Acoustics Test Report Number 1274 Date 13/05/88

LABORATORY AIRBORNE SOUND INSULATION MEASUREMENTS ON A 300mm GYPROC METAL STUD SEPARATING WALL WITH 25mm GYPGLAS 1200 IN THE CAVITY.

Test carried out for

BRITISH GYPSUM LTD, MARKETING DEPT.

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Project Manager (Acoustics)

NAMAS TESTING No. 0296

British Gypsum Limited,
Research & Development Department,
East Leake, Loughborough, Leicestershire, England.

LABORATORY TEST

Acoustics test report - Confidential

Test code	Date tested
H367.46	13 May. 1988

Type of test

AIRBORNE SOUND INSULATION

Tested in accordance with

BS 2750 AND ISO 140

Report prepared by	D. PATTERSON	

1. CONSTRUCTION TESTED

300 mm Gyproc metal stud separating wall with 25 mm Gypglas 1200 glass wool mat in the cavity

comprising:

* 12.5 mm Gyproc wallboard
* 19 mm Gyproc plank
* 48 mm Gyproc 48S55 metal studs at 600 mm centres
* 137 mm airspace
* Cross braces of 48 mm Gyproc 48S55 metal stud at mid-height
* 48 mm Gyproc 48S55 metal studs at 600 mm centres
* 25 mm Gypglas 1200 glass wool mat
* 19 mm Gyproc plank
* 12.5 mm Gyproc wallboard

Joints filled and perimeter sealed.

See Appendix 1 for construction schedule and Appendix 2 for details of the airborne sound insulation test procedure.

2. RESULTS

The result sheet overleaf gives the tabulated sound reduction indices and the principal single figure ratings in addition to the plotted spectrum, the BS 5821:1984 curve and the ASTM E413 curve.

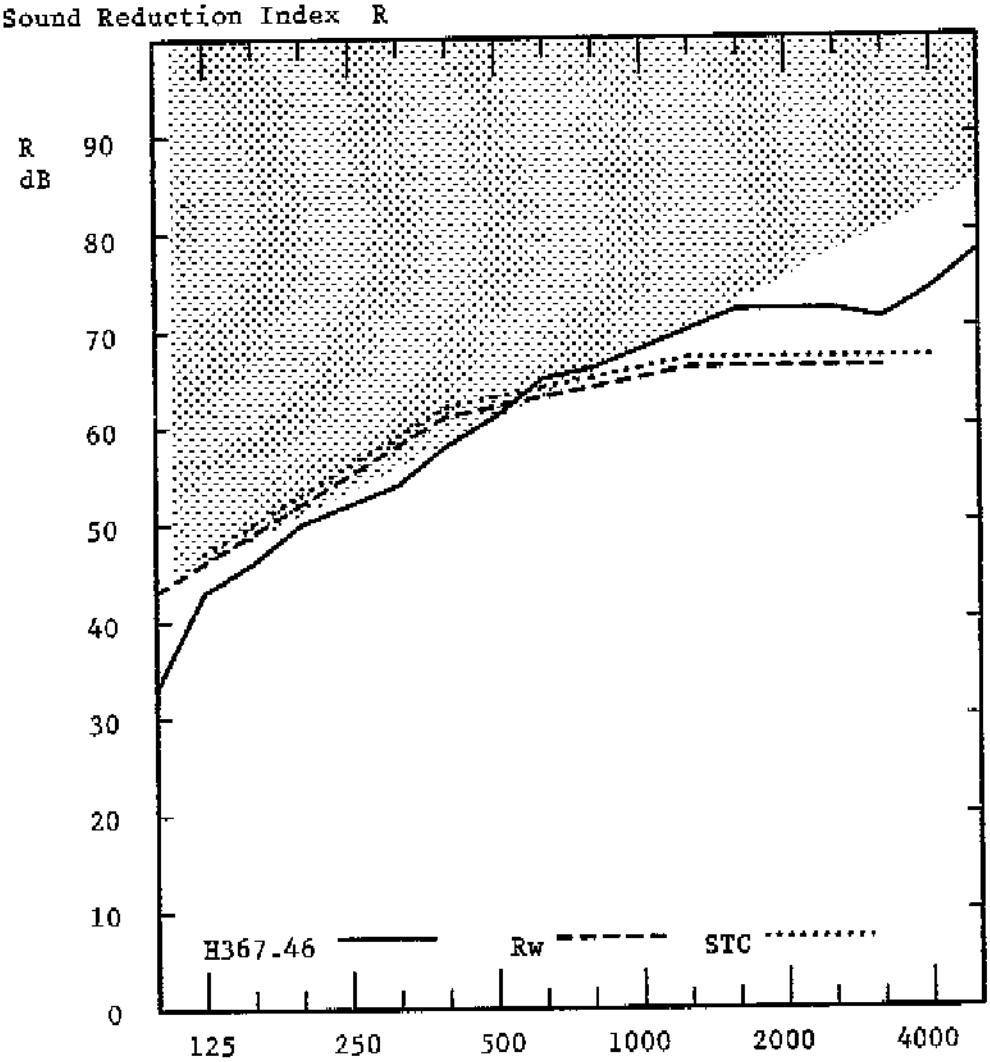
The result calculated to BS 5821:1984 is:

Weighted Sound Reduction Index Rw = 62 (BS 5821)

The adverse deviation at 100 Hz is 10 dB.

Laboratory Test Code H367.46

Sound Reduction Index R



1/3 Octave Band Centre Freq. Hz	R dB
100	33
125	43
160	46
200	50
250	52
315	54
400	58
500	61
630	65
800	66
1000	68
1250	70
1600	72
2000	72
2500	72
3150	71
4000	74
5000	78

Rw(BS5821)	62
Mean(100-3150)	60
STC(ASTM E413)	63
dB(A)(100-5000)	60

Note: The lower edge of the shaded region approximates to the maximum sound reduction index that can be measured in this laboratory. A measured curve which lies in the shaded region will be an underestimate of the performance of the construction.

RESULT SHEET

APPENDIX 1

CONSTRUCTION SCHEDULE

Test specimen erected within a timber lined aperture between two reverberation rooms in the Acoustics Research and Testing Laboratory, British Gypsum Research and Development Department.

Test aperture dimensions: 2400 mm high x 3600 mm wide.

Component List

Floor/ceiling channel: Gyproc 50C55
Metal studs : Gyproc 48S55
Glass wool infil : 25 mm Gypglas 1200 (0.41 kg/m^2)
Plank : 19 mm Gyproc plank (16.04 kg/m^2)
Wallboard : 12.5 mm Gyproc wallboard (10.00 kg/m^2)
Gyproc Jointex
Gyproc Joint Tape
Gyproc Sealant

Metal Stud Partition Construction Details:

Two rows of channels screw-fixed to the head and base of the aperture lining at 600 mm centres set 137 mm apart.

Studs located between channels at 600 mm centres. The end studs screw-fixed to the aperture lining at 600 mm centres.

The glass wool mat placed in one row of the stud cavities.

A base layer of plank fixed to both sides of the frame, fixed horizontally and with joints staggered using two Gyproc Drywall screws into each stud.

An outer layer of wallboard fixed to both sides of the partition, fixed vertically using Gyproc Drywall screws at 300 mm centres around the perimeter of each board and at 300 mm centres along all studs.

The joints between wallboard filled with Gyproc Jointex and reinforced with Gyproc joint tape.

The perimeters sealed with Gyproc Sealant.

Product specification and further application details are available in the British Gypsum White Book.

APPENDIX 2

HORIZONTAL TEST SUITE - AIRBORNE SOUND INSULATION

Test method to BS 2750:1980 Part III, ISO 140 Part III and ASTM E90-83. The test rooms are approximately 109 m^3 in volume and the test specimen is 2.4 m x 3.6 m. The level difference at a given 1/3 octave band centre frequency is obtained by measuring the difference in mean sound pressure levels between rooms when one room contains a loudspeaker emitting band limited pink noise. The mean sound pressure level is estimated from the average of the spatial intensities measured within the room. The Sound Reduction Index R for the test specimen is obtained by the addition of the term 10 $\log_{10}$ S/A to the level difference where S is the area of the test specimen and A is the equivalent absorption in the receiving room.

TEST PROCEDURE

With the following test method, the measurement of the sound reduction index of a test specimen meets the requirements of BS 2750:1980 Part II and ISO 140 Part II in terms of repeatability:

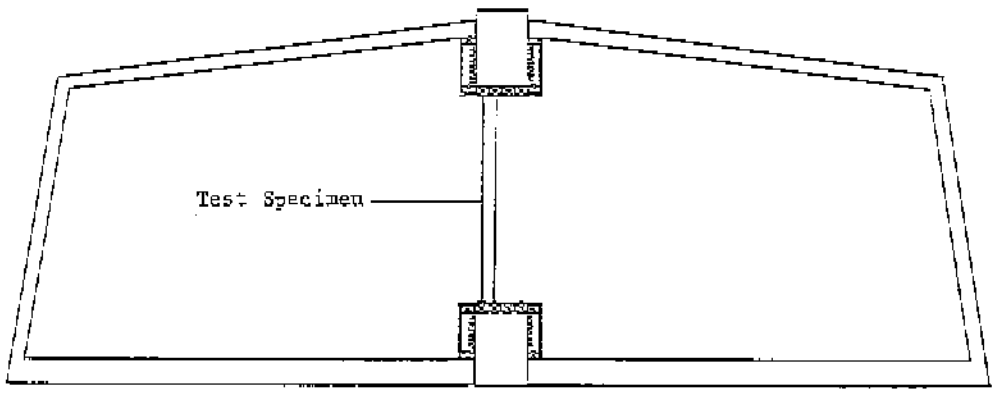
Four randomly placed stationary microphones to sample sound pressure levels in each room - Four reverberation time measurements (at different microphone locations) - The sound reduction index is measured in both directions and the mean result reported.

EXPRESSION OF RESULTS

The Sound Reduction Index R over the 1/3 octave band centre frequency range 100 - 5000 Hz is presented in tabular and graphical form. Four single figure ratings are given; the arithmetic mean of the sixteen spectral values over the range 100 - 3150 Hz, i.e Mean R, The Weighted Sound Reduction Index R_w evaluated in accordance with BS 5821:1984, the Sound Transmission Class STC evaluated in accordance with ASTM E413 and the single figure rating in dB(A) as used in France.

TEST EQUIPMENT

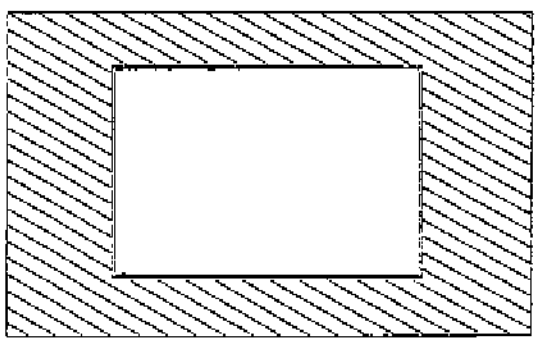
Norwegian Electronics Sound Insulation Measuring System Type 823 controlled by a Hewlett Packard 9836 microcomputer with Norwegian Electronics Microphone Multiplexers Type 827 with Bruel and Kjaer Type 4166/2619 microphones.



Section through Horizontal Test Suite

Room Dimensions

Mean Height	≈	3.6 m
Mean Width	≈	6.0 m
Mean Depth	≈	5.0 m
Volume	≈	109 m^3



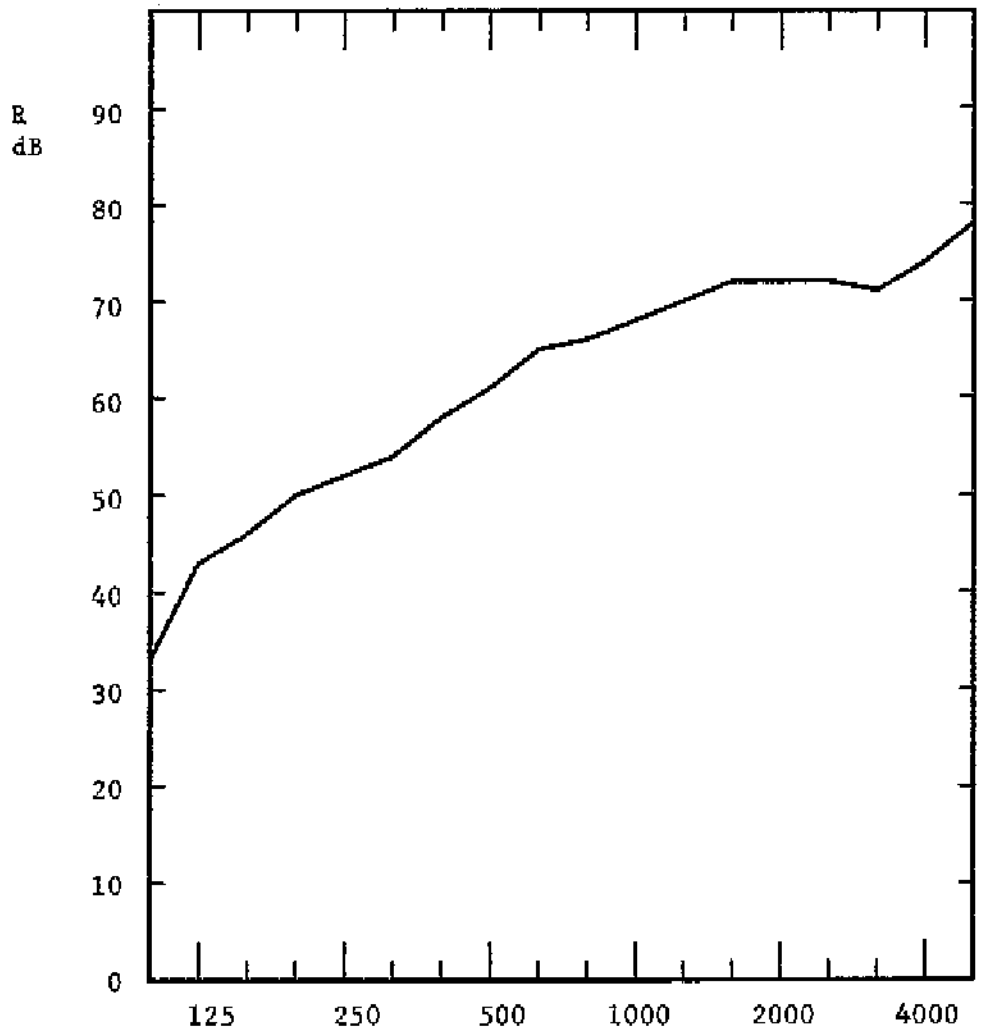
Elevation of Test Aperture (2.4 m x 3.6 m)

DETAILS OF THE TEST FACILITY

ACOUSTIC TEST DATA SHEET

Laboratory Test Code H367.46

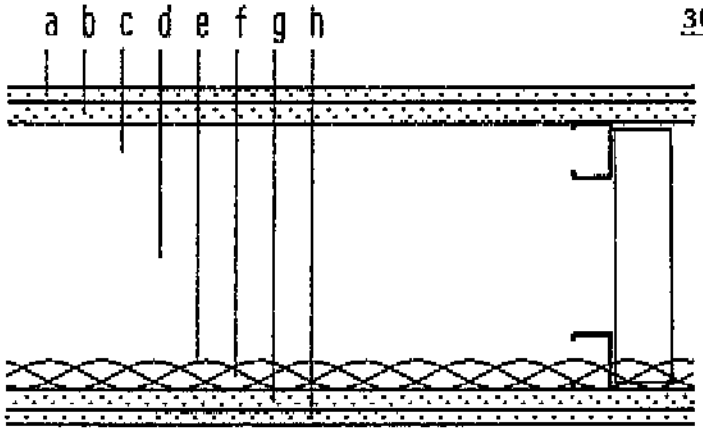
Sound Reduction Index R



Freq.	db
100	33
125	43
160	46
200	50
250	52
315	54
400	58
500	61
630	65
800	66
1000	68
1250	70
1600	72
2000	72
2500	72
3150	71
4000	74
5000	78

Rw = 62 Mean = 60 STC = 63 dB(A) = 60

300mm Gyproc Metal Stud Separating Wall



a. 12.5mm Gyproc wallboard
b. 19mm Gyproc plank
c. 48mm Gyproc 48S55 metal studs at 600mm centres
d. 137mm airspace
e. 48mm Gyproc 48S55 metal studs at 600mm centres
f. 25mm Gypglas 1200
g. 19mm Gyproc plank
h. 12.5mm Gyproc wallboard

This data sheet presents the results of LABORATORY sound insulation tests on the partition under ideal conditions. When the partition is used in a building to divide rooms the result is affected by the surrounding structure. In order to achieve the optimum sound insulation it is therefore imperative that the surrounding structure is considered. The partition will achieve its maximum sound insulation so long as sound cannot find a weaker path from the source room to the receiving room. There must be no leakage path under, over or at the sides of the partition. The introduction of doors, windows or other departures from the specified partition construction may also reduce the sound insulation. Continuous floorboards under the partition or continuous timber joists over the partition may be a weak path as may blockwork flank walls. In the absence of flanking transmission the laboratory Rw rating is equivalent to the field DnTw when the receiving room is 30 m³ in volume with a common wall area of 10 m². When the room sizes vary from this, the ratings differ from each other slightly depending on the layout. Further advice can be obtained from British Gypsum's Technical Advisory Service if required.

NAMAS TESTING No. 0296

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Addendum To BGATR 1274 Ctr CALCULATION

Freq Hz	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									
63									
80									
100							**33.0**	10.0	
125							**43.0**	3.0	
160							**46.0**	3.0	
200							**50.0**	2.0	
250							**52.0**	3.0	
315							**54.0**	4.0	
400							**58.0**	3.0	
500							**61.0**	1.0	
630							**65.0**		
800							**66.0**		
1 000							**68.0**		
1 250							**70.0**		
1 600							**72.0**		
2 000							**72.0**		
2 500							**72.0**		
3 150							**71.0**		
4 000							**74.0**		
5 000							**78.0**		
6 300									
8 000									
10 000									

Single Figure Ratings	**Rw**	**C**	**Ctr**	**Total U. Dev., dB**	**29**
BS EN ISO 717-1: 1997	**dB**	**dB**	**dB**		
	62	**-3**	**-10**		

Rw + Ctr = 52

Calculated By:_ Franklin Sanicharane

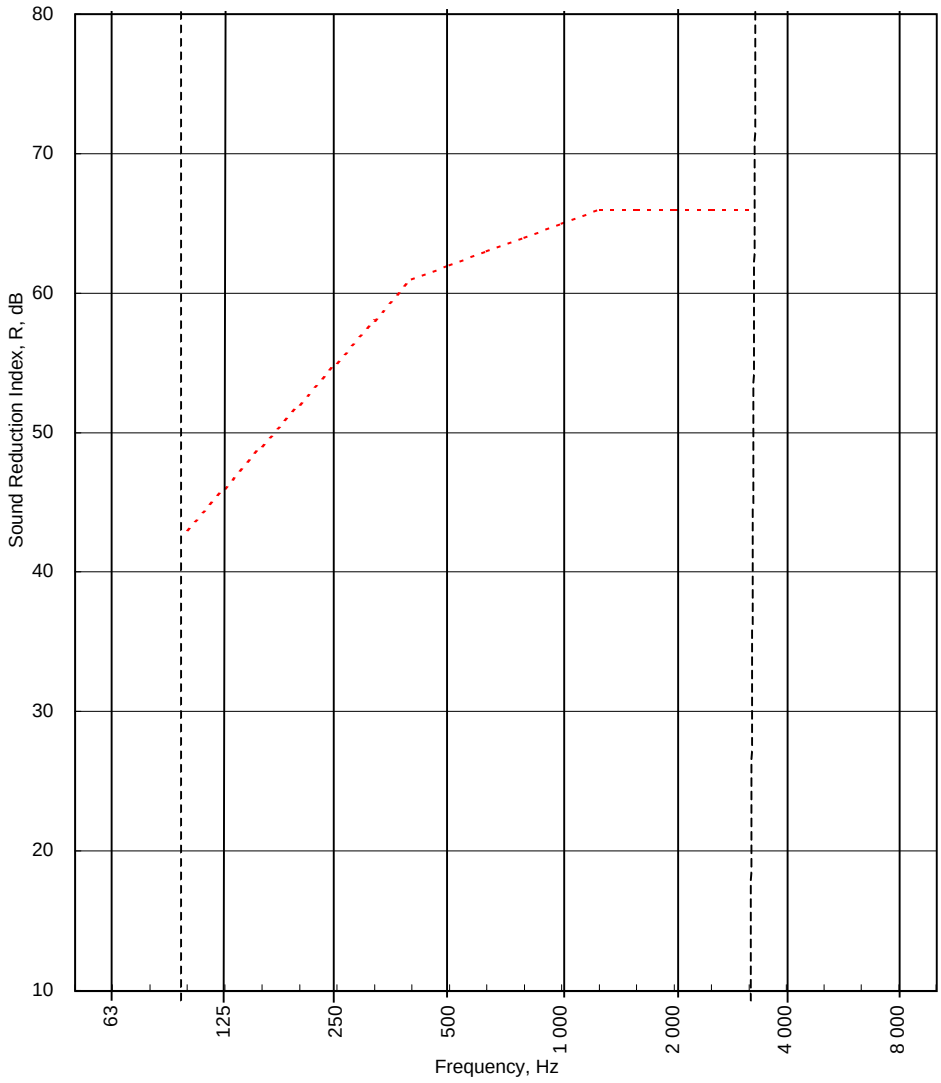
Checked By:__ Bob Allen

Test Standard: BS 2750: Part 3: 1980
Test Procedure: 2750/3 issue 4

Worksheet: ctr calculation.xls

Test Code:
Test Date:

Freq. Hz	R dB
50	
63	
80	
100	33.0
125	43.0
160	46.0
200	50.0
250	52.0
315	54.0
400	58.0
500	61.0
630	65.0
800	66.0
1 000	68.0
1 250	70.0
1 600	72.0
2 000	72.0
2 500	72.0
3 150	71.0
4 000	74.0
5 000	78.0
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) = 62 (-3;-10) dB

Max dev. dB at Hz

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

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

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