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Report Number **BTC 11152A**

# ACOUSTIC TEST REPORT COVERING A TEST TO BS EN ISO 140-3:1995 ON A GYPROC 92S55 METAL STUD PARTITION INCORPORATING A SINGLE LAYER 15mm GYPROC SOUNdBLOC BOARD EACH SIDE AND 75mm ISOWOOL 1200 IN THE CAVITY.

Test Date: 7th August 2000

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



UKAS TESTING
No. 0296
No. 0296SI

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# ACOUSTIC TEST REPORT COVERING A TEST TO BS EN ISO 140-3:1995 ON A GYPROC 92S55 METAL STUD PARTITION INCORPORATING SINGLE LAYER 15mm GYPROC SOUNdBLOC BOARDS EACH SIDE.

## TABLE OF CONTENTS

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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 7th August 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 |
|---|---|
| **Arshad Mahmood**<br>B.Sc. , CPhys MInstP, MIOA<br>*Senior Project Leader* | Eur Ing. **Paul Howard**<br>BSc. (Hons.), CEng., MIOA<br>*Head of Laboratory* |

*The Building Test Centre will not discuss the content of this report without written permission from the test sponsor. The Building Test Centre retains ownership of the test report content but authorises the test sponsor to reproduce the report as necessary in its entirety only.*



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## TEST CONSTRUCTION

Gyproc 94C90 channel was screw fixed at 600mm staggered centres to the head and base of the test aperture. Gyproc 92S55 metal studs were located at 600mm centres between the head and base channels and the end studs were screw fixed to the side of the test aperture at 600mm centres.

The framework was clad both sides with a single layer of 15mm Gyproc SoundBloc board. The boards were screw fixed using 25mm Gyproc jackpoint screws at 300mm centres around the perimeter of the board and to the intermediate studs. Three layers of 25mm Isowool 1200 Acoustic Partition roll were placed in the cavity.

The perimeter of the partition was sealed with Gyproc sealant. The board joints and screw heads were covered with adhesive tape.

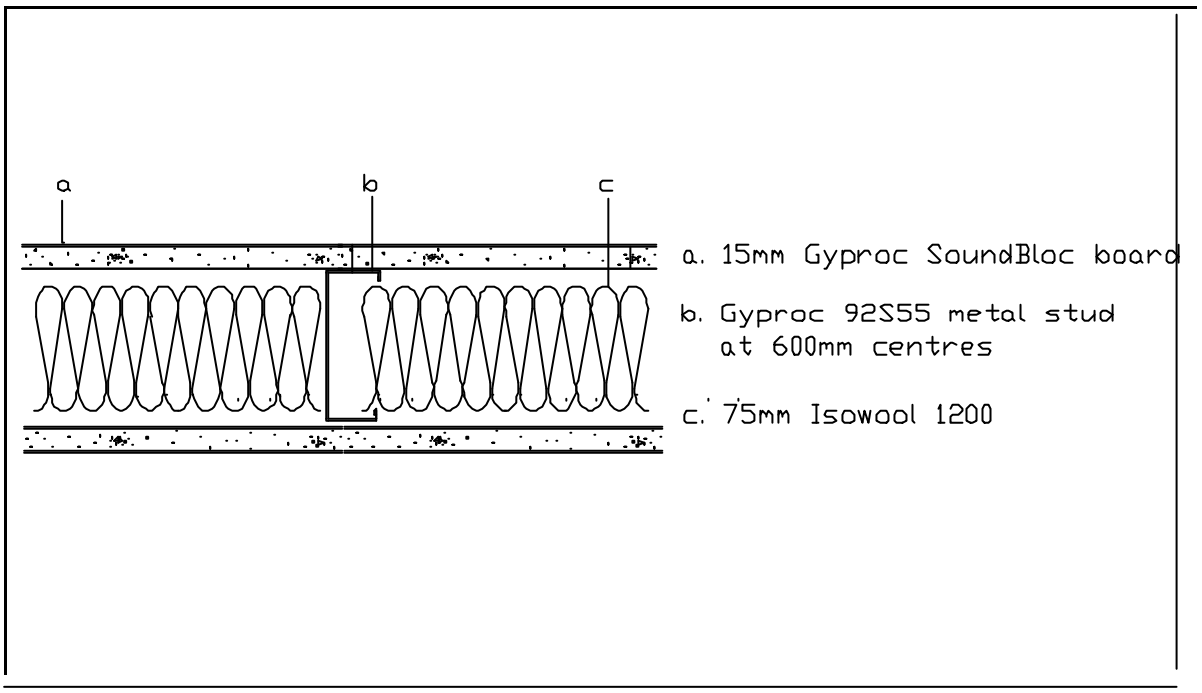


**Figure 1.** Cross-section through the partition

*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 15mm (thick) Gyproc SoundBloc manufactured by British Gypsum Limited ex Kirkby Thore works.

| | |
|---|---|
| Average surface density: | 13.12 kg/m$^2$ |
| Average thickness: | - |
| Board code: | 271760 1115:52 |

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

Metal components

i) Gyproc 92S55 metal stud manufactured from hot dipped galvanised mild steel
ii) Gyproc 94C90 channel manufactured from hot dipped galvanised mild steel.

All components supplied by British Gypsum Limited.

Fasteners

i) 25mm Gyproc jack point screws supplied by British Gypsum Limited.

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.

Insulation

Nominally 25mm thick Isowool 1200 glass wool roll manufactured by British Gypsum-Isover Ltd.

| | |
|---|---|
| Average surface density: | 0.44 kg/m$^2$ |
| Average density: | 17.6kg/m$^3$ |

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## 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) = 52 (-3; -7 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 nor do they reflect the actual behaviour.

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.



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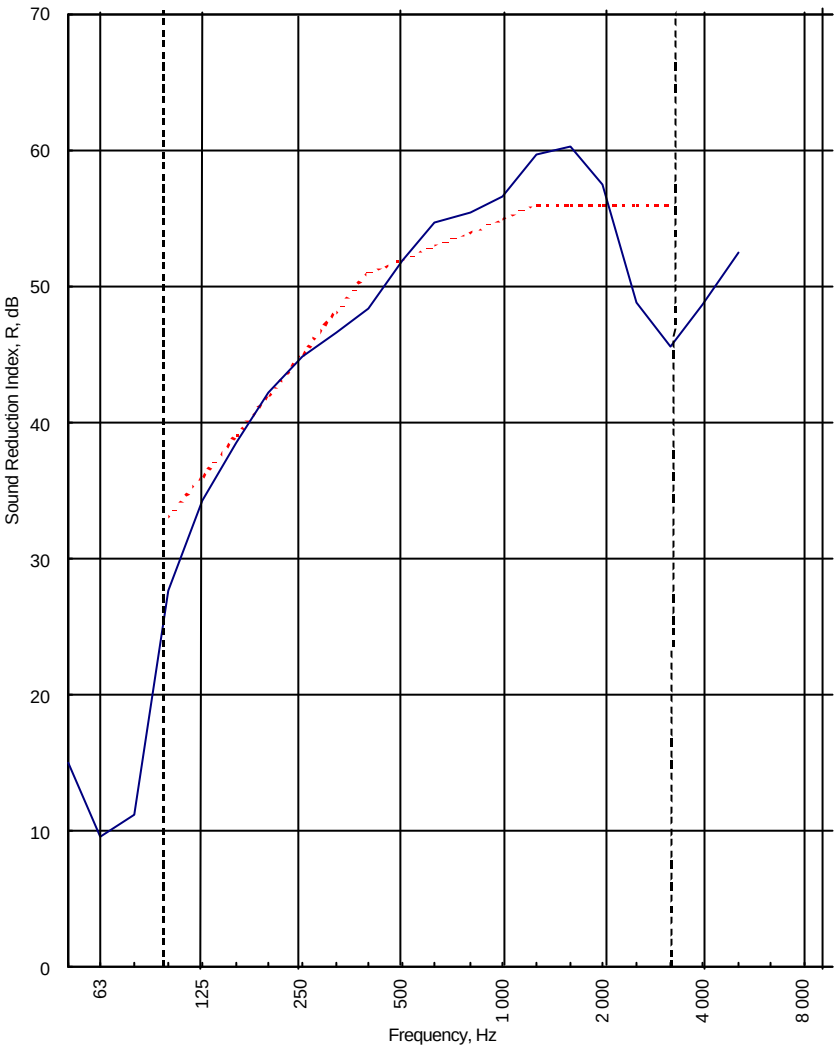
## TEST RESULTS

| Test Code: |
|---|
| H11152A |
| Test Date: |
| 07/08/00 |

| Freq. Hz | R dB |
|---|---|
| 50 | 15.0 |
| 63 | 9.6 |
| 80 | 11.3 |
| 100 | 27.7 |
| 125 | 34.3 |
| 160 | 38.6 |
| 200 | 42.2 |
| 250 | 44.9 |
| 315 | 46.6 |
| 400 | 48.4 |
| 500 | 51.9 |
| 630 | 54.7 |
| 800 | 55.5 |
| 1 000 | 56.6 |
| 1 250 | 59.8 |
| 1 600 | 60.3 |
| 2 000 | 57.5 |
| 2 500 | 48.8 |
| 3 150 | 45.6 |
| 4 000 | 48.7 |
| 5 000 | 52.6 |
| 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) = 52 (-3;-7) dB**

**Max dev. 10.4 dB at 3 150 Hz**

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

$C_{50\text{-}3150}$= **-11 dB** $C_{50\text{-}5000}$= **-10 dB** $C_{100\text{-}5000}$= **-3 dB**

$C_{tr,50\text{-}3150}$= **-23 dB** $C_{tr,50\text{-}5000}$= **-23 dB** $C_{tr,100\text{-}5000}$= **-7 dB**

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

Test Code: **H11152A** Test Date: **07/08/00**

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

| | Room T2 | Room T1 |
|---|---|---|
| Room Volume, $m^3$: | **98** | **62** |
| Temperature, deg.C: | **20.3** | **20.5** |
| Rel. Humidity, %RH: | **66.5** | **66.7** |

| 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 | 58.2 | 40.1 | 17.0 | 40.1 | 0.56 | -3.1 | **15.0** | | |
| 63 | 60.4 | 47.8 | 13.2 | 47.8 | 0.58 | -3.0 | **9.6** | | 11.4 |
| 80 | 63.4 | 50.6 | 8.0 | 50.6 | 0.81 | -1.5 | **11.3** | | |
| 100 | 75.4 | 47.2 | 27.3 | 47.2 | 1.03 | -0.5 | **27.7** | 5.3 | |
| 125 | 80.7 | 46.3 | 10.5 | 46.3 | 1.12 | -0.1 | **34.3** | 1.7 | 31.3 |
| 160 | 87.7 | 49.2 | 9.5 | 49.2 | 1.18 | 0.1 | **38.6** | 0.4 | |
| 200 | 93.0 | 51.4 | 19.8 | 51.4 | 1.32 | 0.6 | **42.2** | | |
| 250 | 95.6 | 51.7 | 14.5 | 51.7 | 1.45 | 1.0 | **44.9** | 0.1 | 44.2 |
| 315 | 95.1 | 48.8 | 14.2 | 48.8 | 1.24 | 0.3 | **46.6** | 1.4 | |
| 400 | 93.1 | 44.3 | 15.1 | 44.3 | 1.04 | -0.4 | **48.4** | 2.6 | |
| 500 | 91.2 | 40.1 | 12.7 | 40.1 | 1.38 | 0.8 | **51.9** | 0.1 | 50.9 |
| 630 | 89.9 | 36.0 | 8.8 | 36.0 | 1.37 | 0.8 | **54.7** | | |
| 800 | 90.5 | 35.9 | 10.4 | 35.9 | 1.40 | 0.9 | **55.5** | | |
| 1 000 | 90.2 | 35.1 | 9.2 | 35.1 | 1.61 | 1.5 | **56.6** | | 57.0 |
| 1 250 | 90.7 | 32.8 | 8.0 | 32.8 | 1.77 | 1.9 | **59.8** | | |
| 1 600 | 93.5 | 35.0 | 8.6 | 35.0 | 1.74 | 1.8 | **60.3** | | |
| 2 000 | 94.9 | 39.1 | 7.4 | 39.1 | 1.71 | 1.7 | **57.5** | | 52.8 |
| 2 500 | 93.5 | 46.2 | 7.4 | 46.2 | 1.64 | 1.5 | **48.8** | 7.2 | |
| 3 150 | 93.0 | 48.1 | 9.5 | 48.1 | 1.35 | 0.7 | **45.6** | 10.4 | |
| 4 000 | 92.5 | 44.6 | 10.9 | 44.6 | 1.39 | 0.8 | **48.7** | | 48.1 |
| 5 000 | 89.9 | 38.1 | 12.4 | 38.1 | 1.37 | 0.8 | **52.6** | | |
| 6 300 | | | | | | | | | |
| 8 000 | | | | | | | | | |
| 10 000 | | | | | | | | | |

| **Single Figure Ratings** | **Rw** | **C** | **Ctr** | **Total U. Dev., dB** | **29.2** |
|---|---|---|---|---|---|
| **BS EN ISO 717-1: 1997** | **dB** | **dB** | **dB** | | |
| | **52** | **-3** | **-7** | | |
| | **(100-5000)** | **-3** | **-7** | | |
| | **(50-3150)** | **-11** | **-23** | | |
| | **(50-5000)** | **-10** | **-23** | | |

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

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Fire Acoustics Structures

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## APPENDIX A: 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 $30^{o}$ 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.

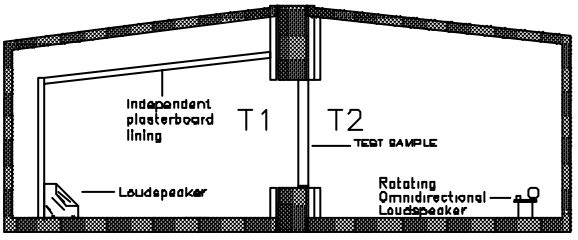
The test specimen is installed in the aperture so that it finishes flush with the last timber in room T2 side to eliminate indirect transmission between rooms. The specimen is not installed so that the aperture depth ratio 2:1 is met as recommended in section 5.2.1 of BS EN ISO 140-3:1995. Laboratory 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.

HTS SECTION



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