



# 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)

Report Number **BTC 12772A**

AN ACOUSTIC TEST REPORT COVERING A TEST TO BS EN ISO 140-3:1995 ON A TIMBER STUD PARTITION COMPRISING 63mm x 38mm TIMBER STUDS CLAD EACH SIDE WITH A SINGLE LAYER OF 15mm GYPROC WALLBOARD AND 25mm ISOWOOL 1200 IN THE CAVITY.

Test Date: 8<sup>th</sup> May 2003

[www.btconline.co.uk](http://www.btconline.co.uk)

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

Customer: **British Gypsum Limited**

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## FOREWORD

This test report details a sound insulation test conducted on a timber stud partition. The test sponsor was British Gypsum Limited.

The test specimen was installed by British Gypsum Limited. The construction of the specimen took place on the 7<sup>th</sup> May 2003. The Building Test Centre played no role in the design or selection of the materials comprising the test specimen.

## REPORT AUTHORISATION

Report Author

*Sarah J Wood*

**Sarah Wood**  
B.Eng. (Hons.), AMIOA  
Project Leader

Authorised by

*Paul Howard*

**Eur Ing. Paul Howard**  
BSc. (Hons.), CEng., MIOA  
Head of Laboratory

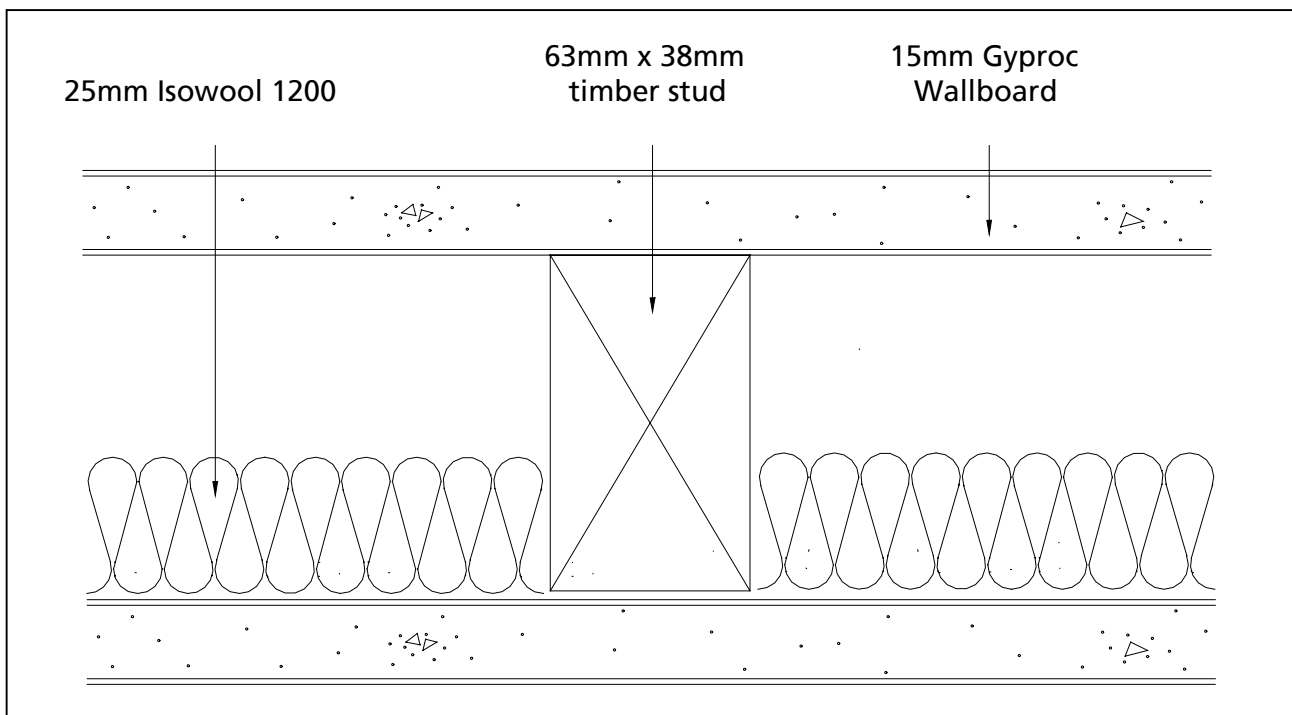
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## TEST CONSTRUCTION

63mm x 38mm timbers were fixed at 600mm centres to the head and base of the test aperture. 63mm x 38mm timber studs were installed at 600mm centres between the head and base timbers. 25mm Isowool 1200 was located in the cavity between the studs.

The frame work was clad each side with a single layer of 15mm Gyproc Wallboard using 38mm Gyproc Drywall Timber Screws at 300mm centres around the perimeter of the boards and to the intermediate stud positions.

All joints were staggered and taped, the perimeter of the specimen was sealed with Gyproc sealant.



**Figure 1.** Cross section through 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

### Plasterboard

Nominally 3000mm (long) x 1200mm (wide) x 15mm (thick) Gyproc Wallboard manufactured by British Gypsum Limited, ex East Leake works.

Average thickness:	14.98mm
Average surface density:	9.88kg/m <sup>2</sup>
Board identification numbers:	16 023 3 09:12
Nominal moisture content:	<1%

The surface density was calculated using the actual weight and size of a selection of the boards used in the test specimen. The board thickness is the mean thickness of the boards used in the test specimen. The moisture content of plasterboard has been established from measurements made over many tests using samples dried to constant weight in an oven at 40°C.

### Fasteners

- i) 38mm Gyproc Drywall Timber Screws

All fasteners supplied by British Gypsum Limited.

### Insulation

Nominally 25mm thick Isowool 1200 glass mineral wool, manufactured and supplied by British Gypsum – Isover Limited.

Actual density:	18.00 kg/m <sup>3</sup> .
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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 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 60m<sup>3</sup>. The accuracy of the test method conforms to BS EN 20140-2:1993, the test procedure used was 140/3 issue 5. 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 for further information.

## TEST RESULTS

**Weighted Airborne Sound Reduction Index**

**$R_w$  (C; Ctr) = 40 (-2; -7) dB**

For full data see pages 7 - 8.

Test conducted in accordance with BS EN ISO 140-3: 1995  
Rated in accordance with BS EN ISO 717/1: 1997

## 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.

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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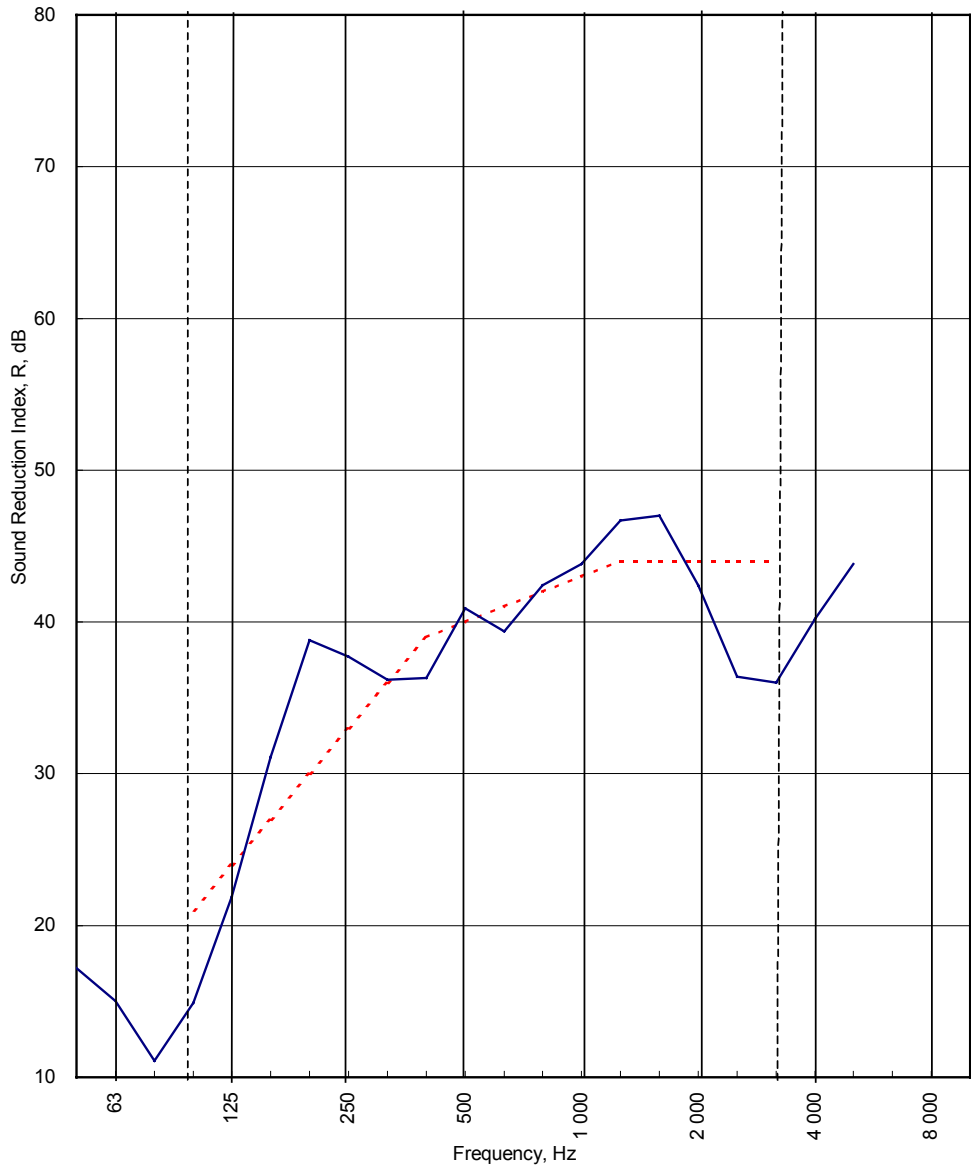


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**APPENDIX A – TEST DATA**

Test Code: H12772A
Test Date: 08/05/03

Freq. Hz	R dB
50	17.2
63	15.0
80	11.1
100	14.9
125	21.9
160	31.1
200	38.8
250	37.7
315	36.2
400	36.3
500	40.9
630	39.4
800	42.4
1 000	43.8
1 250	46.7
1 600	47.0
2 000	42.4
2 500	36.4
3 150	36.0
4 000	40.2
5 000	43.8
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) = 40 (-2;-7) dB</b>		
	Max dev. 8 dB at 3 150 Hz		
Evaluation based on laboratory measurement results obtained by an engineering method:	C <sub>50-3150</sub> = -3 dB	C <sub>50-5000</sub> = -3 dB	C <sub>100-5000</sub> = -2 dB
	C <sub>tr,50-3150</sub> = -11 dB	C <sub>tr,50-5000</sub> = -11 dB	C <sub>tr,100-5000</sub> = -7 dB

Customer: **British Gypsum Limited**



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

Test Code: **H12772A**

Test Date: **08/05/03**

Specimen Area, S =	<b>8.64</b> m <sup>2</sup>	Room Volume, m <sup>3</sup> :	<b>98</b>	Room T2	<b>60.2</b>
		Temperature, deg.C:	<b>16.1</b>	Room T1	<b>15.9</b>
		Rel. Humidity, %RH:	<b>51.7</b>		<b>50.7</b>

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	60.0	39.4	22.4	39.4	<b>0.51</b>	-3.4	<b>17.2</b>		
63	63.4	47.3	20.1	47.3	<b>0.86</b>	-1.1	<b>15.0</b>		13.7
80	64.3	51.5	11.7	51.5	0.76	-1.7	<b>11.1</b>		
100	73.9	58.3	25.4	58.3	0.94	-0.7	<b>14.9</b>	6.1	
125	79.5	57.5	11.0	57.5	1.08	-0.1	<b>21.9</b>	2.1	18.8
160	86.0	55.1	7.5	55.1	1.16	0.2	<b>31.1</b>		
200	92.1	54.5	15.7	54.5	1.47	1.2	<b>38.8</b>		
250	94.4	57.6	7.8	57.6	1.38	0.9	<b>37.7</b>		37.4
315	94.9	59.4	13.1	59.4	1.31	0.7	<b>36.2</b>		
400	93.0	57.0	13.5	57.0	1.19	0.3	<b>36.3</b>	2.7	
500	90.7	50.5	10.4	50.5	1.31	0.7	<b>40.9</b>		38.4
630	89.9	51.3	12.2	51.3	1.34	0.8	<b>39.4</b>	1.6	
800	90.7	49.2	10.2	49.2	1.38	0.9	<b>42.4</b>		
1 000	90.2	47.8	6.8	47.8	1.53	1.4	<b>43.8</b>		44.0
1 250	91.4	46.4	5.0	46.4	1.64	1.7	<b>46.7</b>		
1 600	94.1	48.9	7.4	48.9	1.70	1.8	<b>47.0</b>		
2 000	95.5	54.7	6.4	54.7	1.63	1.6	<b>42.4</b>	1.6	39.9
2 500	93.7	58.5	6.8	58.5	1.48	1.2	<b>36.4</b>	7.6	
3 150	92.7	57.5	7.6	57.5	1.35	0.8	<b>36.0</b>	8.0	
4 000	91.6	52.3	8.4	52.3	1.38	0.9	<b>40.2</b>		38.9
5 000	90.0	46.8	8.9	46.8	1.27	0.6	<b>43.8</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>29.7</b>
<b>BS EN ISO 717-1: 1997</b>	<b>dB</b>	<b>dB</b>	<b>dB</b>		
	<b>40</b>	<b>-2</b>	<b>-7</b>		
	<b>(100-5000)</b>	<b>-2</b>	<b>-7</b>		
	<b>(50-3150)</b>	<b>-3</b>	<b>-11</b>		
RT's > factor 1.5 apart				Test Procedure: 140/3/issue 5	
Tested Serially[ ] Real Time[ ]	<b>(50-5000)</b>	<b>-3</b>	<b>-11</b>	Worksheet: MSOFFICE\EXCEL\140\140_3_1.XLS	





## APPENDIX B – LABORATORY DETAILS

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 (BTC 11709A)

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	56.3	61.8	58.5	60.6	62.5	66.3	74.1	79.5	85.0	90.4	93.8	95.0	95.3	98.3	100.4	98.5	96.3	93.9	91.1

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

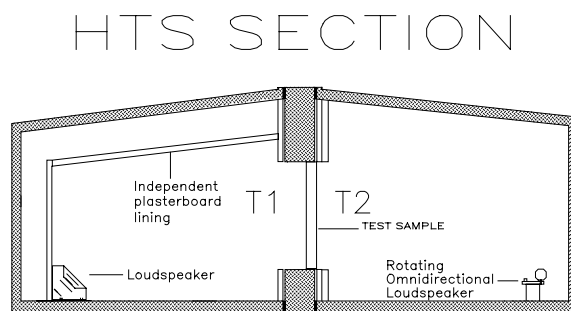


Figure 2. Chamber layout