ACOUSTIC CONSULTING

Determination of Sound Transmission Loss For Sliding Door Constructions Lorient Acoustic Laboratory, Banyo QLD

Project 207 047

April 2007

Document Information

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1 Introduction

This report provides the results of Sound Transmission Loss tests carried out for Infinity Design at the acoustic laboratory at Lorient, Banyo, QLD, between the dates Monday 26th March and Friday 30th March 2007.

The purposes of the tests were to determine the acoustic performance of a number of sliding doors by Infinity Design and compare their respective ratings to a specified criteria.

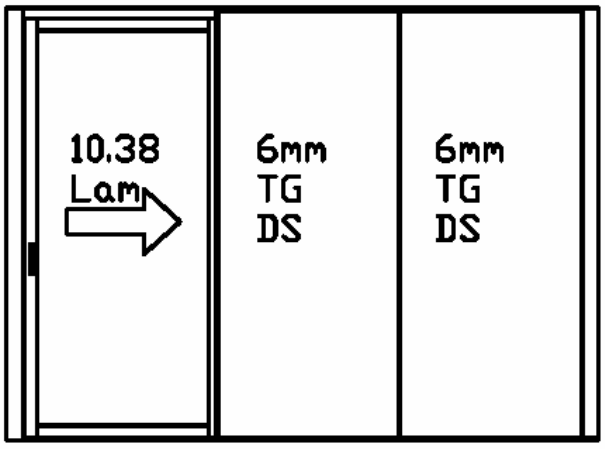
2 Tested Constructions

The results listed in this report are based on measurements and analysis performed by PKA Acoustic Consulting.

Pocket Sliding Door

Construction 1:
- Lorient door bottom brush seal IS 5115
- PAC PLAS brush seals in sliding door stile

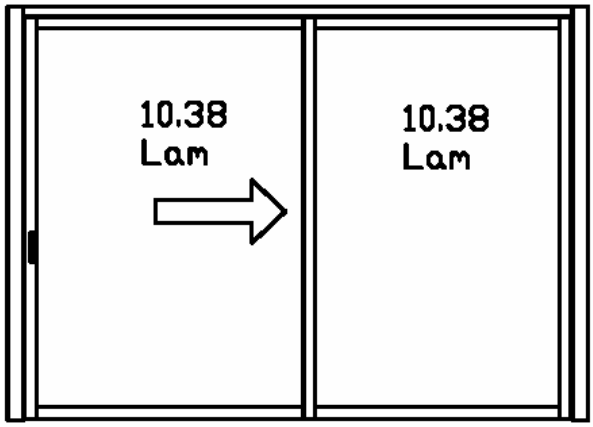
Construction 2:
- Lorient silicon door bottom seals IS5111si
- Lorient fin seals IS7070si in sliding door stile
- Insulation in vertical posts



Offset Sliding Door

Construction 1:
- Lorient silicon door bottom seals IS5111si
- Lorient fin seals IS7070si in stiles and rails
- Insulation in posts

Construction 2:
- Lorient modified drop seal at base
- Lorient fin seals IS7070si in stiles and rails
- Insulation in posts



3 Results and Discussions

Below is the performance of the tested constructions

Test	Sliding Door	Construction	Rw	Rw + Ctr
1	Pocket	Type 1	30	29
2	Pocket	Type 2	31	29
3	Offset	Type 1	30	29
4	Offset	Type 2	33	31

Pocket Sliding Door

Construction 1
Noticed sound leakage through bottom of door.
Noticed sound leakage through adjoining panels 10.38mm and 6mm.
Noticed sound leakage through vertical posts.

Construction 2
Sound leakage through bottom of door addressed by changing seal type
Sound leakage through adjoining panels 10.38mm and 6mm addressed by changing seal type.
Sound leakage through vertical posts addressed by placing insulation

Once the obvious sound leakage points were addressed, the sound transmission loss of the glass was reaching its limit. Therefore we can conclude that the base system achieves Rw = 30 and when sound leakages were addressed the system achieves Rw = 31

Offset Sliding Door

Construction 1
Noticed sound leakage through bottom of door.

Construction 2
Sound leakage through bottom of door addressed by changing to drop seals.

The sound transmission loss of the base system achieves Rw = 30. Once the obvious sound leakage point was addressed, the sound transmission loss of the system achieves Rw = 33

4 Test Procedure

The tests were carried out on a 7.2m^2 (2.4m high and 3.0m wide) sample installed in Lorient's acoustic laboratory located at their workshop in Banyo, QLD. The Lorient is capable of a Rw 75 and greater from the source room to the receiving room.

Lorients measurements were carried out in general accordance with Australian Standard AS 1191-2002 *Acoustics - Method for Laboratory Measurement of Air Borne Sound Transmission Loss of Building Partitions*. R_w results were calculated using the procedure in Australian Standard AS1276 (1999) *Acoustics – Rating of sound insulation in buildings and of building elements Part 1: Airborne sound insulation*. Differences between the test method used and the Standard are due to the size of the test samples and room volumes.

Pink noise was amplified and reproduced by a loudspeaker in the source room. The loudspeaker was located in the corner of the room opposite the partition being tested and gave an even spread of sound energy in the source room. Determination of the space average sound field in the source and receiving rooms was carried out using a Type 1 Precision Sound Level Meter and measuring the average Sound Pressure Level in each room. The sound field in both source and receive rooms was sampled using a continuous traverse to obtain a space-time average, as described in the Standard.

Three discrete microphone positions were used to sample reverberation time. At each position, three reverberation decays were recorded for each of two speaker locations. Interrupted pink noise was used for reverberation time. The microphone positions were at least 1.2m from any room surface. Microphone height was approximately 1.2-1.4m. The three microphone positions were not in a line and were not in any plane parallel to a room surface.

A field check of the calibration of the Sound Analyser was performed before and after the testing. No drift was observed.

The equipment used comprised the following: -

- Svantek Svan 949 Real Time Sound and Vibration Analyser.
- B&K 2270 Sound Level Meter
- B&K omni directional sound source with pink noise generator
- Portable laptop PC with sound card, running Windows XP, for recording and analysing data.

Room Volume of Source and Receiving Rooms

The room volumes are of reasonable size. Using the formula given in AS 1191, the room is suitable for measurements of 125 Hz and above. In accordance with the Standard, the source and receiving room vary in volume by more than 10% and the ratio of room dimensions are in accordance with Appendix A.3.1.3 of the Standard. The sound field within both rooms has been calibrated and has been found to be uniformly distributed, even down to 100 Hz. Natural sound absorption and diffusion exists within the room.

5 Calculation Criteria

The data from the 16 bands is compared to standard R_w contours. The highest standard contour that fits the data, subject to the following rules, gives the rating.

For R_w calculation;

- Frequency bands assessed from 100Hz to 3150Hz.
- The test data is allowed to be below the standard contour, provided the total of the deficiencies is no more than 32 dB.

The R_w results are calculated using the procedure in Australian Standard AS1276 (1999) *Acoustics - Rating of sound insulation in buildings and of building elements Part 1: Airborne sound insulation*.

Discussion Of Corrections

Spectrum Adaptation Term (C_{tr})

This is the value, in decibels, to be added to the single-number rating (e.g. R_w) to take account of the characteristics of particular sound spectra. The spectrum is based on the characteristics of road traffic noise, however is also applicable to other types of noise source such as living activities (radio, music, tv), aircraft and rail noise, disco music, industrial noise etc.

- C_{tr} adaptation term is based on the difference between the A-weighted levels in the source room and receiving room for road traffic noise.

We trust this information meets with your current requirements. Should you have any queries please contact this office.

Yours Faithfully

Joel Parry-Jones
PKA ACOUSTIC CONSULTING

Apparent Sound Reduction Index according to ISO 140-4

Field measurements of airborne sound insulation between rooms

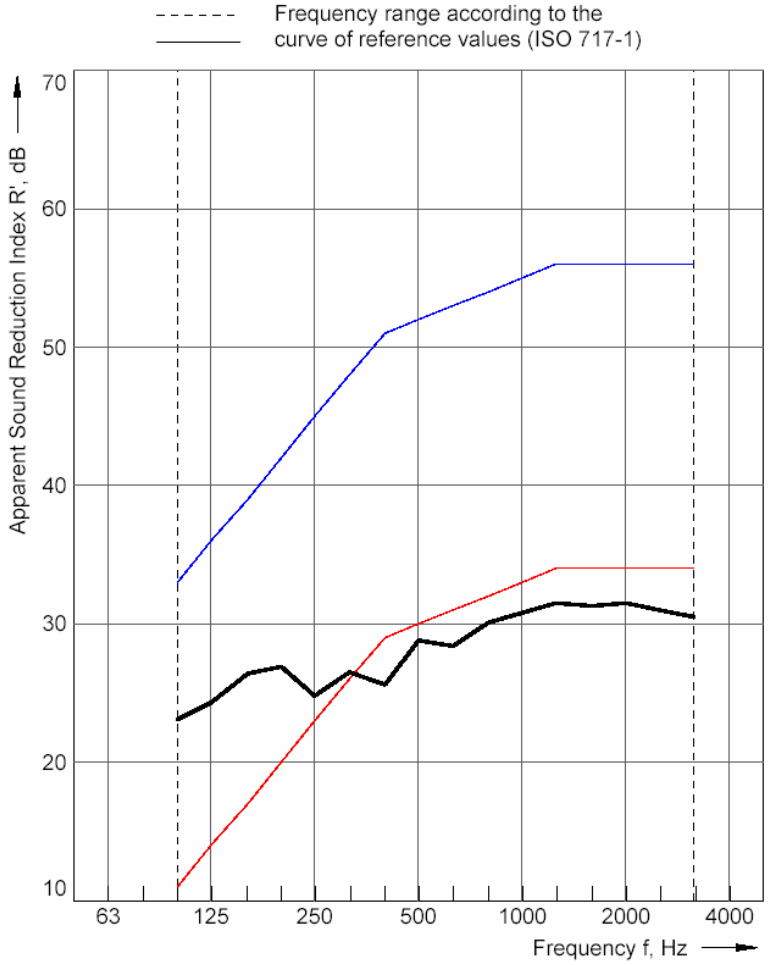
Client: Date of test: 26/03/2007

Description and identification of the building construction and test arrangement, direction of measurement:

Pocket Sliding Door
Test 1

Area S of separating element: 7.20 m²
Source room volume: m³
Receiving room volume: 82.00 m³

Frequency f Hz	R' 1/3 Octave dB
50	
63	
80	
100	23.1
125	24.3
160	26.4
200	26.9
250	24.8
315	26.5
400	25.6
500	28.8
630	28.4
800	30.1
1000	30.8
1250	31.5
1600	31.3
2000	31.5
2500	31.0
3150	30.5
4000	
5000	



Rating according to ISO 717-1

$R'_w\ (C;C_{tr})$ = 30 (0; -1) dB

$C_{50\text{-}3150}$ = N/AdB; $C_{50\text{-}5000}$ = N/AdB; $C_{100\text{-}5000}$ = N/AdB;

Evaluation based on field measurement results obtained in one-third-octave bands by an engineering method

$C_{tr,50\text{-}3150}$ = N/AdB; $C_{tr,50\text{-}5000}$ = N/AdB; $C_{tr,100\text{-}5000}$ = N/AdB;

No. of test report: Name of test institute:

Date: 03/26/2007 Signature:

Apparent Sound Reduction Index according to ISO 140-4

Field measurements of airborne sound insulation between rooms

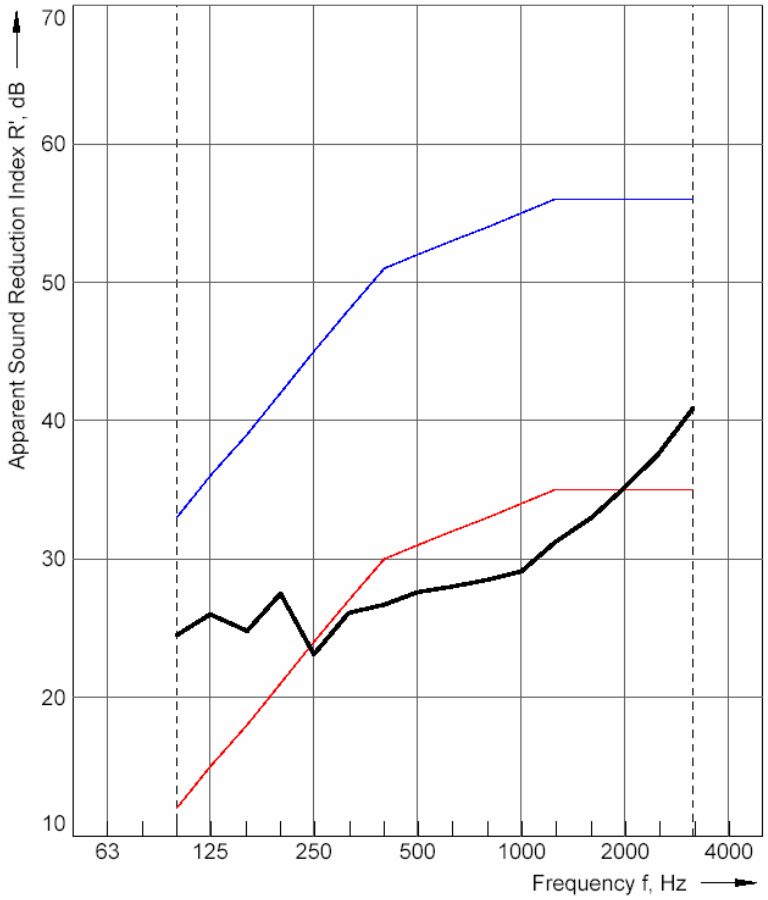
Client: Date of test: 26/03/2007

Description and identification of the building construction and test arrangement, direction of measurement:

Pocket Sliding Door
Test 2

Area S of separating element: 7.20 m²
Source room volume: m³
Receiving room volume: 82.00 m³

Frequency f Hz	R' 1/3 Octave dB
50	
63	
80	
100	24.5
125	26.0
160	24.8
200	27.5
250	23.1
315	26.1
400	26.7
500	27.6
630	28.0
800	28.5
1000	29.1
1250	31.2
1600	33.0
2000	35.2
2500	37.6
3150	40.9
4000	
5000	



Rating according to ISO 717-1

$R'_w\ (C;C_{tr})$ = 31 (0; -2) dB

$C_{50\text{-}3150}$ = N/AdB; $C_{50\text{-}5000}$ = N/AdB; $C_{100\text{-}5000}$ = N/AdB;

Evaluation based on field measurement results obtained in one-third-octave bands by an engineering method

$C_{tr,50\text{-}3150}$ = N/AdB; $C_{tr,50\text{-}5000}$ = N/AdB; $C_{tr,100\text{-}5000}$ = N/AdB;

No. of test report: Name of test institute:

Date: 03/26/2007 Signature:

Apparent Sound Reduction Index according to ISO 140-4

Field measurements of airborne sound insulation between rooms

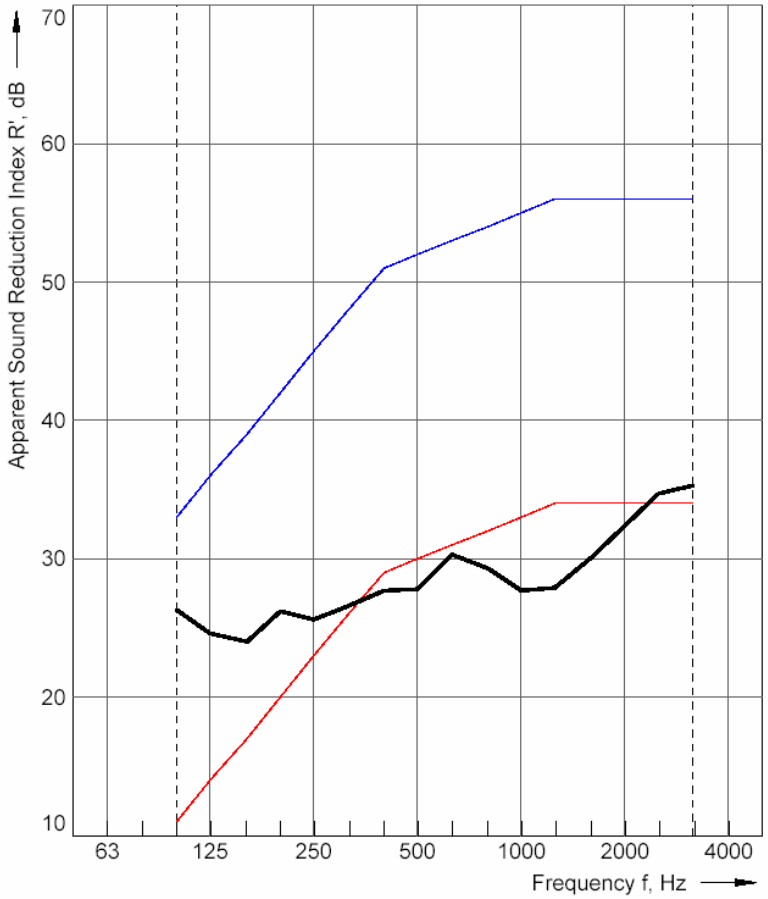
Client: Date of test: 27/03/2007

Description and identification of the building construction and test arrangement, direction of measurement:
Infinity design glass partition with sliding door
fitted with IS7070si gasket and IS5111si bottom fin

Offset Sliding Door
Test 1

Area S of separating element: 7.20 m²
Source room volume: 71 m³
Receiving room volume: 82.00 m³

Frequency f Hz	R' 1/3 Octave dB
50	
63	
80	
100	26.3
125	24.6
160	24.0
200	26.2
250	25.6
315	26.6
400	27.7
500	27.8
630	30.3
800	29.3
1000	27.7
1250	27.9
1600	30.1
2000	32.4
2500	34.7
3150	35.3
4000	
5000	



Rating according to ISO 717-1

$R'_w\ (C;C_{tr})$ = 30 (0; -1) dB

$C_{50\text{-}3150}$ = N/AdB; $C_{50\text{-}5000}$ = N/AdB; $C_{100\text{-}5000}$ = N/AdB;

Evaluation based on field measurement results obtained in one-third-octave bands by an engineering method

$C_{tr,50\text{-}3150}$ = N/AdB; $C_{tr,50\text{-}5000}$ = N/AdB; $C_{tr,100\text{-}5000}$ = N/AdB;

No. of test report: BA 0010 Name of test institute:

Date: 03/27/2007 Signature:

Apparent Sound Reduction Index according to ISO 140-4

Field measurements of airborne sound insulation between rooms

Client: Date of test: 27/03/2007

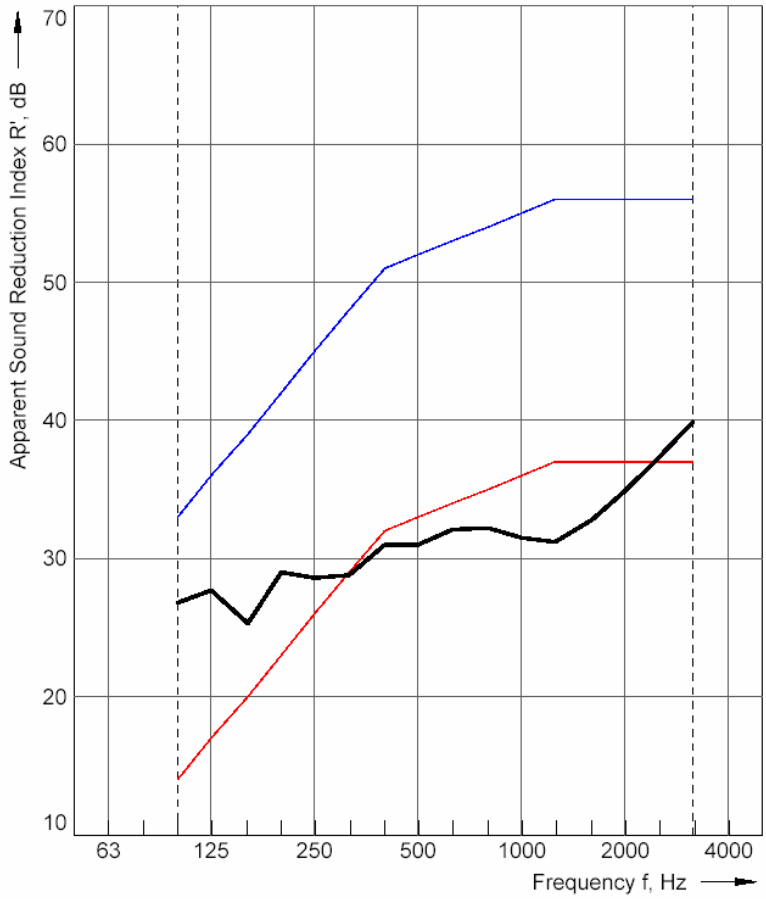
Description and identification of the building construction and test arrangement, direction of measurement:

Infinity Design glazed partition with sliding door
fitted with IS7070si gaskets and IS5111 fin seals
visible through gaps caulked with plasticine

Offset Sliding Door
Test 2

Area S of separating element: 7.20 m²
Source room volume: 71 m³
Receiving room volume: 82.00 m³

Frequency f Hz	R' 1/3 Octave dB
50	
63	
80	
100	26.8
125	27.7
160	25.3
200	29.0
250	28.6
315	28.8
400	31.0
500	31.0
630	32.1
800	32.2
1000	31.5
1250	31.2
1600	32.8
2000	34.9
2500	37.3
3150	39.9
4000	
5000	



Rating according to ISO 717-1

$R'_w\ (C;C_{tr})$ = 33 (0; -2) dB

$C_{50\text{-}3150}$ = N/AdB; $C_{50\text{-}5000}$ = N/AdB; $C_{100\text{-}5000}$ = N/AdB;

Evaluation based on field measurement results obtained in one-third-octave bands by an engineering method

$C_{tr,50\text{-}3150}$ = N/AdB; $C_{tr,50\text{-}5000}$ = N/AdB; $C_{tr,100\text{-}5000}$ = N/AdB;

No. of test report: Name of test institute:

Date: 03/27/2007 Signature:

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