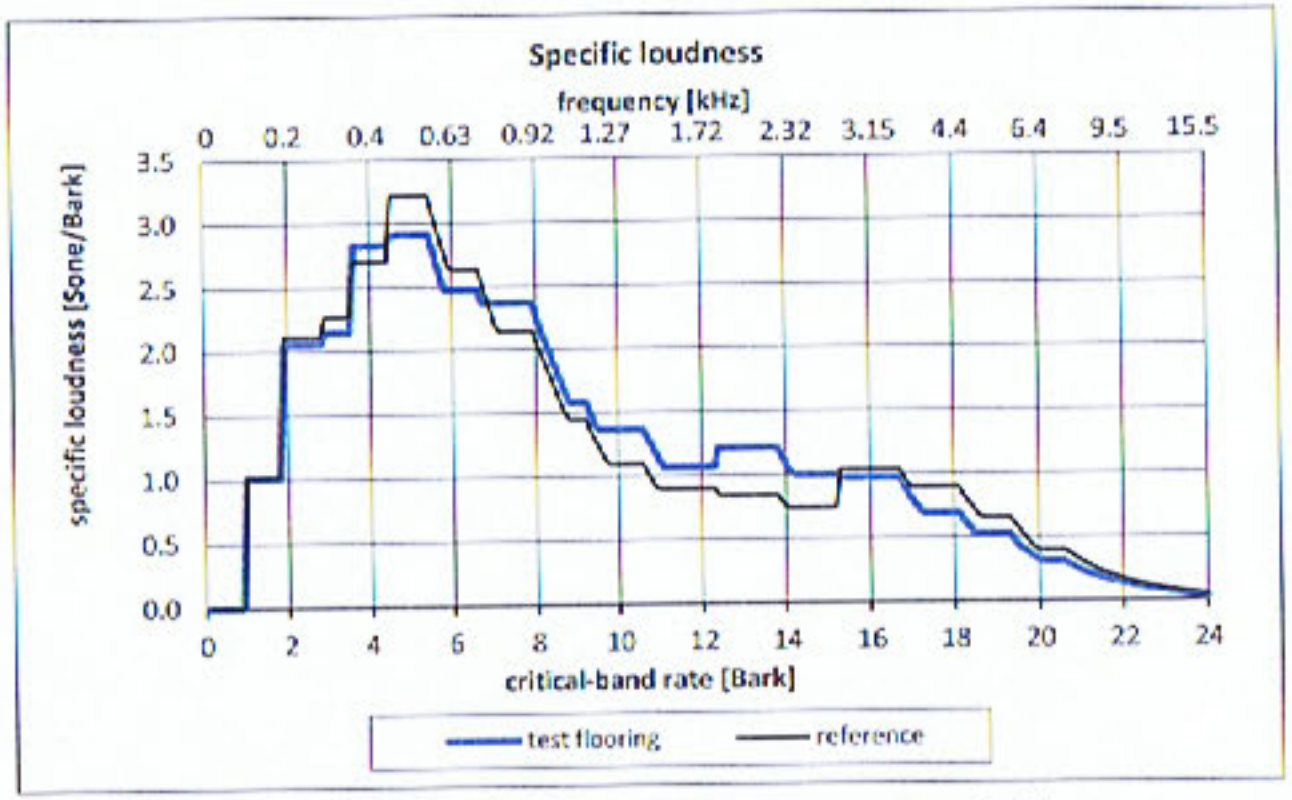
Noise excitation by means of a proband, calculation of the A-weighted total sound pressure level and the loudness from the sound pressure level spectrum (according to E. Zwicker, DIN 45 631)

EPH SUCCESS BY QUALITY

Client:	ScanUnderlay	Installation:	EPH	Test area [m²]:	10
Manufacturer:	ScanUnderlay	Product identification:	Parquet Floor 2200 x 215 x 14 mm Acoustic Silence 700	Date of test:	1 August 2017

Sound pressure level:	A-weighted total sound pressure level of the test flooring [dB(A)]:	76.1
	A-weighted total sound pressure level of the reference flooring [dB(A)]:	76.1
	Difference of the A-weighted total sound pressure levels of the reference and the test flooring [dB(A)]:	0.0
Loudness:	Loudness of the test flooring [Sone]:	29.6
	Loudness of the reference flooring [Sone]:	28.9
	Difference of the loudnesses of the reference and the test flooring [Sone]:	-0.7
	Relative difference of the loudnesses of the reference and the test flooring [%]:	-2





Name of testing institute:	Entwicklungs- und Prüflabor Holztechnologie GmbH	N° test report/variant:	2617089/Variant-2.2 (loose laid)
Date:	15 August 2017	Signature:	Hauswald

Improvement of impact insulation according to ISO 10140-3

Laboratory measurement of the reduction of transmitted impact noise by floor coverings on a heavy standard floor

Client:	ScanUnderlay	Product identification:	Variant-2.2 (loose laid)
Manufacturer:	ScanUnderlay	Test room identification:	Schalllabor 2 (OG)/Schalllabor 1 (EG)
Installation:	EPH	Date of test:	1 August 2017

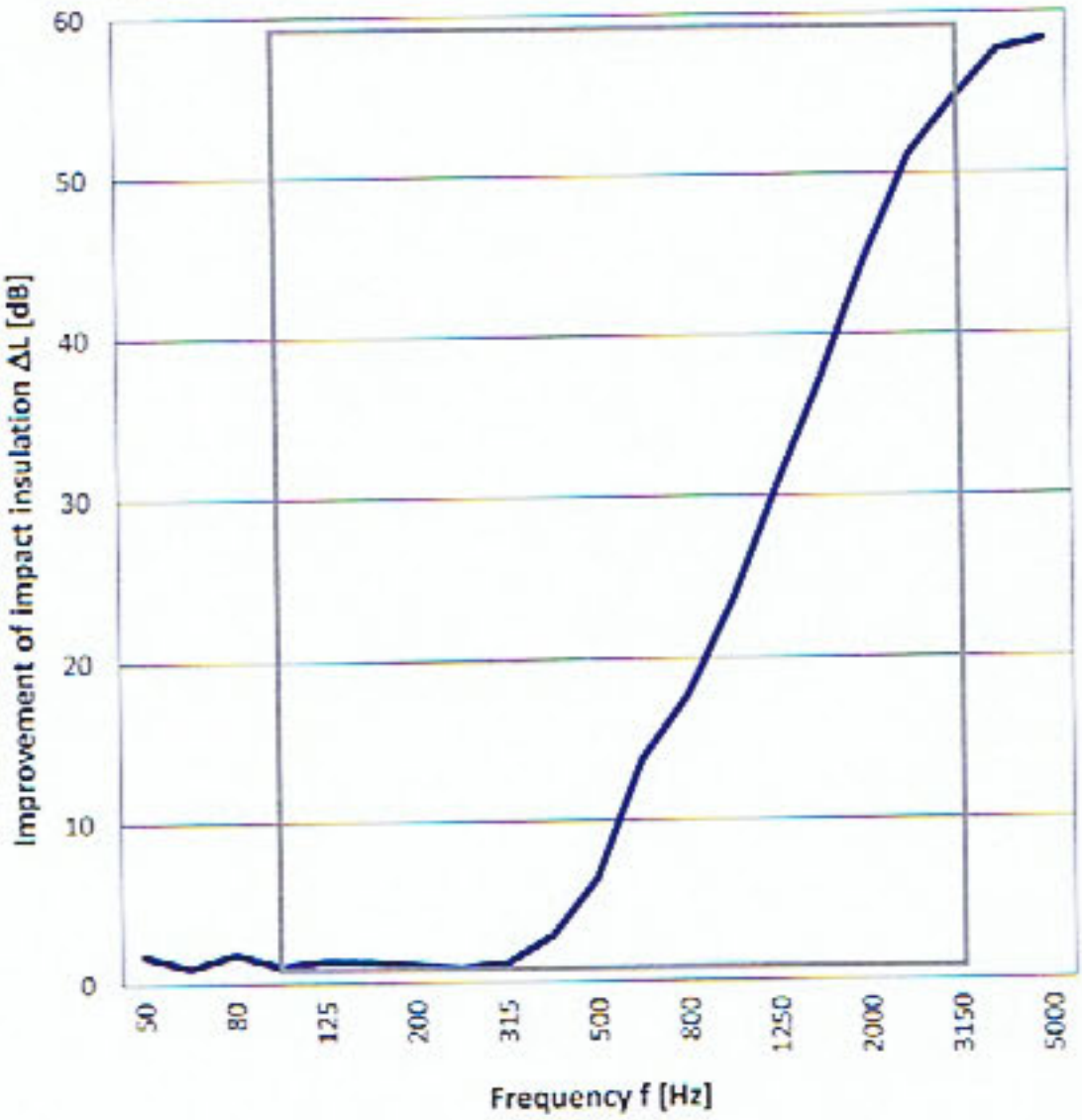
Description of the specimen/test set-up:
(top down)

Parquet Floor Boen 2200 x 215 x 14 mm
(measured thickness: 14.3 mm);
Underlayment Acoustic Silence 2 mm 700
(loosely laid; thickness: 2.0 mm);
Reinforced concrete floor (thickness: 140 mm)

Area-related mass [kg/m²]:	-
Curing time:	-
Temperature [°C]:	24.0
Relative Humidity [%]:	47.5
Volume of receiving room: [m³]:	76.9

Frequency [Hz]	$L_{n,0}$ 1/3 oct. [dB]	ΔL 1/3 oct. [dB]
50	54.1	1.8
63	61.7	1.0
80	61.1	1.9
100	57.3	1.0
125	63.9	1.4
160	63.8	1.4
200	68.7	1.1
250	69.4	0.9
315	73.2	1.2
400	72.1	2.9
500	72.8	6.5
630	75.6	13.7
800	77.4	17.7
1000	78.7	23.3
1250	77.3	30.5
1600	78.0	37.2
2000	77.3	44.7
2500	77.6	51.2
3150	76.5	54.6
4000	74.9	57.7
5000	72.3	58.3

Frequency range for the rating according to ISO 717-2 ☐



Rating according to ISO 717-2:

ΔL_w =	16 dB	$L_{n,w}$ =	62 dB	$L_{n,0,w}$ =	78 dB
$C_{I,\Delta}$ =	-10 dB	$C_{I,r}$ =	-1 dB	C_I =	0 dB

These results are based on tests made with an artificial source under laboratory conditions (third-octave band measurements).

Name of the testing institut:	Entwicklungs- und Prüflabor Holztechnologie GmbH		
No. test report/variant:	2617089/Variant-2.2 (loose laid)		
Date:	15 August 2017	Signature:	Hauswald

EPH ® SUCCESS BY QUALITY

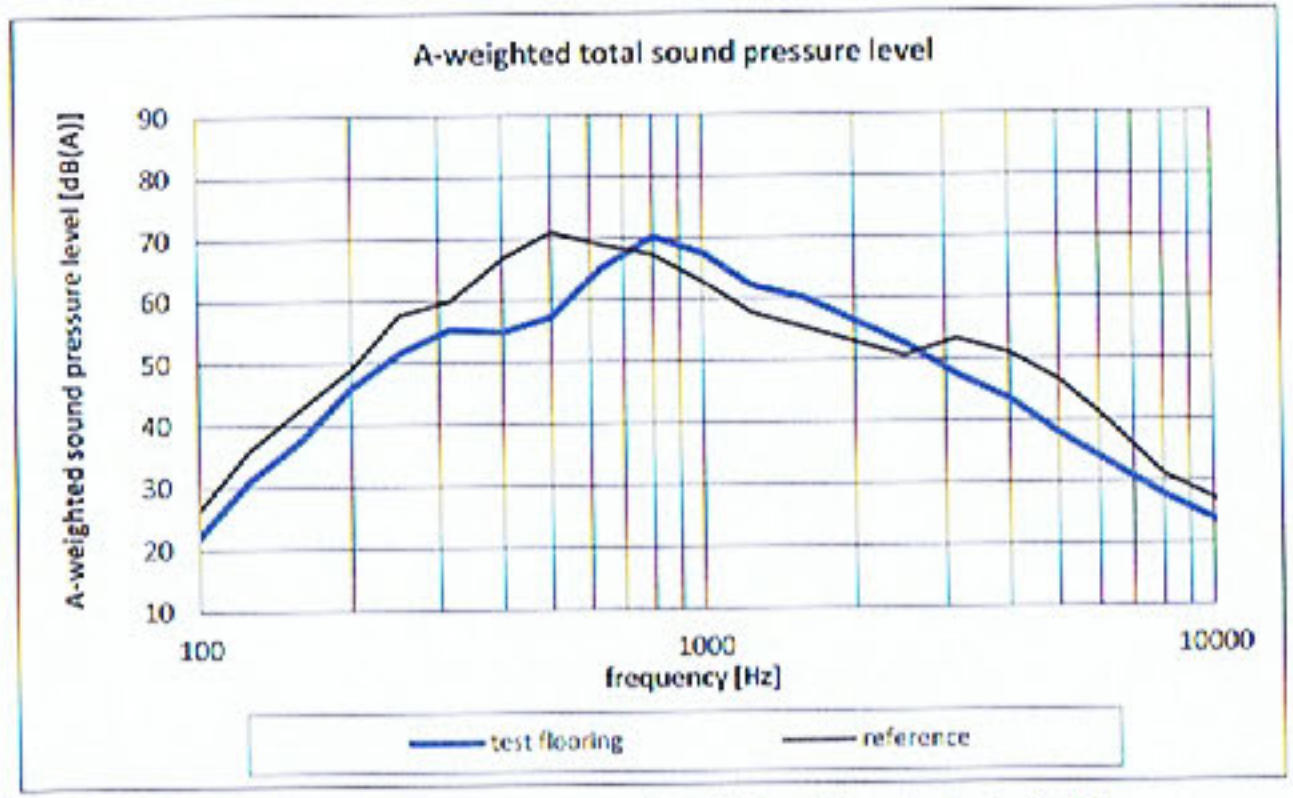
Analysis of walking noise emission according to IHD-W 431

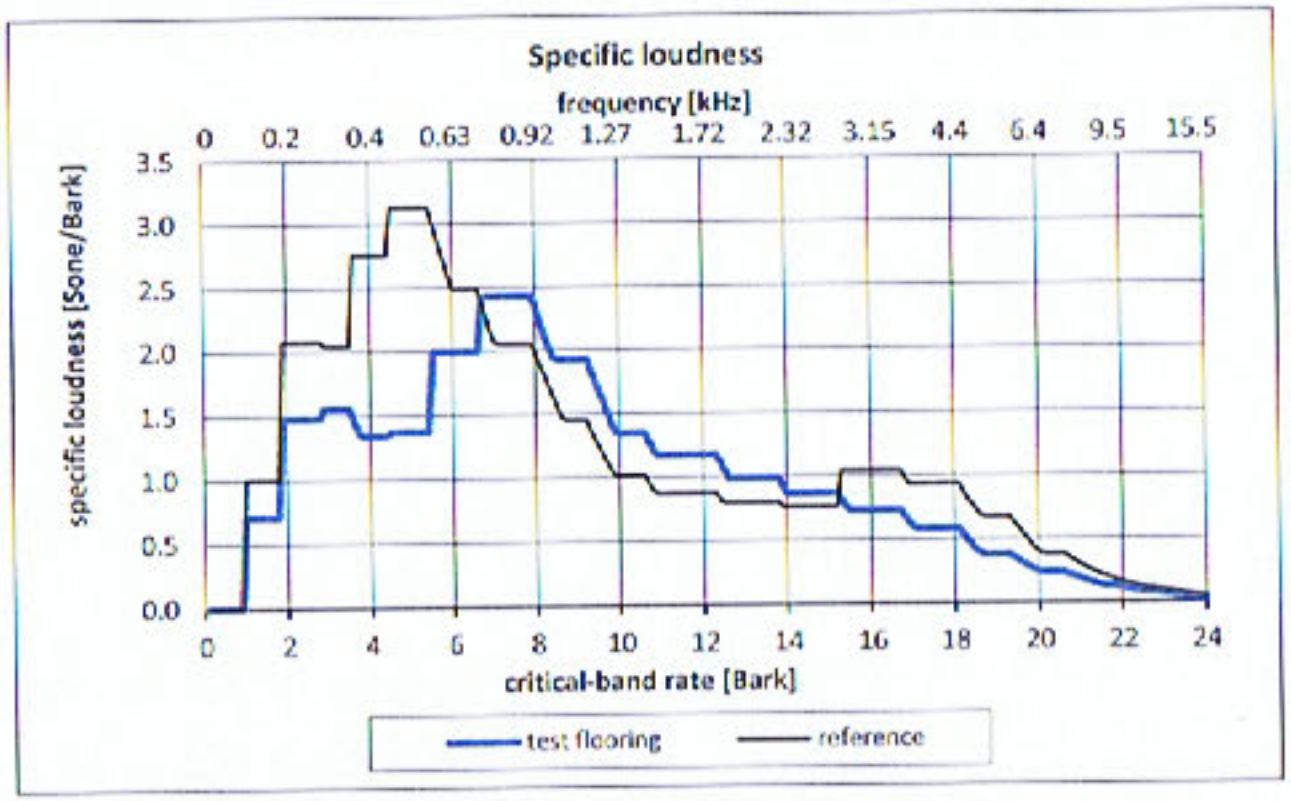
Noise excitation by means of a proband, calculation of the A-weighted total sound pressure level and the loudness from the sound pressure level spectrum (according to E. Zwicker, DIN 45 631)

EPH SUCCESS BY QUALITY

Client:	ScanUnderlay	Installation:	EPH	Test area [m²]:	10
Manufacturer:	ScanUnderlay	Product identification:	Parquet Floor 2200 x 215 x 14 mm Acoustic Silence 700 glued with Uzin KE 2000 S	Date of test:	7 August 2017

Sound pressure level:	A-weighted total sound pressure level of the test flooring [dB(A)]:	73.9
	A-weighted total sound pressure level of the reference flooring [dB(A)]:	75.5
	Difference of the A-weighted total sound pressure levels of the reference and the test flooring [dB(A)]:	1.7
Loudness:	Loudness of the test flooring [Sone]:	24.0
	Loudness of the reference flooring [Sone]:	28.3
	Difference of the loudnesses of the reference and the test flooring [Sone]:	4.2
	Relative difference of the loudnesses of the reference and the test flooring [%]:	15





Name of testing institute:	Entwicklungs- und Prüflabor Holztechnologie GmbH	N° test report/variant:	2617089/Variant-2.2 (glued)
Date:	15 August 2017	Signature:	Hauswald

Improvement of impact insulation according to ISO 10140-3

Laboratory measurement of the reduction of transmitted impact noise by floor coverings on a heavy standard floor

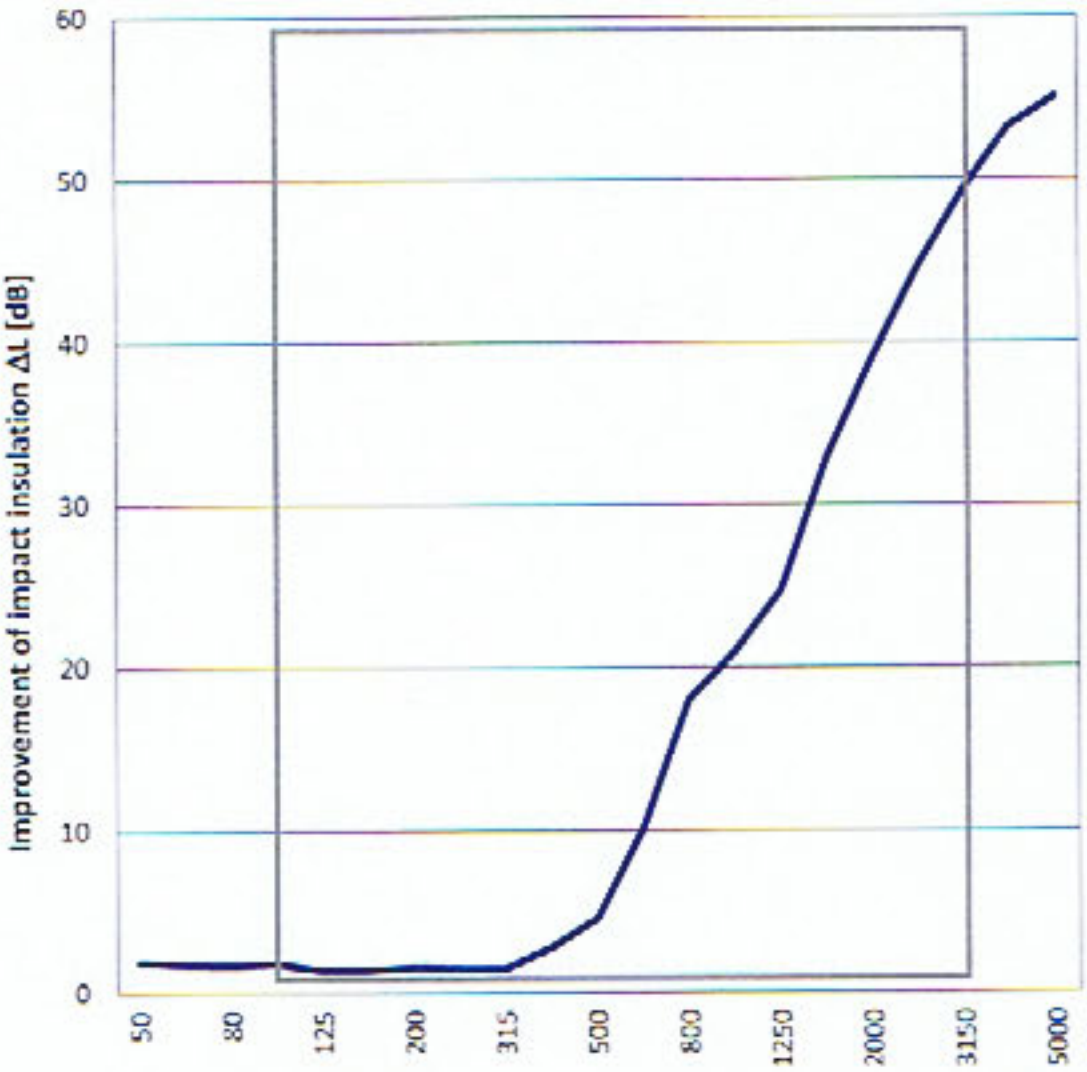
Client:	ScanUnderlay	Product identification:	Variant-2.2 (glued)
Manufacturer:	ScanUnderlay	Test room identification:	Schalllabor 2 (OG)/Schalllabor 1 (EG)
Installation:	EPH	Date of test:	7 August 2017

Description of the specimen/test set-up:
(top down)

Parquet Floor Boen 2200 x 215 x 14 mm
(measured total thickness: 16.5 mm);
Underlayment Acoustic Silence 2 mm 700
glued with Uzin KE 2000 S;
Reinforced concrete floor (thickness: 140 mm)

Area-related mass [kg/m²]: -
Curing time: -
Temperature [°C]: 24.0
Relative Humidity [%]: 41.2
Volume of receiving room: [m³]: 76.9

Frequency [Hz]	$L_{n,0}$ 1/3 oct. [dB]	ΔL 1/3 oct. [dB]
50	54.1	1.9
63	61.7	1.7
80	61.1	1.7
100	57.3	1.8
125	63.9	1.4
160	63.8	1.4
200	68.7	1.6
250	69.4	1.5
315	73.2	1.5
400	72.1	2.8
500	72.8	4.5
630	75.6	10.1
800	77.4	18.0
1000	78.7	20.9
1250	77.3	24.7
1600	78.0	32.8
2000	77.3	39.0
2500	77.6	44.6
3150	76.5	49.3
4000	74.9	53.3
5000	72.3	55.1



Frequency range for the rating according to ISO 717-2 ☐

Rating according to ISO 717-2:

ΔL_w = 16 dB $L_{n,w}$ = 62 dB $L_{n,0,w}$ = 78 dB

$C_{I,\Delta}$ = -10 dB $C_{I,r}$ = -1 dB C_I = 0 dB

These results are based on tests made with an artificial source under laboratory conditions (third-octave band measurements).

Name of the testing institut: Entwicklungs- und Prüflabor Holztechnologie GmbH
No. test report/variant: 2617089/Variant-2.2 (glued)

Date: 15 August 2017 Signature: Hauswald

EPH® SUCCESS BY QUALITY