Confidential Report

Our Ref: 25/10645B/03/21

Wira House, West Park Ring Road, Leeds, LS16 6QL, UK.
Telephone: +44 (0) 113 259 1999
Email: info@bttg.co.uk
: www.bttg.co.uk

Date: 21 April 2021

Our Ref: 25/10645B/03/21
Your Ref: ---

Client: **Forbo Flooring UK Ltd**

Unit 241, Dawson Place
Walton Summit Centre
Bamber Bridge
Preston
Lancashire
PR5 8AL

Job Title: Various Tests on One Sample of Carpet Tile

Clients Order Ref: 4501158821

Date of Receipt: 24 March 2021

Description of Sample: One sample of carpet tile, referenced; Teviot Basis Pro.

Work Requested: We were asked to make the following test(s):

BS EN ISO 10140-3
BS EN ISO 354
BS EN 13893

* subcontracted test, UKAS accredited
** subcontracted test, EN ISO/IEC 17025 accredited
*** not UKAS accredited

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Note: This report relates only to the samples submitted and as described in the report.

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Measurement of the Reduction of Transmitted Impact Noise by Floor Coverings on a Heavyweight Standard Floor (*)

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 330mm 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 3.4m x 3.4m x 140mm thick reinforced homogeneous concrete floor slab which is inserted into the roof of the chamber. The chamber contains 11 randomly orientated plywood diffusing elements to provide a uniform diffuse sound field.

Test Procedure

The procedure followed that detailed in BS EN ISO 10140-3:2010+A1:2015 (2016) "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+A1:2014 was used as the impact sound source. 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 10140-1:2016.

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 100Hz to 5000Hz. An averaging time of 16s 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 1m. The distance between any microphone and diffusers exceeded 0.7m. 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.

The Improvement in Impact Sound Insulation IISI (L) is given in 1/3 octave bands, as defined in BS EN ISO 717-2:2013.

The results here presented relate only to the items tested and described in this report. The test samples were loose laid directly on the bare concrete test floor and were not loaded.

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

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Frequency f [Hz]	$L_{n,0}$ ⅓ octave [dB]	ΔL ⅓ octave [dB]
50	-.-	-.-
63	-.-	-.-
80	-.-	-.-
100	67.4	2.8
125	67.6	2.5
160	65.2	5.6
200	71.1	10.1
250	70.8	14.1
315	71.2	16.0
400	71.9	21.8
500	74.4	28.4
630	74.6	29.5
800	75.2	34.7
1000	76.6	43.9
1250	76.4	45.1
1600	76.3	47.4
2000	78.2	53.4
2500	78.4	55.2
3150	77.4	56.8
4000	76.8	57.8
5000	75.4	60.2

[1] Minimum Value

ΔLW = 25 dB

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Measurement of Sound Absorption in a Reverberation Room - BS EN ISO 354:2003 (2015) (*)

Description of Test Facility

The tests were carried out in a large reverberation room. The room has been designed with hard surfaces and non-parallel walls to give long empty room reverberation times with uniform decays. It has the shape of a truncated wedge. In addition 11 plywood panels, each panel 1.22m × 2.44m, were hung in the room to improve the diffusivity of the sound field. The test sample was placed in the center of the floor. The excitation signal comprised wide band random noise played into the room via a loudspeaker system mounted in a cabinet facing a corner. The sound was monitored at each of 6 microphone positions. The room is 7.4m long × ~6.6m wide × 4.5m high with a volume of 220m^3 and a total surface area of 224m^2.

The volume of the room permits a maximum sample size of 12.79m^2 to be tested, in accordance with Clause 6.2.1.1 in BS EN ISO 354: 2003, "Acoustics - Measurement of sound absorption in a reverberation room".

Test Procedure

The procedure followed that detailed in BS EN ISO 354:2003 (2015). Measurements were made on the rate of decay of sound in the test chamber with and without the sample in place. The frequency range from 100Hz to 5000Hz was covered in one-third octave bands. An average reverberation time was taken from five decays at each of six microphone positions for each of two loudspeaker positions (i.e. 60 decays per third octave band). The decays were produced by exciting the room with amplified wide band random noise and stopping the excitation once the chamber became saturated. The time taken for the sound to decay by a given amount is measured and extrapolated to give the reverberation time. In practice this was determined by sampling the decaying sound field on a one-third octave band frequency analyser and storing the spectrum in a computer every 32 milliseconds. The reverberation time was obtained from the arithmetically averaged decays at each frequency. The measurements with and without the sample in the room were carried out consecutively to avoid significant changes in relative humidity and temperature that influence air absorption at higher frequencies.

The random incidence sound absorption coefficients are given in the table overleaf. The single-number rating, α_w, has been calculated in accordance with BS EN ISO 11654:1997 (2002).

(No correction is applied for the absorption of the surface covered by the test sample)

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Random Incidence Sound Absorption Coefficient

Frequency (Hz)	α_{pi}
125	0.00
250	0.00
500	0.05
1000	0.15
2000	0.40
4000	0.60

Weighted sound absorption coefficient (α_w) 0.15 (H)

Classification: E

Dynamic friction (***)

The sample was tested in accordance with BS EN 13893:2002 (2018).

Method: Two leather and 1 rubber sole are attached to the GMG 100. The appliance is pulled over the sample with a constant speed. The horizontal force needed is registered. The dynamic friction coefficient is determined by dividing the horizontal force through the vertical force.

	Dynamic Friction	
	Warp	Weft
	0.56	0.56
	0.56	0.57
	0.56	0.57
Mean:	0.56	0.57

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Reported by:……D. Feltham……D Feltham, Laboratory Technician

Countersigned by:…….. P Doherty, Manager

Enquiries concerning this report should be addressed to Customer Services.