The Building Test Centre

Fire Acoustics Structures

The Building Test Centre
British Gypsum
East Leake
Loughborough
Leics. LE12 6NP
Tel (0115) 945 1564
Fax (0115) 945 1562
Email btc.testing@saint-gobain.com
Website www.btconline.co.uk

Report Number **BTC 20730A**

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 12.5mm Gyproc SoundBloc each side with 50mm Isover APR 1200 Insulation in the cavity.

Test date: 2nd November 2018

Report issued date: 2nd November 2018

www.btconline.co.uk

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

UKAS TESTING
0296

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FOREWORD

The test sponsor was British Gypsum.

The test specimen was installed by Karl Negus and Cameron Whitaker on the 2nd November 2018.

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 pp James Lucas
Eric Chee BSc (Hons) *Scientist*	**Yasmin Latif** BSc (Hons) MSc *Section Manager*

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TEST REPORT AMENDMENTS

Page	Amendments	Date

Report Amendments Author	Amendments Authorised by
Name *Role*	**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 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 12.5mm Gyproc SoundBloc and an outer layer of 12.5mm Gyproc Habito 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 the intermediate stud positions at 300mm centres using 35mm 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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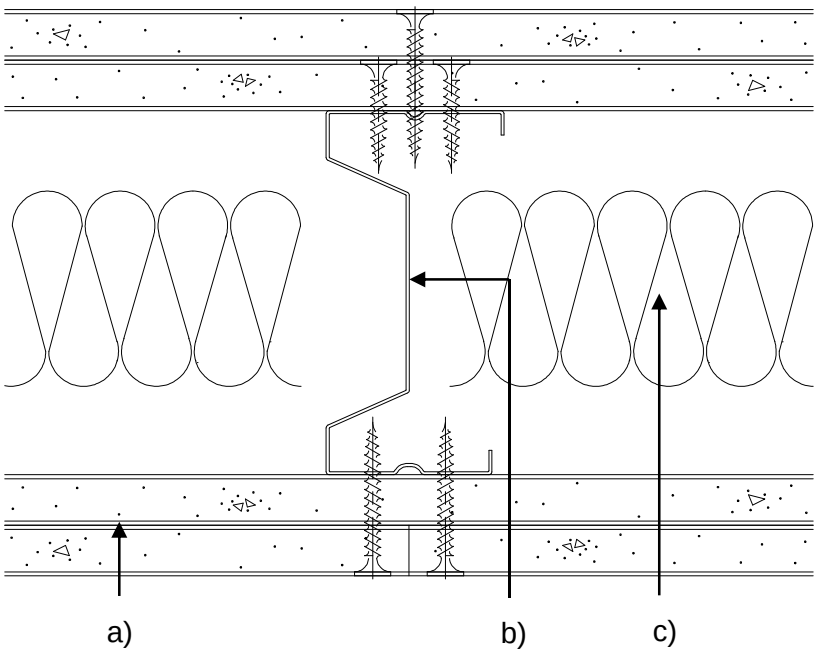

a) Inner layer of 12.5mm Gyproc SoundBloc and an outer layer of 12.5mm Gyproc Habito.

a) Gypframe 92AS50 AcouStuds @ 600mm c/c.

b) 50mm Isover APR 1200 insulation.

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 12.5mm (thick) Gyproc SoundBloc manufactured by British Gypsum, ex East Leake.

Surface density:	11.8kg/m^2
Average thickness:	12.4mm
Board Code:	16 298 18 04:36
	16 298 18 04:36
	16 298 18 04:36

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

Surface density:	12.2kg/m^2
Average thickness:	12.9mm
Board Code:	31 276 18 10:51
	31 276 18 10:52
	31 276 18 10:51

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	10.75kg
Density	13.78kg/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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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 UltraEMBOSSED™ process and supplied by British Gypsum

Fasteners

i) 25mm British Gypsum Drywall Screws.
ii) 35mm British Gypsum High Performance Fixings.

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.

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TEST RESULTS

Test Code	Description	Weighted Airborne Sound Reduction Index R_w (C; Ctr)
H20730AA	Double layer of 12.5mm Gyproc SoundBloc (inner) and 12.5mm Gyproc Habito (outer) each side on Gypframe 92AS50 AcouStuds 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 98m^3 and 62m^3. 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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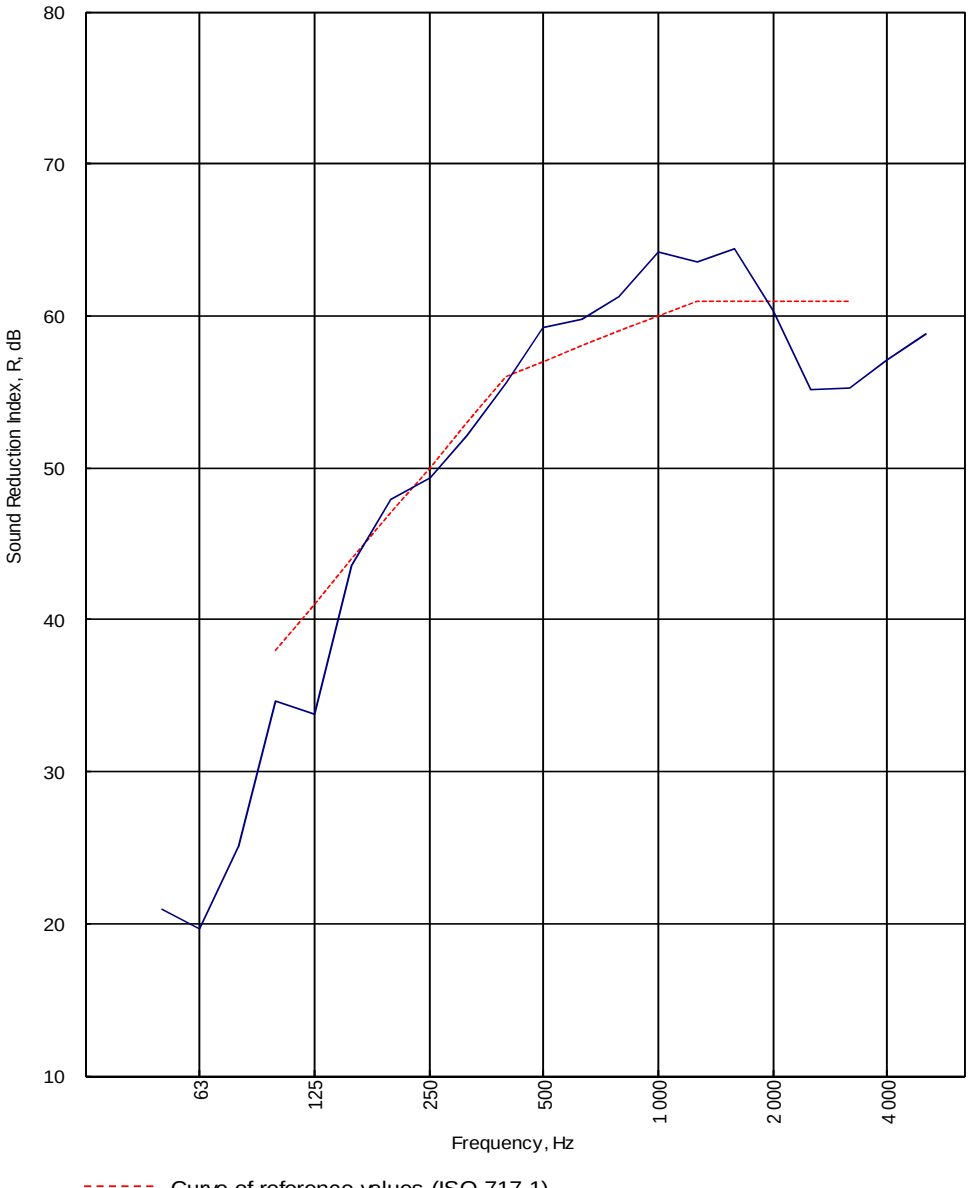
LIMITATIONS

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.

APPENDIX A - TEST DATA

Test Code:
H20730AA
Test Date:
02/11/2018

Freq. Hz	R dB
50	20.9
63	19.7
80	25.1
100	34.6
125	33.8
160	43.6
200	47.9
250	49.3
315	52.1
400	55.6
500	59.2
630	59.8
800	61.3
1 000	64.2
1 250	63.6
1 600	64.4
2 000	60.3
2 500	55.1
3 150	55.3
4 000	57.1
5 000	58.8



Rating according to BS EN ISO 717-1:2013	**Rw (C;Ctr) = 57 (-2;-7) dB**		
	Max dev. 7.2 dB at 125 Hz		
Evaluation based on laboratory measurement results obtained by an engineering method:	$C_{50\text{-}3150}$= **-6 dB**	$C_{50\text{-}5000}$= **-5 dB**	$C_{100\text{-}5000}$= **-2 dB**
	$C_{tr,50\text{-}3150}$= **-18 dB**	$C_{tr,50\text{-}5000}$= **-18 dB**	$C_{tr,100\text{-}5000}$: **-7 dB**

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

Test Code: **H20730AA** Test Date: **02/11/2018**

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

	Room T2	Room T1	
Room Volume, m^3:	**98**	**59.76**	
Temperature, deg.C:	**15.9**	**16**	**± 0.3**
Rel. Humidity, %RH:	**48.3**	**48.2**	**± 1.6**
Static Pressure, Pa:	**101800**	**101800**	**± 65**

	Test Room T2 to Test Room T1								
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	56.7	33.1	17.8	33.1	0.59	-2.7	**20.9**		
63	61.9	41.1	15.6	41.1	0.86	-1.1	**19.7**		21.4
80	73.2	46.3	9.2	46.3	0.73	-1.8	**25.1**		
100	78.3	43.5	5.5	43.5	1.06	-0.2	**34.6**	3.4	
125	103.6	69.7	4.9	69.7	1.08	-0.1	**33.8**	7.2	35.7
160	83.3	40.2	3.0	40.2	1.24	0.5	**43.6**	0.4	
200	88.4	42.0	13.7	42.0	1.55	1.5	**47.9**		
250	90.5	42.9	3.3	42.9	1.63	1.7	**49.3**	0.7	49.4
315	90.2	39.9	5.1	39.9	1.67	1.8	**52.1**	0.9	
400	89.1	34.9	16.4	34.9	1.54	1.4	**55.6**	0.4	
500	87.8	30.1	6.1	30.1	1.57	1.5	**59.2**		57.8
630	86.3	27.8	3.1	27.8	1.50	1.3	**59.8**		
800	86.8	27.1	4.0	27.1	1.59	1.6	**61.3**		
1 000	105.3	42.5	13.9	42.5	1.53	1.4	**64.2**		62.8
1 250	87.5	25.4	4.4	25.4	1.55	1.5	**63.6**		
1 600	90.0	27.3	3.1	27.3	1.63	1.7	**64.4**		
2 000	92.2	33.3	3.3	33.3	1.52	1.4	**60.3**	0.7	58.3
2 500	90.6	36.4	3.0	36.4	1.35	0.9	**55.1**	5.9	
3 150	89.5	34.9	3.9	34.9	1.31	0.7	**55.3**	5.7	
4 000	89.8	33.3	9.3	33.3	1.26	0.6	**57.1**		56.8
5 000	94.6	36.0	10.4	36.0	1.16	0.2	**58.8**		
6 300									
8 000									
10 000									

Single Figure Ratings	**Rw**	**C**	**Ctr**	**Total U. Dev., dB**	**25.3**
BS EN ISO 717-1: 2013	**dB**	**dB**	**dB**		
	57	**-2**	**-7**		
	(100-5000)	**-2**	**-7**		
	(50-3150)	**-6**	**-18**		
	(50-5000)	**-5**	**-18**		

Procedure: AP 046 vs 5.2

Worksheet: 140_3_1.XLS

Customer**: British Gypsum**

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APPENDIX B - TEST METHOD AND CONDITIONS

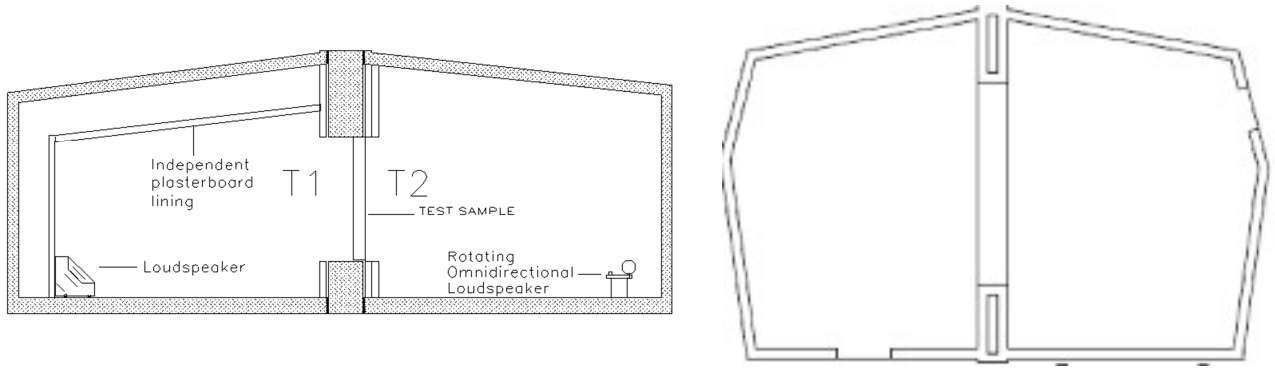
Method

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^{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 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 possibly in order to minimise flanking transmission paths.



Side Elevation **Plan view**

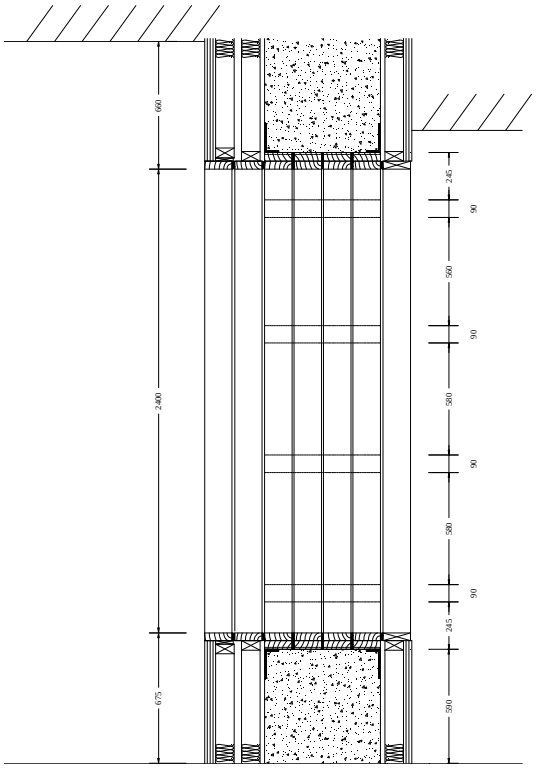
Test Chamber Shape

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.

Mounting

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.

Recommendations for installation position within the niche are given in our Installation Guidance Document. Details of actual installation position are held by the BTC in the Test Report folder.



Cross section of test aperture

Lab Limits

The laboratory limit for measurement due to flanking is (combined BTC 11709A, BTC13562EA, BTC 15829A and BTC 19792A).

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

Uncertainties for test

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