



Report Number **BTC16500A**

An acoustic test report covering laboratory sound insulation testing to BS EN ISO 140-3:1995 on a British Gypsum Gypwall Classic partition clad with a single layer of 15mm SoundBloc with 50mm Isover APR or 100mm Modular roll in the cavity.

Test Date: 15th June 2009

www.btconline.co.uk

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

Customer: **British Gypsum**

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FOREWORD

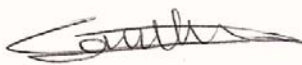
The test sponsor was British Gypsum.

The test specimens were installed by Liam Woodford and John Gwynne on the 15th June 2009.

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

REPORT AUTHORISATION

Report Author



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TEST CONSTRUCTION

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

Gypframe 94C50 Floor & Ceiling Channels were fixed to the head and base of the aperture using 25mm Gyproc drywall screw fixings spaced at 600mm centres.

Gypframe 92A50 were positioned between the head and base channels at each end of the aperture and fixed using 40mm Gyproc drywall screw fixings spaced at 600mm centres.

Gypframe 92A50 were positioned between the head and base channels at 600mm centres.

50mm Isover APR insulation was placed within the stud cavity.

The framework was clad with a single layer of 15mm SoundBloc.

The boards were screw fixed around the perimeter of the board and the intermediate stud positions at 300mm centres using 25mm Gyproc drywall screws.

All vertical joints were staggered between layers. All joints were taped and the perimeter sealed with Gyproc Sealant.

Following the first test the insulation was removed from the cavity and replaced with Isover 100mm Modular Roll, before returning the boards to the framework. The joints were taped and the perimeter resealed with Gyproc Sealant before repeating the test.

For the third test the insulation was removed from the cavity the boards returned, the joints were taped and the perimeter resealed with Gyproc Sealant before repeating the test.

Test	No. of layers and Board Type	No. of layers and Insulation Type
A	1 x 15mm SoundBloc	1 x 50mm Isover APR
B	1 x 15mm SoundBloc	1 x 100mm Modular Roll
C	1 x 15mm SoundBloc	No Insulation

Table 1. Details of board specifications and insulation used in the test series.

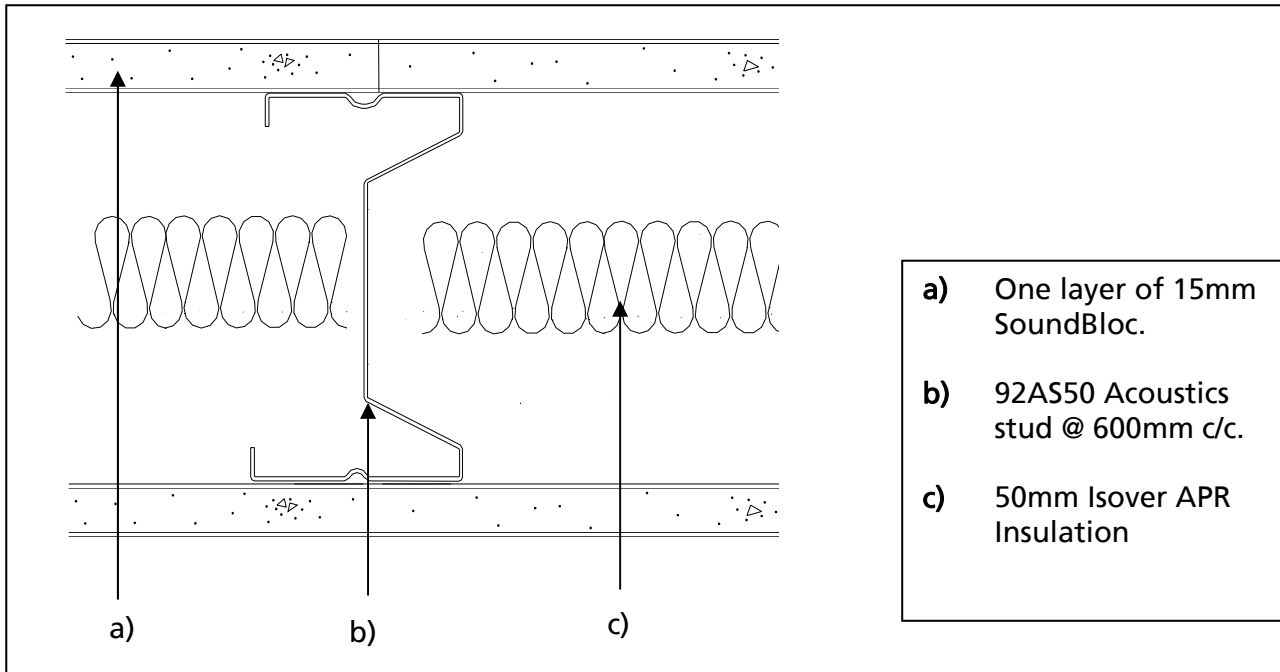


Figure 1. Horizontal cross section view through partition BTC16500AA.

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

TEST MATERIALS

Plasterboard

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

Surface density:	13.64 kg/m ²
Average thickness:	14.99 mm
Board Code:	16 141 9 02:10

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 50mm thick Isover APR insulation supplied by Saint Gobain Isover.

Average area	15.60 m ²
Average weight	9.95 kg
Density	12.76 kg/m ³

- ii) Nominally 100mm thick Modular Roll insulation supplied by Saint Gobain Isover.

Average area	11.00 m ²
Average weight	10.95 kg
Density	9.95 kg/m ³

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 92A50 AcouStud.
ii) 0.5mm thick Gypframe 94C50 Floor & Ceiling Channel.

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

Fasteners

- i) 25mm Gyproc drywall screws
- ii) 32mm Gyproc drywall screws
- iii) 40mm Gyproc drywall screws

All fasteners supplied by British Gypsum

Miscellaneous Components

- i) Gyproc Sealant supplied by British Gypsum
- 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)
H16500AA	Single layer of 15mm SoundBloc with 50mm Isover APR within the cavity	51 (-3; -7) dB
H16500BA	Single layer of 15mm SoundBloc with 100mm Modular Roll within the cavity	52 (-3; -6) dB
H16500CA	Single layer of 15mm SoundBloc	45 (-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 98m³ and 62m³. 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

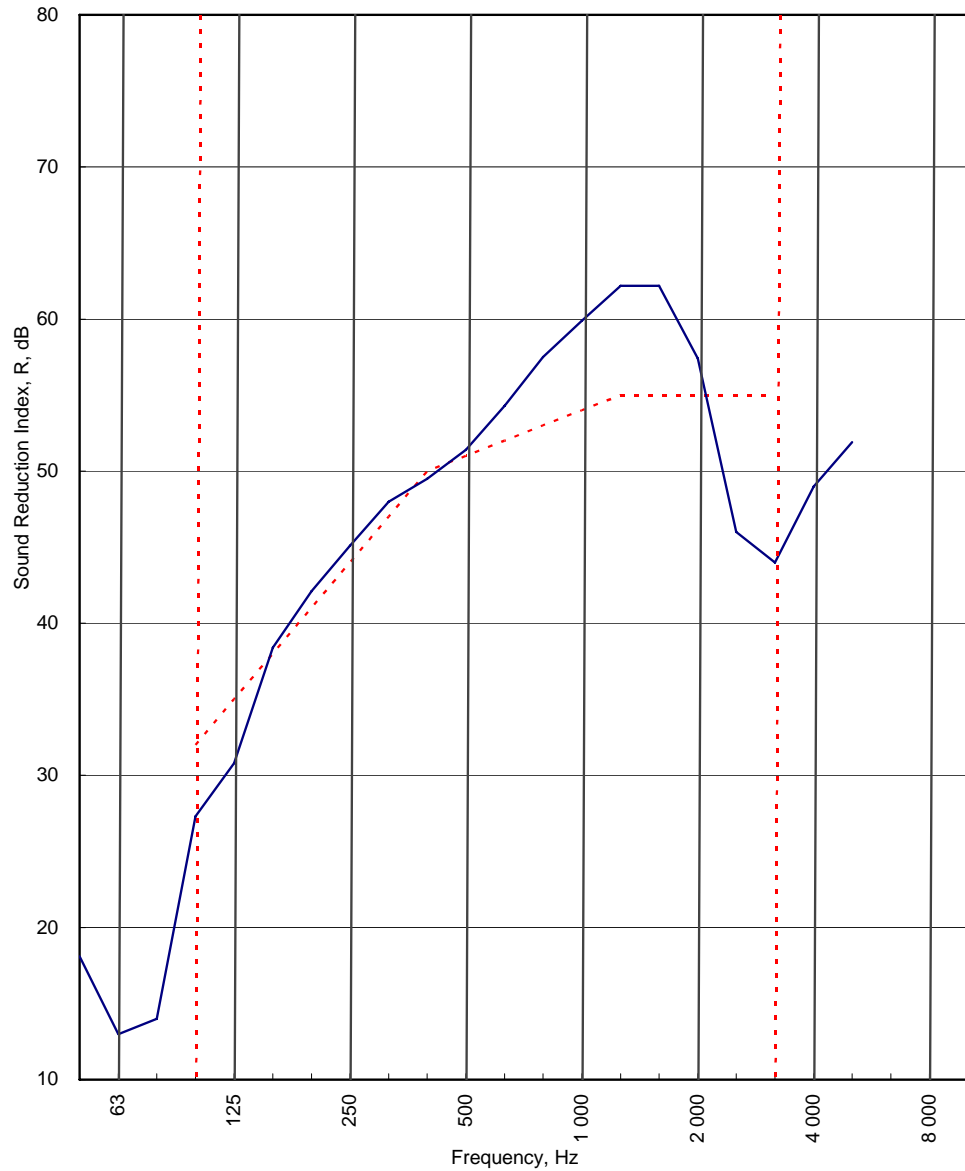
The results only relate to the behaviour of the element of construction under the particular conditions of test; they are not intended to be the sole criteria for assessing the potential acoustic performance of the element in use nor do they reflect the actual behaviour.

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.

APPENDIX A - TEST DATA

Test Code: H16500AA
Test Date: 15/06/2009

Freq. Hz	R dB
50	18.1
63	13.0
80	14.0
100	27.3
125	30.8
160	38.4
200	42.1
250	45.1
315	48.0
400	49.5
500	51.4
630	54.3
800	57.5
1 000	59.9
1 250	62.2
1 600	62.2
2 000	57.4
2 500	46.0
3 150	44.0
4 000	49.0
5 000	51.9
6 300	
8 000	
10 000	



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

Rating according to
BS EN ISO 717-1:1997

R_w (C;Ctr) = 51 (-3;-7) dB

Max dev. 11 dB at 3 150 Hz

Evaluation based on laboratory
measurement results obtained by
an engineering method:

C₅₀₋₃₁₅₀ = **-8 dB**

C₅₀₋₅₀₀₀ = **-7 dB**

C₁₀₀₋₅₀₀₀ = **-3 dB**

C_{tr,50-3150} = **-19 dB**

C_{tr,50-5000} = **-19 dB**

C_{tr,100-5000} = **-7 dB**

Customer: **British Gypsum**

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

Test Code: **H16500AA**

Test Date: **15/06/2009**

Specimen Area, S = **8.64 m²**

	Room T2	Room T1
Room Volume, m ³ :	98	59.93
Temperature, deg.C:	18.6	19.2
Rel. Humidity, %RH:	58	54.6

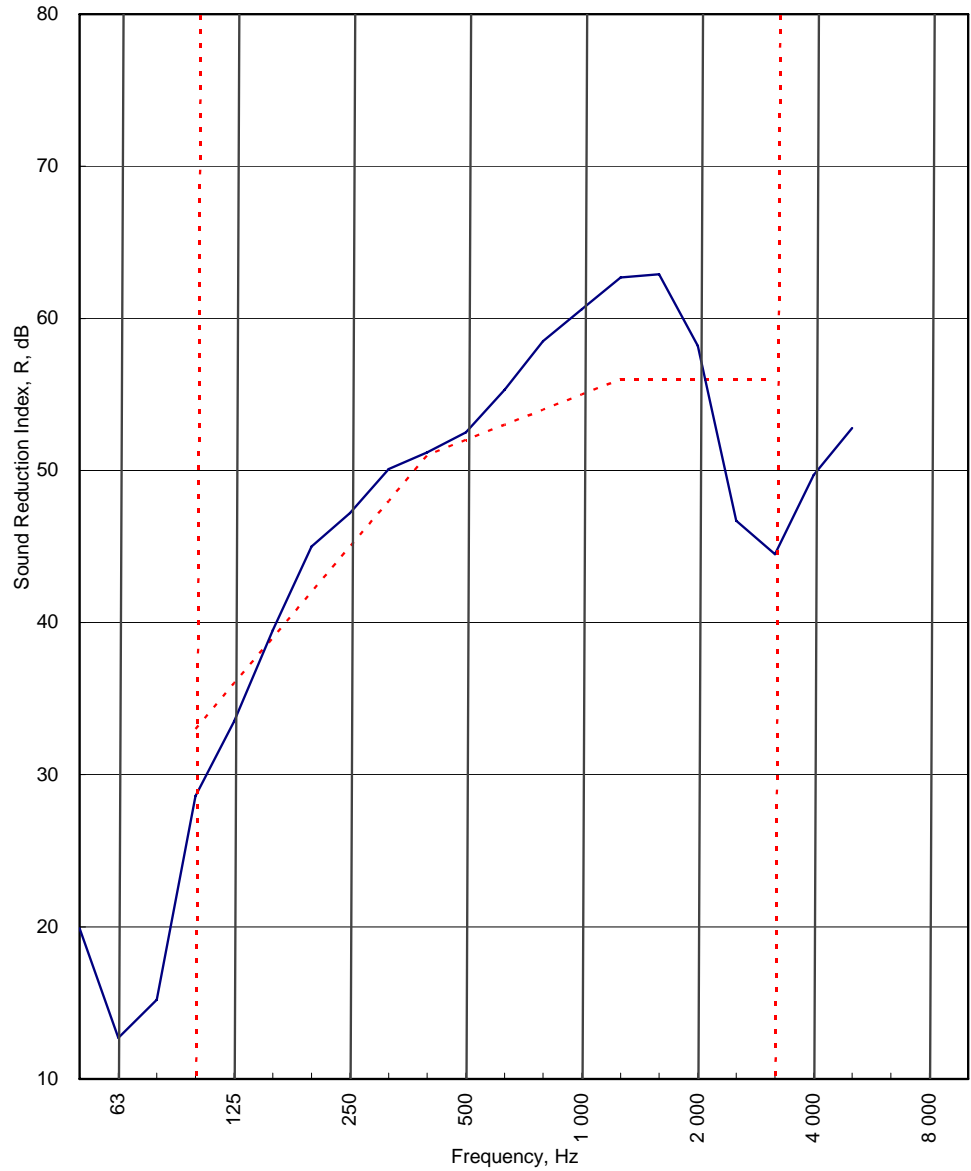
Freq Hz	Test Room T2 to Test Room T1						R dB	U.Dev. dB	R 1/10Oct dB
	Source dB	Rec. (uc) dB	Bgrnd dB	Rec. (corr) dB	Rev.time Sec	Corr. dB			
50	64.0	43.2	12.8	43.2	0.60	-2.7	18.1		
63	63.8	50.4	12.2	50.4	1.02	-0.4	13.0		14.5
80	71.6	56.7	5.4	56.7	0.90	-0.9	14.0		
100	84.6	56.3	19.5	56.3	0.88	-1.0	27.3	4.7	
125	84.2	53.2	11.1	53.2	1.07	-0.2	30.8	4.2	30.2
160	89.1	50.7	11.4	50.7	1.12	0.0	38.4		
200	94.5	53.5	16.7	53.5	1.43	1.1	42.1		
250	96.4	52.6	16.6	52.6	1.48	1.3	45.1		44.4
315	96.0	49.2	18.6	49.2	1.47	1.2	48.0		
400	94.8	46.3	14.0	46.3	1.40	1.0	49.5	0.5	
500	92.9	42.6	11.4	42.6	1.42	1.1	51.4		51.3
630	91.7	38.7	10.4	38.7	1.49	1.3	54.3		
800	92.3	36.1	7.9	36.1	1.50	1.3	57.5		
1 000	91.7	33.1	14.2	33.1	1.51	1.3	59.9		59.5
1 250	92.4	31.5	6.5	31.5	1.48	1.3	62.2		
1 600	95.4	34.6	6.4	34.6	1.53	1.4	62.2		
2 000	97.1	41.1	7.9	41.1	1.54	1.4	57.4		50.4
2 500	95.9	50.7	8.2	50.7	1.34	0.8	46.0	9.0	
3 150	95.4	52.0	8.4	52.0	1.28	0.6	44.0	11.0	
4 000	97.3	48.9	10.6	48.9	1.26	0.6	49.0		47.1
5 000	101.0	49.5	10.5	49.5	1.21	0.4	51.9		
6 300									
8 000									
10 000									

Single Figure Ratings	Rw	C	Ctr	Total U. Dev., dB	29.4
BS EN ISO 717-1: 1997	dB	dB	dB		
	51	-3	-7		
	(100-5000)	-3	-7		
	(50-3150)	-8	-19		
RT's > factor 1.5 apart	(50-5000)	-7	-19		
				Procedure: ISO140/3/B - issue 2	
				Worksheet: 140_3_1.XLS	



Test Code:
H16500BA
Test Date:
15/06/2009

Freq. Hz	R dB
50	19.9
63	12.7
80	15.2
100	28.6
125	33.5
160	39.5
200	45.0
250	47.2
315	50.1
400	51.2
500	52.5
630	55.3
800	58.5
1 000	60.6
1 250	62.7
1 600	62.9
2 000	58.2
2 500	46.7
3 150	44.5
4 000	49.7
5 000	52.8
6 300	
8 000	
10 000	



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

Rating according to BS EN ISO 717-1:1997	R_w (C;Ctr) = 52 (-3;-6) dB		
Evaluation based on laboratory measurement results obtained by an engineering method:	Max dev. 11.5 dB at 3 150 Hz		
	C₅₀₋₃₁₅₀ = -8 dB	C₅₀₋₅₀₀₀ = -7 dB	C₁₀₀₋₅₀₀₀ = -3 dB
	C_{tr,50-3150} = -20 dB	C_{tr,50-5000} = -20 dB	C_{tr,100-5000} = -6 dB

Customer: **British Gypsum**



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

Test Code: **H16500BA**

Test Date: **15/06/2009**

Specimen Area, S = **8.64** m²

	Room T2	Room T1
Room Volume, m ³ :	98	59.93
Temperature, deg.C:	18.9	19.7
Rel. Humidity, %RH:	55.1	54.7

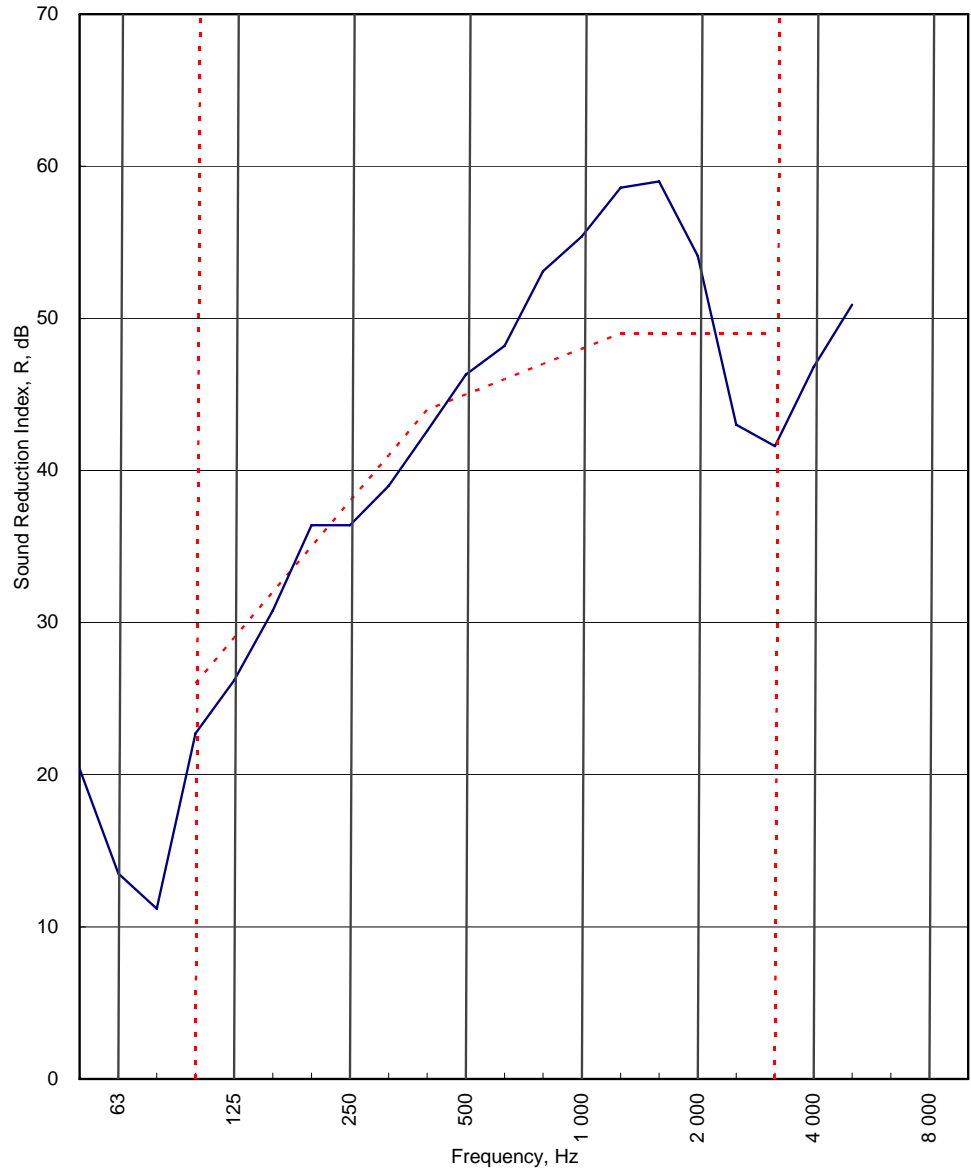
Freq Hz	Test Room T2 to Test Room T1						R dB	U.Dev. dB	R 1/10ct dB
	Source dB	Rec. (uc) dB	Bgrnd dB	Rec. (corr) dB	Rev.time Sec	Corr. dB			
50	64.6	42.5	16.6	42.5	0.67	-2.2	19.9		
63	64.0	53.1	25.3	53.1	1.67	1.8	12.7		15.0
80	72.6	56.0	8.8	56.0	0.81	-1.4	15.2		
100	84.8	55.0	17.4	55.0	0.85	-1.2	28.6	4.4	
125	83.8	50.1	3.8	50.1	1.05	-0.2	33.5	2.5	31.9
160	88.8	49.3	2.8	49.3	1.11	0.0	39.5		
200	94.5	50.6	12.6	50.6	1.42	1.1	45.0		
250	96.3	50.4	3.5	50.4	1.50	1.3	47.2		47.0
315	95.9	47.1	8.1	47.1	1.50	1.3	50.1		
400	94.8	44.7	10.8	44.7	1.42	1.1	51.2		
500	92.9	41.5	5.1	41.5	1.43	1.1	52.5		52.7
630	91.7	37.6	2.3	37.6	1.46	1.2	55.3		
800	92.2	35.2	5.7	35.2	1.56	1.5	58.5		
1 000	91.7	32.6	14.9	32.6	1.57	1.5	60.6		60.3
1 250	92.4	30.9	4.8	30.9	1.46	1.2	62.7		
1 600	95.3	33.7	6.4	33.7	1.50	1.3	62.9		
2 000	97.1	40.3	7.4	40.3	1.52	1.4	58.2		51.1
2 500	95.9	50.0	8.4	50.0	1.34	0.8	46.7	9.3	
3 150	95.4	51.5	8.6	51.5	1.27	0.6	44.5	11.5	
4 000	97.2	48.1	10.6	48.1	1.27	0.6	49.7		47.7
5 000	101.0	48.7	10.7	48.7	1.25	0.5	52.8		
6 300									
8 000									
10 000									

Single Figure Ratings	Rw	C	Ctr	Total U. Dev., dB	27.7
BS EN ISO 717-1: 1997	dB	dB	dB		
	52	-3	-6		
	(100-5000)	-3	-6		
	(50-3150)	-8	-20		
RT's > factor 1.5 apart	(50-5000)	-7	-20		
				Procedure: ISO140/3/B - issue 2	
				Worksheet: 140_3_1.XLS	



Test Code:
H16500CA
Test Date:
15/06/2009

Freq. Hz	R dB
50	20.4
63	13.5
80	11.2
100	22.7
125	26.2
160	30.8
200	36.4
250	36.4
315	39.0
400	42.6
500	46.3
630	48.2
800	53.1
1 000	55.4
1 250	58.6
1 600	59.0
2 000	54.1
2 500	43.0
3 150	41.6
4 000	46.8
5 000	50.9
6 300	
8 000	
10 000	



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

Rating according to BS EN ISO 717-1:1997	R_w (C;C_{tr}) = 45 (-1;-6) dB		
Evaluation based on laboratory measurement results obtained by an engineering method:	Max dev. 7.4 dB at 3 150 Hz		
	C₅₀₋₃₁₅₀ = -5 dB	C₅₀₋₅₀₀₀ = -4 dB	C₁₀₀₋₅₀₀₀ = -1 dB
	C_{tr,50-3150} = -15 dB	C_{tr,50-5000} = -15 dB	C_{tr,100-5000} = -6 dB

Customer: **British Gypsum**



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

Test Code: **H16500CA**

Test Date: **15/06/2009**

Specimen Area, S = **8.64** m²

	Room T2	Room T1
Room Volume, m ³ :	98	59.93
Temperature, deg.C:	19.1	19.6
Rel. Humidity, %RH:	55.4	54.7

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	65.4	42.3	15.2	42.3	0.60	-2.7	20.4		
63	65.5	51.4	16.2	51.4	0.97	-0.6	13.5		13.6
80	71.7	60.2	8.5	60.2	1.03	-0.3	11.2		
100	84.6	61.1	24.6	61.1	0.93	-0.8	22.7	3.3	
125	83.5	56.9	6.9	56.9	1.02	-0.4	26.2	2.8	25.4
160	88.3	58.1	3.8	58.1	1.26	0.6	30.8	1.2	
200	94.3	59.0	10.2	59.0	1.43	1.1	36.4		
250	96.1	60.9	3.9	60.9	1.46	1.2	36.4	1.6	37.1
315	95.9	58.1	7.4	58.1	1.47	1.2	39.0	2.0	
400	94.8	53.2	10.5	53.2	1.40	1.0	42.6	1.4	
500	92.4	47.1	4.9	47.1	1.40	1.0	46.3		45.1
630	91.5	44.5	2.8	44.5	1.47	1.2	48.2		
800	92.2	40.4	6.0	40.4	1.51	1.3	53.1		
1 000	91.6	37.5	15.1	37.5	1.51	1.3	55.4		55.2
1 250	92.4	35.1	5.4	35.1	1.48	1.3	58.6		
1 600	95.4	37.9	6.8	37.9	1.56	1.5	59.0		
2 000	97.0	44.4	7.7	44.4	1.55	1.5	54.1		47.3
2 500	95.8	53.6	9.5	53.6	1.33	0.8	43.0	6.0	
3 150	95.4	54.3	9.8	54.3	1.25	0.5	41.6	7.4	
4 000	97.2	51.0	11.1	51.0	1.26	0.6	46.8		44.8
5 000	101.0	50.6	10.7	50.6	1.25	0.5	50.9		
6 300									
8 000									
10 000									

Single Figure Ratings	Rw	C	Ctr	Total U. Dev., dB	25.7
BS EN ISO 717-1: 1997	dB	dB	dB		
	45	-1	-6		
	(100-5000)	-1	-6		
	(50-3150)	-5	-15		
RT's > factor 1.5 apart	(50-5000)	-4	-15		
				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.

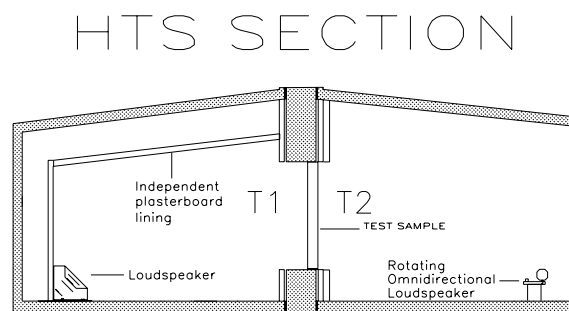
The equivalent absorption area of the receiving room is determined by producing the arithmetic average of twelve reverberation times and applying this to the Sabine formula.

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**

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