The Building Test Centre
Fire Acoustics Structures

The Building Test Centre
British Gypsum Limited
East Leake
Loughborough
Leicestershire LE12 6NP
Tel 0115 945 1564
Fax 0115 945 1562

Report Number BTC 10053A

ACOUSTIC TEST REPORT COVERING LABORATORY SOUND INSULATION TEST TO BS EN ISO 140-3:1995 ON A 164mm GYPROC METAL STUD PARTITION INCORPORATING GYPROC 70S50 STUDS WITH GYPROC RESILIENT BAR BOTH SIDES, LINED EACH SIDE WITH A DOUBLE LAYER 15mm GYPROC SOUNdBLOC BOARD AND 50mm ISOWOOL 1200 IN THE CAVITY.

Test Date: 03 April 1998

Customer:

British Gypsum Limited
Head Office
East Leake
Loughborough
Leicestershire
LE12 6HX

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DESCRIPTION

Gyproc 72C50 channel was fixed at the head and base of the test aperture at 600mm centres. Gyproc 70S50 studs were set at 600mm centres between the head and base channel. Gyproc Resilient bar was fixed horizontally at 600mm centres to both sides of the framework with Gyproc wafer head screws to each stud. Gyproc resilient bar noggings were fixed vertically to the end studs.
The metal framework was clad both sides with a double layer of 15mm Gyproc SoundBloc board. The inner layer boards were fixed with 25mm Gyproc drywall screws at 230mm centres around the perimeter to the resilient bar. The outer layer boards were fixed with 42mm Gyproc drywall screws at 230mm centres around the perimeter and at the intermediate positions to the resilient bar.
50mm Isowool 1200 insulation was placed in the cavity.
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.

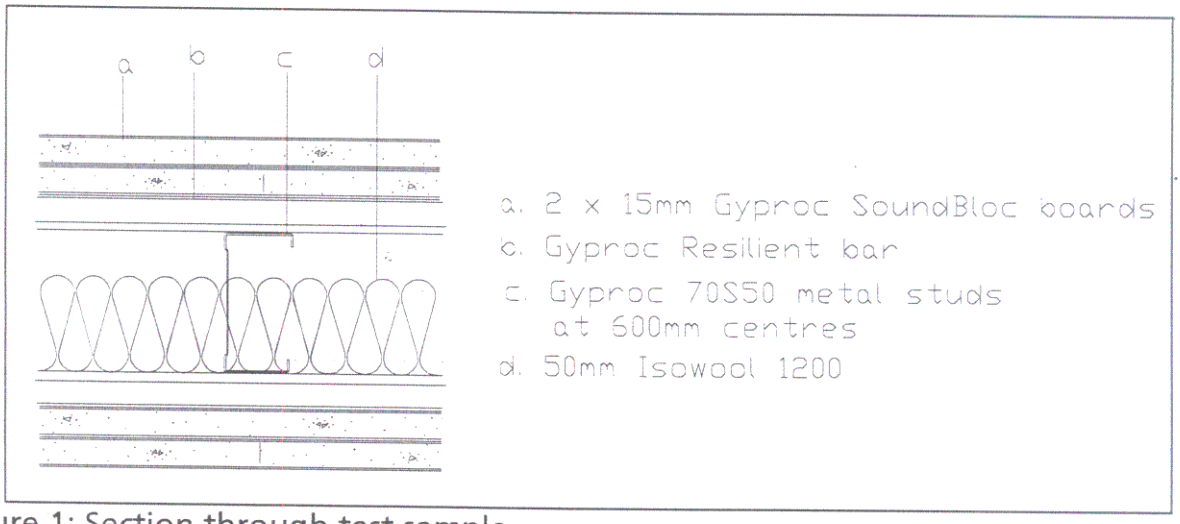

Figure 1: Section through test sample

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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RESULTS

Weighted Airborne Sound Reduction Index R_w (C; Ctr) = 65 (-2;-8) dB

For full data see pages 5 and 6.

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

MATERIALS

Gyproc SoundBloc board

Nominally 15mm (thick) x 1200mm (wide) x 2400mm (long) Gyproc SoundBloc board manufactured by British Gypsum Limited ex Kirkby Thore works.

Actual surface density:	12.80 kg/m^2
Actual thickness:	15.04 mm
Board identification number:	27 2886 14 41 12
Nominal moisture content:	-

Surface density calculated using actual weight of all the boards used in the test specimen.

Metal components

(i) Gyproc 70S50 metal studs and 72C50 channel manufactured using the Ultrasteel process from hot dipped galvanised mild steel nominally 0.5mm thick.

(ii) Gyproc Resilient bar manufactured using the Ultrasteel process from hot dipped galvanised mild steel.

All metal components supplied by British Gypsum Limited.

Fasteners

(i) 25mm Gyproc drywall screws.
(ii) 42mm Gyproc drywall screws.

All fasteners supplied by British Gypsum Limited.

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Insulation

50mm thick Isowool 1200 glass mineral wool roll manufactured by British Gypsum- Isover Limited.

Actual surface density: 0.71 kg/m^2

Surface density calculated using actual weight of the material used in the test specimen

TEST PROCEDURE

The test specimen (2.4 m x 3.6 m) was constructed in a wall dividing two reverberant rooms of approximately 62m^3 and 98m^3. The accuracy of the test method conforms to BS EN 20140-2:1993, the test procedure used was 140/3 issue 1. 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.

Report Author: Arshad Mahmood

Arshad Mahmood BSc., GradInstP, MIOA
Scientist

Head of Laboratory: P Howard

Paul Howard BSc. (Hons), CEng, MIOA
Systems Technical Manager

Report Date: 8 April 1998

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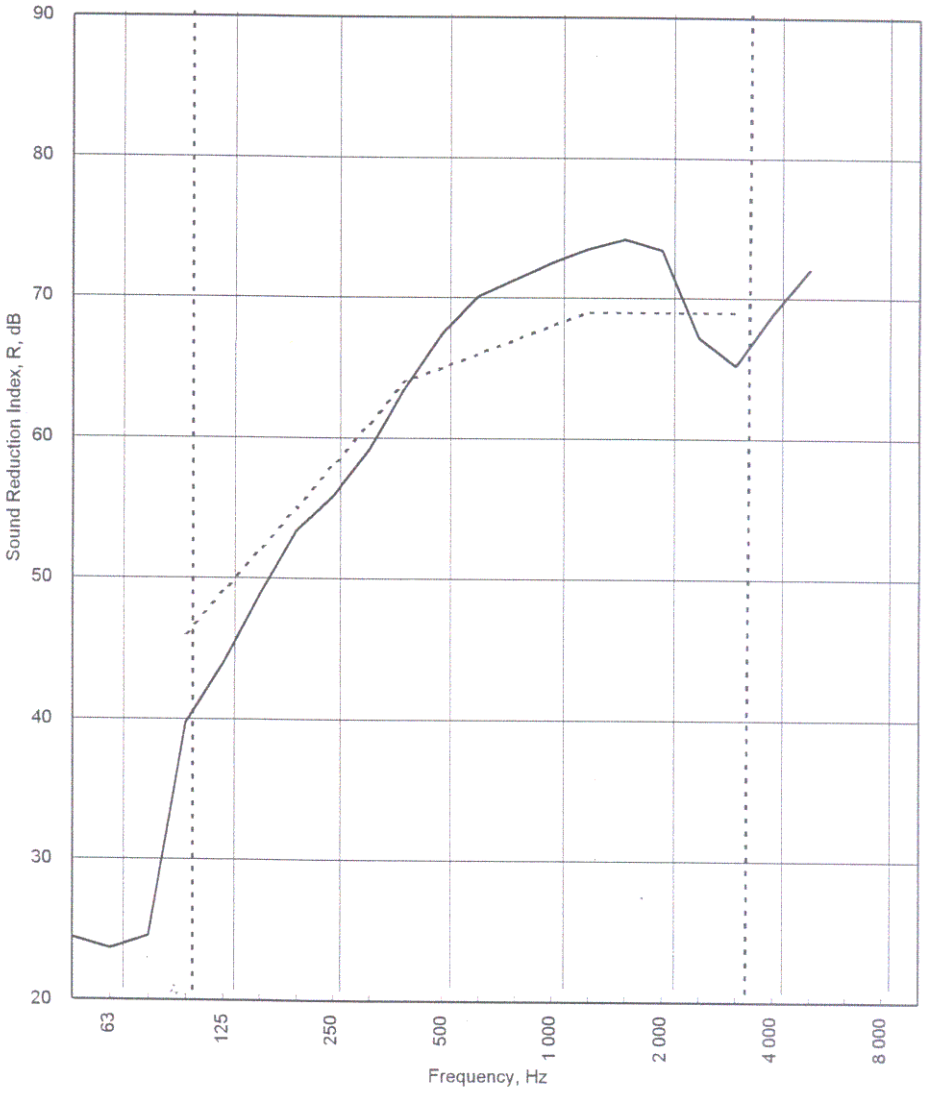
Test Code:
H10053A
Test Date:
03/04/98

Freq. Hz	R dB
50	24.4
63	23.6
80	24.5
100	39.7
125	43.9
160	48.8
200	53.4
250	55.8
315	59.2
400	63.6
500	67.4
630	70.1
800	71.3
1 000	72.5
1 250	73.5
1 600	74.2
2 000	73.4
2 500	67.2
3 150	65.2
4 000	68.9
5 000	72.1
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) = 65 (-2;-8) dB

Max dev. 6.3 dB at 100 Hz

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

$C_{50\text{-}3150}$= **-11 dB** $C_{50\text{-}5000}$= **-10 dB** $C_{100\text{-}5000}$= **-1 dB**

$C_{tr,50\text{-}3150}$= **-23 dB** $C_{tr,50\text{-}5000}$= **-23 dB** $C_{tr,100\text{-}5000}$ **-8 dB**

Customer: **British Gypsum Ltd.**

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

Test Code: **H10053A** Test Date: **03/04/98**

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

	Room T2	Room T1
Room Volume, m^3:	**98**	**62**
Temperature, deg.C:	**16**	**15**
Rel. Humidity, %RH:	**52**	**52**

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	60.4	32.3	16.2	32.3	0.49	-3.7	**24.4**		
63	64.9	39.8	9.6	39.8	0.82	-1.5	**23.6**		24.1
80	66.7	38.9	5.7	38.9	0.54	-3.3	**24.5**		
100	75.8	34.1	12.2	34.1	0.72	-2.0	**39.7**	6.3	
125	80.6	36.0	5.6	36.0	0.97	-0.7	**43.9**	5.1	42.7
160	87.4	38.8	10.0	38.8	1.19	0.2	**48.8**	3.2	
200	93.0	39.7	23.3	39.7	1.18	0.1	**53.4**	1.6	
250	95.4	39.8	14.5	39.8	1.21	0.2	**55.8**	2.2	55.5
315	95.3	35.6	15.2	35.6	1.02	-0.5	**59.2**	1.8	
400	93.4	29.6	16.7	29.4	1.04	-0.4	**63.6**	0.4	
500	91.8	24.5	15.0	24.0	1.05	-0.4	**67.4**		66.2
630	90.6	21.0	11.6	20.5	1.14	0.0	**70.1**		
800	90.7	20.2	11.2	19.6	1.20	0.2	**71.3**		
1 000	90.4	19.5	12.4	18.6	1.35	0.7	**72.5**		72.3
1 250	91.6	19.8	8.8	19.4	1.55	1.3	**73.5**		
1 600	94.3	21.6	9.5	21.3	1.53	1.2	**74.2**		
2 000	95.7	23.6	9.5	23.4	1.49	1.1	**73.4**		70.4
2 500	94.0	27.4	8.8	27.4	1.31	0.6	**67.2**	1.8	
3 150	93.1	28.3	10.0	28.3	1.25	0.4	**65.2**	3.8	
4 000	92.1	23.9	11.3	23.7	1.30	0.5	**68.9**		67.8
5 000	90.6	19.2	11.6	18.4	1.13	-0.1	**72.1**		
6 300									
8 000									
10 000									

Single Figure Ratings
BS EN ISO 717-1: 1997

	Rw dB	C dB	Ctr dB
	65	**-2**	**-8**
(100-5000)		**-1**	**-8**
(50-3150)		**-11**	**-23**
(50-5000)		**-10**	**-23**

Total U. Dev., dB **26.2**

Tested By:

Checked By:

Test Procedure: 140/3/issue 1

Worksheet: MSOFFICE\EXCEL\140\140_3_1.XLS

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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 laboratory limit for measurement due to flanking is

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	34	39	43	56	57	63	62	67	71	78	85	89	91	94	94	97	98	98	95	91	87

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

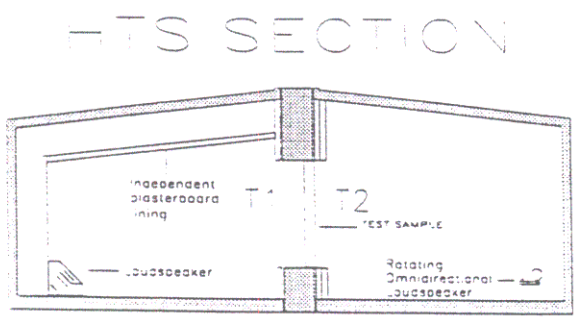

Figure 1 Chamber layout

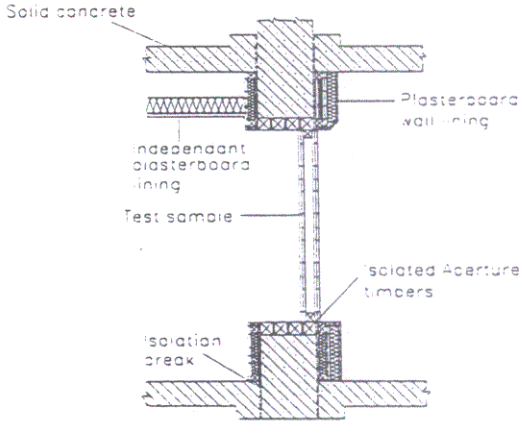

Figure 2 Flanking treatment applied to the chamber

Customer: **British Gypsum Ltd.**

BTC 10053A: Appendix

NAMAS
TESTING
No. 0296
0296SI

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BRITISH GYPSUM REPORT N° BTC 10053A
SUPPLEMENTARY INFORMATION

WORK REQUESTED BY: Mike Pritchard, British Gypsum

OBJECTIVE: To determine the sound insulation of double layer 15mm Gyproc SoundBloc boards on Gyproc 70S50 Gyproc metal studs with Gyproc Resilient bar both sides and 50mm Isowool 1200 in the cavity.

MATERIALS: 15mm Gyproc SoundBloc boards (12.80 kg/m^2).

CONCLUSIONS: The tested construction achieved R_w ($C;C_{tr}$)= 65 (-2:-8) dB, which compared with the system with resilient bar one side only (report No. 10051A) is 3 dB greater. The greatest effect of the resilient bar is taken up when on one side only , giving a 6dB increase.

Summary prepared by

Arshad Mahmood

Arshad Mahmood

This supplement must be read in conjunction with the test report