

The Building Test Centre

Fire Acoustics Structures

The Building Test Centre
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Report Number BTC 17336A

An acoustic test report covering laboratory sound insulation testing to BS EN ISO 140-3:1995 on a British Gypsum GypWall ROBUST partition clad each side with an inner layer of 12.5mm Gyproc SoundBloc and an outer layer of 15mm Gyproc DuraLine, with 25mm Isover APR in the cavity.

Test Date: 28th April 2011

www.btconline.co.uk

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

Customer: **British Gypsum**

BTC 17336A: Page 1 of 11



0296

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TABLE OF CONTENTS

FOREWORD	3
REPORT AUTHORISATION	3
TEST CONSTRUCTION	4
TEST MATERIALS	6
<i>Plasterboard.....</i>	<i>6</i>
<i>Insulation</i>	<i>6</i>
<i>Metal Components</i>	<i>7</i>
<i>Fasteners</i>	<i>7</i>
<i>Miscellaneous Components</i>	<i>7</i>
TEST RESULTS	8
TEST PROCEDURE	8
LIMITATIONS	8
APPENDIX A - TEST DATA	9
APPENDIX B - TEST METHOD AND CONDITIONS	11

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FOREWORD

The test sponsor was British Gypsum.

The test specimen was installed by John Gwynne, Sam Potter and Yasmine Latif between the 27th and 28th April 2011.

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

REPORT AUTHORISATION

Report Author



Martin Lynch
Technologist

Authorised by



Christopher Mutton
M.Phys
Technologist

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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 72DC60 Deep Flange Floor and Ceiling Channels were fixed to the head and base of the aperture using 25mm Gyproc drywall screws spaced at 600mm centres.

Gypframe 70AS50 AcouStuds were positioned between the head and base channels at each end of the aperture and fixed using 25mm Gyproc drywall screw fixings spaced at 600mm centres.

Gypframe 70AS50 AcouStuds were positioned between the head and base channels at 600mm centres.

A layer of 25mm thick Isover Acoustic Partition Roll was positioned in the cavity.

The framework was clad with an inner layer of 12.5mm Gyproc SoundBloc and an outer layer of 15mm Gyproc DuraLine boards.

The inner layer of boards were fixed with 25mm Gyproc Drywall Screws at 300mm centres around the perimeter of the boards only.

The outer layer of boards were fixed with 42mm Gyproc Drywall Screws at 300mm centres around the perimeter and within the field of the boards.

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

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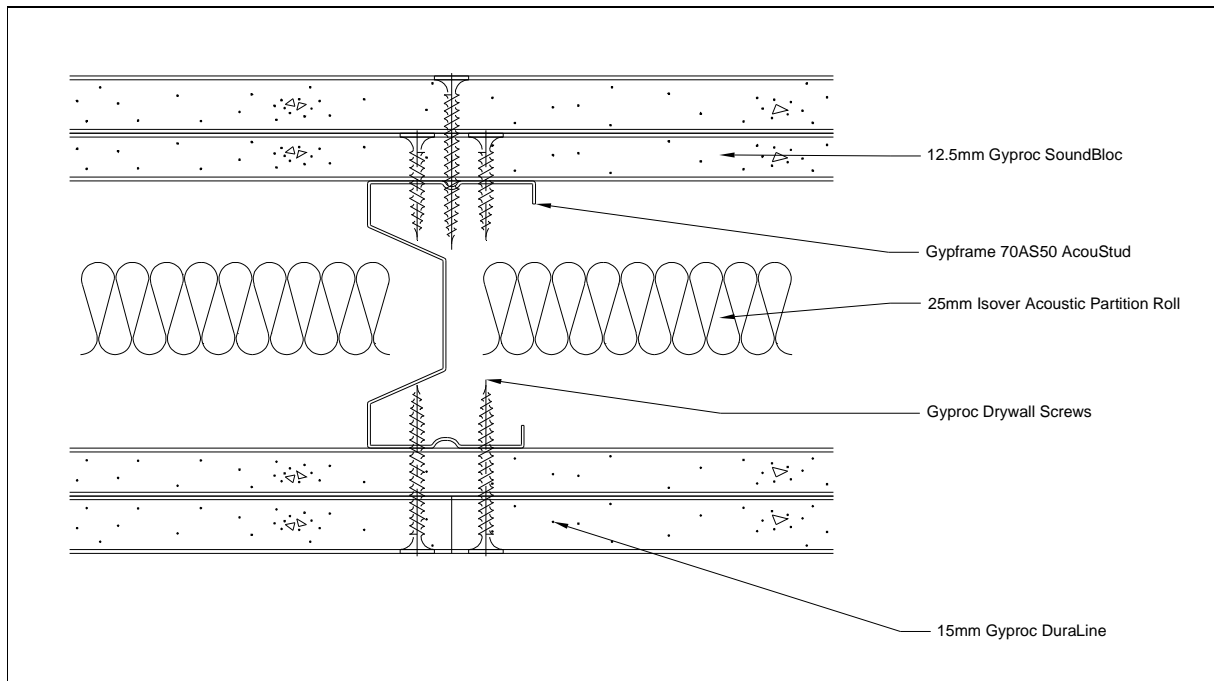


Figure 1. Cross-sectional view of the tested construction

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

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TEST MATERIALS

Plasterboard

- i) Nominally 2400mm (long) x 1200mm (wide) x 12.5mm (thick) Gyproc SoundBloc manufactured by British Gypsum, ex Sherburn.

Surface density:	11.5 kg/m ²
Average thickness:	12.5 mm
Board Code:	31 356 10 16:51

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

Material dimensions were supplied by the customer.

- ii) Nominally 2400mm (long) x 1200mm (wide) x 15mm (thick) Gyproc DuraLine manufactured by British Gypsum, ex Robertsbridge.

Surface density:	13.9 kg/m ²
Average thickness:	15.3 mm
Board Code:	24 080 11 19:25

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

Material dimensions were supplied by the customer.

Insulation

- i) Nominally 25mm thick Isover APR insulation supplied by Saint Gobain Isover.

Average area	24.00m ²
Average weight	9.61kg
Density	16.02kg/m ³

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

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Metal Components

- i) 0.5mm thick Gypframe 70AS50 AcouStuds
- ii) 0.6mm thick Gypframe 72DC60 Deep Flange Floor and Ceiling Channels

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) 42mm 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.

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TEST RESULTS

Test Code	Description	Weighted Airborne Sound Reduction Index R_w (C; Ctr)
H17336AA	Gypframe 70AS50 AcouStuds partition clad each side with an inner layer of 12.5mm Gyproc SoundBloc and an outer layer of 15mm Gyproc DuraLine, with 25mm Isover APR in the cavity	57 (-3; -9) dB

For full data see 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.

Customer: British Gypsum

BTC 17336A: Page 8 of 11

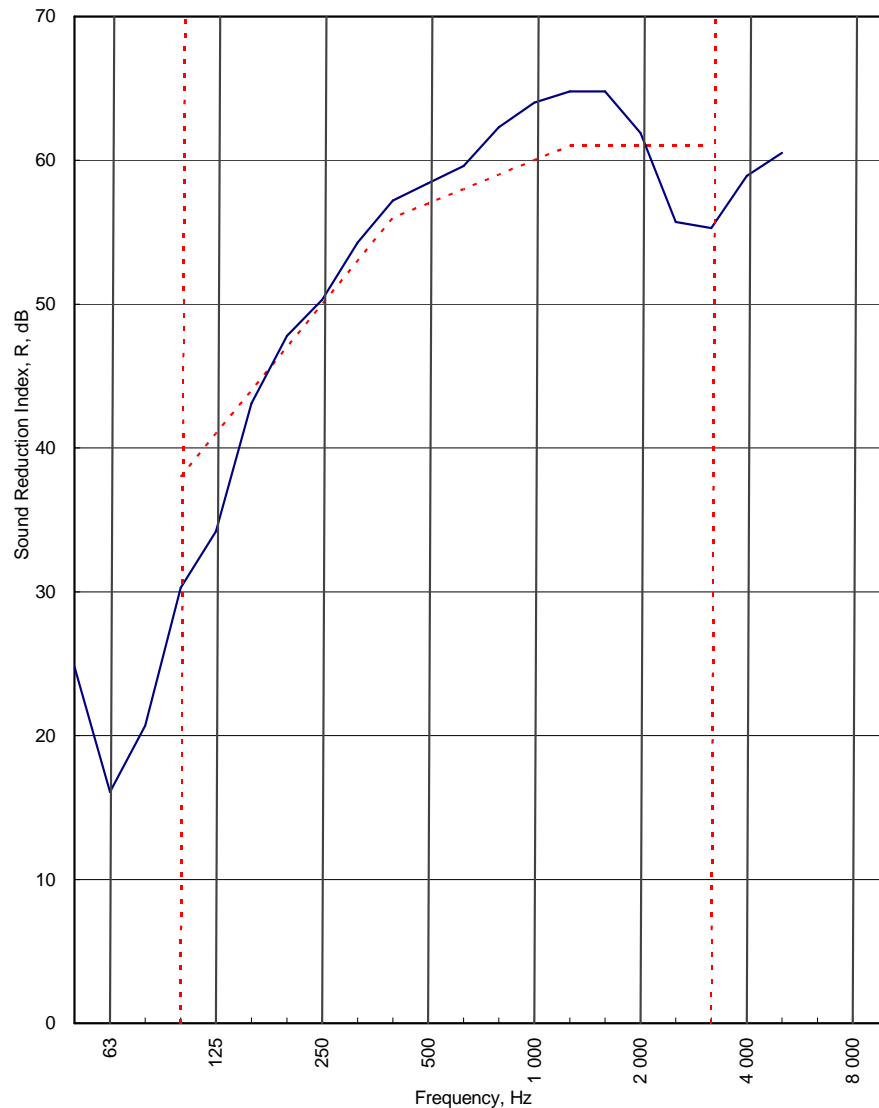


0296

APPENDIX A - TEST DATA

Test Code:
H17336AA
Test Date:
28/04/2011

Freq. Hz	R dB
50	24.8
63	16.1
80	20.7
100	30.3
125	34.2
160	43.1
200	47.8
250	50.3
315	54.3
400	57.2
500	58.4
630	59.6
800	62.3
1 000	64.0
1 250	64.8
1 600	64.8
2 000	61.9
2 500	55.7
3 150	55.3
4 000	58.9
5 000	60.5
6 300	
8 000	
10 000	



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

Rating according to
BS EN ISO 717-1:1997

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

$R_w (C; C_{tr}) = 57 (-3; -9) \text{ dB}$

Max dev. 7.7 dB at 100 Hz

$C_{50-3150} = -9 \text{ dB}$

$C_{50-5000} = -8 \text{ dB}$

$C_{100-5000} = -2 \text{ dB}$

$C_{tr, 50-3150} = -20 \text{ dB}$

$C_{tr, 50-5000} = -20 \text{ dB}$

$C_{tr, 100-5000} = -9 \text{ dB}$

Customer: British Gypsum

BTC 17336A: Page 9 of 11



0296

LABORATORY AIRBORNE SOUND INSULATION TEST - BS EN ISO 140-3:1995									
Test Code: H17336AA			Test Date: 28/04/2011						
Specimen Area, S = 8.64 m ²			Room T2				Room T1		
			Room Volume, m ³ :				98	59.9	
			Temperature, deg.C:				17.3	17.1	
			Rel. Humidity, %RH:				44.1	43.2	
Freq Hz	Test Room T2 to Test Room T1						R dB	U.Dev. dB	R 1/1Oct dB
	Source dB	Rec. (uc) dB	Bgrnd dB	Rec. (corr) dB	Rev.time Sec	Corr. dB			
50	62.9	35.9	16.1	35.9	0.67	-2.2	24.8	7.7 6.8 0.9	19.2 33.4
63	65.2	48.2	13.9	48.2	0.90	-0.9	16.1		
80	72.3	50.0	11.0	50.0	0.76	-1.6	20.7		
100	83.7	52.8	18.5	52.8	0.97	-0.6	30.3		
125	81.4	47.2	8.8	47.2	1.12	0.0	34.2	50.1	
160	85.3	43.2	10.6	43.2	1.41	1.0	43.1		
200	90.0	44.2	22.7	44.2	1.76	2.0	47.8		
250	94.9	46.7	10.6	46.7	1.79	2.1	50.3		
315	97.7	45.3	13.0	45.3	1.72	1.9	54.3	58.3	
400	97.3	41.8	18.5	41.8	1.64	1.7	57.2		
500	95.4	38.4	8.5	38.4	1.52	1.4	58.4		
630	94.8	36.9	8.5	36.9	1.65	1.7	59.6		
800	95.7	35.4	5.9	35.4	1.75	2.0	62.3	63.6	
1 000	95.3	33.0	13.7	33.0	1.65	1.7	64.0		
1 250	95.7	32.8	4.5	32.8	1.70	1.9	64.8		
1 600	99.0	36.2	5.4	36.2	1.75	2.0	64.8		
2 000	99.4	39.3	5.1	39.3	1.69	1.8	61.9	59.1	
2 500	99.1	44.7	5.0	44.7	1.48	1.3	55.7		
3 150	99.0	44.6	6.2	44.6	1.38	0.9	55.3		
4 000	101.4	43.4	9.8	43.4	1.35	0.9	58.9		
5 000	105.3	45.4	9.5	45.4	1.28	0.6	60.5	57.7	
6 300									
8 000									
10 000									
Single Figure Ratings		Rw	C	Ctr	Total U. Dev., dB			26.4	
BS EN ISO 717-1: 1997		dB	dB	dB					
		57	-3	-9					
		(100-5000)	-2	-9					
		(50-3150)	-9	-20					
		(50-5000)	-8	-20					
					Procedure: ISO140/3/B - issue 3				
					Worksheet: 140_3_1.XLS				

Customer: British Gypsum



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.

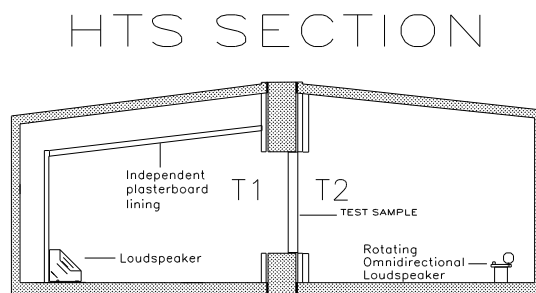
The equivalent absorption area of the receiving room is determined by producing the arithmetic average of twelve reverberation times and applying this to the Sabine formula.

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