The Building Test Centre
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Report Number **BTC 12151A**

SOUND INSULATION TEST TO BS EN ISO 140-3:1995 ON A BRITISH GYPSUM GYPWALL dB PLUS PARTITION SYSTEM INCORPORATING 70mm ACOUSTUDS AT 600mm CENTRES, CLAD WITH A SINGLE LAYER OF 12.5mm GYPROC SOUNDBLOC BOARD EACH SIDE WITH 25mm ISOWOOL 1200 IN THE CAVITY.

Test Date: 1st August 2002

www.btconline.co.uk

Customer: **British Gypsum Ltd.**
East Leake
Loughborough
Leicestershire
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FOREWORD

This test report details a sound insulation test conducted on a sheet and stud partition system. The test sponsor was British Gypsum Ltd.

The test specimen was installed by British Gypsum Limited. The construction of the specimen took place on the 1st August 2002.

REPORT AUTHORISATION

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TEST CONSTRUCTION

Gyproc 72C50 floor and ceiling metal channels were screw fixed at 600mm centres to the head and the base of the test aperture using 25mm Gyproc Drywall screws. Gyproc 70AS50 Acoustuds were inserted between the head and base channels at 600mm centres.

A single layer of 12.5mm Gyproc SoundBloc board was screw fixed to either side of the metal framework. The boards were screw fixed at 300mm centres around the perimeter, and at 300mm centres within the field of the boards using 25mm Gyproc Drywall screws. 25mm Isowool 1200 insulation was inserted in the cavity. 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. All the board joints were left staggered.

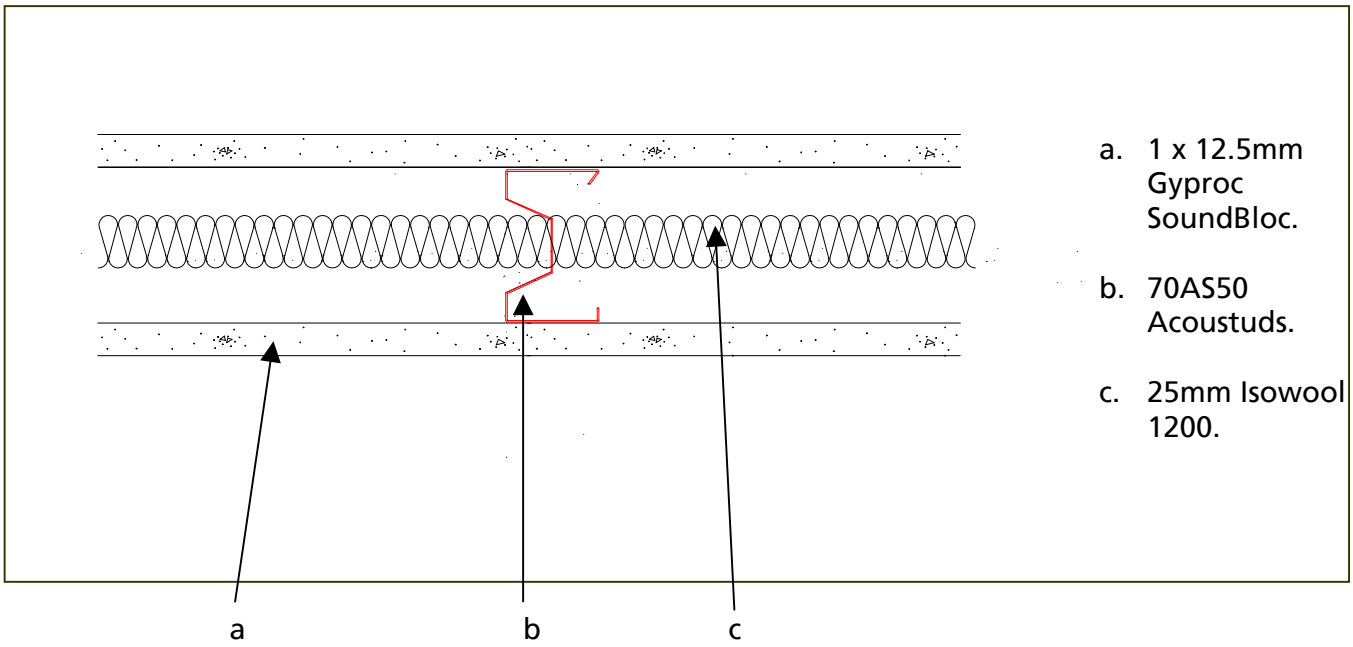

Figure 1. Cross-section through the partition.

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

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TEST MATERIALS

Gyproc SoundBloc

Nominally 2400mm (long) x 1200mm (wide) x 12.5mm (thick) Gyproc board, manufactured by British Gypsum ex East Leake Works.

Average surface density:	10.76 kg/m^2
Actual thickness:	12.55 mm
Board code:	271672 00:15

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

Metal components

i) 72C50 channels manufactured from hot dipped galvanised mild steel.
ii) 70mm Acoustuds manufactured from hot dipped galvanised mild steel 0.5mm thick, using the Ultrasteel process.

All components supplied by British Gypsum Ltd.

Fasteners

i) 25mm Gyproc S point Drywall screws supplied by British Gypsum Limited.

Insulation

Nominally 25mm (thick) Isowool 1200mm x 600mm glass mineral wool insulation manufactured by Isover Gullfiber.

i) Average surface density 0.45 Kg/m^2
ii) Average density 17.94 Kg/m^3

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 PROCEDURE

The test specimen (3.6 m x 2.4 m) was constructed in a wall dividing two reverberant rooms of approximately 98m^3 and 62m^3. The accuracy of the test method conforms to BS EN 20140-2:1993, the test procedure used was 140/3 issue 4. 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.

TEST RESULTS

Weighted Airborne Sound Reduction Index	R_w (C; Ctr) = 48 (-4; -12) 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

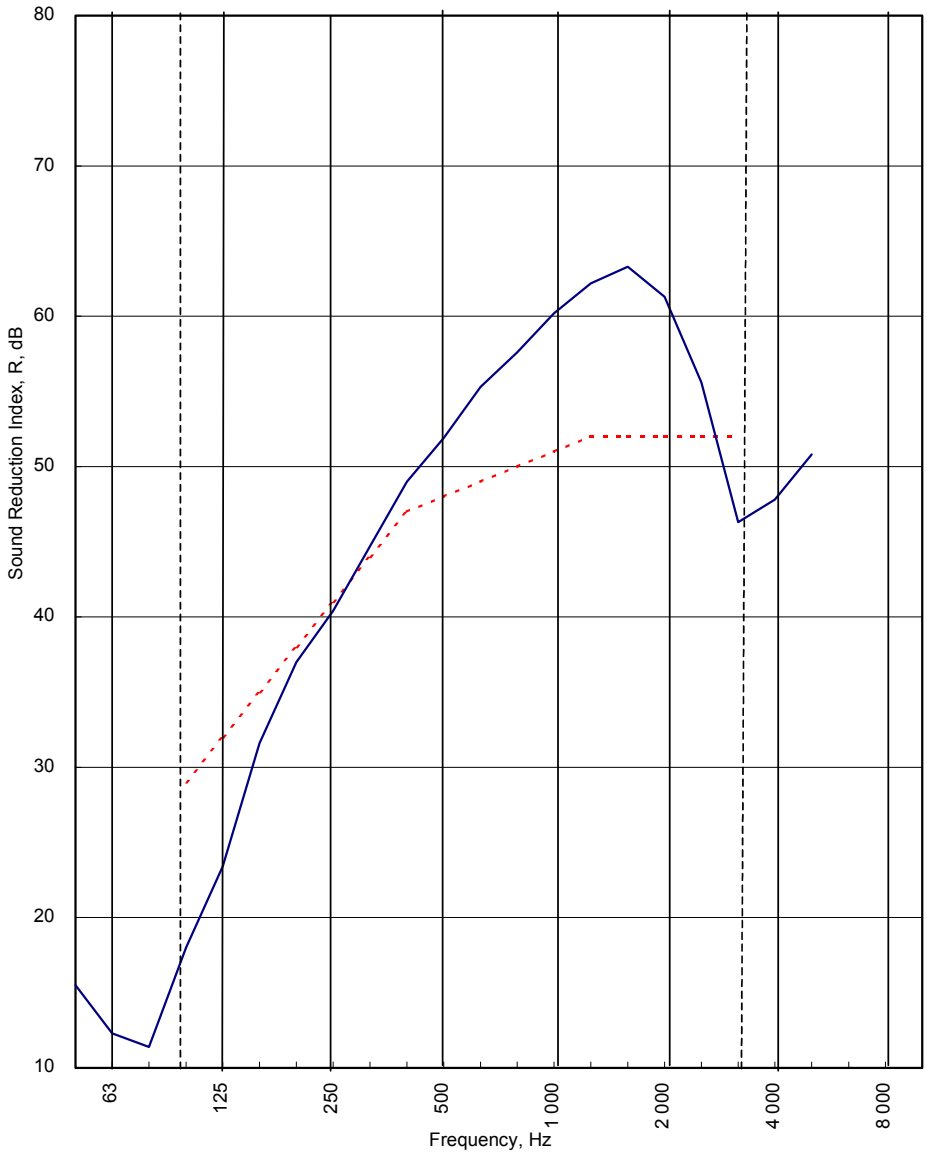
The results only relate to the behaviour of the element of construction under the particular conditions of test; they are not intended to be the sole criteria for assessing the potential acoustic performance of the element in use nor do they reflect the actual behaviour.

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.

APPENDIX A- TEST DATA

Test Code:
H12151A
Test Date:
01/08/02

Freq. Hz	R dB
50	15.5
63	12.3
80	11.4
100	18.0
125	23.4
160	31.6
200	37.0
250	40.4
315	44.7
400	49.0
500	51.9
630	55.3
800	57.6
1 000	60.2
1 250	62.2
1 600	63.3
2 000	61.3
2 500	55.6
3 150	46.3
4 000	47.8
5 000	50.8
6 300	
8 000	
10 000	



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

Rating according to BS EN ISO 717-1:1997	**Rw (C;Ctr) = 48 (-4;-12) dB**		
	Max dev. 11 dB at 100 Hz		
Evaluation based on laboratory measurement results obtained by an engineering method:	$C_{50\text{-}3150}$= **-8 dB**	$C_{50\text{-}5000}$= **-7 dB**	$C_{100\text{-}5000}$= **-4 dB**
	$C_{tr,50\text{-}3150}$= **-19 dB**	$C_{tr,50\text{-}5000}$= **-19 dB**	$C_{tr,100\text{-}5000}$: **-12 dB**

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

Test Code: **H12151A** Test Date: **01/08/02**

	Room T2	Room T1
Specimen Area, S = **8.64** m^2		
Room Volume, m^3:	**98**	**62**
Temperature, deg.C:	**21.6**	**22.4**
Rel. Humidity, %RH:	**66.9**	**64.1**

Freq Hz	Test Room T2 to Test Room T1 Source dB	Rec. (uc) dB	Bgrnd dB	Rec. (corr) dB	Rev.time Sec	Corr. dB	R dB	U.Dev. dB	R 1/1Oct dB
50	53.7	36.2	27.5	**35.6**	**0.63**	-2.6	**15.5**		
63	58.3	45.2	21.0	45.2	**0.95**	-0.8	**12.3**		12.7
80	58.0	46.9	10.1	46.9	1.22	0.3	**11.4**		
100	69.0	49.8	27.8	49.8	0.87	-1.2	**18.0**	11.0	
125	74.1	50.3	17.5	50.3	1.04	-0.4	**23.4**	8.6	21.5
160	81.3	49.6	23.9	49.6	1.11	-0.1	**31.6**	3.4	
200	86.6	50.3	24.0	50.3	1.36	0.7	**37.0**	1.0	
250	88.4	48.9	9.6	48.9	1.41	0.9	**40.4**	0.6	39.7
315	88.1	44.3	19.5	44.3	1.40	0.9	**44.7**		
400	86.7	37.6	18.6	37.6	1.13	-0.1	**49.0**		
500	84.8	32.9	15.8	32.9	1.15	0.0	**51.9**		51.3
630	83.5	28.9	15.9	**28.7**	1.30	0.5	**55.3**		
800	84.6	28.0	11.8	28.0	1.43	1.0	**57.6**		
1 000	84.2	25.5	11.0	**25.3**	1.56	1.3	**60.2**		59.6
1 250	84.7	24.2	8.4	24.2	1.68	1.7	**62.2**		
1 600	87.8	26.2	7.5	26.2	1.71	1.7	**63.3**		
2 000	89.2	29.6	6.5	29.6	1.69	1.7	**61.3**		58.8
2 500	88.0	34.0	5.9	34.0	1.67	1.6	**55.6**		
3 150	87.6	42.3	7.4	42.3	1.43	1.0	**46.3**	5.7	
4 000	87.3	40.7	9.2	40.7	1.50	1.2	**47.8**		47.9
5 000	84.4	34.6	18.6	34.6	1.45	1.0	**50.8**		
6 300									
8 000									
10 000									

Single Figure Ratings	**Rw**	**C**	**Ctr**	**Total U. Dev., dB**	**30.3**
BS EN ISO 717-1: 1997	**dB**	**dB**	**dB**		
	48	**-4**	**-12**		
	(100-5000)	**-4**	**-12**		
Background Corrected					
	(50-3150)	**-8**	**-19**		
RT's > factor 1.5 apart					
Tested Serially[ ] Real Time[ ]	**(50-5000)**	**-7**	**-19**		

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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 (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.

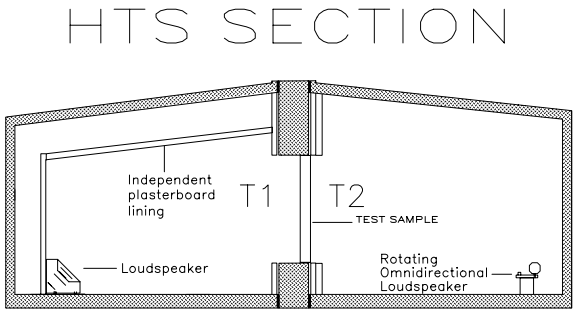

Figure 2 Chamber layout.

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