

The Building Test Centre

Fire Acoustics Structures

The Building Test Centre
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Report Number **BTC 20939A**

An acoustic test report covering laboratory sound insulation testing to BS EN ISO 10140-2:2010 on a British Gypsum GypWall Extreme partition clad with a single layer of 15mm Rigidur H each side.

Test date: 18th April 2019

Report issued date: 18th April 2019

www.btconline.co.uk

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

Customer: **British Gypsum**

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FOREWORD

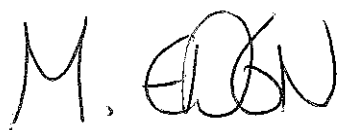
The test sponsor was British Gypsum.

The test specimen was installed by Tony Clark, Cameron Whitaker, and John Gwynne between the 17th April 2019 and the 18th April 2019.

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

REPORT AUTHORISATION

Report Author



Macaulay Eden
BEng (Hons)
Scientist

Authorised by



Yasmin Latif
BSc (Hons) MSc
Section Manager

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TEST REPORT AMENDMENTS

Page	Amendments	Date

Report Amendments Author

Name
Role

Amendments Authorised by

Name
Role

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TEST CONSTRUCTION

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

Gypframe 72DC60 Deep Flange Floor and Ceiling Channels were fixed to the head and base of the test aperture at 600mm centres using 25mm British Gypsum Drywall Screws.

Gypframe 70S60 'C' Studs 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 70S60 'C' Studs were positioned between the head and base channels at 600mm centres.

The framework was clad with a single layer of 15mm Rigidur H each side.

The boards were screw fixed around the perimeter of the board and the intermediate stud positions at 300mm centres using 40mm Rigidur 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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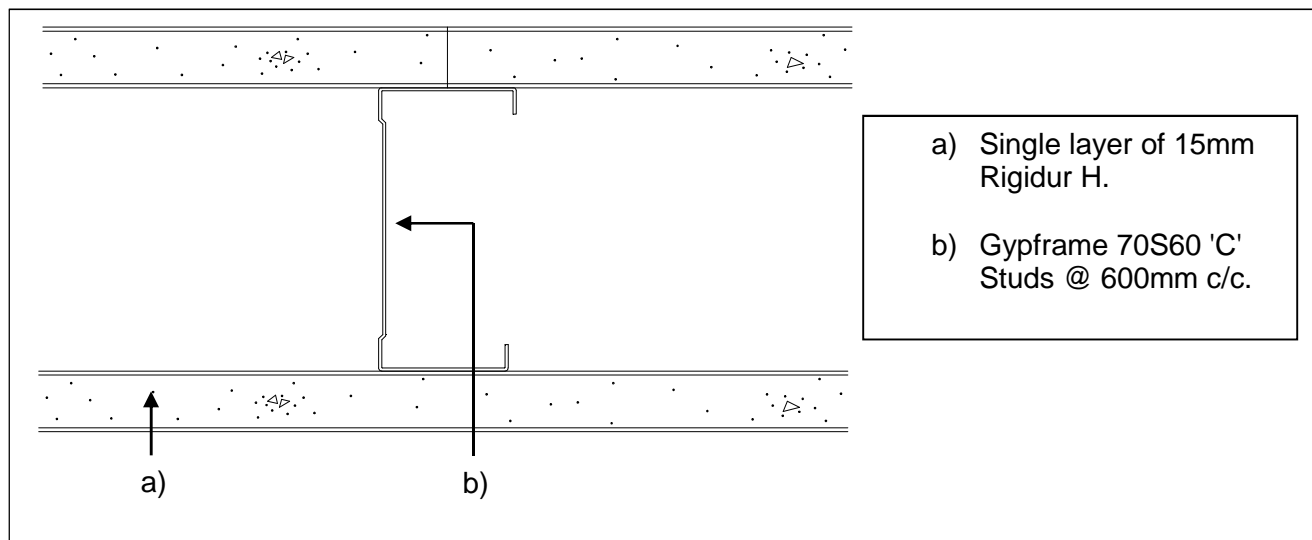


Figure 1. Horizontal cross section view

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

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TEST MATERIALS

Plasterboard

- i) Nominally 2400mm (long) x 1200mm (wide) x 15mm (thick) Rigidur H manufactured by British Gypsum, ex Bodenwerder.

Surface density:	19.2kg/m ²
Average thickness:	15.1mm
Board Code:	300718 12:46
	300718 12:46
	300718 12:45

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.

Metal Components

- i) 0.6mm thick Gypframe 70S60 'C' Studs.
ii) 0.6mm thick Gypframe 72DC60 Deep Flange 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 Rigidur 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.

Customer: **British Gypsum**

TEST RESULTS

Test Code	Description	Weighted Airborne Sound Reduction Index R_w (C; Ctr)
H20939AA	Single layer of 15mm Rigidur H each side on Gypframe 70S60 'C' Studs.	43 (-2;-6) 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.

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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.

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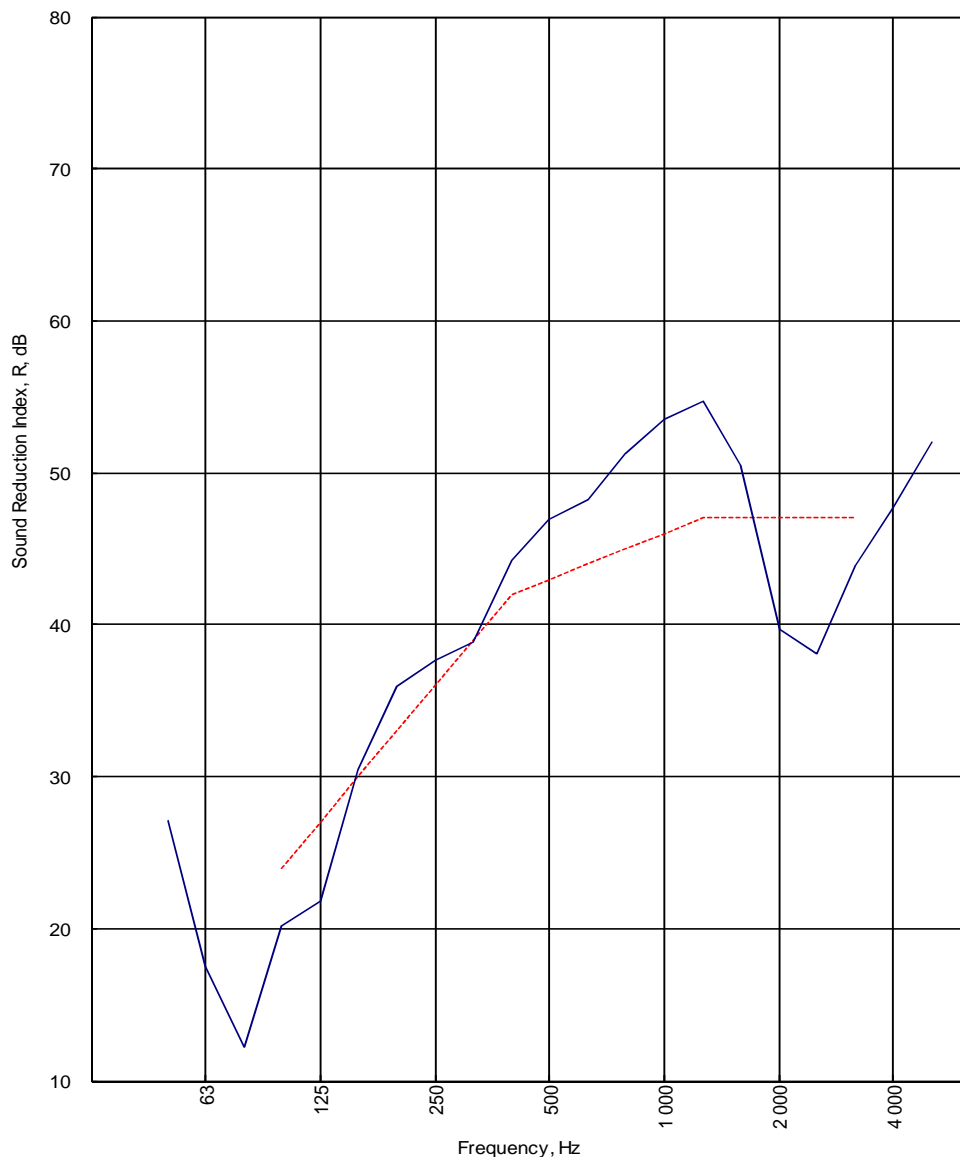


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APPENDIX A - TEST DATA

Test Code:
H20939AA
Test Date:
18/04/2019

Freq. Hz	R dB
50	27.1
63	17.5
80	12.2
100	20.2
125	21.8
160	30.4
200	35.9
250	37.7
315	38.9
400	44.2
500	46.9
630	48.2
800	51.3
1 000	53.5
1 250	54.7
1 600	50.5
2 000	39.7
2 500	38.1
3 150	43.9
4 000	47.7
5 000	52.0



Rating according to
BS EN ISO 717-1:2013

R_w (C;C_{tr}) = 43 (-2;-6) dB

Max dev. 8.9 dB at 2 500 Hz

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

C₅₀₋₃₁₅₀ = **-4 dB**

C₅₀₋₅₀₀₀ = **-3 dB**

C₁₀₀₋₅₀₀₀ = **-1 dB**

C_{tr,50-3150} = **-12 dB**

C_{tr,50-5000} = **-12 dB**

C_{tr,100-5000} = **-6 dB**

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

Test Code: **H20939AA**

Test Date: **18/04/2019**

Specimen Area, S = 8.64 m ²	Room Volume, m ³ : 98	Room T2 60.12	Room T1 17 ± 0.3
	Temperature, deg.C:	16.7	17 ± 0.3
	Rel. Humidity, %RH:	53.9	52.8 ± 1.6
	Static Pressure, Pa:	101900	101900 ± 65

Freq Hz	Test Room T2 to Test Room T1						R dB	U.Dev. dB	R 1/1Oct dB
	Source dB	Rec. (uc) dB	Bgrnd dB	Rec. (corr) dB	Rev.time Sec	Corr. dB			
50	59.2	30.8	22.2	30.2	0.72	-1.9	27.1		
63	63.1	45.0	22.9	45.0	0.97	-0.6	17.5		15.7
80	70.7	57.3	11.2	57.3	0.84	-1.2	12.2		
100	78.5	57.6	6.5	57.6	0.94	-0.7	20.2	3.8	
125	104.0	82.7	9.8	82.7	1.24	0.5	21.8	5.2	22.4
160	83.9	54.2	11.7	54.2	1.31	0.7	30.4		
200	88.2	53.7	20.4	53.7	1.54	1.4	35.9		
250	91.1	55.1	11.6	55.1	1.66	1.7	37.7		37.3
315	90.2	53.2	10.5	53.2	1.73	1.9	38.9	0.1	
400	88.9	46.3	17.6	46.3	1.62	1.6	44.2		
500	87.9	42.6	10.0	42.6	1.62	1.6	46.9		46.1
630	86.7	40.4	6.2	40.4	1.74	1.9	48.2		
800	87.3	38.1	13.8	38.1	1.82	2.1	51.3		
1 000	87.1	35.8	17.5	35.8	1.83	2.2	53.5		52.9
1 250	88.0	35.5	13.6	35.5	1.85	2.2	54.7		
1 600	90.6	42.1	10.4	42.1	1.78	2.0	50.5		
2 000	92.6	54.8	9.4	54.8	1.72	1.9	39.7	7.3	40.4
2 500	91.1	54.3	7.9	54.3	1.51	1.3	38.1	8.9	
3 150	90.2	47.4	6.2	47.4	1.42	1.1	43.9	3.1	
4 000	90.7	43.9	9.3	43.9	1.37	0.9	47.7		46.7
5 000	95.4	44.2	11.8	44.2	1.33	0.8	52.0		
6 300									
8 000									
10 000									

Single Figure Ratings	Rw	C	Ctr	Total U. Dev., dB	28.4
BS EN ISO 717-1: 2013	dB	dB	dB		
	43	-2	-6		
	(100-5000)	-1	-6		
Background Corrected	(50-3150)	-4	-12		
	(50-5000)	-3	-12		
Procedure: AP 046 vs 5.2					
Worksheet: 140_3_1.XLS					

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APPENDIX B - TEST METHOD AND CONDITIONS

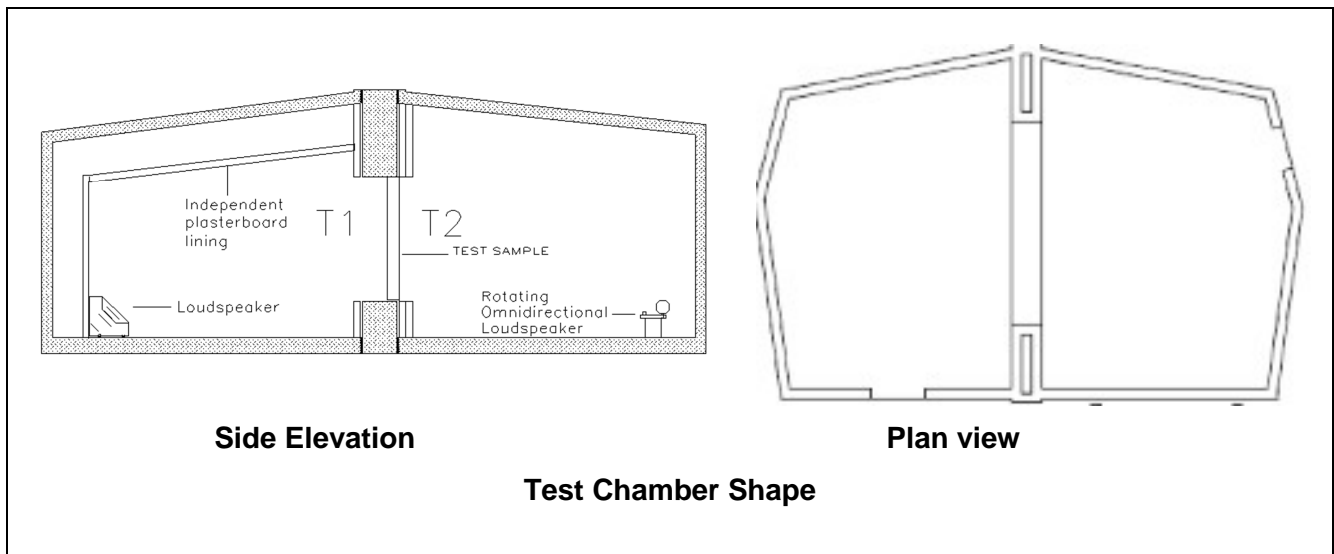
Method

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.

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.

Freq Hz	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000
Standard Uncertainty	4.0	3.6	3.2	2.8	2.4	2.0	1.8	1.6	1.4	1.2	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.3	1.6	1.9	2.2

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

