The Building Test Centre
British Gypsum Limited
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Report Number **BTC 14225A**

AN ACOUSTIC TEST REPORT COVERING LABORATORY SOUND INSULATION TESTS TO BS EN ISO 140-3: 1995 ON STRUCTURAL INSULATED PANEL (SIP) SYSTEMS INCORPORATING GYPROC PLASTERBOARD LININGS DIRECTLY FIXED AND ON TIMBER BATTENS.

Test Dates: 13th and 14th October 2005

www.btconline.co.uk

Customer: **SIP Building Systems Limited**
Unit 2
Expressway Industrial Estate
Turnall Road
Ditton
Widnes
Cheshire WA8 8RD

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FOREWORD

This test report details sound insulation tests conducted on structural insulated panel (SIP) systems incorporating plasterboard linings, directly fixed and fixed to timber battens. The test sponsor was SIP Building Systems Limited.

The test specimens were installed by The Building Test Centre. The construction of the specimen took place between the 12th and 14th October 2005. The Building Test Centre played no role in the design or selection of the materials comprising the test specimens.

The tests were witnessed by Mr. Peter Jones on behalf of SIP Building Systems Limited.

REPORT AUTHORISATION

Report Author	Authorised by
Sarah J. Wood	
Sarah Wood B.Eng. (Hons.), AMIOA *Section Manager*	**Dan Patterson** BSc. (Hons.), MIOA Technical Manager

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TEST CONSTRUCTIONS

The test panels were supplied pre – fabricated, consisting of two facings of 11mm OSB (oriented strand board) bonded by pressure injection to CFC free/ODP zero polyurethane closed cell foam. The facings and core act as a composite construction.

BTC 14225AA

The panels were positioned within the test aperture to create a double leaf partition with a 50mm cavity. OSB splines, nominally 11mm x 100mm, were used in the joints of the test panel.

The partition was lined on one side only with an inner layer of 19mm Gyproc Plank fixed horizontally with 32mm Gyproc Drywall Timber screws at 600mm centres and an outer layer of 12.5mm Gyproc FireLine fixed with 41mm Gyproc Drywall Timber screws at 300mm centres.

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

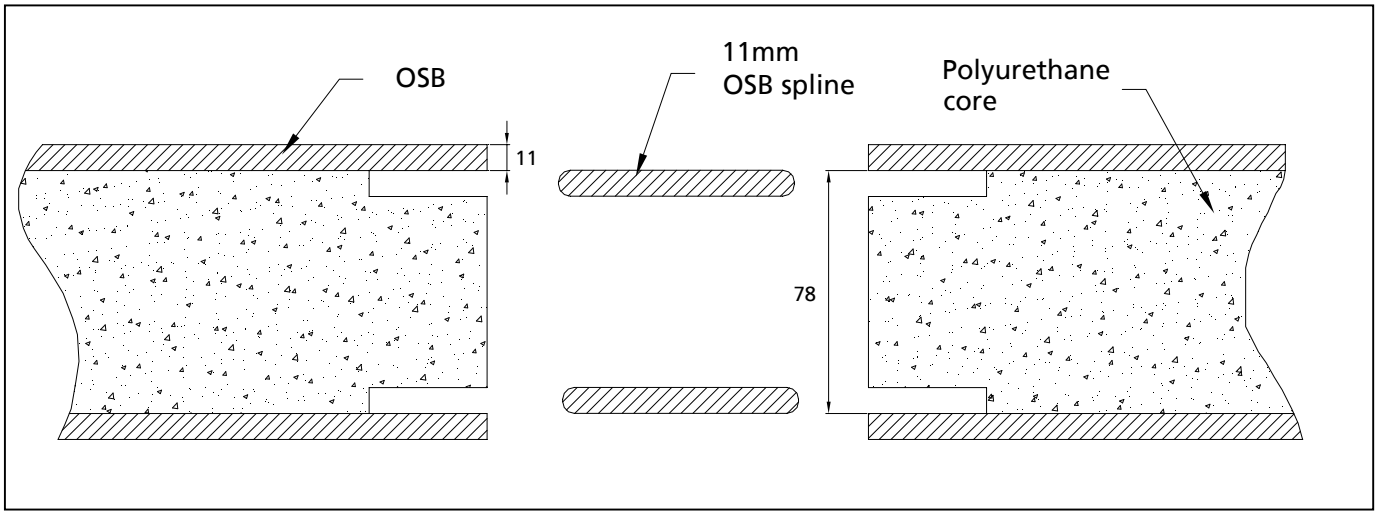

Figure 1. Cross-section through the structural insulated panel

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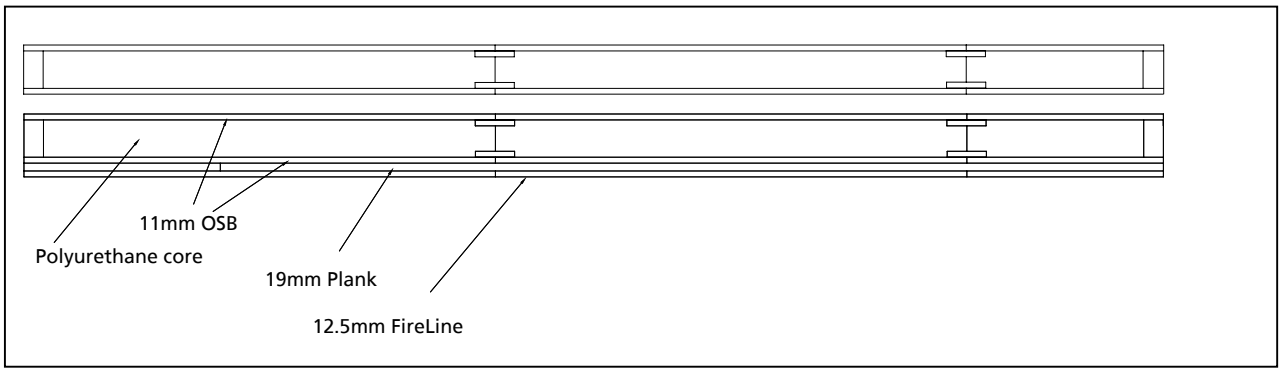

Figure 2. Cross section through test specimen BTC 14425AA

BTC 14225BA

The panels were positioned within the test aperture to create a double leaf partition with a 50mm cavity. OSB splines, nominally 11mm x 100mm, were used in the joints of the test panel.

The partition was lined on one side with an inner layer of 19mm Gyproc Plank fixed horizontally with 32mm Gyproc Drywall Timber screws at 600mm centres and an outer layer of 12.5mm Gyproc FireLine fixed with 42mm Gyproc Drywall screws at 300mm centres.

The other side was lined with an inner layer of 19mm Gyproc Plank fixed horizontally with 32mm Gyproc Drywall screws at 600mm centres and an outer layer of 12.5mm Gyproc FireLine fixed with 41mm Gyproc Drywall Timber screws at 300mm centres both fixed to 25mm (deep) x 50mm (wide) timber battens fixed at 600mm centres onto the face on the SIP panel.

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

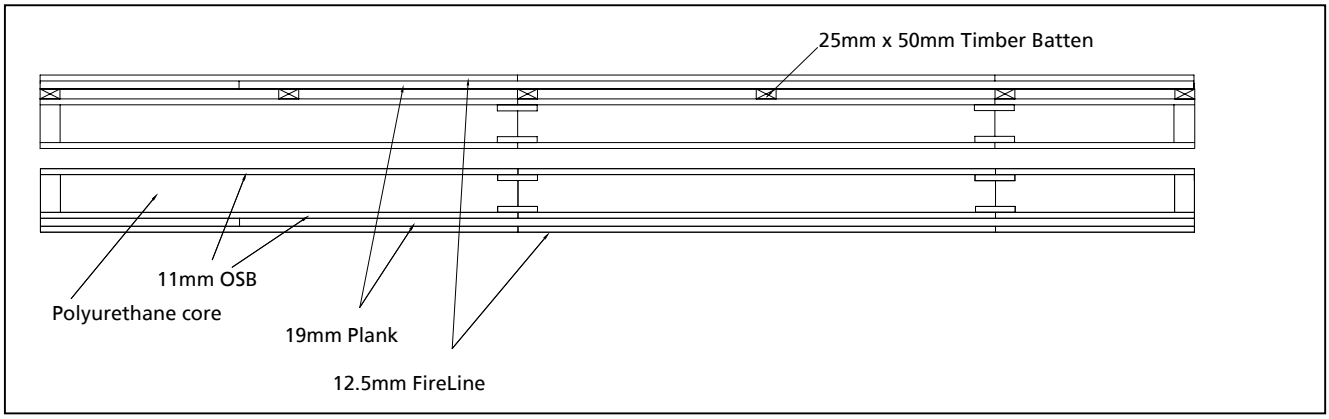

Figure 3. Cross section through test specimen BTC 14425BA

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BTC 14225CA

The panels were positioned within the test aperture to create a double leaf partition with a 50mm cavity. OSB splines, nominally 11mm x 100mm, were used in the joints of the test panel.

The partition was lined on both sides with an inner layer of 19mm Gyproc Plank fixed horizontally with 32mm Gyproc Drywall Timber screws at 600mm centres and an outer layer of 12.5mm Gyproc FireLine fixed with 41mm Gyproc Drywall Timber screws at 300mm centres both fixed to 25mm (deep) x 50mm (wide) timber battens fixed at 600mm centres onto the face on the SIP panel.

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

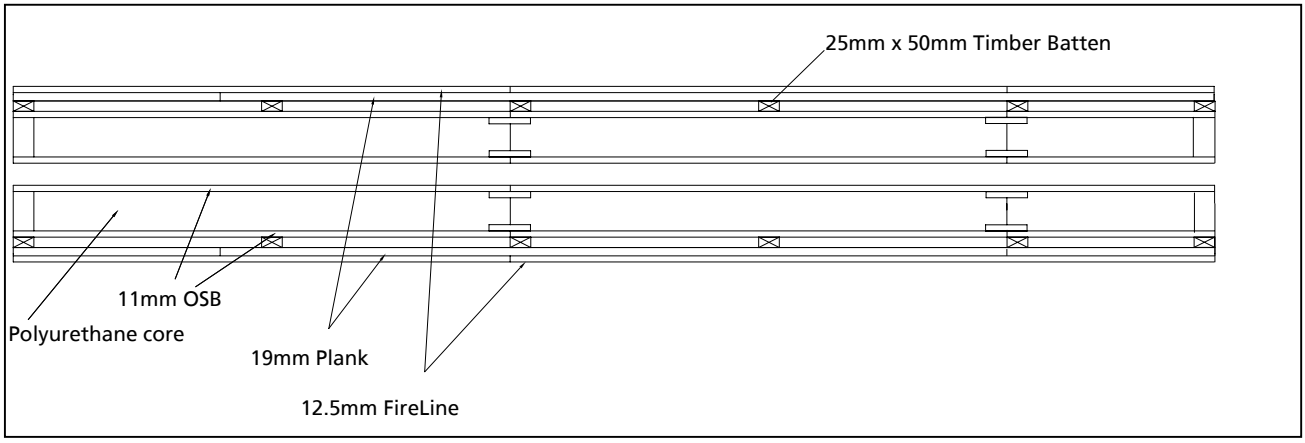

Figure 4. Cross section through test specimen BTC 14425CA

BTC 14225DA

The panels were positioned within the test aperture to create a single leaf partition. OSB splines, nominally 11mm x 100mm, were used in the joints of the test panel.

The partition was lined on one side with a single layer of 12.5mm Gyproc SoundBloc fixed directly to the SIP panel with 32mm Gyproc Drywall Timber screws at 300mm centres.

The other side was lined with a single layer of 12.5mm Gyproc SoundBloc fixed with 32mm Gyproc Drywall Timber screws at 300mm centres to 25mm (deep) x 50mm (wide) timber battens fixed at 600mm centres onto the face on the SIP panel.

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

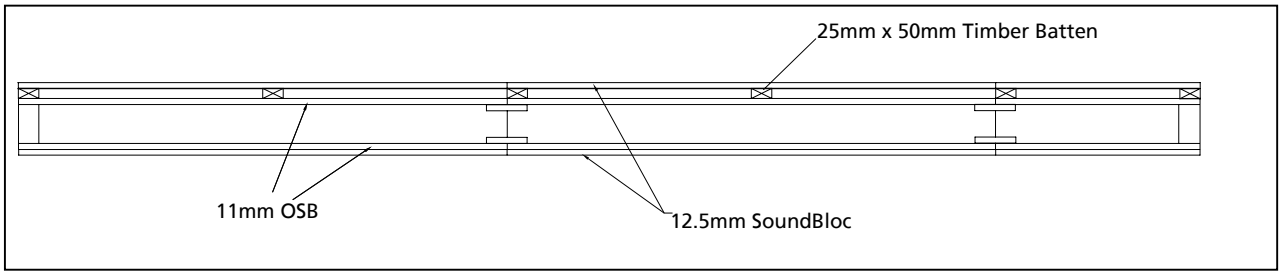

Figure 5. Cross section through test specimen BTC 14425DA

BTC 14225EA

The panels were positioned within the test aperture to create a single leaf partition. OSB splines, nominally 11mm x 100mm, were used in the joints of the test panel.

The partition was lined on both sides with a single layer of 12.5mm Gyproc SoundBloc fixed with 32mm Gyproc Drywall Timber screws at 300mm centres to 25mm (deep) x 50mm (wide) timber battens fixed at 600mm centres onto the face on the SIP panel.

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

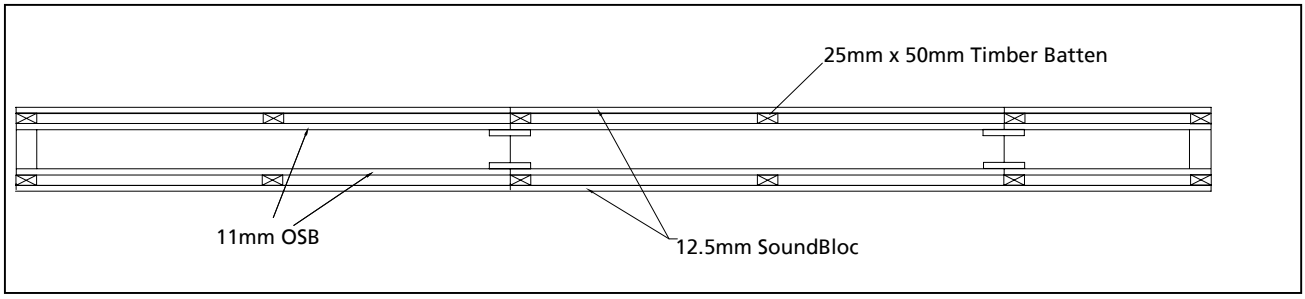

Figure 6. Cross section through test specimen BTC 14425EA

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

Structural Insulated Panel (SIP)

Nominally 100mm (thick) SIP panel consisting of two facings of 11mm OSB (oriented strand board) bonded by pressure injection to CFC free/ODP zero polyurethane closed cell foam.

Average surface density: 17.18kg/m^2

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

Gyproc Plank

Nominally 2400mm (long) x 600mm (wide) x 19mm (thick) Gyproc Plank manufactured by British Gypsum Limited.

Average surface density:	15.36 kg/m^2.
Average thickness:	18.86 mm
Board identification number:	75 095 05 12:20

Gyproc FireLine

Nominally 2400mm (long) x 1200mm (wide) x 12.5mm (thick) Gyproc FireLine manufactured by British Gypsum Limited, ex Robertsbridge works.

Average surface density:	10.70 kg/m^2.
Average thickness:	12.78 mm
Board identification number:	24 119 5 08:09

Gyproc SoundBloc

Nominally 2400mm (long) x 1200mm (wide) x 12.5mm (thick) Gyproc SoundBloc manufactured by British Gypsum Limited, ex East Leake works.

Average surface density:	10.59 kg/m^2.
Average thickness:	12.45 mm
Board identification number:	16 249 5 10:35

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

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Timber components

Nominally 25mm (deep) x 50mm (wide) timber battens supplied by Nixon Knowles & Co. Limited, Queens Drive Industrial Estate, Nottingham.

Fasteners

i) 32mm Gyproc Drywall Timber screws.
ii) 41mm Gyproc Drywall Timber screws.

All fasteners 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.

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TEST PROCEDURE

The test specimens (3.6 m x 2.4 m) were 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 6. 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

Test Code	Description	Weighted Airborne Sound Reduction Index R_w (C; Ctr)
H14225AA	Double skin SIP partition system with 19mm Gyproc Plank and 12.5mm Gyproc FireLine directly fixed on one side only.	52 (-2; -7)
H14225BA	Double skin SIP partition system with 19mm Gyproc Plank and 12.5mm Gyproc FireLine directly fixed on one side and fixed to timber battens on the other side.	60 (-2; -8)
H14225CA	Double skin SIP partition system with 19mm Gyproc Plank and 12.5mm Gyproc FireLine fixed to timber battens on both sides.	58 (-4; -10)
H14225DA	Single skin SIP partition system with 12.5mm Gyproc SoundBloc directly fixed on one side and fixed to timber battens on the other side.	43 (-2; -7)
H14225EA	Single skin SIP partition system with 12.5mm Gyproc SoundBloc fixed to timber battens on both sides.	42 (-2; -9)

For full data see pages 12 – 21.

Test conducted in accordance with BS EN ISO 140-3: 1995
Rated in accordance with BS EN ISO 717/1: 1997

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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.

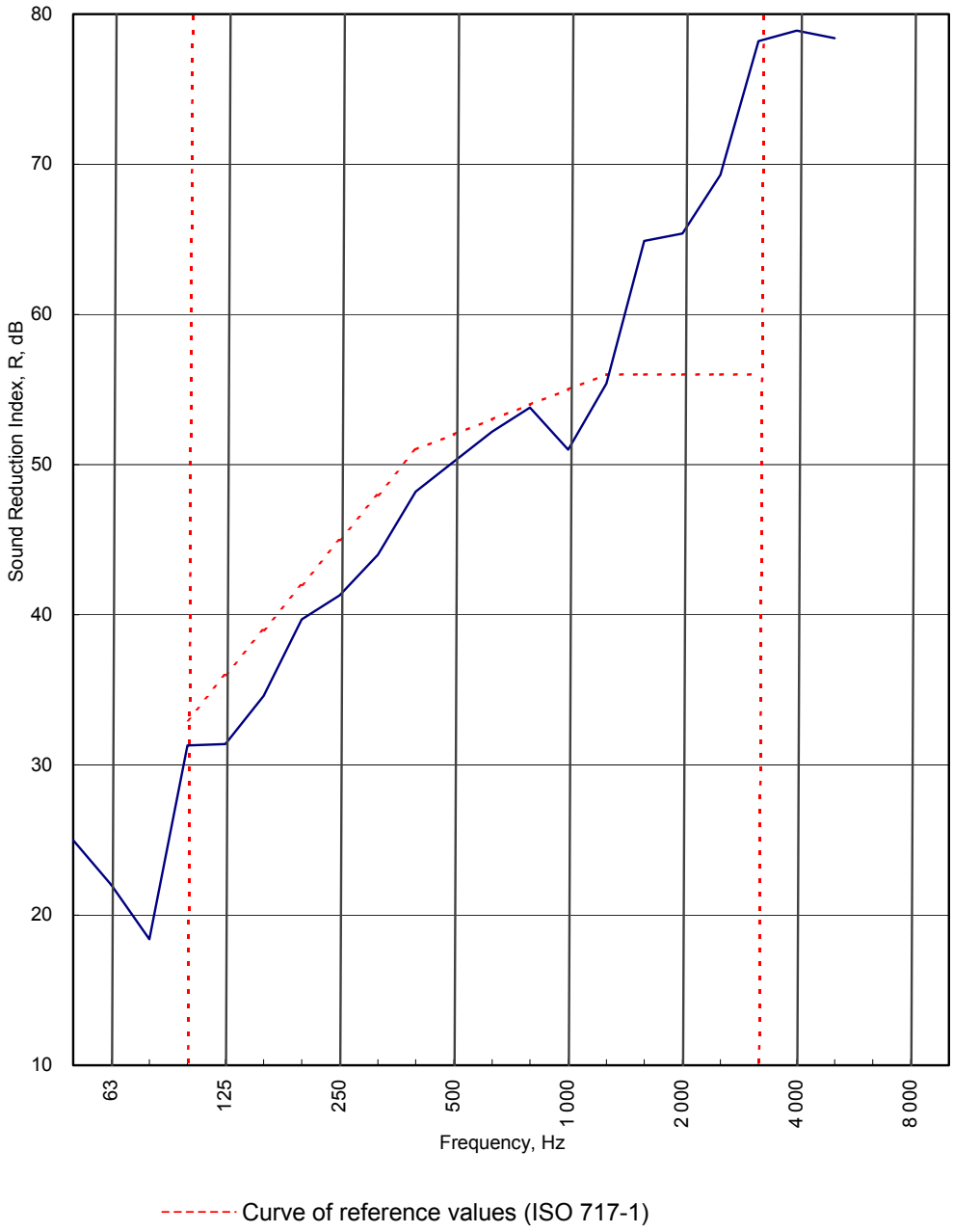
The specification and interpretation of test methods are the subject of ongoing development and refinement. Changes in associated legislation may also occur. For these reasons it is recommended that the relevance of test reports over 5 years old should be considered by the user. The laboratory that issued 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.

APPENDIX A – TEST DATA

BTC 14225AA

Test Code:
H14225AA
Test Date:
13/10/05

Freq. Hz	R dB
50	25.0
63	22.0
80	18.4
100	31.3
125	31.4
160	34.6
200	39.7
250	41.3
315	44.0
400	48.2
500	50.2
630	52.2
800	53.8
1 000	51.0
1 250	55.4
1 600	64.9
2 000	65.4
2 500	69.3
3 150	78.2
4 000	78.9
5 000	78.4
6 300	
8 000	
10 000	



Rating according to BS EN ISO 717-1:1997	**Rw (C;Ctr) = 52 (-2;-7) dB**		
	Max dev. 4.6 dB at 125 Hz		
Evaluation based on laboratory measurement results obtained by an engineering method:	$C_{50\text{-}3150}$= **-5 dB**	$C_{50\text{-}5000}$= **-4 dB**	$C_{100\text{-}5000}$= **-1 dB**
	$C_{tr,50\text{-}3150}$= **-15 dB**	$C_{tr,50\text{-}5000}$= **-15 dB**	$C_{tr,100\text{-}5000}$: **-7 dB**

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

Test Code: **H14225AA** Test Date: **13/10/05**

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

	Room T2	Room T1
Room Volume, m^3:	**98**	**58.57**
Temperature, deg.C:	**19**	**18.4**
Rel. Humidity, %RH:	**63.1**	**62.6**

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	60.1	32.5	14.3	32.5	0.59	-2.6	**25.0**		
63	65.9	41.5	19.0	41.5	0.62	-2.4	**22.0**		21.0
80	67.9	46.0	11.8	46.0	**0.49**	-3.5	**18.4**		
100	75.9	44.1	20.7	44.1	**0.97**	-0.5	**31.3**	1.7	
125	79.5	47.7	8.8	47.7	1.00	-0.4	**31.4**	4.6	32.2
160	85.7	50.2	9.0	50.2	0.89	-0.9	**34.6**	4.4	
200	92.1	52.8	13.5	52.8	1.19	0.4	**39.7**	2.3	
250	95.1	54.6	13.5	54.6	1.31	0.8	**41.3**	3.7	41.3
315	94.4	51.3	15.1	51.3	1.32	0.9	**44.0**	4.0	
400	93.1	45.9	16.0	45.9	1.36	1.0	**48.2**	2.8	
500	91.3	42.1	13.8	42.1	1.35	1.0	**50.2**	1.8	49.9
630	90.2	39.0	11.2	39.0	1.37	1.0	**52.2**	0.8	
800	90.9	38.6	15.8	38.6	1.54	1.5	**53.8**	0.2	
1 000	90.5	40.9	10.9	40.9	1.49	1.4	**51.0**	4.0	53.0
1 250	91.0	37.2	10.2	37.2	1.57	1.6	**55.4**	0.6	
1 600	94.1	31.1	10.5	31.1	1.68	1.9	**64.9**		
2 000	95.9	32.4	10.8	32.4	1.67	1.9	**65.4**		66.1
2 500	94.6	26.6	9.4	26.6	1.45	1.3	**69.3**		
3 150	93.7	17.4	10.0	**16.5**	1.35	1.0	**78.2**		
4 000	92.7	16.2	10.8	**14.9**	1.41	1.1	**78.9**		78.5
5 000	90.2	13.9	10.6	**12.6**	1.31	0.8	**78.4**		
6 300									
8 000									
10 000									

Single Figure Ratings	**Rw**	**C**	**Ctr**	**Total U. Dev., dB**	**30.9**
BS EN ISO 717-1: 1997	**dB**	**dB**	**dB**		
	52	**-2**	**-7**		
	(100-5000)	**-1**	**-7**		
Background Corrected					
	(50-3150)	**-5**	**-15**		
RT's > factor 1.5 apart				Procedure: 140/3/issue 6	
Tested Serially[ ] Real Time[X]	**(50-5000)**	**-4**	**-15**	Worksheet: 140_3_1.XLS	

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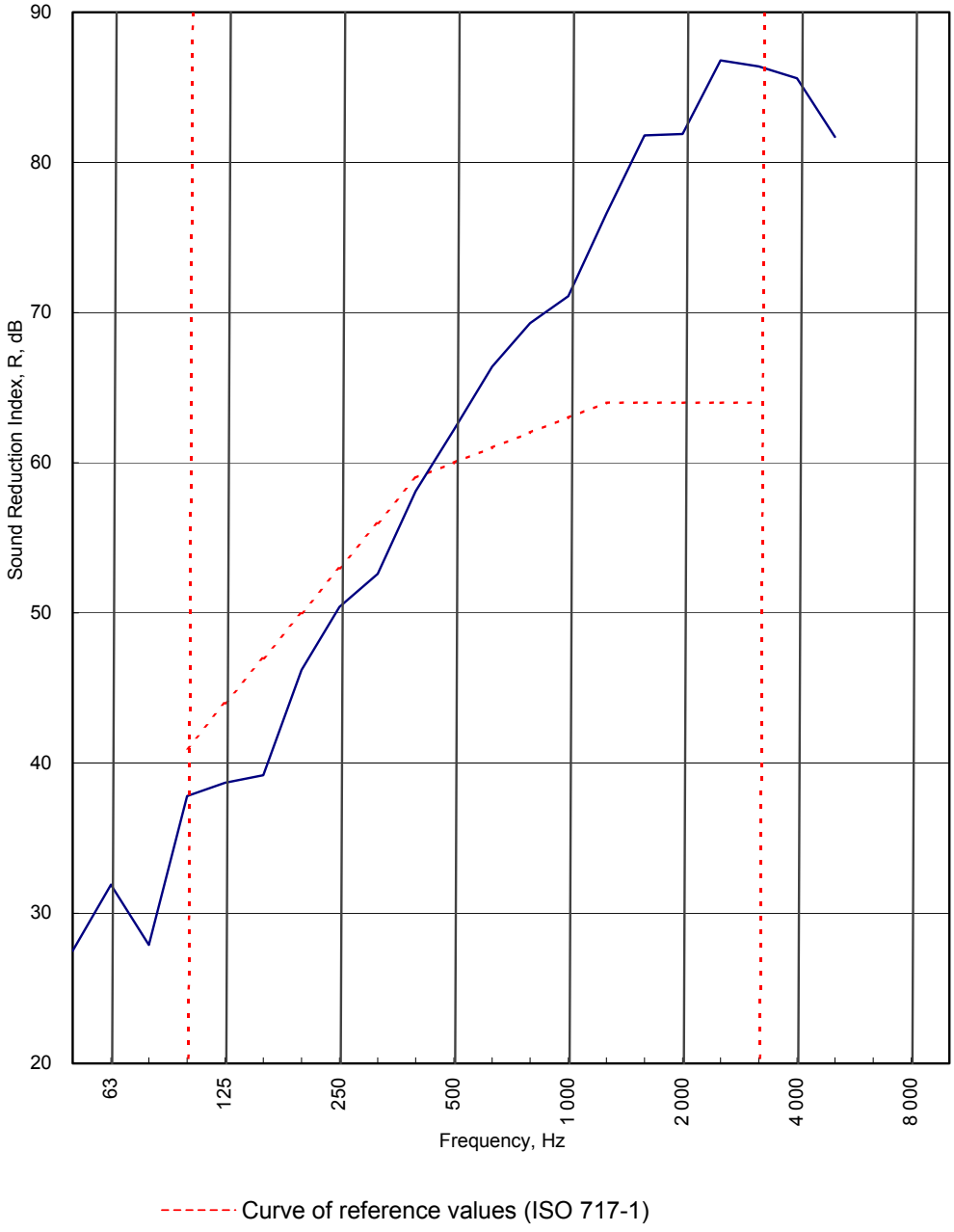
BTC 14225BA

Test Code:
H14225BA
Test Date:
13/10/05

Freq. Hz	R dB
50	27.5
63	31.9
80	27.9
100	37.8
125	38.7
160	39.2
200	46.2
250	50.4
315	52.6
400	58.1
500	62.2
630	66.4
800	69.3
1 000	71.1
1 250	76.6
1 600	81.8
2 000	81.9
2 500	86.8
3 150	86.4
4 000	85.6
5 000	81.7
6 300	
8 000	
10 000	



Rating according to
BS EN ISO 717-1:1997

Rw (C;Ctr) = 60 (-2;-8) dB

Max dev. 7.8 dB at 160 Hz

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

$C_{50\text{-}3150}$= **-5 dB** $C_{50\text{-}5000}$= **-4 dB** $C_{100\text{-}5000}$= **-1 dB**

$C_{tr,50\text{-}3150}$= **-14 dB** $C_{tr,50\text{-}5000}$= **-14 dB** $C_{tr,100\text{-}5000}$= **-8 dB**

Customer: **SIP Building Systems Limited**

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

Test Code: **H14225BA** Test Date: **13/10/05**

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

	Room T2	Room T1
Room Volume, m^3:	**98**	**58.08**
Temperature, deg.C:	**18.1**	**18.8**
Rel. Humidity, %RH:	**64.8**	**62.2**

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	59.4	28.7	12.9	28.7	0.52	-3.2	**27.5**		
63	65.1	30.4	10.0	30.4	0.57	-2.8	**31.9**		28.7
80	66.7	36.1	7.8	36.1	**0.58**	-2.7	**27.9**		
100	76.2	37.5	15.5	37.5	**0.88**	-0.9	**37.8**	3.2	
125	80.0	41.0	6.6	41.0	1.01	-0.3	**38.7**	5.3	38.5
160	85.9	46.6	5.1	46.6	1.06	-0.1	**39.2**	7.8	
200	92.4	47.0	7.4	47.0	1.28	0.8	**46.2**	3.8	
250	95.0	46.0	4.1	46.0	1.49	1.4	**50.4**	2.6	48.9
315	94.3	42.8	9.1	42.8	1.40	1.1	**52.6**	3.4	
400	93.1	36.4	13.1	36.4	1.47	1.4	**58.1**	0.9	
500	91.4	30.2	6.5	30.2	1.36	1.0	**62.2**		61.0
630	90.1	25.0	9.4	25.0	1.44	1.3	**66.4**		
800	91.0	23.4	8.0	23.4	1.60	1.7	**69.3**		
1 000	90.5	21.6	9.3	**21.3**	1.65	1.9	**71.1**		71.4
1 250	91.2	17.7	9.8	**16.9**	1.84	2.3	**76.6**		
1 600	94.1	15.9	10.2	**14.6**	1.82	2.3	**81.8**		
2 000	95.9	17.1	9.2	**16.3**	1.83	2.3	**81.9**		83.0
2 500	94.6	10.9	9.7	**9.6**	1.61	1.8	**86.8**		
3 150	93.7	10.0	10.1	**8.7**	1.47	1.4	**86.4**		
4 000	92.7	9.9	10.3	**8.6**	1.51	1.5	**85.6**		84.1
5 000	90.1	10.8	10.9	**9.5**	1.38	1.1	**81.7**		
6 300									
8 000									
10 000									

Single Figure Ratings	**Rw**	**C**	**Ctr**	**Total U. Dev., dB**	**27**
BS EN ISO 717-1: 1997	**dB**	**dB**	**dB**		
	60	**-2**	**-8**		
	(100-5000)	**-1**	**-8**		
Background Corrected					
	(50-3150)	**-5**	**-14**		
RT's > factor 1.5 apart				Procedure: 140/3/issue 6	
Tested Serially[ ] Real Time[X]	**(50-5000)**	**-4**	**-14**	Worksheet: 140_3_1.XLS	

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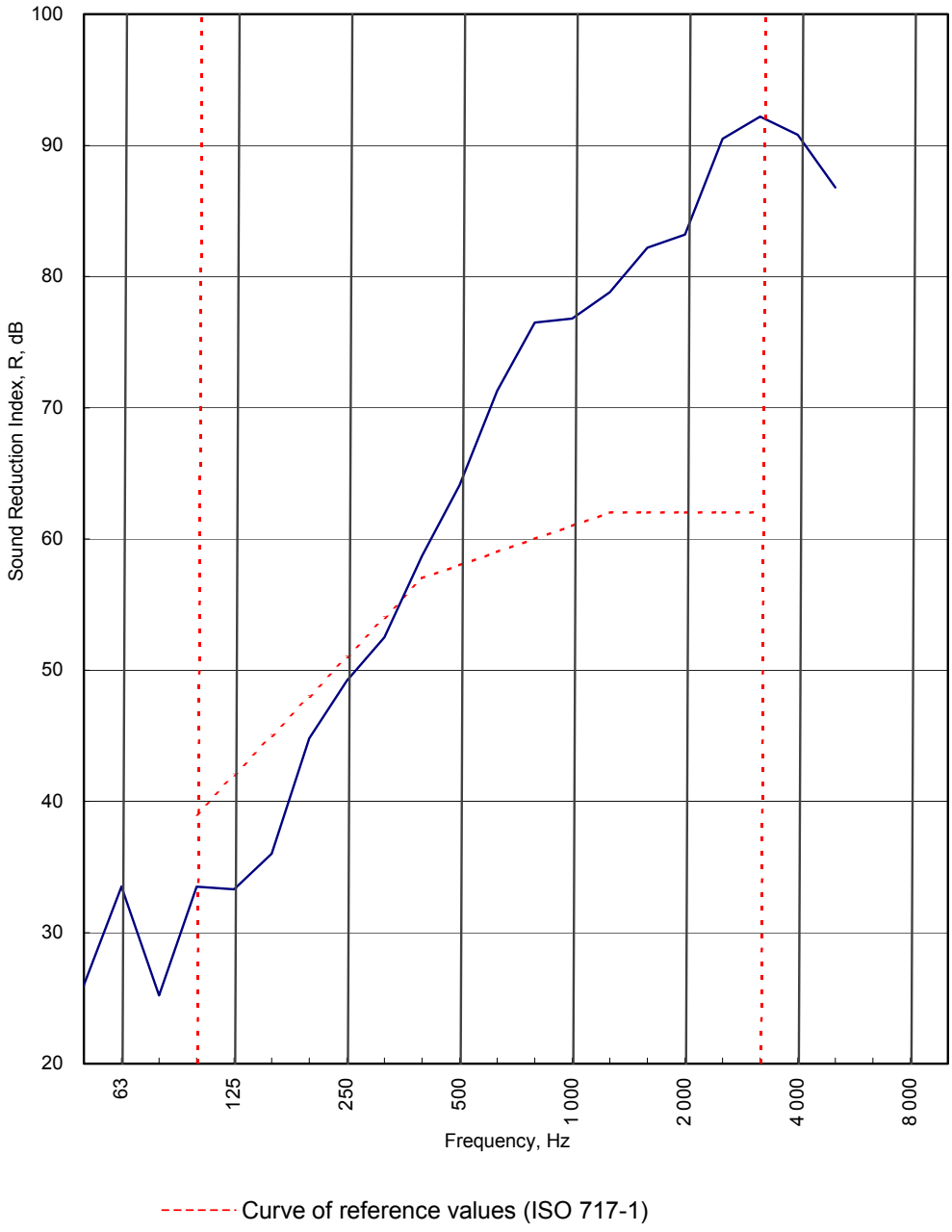
Test Code:
H14225CA
Test Date:
13/10/05

Freq. Hz	R dB
50	26.0
63	33.5
80	25.2
100	33.5
125	33.3
160	36.0
200	44.8
250	49.2
315	52.5
400	58.7
500	64.1
630	71.3
800	76.5
1 000	76.8
1 250	78.8
1 600	82.2
2 000	83.2
2 500	90.5
3 150	92.2
4 000	90.8
5 000	86.8
6 300	
8 000	
10 000	



Rating according to BS EN ISO 717-1:1997

Rw (C;Ctr) = 58 (-4;-10) dB

Max dev. 9 dB at 160 Hz

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

$C_{50\text{-}3150}$= **-5 dB** $C_{50\text{-}5000}$= **-4 dB** $C_{100\text{-}5000}$= **-3 dB**

$C_{tr,50\text{-}3150}$= **-15 dB** $C_{tr,50\text{-}5000}$= **-15 dB** $C_{tr,100\text{-}5000}$: **-10 dB**

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

Test Code: **H14225CA** Test Date: **13/10/05**

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

	Room T2	Room T1
Room Volume, m^3:	**98**	**57.86**
Temperature, deg.C:	**19.1**	**19.5**
Rel. Humidity, %RH:	**62.6**	**58.9**

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	59.9	30.8	14.7	30.8	0.52	-3.1	**26.0**		
63	66.4	31.4	18.1	**31.2**	0.73	-1.7	**33.5**		27.0
80	66.3	38.0	10.4	38.0	**0.53**	-3.1	**25.2**		
100	75.7	41.3	15.5	41.3	**0.87**	-0.9	**33.5**	5.5	
125	79.8	46.1	8.1	46.1	0.97	-0.4	**33.3**	8.7	34.1
160	86.2	50.4	9.5	50.4	1.11	0.2	**36.0**	9.0	
200	93.1	48.9	12.6	48.9	1.22	0.6	**44.8**	3.2	
250	95.2	47.4	15.6	47.4	1.49	1.4	**49.2**	1.8	47.7
315	94.7	43.0	17.6	43.0	1.28	0.8	**52.5**	1.5	
400	93.6	36.0	18.6	36.0	1.37	1.1	**58.7**		
500	106.7	43.5	15.4	43.5	1.32	0.9	**64.1**		62.2
630	104.6	34.7	12.4	34.7	1.47	1.4	**71.3**		
800	104.1	29.5	14.9	**29.3**	1.59	1.7	**76.5**		
1 000	102.8	28.0	12.4	28.0	1.68	2.0	**76.8**		77.3
1 250	102.1	25.7	11.6	**25.5**	1.77	2.2	**78.8**		
1 600	104.0	24.2	11.6	**24.0**	1.77	2.2	**82.2**		
2 000	105.7	24.8	10.8	**24.6**	1.75	2.1	**83.2**		84.1
2 500	103.4	15.8	10.6	**14.5**	1.54	1.6	**90.5**		
3 150	101.5	12.0	11.6	**10.7**	1.48	1.4	**92.2**		
4 000	100.1	12.0	12.0	**10.7**	1.49	1.4	**90.8**		89.3
5 000	96.3	11.8	12.1	**10.5**	1.36	1.0	**86.8**		
6 300									
8 000									
10 000									

Single Figure Ratings	**Rw**	**C**	**Ctr**	**Total U. Dev., dB**	**29.7**
BS EN ISO 717-1: 1997	**dB**	**dB**	**dB**		
	58	**-4**	**-10**		
	(100-5000)	**-3**	**-10**		
Background Corrected					
	(50-3150)	**-5**	**-15**		
RT's > factor 1.5 apart				Procedure: 140/3/issue 6	
Tested Serially[ ] Real Time[X]	**(50-5000)**	**-4**	**-15**	Worksheet: 140_3_1.XLS	

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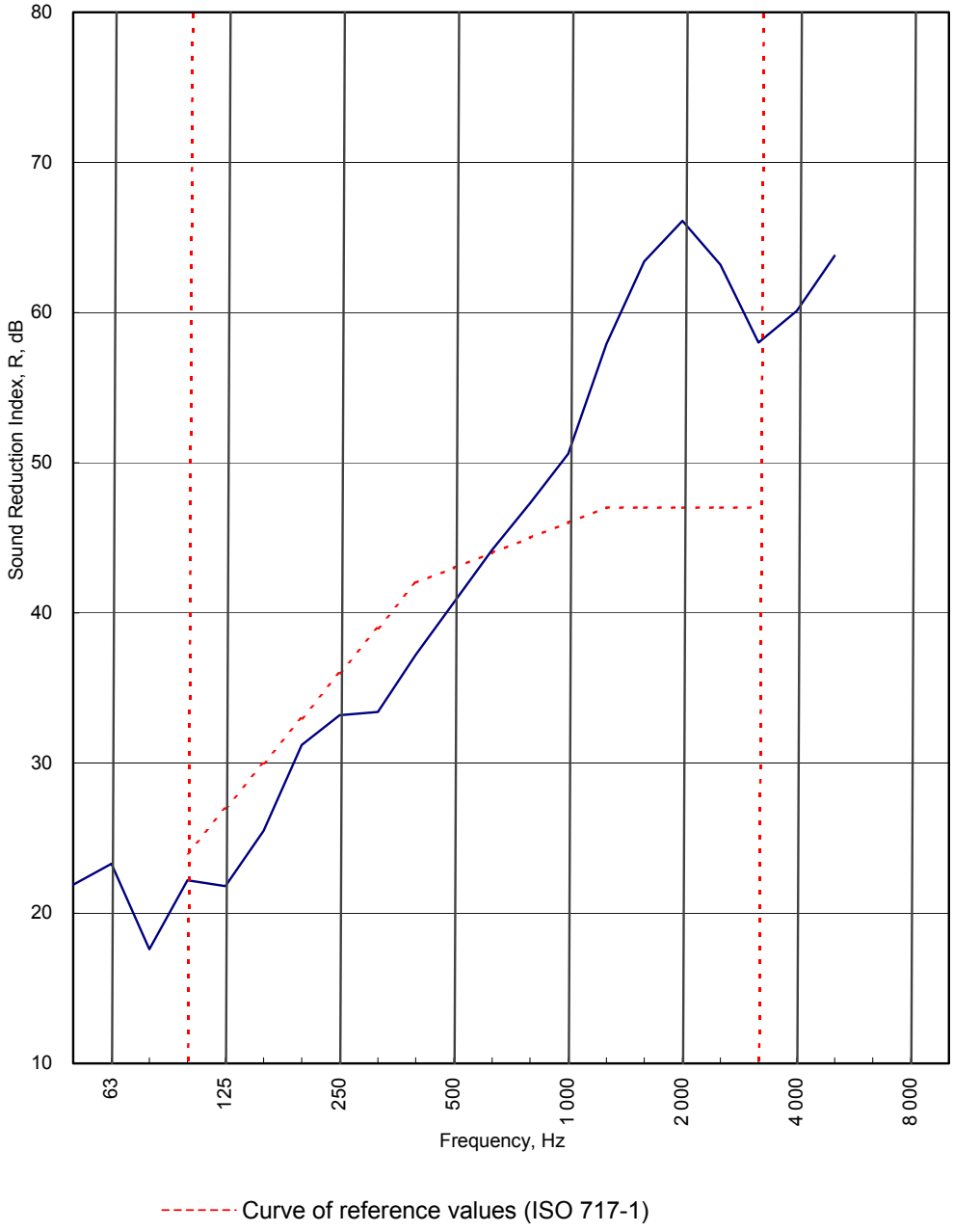
Test Code:
H14225DA
Test Date:
14/10/05

Freq. Hz	R dB
50	21.9
63	23.3
80	17.6
100	22.2
125	21.8
160	25.5
200	31.2
250	33.2
315	33.4
400	37.2
500	40.7
630	44.2
800	47.3
1 000	50.6
1 250	57.9
1 600	63.4
2 000	66.1
2 500	63.2
3 150	58.0
4 000	60.1
5 000	63.8
6 300	
8 000	
10 000	



Rating according to
BS EN ISO 717-1:1997

Rw (C;Ctr) = 43 (-2;-7) dB

Max dev. 5.6 dB at 315 Hz

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

$C_{50\text{-}3150}$= **-2 dB** $C_{50\text{-}5000}$= **-1 dB** $C_{100\text{-}5000}$= **-1 dB**

$C_{tr,50\text{-}3150}$= **-9 dB** $C_{tr,50\text{-}5000}$= **-9 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: **H14225DA** Test Date: **14/10/05**

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

	Room T2	Room T1
Room Volume, m^3:	**98**	**59.7**
Temperature, deg.C:	**17.4**	**18**
Rel. Humidity, %RH:	**56.3**	**56.9**

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	60.1	34.8	15.1	34.8	**0.50**	-3.4	**21.9**		
63	66.9	42.5	18.5	42.5	**0.86**	-1.1	**23.3**		20.2
80	67.4	47.9	13.8	47.9	0.71	-1.9	**17.6**		
100	75.2	52.3	21.9	52.3	0.95	-0.7	**22.2**	1.8	
125	78.6	56.6	13.8	56.6	1.05	-0.2	**21.8**	5.2	22.9
160	85.9	60.6	11.0	60.6	1.17	0.2	**25.5**	4.5	
200	92.4	62.0	14.5	62.0	1.33	0.8	**31.2**	1.8	
250	94.9	62.7	17.0	62.7	1.39	1.0	**33.2**	2.8	32.5
315	94.5	61.7	18.1	61.7	1.27	0.6	**33.4**	5.6	
400	93.5	56.9	18.4	56.9	1.26	0.6	**37.2**	4.8	
500	91.1	51.1	17.3	51.1	1.30	0.7	**40.7**	2.3	39.8
630	90.2	47.0	11.5	47.0	1.40	1.0	**44.2**		
800	91.1	45.1	15.6	45.1	1.49	1.3	**47.3**		
1 000	90.7	41.8	13.3	41.8	1.62	1.7	**50.6**		50.2
1 250	91.4	35.3	9.7	35.3	1.67	1.8	**57.9**		
1 600	94.3	32.7	11.4	32.7	1.66	1.8	**63.4**		
2 000	96.0	31.5	10.4	31.5	1.58	1.6	**66.1**		64.0
2 500	94.5	32.5	9.6	32.5	1.46	1.2	**63.2**		
3 150	93.6	36.4	10.6	36.4	1.32	0.8	**58.0**		
4 000	92.5	33.4	11.5	33.4	1.38	1.0	**60.1**		60.0
5 000	90.2	26.9	11.6	26.9	1.24	0.5	**63.8**		
6 300									
8 000									
10 000									

Single Figure Ratings	**Rw**	**C**	**Ctr**	**Total U. Dev., dB**	**28.8**
BS EN ISO 717-1: 1997	**dB**	**dB**	**dB**		
	43	**-2**	**-7**		
	(100-5000)	**-1**	**-7**		
	(50-3150)	**-2**	**-9**		
RT's > factor 1.5 apart				Procedure: 140/3/issue 6	
Tested Serially[ ] Real Time[X]	**(50-5000)**	**-1**	**-9**	Worksheet: 140_3_1.XLS	

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

Test Code: **H14225EA** Test Date: **14/10/05**

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

	Room T2	Room T1
Room Volume, m^3:	**98**	**59.5**
Temperature, deg.C:	**18.4**	**18.4**
Rel. Humidity, %RH:	**51.7**	**51.8**

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	61.8	37.7	20.1	37.7	**0.52**	-3.3	**20.8**		
63	66.8	45.1	23.5	45.1	**0.82**	-1.3	**20.4**		17.7
80	66.8	49.6	14.1	49.6	0.62	-2.5	**14.7**		
100	74.7	56.0	21.8	56.0	0.69	-2.0	**16.7**	6.3	
125	77.8	57.7	11.6	57.7	0.80	-1.4	**18.7**	7.3	19.1
160	85.3	58.7	10.8	58.7	1.08	-0.1	**26.5**	2.5	
200	91.8	63.5	17.8	63.5	1.24	0.5	**28.8**	3.2	
250	94.4	63.4	15.9	63.4	1.29	0.7	**31.7**	3.3	31.0
315	94.8	61.5	18.6	61.5	1.40	1.0	**34.3**	3.7	
400	93.2	55.3	19.9	55.3	1.29	0.7	**38.6**	2.4	
500	91.4	47.9	18.0	47.9	1.24	0.5	**44.0**		42.0
630	90.3	42.4	15.6	42.4	1.43	1.1	**49.0**		
800	91.0	39.6	16.4	39.6	1.49	1.3	**52.7**		
1 000	90.6	36.2	14.9	36.2	1.52	1.4	**55.8**		55.3
1 250	91.3	32.1	13.2	32.1	1.64	1.7	**60.9**		
1 600	94.3	30.7	13.2	30.7	1.67	1.8	**65.4**		
2 000	96.1	28.8	15.9	**28.6**	1.53	1.4	**68.9**		67.0
2 500	94.7	28.5	11.4	28.5	1.47	1.3	**67.5**		
3 150	93.7	31.9	13.8	31.9	1.32	0.8	**62.6**		
4 000	92.6	27.0	22.4	**25.7**	1.35	0.9	**67.8**		65.9
5 000	90.2	19.3	17.5	**18.0**	1.27	0.6	**72.8**		
6 300									
8 000									
10 000									

Single Figure Ratings	**Rw**	**C**	**Ctr**	**Total U. Dev., dB**	**28.7**
BS EN ISO 717-1: 1997	**dB**	**dB**	**dB**		
	42	**-2**	**-9**		
	(100-5000)	**-1**	**-9**		
Background Corrected					
	(50-3150)	**-3**	**-11**		
RT's > factor 1.5 apart				Procedure: 140/3/issue 6	
Tested Serially[ ] Real Time[X]	**(50-5000)**	**-2**	**-11**	Worksheet: 140_3_1.XLS	

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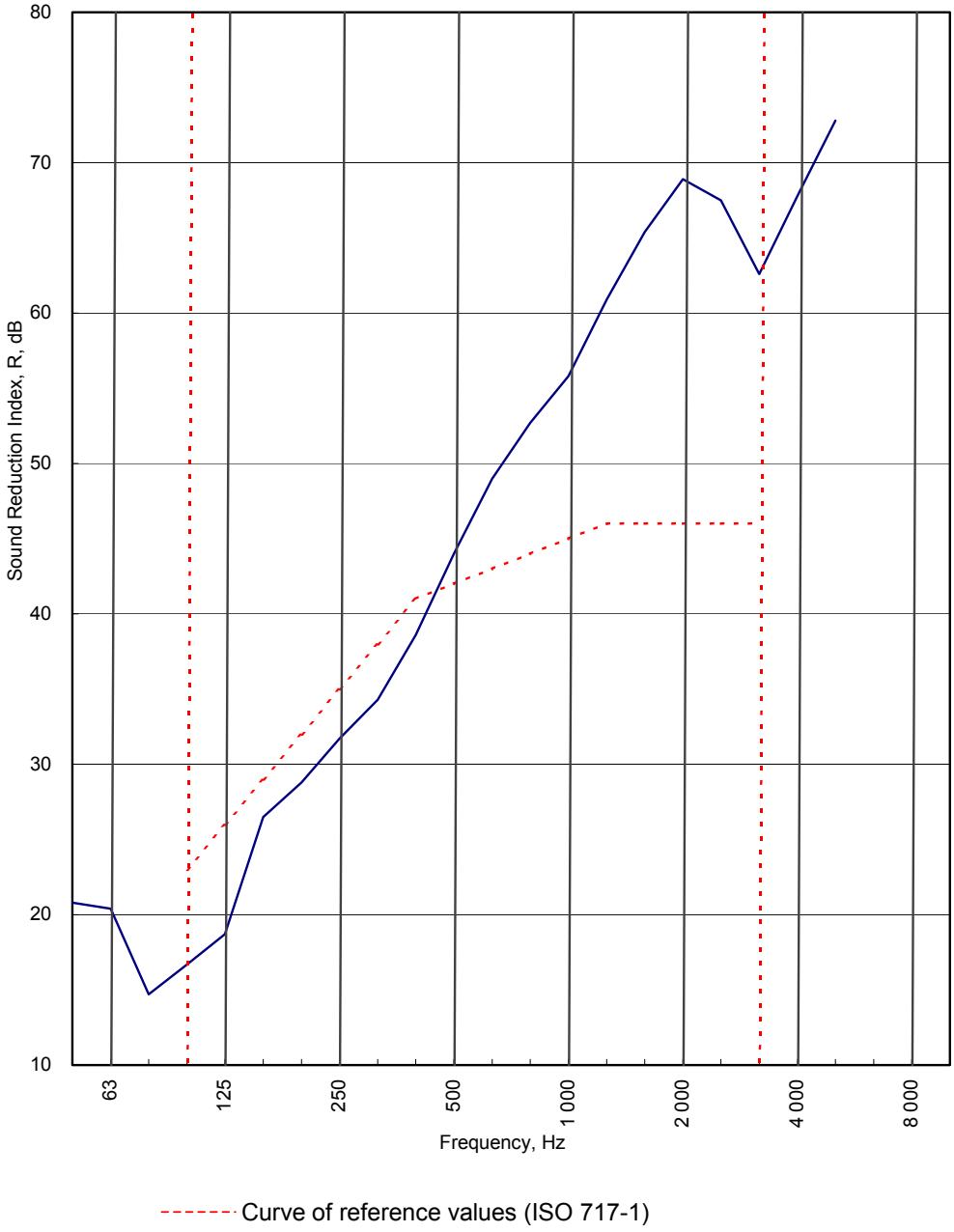
BTC 14225EA

Test Code:
H14225EA
Test Date:
14/10/05

Freq. Hz	R dB
50	20.8
63	20.4
80	14.7
100	16.7
125	18.7
160	26.5
200	28.8
250	31.7
315	34.3
400	38.6
500	44.0
630	49.0
800	52.7
1 000	55.8
1 250	60.9
1 600	65.4
2 000	68.9
2 500	67.5
3 150	62.6
4 000	67.8
5 000	72.8
6 300	
8 000	
10 000	



Rating according to
BS EN ISO 717-1:1997

Rw (C;Ctr) = 42 (-2;-9) dB

Max dev. 7.3 dB at 125 Hz

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

$C_{50\text{-}3150}$= **-3 dB** $C_{50\text{-}5000}$= **-2 dB** $C_{100\text{-}5000}$= **-1 dB**

$C_{tr,50\text{-}3150}$= **-11 dB** $C_{tr,50\text{-}5000}$= **-11 dB** $C_{tr,100\text{-}5000}$: **-9 dB**

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APPENDIX B – LABORATORY DETAILS

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° 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 been carried out to prove the insignificance of this installation position on the test results.

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

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	93.9	91.1

The figure below show flanking and isolation treatments in the test chamber.

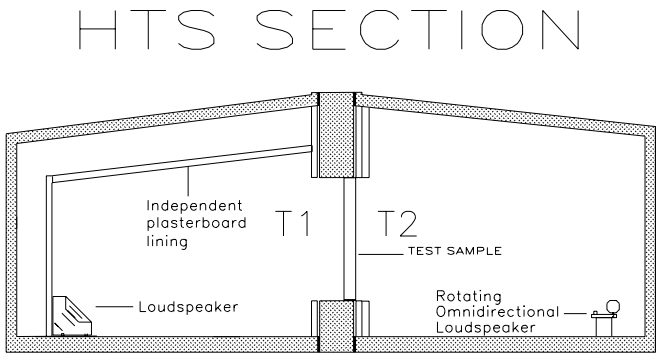

Figure 7. Chamber layout