Test Report

Report nº ACL 267/22 **Date of issue:** 2022/06/22

Requested by:

Name: Flexecork
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Manufacturer and product identification:

Name*: Flexecork
Product*: Flexecork 6 mm
Sampling responsibility*: Customer
Responsability of the test specimen installation*: Itecons, by appointment of the customer

Test data:

Test: **Laboratory measurement of the effectiveness of floor coverings in reducing impact sound transmission through concrete floors, ΔIIC**

Date of test:	2022/06/07	**Construction date of test specimen:**	2022/06/06
Source room:		**Receiving room:**	
Temperature (ºC):	22,3 ± 1	**Temperature (ºC):**	20,6 ± 1
Relative humidity (%):	64,2 ± 5	**Relative humidity (%):**	73,8 ± 5
Static pressure (mbar):	1017,2 ± 5	**Static pressure (mbar):**	1018,0 ± 5

Test method: Test procedure adapted from standards ASTM E2179-21; ASTM E492-09; ASTM E989-21; ASTM E2235-04
Test site: Itecons, Rua Pedro Hispano s/n; 3030-289 Coimbra
Operator: Daniela Ferreira

Test specimen description*:

Test specimen with internal reference ACL153A/22 composed by individual laminate floor covering planks (commercial reference of "ARTENS INTENSO") with nominal dimensions of 1327 mm x 194 mm x 12 mm (length x width x thickness), over a resilient layer formed by cork and EVA, with nominal thickness of 6 mm, density of 250 kg/m³ and area density of 985 g/m² (sample with customer reference "5608"), placed on the surface of a reinforced concrete slab with thickness of 140 mm (Itecons heavyweight reference floor) with total area of 3.56 m x 3.56 m, with its perimeter supported on the test rim along the width of 200 mm, under which was suspended a false ceiling composed by a simple metallic structure (profiles spaced 500 mm apart and supported 1000 mm apart with threaded rod M6 and acoustic hangers), an air space of approximately 175 mm (filled with mineral wool 160 mm thick) and two layers of plasterboard (thickness of 15 mm and density of approximately 607 kg/m³, each layer), with joints filled, taped and finished.

Test opening description:

The test opening between the acoustic chambers, where the test specimen was installed, has dimensions of 3.16 m x 3.16 m, which corresponds to an area of approximately 10 m².

Test equipment:

Acoustic chambers at Itecons (Source room: cubic shape with approximately 3,75 m edges and multi-layered "Viroc" walls about 50 cm thick; receiving room: parallelepiped shape of 3,92 m x 3,92 m x 4,72 m and double layered reinforced concrete walls with masonry units about 50 cm thick); "Brüel & Kjær" Pulse multianalyser system, PUL02, model 3560-C-T46, with five acquisition channels; "Brüel & Kjær" rotating microphone boom, type 3923, GIR05, with "Brüel & Kjær" 1/2" microphones, type 4190, MIC29, and type 4955, MIC22; sound level meter calibrator, type 4231, from "Brüel & Kjær", CLS09; impact sound generator, type 3207, from "Brüel & Kjær", MPR02; omnidirectional sound source, type OMNIPOWER 4292, from "Brüel & Kjær", FSO03; thermo-hygrometer THR09; barometer BAR01; thermometer, TER18.

Brief description of test procedure:

The test is performed in the laboratory, in accordance with the standards ASTM E2179-21 and ASTM E492-09, by the following adapted procedure: measurement of the sound pressure level in the receiving room (minimum averaging time of 60 s), with the standard tapping machine activated on the Itecons standard concrete floor (reinforced concrete slab with thickness of 140 mm), in four different positions; installation of the floor covering on the standard concrete floor, in accordance with the manufacturer's specification; measurement of the sound pressure level in the receiving room (minimum averaging time of 60 s), for the same positions of the standard tapping machine; measurement of the reverberation time in the receiving room; calculation of the differences in normalized impact sound pressure level, L_d, for each one-third-octave band, which are subtracted from the levels defined for a reference concrete floor, L_{ref}, to obtain the normalized impact sound pressure level of the reference concrete floor with the floor covering under test, $L_{ref,c}$, in accordance with the standard ASTM E2179-21. According to the standard ASTM E989-21, a reference impact rating contour is then fitted to the previously obtained normalized impact sound pressure levels, to determine the impact insulation class, IIC_C. The Change in Impact Insulation (ΔIIC) is determined in accordance with the standard ASTM E2179-21.

Observations:

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Results obtained from the test:

Average sound pressure level in the receiving room, with the floor covering (L_{sb}):

Freq. (Hz)	100	125	160	200	250	315	400	500	630
L_{sb} (dB)	48,3	55,6	42,1	49,1	42,3	41,7	35,6	33,0	28,0
Freq. (Hz)	800	1000	1250	1600	2000	2500	3150	4000	5000
L_{sb} (dB)	22,0	23,1	19,1	11,7	10,1	14,5	9,8	4,7	5,2

Average background noise pressure level in the receiving room (L_b):

Freq. (Hz)	100	125	160	200	250	315	400	500	630
L_b (dB)	-1,6	2,7	6,1	-2,7	-2,7	-2,6	-2,4	0,1	-0,5
Freq. (Hz)	800	1000	1250	1600	2000	2500	3150	4000	5000
L_b (dB)	-0,5	4,3	0,8	1,6	2,4	3,2	4,0	4,7	5,2

Average sound pressure level in the receiving room after background noise correction (L_s):

Freq. (Hz)	100	125	160	200	250	315	400	500	630
L_s (dB)	48,3	55,6	42,1	49,1	42,3	41,7	35,6	33,0	28,0
Freq. (Hz)	800	1000	1250	1600	2000	2500	3150	4000	5000
L_s (dB)	22,0	23,1	19,1	11,7	9,2	14,5	8,5	2,7	3,2

Average reverberation time in the receiving room (T_r):

Freq. (Hz)	100	125	160	200	250	315	400	500	630
T_r (s)	2,13	2,03	1,67	1,74	1,37	1,15	1,04	1,07	1,01
Freq. (Hz)	800	1000	1250	1600	2000	2500	3150	4000	5000
T_r (s)	1,08	1,10	1,19	1,17	1,16	1,05	1,10	1,09	0,97

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Calculations for the determination of the change in impact insulation class due to the floor covering under test, on a standard concrete floor:

Average normalized impact sound pressure level in the receiving room, of the Itecons standard concrete floor, without the floor covering (L_0):

Freq. (Hz)	100	125	160	200	250	315	400	500	630
L_0 (dB)	56,4	67,2	62,7	72,7	69,5	78,6	73,8	77,3	75,6
Freq. (Hz)	800	1000	1250	1600	2000	2500	3150	4000	5000
L_0 (dB)	75,2	75,9	75,0	75,3	74,8	74,0	72,7	70,8	67,1

Average normalized impact sound pressure level in the receiving room, of the Itecons standard concrete floor, with the floor covering (L_c):

Freq. (Hz)	100	125	160	200	250	315	400	500	630
L_c (dB)	45,9	53,4	40,8	47,5	41,8	42,0	36,3	33,5	28,8
Freq. (Hz)	800	1000	1250	1600	2000	2500	3150	4000	5000
L_c (dB)	22,5	23,6	19,2	11,9	9,4	15,1	8,9	3,2	4,2

Average reduction in normalized impact sound pressure levels in the receiving room, due to the floor covering ($L_d = L_0 - L_c$):

Freq. (Hz)	100	125	160	200	250	315	400	500	630
L_d (dB)	10,5	13,8	21,9	25,2	27,7	36,6	37,5	43,8	46,8
Freq. (Hz)	800	1000	1250	1600	2000	2500	3150	4000	5000
L_d (dB)	52,7	52,3	55,8	63,4	65,4	58,9	63,8	67,6	62,9

Average normalized impact sound pressure level (L_{ref}), assumed for the reference floor (ASTM E2179-21)

Freq. (Hz)	100	125	160	200	250	315	400	500	630
L_{ref} (dB)	67,0	67,5	68,0	68,5	69,0	69,5	70,0	70,5	71,0
Freq. (Hz)	800	1000	1250	1600	2000	2500	3150	4000	5000
L_{ref} (dB)	71,5	72,0	72,0	72,0	72,0	72,0	72,0	--	--

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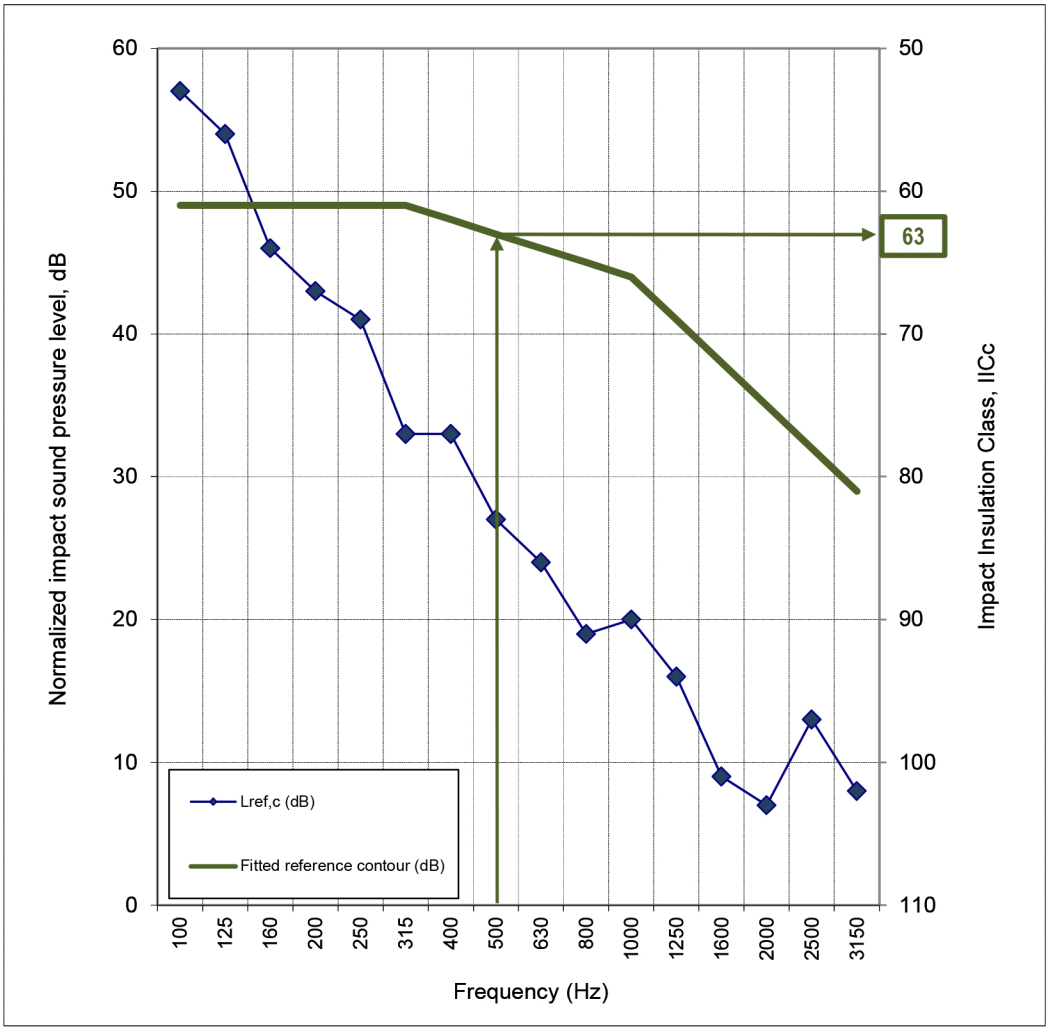
Volume of the rooms (in m^3):

Source room: 52,9 Receiving room: 75,3

Average normalized impact sound pressure level of the reference concrete floor with the floor covering under test ($L_{ref,c}$):

Freq. (Hz)	100	125	160	200	250	315	400	500	630
$L_{ref,c}$ (dB)	57	54	46	43	41	33	33	27	24
Freq. (Hz)	800	1000	1250	1600	2000	2500	3150	4000	5000
$L_{ref,c}$ (dB)	19	20	16	9	7	13	8	--	--



IIC_C = 63 dB

ΔIIC = 35 dB (Change in Impact Insulation Class)

(Results obtained in accordance with ASTM E2179-21 and ASTM E989-21)

ACL267/22

Report author	Technical responsibility	Administration
Daniela Ferreira Senior Official	Julieta António Technical and Scientific Supervisor	Validated document

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The presented results refer exclusively to the tested specimens and apply to the sample as received.

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