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TEST REPORT

Title : **Testing of Sound Insulation Between Rooms
to BS EN ISO 140-4:1998 and BS EN ISO 140-
7:1998**

Property Address : **Grosvenor House
13-19 Evesham Road
Cheltenham
Gloucestershire**

Laboratory Number : **SW402.06**

Client : 
**The Concrete Centre
Riverside House
4 Meadows Business Park
Station Approach
Blackwater
Camberley
GU17 9AB**

For the Attention of : **Mr C Sutcliffe**

Date Tested : **17 November 2006**

Authorised by : **Mr D Dix**

Date of Issue : **05 June 2007**

Our Reference : **H:/shared/dix/SW402.06**

Page 1 of 19 pages

C O N T E N T S

| | Page No. |
|--|-----------------|
| 1. INTRODUCTION | 3 |
| 2. DESCRIPTION OF BUILDING CONSTRUCTION | 3 |
| 3. TEST METHOD | 3 |
| 4. RESULTS | 4 |
| TABLES | 5 |
| FIGURES | 12 |
| PLATES | 17 |
| APPENDIX | |

TESTING OF SOUND INSULATION BETWEEN ROOMS

1. INTRODUCTION

CERAM Building Technology were commissioned to carry out tests to determine the airborne and impact sound insulation of separating floors and walls within Grosvenor House, 13-19 Evesham Road, Cheltenham, Gloucestershire in accordance with the methods given in BS EN ISO 140-4:1998 and BS EN ISO 140-7:1998.

2. DESCRIPTION OF BUILDING CONSTRUCTION

The building under test was a four storey newly built apartment block, consisting of a total of 24 apartments. Testing was carried out between two adjacent apartments on the second floor (Flats 22 and 23) and between one of the Penthouse apartments (Flat 24) on the third floor and an apartment (Flat 23) on the third floor. The relevant floor plans of the building are shown in Figures 2 and 3. The building was located at the above address.

The building is constructed from prefabricated concrete wall panels with hollowcore concrete plank floors. The construction is as follows:-

Separating wall – 200mm thick Struchterm Fastbuild solid concrete wall panels with 25mm thick mineral wool and 12.5mm plasterboard with plaster skim on both sides. Mineral wool layer continues to mineral wool mat laid on floor planks.

Separating floor – 200mm thick Hollowcore concrete plank floor running parallel to separating wall and supported on separating wall panel. Upper surface of separating floor has 75mm concrete screed laid on 25mm thick mineral fibre mat (36kgm^{-3}). Screed is isolated from separating wall panel by the mineral wool layer. Underside of separating floor has 100mm thick mineral fibre mat (10kgm^{-3}) above 15mm thick plasterboard with plaster skim.

Total thickness of separating wall nominally 275mm
Total thickness of separating floor nominally 415mm

The floor and wall construction are shown in Figure 1.

A total of three tests were carried out, two airborne and one impact, as follows:-

Test 1 – horizontal airborne test between Flat 23 (bedroom) and Flat 22 (bedroom)

Test 2 – vertical airborne test between Flat 23 (bedroom) and Flat 24 (bedroom)

Test 3 – impact test between Flat 23 (bedroom) and Flat 24 (bedroom)

3. TEST METHOD

The tests were carried out in accordance with the methods stated in BS EN ISO 140-4:1998 "Acoustics – Measurement of sound insulation in buildings and of building elements – Part 4: Field measurements of airborne sound insulation between rooms" and BS EN ISO 140-7:1998 "Acoustics – Measurement of sound insulation in buildings and of building elements – Part 7: Field measurements of impact sound insulation of floors."

The equipment used during the test was as follows:-

| | |
|---|--|
| Brüel & Kjær Type 2260-D Investigator Modular Precision Sound Analyser | Serial No 02443390 CERAM Comac No AS048 |
| Brüel & Kjær Type 4231 Sound Level Calibrator | Serial No 02438870 CERAM Comac No AS050 |
| Brüel & Kjær Type 2716 300W Power Amplifier | Serial No 02439075 CERAM Comac No AM016 |
| Brüel & Kjær Type 4296 Omnipower Omnidirectional Sound Source | Serial No 02421493 CERAM Comac No AS053 |
| AKG WMS80 Wireless Transceiver System | CERAM Comac No AS051 |
| DBX131 Graphic Equaliser | Serial No 000297 CERAM Comac No AS052 |

4. RESULTS

The Standardised Level Differences in accordance with BS EN ISO 140-4 were calculated to be :-

$$\text{Test 1 } D_{nT,w}(C;C_{tr}) = 69 \text{ (-1, -7) dB}$$

$$\text{Test 2 } D_{nT,w}(C;C_{tr}) = 63 \text{ (-2, -8) dB}$$

The Normalised Impact Sound Pressure Level in accordance with BS EN ISO 140-7 were calculated to be :-

$$\text{Test 3 } L'_{nT,w}(C_i) = 42 \text{ (0) dB}$$

Hence the single figure ($D_{nT,w}+C_{tr}$ airborne and $L'_{nT,w}+C_i$ impact) rating for each separating construction was as follows:-

| | |
|---------------------------|-----------------------------|
| Test 1 (Separating Wall) | 62 dB ($D_{nT,w}+C_{tr}$) |
| Test 2 (Separating Floor) | 55 dB ($D_{nT,w}+C_{tr}$) |
| Test 3 (Separating Floor) | 42 dB ($L'_{nT,w}+C_i$) |

The minimum requirements as stated in Approved Document E of the Building Regulations – Resistance to the passage of sound are:-

| | |
|----------------------------|--|
| Walls - airborne | not less than 45 dB ($D_{nT,w}+C_{tr}$) |
| Floors & stairs - airborne | not less than 45 dB ($D_{nT,w}+C_{tr}$) |
| Floors – impact | not greater than 62 dB ($L'_{nT,w}+C_i$) |

The full results of the tests are given in Tables 1 to 11.

The Appendix contains the standard report sheets as required in BS EN ISO 140-4:1998 “Acoustics – Measurement of sound insulation in buildings and of building elements – Part 4: Field measurements of airborne sound insulation between rooms” and BS EN ISO 140-7:1998 “Acoustics – Measurement of sound insulation in buildings and of building elements – Part 7: Field measurements of impact sound insulation of floors.”

~~~~~(End of written report)~~~~~

**Authorised by**

**Dave Dix**  
*Project Manager*

# TABLES

**Table 1  
Test 1  
Sound Pressure Levels – Source Room**

| 1/3 Octave Band Frequency (Hz) | Sound Pressure Level at Microphone Position (dB) |       |       |       |       |       |       |       |       |       |       |       | Average (dB) | Standard Deviation |
|--------------------------------|--------------------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------------|--------------------|
|                                | 1                                                | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | 11    | 12    |              |                    |
| 100                            | 91.7                                             | 99.1  | 91.1  | 99.6  | 98.5  | 97.0  | 97.2  | 102.0 | 100.9 | 94.8  | 103.7 | 90.5  | 98.9         | 4.50               |
| 125                            | 112.8                                            | 110.3 | 109.2 | 108.4 | 106.5 | 109.6 | 107.7 | 106.0 | 106.2 | 108.6 | 106.7 | 107.7 | 108.8        | 1.93               |
| 160                            | 105.1                                            | 105.8 | 106.4 | 108.5 | 102.1 | 104.3 | 107.4 | 108.5 | 107.8 | 105.6 | 106.4 | 106.9 | 106.5        | 1.78               |
| 200                            | 111.7                                            | 110.3 | 109.2 | 107.9 | 107.7 | 105.4 | 107.6 | 109.9 | 109.5 | 111.7 | 109.4 | 112.0 | 109.7        | 1.92               |
| 250                            | 111.6                                            | 107.2 | 106.7 | 105.6 | 107.9 | 104.9 | 106.3 | 107.1 | 109.7 | 108.8 | 102.5 | 107.1 | 107.7        | 2.29               |
| 315                            | 105.2                                            | 102.4 | 105.1 | 102.3 | 103.4 | 104.2 | 104.4 | 107.2 | 104.9 | 104.2 | 103.2 | 108.4 | 105.0        | 1.77               |
| 400                            | 105.5                                            | 103.2 | 105.2 | 104.1 | 102.3 | 104.5 | 102.2 | 102.1 | 103.6 | 103.7 | 101.6 | 104.2 | 103.7        | 1.21               |
| 500                            | 103.5                                            | 101.4 | 101.8 | 101.8 | 101.5 | 102.6 | 101.8 | 102.0 | 102.1 | 102.5 | 101.5 | 100.6 | 102.0        | 0.68               |
| 630                            | 103.5                                            | 104.4 | 103.6 | 102.3 | 104.4 | 102.1 | 101.7 | 102.7 | 102.0 | 102.7 | 101.8 | 103.3 | 103.0        | 0.93               |
| 800                            | 105.7                                            | 104.6 | 104.9 | 103.5 | 105.2 | 104.8 | 104.3 | 104.7 | 103.9 | 102.8 | 104.0 | 103.9 | 104.4        | 0.75               |
| 1000                           | 105.4                                            | 106.4 | 104.4 | 104.8 | 105.3 | 105.1 | 104.5 | 105.3 | 105.1 | 105.0 | 104.9 | 104.6 | 105.1        | 0.50               |
| 1250                           | 107.7                                            | 108.3 | 107.2 | 107.7 | 107.5 | 107.5 | 107.6 | 108.0 | 107.7 | 107.0 | 106.8 | 106.4 | 107.5        | 0.50               |
| 1600                           | 107.4                                            | 108.7 | 108.1 | 107.9 | 108.6 | 107.6 | 106.9 | 108.8 | 108.4 | 108.3 | 108.0 | 107.7 | 108.1        | 0.53               |
| 2000                           | 105.6                                            | 106.8 | 106.6 | 106.3 | 107.0 | 106.0 | 106.1 | 107.1 | 107.2 | 106.9 | 106.1 | 105.9 | 106.5        | 0.51               |
| 2500                           | 104.7                                            | 104.9 | 105.4 | 105.0 | 105.4 | 104.8 | 105.5 | 106.6 | 104.6 | 104.8 | 105.4 | 105.6 | 105.3        | 0.53               |
| 3150                           | 103.4                                            | 103.8 | 104.9 | 104.5 | 104.1 | 103.6 | 104.0 | 104.7 | 104.3 | 103.7 | 104.8 | 104.6 | 104.2        | 0.49               |

**Table 2  
Test 1  
Sound Pressure Levels – Receiving Room**

| 1/3 Octave Band Frequency (Hz) | Sound Pressure Level at Microphone Position (dB) |      |      |      |      |      |      |      |      |      |      |      | Average (dB) | Standard Deviation |
|--------------------------------|--------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|--------------|--------------------|
|                                | 1                                                | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   |              |                    |
| 100                            | 52.8                                             | 57.4 | 58.8 | 51.7 | 56.2 | 48.6 | 51.6 | 56.4 | 49.7 | 54.8 | 57.8 | 51.9 | 55.1         | 3.40               |
| 125                            | 59.7                                             | 60.4 | 59.4 | 59.4 | 58.7 | 59.7 | 60.0 | 58.9 | 60.5 | 61.7 | 60.1 | 59.5 | 59.9         | 0.77               |
| 160                            | 57.5                                             | 56.7 | 56.2 | 57.0 | 53.8 | 56.8 | 54.7 | 52.5 | 51.9 | 54.6 | 54.5 | 51.5 | 55.2         | 2.01               |
| 200                            | 54.7                                             | 54.1 | 52.6 | 54.0 | 56.4 | 54.0 | 56.9 | 57.4 | 52.9 | 59.0 | 52.9 | 56.6 | 55.6         | 2.03               |
| 250                            | 52.9                                             | 54.1 | 52.2 | 52.6 | 52.4 | 51.5 | 53.7 | 51.9 | 52.6 | 55.2 | 54.5 | 54.7 | 53.4         | 1.17               |
| 315                            | 48.2                                             | 50.0 | 51.0 | 50.4 | 50.8 | 49.8 | 49.3 | 51.4 | 49.4 | 50.2 | 48.2 | 50.1 | 50.0         | 0.96               |
| 400                            | 44.1                                             | 47.3 | 47.1 | 45.2 | 45.9 | 44.7 | 44.4 | 46.1 | 44.5 | 44.0 | 45.3 | 43.5 | 45.3         | 1.18               |
| 500                            | 41.8                                             | 41.3 | 41.9 | 42.1 | 41.7 | 41.8 | 40.9 | 41.6 | 41.1 | 42.2 | 41.1 | 41.1 | 41.6         | 0.43               |
| 630                            | 38.7                                             | 37.8 | 38.7 | 37.3 | 37.2 | 38.3 | 38.1 | 38.0 | 37.4 | 37.9 | 37.7 | 38.0 | 37.9         | 0.47               |
| 800                            | 36.8                                             | 35.6 | 35.9 | 36.7 | 36.8 | 35.7 | 37.3 | 36.1 | 37.3 | 36.7 | 36.1 | 35.9 | 36.4         | 0.57               |
| 1000                           | 33.7                                             | 34.2 | 34.5 | 34.8 | 34.3 | 33.4 | 35.1 | 34.4 | 34.8 | 34.7 | 35.7 | 35.4 | 34.6         | 0.63               |
| 1250                           | 34.2                                             | 34.6 | 35.0 | 34.8 | 35.9 | 33.9 | 35.3 | 34.4 | 35.6 | 35.2 | 35.7 | 35.5 | 35.0         | 0.59               |
| 1600                           | 32.5                                             | 32.3 | 32.8 | 32.8 | 33.1 | 32.7 | 33.3 | 33.6 | 33.8 | 33.2 | 33.6 | 33.1 | 33.1         | 0.44               |
| 2000                           | 29.3                                             | 29.0 | 29.4 | 29.3 | 29.5 | 29.5 | 29.0 | 29.5 | 29.4 | 29.0 | 29.6 | 29.3 | 29.3         | 0.20               |
| 2500                           | 27.9                                             | 28.2 | 28.5 | 28.3 | 28.9 | 28.1 | 28.4 | 28.8 | 28.8 | 28.9 | 29.4 | 28.7 | 28.6         | 0.39               |
| 3150                           | 24.5                                             | 24.4 | 24.9 | 25.1 | 25.3 | 24.3 | 25.0 | 25.1 | 25.7 | 25.3 | 26.0 | 25.6 | 25.1         | 0.51               |

**Table 3**  
**Test 1**  
**Sound Pressure Levels – Background Levels Receiving Room**

| 1/3 Octave Band Frequency (Hz) | Sound Pressure Level at Microphone Position (dB) |      |      |      |      | Average (dB) | Standard Deviation |
|--------------------------------|--------------------------------------------------|------|------|------|------|--------------|--------------------|
|                                | 1                                                | 2    | 3    | 4    | 5    |              |                    |
| 100                            | 20.8                                             | 21.8 | 29.0 | 20.5 | 31.2 | 27.0         | 5.08               |
| 125                            | 24.4                                             | 24.2 | 30.0 | 21.6 | 24.9 | 26.0         | 2.91               |
| 160                            | 27.3                                             | 33.8 | 32.6 | 26.7 | 33.4 | 31.7         | 3.22               |
| 200                            | 27.3                                             | 27.9 | 30.2 | 27.4 | 26.8 | 28.1         | 1.20               |
| 250                            | 32.5                                             | 29.4 | 29.4 | 28.4 | 28.1 | 29.9         | 1.60               |
| 315                            | 25.4                                             | 26.5 | 26.1 | 23.6 | 25.8 | 25.6         | 0.99               |
| 400                            | 19.2                                             | 22.4 | 24.0 | 21.9 | 24.4 | 22.7         | 1.89               |
| 500                            | 19.1                                             | 19.9 | 22.1 | 20.9 | 22.9 | 21.2         | 1.40               |
| 630                            | 19.8                                             | 20.3 | 22.1 | 20.6 | 21.9 | 21.0         | 0.90               |
| 800                            | 22.5                                             | 20.0 | 21.8 | 22.1 | 23.0 | 22.0         | 1.02               |
| 1000                           | 22.9                                             | 20.5 | 22.3 | 22.3 | 23.3 | 22.4         | 0.97               |
| 1250                           | 21.1                                             | 18.4 | 21.4 | 20.1 | 21.9 | 20.8         | 1.25               |
| 1600                           | 18.3                                             | 16.3 | 18.4 | 17.2 | 19.1 | 18.0         | 0.98               |
| 2000                           | 15.0                                             | 13.4 | 15.7 | 14.0 | 16.0 | 14.9         | 0.98               |
| 2500                           | 14.4                                             | 11.5 | 14.7 | 12.3 | 15.0 | 13.8         | 1.44               |
| 3150                           | 13.8                                             | 11.4 | 14.2 | 11.4 | 14.0 | 13.1         | 1.30               |

**Table 4**  
**Test 1**  
**Reverberation Times – Receiving Room**

| 1/3 Octave Band Frequency (Hz) | Sound Pressure Level at Microphone Position (dB) |      |      |      |      |      | Average (dB) | Standard Deviation |
|--------------------------------|--------------------------------------------------|------|------|------|------|------|--------------|--------------------|
|                                | 1                                                | 2    | 3    | 4    | 5    | 6    |              |                    |
| 100                            | 0.84                                             | 0.49 | 0.69 | 0.79 | 0.41 | 0.53 | 0.63         | 0.15               |
| 125                            | 0.79                                             | 0.87 | 0.83 | 0.83 | 0.77 | 0.83 | 0.82         | 0.03               |
| 160                            | 1.05                                             | 1.11 | 0.96 | 1.00 | 1.05 | 1.07 | 1.04         | 0.04               |
| 200                            | 1.36                                             | 1.58 | 1.42 | 1.50 | 1.56 | 1.46 | 1.48         | 0.07               |
| 250                            | 1.63                                             | 1.77 | 1.37 | 1.61 | 1.56 | 2.03 | 1.66         | 0.20               |
| 315                            | 1.56                                             | 1.70 | 1.52 | 1.50 | 1.53 | 1.43 | 1.54         | 0.08               |
| 400                            | 1.52                                             | 1.60 | 1.51 | 1.60 | 1.52 | 1.56 | 1.55         | 0.03               |
| 500                            | 1.44                                             | 1.38 | 1.38 | 1.34 | 1.63 | 1.51 | 1.45         | 0.09               |
| 630                            | 1.59                                             | 1.64 | 1.67 | 1.58 | 1.62 | 1.78 | 1.65         | 0.06               |
| 800                            | 2.05                                             | 2.00 | 1.83 | 1.88 | 1.98 | 1.95 | 1.95         | 0.07               |
| 1000                           | 1.92                                             | 1.88 | 1.78 | 1.98 | 1.83 | 1.98 | 1.90         | 0.07               |
| 1250                           | 1.84                                             | 1.78 | 1.95 | 1.89 | 1.81 | 1.86 | 1.86         | 0.05               |
| 1600                           | 1.63                                             | 1.60 | 1.69 | 1.67 | 1.67 | 1.66 | 1.65         | 0.03               |
| 2000                           | 1.31                                             | 1.37 | 1.42 | 1.36 | 1.43 | 1.41 | 1.38         | 0.04               |
| 2500                           | 1.44                                             | 1.46 | 1.50 | 1.54 | 1.64 | 1.51 | 1.52         | 0.06               |
| 3150                           | 1.43                                             | 1.50 | 1.52 | 1.55 | 1.58 | 1.52 | 1.52         | 0.04               |



**Table 5  
Test 2  
Sound Pressure Levels – Source Room**

| 1/3 Octave Band Frequency (Hz) | Sound Pressure Level at Microphone Position (dB) |       |       |       |       |       |       |       |       |       |       |       | Average (dB) | Standard Deviation |
|--------------------------------|--------------------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------------|--------------------|
|                                | 1                                                | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | 11    | 12    |              |                    |
| 100                            | 94.6                                             | 98.9  | 92.8  | 93.4  | 99.5  | 99.6  | 93.3  | 92.5  | 98.2  | 94.6  | 94.5  | 94.4  | 96.3         | 2.72               |
| 125                            | 111.9                                            | 110.9 | 112.5 | 109.9 | 107.8 | 110.3 | 112.6 | 111.0 | 107.5 | 110.3 | 110.9 | 110.4 | 110.8        | 1.54               |
| 160                            | 109.1                                            | 105.6 | 108.8 | 109.8 | 107.0 | 106.9 | 110.0 | 107.2 | 105.9 | 103.6 | 108.4 | 108.6 | 107.9        | 1.85               |
| 200                            | 109.8                                            | 108.6 | 109.3 | 110.6 | 108.6 | 106.8 | 108.6 | 106.8 | 106.8 | 106.0 | 110.1 | 110.4 | 108.8        | 1.55               |
| 250                            | 109.6                                            | 107.1 | 110.7 | 109.4 | 105.2 | 107.8 | 110.9 | 106.7 | 105.0 | 108.2 | 110.8 | 106.6 | 108.6        | 2.06               |
| 315                            | 108.0                                            | 106.0 | 109.3 | 109.3 | 106.3 | 106.2 | 108.2 | 106.7 | 107.6 | 106.9 | 108.3 | 105.4 | 107.5        | 1.24               |
| 400                            | 104.8                                            | 104.2 | 106.0 | 104.9 | 102.2 | 104.0 | 104.3 | 103.9 | 103.3 | 102.8 | 104.7 | 103.5 | 104.2        | 0.97               |
| 500                            | 104.3                                            | 104.4 | 105.9 | 103.9 | 103.4 | 104.6 | 104.8 | 104.5 | 105.1 | 103.6 | 105.1 | 103.2 | 104.5        | 0.75               |
| 630                            | 106.4                                            | 104.3 | 104.0 | 105.0 | 104.2 | 104.6 | 104.7 | 106.1 | 104.1 | 103.4 | 105.1 | 103.1 | 104.7        | 0.93               |
| 800                            | 105.8                                            | 106.0 | 106.1 | 106.3 | 105.1 | 105.4 | 106.6 | 105.4 | 105.5 | 105.8 | 106.7 | 105.1 | 105.8        | 0.53               |
| 1000                           | 106.5                                            | 105.8 | 106.2 | 106.2 | 106.3 | 106.7 | 107.5 | 106.4 | 106.8 | 106.5 | 106.9 | 105.7 | 106.5        | 0.46               |
| 1250                           | 108.9                                            | 109.1 | 109.3 | 109.2 | 108.1 | 108.9 | 108.1 | 109.0 | 108.6 | 108.2 | 108.1 | 107.6 | 108.6        | 0.52               |
| 1600                           | 109.2                                            | 109.9 | 109.7 | 109.7 | 109.0 | 109.6 | 109.1 | 109.1 | 108.3 | 109.0 | 109.5 | 109.1 | 109.3        | 0.41               |
| 2000                           | 107.5                                            | 107.5 | 107.2 | 106.8 | 106.8 | 106.5 | 107.4 | 106.4 | 107.5 | 106.8 | 107.1 | 107.6 | 107.1        | 0.40               |
| 2500                           | 106.5                                            | 106.7 | 106.0 | 106.0 | 105.9 | 106.5 | 106.1 | 106.1 | 106.1 | 106.6 | 105.9 | 107.0 | 106.3        | 0.33               |
| 3150                           | 104.0                                            | 105.1 | 104.5 | 105.0 | 104.3 | 104.9 | 104.7 | 104.9 | 104.9 | 104.8 | 105.2 | 104.8 | 104.8        | 0.31               |

**Table 6  
Test 2  
Sound Pressure Levels – Receiving Room**

| 1/3 Octave Band Frequency (Hz) | Sound Pressure Level at Microphone Position (dB) |      |      |      |      |      |      |      |      |      |      |      | Average (dB) | Standard Deviation |
|--------------------------------|--------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|--------------|--------------------|
|                                | 1                                                | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   |              |                    |
| 100                            | 59.5                                             | 59.2 | 68.6 | 62.6 | 60.1 | 58.4 | 60.7 | 53.4 | 64.0 | 59.3 | 62.1 | 49.2 | 62.0         | 5.21               |
| 125                            | 54.8                                             | 56.3 | 55.1 | 56.1 | 59.4 | 52.2 | 55.7 | 58.4 | 54.3 | 56.0 | 53.5 | 55.7 | 56.0         | 1.91               |
| 160                            | 59.6                                             | 59.9 | 55.8 | 60.7 | 59.5 | 58.5 | 60.0 | 59.7 | 58.4 | 62.1 | 61.6 | 60.5 | 59.9         | 1.59               |
| 200                            | 65.9                                             | 62.6 | 62.1 | 61.3 | 63.9 | 63.0 | 65.2 | 64.7 | 65.0 | 65.7 | 63.0 | 65.6 | 64.2         | 1.51               |
| 250                            | 60.2                                             | 60.8 | 62.2 | 57.6 | 59.4 | 61.8 | 61.4 | 61.3 | 59.8 | 58.9 | 60.4 | 59.2 | 60.4         | 1.29               |
| 315                            | 58.6                                             | 59.6 | 60.4 | 56.8 | 58.1 | 58.1 | 57.5 | 59.5 | 57.9 | 56.6 | 57.2 | 58.8 | 58.4         | 1.13               |
| 400                            | 54.6                                             | 55.2 | 55.2 | 53.9 | 54.5 | 54.4 | 53.4 | 53.3 | 53.6 | 52.7 | 53.3 | 53.5 | 54.0         | 0.76               |
| 500                            | 51.9                                             | 51.6 | 51.1 | 51.4 | 52.2 | 51.1 | 50.3 | 49.2 | 50.7 | 48.0 | 50.6 | 49.5 | 50.8         | 1.17               |
| 630                            | 46.1                                             | 46.3 | 45.6 | 45.1 | 45.2 | 44.8 | 44.4 | 46.0 | 45.8 | 44.8 | 46.3 | 44.6 | 45.5         | 0.65               |
| 800                            | 46.5                                             | 45.6 | 44.5 | 44.4 | 43.5 | 44.1 | 42.9 | 44.4 | 44.5 | 43.4 | 43.8 | 43.7 | 44.4         | 0.95               |
| 1000                           | 43.9                                             | 43.2 | 42.1 | 42.3 | 42.7 | 42.8 | 42.3 | 42.2 | 41.6 | 41.6 | 41.9 | 42.7 | 42.5         | 0.64               |
| 1250                           | 44.3                                             | 44.4 | 44.5 | 43.9 | 43.8 | 44.3 | 43.7 | 43.1 | 43.5 | 42.5 | 42.9 | 43.4 | 43.7         | 0.60               |
| 1600                           | 46.1                                             | 46.4 | 46.0 | 46.0 | 45.9 | 45.9 | 46.2 | 45.8 | 45.5 | 45.8 | 45.4 | 45.2 | 45.9         | 0.31               |
| 2000                           | 45.9                                             | 45.6 | 45.7 | 44.5 | 45.2 | 45.3 | 45.2 | 44.5 | 44.6 | 43.8 | 44.3 | 44.0 | 44.9         | 0.67               |
| 2500                           | 48.4                                             | 42.3 | 43.0 | 42.5 | 41.8 | 43.2 | 43.0 | 41.8 | 42.3 | 42.7 | 42.4 | 42.6 | 43.5         | 1.75               |
| 3150                           | 37.4                                             | 36.8 | 36.2 | 36.3 | 35.8 | 36.9 | 36.3 | 35.8 | 36.7 | 36.4 | 35.6 | 36.9 | 36.5         | 0.50               |

**Table 7  
Test 2  
Sound Pressure Levels – Background Levels Receiving Room**

| 1/3 Octave Band Frequency (Hz) | Sound Pressure Level at Microphone Position (dB) |      |      |      |      | Average (dB) | Standard Deviation |
|--------------------------------|--------------------------------------------------|------|------|------|------|--------------|--------------------|
|                                | 1                                                | 2    | 3    | 4    | 5    |              |                    |
| 100                            | 34.4                                             | 30.3 | 34.8 | 28.3 | 28.0 | 32.1         | 3.07               |
| 125                            | 28.5                                             | 34.3 | 29.7 | 29.7 | 31.1 | 31.2         | 2.08               |
| 160                            | 27.7                                             | 29.0 | 28.5 | 27.8 | 30.9 | 29.0         | 1.18               |
| 200                            | 26.7                                             | 28.5 | 27.7 | 27.4 | 27.6 | 27.6         | 0.56               |
| 250                            | 25.6                                             | 25.1 | 26.5 | 27.8 | 27.0 | 26.5         | 0.98               |
| 315                            | 23.4                                             | 21.5 | 24.2 | 24.2 | 25.5 | 24.0         | 1.32               |
| 400                            | 23.2                                             | 23.7 | 24.9 | 24.9 | 24.6 | 24.3         | 0.69               |
| 500                            | 23.9                                             | 22.4 | 24.6 | 23.8 | 24.5 | 23.9         | 0.81               |
| 630                            | 22.8                                             | 20.7 | 23.9 | 22.6 | 24.1 | 23.0         | 1.21               |
| 800                            | 21.2                                             | 19.7 | 21.5 | 22.1 | 24.7 | 22.1         | 1.65               |
| 1000                           | 23.5                                             | 21.3 | 21.6 | 23.4 | 25.6 | 23.4         | 1.56               |
| 1250                           | 23.3                                             | 20.7 | 21.7 | 23.2 | 25.1 | 23.1         | 1.53               |
| 1600                           | 22.1                                             | 19.9 | 20.9 | 22.4 | 24.5 | 22.2         | 1.58               |
| 2000                           | 17.9                                             | 15.3 | 16.5 | 18.6 | 21.1 | 18.3         | 2.01               |
| 2500                           | 15.1                                             | 12.7 | 13.4 | 15.5 | 17.6 | 15.2         | 1.77               |
| 3150                           | 13.2                                             | 11.5 | 11.6 | 14.3 | 15.0 | 13.4         | 1.44               |

**Table 8  
Test 2  
Reverberation Times – Receiving Room**

| 1/3 Octave Band Frequency (Hz) | Sound Pressure Level at Microphone Position (dB) |      |      |      |      |      | Average (dB) | Standard Deviation |
|--------------------------------|--------------------------------------------------|------|------|------|------|------|--------------|--------------------|
|                                | 1                                                | 2    | 3    | 4    | 5    | 6    |              |                    |
| 100                            | 0.96                                             | 1.08 | 1.04 | 1.10 | 0.92 | 0.93 | 1.01         | 0.07               |
| 125                            | 1.11                                             | 1.02 | 1.07 | 1.04 | 1.12 | 1.05 | 1.07         | 0.03               |
| 160                            | 0.98                                             | 1.01 | 1.02 | 0.79 | 0.89 | 1.00 | 0.95         | 0.08               |
| 200                            | 1.04                                             | 1.07 | 1.11 | 1.27 | 1.35 | 1.31 | 1.19         | 0.12               |
| 250                            | 1.38                                             | 1.14 | 1.29 | 1.23 | 1.30 | 1.24 | 1.26         | 0.07               |
| 315                            | 1.38                                             | 1.23 | 1.29 | 1.33 | 1.18 | 1.24 | 1.28         | 0.06               |
| 400                            | 1.53                                             | 1.65 | 1.72 | 1.60 | 1.51 | 1.73 | 1.62         | 0.08               |
| 500                            | 1.63                                             | 1.73 | 1.67 | 1.71 | 1.73 | 1.73 | 1.70         | 0.03               |
| 630                            | 1.98                                             | 1.84 | 1.91 | 1.93 | 1.87 | 1.92 | 1.91         | 0.04               |
| 800                            | 1.93                                             | 1.97 | 2.03 | 1.90 | 2.01 | 1.96 | 1.97         | 0.04               |
| 1000                           | 1.95                                             | 1.97 | 1.97 | 1.90 | 1.99 | 1.97 | 1.96         | 0.02               |
| 1250                           | 1.89                                             | 1.86 | 1.87 | 1.87 | 1.91 | 1.84 | 1.87         | 0.02               |
| 1600                           | 1.75                                             | 1.60 | 1.64 | 1.56 | 1.65 | 1.56 | 1.63         | 0.06               |
| 2000                           | 1.47                                             | 1.46 | 1.42 | 1.38 | 1.46 | 1.39 | 1.43         | 0.03               |
| 2500                           | 1.38                                             | 1.43 | 1.52 | 1.38 | 1.39 | 1.40 | 1.42         | 0.04               |
| 3150                           | 1.42                                             | 1.42 | 1.48 | 1.42 | 1.44 | 1.41 | 1.43         | 0.02               |

**Table 9  
Test 3  
Sound Pressure Levels – Receiving Room**

| 1/3 Octave Band Frequency (Hz) | Sound Pressure Level at Microphone Position (dB) |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Average (dB) | Standard Deviation |
|--------------------------------|--------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--------------|--------------------|
|                                | 1                                                | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20   |              |                    |
| 100                            | 50.7                                             | 47.2 | 51.2 | 52.5 | 48.9 | 47.5 | 48.4 | 46.2 | 50.4 | 50.6 | 52.6 | 51.1 | 53.0 | 53.6 | 54.2 | 52.9 | 51.8 | 52.0 | 53.8 | 51.9 | 51.5         | 2.30               |
| 125                            | 51.6                                             | 53.0 | 54.4 | 54.5 | 56.1 | 56.1 | 52.8 | 53.2 | 53.1 | 54.6 | 52.2 | 53.7 | 56.4 | 54.1 | 56.1 | 54.5 | 52.9 | 53.0 | 51.6 | 50.9 | 54.0         | 1.59               |
| 160                            | 55.0                                             | 52.8 | 54.7 | 54.1 | 54.2 | 55.5 | 51.5 | 53.7 | 53.1 | 52.1 | 52.0 | 54.2 | 51.4 | 54.0 | 51.5 | 49.7 | 50.1 | 48.8 | 55.8 | 52.2 | 53.2         | 1.94               |
| 200                            | 52.7                                             | 52.0 | 51.3 | 53.9 | 48.8 | 50.9 | 51.6 | 51.5 | 53.5 | 52.9 | 52.3 | 53.1 | 50.5 | 52.4 | 49.1 | 50.2 | 47.9 | 48.4 | 51.8 | 49.6 | 51.5         | 1.74               |
| 250                            | 50.4                                             | 50.4 | 49.6 | 52.3 | 49.2 | 47.7 | 49.3 | 48.4 | 50.9 | 50.8 | 51.3 | 51.8 | 50.1 | 49.5 | 50.3 | 50.9 | 49.0 | 48.7 | 50.0 | 49.7 | 50.2         | 1.12               |
| 315                            | 54.7                                             | 54.6 | 52.8 | 53.9 | 48.0 | 47.1 | 47.4 | 46.6 | 49.8 | 51.8 | 54.7 | 51.2 | 50.8 | 52.0 | 51.4 | 51.1 | 50.3 | 48.9 | 51.8 | 50.7 | 51.6         | 2.50               |
| 400                            | 49.1                                             | 49.7 | 50.0 | 49.5 | 44.8 | 45.4 | 44.4 | 44.5 | 48.7 | 47.8 | 49.2 | 47.8 | 49.7 | 51.5 | 49.0 | 50.3 | 48.5 | 47.2 | 49.3 | 48.3 | 48.6         | 2.00               |
| 500                            | 45.9                                             | 45.6 | 45.7 | 46.7 | 39.0 | 38.5 | 37.9 | 38.0 | 44.4 | 43.0 | 44.6 | 43.1 | 45.6 | 45.7 | 45.0 | 44.8 | 41.9 | 41.6 | 42.4 | 43.0 | 43.9         | 2.85               |
| 630                            | 40.2                                             | 39.2 | 38.9 | 40.5 | 37.3 | 36.2 | 34.6 | 35.5 | 38.4 | 38.5 | 38.0 | 37.7 | 41.3 | 42.1 | 39.9 | 40.7 | 37.0 | 37.3 | 38.3 | 37.8 | 38.9         | 1.93               |
| 800                            | 37.6                                             | 36.7 | 36.8 | 36.9 | 35.1 | 35.5 | 35.0 | 35.2 | 36.5 | 36.5 | 35.7 | 35.7 | 40.1 | 40.5 | 39.4 | 40.3 | 35.3 | 36.1 | 35.8 | 36.1 | 37.2         | 1.80               |
| 1000                           | 36.0                                             | 36.2 | 35.8 | 36.3 | 32.4 | 32.7 | 32.9 | 33.5 | 34.8 | 33.6 | 33.5 | 33.2 | 37.0 | 36.0 | 36.3 | 36.5 | 34.5 | 34.9 | 35.0 | 33.8 | 35.0         | 1.42               |
| 1250                           | 33.2                                             | 34.2 | 38.2 | 45.1 | 31.1 | 30.7 | 30.9 | 31.7 | 31.3 | 32.0 | 31.1 | 31.0 | 34.1 | 33.3 | 32.8 | 33.5 | 32.6 | 32.6 | 33.1 | 33.0 | 35.5         | 3.88               |
| 1600                           | 32.1                                             | 31.5 | 35.1 | 41.2 | 30.0 | 29.1 | 29.3 | 30.6 | 30.6 | 30.5 | 30.0 | 30.4 | 32.8 | 32.7 | 32.1 | 33.0 | 30.3 | 30.5 | 31.3 | 30.6 | 33.0         | 2.90               |
| 2000                           | 29.6                                             | 29.7 | 29.3 | 29.7 | 28.6 | 28.0 | 27.9 | 29.7 | 29.2 | 28.9 | 28.4 | 29.5 | 31.8 | 31.3 | 30.6 | 31.4 | 28.9 | 29.6 | 29.8 | 29.2 | 29.7         | 1.05               |
| 2500                           | 29.0                                             | 28.7 | 29.2 | 29.8 | 29.2 | 28.2 | 27.7 | 29.3 | 28.1 | 28.1 | 27.9 | 27.9 | 30.3 | 30.7 | 30.2 | 30.9 | 28.7 | 28.8 | 29.3 | 28.7 | 29.1         | 0.92               |
| 3150                           | 25.5                                             | 25.0 | 25.4 | 26.1 | 25.8 | 24.6 | 24.6 | 26.5 | 24.4 | 24.8 | 24.3 | 25.0 | 26.5 | 26.7 | 26.9 | 26.3 | 24.3 | 25.1 | 25.0 | 25.0 | 25.5         | 0.83               |

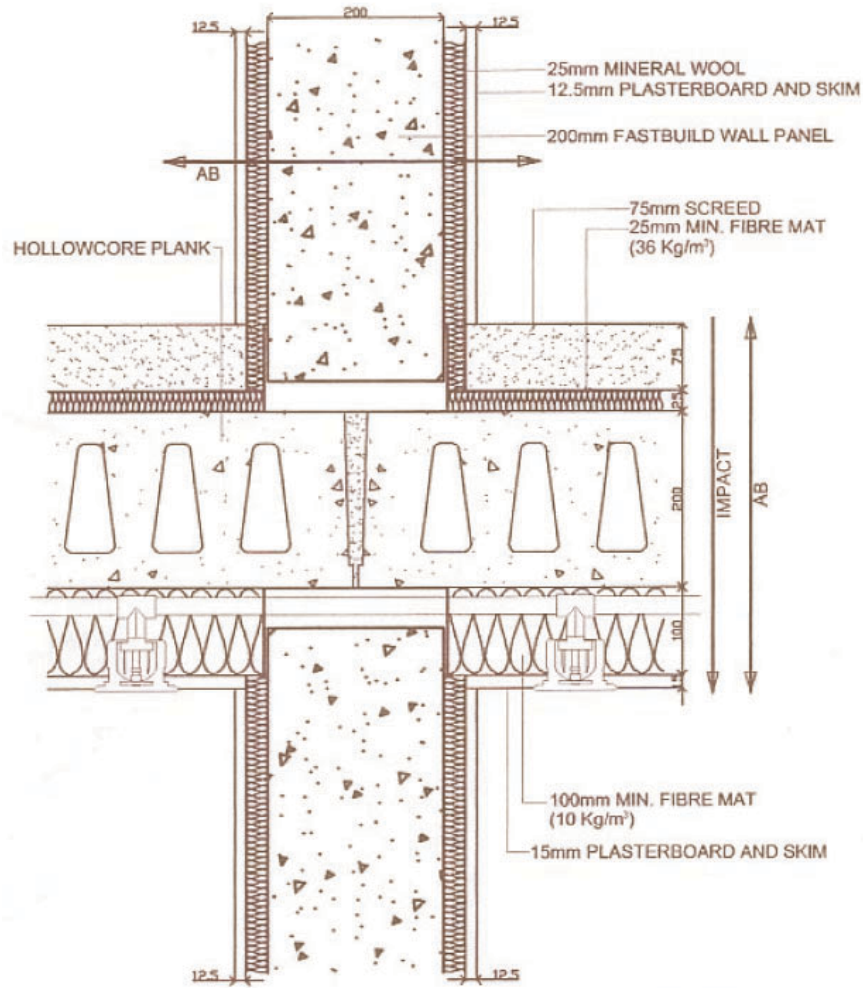
**Table 10  
Test 3  
Sound Pressure Levels – Background Levels Receiving Room**

| 1/3 Octave Band Frequency (Hz) | Sound Pressure Level at Microphone Position (dB) |      |      |      |      | Average (dB) | Standard Deviation |
|--------------------------------|--------------------------------------------------|------|------|------|------|--------------|--------------------|
|                                | 1                                                | 2    | 3    | 4    | 5    |              |                    |
| 100                            | 23.2                                             | 23.9 | 33.4 | 28.6 | 30.2 | 29.5         | 4.16               |
| 125                            | 31.4                                             | 24.0 | 28.5 | 23.3 | 27.9 | 28.0         | 3.15               |
| 160                            | 27.9                                             | 22.1 | 24.1 | 21.4 | 25.6 | 24.9         | 2.47               |
| 200                            | 27.8                                             | 24.0 | 24.7 | 23.4 | 26.3 | 25.5         | 1.63               |
| 250                            | 26.5                                             | 20.7 | 25.2 | 23.7 | 27.5 | 25.3         | 2.44               |
| 315                            | 23.0                                             | 19.2 | 19.9 | 20.7 | 21.0 | 21.0         | 1.28               |
| 400                            | 23.2                                             | 18.2 | 18.2 | 18.0 | 19.5 | 19.9         | 2.01               |
| 500                            | 21.5                                             | 17.7 | 18.1 | 17.4 | 18.7 | 19.0         | 1.48               |
| 630                            | 22.4                                             | 18.0 | 18.8 | 18.1 | 19.7 | 19.8         | 1.64               |
| 800                            | 21.9                                             | 19.1 | 19.5 | 20.5 | 21.2 | 20.6         | 1.04               |
| 1000                           | 22.9                                             | 20.0 | 20.6 | 21.5 | 22.2 | 21.6         | 1.05               |
| 1250                           | 24.2                                             | 21.4 | 22.3 | 21.7 | 23.0 | 22.7         | 1.00               |
| 1600                           | 24.1                                             | 21.4 | 22.7 | 21.3 | 22.5 | 22.5         | 1.04               |
| 2000                           | 21.2                                             | 18.6 | 19.1 | 18.4 | 19.4 | 19.5         | 1.01               |
| 2500                           | 18.4                                             | 16.0 | 16.8 | 16.0 | 17.1 | 16.9         | 0.87               |
| 3150                           | 16.4                                             | 14.3 | 14.5 | 14.2 | 15.4 | 15.0         | 0.81               |

**Table 11**  
**Test 3**  
**Reverberation Times – Receiving Room**

| 1/3 Octave Band Frequency (Hz) | Sound Pressure Level at Microphone Position (dB) |      |      |      |      |      | Average (dB) | Standard Deviation |
|--------------------------------|--------------------------------------------------|------|------|------|------|------|--------------|--------------------|
|                                | 1                                                | 2    | 3    | 4    | 5    | 6    |              |                    |
| 100                            | 1.00                                             | 0.74 | 0.95 | 1.09 | 1.00 | 1.04 | 0.97         | 0.11               |
| 125                            | 1.38                                             | 1.32 | 1.15 | 1.32 | 1.06 | 1.24 | 1.25         | 0.11               |
| 160                            | 1.05                                             | 0.98 | 0.81 | 1.16 | 1.08 | 1.06 | 1.02         | 0.10               |
| 200                            | 1.07                                             | 1.09 | 1.24 | 1.16 | 1.16 | 1.01 | 1.12         | 0.07               |
| 250                            | 0.98                                             | 1.16 | 1.22 | 1.06 | 1.15 | 1.23 | 1.13         | 0.08               |
| 315                            | 1.00                                             | 1.01 | 0.99 | 1.15 | 1.06 | 1.01 | 1.04         | 0.05               |
| 400                            | 1.11                                             | 0.92 | 1.08 | 1.29 | 1.12 | 1.03 | 1.09         | 0.11               |
| 500                            | 1.22                                             | 1.34 | 1.24 | 1.26 | 1.27 | 1.24 | 1.26         | 0.03               |
| 630                            | 1.47                                             | 1.66 | 1.53 | 1.56 | 1.49 | 1.54 | 1.54         | 0.06               |
| 800                            | 1.63                                             | 1.73 | 1.68 | 1.77 | 1.66 | 1.59 | 1.68         | 0.06               |
| 1000                           | 1.72                                             | 1.72 | 1.77 | 1.84 | 1.83 | 1.76 | 1.77         | 0.04               |
| 1250                           | 1.79                                             | 1.76 | 1.70 | 1.82 | 1.76 | 1.95 | 1.80         | 0.07               |
| 1600                           | 1.56                                             | 1.68 | 1.61 | 1.63 | 1.62 | 1.74 | 1.64         | 0.05               |
| 2000                           | 1.32                                             | 1.50 | 1.47 | 1.50 | 1.47 | 1.46 | 1.45         | 0.06               |
| 2500                           | 1.32                                             | 1.40 | 1.40 | 1.39 | 1.42 | 1.36 | 1.38         | 0.03               |
| 3150                           | 1.36                                             | 1.41 | 1.42 | 1.43 | 1.46 | 1.37 | 1.41         | 0.03               |

# FIGURES



Test Report No. SW402.06

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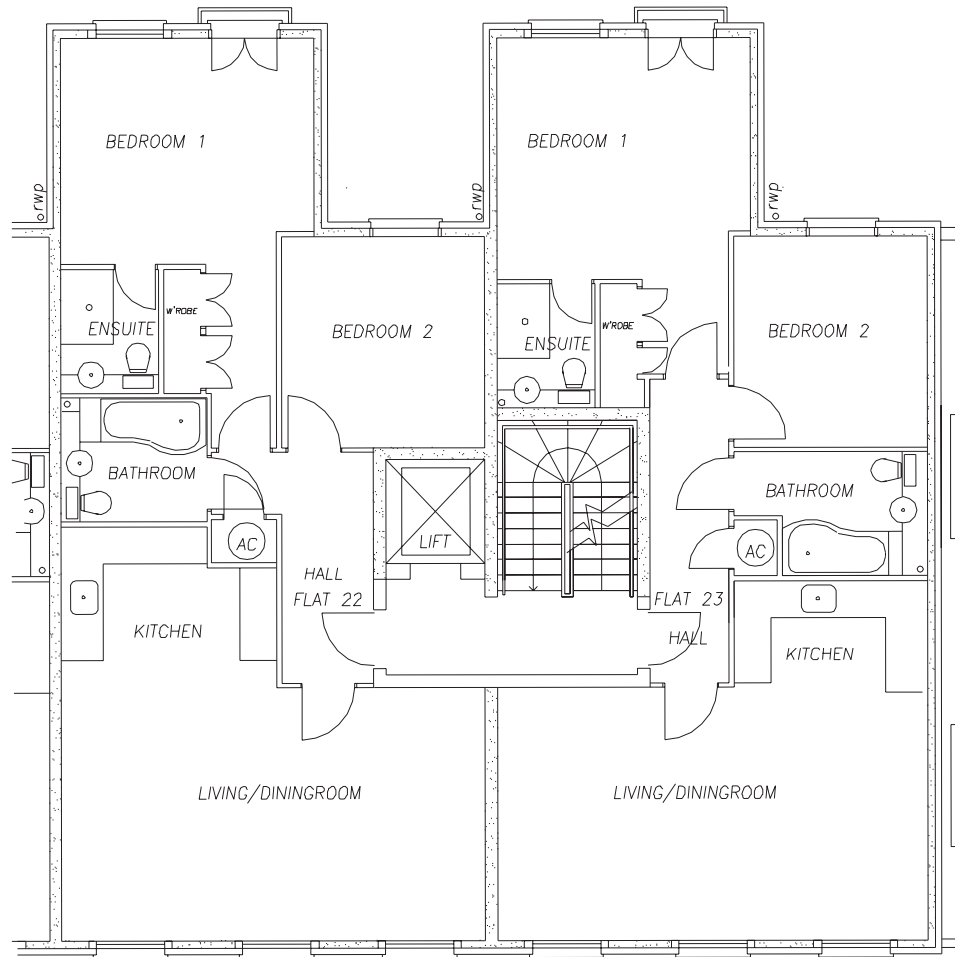
|                                                                                   |                        |                           |           |
|-----------------------------------------------------------------------------------|------------------------|---------------------------|-----------|
| DWG. N°:<br><b>Figure 1</b>                                                       | SCALE:<br>NOT TO SCALE | DATE DRAWN:<br>22/05/2007 | DRAWN BY: |
| TITLE:<br>Detail and Dimensions of Floor and Wall Construction<br>Grosvenor House |                        |                           |           |



Test Report  
Laboratory Number:  
SW402.06

Queens Road, Penkull,  
Stoke-on-Trent, Staffs. ST4 7LQ  
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Test Report No. SW402.06

**CERAM**  
BUILDING TECHNOLOGY

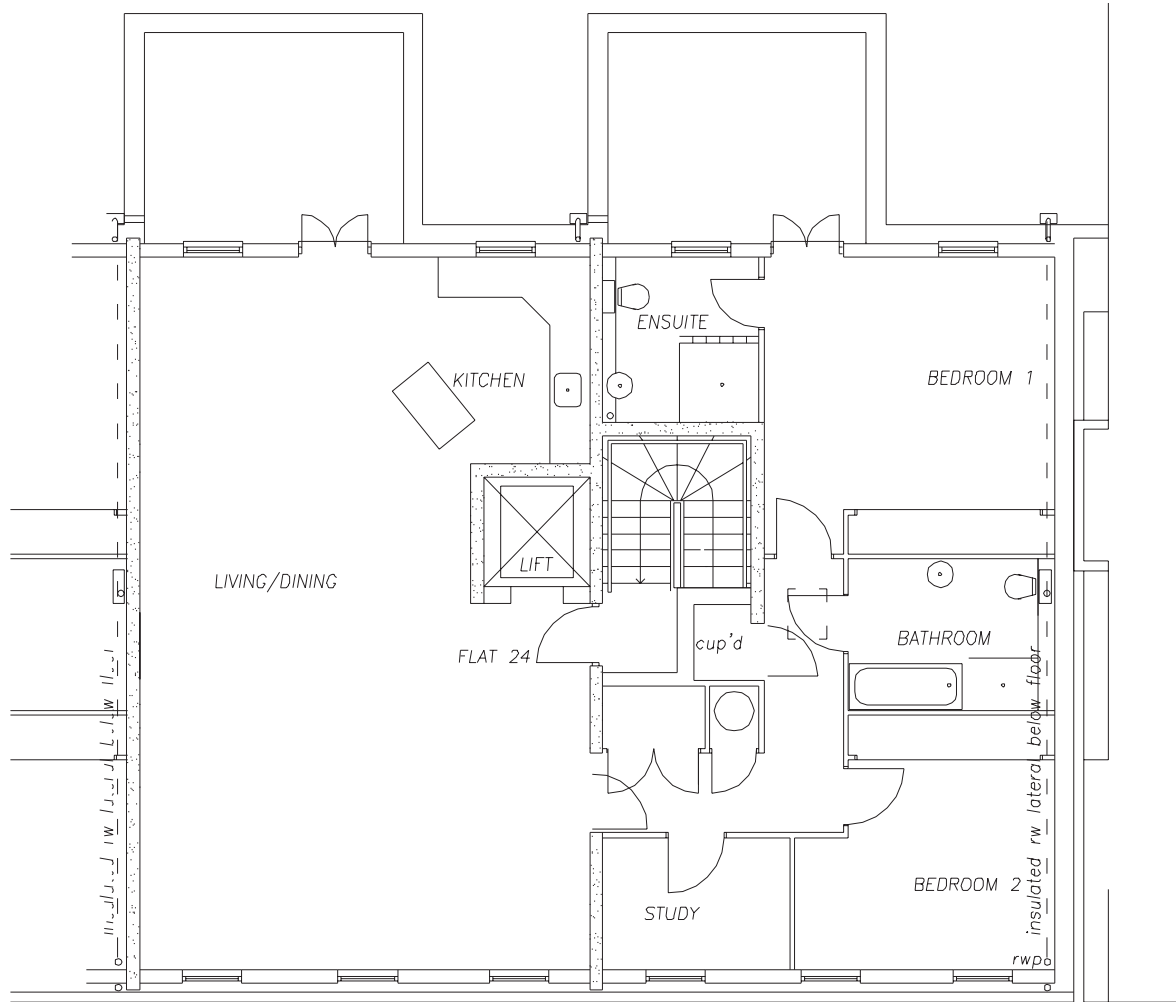
|                                                                    |                        |                           |           |
|--------------------------------------------------------------------|------------------------|---------------------------|-----------|
| DWG. N°:<br><b>Figure 2</b>                                        | SCALE:<br>NOT TO SCALE | DATE DRAWN:<br>22/05/2007 | DRAWN BY: |
| TITLE:<br>Detail of Flats 22 and 23, Second Floor, Grosvenor House |                        |                           |           |



Test Report  
Laboratory Number:  
SW402.06

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Test Report No. SW402.06



|                                                         |                        |                           |           |
|---------------------------------------------------------|------------------------|---------------------------|-----------|
| DWG. N°:<br><b>Figure 3</b>                             | SCALE:<br>NOT TO SCALE | DATE DRAWN:<br>22/05/2007 | DRAWN BY: |
| TITLE:<br>Detail of Flat 24, Penthouse, Grosvenor House |                        |                           |           |



Test Report  
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# PLATES



Plate 1 – Grosvenor House: Front Elevation



Plate 2 – Grosvenor House: Rear Elevation

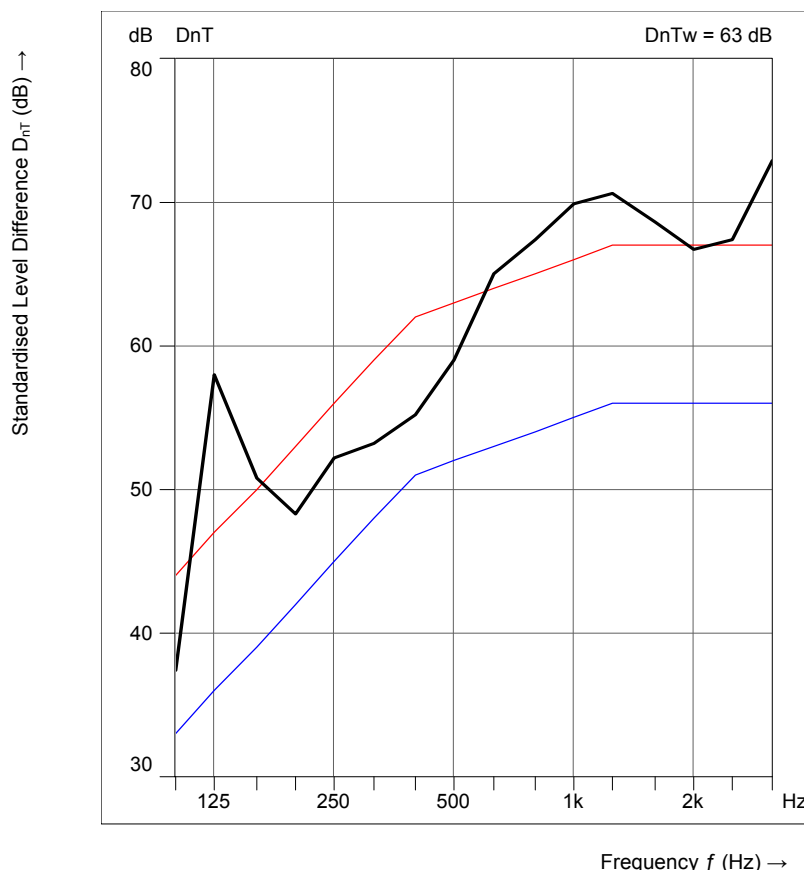
# APPENDIX

**Standardised Level Difference according to ISO 140-4**  
**Field measurements of airborne sound insulation between rooms**



|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                     |                                                 |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------------------|
| <b>Project No:</b>       | SW402.06                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Date of Test:</b>                | 17 Nov 2006                                     |
| <b>Client:</b>           | The Concrete Centre                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>Building Element Under Test:</b> | Separating floor                                |
| <b>Location of Test:</b> | Grosvenor House, 13-19 Evesham Road, Cheltenham, Gloucestershire                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>Transmission Path:</b>           | Bedroom of Flat 23 to Bedroom of Penthouse Flat |
| <b>Description:</b>      | <p>Separating wall – 200mm thick Structerm Fastbuild solid concrete wall panels with 25mm thick mineral wool and 12.5mm plasterboard with plaster skim on both sides. Mineral wool layer continues to mineral wool mat laid on floor planks.</p> <p>Separating floor – 200mm thick Hollowcore concrete plank floor running parallel to separating wall and supported on separating wall panel. Upper surface of separating floor has 75mm concrete screed laid on 25mm thick mineral fibre mat (36kgm<sup>-3</sup>). Screed is isolated from separating wall panel by the mineral wool layer. Underside of separating floor has 100mm thick mineral fibre mat (10kgm<sup>-3</sup>) above 15mm thick plasterboard with plaster skim.</p> <p>Total thickness of separating wall nominally 275mm<br/>                 Total thickness of separating floor nominally 415mm</p> |                                     |                                                 |

| 1/3 Octave Band Centre Frequency (f) Hz | D <sub>nT</sub> 1/3 Octave dB |
|-----------------------------------------|-------------------------------|
| 50                                      |                               |
| 63                                      |                               |
| 80                                      |                               |
| 100                                     | 37.4                          |
| 125                                     | 58.0                          |
| 160                                     | 50.8                          |
| 200                                     | 48.3                          |
| 250                                     | 52.2                          |
| 315                                     | 53.2                          |
| 400                                     | 55.2                          |
| 500                                     | 59.0                          |
| 630                                     | 65.0                          |
| 800                                     | 67.4                          |
| 1000                                    | 69.9                          |
| 1250                                    | 70.6                          |
| 1600                                    | 68.6                          |
| 2000                                    | 66.7                          |
| 2500                                    | 67.4                          |
| 3150                                    | 72.9                          |
| 4000                                    |                               |
| 5000                                    |                               |



Rating according to ISO 717-1

**D<sub>nT,w</sub> (C; C<sub>tr</sub>) = 63 (-2; -8) dB**

Evaluation based on field measurement results obtained in 1/3 octave bands by an engineering method.

Note: Table 1a of Approved Document E of the Building Regulations 2000 states that, when tested in accordance with the methods stated in BS EN ISO 140-4 and BS EN ISO 717, a separating wall or floor in any purpose built dwelling house or flat shall achieve an airborne sound insulation figure of **not less than 45dB (D<sub>nT,w</sub> + C<sub>tr</sub>)**. The separating floor tested at the above location achieved a figure of **55dB (D<sub>nT,w</sub> + C<sub>tr</sub>)**. The separating floor tested at the above location **passes** the requirements of Approved Document E of the Building Regulations 2000.

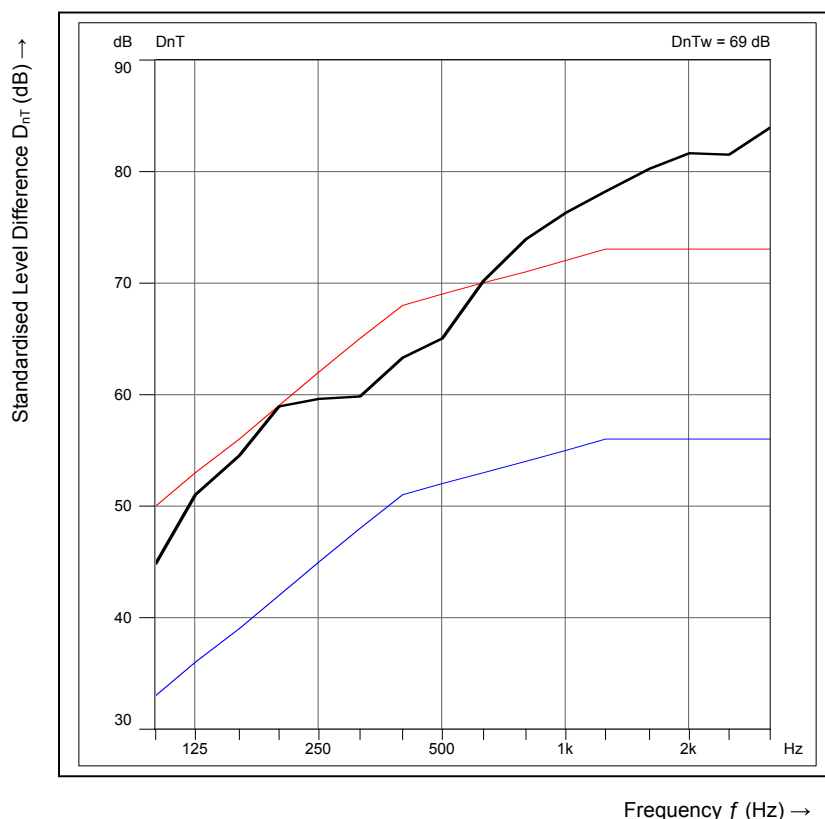
|                           |                 |                                |                           |
|---------------------------|-----------------|--------------------------------|---------------------------|
| <b>No of Test Report:</b> | AC040           | <b>Name of Test Institute:</b> | CERAM Building Technology |
| <b>Date of Issue:</b>     | 6 December 2006 | <b>Signature:</b>              |                           |

**Standardised Level Difference according to ISO 140-4**  
**Field measurements of airborne sound insulation between rooms**



|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                     |                                          |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|------------------------------------------|
| <b>Project No:</b>       | SW402.06                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Date of Test:</b>                | 17 Nov 2006                              |
| <b>Client:</b>           | The Concrete Centre                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>Building Element Under Test:</b> | Separating wall                          |
| <b>Location of Test:</b> | Grosvenor House, 13-19 Evesham Road, Cheltenham, Gloucestershire                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>Transmission Path:</b>           | Bedroom of Flat 23 to Bedroom of Flat 22 |
| <b>Description:</b>      | <p>Separating wall – 200mm thick Structherm Fastbuild solid concrete wall panels with 25mm thick mineral wool and 12.5mm plasterboard with plaster skim on both sides. Mineral wool layer continues to mineral wool mat laid on floor planks.</p> <p>Separating floor – 200mm thick Hollowcore concrete plank floor running parallel to separating wall and supported on separating wall panel. Upper surface of separating floor has 75mm concrete screed laid on 25mm thick mineral fibre mat (36kgm<sup>-3</sup>). Screed is isolated from separating wall panel by the mineral wool layer. Underside of separating floor has 100mm thick mineral fibre mat (10kgm<sup>-3</sup>) above 15mm thick plasterboard with plaster skim.</p> <p>Total thickness of separating wall nominally 275mm<br/>                 Total thickness of separating floor nominally 415mm</p> |                                     |                                          |

| 1/3 Octave Band Centre Frequency (f) Hz | D <sub>NT</sub> 1/3 Octave dB |
|-----------------------------------------|-------------------------------|
| 50                                      |                               |
| 63                                      |                               |
| 80                                      |                               |
| 100                                     | 44.8                          |
| 125                                     | 51.0                          |
| 160                                     | 54.5                          |
| 200                                     | 58.9                          |
| 250                                     | 59.6                          |
| 315                                     | 59.8                          |
| 400                                     | 63.3                          |
| 500                                     | 65.0                          |
| 630                                     | 70.2                          |
| 800                                     | 73.9                          |
| 1000                                    | 76.3                          |
| 1250                                    | 78.2                          |
| 1600                                    | 80.2                          |
| 2000                                    | 81.6                          |
| 2500                                    | 81.5                          |
| 3150                                    | 83.9                          |
| 4000                                    |                               |
| 5000                                    |                               |



Rating according to ISO 717-1

**D<sub>NT,w</sub> (C; C<sub>tr</sub>) = 69 (-1; -7) dB**

Evaluation based on field measurement results obtained in 1/3 octave bands by an engineering method.

Note: Table 1a of Approved Document E of the Building Regulations 2000 states that, when tested in accordance with the methods stated in BS EN ISO 140-4 and BS EN ISO 717, a separating wall or floor in any purpose built dwelling house or flat shall achieve an airborne sound insulation figure of **not less than 45dB (D<sub>NT,w</sub> + C<sub>tr</sub>)**. The separating wall tested at the above location achieved a figure of **62dB (D<sub>NT,w</sub> + C<sub>tr</sub>)**. The separating wall tested at the above location **passes** the requirements of Approved Document E of the Building Regulations 2000.

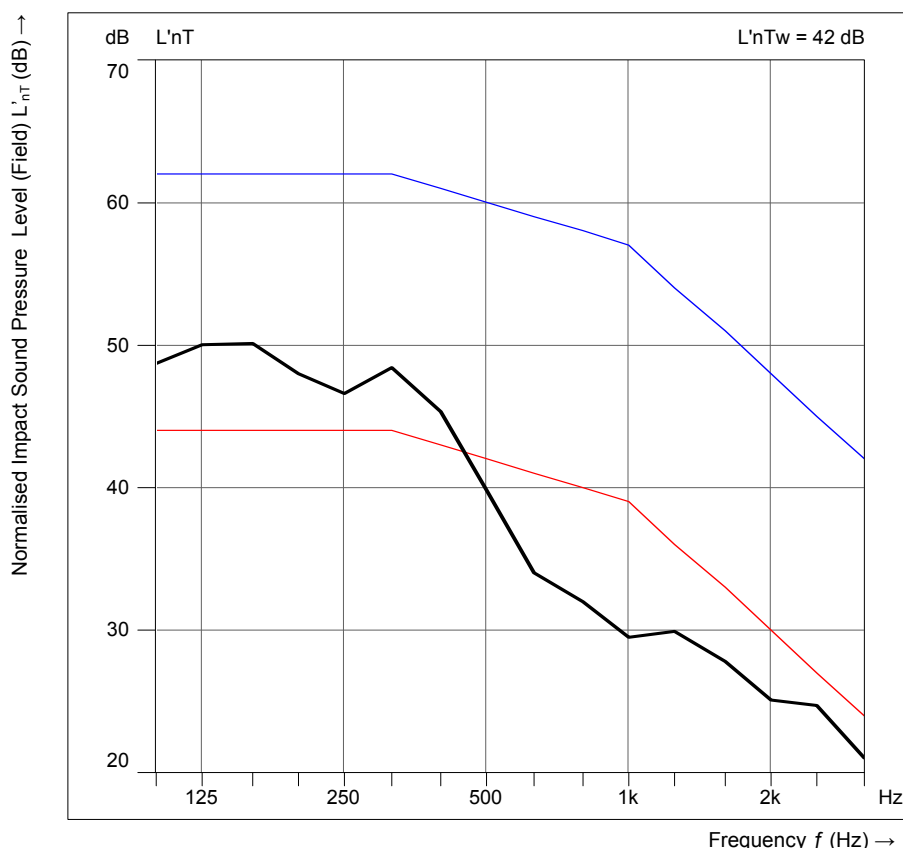
|                           |                 |                                |                           |
|---------------------------|-----------------|--------------------------------|---------------------------|
| <b>No of Test Report:</b> | AC039           | <b>Name of Test Institute:</b> | CERAM Building Technology |
| <b>Date of Issue:</b>     | 6 December 2006 | <b>Signature:</b>              |                           |

**Standardised Impact Sound Pressure Levels according to ISO 140-7**  
**Field measurements of impact sound insulation of floors**



|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                     |                                                      |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|------------------------------------------------------|
| <b>Project No:</b>       | SW402.06                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Date of Test:</b>                | 17 Nov 2006                                          |
| <b>Client:</b>           | The Concrete Centre                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>Building Element Under Test:</b> | Separating floor                                     |
| <b>Location of Test:</b> | Grosvenor House, 13-19 Evesham Road, Cheltenham, Gloucestershire                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>Transmission Path:</b>           | Bedroom of Flat 23 to Bedroom of Flat 24 (Penthouse) |
| <b>Description:</b>      | <p>Separating wall – 200mm thick Structherm Fastbuild solid concrete wall panels with 25mm thick mineral wool and 12.5mm plasterboard with plaster skim on both sides. Mineral wool layer continues to mineral wool mat laid on floor planks.</p> <p>Separating floor – 200mm thick Hollowcore concrete plank floor running parallel to separating wall and supported on separating wall panel. Upper surface of separating floor has 75mm concrete screed laid on 25mm thick mineral fibre mat (36kgm<sup>-3</sup>). Screed is isolated from separating wall panel by the mineral wool layer. Underside of separating floor has 100mm thick mineral fibre mat (10kgm<sup>-3</sup>) above 15mm thick plasterboard with plaster skim.</p> <p>Total thickness of separating wall nominally 275mm<br/>                 Total thickness of separating floor nominally 415mm</p> |                                     |                                                      |

| 1/3 Octave Band Centre Frequency (f) Hz | L' nT 1/3 Octave dB |
|-----------------------------------------|---------------------|
| 50                                      |                     |
| 63                                      |                     |
| 80                                      |                     |
| 100                                     | 48.7                |
| 125                                     | 50.0                |
| 160                                     | 50.1                |
| 200                                     | 48.0                |
| 250                                     | 46.6                |
| 315                                     | 48.4                |
| 400                                     | 45.3                |
| 500                                     | 39.8                |
| 630                                     | 34.0                |
| 800                                     | 32.0                |
| 1000                                    | 29.5                |
| 1250                                    | 29.9                |
| 1600                                    | 27.8                |
| 2000                                    | 25.1                |
| 2500                                    | 24.7                |
| 3150                                    | 21.0                |
| 4000                                    |                     |
| 5000                                    |                     |



Rating according to ISO 717-1

$$L_{nT,w} (C_i) = 42 (42) \text{ dB}$$

Evaluation based on field measurement results obtained in 1/3 octave bands by an engineering method.

Note: Table 1a of Approved Document E of the Building Regulations 2000 states that, when tested in accordance with the methods stated in BS EN ISO 140-7 and BS EN ISO 717, a separating floor in any purpose built dwelling house or flat shall achieve an impact sound insulation figure of **not greater than 62dB** ( $L'_{nT,w} + C_i$ ). The separating floor tested at the above location achieved a figure of **42dB** ( $L'_{nT,w} + C_i$ ). The separating floor tested at the above location **passes** the requirements of Approved Document E of the Building Regulations 2000.

|                           |                 |                                |                           |
|---------------------------|-----------------|--------------------------------|---------------------------|
| <b>No of Test Report:</b> | AC041           | <b>Name of Test Institute:</b> | CERAM Building Technology |
| <b>Date of Issue:</b>     | 6 December 2006 | <b>Signature:</b>              |                           |