

The Building Test Centre

Fire Acoustics Structures

The Building Test Centre
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Report Number **BTC 20779A**

An acoustic test report covering laboratory sound insulation testing to BS EN ISO 10140-2:2010 on a British Gypsum GypWall Robust partition clad with an outer layer of 12.5mm Gyproc Habito and inner layer of 15mm Gyproc SoundBloc F each side with 50mm Isover APR 1200 insulation in the cavity.

Test date: 7th January 2019

Report issued date: 7th January 2019

www.btconline.co.uk

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

Customer: **British Gypsum**

BTC 20779A: Page 1 of 14



0296

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TABLE OF CONTENTS

FOREWORD	3
REPORT AUTHORISATION.....	3
TEST REPORT AMENDMENTS.....	4
TEST CONSTRUCTION.....	5
TEST MATERIALS	7
<i>Plasterboard</i>	<i>7</i>
<i>Insulation</i>	<i>7</i>
<i>Metal Components</i>	<i>8</i>
<i>Fasteners</i>	<i>8</i>
<i>Miscellaneous Components.....</i>	<i>8</i>
TEST RESULTS	9
TEST PROCEDURE.....	9
LIMITATIONS	10
APPENDIX A - TEST DATA	11
APPENDIX B - TEST METHOD AND CONDITIONS	13

Customer: **British Gypsum**

BTC 20779A: Page 2 of 14



0296

FOREWORD

The test sponsor was British Gypsum.

The test specimen was installed by Karl Negus and John Gwynne on the 7th January 2019.

The Building Test Centre played no role in the design or selection of the materials comprising the test specimen.

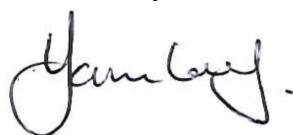
REPORT AUTHORISATION

Report Author



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Authorised by



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TEST REPORT AMENDMENTS

Page	Amendments	Date

Report Amendments Author

Name
Role

Amendments Authorised by

Name
Role

Customer: **British Gypsum**

BTC 20779A: Page 4 of 14



0296

TEST CONSTRUCTION

The test specimen was constructed in an aperture having an overall opening of 2400mm (high) x 3600mm (wide).

Gypframe 94FEC50 Folded Edge Standard Floor and Ceiling Channels were fixed to the head and base of the test aperture with two rows of staggered fixings at 600mm centres using 25mm British Gypsum Drywall Screws.

Gypframe 92AS50 AcouStuds were positioned between the head and base channels at each end of the aperture and fixed using 25mm British Gypsum Drywall Screws spaced at 600mm centres.

Gypframe 92AS50 AcouStuds were positioned between the head and base channels at 600mm centres.

50mm Isover APR 1200 insulation was placed within the stud cavity.

The framework was clad with an inner layer of 15mm Gyproc SoundBloc F and an outer layer of 12.5mm Gyproc Habito on each side.

The inner layer of boards was screw fixed around the perimeter of the board at 300mm centres using 25mm British Gypsum Drywall Screws.

The outer layer of boards was screw fixed around the perimeter of the board and intermediate stud positions at 300mm centres using 40mm British Gypsum High Performance Screws.

All vertical joints were staggered between layers. All joints and screw heads were taped and the perimeter was taped and sealed with Gyproc Sealant.

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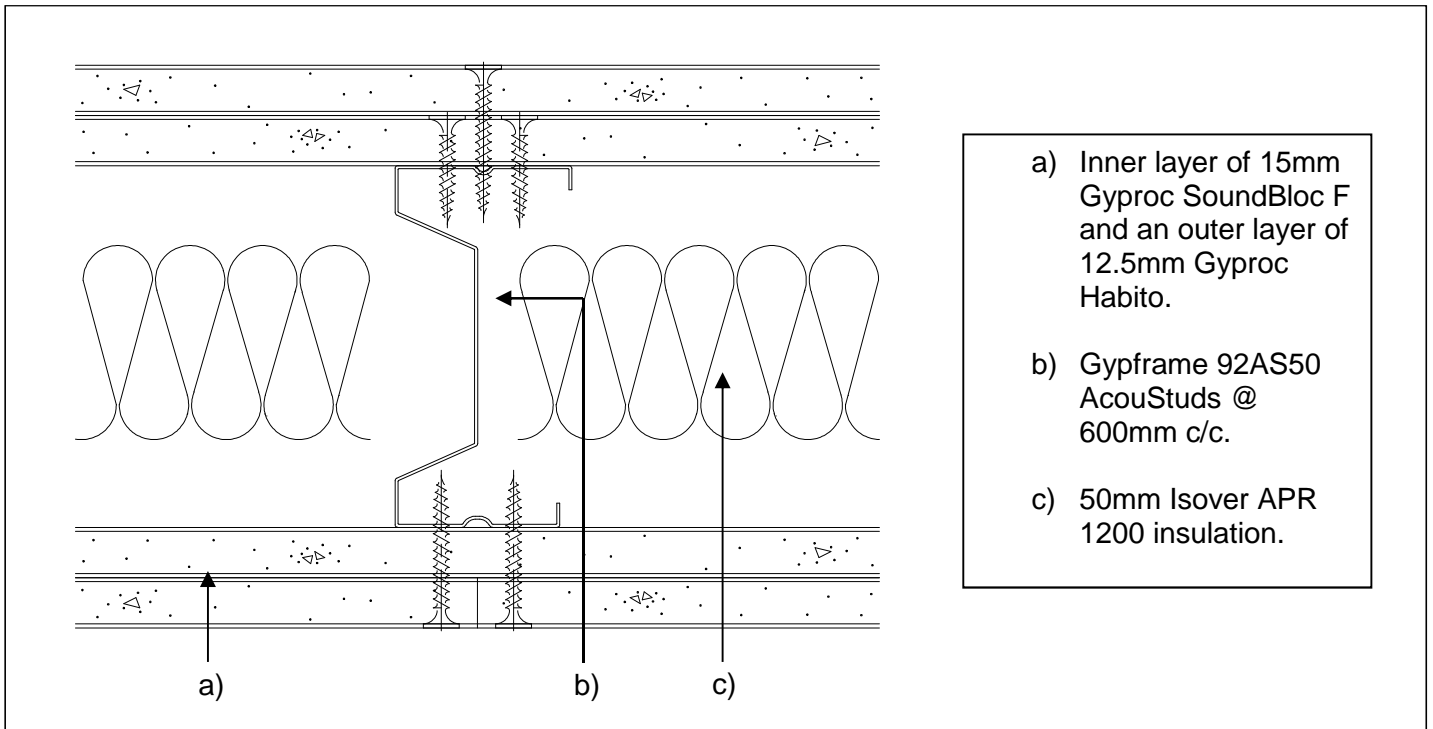


Figure 1. Horizontal cross section view

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

TEST MATERIALS

Plasterboard

- i) Nominally 2400mm (long) x 1200mm (wide) x 15mm (thick) Gyproc SoundBloc F manufactured by British Gypsum, ex Kirkby Thore.

Surface density:	13.6kg/m ²
Average thickness:	15.4mm
Board Code:	26 176 18 09:47
	26 176 18 09:47
	26 176 18 09:47

- ii) Nominally 2400mm (long) x 1200mm (wide) x 12.5mm (thick) Gyproc Habito manufactured by British Gypsum, ex Sherburn.

Surface density:	12.0kg/m ²
Average thickness:	12.8mm
Board Code:	31 297 18 13:57
	31 297 18 13:57
	31 297 18 13:57

The surface densities were calculated using the actual weight and size of a selection of the boards used in the test specimen.

Material dimensions were supplied by the customer.

Insulation

- i) Nominally 50mm thick Isover APR 1200 insulation supplied by British Gypsum.

Average area	15.60m ²
Average weight	10.86kg
Density	13.92kg/m ³

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

Material dimensions were supplied by the customer.

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BTC 20779A: Page 7 of 14



0296

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Metal Components

- i) 0.5mm thick Gypframe 92AS50 AcouStuds.
- ii) 0.5mm thick Gypframe 94FEC50 Folded Edge Standard Floor and Ceiling Channels

All metal components are manufactured from galvanised mild steel using the UltraSTEEL™ process and supplied by British Gypsum

Fasteners

- i) 25mm British Gypsum Drywall Screws.
- ii) 40mm British Gypsum High Performance Screws.

All fasteners supplied by British Gypsum.

Miscellaneous Components

- i) Gyproc Sealant supplied by British Gypsum.
- ii) Joint tape supplied by The Building Test Centre.

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 AP070 vs 1.1.

TEST RESULTS

Test Code	Description	Weighted Airborne Sound Reduction Index R_w (C; Ctr)
H20779AA	British Gypsum GypWall Robust partition clad with an outer layer of 12.5mm Gyproc Habito and inner layer of 15mm Gyproc SoundBloc F each side with 50mm Isover APR 1200 insulation in the cavity.	57 (-2;-7) dB

For full data see Appendix A of this report.

Test conducted in accordance with BS EN ISO 10140-2:2010 except for Clause A.2 in BS EN ISO 10140-4:2010 where minimum distances for measurements at frequencies under 100Hz cannot be met.

Rated in accordance with BS EN ISO 717-1: 2013.

No visible damage of the test specimen occurred during test.

Testing to BS EN ISO 10140-2:2010 conforms to the requirements of BS EN ISO 140-3:1995 (withdrawn).

Where the uncertainty of measured values is stated, (e.g. temperature, relative humidity and static pressure) the reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

TEST PROCEDURE

The test specimen (3.6 m x 2.4 m) was constructed in a wall dividing two reverberant rooms of approximately 98m³ and 62m³. The accuracy of the test method conforms to BS EN 20140-2:1993, the test procedure used is detailed in the test data in Appendix A of this report. 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 B for further information.

Customer: **British Gypsum**

BTC 20779A: Page 9 of 14



0296

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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.

Customer: **British Gypsum**

BTC 20779A: Page 10 of 14

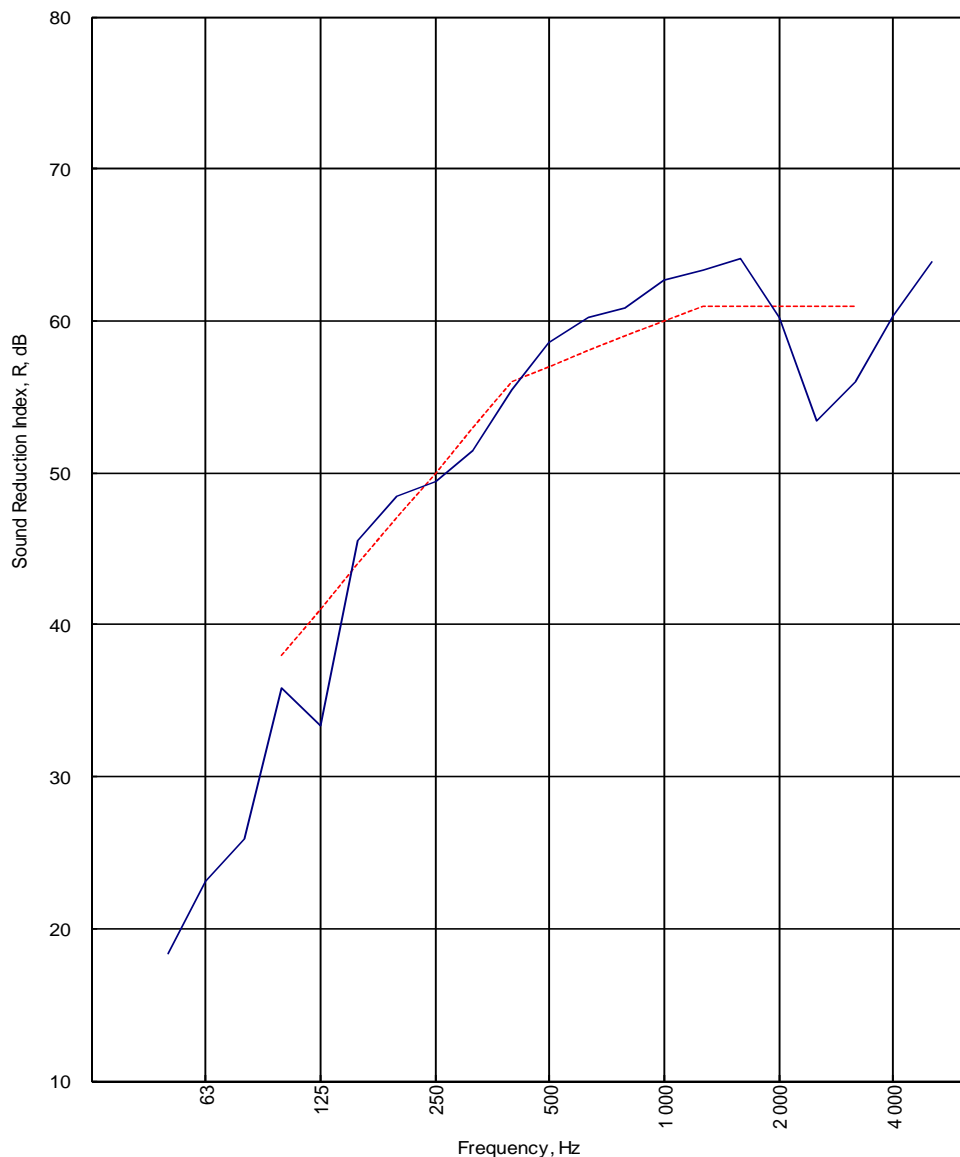


0296

APPENDIX A - TEST DATA

Test Code:
H20779AA
Test Date:
07/01/2019

Freq. Hz	R dB
50	18.4
63	23.1
80	25.9
100	35.8
125	33.4
160	45.5
200	48.4
250	49.4
315	51.5
400	55.5
500	58.6
630	60.2
800	60.9
1 000	62.7
1 250	63.3
1 600	64.1
2 000	60.2
2 500	53.4
3 150	56.0
4 000	60.3
5 000	63.9



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

Rating according to
BS EN ISO 717-1:2013

R_w (C;C_{tr}) = 57 (-2;-7) dB

Max dev. 7.6 dB at 2 500 Hz

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

C₅₀₋₃₁₅₀ = **-6 dB**

C₅₀₋₅₀₀₀ = **-5 dB**

C₁₀₀₋₅₀₀₀ = **-2 dB**

C_{tr,50-3150} = **-17 dB**

C_{tr,50-5000} = **-17 dB**

C_{tr,100-5000} = **-7 dB**

Customer: **British Gypsum**

BTC 20779A: Page 11 of 14



0296

LABORATORY AIRBORNE SOUND INSULATION TEST - BS EN ISO 10140-2:2010

Test Code: **H20779AA**

Test Date: **07/01/2019**

Specimen Area, S = **8.64** m²

	Room T2	Room T1
Room Volume, m ³ :	98	59.71
Temperature, deg.C:	14.4	14.6 ± 0.3
Rel. Humidity, %RH:	61.3	61.5 ± 1.6
Static Pressure, Pa:	102100	102100 ± 65

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	56.3	35.5	16.5	35.5	0.64	-2.4	18.4		
63	63.4	39.2	18.9	39.2	0.85	-1.1	23.1		21.4
80	73.1	45.8	12.7	45.8	0.80	-1.4	25.9		
100	78.7	42.7	6.7	42.7	1.06	-0.2	35.8	2.2	
125	103.8	70.3	7.9	70.3	1.09	-0.1	33.4	7.6	36.0
160	83.4	38.6	4.2	38.6	1.29	0.7	45.5		
200	88.0	41.1	13.3	41.1	1.57	1.5	48.4		
250	90.3	42.6	4.3	42.6	1.63	1.7	49.4	0.6	49.6
315	90.3	40.6	6.6	40.6	1.66	1.8	51.5	1.5	
400	111.5	57.4	25.2	57.4	1.53	1.4	55.5	0.5	
500	87.9	30.9	8.2	30.9	1.60	1.6	58.6		57.6
630	86.1	27.9	8.2	27.9	1.76	2.0	60.2		
800	86.7	27.7	3.7	27.7	1.73	1.9	60.9		
1 000	105.1	44.3	12.9	44.3	1.72	1.9	62.7		62.2
1 250	87.7	26.3	4.9	26.3	1.73	1.9	63.3		
1 600	90.2	28.1	3.4	28.1	1.75	2.0	64.1		
2 000	92.2	33.6	2.8	33.6	1.60	1.6	60.2	0.8	57.1
2 500	90.8	38.4	2.7	38.4	1.39	1.0	53.4	7.6	
3 150	89.8	34.7	3.5	34.7	1.35	0.9	56.0	5.0	
4 000	90.4	30.9	7.8	30.9	1.33	0.8	60.3		58.9
5 000	95.3	32.0	12.1	32.0	1.27	0.6	63.9		
6 300									
8 000									
10 000									

Single Figure Ratings	R_w	C	C_{tr}	Total U. Dev., dB	25.8
BS EN ISO 717-1: 2013	dB	dB	dB		
	57	-2	-7		
	(100-5000)	-2	-7		
	(50-3150)	-6	-17		
	(50-5000)	-5	-17		
				Procedure: AP 046 vs 5.2	
				Worksheet: 140_3_1.XLS	

Customer: **British Gypsum**

BTC 20779A: Page 12 of 14



0296

APPENDIX B - TEST METHOD AND CONDITIONS

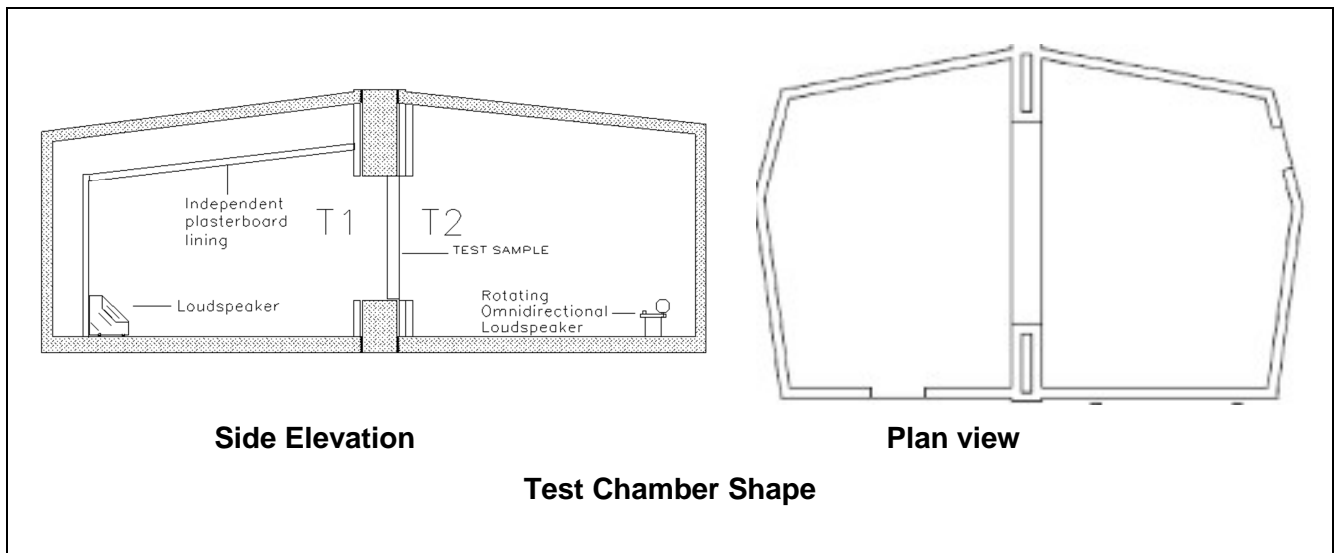
Method

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 twelve reverberation times and applying this to the Sabine formula.

Test Chamber Layout

The test suite is constructed to be as independent from the surround building as is physically possible in order to minimise flanking transmission paths.



The source room (T2) contains two perspex diffusers of approximately 900mm x 1220mm. Panel absorbers are used to ensure reverberation times in source room (T2) are between one and two seconds at all frequencies at and above 100 Hz. 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. A stationary loudspeaker sound source is placed in the corner of the receiving room (T1) opposite the test specimen.

The BTC has a solid concrete frame which has been additionally lined to give improved reduction of flanking transmission. This is in order to ensure that, as far as possible, lab limits will not restrict the real performance measurement of just the test specimen.

Technical drawing of a building section showing a cross-section of a wall and floor system. The drawing includes dimensions for the wall thickness (660), floor thickness (240), and total height (675). It also shows a grid of vertical lines and a horizontal line indicating a structural break.

Lab Limits

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}	45.0	46.9	58.5	62.4	62.9	67.7	71.2	77.2	84.2	92.0	97.7	101.5	103.8	97.6	102.4	104.8	101.8	102.9	98.7	96.4	96.3

The uncertainties values for test are taken from ISO 12999-1 situation B situ standard deviation.

Descriptor	Rw	Rw + C	Rw + Ctr	Rw + C	Rw + Ctr	Rw + C	Rw + Ctr	Rw + C	Rw + Ctr
		(100-3150)	(100-3150)	(100-5000)	(100-5000)	(50-3150)	(50-3150)	(50-5000)	(50-5000)
Standard Uncertainty	0.9	0.9	1.1	1.1	1.1	1.0	1.3	1.1	1.0

