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Acoustics Test Report Number 1200 Date 07/12/87

LABORATORY AIRBORNE SOUND INSULATION
MEASUREMENTS ON A 100mm GYPROC METAL STUD
PARTITION WITH 25mm GYPGLAS 1200 IN THE
CAVITY.

Test carried out for

BRITISH GYPSUM LTD, MARKETING DEPT.

<u>CONTENTS</u>	<u>Page No.</u>
1. CONSTRUCTION TESTED	1
2. THE RESULTS	1
- Result Sheet	2
APPENDIX 1 - CONSTRUCTION SCHEDULE	3
APPENDIX 2 - HORIZONTAL TEST SUITE - AIRBORNE SOUND INSULATION	4
DATA SHEET	5



Project Manager (Acoustics)



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LABORATORY TEST

Acoustics test report - Confidential

Test code

H367.2

Date tested

07 Dec. 1987

Type of test

AIRBORNE SOUND INSULATION

Tested in accordance with

BS 2750 AND ISO 140

Report prepared by

R. MEER

R Meel

Specimen description

1. CONSTRUCTION TESTED

100 mm Gyproc metal stud partition with 25 mm Gypglas 1200 glass wool mat in the cavity

comprising:

- * 2 x 12.5 mm Gyproc wallboard
- * 48 mm Gyproc 48S55 metal studs at 600 mm centres
- * 25 mm Gypglas 1200 glass wool mat
- * 2 x 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.

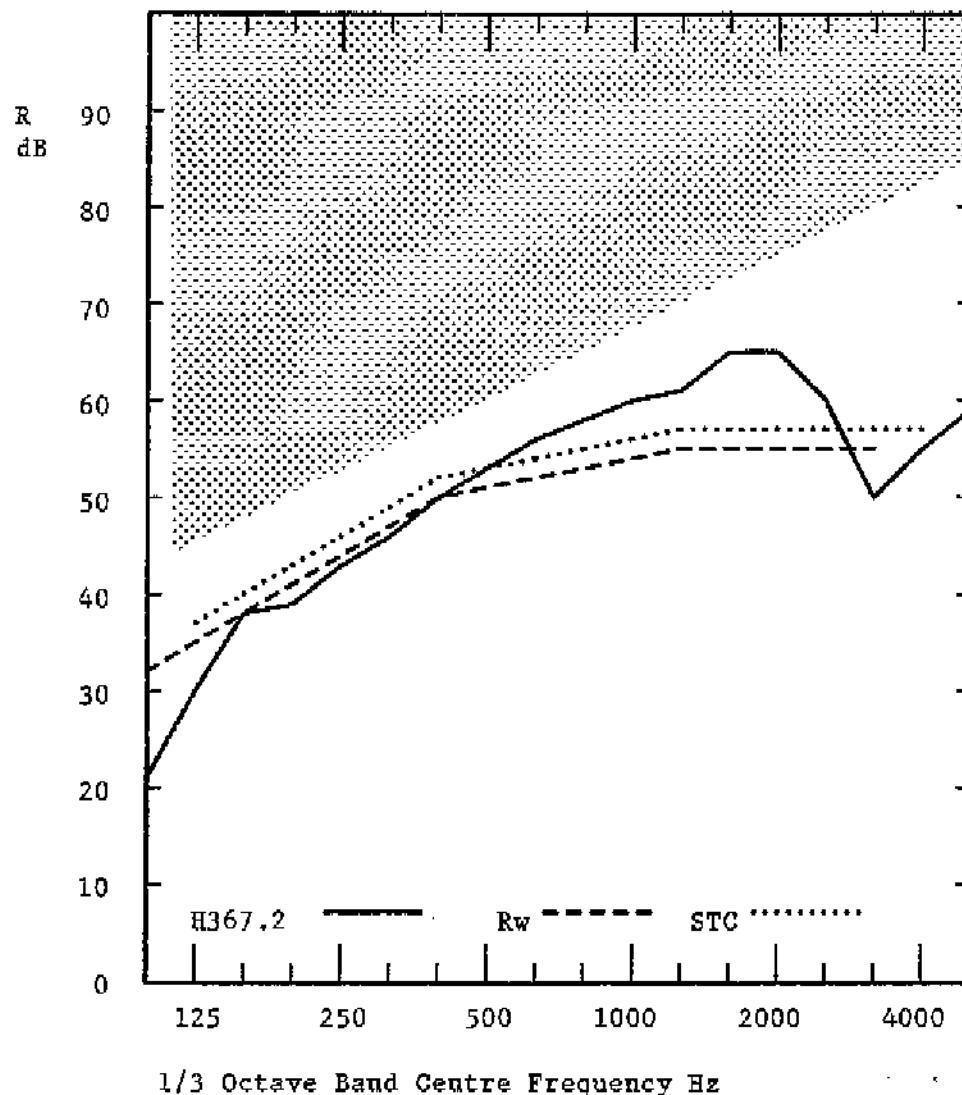
The result calculated to BS 5821:1984 is:

Weighted Sound Reduction Index $R_w = 51$ (BS 5821)

The adverse deviation at 100 Hz is 11 dB.

Laboratory Test Code H367.2

Sound Reduction Index R



1/3 Octave Band Centre Freq. Hz	R dB
100	21
125	30
160	38
200	39
250	43
315	46
400	50
500	53
630	56
800	58
1000	60
1250	61
1600	65
2000	65
2500	60
3150	50
4000	55
5000	59

Rw(BS5821)	51
Mean(100-3150)	50
STC(ASTM E413)	53
dB(A)(100-5000)	48

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 1CONSTRUCTION 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 infill : 25 mm Gypglas 1200 (0.39 kg/m^2)
Wallboard : 12.5 mm Gyproc wallboard (10.03 kg/m^2)
Gyproc Jointex
Gyproc Joint Tape
Gyproc Sealant

Metal Stud Partition Construction Details:

Channels screw-fixed to the head and base of the aperture lining at 600 mm centres.

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 between the studs in the cavity.

A double layer of wallboard fixed to both sides of the frame; the base layer fixed with Gyproc Drywall screws at 300 mm centres around the perimeter of each board and the second layer, starting with a half-width board fixed with screws around the perimeter at 300 mm centres 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 2HORIZONTAL TEST SUITE - AIRBORNE SOUND INSULATION

Test method to BS 3750:1980 Part III, ISO 140 Part III and ASTM E90-83. The test rooms are approximately 109 m³ 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:

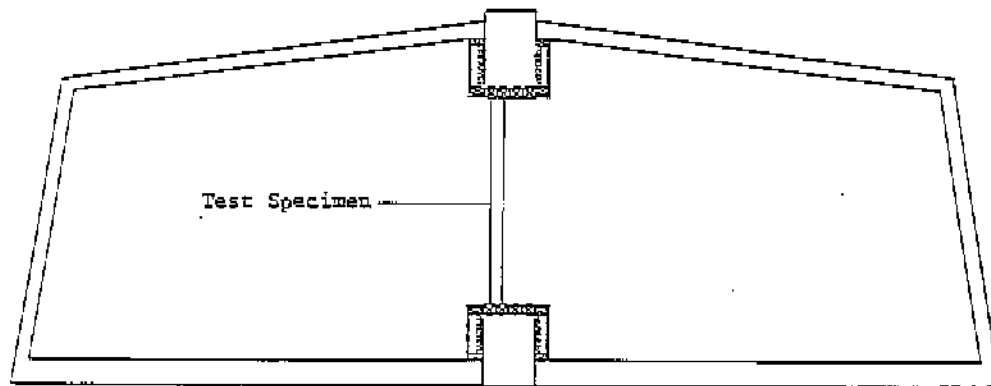
Four randomly placed stationary microphones to sample sound pressure levels in each room - Four reverberation time measurements (at different microphone locations) - The sound reduction index is measured in both directions and the mean result reported.

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

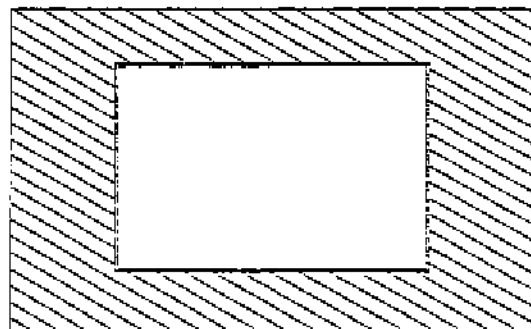
Norwegian Electronics Sound Insulation Measuring System Type 823 controlled by a Hewlett Packard 9836 microcomputer with Norwegian Electronics Microphone Multiplexers Type 827 with Bruel and Kjaer Type 4166/2619 microphones.



Section through Horizontal Test Suite

Room Dimensions

Mean Height = 3.6 m
 Mean Width = 6.0 m
 Mean Depth = 5.0 m
 Volume = 109 m³

DETAILS OF THE TEST FACILITY

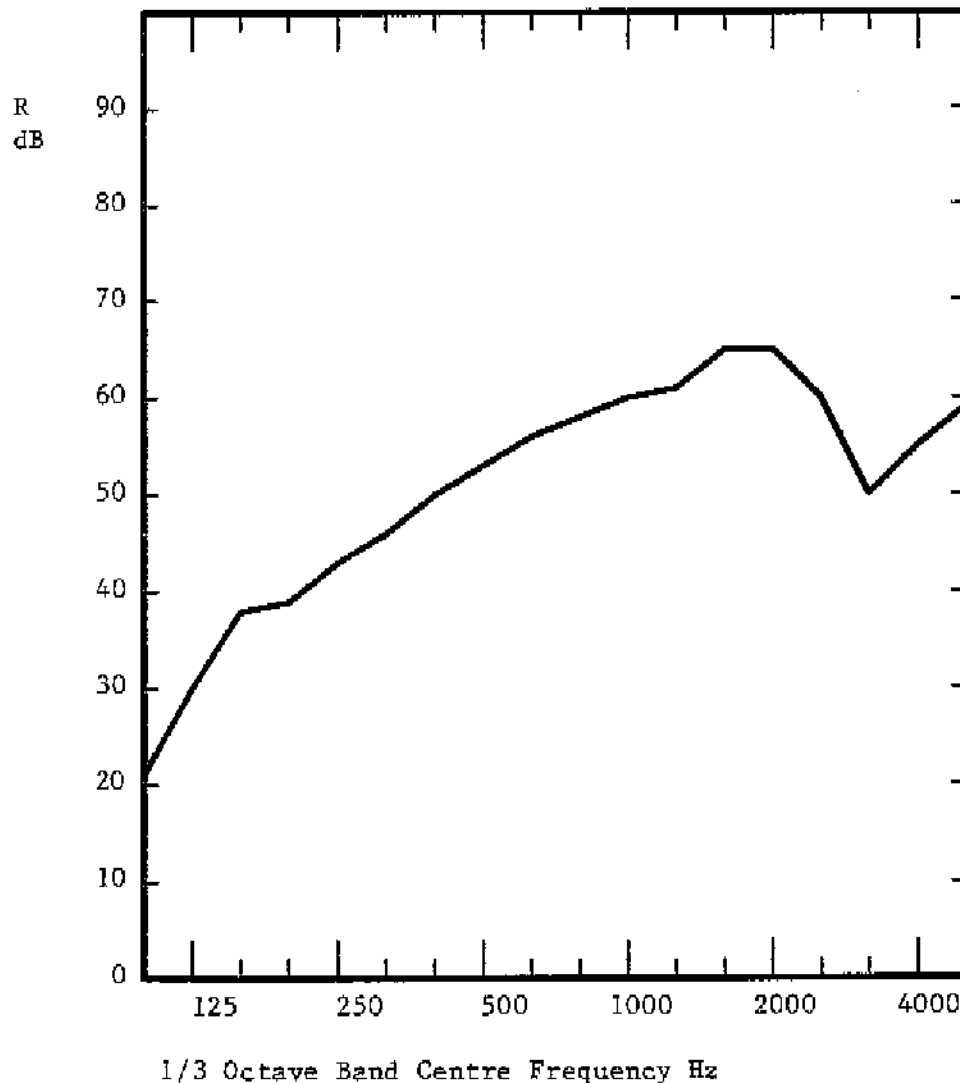
Elevation of Test Aperture (2.4 m x 3.6 m)

ACOUSTIC TEST DATA SHEET

Laboratory Test Code H367.2



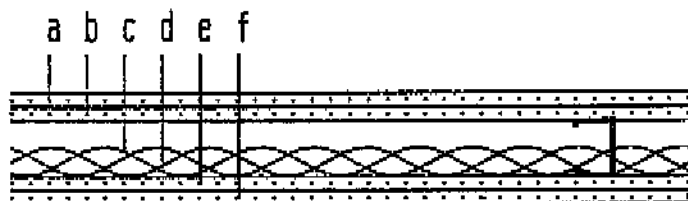
Sound Reduction Index R



Freq. db

100	21
125	30
160	38
200	39
250	43
315	46
400	50
500	53
630	56
800	58
1000	60
1250	61
1600	65
2000	65
2500	60
3150	50
4000	55
5000	59

Rw = 51 Mean = 50 STC = 53 dB(A) = 48

**100mm Gyproc Metal Stud Partition**

- a. 12.5mm Gyproc wallboard
- b. 12.5mm Gyproc wallboard
- c. Gyproc 48S55 metal studs
- d. 25mm Gypglas 1200
- e. 12.5mm Gyproc wallboard
- f. 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 on 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.



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Addendum To BGATR 1200 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							21.0	11.0	
125							30.0	5.0	
160							38.0		
200							39.0	2.0	
250							43.0	1.0	
315							46.0	1.0	
400							50.0		
500							53.0		
630							56.0		
800							58.0		
1 000							60.0		
1 250							61.0		
1 600							65.0		
2 000							65.0		
2 500							60.0		
3 150							50.0	5.0	
4 000									
5 000									
6 300									
8 000									
10 000									

Single Figure Ratings
BS EN ISO 717-1: 1997

Rw
dB
51

C
dB
-4

Ctr
dB
-11

Total U. Dev., dB

25

Rw + Ctr = 40

Calculated By: _ Franklin Sanicharane

Checked By: _ Bob Allen

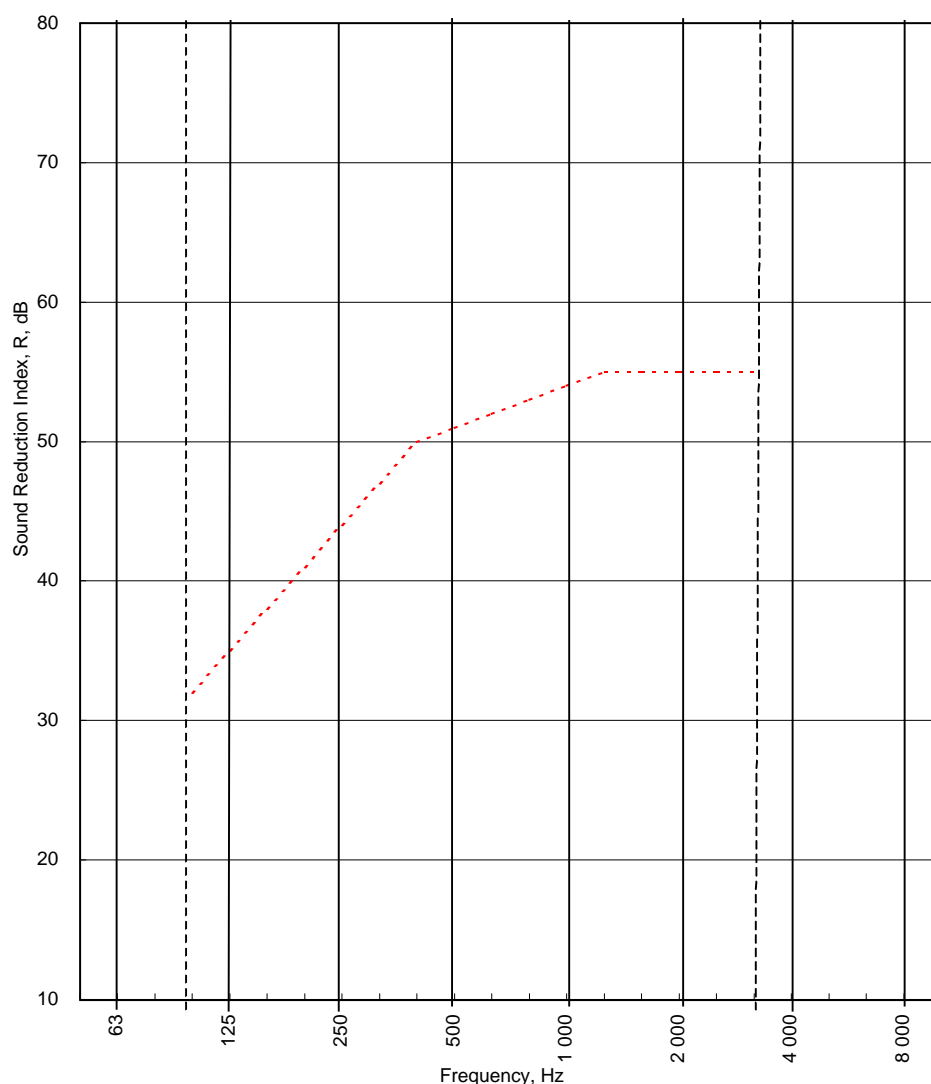
Test Standard: BS 2750: Part 3: 1980

Test Procedure: 2750/3 issue 4

Worksheet: ctr calculation.xls

Test Code:
Test Date:

Freq. Hz	R dB
50	
63	
80	
100	21.0
125	30.0
160	38.0
200	39.0
250	43.0
315	46.0
400	50.0
500	53.0
630	56.0
800	58.0
1 000	60.0
1 250	61.0
1 600	65.0
2 000	65.0
2 500	60.0
3 150	50.0
4 000	
5 000	
6 300	
8 000	
10 000	



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

Rating according to BS EN ISO 717-1:1997	R_w (C;C_{tr}) = 51 (-4;-11) dB		
	Max dev. dB at Hz		
	C ₅₀₋₃₁₅₀ = dB	C ₅₀₋₅₀₀₀ = dB	C ₁₀₀₋₅₀₀₀ = dB
	C _{tr,50-3150} = dB	C _{tr,50-5000} = dB	C _{tr,100-5000} = dB

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