The Building Test Centre
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Report Number **BTC 11303A**

AN ACOUSTIC TEST REPORT COVERING A LABORATORY SOUND INSULATION TEST TO BS EN ISO 140-3: 1995 ON A 146S50 METAL STUD PARTITION INCORPORATING GYPROC RESILIENT BAR AND A DOUBLE LAYER OF 12.5mm GYPROC SOUNdBLOC ON BOTH SIDES AND 50mm ISOWOOL 1200 IN THE CAVITY

Test Date: 6th December 2000

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

UKAS TESTING
No. 0296

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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 Limited.

The test specimen was installed by British Gypsum Limited. The construction of the specimen took place on the 1st and 6th December 2000. The Building Test Centre played no role in the design or selection of the materials comprising the test specimen.

REPORT AUTHORISATION

Report Author	Authorised by
Sarah J. Wood	
Sarah Wood B.Eng. (Hons.), AMIOA *Project Leader*	Eur Ing. **Paul Howard** BSc. (Hons.), CEng., MIOA *Head of Laboratory*

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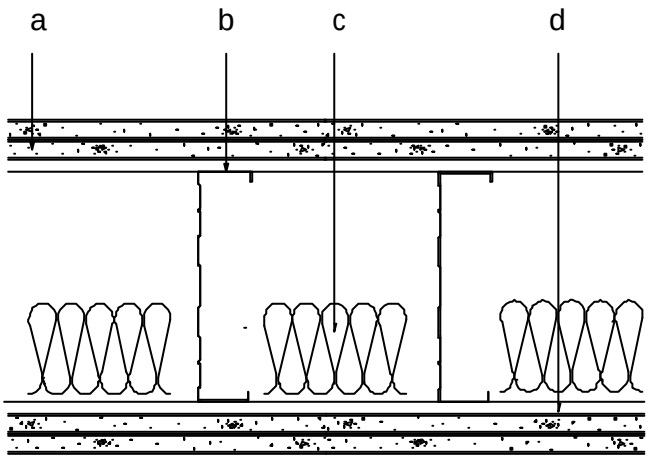
TEST CONSTRUCTION

Gyproc 148C50 channel was fixed to the head and base of the test aperture using 36mm Gyproc Drywall screws at 600mm centres. Gyproc 146S50 studs were set at 600mm centres between the head and base channel. 50mm Isowool 1200 was placed between the studs.

Gyproc Resilient Bar was fixed horizontally at 600mm centres to both sides of the framework using 25mm Gyproc Wafer Head screws. Gyproc Resilient Bar noggings were fixed vertically to the end studs.

The metal framework was clad both sides with a double layer of 12.5mm Gyproc SoundBloc board. The inner layer boards were fixed with 25mm Gyproc Drywall screws at 230mm centres to the resilient bar and around the perimeter of the boards. The outer layer boards were fixed with 42mm Gyproc Drywall screws at 230mm centres to the resilient bar and around the perimeter of the boards. All joints were staggered from side to side and between layers.

Screwheads and joints were taped with Gyproc self adhesive tape. The perimeter of the partition was sealed with Gyproc Sealant.



a. Double layer of 12.5mm Gyproc SoundBloc

b. Gyproc 146S50 metal studs

c. 50mm Isowool 1200 insulation

d. Gyproc Resilient Bar

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 SoundBloc manufactured by British Gypsum Limited, ex Kirby Thore works.

Average surface density:	10.52 kg/m^2
Average thickness:	12.59 mm
Board identification numbers:	27-290-0 23:07

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

Metal components

i) Gyproc 146S50 metal studs, nominally 0.5mm thick, manufactured from galvanised mild steel using the 'Ultrasteel' process.
ii) Gyproc 148C50 channel, nominally 0.5mm thick, manufactured from galvanised mild steel using the 'Ultrasteel' process.
iii) Gyproc Resilient Bar manufactured from galvanised mild steel.

All metal components supplied by British Gypsum Limited.

Fasteners

i) 25mm Gyproc Drywall screws.
ii) 36mm Gyproc Drywall screws.
iii) 42mm Gyproc Drywall screws.
iv) 25mm Gyproc Wafer Head screws.

All fasteners supplied by British Gypsum Limited.

Insulation

Isowool 1200 acoustic partition roll, nominally 50mm thick. Manufactured and supplied by British Gypsum-Isover Limited.

Actual weight:	10.23 kg
Approximate surface density:	0.66 kg/m^2
Approximate density:	13.2 kg/m^3

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Surface density calculated using the weight of one roll of 50mm Isowool 1200 insulation and its surface area and nominal thickness.

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^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 3. 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) = 64 (-2; -6) 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

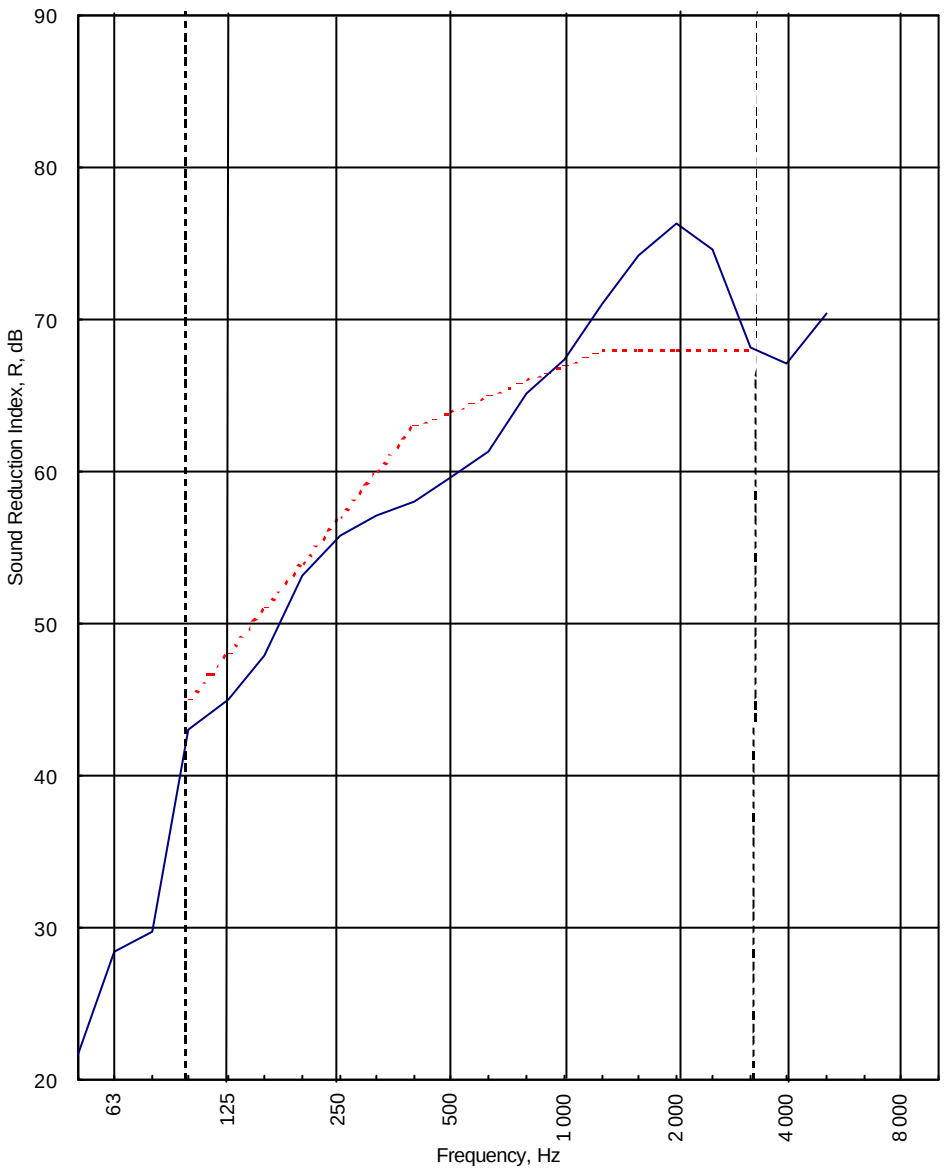
The results only relate to the behaviour of the element of construction under the particular conditions of test; they are not intended to be the sole criteria for assessing the potential acoustic performance of the element in use.

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.

APPENDIX A – TEST DATA

Test Code:
H11303A
Test Date:
06/12/00

Freq. Hz	R dB
50	21.7
63	28.5
80	29.8
100	43.0
125	45.0
160	47.9
200	53.2
250	55.8
315	57.2
400	58.0
500	59.7
630	61.4
800	65.1
1 000	67.5
1 250	71.0
1 600	74.3
2 000	76.4
2 500	74.7
3 150	68.3
4 000	67.1
5 000	70.5
6 300	
8 000	
10 000	



Rating according to BS EN ISO 717-1:1997

Rw (C;Ctr) = 64 (-2;-6) dB

Max dev. 5 dB at 400 Hz

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

$C_{50\text{-}3150}$= **-7 dB** $C_{50\text{-}5000}$= **-6 dB** $C_{100\text{-}5000}$= **-1 dB**

$C_{tr,50\text{-}3150}$= **-20 dB** $C_{tr,50\text{-}5000}$= **-20 dB** $C_{tr,100\text{-}5000}$: **-6 dB**

UKAS TESTING
No. 0296

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

Test Code: **H11303A** Test Date: **06/12/00**

Specimen Area, S = **8.64** m^2

	Room T2	Room T1
Room Volume, m^3:	**98**	**62**
Temperature, deg.C:	**14.4**	**14**
Rel. Humidity, %RH:	**70.8**	**68.8**

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	59.4	34.0	16.7	34.0	0.49	-3.7	**21.7**		
63	62.3	31.9	17.5	**31.7**	0.70	-2.1	**28.5**		25.1
80	65.5	33.0	6.7	33.0	**0.62**	-2.7	**29.8**		
100	74.2	31.1	19.0	**30.8**	**1.04**	-0.4	**43.0**	2.0	
125	80.2	35.6	5.1	35.6	1.26	0.4	**45.0**	3.0	44.9
160	87.3	40.4	6.7	40.4	1.45	1.0	**47.9**	3.1	
200	92.6	40.8	21.5	40.8	1.59	1.4	**53.2**	0.8	
250	95.3	40.4	17.9	40.4	1.42	0.9	**55.8**	1.2	55.1
315	95.3	39.1	19.7	39.1	1.45	1.0	**57.2**	2.8	
400	93.5	35.8	16.7	35.8	1.23	0.3	**58.0**	5.0	
500	91.6	32.6	12.1	32.6	1.35	0.7	**59.7**	4.3	59.5
630	90.5	29.2	10.3	29.2	1.18	0.1	**61.4**	3.6	
800	90.5	26.6	10.5	26.6	1.53	1.2	**65.1**	0.9	
1 000	90.2	24.4	8.8	24.4	1.69	1.7	**67.5**		67.2
1 250	91.3	22.7	8.5	**22.5**	1.91	2.2	**71.0**		
1 600	94.0	22.0	8.1	**21.8**	1.87	2.1	**74.3**		
2 000	95.5	21.3	6.7	**21.1**	1.84	2.0	**76.4**		75.0
2 500	93.9	21.0	7.2	**20.8**	1.66	1.6	**74.7**		
3 150	93.2	25.9	8.1	25.9	1.45	1.0	**68.3**		
4 000	92.5	26.2	10.5	26.2	1.39	0.8	**67.1**		68.4
5 000	90.4	21.0	11.2	**20.5**	1.32	0.6	**70.5**		
6 300									
8 000									
10 000									

Single Figure Ratings	**Rw**	**C**	**Ctr**	**Total U. Dev., dB**	**26.7**
BS EN ISO 717-1: 1997	**dB**	**dB**	**dB**		
	64	**-2**	**-6**		
	(100-5000)	**-1**	**-6**		
Background Corrected					
	(50-3150)	**-7**	**-20**		
RT's > factor 1.5 apart				Test Procedure: 140/3/issue 3	
Tested Serially[ ] Real Time[ ]	**(50-5000)**	**-6**	**-20**	Worksheet: MSOFFICE\EXCEL\140\140_3_1.XLS	

Customer: **British Gypsum Limited**

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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^{o} 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 last 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 shown to prove the insignificance of this installation position on the test results.

The laboratory limit for measurement due to flanking is (BTC H 3306A)

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	32	44	39	55	56	59	64	63	70	77	84	88	91	92	94	97	96	98	96	90	87

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

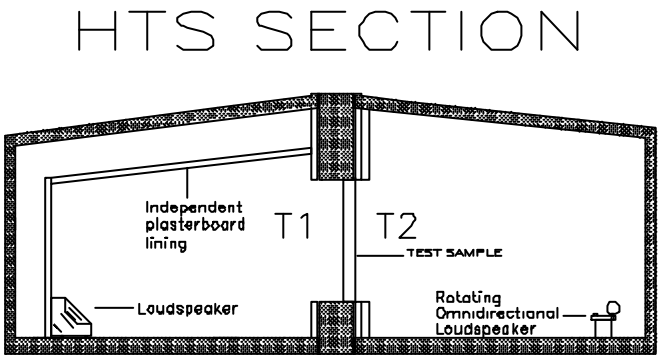

Figure 1. Chamber layout