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TEST REPORT No : 05681-5443 **DATE OF ISSUE : 10 June 2022**

BS EN ISO 10140-3:2010

Acoustics – Laboratory Measurement of Sound Insulation of Building Elements

Part 3: Measurement of Impact Sound Insulation

Measurement of the Reduction of Transmitted Impact Noise by Floorcoverings on a Heavyweight Standard Floor

Client:	Forbo Flooring UK
Job Number:	05681
Test Sample:	FLOTEX NEXT
Date(s) of Test:	6 April 2022

Signed: . . . . . D Wong-McSweeney
Laboratory Manager

Approved: . . . . . S M Furlong
Specialist Acoustics Technician

Contents

Client Details:	Forbo Flooring UK
	High Holborn Road
	Ripley
	Derbyshire
	DE5 3NT
Manufacturer:	Client
Date Order Received:	23 March 2022

1. Test Samples

The following sample was installed on the standard heavy weight concrete test floor of the University of Salford Acoustic Test Laboratory in accordance with Annex H of BS EN ISO 10140-1:2016. All information regarding the samples comes from laboratory measurements unless marked with "*cs*" or otherwise stated.

1.1. Description of Test Samples

Test Reference: **05681-5443**
Sample Reference *cs*: FLOTEX NEXT
Sample Description: Carpet - Category I

Three 1055 × 550 mm sections of carpet, as received from the client, were submitted to impact testing. The samples were loose laid directly onto the concrete test floor and were not loaded.

Mass per unit area:	2.3 kg/m^2 (measured)
Thickness:	3.7 mm (average measured)

1.2. Photograph

2. Description of Test Procedure

2.1. Description of Test Facility

The measurements were made in the large reverberation chamber at the University of Salford. The walls of the test room are 330 mm thick and are constructed from Accrington Brick. The floor plan of the room has the shape of a truncated wedge with one pair of parallel walls and one pair of non-parallel walls. The floor and ceiling are parallel and the room surfaces are painted throughout. The test sample was placed on a 3.4 m × 3.4 m × 140 mm thick reinforced homogeneous concrete floor slab which is inserted into the roof of the chamber. The chamber contains 18 randomly orientated plywood diffusing elements to provide a uniform diffuse sound field.

2.2. Test Procedure

The procedure followed that detailed in BS EN ISO 10140-3: 2010 "Acoustics, Measurement of sound insulation in buildings and of building elements – Part 3: Measurement of impact sound insulation". A standard tapping machine with metal tipped hammers and conforming to Annex E of BS EN ISO 10140-5: 2010 was used as the impact sound source.

Mass of tapping machine:	10 kg
Dimensions of tapping machine:	600 mm × 140 mm × 260 mm
Hammer material:	Metal
Number of tapping machine supports:	3

The impact sound pressure levels (L_i) produced by the tapping machine in the reverberant room below were measured both with and without the test specimen installed, as detailed in Annex H of BS EN ISO 10140-1. The measured sound pressure levels were normalised according to:

$$L_n = L_i + 10 \log \frac{A}{A_0} \quad \text{dB} \qquad (1)$$

where Ln is the normalised impact sound pressure level

A is the measured equivalent absorption area of the receiving room (m^2)

A_0 is reference equivalent absorption area ($A_0 = 10\ m^2$)

A is evaluated from the reverberation time using Sabine's formula:

$$A = \frac{0.16V}{T} \qquad m^2 \qquad (2)$$

where V is the receiving room volume (m^3)

T is the reverberation time (seconds)

The improvement in impact sound insulation IISI (ΔL) is obtained from the equation:

$$\Delta L = L_{n0} - L_n \qquad dB \qquad (3)$$

where L_{n0} is the normalised impact sound pressure level in the receiving room in the absence of floor covering

L_n is the normalised impact sound pressure level when the floor covering is in place

The sound pressure levels produced by the tapping machine in the receiving room were measured at 6 microphone positions for each of 3 different positions of the tapping machine and an average level was obtained at each of the one-third octave frequency bands in the range 100 Hz to 5000 Hz. An averaging time of 16 s was used at each microphone position. The microphone positions were chosen such that the distance between positions and between any microphone and a room boundary or sound source exceeded 1.0 m. The distance between any microphone and diffusers exceeded 0.7 m. The microphones were distributed around the room so as to cover the space uniformly.

Five reverberation time measurements were also made at each of the 6 microphone positions and at each of the 2 loudspeaker positions and the results averaged.

3. Equipment

Equipment	Departmental Record No
Norsonics Tapping Machine Type 211	TP1
Norwegian Electronics 1/3 octave band real time analyser type 850 with in-built random noise generator	RTA3-07 to 12
Quad 510 power amplifier	PA7
Norsonic Sound Calibrator type 1251	C8
2 × Norsonic Dodecahedron Loudspeakers	LS10-LS11
4 × G.R.A.S. random incidence condenser microphones type 40AP in the receiving room	M20, M31, M19, M32
2 × Bruel &Kjaer random incidence condenser microphone type 4166 in the receiving room	M9, M18
Environmental sensor data logger, hygrometers and barometer	HL1, HG3, HG2, BM3
Toshiba TECRA R850 119 laptop computer and related peripheral equipment (network switch, printer, monitor etc.)	RTA3-00
Yamaha GQ1031BII graphic equalizer	GEQ1

4. Results

The Improvement in Impact Sound Insulation IISI (ΔL) for each sample, given in 1/3 octave bands, can be found together with the relevant rating units $C_{I,\Delta}$ $C_{I,r}$ and $C_{I,O}$ as defined in ISO 717-2 :2013 on the following pages.

The results here presented relate only to the items received, tested and described in this report.

No significant damage was observed on the sample after testing.

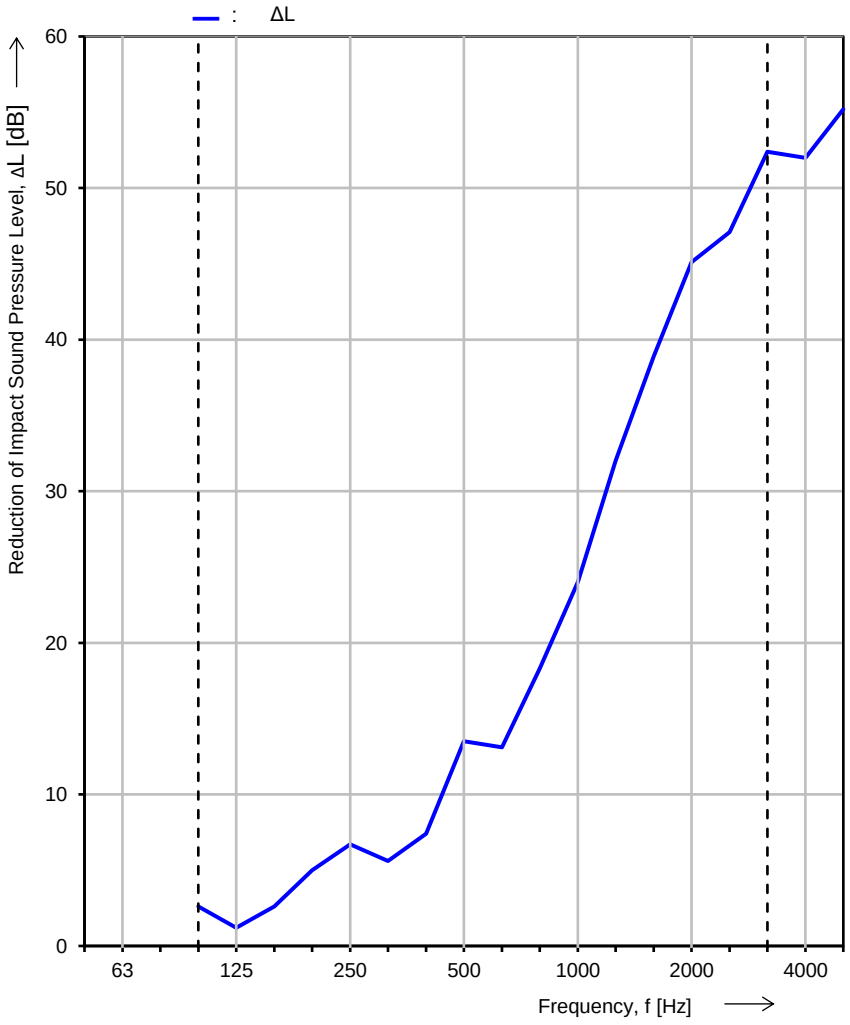
Note: These results are based on tests made with an artificial source under laboratory conditions.

BS EN ISO 10140-3:2010 Acoustics - Laboratory measurement of the reduction of transmitted impact noise by floor coverings on a heavyweight standard floor

Client:	Forbo Flooring UK	Product Identification:	FLOTEX NEXT
Mounted by:	University of Salford, Acoustic Test Lab.		
Manufacturer:	Client	Test Room Identification:	Acoustic Transmission Suite
Description:	Carpet - Category I	Date of Test:	06 April 2022

Curing Time:	Not Applicable	Source Room Temperature:	21.8 °C
Ambient Pressure:	98.4 kPa	Source Room Relative Humidity:	33.1 %
Mass per unit area:	2.3 kg/m^2	Receiving Room Temperature:	20.5 °C
Size / number of samples:	Three 1055mm x 550mm samples	Receiving Room Relative Humidity:	40.3 %
Receiving Room Volume:	222 m^3		

Frequency f [Hz]	$L_{n,0}$ ⅓ octave [dB]	ΔL ⅓ octave [dB]
50	-.-	-.-
63	-.-	-.-
80	-.-	-.-
100	64.5	2.6
125	67.7	1.2
160	65.2	2.6
200	71.4	5.0
250	71.0	6.7
315	70.9	5.6
400	71.8	7.4
500	74.9	13.5
630	74.1	13.1
800	74.8	18.3
1000	76.2	24.0
1250	76.7	32.0
1600	77.3	38.9
2000	77.7	45.1
2500	77.5	47.1
3150	77.2	52.4
4000	76.5	52.0
5000	75.3	55.2



Rating according to BS EN ISO 717-2

ΔL_W = 20 dB $C_{I,\Delta}$ = -10 dB $C_{I,r}$ = -1 dB

Evaluation based on laboratory measurement results obtained in one-third-octave bands by an engineering method.

Name of test institute:	The University of Salford, Acoustic Test Lab.		
Test reference:	05681-5443	Signature:	
Date: 06 April 2022		Operator:	D. Wong-McSweeney