



**Report of Sound Insulation Testing**  
**at**  
**Fountain House**  
**Welwyn Garden City**  
**Hertfordshire**

**Report No:** DJB/6982/B  
**Date of Issue:** 26 April 2017  
**Property Type:** Dwellings to be formed by a material change of use

**Date of Test:** 13 April 2017

**ACOUSTICAL INVESTIGATION & RESEARCH ORGANISATION LTD**

Duxons Turn, Maylands Avenue, Hemel Hempstead, Herts, HP2 4SB Telephone: 01442 247146

AIRO is a UKAS accredited testing laboratory No. 0483 and measurements to British Standards BS EN ISO 140-4 & 7:1998 and BS EN ISO 717-1 & 2:1997 together with Approved Document E to The Building Regulations are included on our schedule of accreditation. UKAS is the United Kingdom Accreditation Service.

**Test Engineer:**

**Client:** GPL 2014 Ltd  
 9 Bridewell Pace  
 London  
 EC4V 6AW

*D J Boaden*

**D J Boaden BSc MInstP MIOA**  
**Managing Consultant**

**Comparison with Approved Document E (2003) to The Building Regulations 2010 (ref 1)**

Test No.	Rooms	$D_{nT,w} + C_{tr}$ (dB)		
		Measured	Required	Pass/Fail
1	The Nail Parlour, Ground Floor to Main Office Space, 1 <sup>st</sup> Floor,	64	≥ 43	<b>PASS</b>

**Equipment**

Type	Serial No.	Type	Serial No.
Norsonic 140 Sound Analyzer	1403123	Norsonic 1209 Microphone Pre-Amplifier	12703
Norsonic 140 Sound Analyzer	1403164	Norsonic 1209 Microphone Pre-Amplifier	12554
GRAS 40AE ½" Condenser Microphone	97969	B&K 4231 Sound Level Calibrator	1795485
GRAS 40AE ½" Condenser Microphone	97972		

The test procedures in Annex B of Approved Document E (2003) have been followed except as follows:

Exception	Reason
B2.15 – Direction of test should be from larger to smaller room.	Direction selected to reflect proposed non-residential to residential use.

**Approved by:**

*D L Watts*

**Eur Ing D L Watts BEng CEng FIOA**  
**Principal Consultant**

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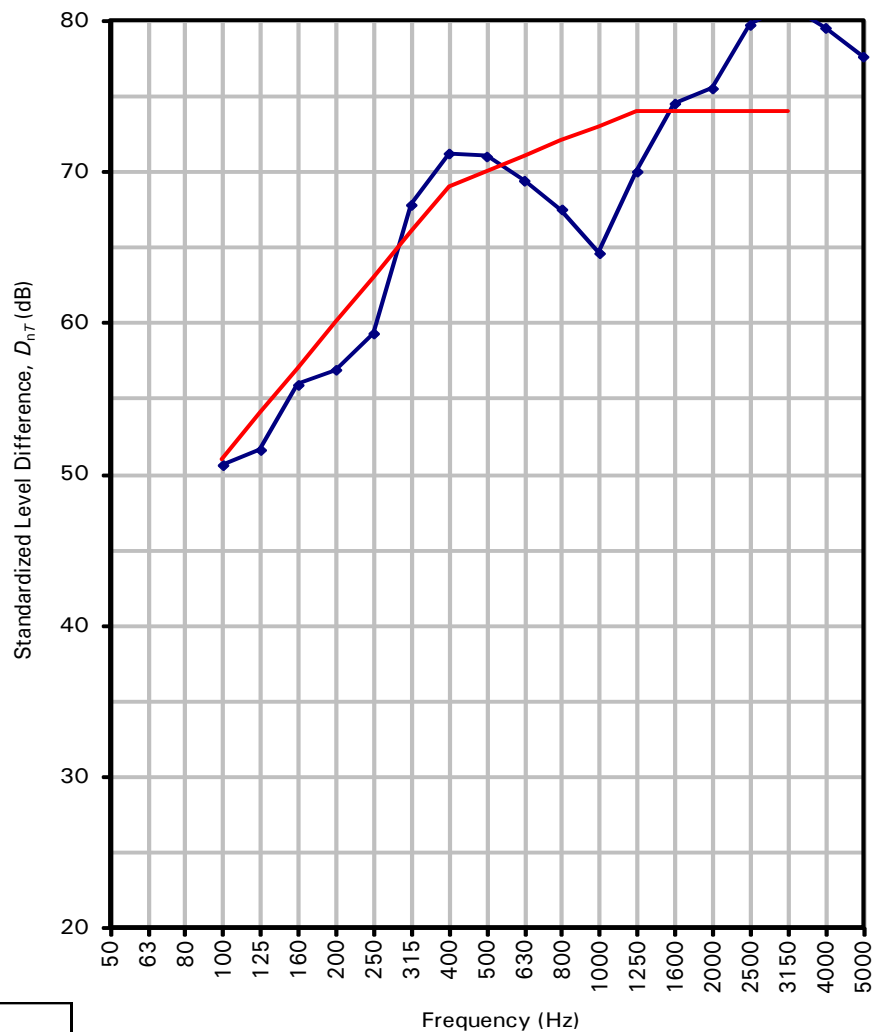
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### Test 1 – Airborne Sound Insulation across Separating Floor

Test No.	SOURCE ROOM		RECEIVE ROOM	
	Room	Vol. (m <sup>3</sup> )	Room.	Vol. (m <sup>3</sup> )
1	The Nail Parlour, Ground Floor	73	Main Office Space, 1 <sup>st</sup> Floor	> 100

Standardized Level Difference according to BS EN ISO 140-4:1998

Frequency (Hz)	$D_{nT}$ (dB)
50	
63	
80	
100	≥ 50.6
125	≥ 51.6
160	55.9
200	56.9
250	59.3
315	67.8
400	71.2
500	≥ 71.0
630	≥ 69.4
800	≥ 67.5
1000	≥ 64.6
1250	≥ 70.0
1600	≥ 74.5
2000	≥ 75.5
2500	≥ 79.7
3150	≥ 81.0
4000	≥ 79.5
5000	≥ 77.6
6300	
8000	
10000	



Rating according to BS EN ISO 717-1:1997	
$D_{nT,w} (C; C_{tr}) =$	70 (-2;-6) dB
$D_{nT,w} + C_{tr} =$	64 dB

—◆— Measured Standardized Level Difference,  $D_{nT}$  (dB)  
— Reference curve (BS EN ISO 717-1:1997)

$C_{50-3150}$ : --       $C_{50-5000}$ : --       $C_{100-5000}$ : -1 dB  
 $C_{tr,50-3150}$ : --       $C_{tr,50-5000}$ : --       $C_{tr,100-5000}$ : -6 dB

Evaluation based on a result obtained by a field method

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## Procedure

### Airborne Sound Insulation to BS EN ISO 140-4:1998

Airborne sound insulation measurements were performed according to a prescribed procedure that specifies that the sound generated in the source room shall be steady and have a continuous spectrum in the frequency bands of interest. Measurements of the sound levels were made in both source and receive rooms at the one-third octave intervals from 100 Hz to 5000 Hz as recommended in the Standard (ref 2). The measurements were made such as to obtain a spatial average of the sound pressure level in each room. Reverberation time measurements were made in the receive room following the procedures of British Standard BS EN 20354:1993 (ref 3).

The Standardized Level Difference ( $D_{nT}$ ) in decibels (dB) is calculated in each frequency band using the equation:

$$D_{nT} = L_1 - L_2 + 10 \lg \frac{T}{T_0} \quad \text{dB}$$

where

- $D_{nT}$  is the Standardized Level Difference (dB)
- $L_1$  is the average sound pressure level in the source room (dB)
- $L_2$  is the average sound pressure level in the receive room (dB)
- $T$  is the average reverberation time of the receive room (seconds)
- $T_0$  is the reference reverberation time of 0.5 seconds

The Weighted Standardized Level Difference ( $D_{nT,w}$ ) in decibels (dB) and the Spectrum Adaptation Terms ( $C$  and  $C_{tr}$ ), also in decibels, are calculated in accordance with BS EN ISO 717-1:1997 (ref 4) by comparison of the sixteen values of Standardized Level Difference from 100 Hz to 3150 Hz with the relevant reference curves.

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## References

1. The Building Regulations 2010

Approved Document E: Resistance to the passage of sound (2003 Edition incorporating 2004, 2010, 2013 and 2015 amendments)

- E1 Protection against sound from other parts of the building and adjoining buildings
- E2 Protection against sound within a dwelling-house etc
- E3 Reverberation in the common internal parts of buildings containing flats or rooms for residential purposes
- E4 Acoustic conditions in schools

2. British Standard BS EN ISO 140

Acoustics - Measurements of sound insulation in buildings and of building elements

BS EN ISO 140-4:1998

Field measurements of airborne sound insulation between rooms

3. British Standard BS EN 20354:1993

Acoustics - Measurement of sound absorption in a reverberation room

4. British Standard BS EN ISO 717

Acoustics - Rating of sound insulation in buildings and of building elements

BS EN ISO 717-1:1997

Airborne sound insulation