



# The Building Test Centre

Fire Acoustics Structures

The Building Test Centre  
British Gypsum Limited  
East Leake  
Loughborough  
Leics. LE12 6NP  
Tel (0115) 945 1564  
Fax (0115) 945 1562  
Email [btc.testing@bpb.com](mailto:btc.testing@bpb.com)  
Website [www.btconline.co.uk](http://www.btconline.co.uk)

Report Number **BTC15984A**

An acoustic test report covering laboratory sound insulation testing to BS EN ISO 140-3:1995 on a British Gypsum GypWall Quiet partition clad with a double layer of 15mm Gyproc SoundBloc with 75mm Isover Acoustic High Performance Slab and incorporating Gypframe 48 S 50 C Studs.

Test Date: 23<sup>rd</sup> October 2008

Customer: **British Gypsum Limited**  
East Leake  
Loughborough  
Leicestershire  
LE12 6HX

Customer: **British Gypsum Limited**

BTC 15984A: Page 1 of 11



0296



**TABLE OF CONTENTS**

**FOREWORD ..... 3**

**REPORT AUTHORISATION ..... 3**

**TEST CONSTRUCTION ..... 4**

**TEST MATERIALS ..... 6**

*Plasterboard ..... 6*

*Insulation..... 6*

*Metal Components..... 6*

*Fasteners ..... 7*

*Miscellaneous Components ..... 7*

**TEST RESULTS ..... 8**

**TEST PROCEDURE ..... 8**

**LIMITATIONS ..... 8**

**APPENDIX A - TEST DATA ..... 9**

**APPENDIX B - TEST METHOD AND CONDITIONS..... 11**



## FOREWORD

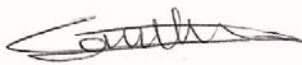
The test sponsor was British Gypsum Limited.

The test specimens were installed by John Gwynne and Liam Woodford on the 22<sup>nd</sup> and 23<sup>rd</sup> October 2008.

The Building Test Centre played no role in the design or selection of the materials comprising the test specimen.

## REPORT AUTHORISATION

Report Author



**Christopher Mutton**  
M.Phys.  
*Technologist*

Authorised by



**James Stonell**  
AMIOA  
*Technologist*

The Building Test Centre will not discuss the content of this report without written permission from the test sponsor. The Building Test Centre retains ownership of the test report content but authorises the test sponsor to reproduce the report as necessary in its entirety only.

Customer: **British Gypsum Limited**

BTC 15984A: Page 3 of 11



0296

## TEST CONSTRUCTION

The test specimen was constructed in the aperture having an overall opening of 2400mm (high) x 3600mm (wide).

Gypframe 50 C 50 Standard Floor & Ceiling channels were fixed to the head and base of the test aperture using 25mm Gyproc drywall screws at 600mm centres.

Gypframe 48 S 50 'C' Studs were screw fixed to either side of the test aperture using 25mm Gyproc drywall screws at 600mm centres.

Gypframe 48 S 50 'C' Studs were inserted between the head and base channels at 600mm centres.

A second framework using the same components and fixing details was located to create the twin frame, and a final partition thickness of 250mm. The 48 S 50 'C' Studs were located at 600mm centres parallel with the first set of framework studs.

Gypframe 99 FC 50 Fixing channel braces were installed to opposing studs at mid-height.

75mm Isover Acoustic High Performance Slab was positioned in the partition cavity.

Both sides of the framework were clad in a double layer of 15mm Gyproc SoundBloc board.

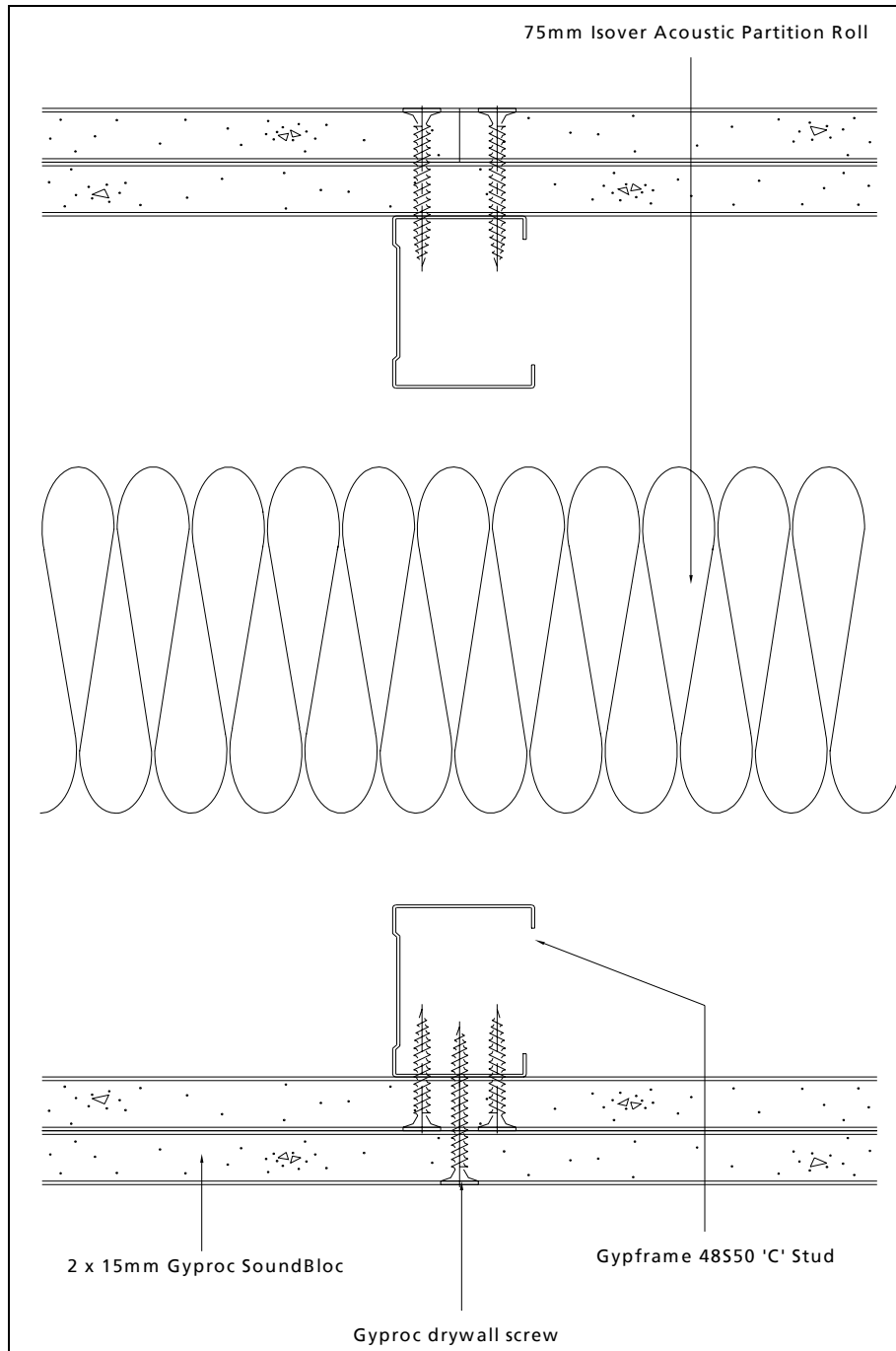
The inner layer was fixed using 32mm Gyproc drywall screws around the perimeter of the board at 300mm centres.

The outer layer was screw fixed around the perimeter of the board and to the intermediate studs using 42mm Gyproc drywall screws at 300mm centres.

All joints were staggered between layers.

The perimeter of the partition was sealed to the test aperture with Gyproc Sealant. The board joints and screw heads were covered with tape.

*The descriptions of individual components making up the test specimen were provided by the customer and were checked for accuracy wherever possible.*



**Figure 1.** Cross section through partition

Customer: **British Gypsum Limited**



## TEST MATERIALS

### Plasterboard

- i) Nominally 2400mm (long) x 1200mm (wide) x 15mm (thick) Gyproc SoundBloc manufactured by British Gypsum Limited, ex East Leake.

Surface density:	13.46kg/m <sup>2</sup>
Average thickness:	15.08mm
Board Code:	16 253 8 07:55

The surface densities were calculated using the actual weight and size of a selection of the boards used in the test specimen.

### Insulation

- i) Nominally 75mm thick Isover Acoustic High Performance Slab insulation supplied by Saint Gobain Isover.

Average area	7.20m <sup>2</sup>
Average weight	10.59kg
Density	19.61kg/m <sup>3</sup>

The density was calculated using the actual weight and size of the insulation used in the test specimen.

### Metal Components

- i) 0.5mm thick Gypframe 70S50 'C' Studs  
ii) 0.5mm thick Gypframe 72C50 Standard Flange Floor & Ceiling Channel  
iii) 0.5mm thick Gypframe 99FC50 Fixing Channel

All metal components are manufactured from galvanised mild steel using the 'UltraSTEEL' process and supplied by British Gypsum Limited.

### Fasteners

- i) 25mm Gyproc drywall screws
- ii) 32mm Gyproc drywall screws
- iii) 42mm Gyproc drywall screws

All fasteners supplied by British Gypsum Limited

### Miscellaneous Components

- i) Gyproc Sealant supplied by British Gypsum Limited
- ii) Joint tape supplied by The Building Test Centre

Where measurements could not be taken, then weight and dimensions were provided by the customer or the manufacturer e.g. from material labelling. Material information was recorded according to procedure MAT/1.

## TEST RESULTS

Test Code	Description	Weighted Airborne Sound Reduction Index $R_w$ (C; Ctr)
H15984AA	250mm Gypwall Quite IWL partition clad with a Double layer of 15mm SoundBloc (ex East Leake), with 75mm Isover Acoustic High Performance Slab in the cavity, incorporating Gypframe 48S50 C studs and 99FC50 braces	63 (-1;-6) dB

For full data see data in Appendix A of this report.

Test conducted in accordance with BS EN ISO 140-3: 1995 except for Clause F.2 where minimum distances for measurements at frequencies under 100Hz can not be met.

Rated in accordance with BS EN ISO 717-1: 1997

## TEST PROCEDURE

The test specimen (3.6 m x 2.4 m) was constructed in a wall dividing two reverberant rooms of approximately 98m<sup>3</sup> and 62m<sup>3</sup>. The accuracy of the test method conforms to BS EN 20140-2:1993, the test procedure used is detailed in the test data in Appendix A of this report. Broad-band white noise was used to measure the level differences and broad-band pink noise was used to measure the reverberation times. Third octave band pass filters were used in real time mode. See appendix B for further information.

## LIMITATIONS

The results only relate to the behaviour of the element of construction under the particular conditions of test; they are not intended to be the sole criteria for assessing the potential acoustic performance of the element in use nor do they reflect the actual behaviour.

The specification and interpretation of test methods are subject to ongoing development and refinement. Changes in associated legislation may also occur. For these reasons it is recommended that the relevance of test reports over 5 years old should be considered by the user. The laboratory that issued the report will be able to offer, on behalf of the legal owner, a review of the procedures adopted for a particular test to ensure that they are consistent with current practices, and if required may endorse the test report.

Customer: **British Gypsum Limited**

BTC 15984A: Page 8 of 11



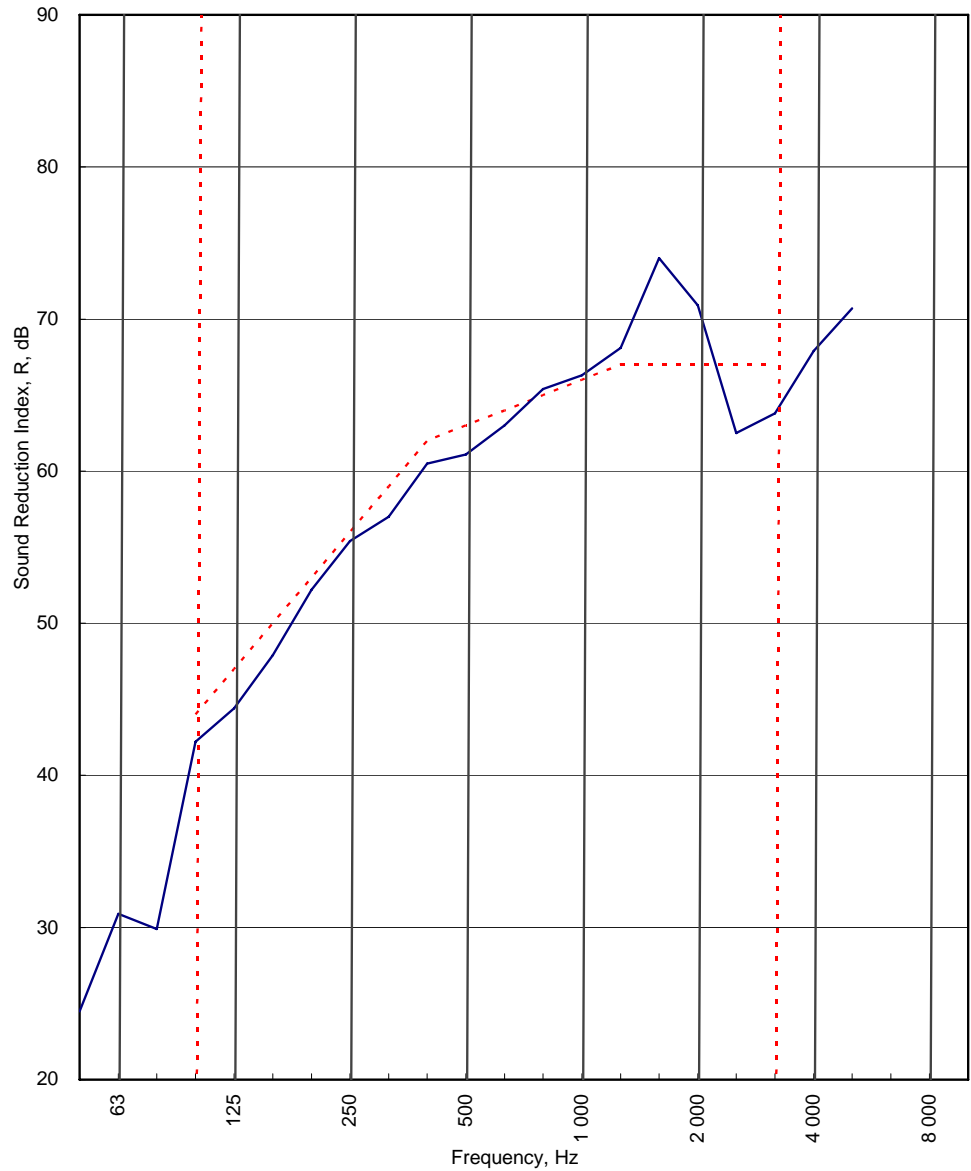
0296



**APPENDIX A - TEST DATA**

Test Code: <b>H15984AA</b>
Test Date: <b>23/10/2008</b>

Freq. Hz	R dB
50	24.5
63	30.9
80	29.9
100	42.2
125	44.4
160	47.9
200	52.2
250	55.4
315	57.0
400	60.5
500	61.1
630	63.0
800	65.4
1 000	66.3
1 250	68.1
1 600	74.0
2 000	70.9
2 500	62.5
3 150	63.8
4 000	67.9
5 000	70.7
6 300	
8 000	
10 000	



----- Curve of reference values (ISO 717-1)

Rating according to BS EN ISO 717-1:1997	<b>R<sub>w</sub> (C;Ctr) = 63 (-1;-6) dB</b>		
	<b>Max dev. 4.5 dB at 2 500 Hz</b>		
Evaluation based on laboratory measurement results obtained by an engineering method:	<b>C<sub>50-3150</sub> = -5 dB</b>	<b>C<sub>50-5000</sub> = -5 dB</b>	<b>C<sub>100-5000</sub> = 0 dB</b>
	<b>C<sub>tr,50-3150</sub> = -17 dB</b>	<b>C<sub>tr,50-5000</sub> = -17 dB</b>	<b>C<sub>tr,100-5000</sub> = -6 dB</b>

Customer: **British Gypsum Limited**



LABORATORY AIRBORNE SOUND INSULATION TEST - BS EN ISO 140-3:1995

Test Code: **H15984AA**

Test Date: **23/10/2008**

Specimen Area, S = **8.64** m<sup>2</sup>

	Room T2	Room T1
Room Volume, m <sup>3</sup> :	<b>98</b>	<b>58.84</b>
Temperature, deg.C:	<b>15.8</b>	<b>15.9</b>
Rel. Humidity, %RH:	<b>56.4</b>	<b>56.3</b>

Freq Hz	Test Room T2 to Test Room T1						R dB	U.Dev. dB	R 1/10ct dB
	Source dB	Rec. (uc) dB	Bgrnd dB	Rec. (corr) dB	Rev.time Sec	Corr. dB			
50	61.3	34.3	15.0	34.3	0.61	-2.5	<b>24.5</b>		
63	62.6	29.9	12.1	29.9	0.72	-1.8	<b>30.9</b>		27.5
80	72.7	39.7	13.3	39.7	<b>0.53</b>	-3.1	<b>29.9</b>		
100	84.2	40.8	13.4	40.8	<b>0.83</b>	-1.2	<b>42.2</b>	1.8	
125	81.0	36.1	10.2	36.1	0.97	-0.5	<b>44.4</b>	2.6	44.2
160	86.8	39.7	6.5	39.7	1.31	0.8	<b>47.9</b>	2.1	
200	92.3	41.3	14.4	41.3	1.42	1.2	<b>52.2</b>	0.8	
250	94.2	40.3	5.5	40.3	1.53	1.5	<b>55.4</b>	0.6	54.4
315	93.9	38.6	8.5	38.6	1.62	1.7	<b>57.0</b>	2.0	
400	92.5	33.1	12.3	33.1	1.40	1.1	<b>60.5</b>	1.5	
500	91.0	31.4	4.6	31.4	1.54	1.5	<b>61.1</b>	1.9	61.4
630	89.7	28.2	3.2	28.2	1.54	1.5	<b>63.0</b>	1.0	
800	90.4	26.7	5.9	26.7	1.60	1.7	<b>65.4</b>		
1 000	89.9	25.5	13.8	<b>25.2</b>	1.57	1.6	<b>66.3</b>		66.5
1 250	91.0	24.5	6.9	24.5	1.59	1.6	<b>68.1</b>		
1 600	110.4	38.1	11.4	38.1	1.62	1.7	<b>74.0</b>		
2 000	95.5	26.3	8.9	26.3	1.62	1.7	<b>70.9</b>		66.4
2 500	94.2	32.7	9.0	32.7	1.38	1.0	<b>62.5</b>	4.5	
3 150	93.5	30.5	9.1	30.5	1.31	0.8	<b>63.8</b>	3.2	
4 000	95.2	28.1	13.0	28.1	1.31	0.8	<b>67.9</b>		66.5
5 000	99.0	28.8	10.7	28.8	1.21	0.5	<b>70.7</b>		
6 300									
8 000									
10 000									

<b>Single Figure Ratings</b>	<b>Rw</b>	<b>C</b>	<b>Ctr</b>	<b>Total U. Dev., dB</b>	<b>22</b>
<b>BS EN ISO 717-1: 1997</b>	<b>dB</b>	<b>dB</b>	<b>dB</b>		
	<b>63</b>	<b>-1</b>	<b>-6</b>		
	<b>(100-5000)</b>	<b>0</b>	<b>-6</b>		
<b>Background Corrected</b>					
	<b>(50-3150)</b>	<b>-5</b>	<b>-17</b>		
<b>RT's &gt; factor 1.5 apart</b>					
	<b>(50-5000)</b>	<b>-5</b>	<b>-17</b>		
				Procedure: ISO140/3/B - issue 2	
				Worksheet: 140_3_1.XLS	



## APPENDIX B - TEST METHOD AND CONDITIONS

The source room (T2) was treated with six perspex diffusers of approximately 900mm x 1220mm. An omni-directional loudspeaker sound source is placed near a back corner of the source room (T2), rotating at 1 rpm and at least 0.7m from any room boundary to satisfy Annex C of BS EN ISO 140-3: 1995. A stationary loudspeaker sound source is placed in the corner of the receiving room (T1) opposite the test specimen.

The average sound pressure level in each 1/3 octave band is measured using a rotating microphone boom, positioned such that the minimum distance between microphone and sound source is 1m and between microphone and room boundaries is 0.7m. The rotating microphone has a sweep radius of at least 1m and is inclined in relation to the boundaries at an angle of at least 30° to the horizontal. The microphone has a traverse time of 32 seconds, and the sound pressure levels are averaged over 64 seconds which is equivalent to two complete sweeps of the microphone boom.

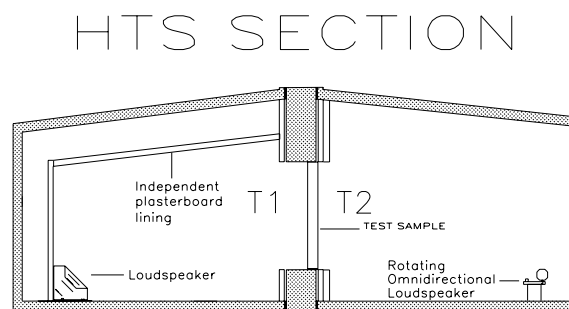
The equivalent absorption area of the receiving room is determined by producing the arithmetic average of twelve reverberation times and applying this to the Sabine formula.

The test specimen is installed in the aperture so that it finishes flush with the first independent timber in room T2 side to eliminate indirect transmission between rooms. The specimen is not installed so that the aperture depth ratio 2:1 is met as recommended in section 5.2.1 of BS EN ISO 140-3:1995. Laboratory tests have been carried out to prove the insignificance of this installation position on the test results.

The laboratory limit for measurement due to flanking is (combined BTC 11709A, BTC13562EA, BTC 15398A and BTC 15829A)

Freq Hz	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000
R'max	45.0	46.9	58.5	62.4	62.9	67.7	71.2	77.2	84.2	92.0	97.7	101.5	103.8	97.6	102.4	104.8	101.8	102.9	98.7	96.4	96.2

The figure below shows flanking and isolation treatments in the test chamber.



Chamber layout

Customer: **British Gypsum Limited**

BTC 15984A: Page 11 of 11



0296