

Report Number BTC 3319A

ACOUSTIC TEST REPORT COVERING  
LABORATORY SOUND INSULATION TEST TO  
BS EN ISO 140-3 : 1995 ON A 550mm GYPROC  
TWIN FRAME HIGH PERFORMANCE WALL WITH  
THREE LAYERS OF 15mm GYPROC SOUND BLOC  
EACH SIDE AND WITH TWO LAYERS OF 100mm  
GYPLAS 1000 IN THE CAVITY.

Test Date: 4<sup>th</sup> September 1997

Customer:

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

Customer: **British Gypsum Ltd.**

**ACOUSTIC TEST REPORT COVERING LABORATORY SOUND INSULATION TEST TO BS EN ISO 140-3 : 1995 ON A 550mm GYPROC TWIN FRAME HIGH PERFORMANCE WALL WITH THREE LAYERS OF 15mm GYPROC SOUNdBLOC EACH SIDE AND WITH TWO LAYERS OF 100mm GYPGLAS 1000 IN THE CAVITY.**

**DESCRIPTION**

Two independent metal frames were constructed 272mm apart. Each frame comprised of Gyproc 94C90 channel fixed at the head and base of the test aperture at 300mm staggered centres. Gyproc 92S12 studs were set at 600mm centres between the head and base channel. The metal frameworks were clad on the outside with three layers of 15mm Gyproc SoundBloc. The inner layer was fixed with 25mm Gyproc Jack point screws at 300mm centres around the perimeter, the middle layer boards with 41mm Gyproc Jack point screws at 300mm centres around the perimeter, the outer layer boards with 60mm Gyproc Jack Point screws at 300mm centres at intermediate stud positions and also around the perimeter. Two layers of 100mm Gypglas 1000 were placed in the cavity. Finally, the perimeter of the partition was sealed with Gyproc sealant and Tri-line treatment was applied to the aperture on the T1 side.

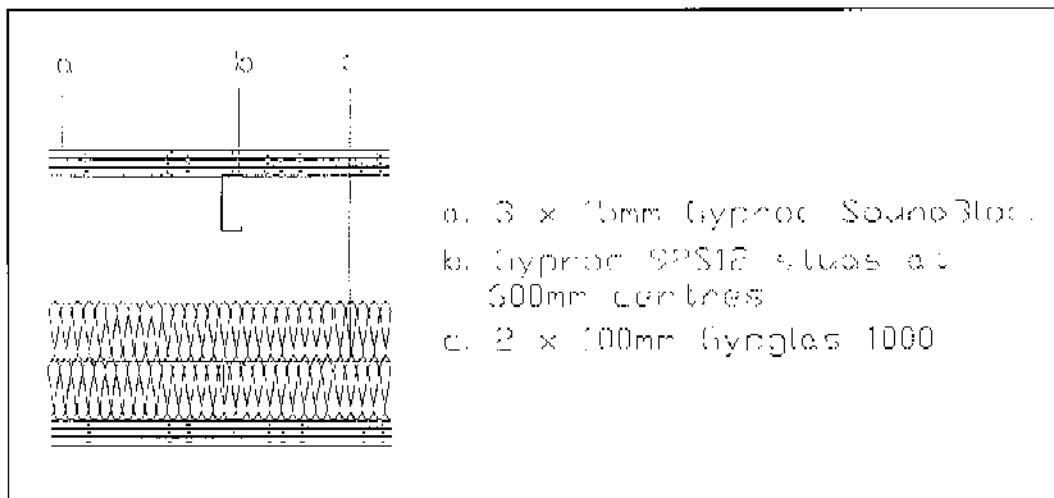


Figure 1: Section through test sample

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

Customer : British Gypsum Ltd.

## RESULTS

Weighted Airborne Sound Reduction Index

$R_w (C;Ctr) = 76 (-2;-8) \text{ dB}$

For full tabulated data see pages 6 and 7.

### Additional Results

Frequency (Hz)	R (dB)
31.5	34.2
40	35.1

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

## MATERIALS

### 15mm Gyproc SoundBloc

Nominally 15mm (thick), 1200mm (wide), 2400mm (long) Gyproc SoundBloc manufactured by British Gypsum Ltd.

Actual surface density: 12.78 kg/m<sup>2</sup>  
Actual thickness: 14.88 mm  
Board identification number: 27 351 6  
Nominal moisture content:

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

### Metal components

- (i) Gyproc 92S12 metal studs and 94C90 channel manufactured using the Ultrasteel process from hot dipped galvanised mild steel.

All metal components supplied by British Gypsum Limited.

Customer : British Gypsum Ltd.

### Fasteners

25mm Gyproc Jack point screws.  
41mm Gyproc Jack point screws.  
60mm Gyproc Jack point screws.

All fasteners supplied by British Gypsum Limited.

### Insulation

100mm Gypglas 1000 glass mineral wool roll manufactured by British Gypsum Isover Ltd.

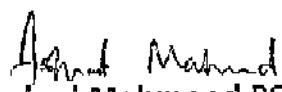
Actual surface density: 1.05 kg/m<sup>2</sup>

Surface density calculated using the actual weight of the insulation.

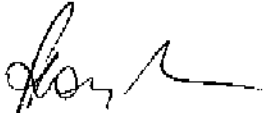
## TEST PROCEDURE

The test specimen (2.4 m x 3.6 m) was constructed in a wall dividing two reverberant rooms of approximately 62m<sup>3</sup> and 98m<sup>3</sup>. 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 BSc., GradInstP, AMIOA  
*Senior Technologist*

Head of Laboratory:

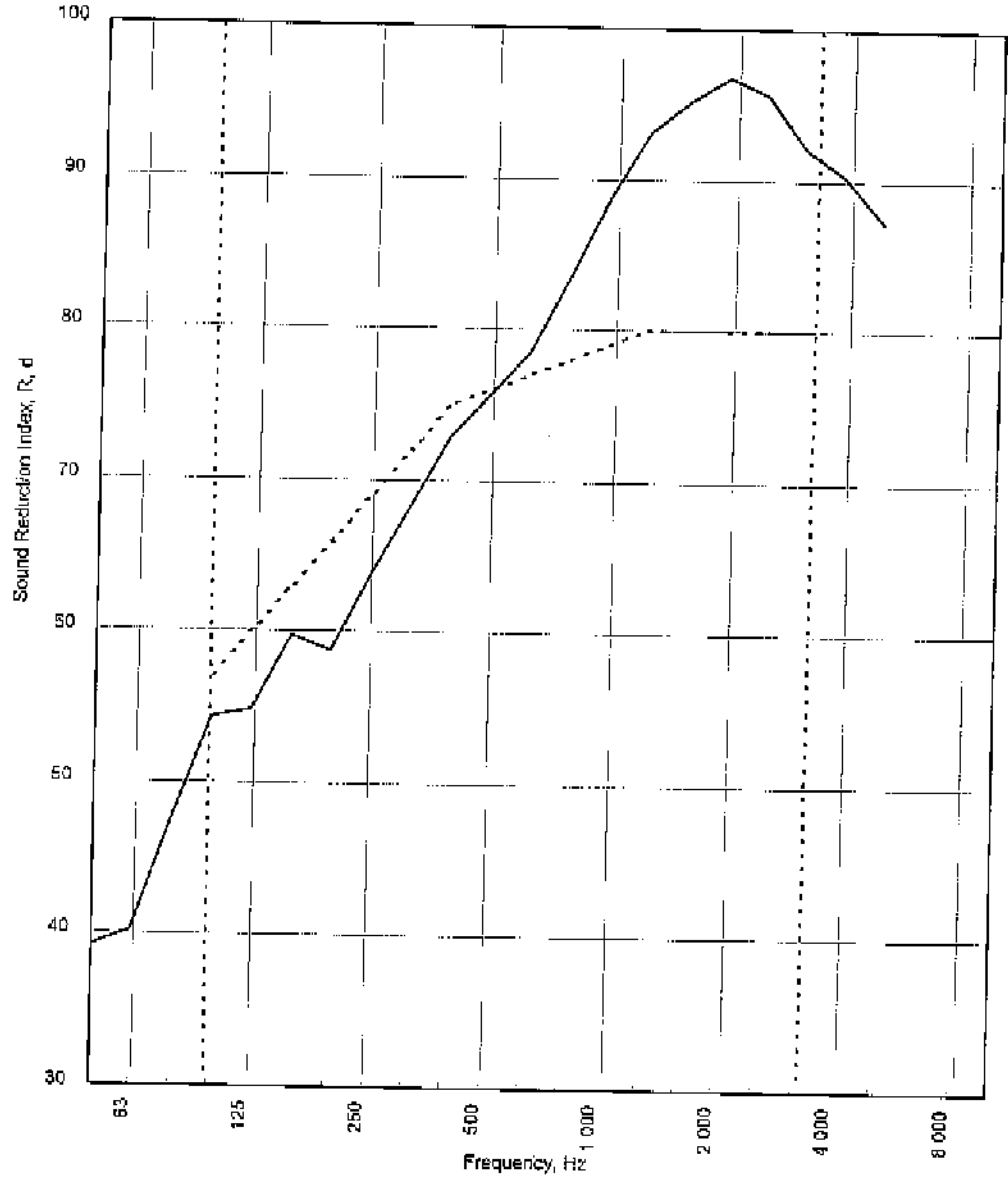
  
Paul Royle B.Tech.(Hons.), M.Sc., MIOA  
*Executive Manager*

Report Date: 5 September 1997

Customer : British Gypsum Ltd.

Test Code:  
H3319A  
Test Date:  
04/09/97

Freq. Hz	R dB
50	39.2
63	40.2
80	47.6
100	54.3
125	54.8
160	59.7
200	58.7
250	63.8
315	68.4
400	72.9
500	75.7
630	78.5
800	83.5
1 000	88.8
1 250	93.2
1 600	95.2
2 000	96.8
2 500	95.7
3 150	92.1
4 000	90.3
5 000	87.2
6 300	85.6
8 000	83.9
10 000	81.0



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

Rating according to **R<sub>w</sub> (C;Ctr) = 76 (-2;-8) dB**

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

C <sub>30-3150</sub> = -5 dB	C <sub>50-5000</sub> = -4 dB	C <sub>100-5000</sub> = -1 dB
C <sub>tr,50-3150</sub> = -17 dB	C <sub>tr,50-5000</sub> = -17 dB	C <sub>tr,100-5000</sub> = -8 dB

Customer : British Gypsum Ltd.

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

Test Code: H3319A

Test Date: 04/09/97

Specimen Area, S =	8.64 m <sup>2</sup>	Room Volume, m <sup>3</sup> :	Room T2	Room T1
		Temperature, deg.C:	98	62
		Rel. Humidity, %RH:	19	19
			63	63

Freq Hz	Test Room T2 to Test Room T1						R dB	U.Dev. dB	R 1/1 Oct dB
	Source dB	Rec. (uc) dB	Bgrnd dB	Rec. (corr) dB	Rev.time Sec	Corr. dB			
50	87.3	44.9	12.4	44.9	0.55	-3.2	39.2		
63	84.7	41.6	7.0	41.6	0.59	-2.9	40.2		41.1
80	91.2	41.4	5.3	41.4	0.69	-2.2	47.6		
100	97.7	42.1	10.7	42.1	0.86	-1.3	54.3	2.7	
125	103.8	48.3	2.8	48.3	0.97	-0.7	54.8	5.2	55.7
160	109.3	49.6	9.9	49.6	1.15	0.0	59.7	3.3	
200	113.2	55.1	11.4	55.1	1.33	0.6	58.7	7.3	
250	114.3	50.4	17.1	50.4	1.12	-0.1	63.8	5.2	62.0
315	112.9	44.3	13.1	44.3	1.09	-0.2	68.4	3.6	
400	111.0	37.5	15.2	37.5	0.99	-0.6	72.9	2.1	
500	107.7	31.4	12.6	31.4	1.01	-0.6	75.7	0.3	75.1
630	105.3	27.0	15.5	26.7	1.11	-0.1	78.5		
800	105.0	22.2	12.9	21.7	1.20	0.2	83.5		
1 000	103.7	16.9	13.5	15.6	1.36	0.7	88.8		86.8
1 250	103.2	12.3	11.1	11.0	1.43	1.0	93.2		
1 600	105.3	12.6	11.7	11.3	1.51	1.2	95.2		
2 000	105.3	12.2	11.1	10.9	1.59	1.4	96.8		95.8
2 500	104.2	10.7	8.5	9.4	1.40	0.9	95.7		
3 150	102.6	12.5	9.4	11.2	1.34	0.7	92.1		
4 000	101.1	12.7	11.7	11.4	1.33	0.6	90.3		89.4
5 000	98.1	12.6	12.6	11.3	1.26	0.4	87.2		
6 300	96.0	11.7	11.5	10.4	1.14	0.0	85.6		
8 000	94.9	11.5	11.4	10.2	0.96	-0.8	83.9		83.1
10 000	92.9	11.4	11.2	10.1	0.75	-1.8	81.0		

Single Figure Ratings BS EN ISO 717-1: 1997	<b>Rw</b> dB <b>76</b>	<b>C</b> dB <b>-2</b>	<b>Ctr</b> dB <b>-8</b>	Total U. Dev., dB	29.7
	(100-5000)	-1	-8	Tested By: <u>A. Mohamed</u>	
	(50-3150)	-5	-17	Checked By: <u>[Signature]</u>	
	(50-5000)	-4	-17	Test Procedure: 140/3/issue 1	
				Worksheet: MSOFFICE\EXCEL\M40\140_3_1.XLS	

Customer: British Gypsum Ltd.

## TEST METHOD AND CONDITIONS

The source room (T2) was treated with six perspex diffusers of approximately 900mm x 1220mm. An omnidirectional 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 <sub>max</sub>	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.

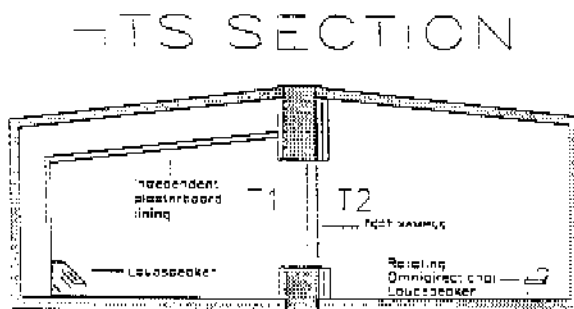


Figure 1 Chamber layout

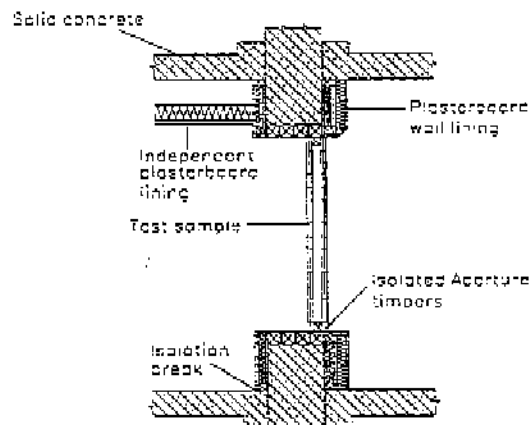


Figure 2 Flanking treatment applied to the chamber

Customer: British Gypsum Ltd.

BTC 3319A: Appendix



**BRITISH GYPSUM REPORT No. BTC 3319A**  
**SUPPLEMENTARY INFORMATION**

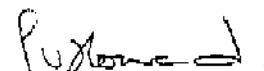
WORK REQUESTED BY: Mike Pritchard, British Gypsum Limited.

OBJECTIVE: To obtain a cinema wall capable of being used in modern digital cinemas.

CONCLUSION: We have successfully designed a wall which meets the requirements at all frequencies as laid down by Warner Cinemas without the use of any masonry component. This wall has been approved for use in Warner Cinemas and has been specified for the new Finchley Road cinema.

We hope to be able to measure the performance achieved on site.

Summary prepared by



Paul Howard  
*Systems Technical Manager*  
The Building Test Centre.