



The Building Test Centre

Fire Acoustics Structures

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Report Number **BTC 14323A**

AN ACOUSTIC TEST REPORT COVERING A
LABORATORY SOUND INSULATION TESTS TO
BS EN ISO 140-3:1995 ON A GYPWALL QUIET
PARTITION INCORPORATING A TWIN FRAME,
DOUBLE LAYER OF 15mm SOUNDBLOC AND
25mm ISOWOOL 1200 APR.

Test Date: 11th November 2005

www.btconline.co.uk

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

Customer: **British Gypsum Limited**

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AN ACOUSTIC TEST REPORT COVERING A LABORATORY SOUND INSULATION TEST TO BS EN ISO 140-3:1995 ON A GYPWALL QUIET PARTITION INCORPORATING A TWIN FRAME, DOUBLE LAYER OF 15mm SOUNDBLOC AND 25mm ISOWOOL 1200 APR.

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FOREWORD

An acoustic test report covering a laboratory sound insulation test to BS EN ISO 140-3:1995 on a twin frame GypWall QUIET partition incorporating Gypframe 48mm (48S50) studs at 600mm centres with a double layer of 15mm Gyproc SoundBloc each side and 25mm Isowool 1200 APR in the cavity.

The test sponsor was British Gypsum Ltd.

The test specimen was installed by The Building Test Centre on the 11th November 2005.

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

REPORT AUTHORISATION

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Customer: **British Gypsum Limited**

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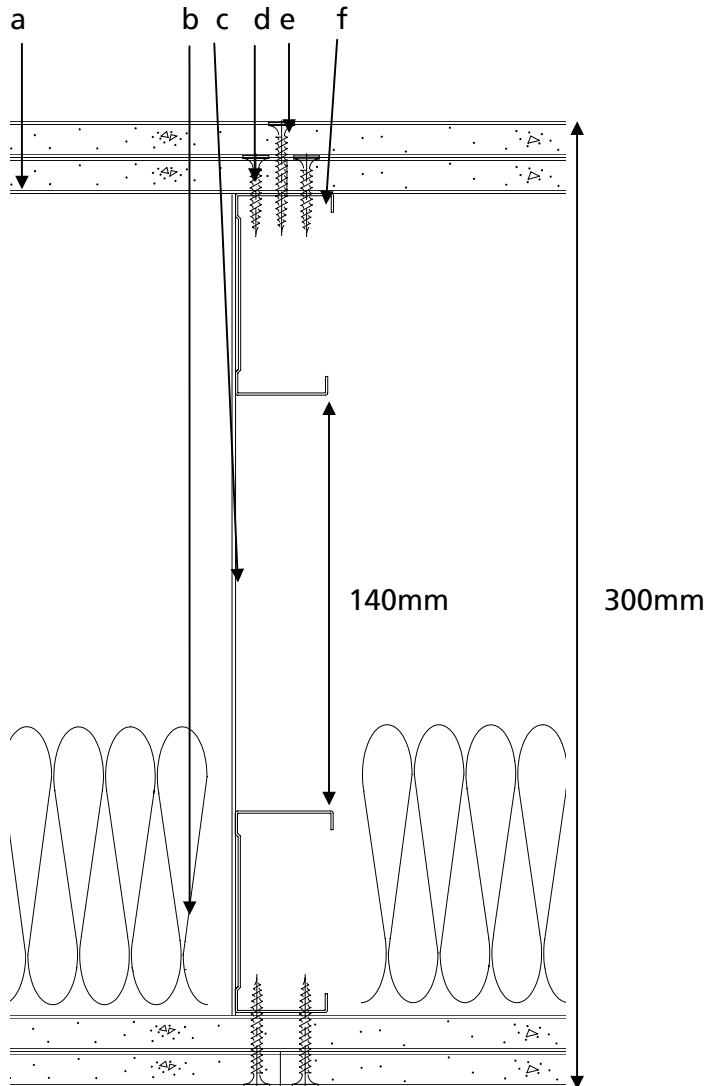
TEST CONSTRUCTION

Gypframe 50C50 channel was screw fixed to the head and base of the test aperture at 600mm centres. Gypframe 48S50 C studs were located 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 300mm. The 48S50 C studs were located at 600mm centres parallel with the first set of framework studs. Gypframe 99 FC Fixing channel braces were installed to opposing studs at mid-height.

One layer of 25mm Isowool was inserted within the cavity.

Both sides were clad with a double layer of 15mm Gyproc SoundBloc. The inner layer boards were fixed to each side of the metal framework using Gyproc 32mm drywall screws at 300mm centres around the board perimeters. The outer layer was fixed to each side of the metal framework using Gyproc 42mm drywall screws at 300mm centres around the board perimeters and at the intermediate stud positions.

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



- a) 15mm Gyproc SoundBloc
- b) 25mm Isowool 1200
- c) Mid-height brace
- d) 32mm Gyproc Drywall screw
- e) 42mm Gyproc Drywall screw
- f) 48S50 Gypframe stud

Figure 1 Cross section plan through the partition

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

TEST MATERIALS

Gyproc SoundBloc

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

Average surface density	12.66 kg/m ²
Average thickness	15.02 mm
Board Code	16 306 5 19:40

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

Metal components

- i) Gypframe 50mm (50C50) channel, nominally 0.5mm thick, manufactured from galvanised mild steel using the "Ultrasteel" process.
- ii) Gypframe 48mm (48S50) stud, nominally 0.5mm thick, manufactured from galvanised mild steel using the "Ultrasteel" process.
- iii) Gypframe 99 FC Fixing channel, nominally 0.5mm thick, manufactured from galvanised mild steel using the "Ultrasteel" process.

All metal components supplied by British Gypsum Limited.

Insulation

25mm Isowool 1200 APR manufactured by British Gypsum-Isover.

Fasteners

- i) 32mm Gyproc Drywall screws supplied by British Gypsum Limited.
- ii) 42mm Gyproc Drywall screws supplied by British Gypsum Limited.

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.

Customer: **British Gypsum Limited**

TEST RESULT

Weighted Airborne Sound Reduction Index R_w (C; Ctr) dB

63 (-2,-6)

For full data see pages 8 and 9.

Test conducted in accordance with BS EN ISO 140-3: 1995
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 was 140/3 issue 6. 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 the subject of 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**

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APPENDIX A- TEST DATA

LABORATORY AIRBORNE SOUND INSULATION TEST - BS EN ISO 140-3:1995										
Test Code: H14323BA		Test Date: 11/11/05								
Specimen Area, S = 8.64 m ²		Room Volume, m ³ :		Room T2	Room T1					
		Temperature, deg.C:		98	58.41					
		Rel. Humidity, %RH:		16.6	17.4					
				59.8	59.6					
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	57.3	31.5	17.1	31.3	0.49	-3.4	22.6			
63	62.6	24.9	10.8	24.7	0.67	-2.1	35.8		26.3	
80	67.6	36.1	13.4	36.1	0.61	-2.5	29.0			
100	77.5	36.3	16.9	36.3	1.10	0.1	41.3	2.7		
125	80.0	34.0	4.9	34.0	1.10	0.1	46.1	0.9	43.8	
160	87.3	41.9	6.9	41.9	1.21	0.5	45.9	4.1		
200	92.1	42.1	10.2	42.1	1.24	0.6	50.6	2.4		
250	94.8	41.9	17.8	41.9	1.35	1.0	53.9	2.1	53.1	
315	94.9	38.8	16.6	38.8	1.39	1.1	57.2	1.8		
400	93.4	34.0	17.4	34.0	1.39	1.1	60.5	1.5		
500	91.1	30.2	16.3	30.0	1.48	1.4	62.5	0.5	61.7	
630	90.0	29.0	10.3	29.0	1.48	1.4	62.4	1.6		
800	91.0	28.0	14.2	27.8	1.56	1.6	64.8	0.2		
1 000	90.5	26.1	13.8	25.8	1.78	2.2	66.9		66.6	
1 250	91.3	24.7	9.8	24.6	1.85	2.3	69.0			
1 600	94.2	25.2	10.5	25.1	1.88	2.4	71.5			
2 000	95.8	29.0	10.5	29.0	1.82	2.3	69.1		64.5	
2 500	94.3	35.2	9.4	35.2	1.54	1.5	60.6	6.4		
3 150	93.2	33.3	10.2	33.3	1.43	1.2	61.1	5.9		
4 000	92.1	27.3	13.0	27.1	1.53	1.5	66.5		64.3	
5 000	90.0	22.3	12.1	21.9	1.34	0.9	69.0			
6 300										
8 000										
10 000										
Single Figure Ratings		Rw	C	Ctr	Total U. Dev., dB			30.1		
BS EN ISO 717-1: 1997		dB	dB	dB						
		63	-2	-6						
		(100-5000)	-1	-6						
Background Corrected										
		(50-3150)	-6	-18						
RT's > factor 1.5 apart										
		(50-5000)	-5	-18						
					Procedure: 140/3/issue 6					
					Worksheet: 140_3_1.XLS					

Customer: **British Gypsum Limited**

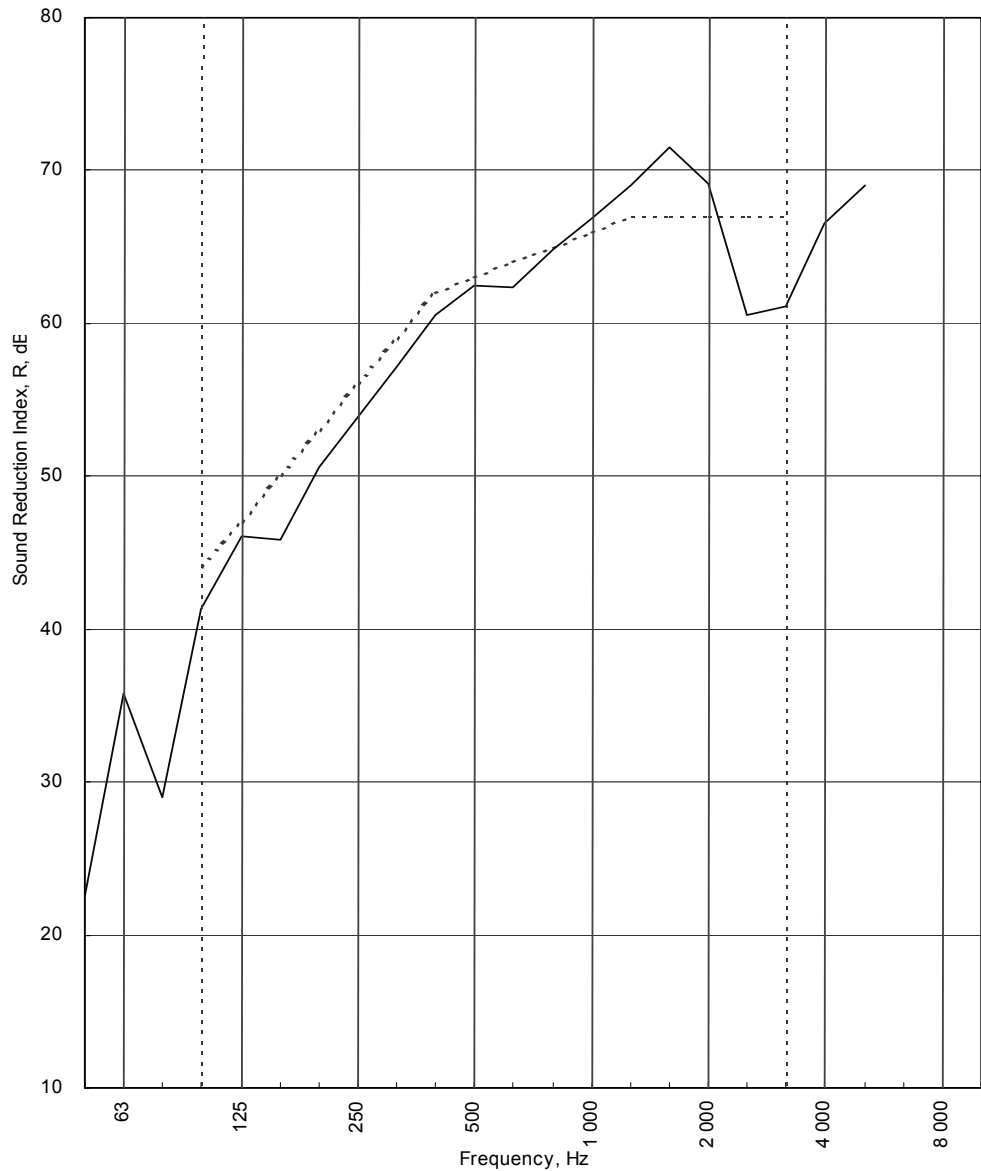
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Test Code:
H14323BA
 Test Date:
11/11/05

Freq. Hz	R dB
50	22.6
63	35.8
80	29.0
100	41.3
125	46.1
160	45.9
200	50.6
250	53.9
315	57.2
400	60.5
500	62.5
630	62.4
800	64.8
1 000	66.9
1 250	69.0
1 600	71.5
2 000	69.1
2 500	60.6
3 150	61.1
4 000	66.5
5 000	69.0
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) = 63 (-2;-6) dB		
	Max dev. 6.4 dB at 2 500 Hz		
Evaluation based on laboratory measurement results obtained by an engineering method:	C₅₀₋₃₁₅₀ = -6 dB	C₅₀₋₅₀₀₀ = -5 dB	C₁₀₀₋₅₀₀₀ = -1 dB
	C_{tr,50-3150} = -18 dB	C_{tr,50-5000} = -18 dB	C_{tr,100-5000} = -6 dB

Customer: **British Gypsum Limited**



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 six 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 and BTC13562EA)

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	93.9	91.1

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

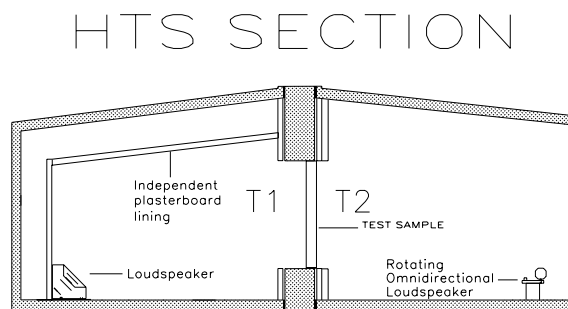


Figure 2 Chamber layout