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Technical Report

Report Number C/08/5L/20518/R01b
(supersedes C/08/5L/20518/R01a)

Date 18 February 2009

Project

The Laboratory Determination of
Airborne Sound Transmission of
Various Door Sets Manufactured by
GE Carpentry Utilising Products by
Lorient and Sauerlander

Prepared for

Lorient Polyproducts Ltd
Endeavour House, Fairfax Road
Heathfield Industrial Estate
Newton Abbot
DevonTQ12 6UD

& Sauerlander Spanplatten
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1.0 Summary

Tests have been done in SRL's Laboratory at Holbrook House, Sudbury, Suffolk, to determine the sound reduction index of various door sets in accordance with BS EN ISO 140-3:1995.

From these measurements the required results have been derived and are presented in both tabular and graphic form in Data Sheets 1 to 20.

The results are given in 1/3rd octave bands over the frequency range 50Hz to 10KHz, which is beyond that required by the test standard. Measurements outside the standard frequency range are not UKAS accredited.



.....
Allen Smalls
Laboratory Manager
Quality Manager



.....
Trevor Hickman
Executive Consultant
Deputy Technical Manager

For and on behalf of
Sound Research Laboratories Ltd

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2.0 Details of Measurements

2.1 Location

Sound Research Laboratories Ltd
 Holbrook House
 Little Waldingfield
 Sudbury
 Suffolk
 CO10 0TH

2.2 Test Date

4 November 2008

2.3 Instrumentation and Apparatus Used

Make	Description	Type
E D I	Microphone Multiplexer Microphone Power Supply Unit	
Norwegian Electronics	Real Time Analyser Rotating Microphone Boom	830 231
Brüel & Kjaer	12mm Condenser Microphones Windshields Pre Amplifiers Microphone Calibrator Omnipower Sound Source	4166 UA0237 2639, 2669C 4231 4296
Larson Davis	12mm Condenser Microphone	2560
SRL	Power Amplifiers	
Celestion	Loudspeakers	100w

Douglas Curtis	Rotating Microphone Boom	
Thermo Hygro	Temperature & Humidity Probe	
TOA	Graphic Equalizer	E-1231
	Power Amplifier	DPA-800

2.4 References

BS EN ISO 140-3:1995	Laboratory measurement of airborne sound insulation of building elements
BS EN ISO 717-1:1997	Rating of sound insulation in buildings and of building elements. Airborne Sound Insulation.

2.5 Personnel Present

P Chudley	Lorient Polyproducts
H Flototto	Sauerlander Spanplatten
D Powell	GE Carpentry
P Evans	GE Carpentry
P Trebble	GE Carpentry
T Fagg	Pilkington

3.0 Description of Test

3.1 Description of Sample

Various single door sets manufactured by GE Carpentry utilising products by Lorient and Sauerlander. See section 4.0 for individual test details and drawings 1 to 3.

Sampling plan:	Selected at random
Sample condition:	New
Details supplied by	Lorient and Sauerlander
Sample installed by	GE Carpentry

3.2 Sample Delivery date

4 November 2008

3.3 Test Procedures

The sample was mounted/located and tested in accordance with the relevant standard. The method and procedure is described in Appendix 1. The measurement uncertainty is given in Appendix 2.

4.0 Results

The results of the measurements and subsequent analysis are given in Data Sheets 1 to 20 and summarised below.

Results relate only to the items tested.

SRL Test No.	Description in Brief	Rw (C;C _{tr})
2	54 S4K door, Fully caulked	44 (-2;-7)
3	54 S4K door, Perimeter seals - Lorient DS Combined Acoustic, Smoke & Fire seal & IS1010 batwing, Threshold caulked	44 (-2;-6)
4	54 S4K door, Perimeter seals - Lorient DS Combined Acoustic, Smoke & Fire seal & IS1010 batwing, Threshold - IS8040 drop seal & 2x IS1511 Firtree & IS4015 threshold plate	44 (-2;-6)
5	54 S4K door, Perimeter seals - Lorient DS Combined Acoustic, Smoke & Fire seal & IS1010 batwing, Threshold - 2x IS1511 Firtree & IS4015 threshold plate	44 (-2;-6)
6	54 S4K door, Perimeter seals - Lorient DS Combined Acoustic, Smoke & Fire seal & IS1010 batwing, Threshold - IS8040 dropseal & IS4015 threshold plate	38 (-1;-3)
7	54 S4G door, Fully caulked	45 (-2;-7)
8	54 S4G door, Perimeter seals - Lorient DS Combined Acoustic, Smoke & Fire seal & IS1010 batwing, Threshold - 2x IS1511 Firtree & IS4015 threshold plate	44 (-1;-6)
9	54 S4G door, Perimeter seals - Lorient DS Combined Acoustic, Smoke & Fire seal & IS1010 batwing, Threshold - IS8040 dropseal & 2x IS1511 Firtree & IS4015 threshold plate	44 (-2;-6)
10	44 S3K door, Fully caulked	43 (-2;-6)
11	44 S3K door, Perimeter seals - Lorient DS Combined Acoustic, Smoke & Fire seal & IS1010 batwing, Threshold - 2x IS1511 Firtree & IS4015 threshold plate	43 (-2;-6)
12	44 S3K door, Perimeter seals - Lorient DS Combined Acoustic, Smoke & Fire seal & IS1010 batwing, Threshold - IS8040 dropseal & IS4015 threshold plate	39 (-1;-4)
13	44 S3K door & 15mm pyrostop glass, Fully caulked	42 (-1;-5)
15	44 S3K door & 15mm pyrostop glass, Perimeter seals - Lorient DS Combined Acoustic, Smoke & Fire seal & IS1010 batwing, Threshold - 2x IS1511 Firtree & IS4015 threshold plate	41 (-1;-4)

16	44 S3K door & 23mm pyrostop glass, Perimeter seals - Lorient DS Combined Acoustic, Smoke & Fire seal & IS1010 batwing, Threshold - 2x IS1511 Firtree & IS4015 threshold plate	41 (-1;-4)
17	44 S3K door & 23mm pyrostop glass, Fully caulked	42 (-1;-5)
18	44 S2 door & 7mm pyrodur glass, Fully caulked	38 (-1;-3)
19	44 S2 door & 7mm pyrodur glass, Perimeter seals - Lorient DS Combined Acoustic, Smoke & Fire seal & IS1010 batwing, Threshold - IS8040 dropseal & IS4015 threshold plate	35 (-1;-2)
20	44 S2 door, Fully caulked	38 (-1;-3)
21	44 S2 door, Perimeter seals - Lorient DS Combined Acoustic, Smoke & Fire seal & IS1010 batwing, Threshold - IS8040 dropseal & IS4015 threshold plate	36 (-1;-2)
22	44 S3G door, Fully caulked	43 (-2;-7)

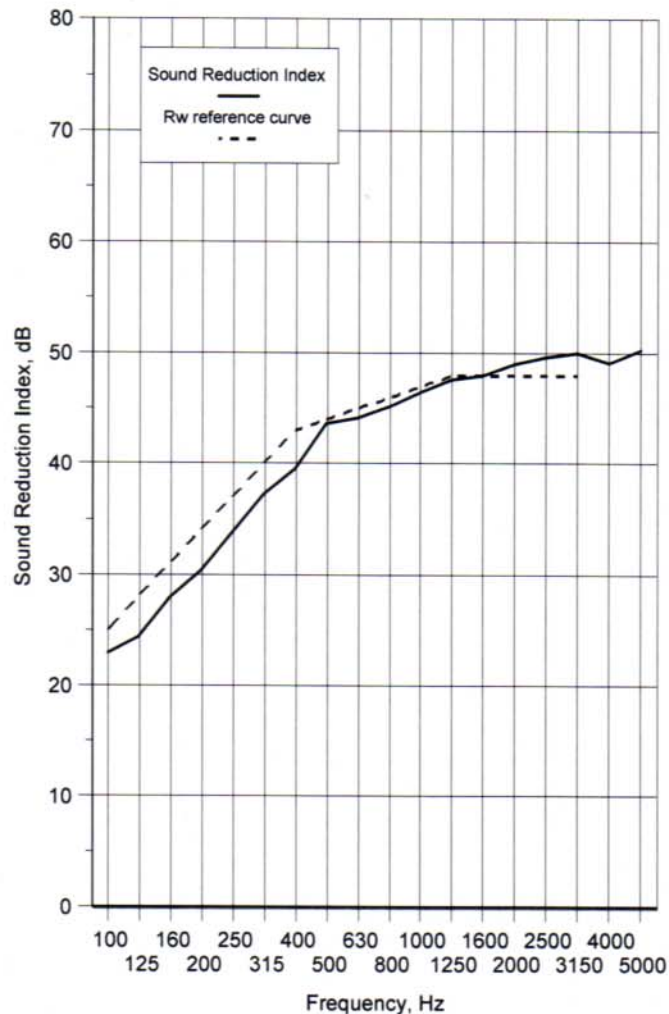
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Data Sheet 1

Test Number : 2
Client: Lorient
Test Date: 04/11/2008
Sample height: 2.19 m
Sample width: 1.01 m
Product 54 S4K door
Identification: Fully caulked

Air temperature: 12.3 °C
Air humidity: 83 %
Receiving room volume: 300 m3
Source room volume: 115 m3
Sample weight: 35.9 kg/m2

Freq f Hz	Sound Reduction Index, dB	
	1/3 Oct	1/1 Oct
50+	25.9	20.9
63+	24.3	
80+	17.4	
100	22.9	24.6
125	24.3	
160	27.9	
200	30.4	33.0
250	33.8	
315	37.3	
400	39.6	42.0
500	43.7	
630	44.1	
800	45.2	46.4
1000	46.5	
1250	47.6	
1600	48.0	48.9
2000	49.0	
2500	49.7	
3150	50.0	49.8
4000	49.2	
5000	50.3	
6300+	51.5	53.2
8000+	53.2 *	
10000+	56.1 #	
Average 100-3150	40.0	



Rating according to BS EN ISO 717-1:1997

Rw(C;Ctr) = **44 (-2;-7)** dB

Notes : * designates measurement corrected for background

designates limit of measurement due to background

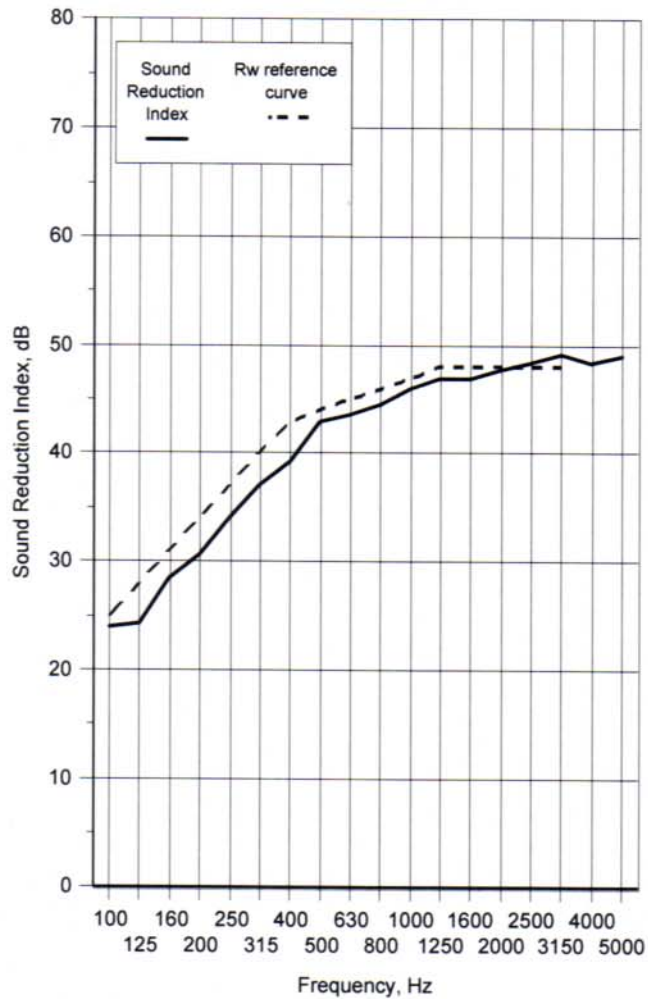
+ designates frequency beyond standard and not UKAS accredited

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Data Sheet 2

Test Number :	3	Air temperature:	12.3 °C
Client:	Lorient	Air humidity:	83 %
Test Date:	04/11/2008	Receiving room volume	300 m3
Sample height:	2.19 m	Source room volume:	115 m3
Sample width:	1.01 m	Sample weight:	35.9 kg/m2
Product	54 S4K door		
Identification:	Perimeter seals= Lorient DS Combined Acoustic, Smoke & Fire + IS1010 batwing - Threshold caulked		

Freq f Hz	Sound Reduction Index, dB	
	1/3 Oct	1/1 Oct
50+	25.2	21.4
63+	25.1	
80+	18.0	
100	24.0	25.2
125	24.3	
160	28.5	
200	30.6	33.1
250	34.1	
315	37.1	
400	39.3	41.5
500	43.0	
630	43.6	
800	44.6	45.8
1000	46.0	
1250	47.0	
1600	46.9	47.6
2000	47.7	
2500	48.4	
3150	49.2	48.8
4000	48.3	
5000	49.0	
6300+	50.5	52.2
8000+	52.2 *	
10000+	55.2 #	
Average 100-3150	39.6	



Rating according to BS EN ISO 717-1:1997

Rw(C;Ctr)= **44 (-2;-6)** dB

Notes * designates measurement corrected for background

designates limit of measurement due to background

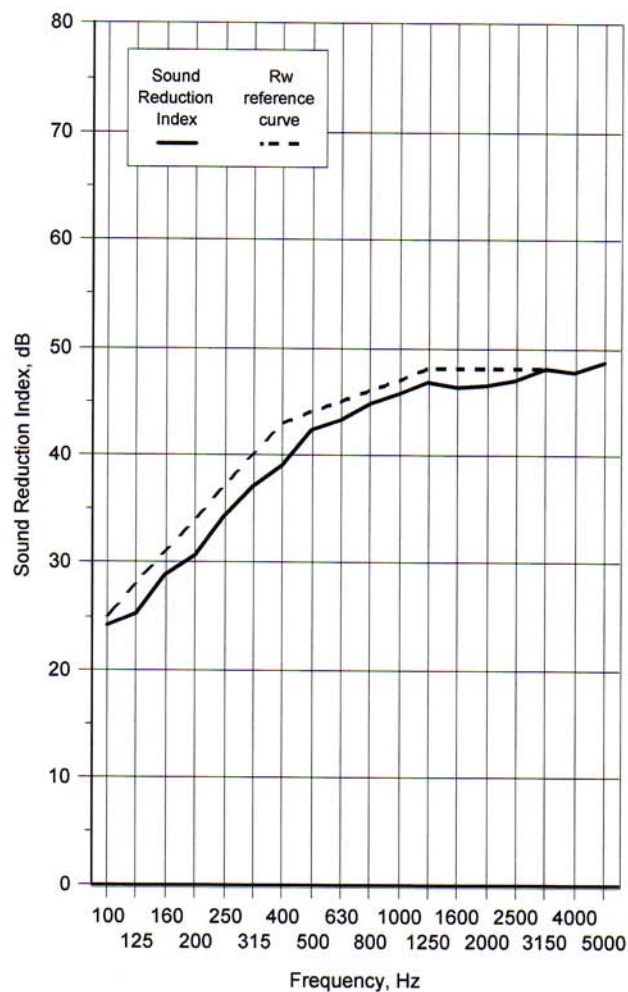
+ designates frequency beyond standard and not UKAS accredited

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Data Sheet 3

Test Number :	4	Air temperature:	12.3 °C
Client:	Lorient	Air humidity:	83 %
Test Date:	04/11/2008	Receiving room volume	300 m3
Sample height:	2.19 m	Source room volume:	115 m3
Sample width:	1.01 m	Sample weight:	35.9 kg/m2
Product	54 S4K door		
Identification:	Perimeter seals=Lorient DS Combined Acoustic, Smoke & Fire seal + IS1010 batwing - 'Threshold=IS8040 drop seal + 2x IS1511 Firtree & IS4015 threshold plate		

Freq f Hz	Sound Reduction Index, dB	
	1/3 Oct	1/1 Oct
50+	25.2	21.2
63+	24.7	
80+	17.8	
100	24.2	25.7
125	25.2	
160	28.8	
200	30.7	33.2
250	34.3	
315	37.1	
400	39.1	41.2
500	42.4	
630	43.2	
800	44.8	45.7
1000	45.8	
1250	46.8	
1600	46.4	46.7
2000	46.6	
2500	47.0	
3150	48.0	48.1
4000	47.8	
5000	48.7	
6300+	50.3	52.1
8000+	52.1 *	
10000+	55.0 #	
Average 100-3150	39.4	



Rating according to BS EN ISO 717-1:1997

Rw(C;Ctr)= 44 (-2;-6) dB

Notes * designates measurement corrected for background

designates limit of measurement due to background

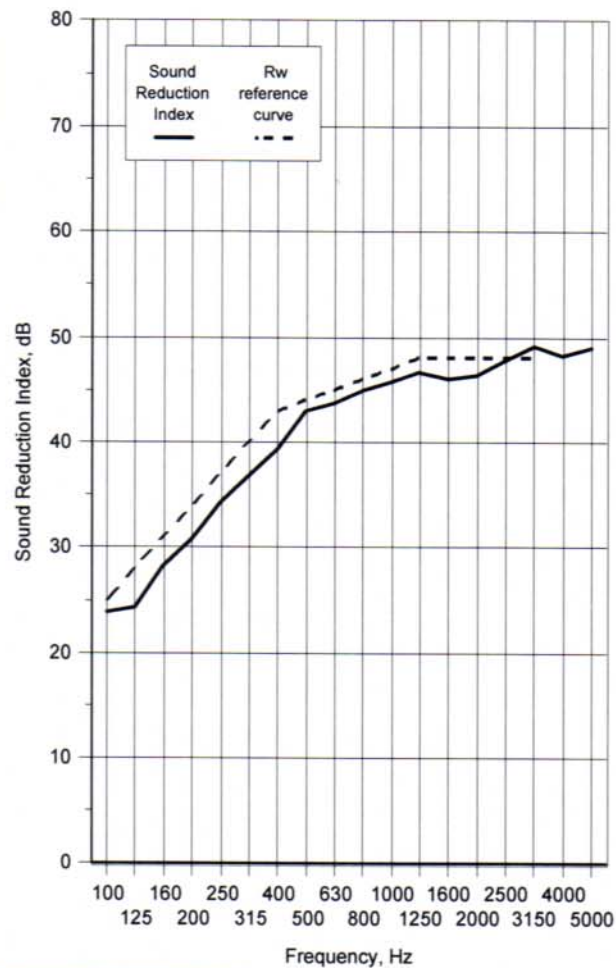
+ designates frequency beyond standard and not UKAS accredited

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Data Sheet 4

Test Number : 5
Client: Lorient
Test Date: 04/11/2008
Sample height: 2.19 m
Sample width: 1.01 m
Product 54 S4K door
Identification: Perimeter seals=Lorient DS Combined Acoustic, Smoke & Fire seal + IS1010 batwing - Threshold=2xIS1511 Firtree & IS4015 threshold plate
Air temperature: 12.3 °C
Air humidity: 83 %
Receiving room volume 300 m³
Source room volume: 115 m³
Sample weight: 35.9 kg/m²

Freq f Hz	Sound Reduction Index, dB	
	1/3 Oct	1/1 Oct
50+	25.4	21.0
63+	24.9	
80+	17.5	
100	23.9	25.1
125	24.3	
160	28.2	
200	30.9	33.3
250	34.2	
315	36.8	
400	39.4	41.5
500	42.9	
630	43.7	
800	44.9	45.7
1000	45.8	
1250	46.7	
1600	46.0	46.7
2000	46.4	
2500	47.8	
3150	49.1	48.8
4000	48.3	
5000	49.0	
6300+	50.3	51.8
8000+	51.6 *	
10000+	54.5 *	
Average 100-3150	39.4	



Rating according to BS EN ISO 717-1:1997

Rw(C;Ctr)= **44 (-2;-6)** dB

Notes * designates measurement corrected for background

designates limit of measurement due to background

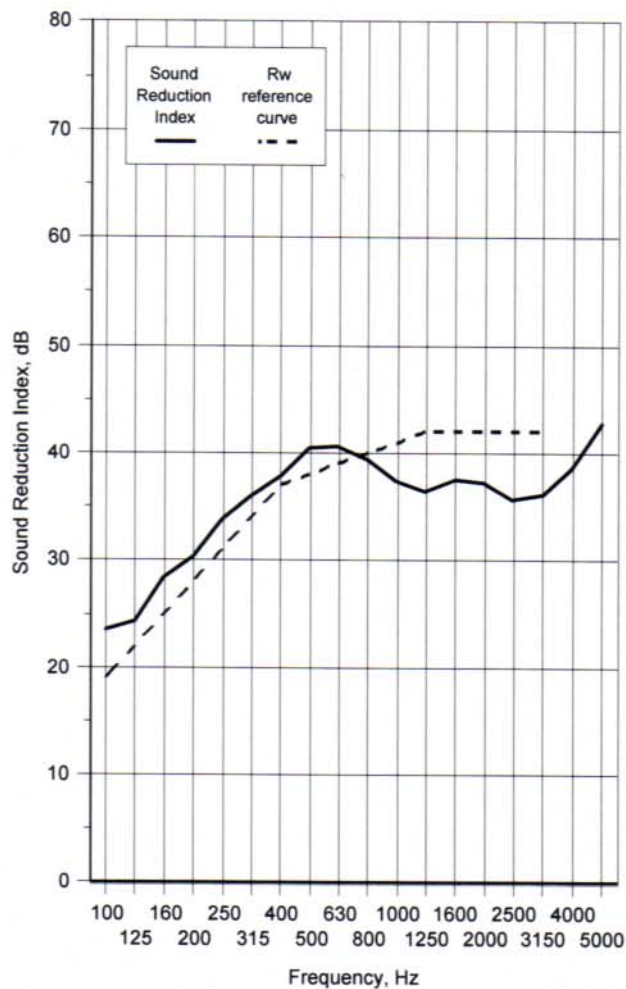
+ designates frequency beyond standard and not UKAS accredited

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Data Sheet 5

Test Number :	6	Air temperature:	12.3 °C
Client:	Lorient	Air humidity:	83 %
Test Date:	04/11/2008	Receiving room volume	300 m3
Sample height:	2.19 m	Source room volume:	115 m3
Sample width:	1.01 m	Sample weight:	35.9 kg/m2
Product	54 S4K door		
Identification:	Perimeter seals=Lorient DS Combined Acoustic, Smoke & Fire seal + IS1010 batwing - Threshold=IS8040 dropseal & IS4015 threshold plate		

Freq f Hz	Sound Reduction Index, dB	
	1/3 Oct	1/1 Oct
50+	25.5	20.4
63+	24.2	
80+	16.8	
100	23.5	24.9
125	24.3	
160	28.4	
200	30.3	32.7
250	33.8	
315	36.0	
400	37.9	39.4
500	40.4	
630	40.6	
800	39.4	37.6
1000	37.3	
1250	36.5	
1600	37.5	36.7
2000	37.2	
2500	35.6	
3150	36.1	38.4
4000	38.6	
5000	42.8	
6300+	44.7	46.2
8000+	46.2	
10000+	48.5 *	
Average 100-3150	34.7	



Rating according to BS EN ISO 717-1:1997

Rw(C;Ctr)= **38 (-1;-3)** dB

Notes * designates measurement corrected for background
 # designates limit of measurement due to background
 + designates frequency beyond standard and not UKAS accredited

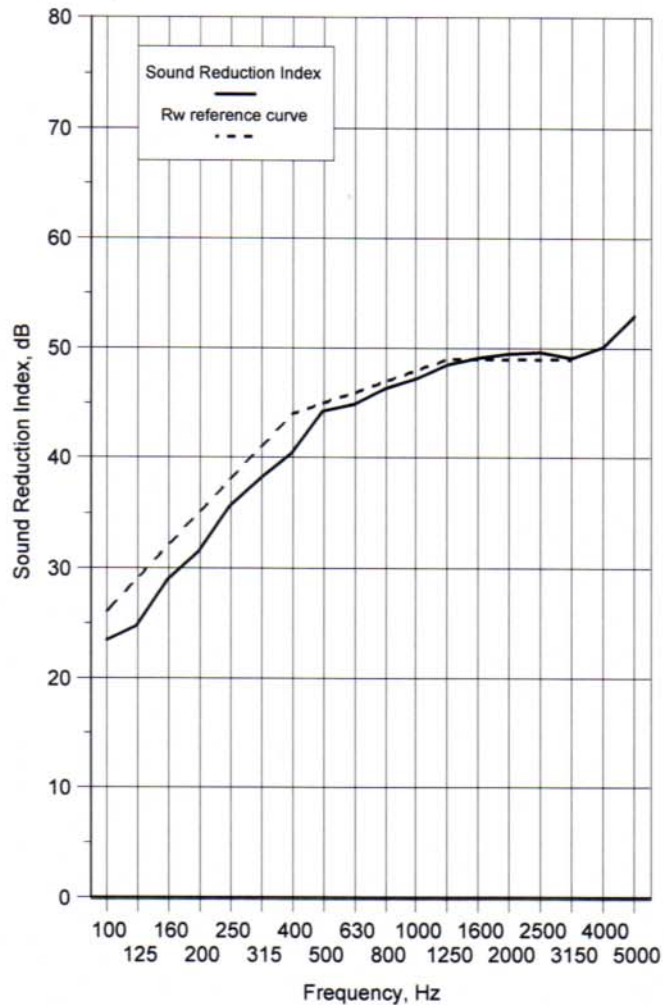
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Data Sheet 6

Test Number : 7
Client: Lorient
Test Date: 04/11/2008
Sample height: 2.19 m
Sample width: 1.01 m
Product 54 S4G door
Identification: Fully caulked

Air temperature: 12.3 °C
Air humidity: 83 %
Receiving room volume: 300 m³
Source room volume: 115 m³
Sample weight: 38.1 kg/m²

Freq f Hz	Sound Reduction Index, dB	
	1/3 Oct	1/1 Oct
50+	26.3	21.2
63+	24.0	
80+	17.9	
100	23.4	25.1
125	24.7	
160	28.9	
200	31.5	34.2
250	35.6	
315	38.1	
400	40.5	42.7
500	44.3	
630	44.9	
800	46.3	47.2
1000	47.2	
1250	48.5	
1600	49.1	49.4
2000	49.5	
2500	49.7	
3150	49.1	50.4
4000	50.1	
5000	53.0	
6300+	56.2	56.5
8000+	56.8 *	
10000+	56.7 #	
Average 100-3150	40.7	



Rating according to BS EN ISO 717-1:1997

Rw(C;Ctr)= **45 (-2;-7)** dB

Notes : * designates measurement corrected for background

designates limit of measurement due to background

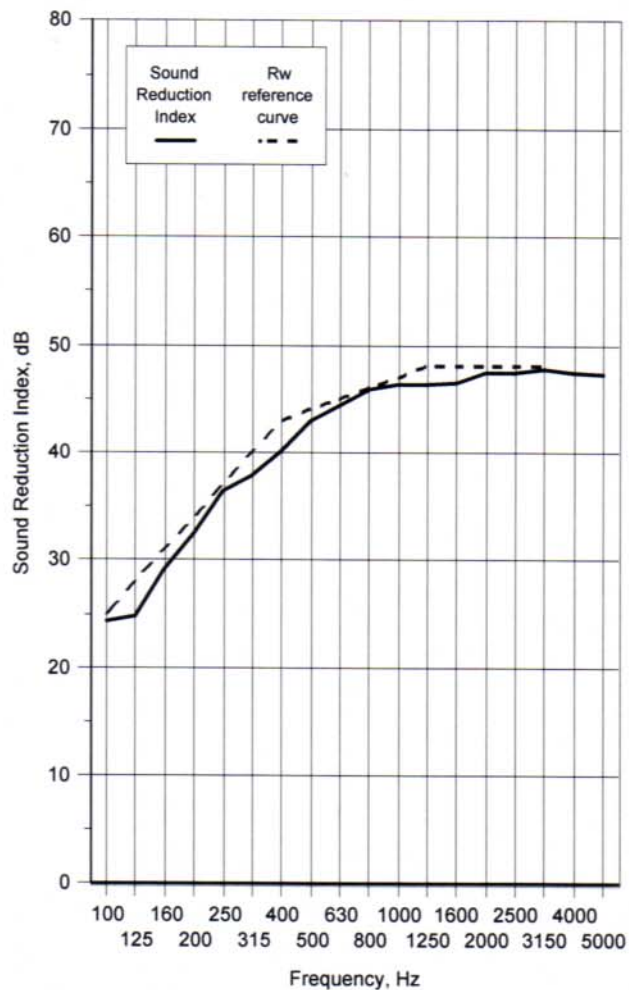
+ designates frequency beyond standard and not UKAS accredited

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Data Sheet 7

Test Number :	8	Air temperature :	12.3 °C
Client:	Lorient	Air humidity:	83 %
Test Date:	04/11/2008	Receiving room volume	300 m3
Sample height:	2.19 m	Source room volume:	115 m3
Sample width:	1.01 m	Sample weight:	38.1 kg/m2
Product	54 S4G door		
Identification:	Perimeter seals=Lorient DS Combined Acoustic, Smoke & Fire seal + IS1010 batwing - Threshold = 2x IS1511 Firtree & IS4015 threshold plate		

Freq f Hz	Sound Reduction Index, dB	
	1/3 Oct	1/1 Oct
50+	26.5	21.6
63+	24.9	
80+	18.2	
100	24.3	25.6
125	24.7	
160	29.2	
200	32.5	34.9
250	36.4	
315	37.8	
400	40.2	42.1
500	42.9	
630	44.3	
800	45.9	46.2
1000	46.3	
1250	46.3	
1600	46.5	47.1
2000	47.4	
2500	47.4	
3150	47.7	47.5
4000	47.5	
5000	47.3	
6300+	49.0	50.0
8000+	50.1	
10000+	51.2 *	
Average 100-3150	40.0	



Rating according to BS EN ISO 717-1:1997

Rw(C;Ctr)= 44 (-1;-6) dB

Notes * designates measurement corrected for background

designates limit of measurement due to background

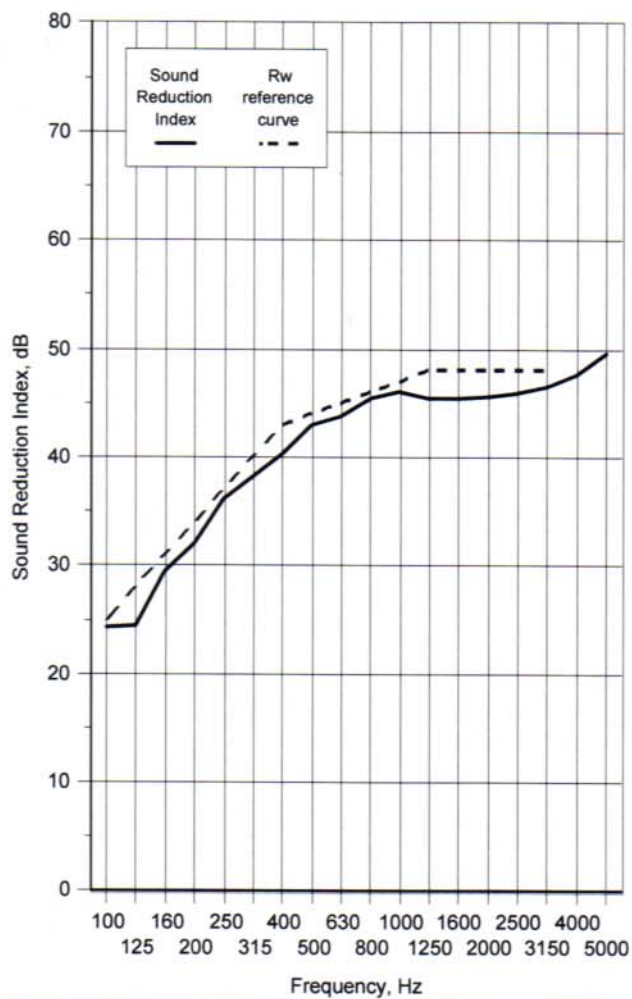
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Data Sheet 8

Test Number :	9	Air temperature:	12.1 °C
Client:	Lorient	Air humidity:	84 %
Test Date:	04/11/2008	Receiving room volume	300 m3
Sample height:	2.19 m	Source room volume:	115 m3
Sample width:	1.01 m	Sample weight:	38.1 kg/m2
Product	54 S4G door		
Identification:	Perimeter seals=Lorient DS Combined Acoustic, Smoke & Fire seal + IS1010 batwing - Threshold=IS8040 dropseal + 2xIS1511 Firtree & IS4015 threshold plate		

Freq f Hz	Sound Reduction Index, dB	
	1/3 Oct	1/1 Oct
50+	25.9	21.3
63+	24.2	
80+	18.0	
100	24.3	25.5
125	24.4	
160	29.4	
200	32.0	34.6
250	36.1	
315	38.1	
400	40.3	42.1
500	42.9	
630	43.8	
800	45.5	45.7
1000	46.1	
1250	45.5	
1600	45.4	45.6
2000	45.6	
2500	45.9	
3150	46.5	47.7
4000	47.6	
5000	49.7	
6300+	50.3	50.6
8000+	50.2	
10000+	51.3 *	
Average 100-3150	39.5	



Rating according to BS EN ISO 717-1:1997

Rw(C;Ctr)= **44 (-2;-6)** dB

Notes * designates measurement corrected for background

designates limit of measurement due to background

+ designates frequency beyond standard and not UKAS accredited

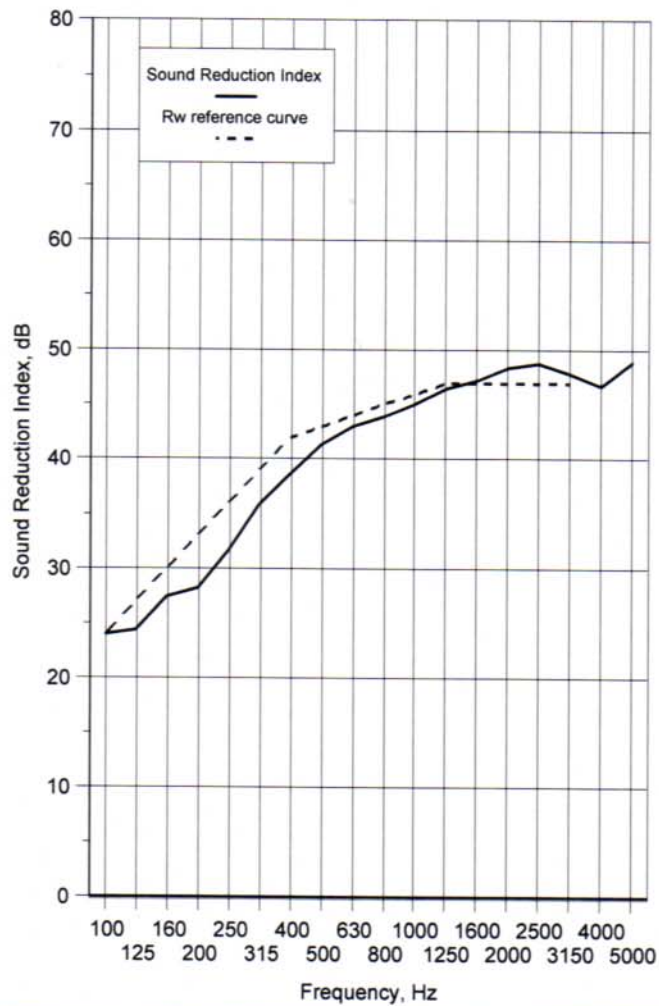
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Data Sheet 9

Test Number : 10
Client: Lorient
Test Date: 04/11/2008
Sample height: 2.19 m
Sample width: 1.01 m
Product 44 S3K door
Identification: Fully caulked

Air temperature: 12.1 °C
Air humidity: 84 %
Receiving room volume: 300 m3
Source room volume: 115 m3
Sample weight: 29.1 kg/m2

Freq f Hz	Sound Reduction Index, dB	
	1/3 Oct	1/1 Oct
50+	24.4	20.3
63+	23.2	
80+	17.1	
100	24.0	25.1
125	24.4	
160	27.4	
200	28.2	30.8
250	31.6	
315	35.8	
400	38.7	40.6
500	41.3	
630	43.0	
800	43.9	45.0
1000	45.0	
1250	46.5	
1600	47.2	48.0
2000	48.4	
2500	48.7	
3150	47.8	47.7
4000	46.7	
5000	48.9	
6300+	52.3	54.1
8000+	54.6 *	
10000+	56.1 #	
Average 100-3150	38.9	



Rating according to BS EN ISO 717-1:1997

Rw(C;Ctr)= **43 (-2;-6) dB**

Notes : * designates measurement corrected for background

designates limit of measurement due to background

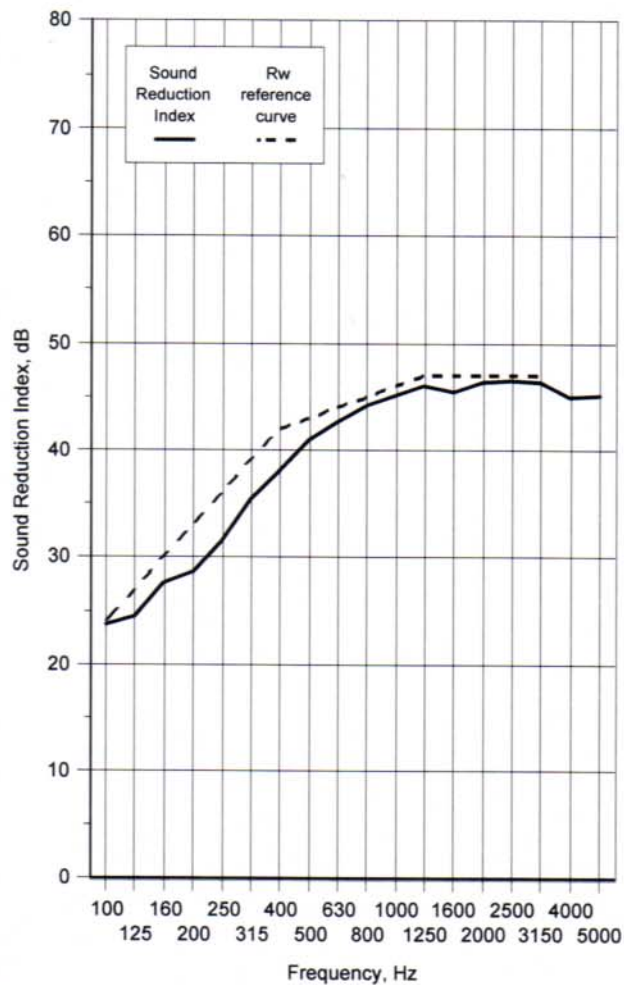
+ designates frequency beyond standard and not UKAS accredited

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Data Sheet 10

Test Number :	11	Air temperature:	12.1 °C
Client:	Lorient	Air humidity:	84 %
Test Date:	04/11/2008	Receiving room volume	300 m3
Sample height:	2.19 m	Source room volume:	115 m3
Sample width:	1.01 m	Sample weight:	29.1 kg/m2
Product	44 S3K door		
Identification:	Perimeter seals=Lorient DS Combined Acoustic, Smoke & Fire seal + IS1010 batwing - Threshold=2x IS1511 Firtree & IS4015 threshold plate		

Freq f Hz	Sound Reduction Index, dB	
	1/3 Oct	1/1 Oct
50+	23.9	20.2
63+	23.3	
80+	17.1	24.9
100	23.7	
125	24.5	
160	27.5	31.0
200	28.6	
250	31.5	
315	35.3	40.2
400	38.2	
500	41.0	
630	42.6	45.1
800	44.2	
1000	45.2	
1250	46.0	46.1
1600	45.5	
2000	46.3	
2500	46.6	45.4
3150	46.3	
4000	44.9	
5000	45.1	47.7
6300+	46.2	
8000+	47.3	
10000+	50.7 *	
Average 100-3150	38.3	



Rating according to BS EN ISO 717-1:1997

Rw(C;Ctr)= **43 (-2;-6)** dB

Notes * designates measurement corrected for background

designates limit of measurement due to background

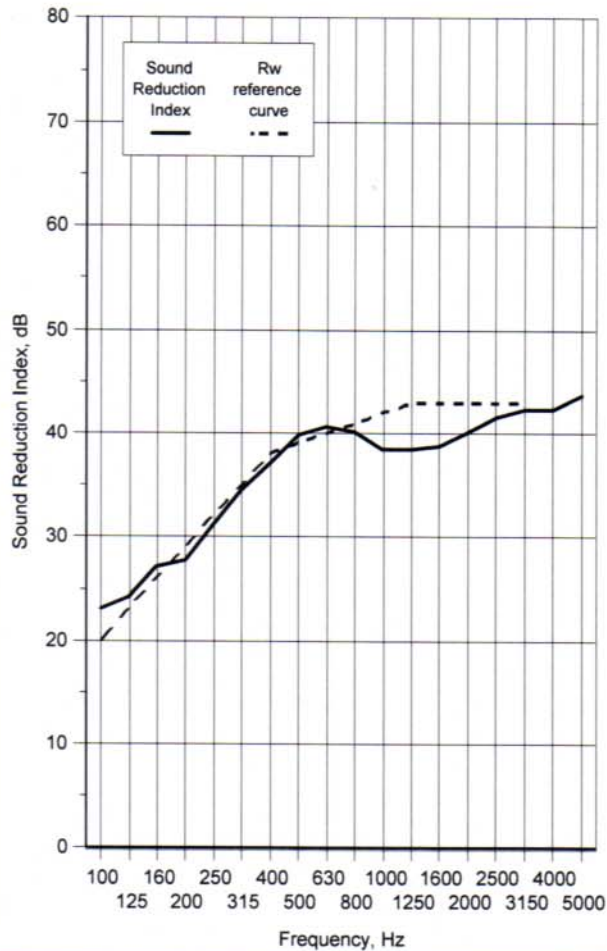
+ designates frequency beyond standard and not UKAS accredited

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Data Sheet 11

Test Number :	12	Air temperature:	12.1 °C
Client:	Lorient	Air humidity:	84 %
Test Date:	04/11/2008	Receiving room volume	300 m3
Sample height:	2.19 m	Source room volume:	115 m3
Sample width:	1.01 m	Sample weight:	29.1 kg/m2
Product	44 S3K door		
Identification:	Perimeter seals=Lorient DS Combined Acoustic, Smoke & Fire seal + IS1010 batwing - Threshold=IS8040 dropseal & IS4015 threshold plate		

Freq f Hz	Sound Reduction Index, dB	
	1/3 Oct	1/1 Oct
50+	23.4	19.9
63+	23.7	
80+	16.7	
100	23.0	24.5
125	24.1	
160	27.1	
200	27.8	30.4
250	31.1	
315	34.6	
400	37.1	38.9
500	39.8	
630	40.6	
800	40.2	38.9
1000	38.4	
1250	38.5	
1600	38.8	40.1
2000	40.2	
2500	41.6	
3150	42.4	42.8
4000	42.4	
5000	43.8	
6300+	46.1	47.0
8000+	46.8	
10000+	48.4 *	
Average 100-3150	35.3	



Rating according to BS EN ISO 717-1:1997

Rw(C;Ctr)= **39 (-1;-4)** dB

Notes * designates measurement corrected for background

designates limit of measurement due to background

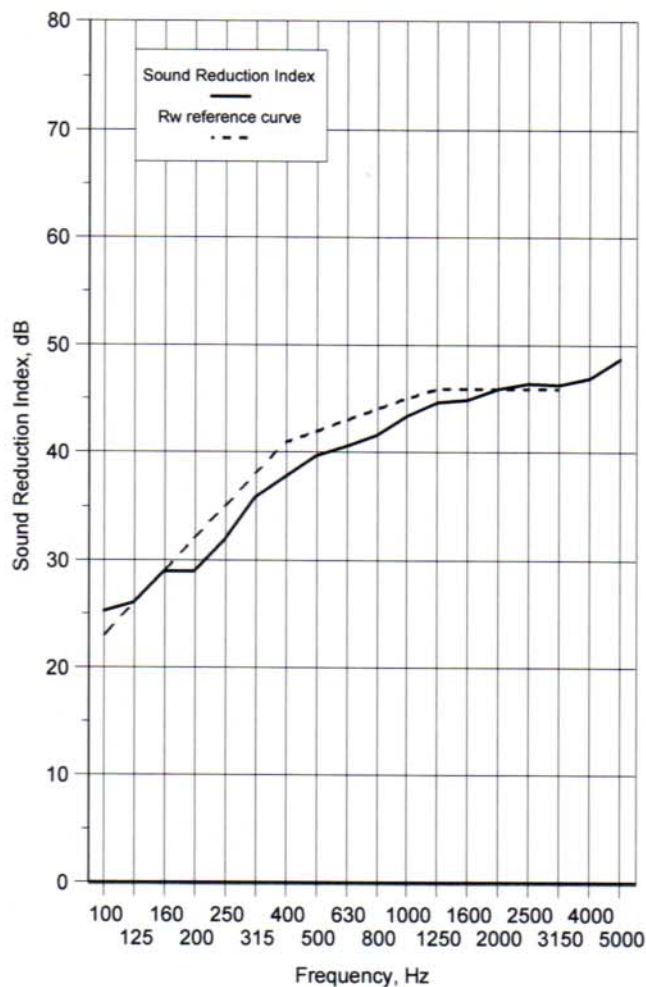
+ designates frequency beyond standard and not UKAS accredited

v1.6

Data Sheet 12

Test Number :	13	Air temperature:	12.1 °C
Client:	Lorient	Air humidity:	84 %
Test Date:	04/11/2008	Receiving room volume:	300 m ³
Sample height:	2.19 m	Source room volume:	115 m ³
Sample width:	1.01 m	Sample weight:	25.7 kg/m ²
Product	44 S3K door + 15mm pyrostop glass		
Identification:	Fully caulked		

Freq f Hz	Sound Reduction Index, dB	
	1/3 Oct	1/1 Oct
50+	28.5	21.7
63+	24.7	
80+	18.1	
100	25.2	26.4
125	26.0	
160	28.9	
200	28.9	31.4
250	31.9	
315	35.9	
400	37.8	39.2
500	39.7	
630	40.6	
800	41.6	43.0
1000	43.4	
1250	44.7	
1600	44.9	45.8
2000	46.0	
2500	46.4	
3150	46.3	47.3
4000	47.0	
5000	48.8	
6300+	51.0	52.4
8000+	52.1 *	
10000+	54.9 #	
Average 100-3150	38.0	



Rating according to BS EN ISO 717-1:1997

Rw(C;Ctr)= 42 (-1;-5) dB

Notes : * designates measurement corrected for background

designates limit of measurement due to background

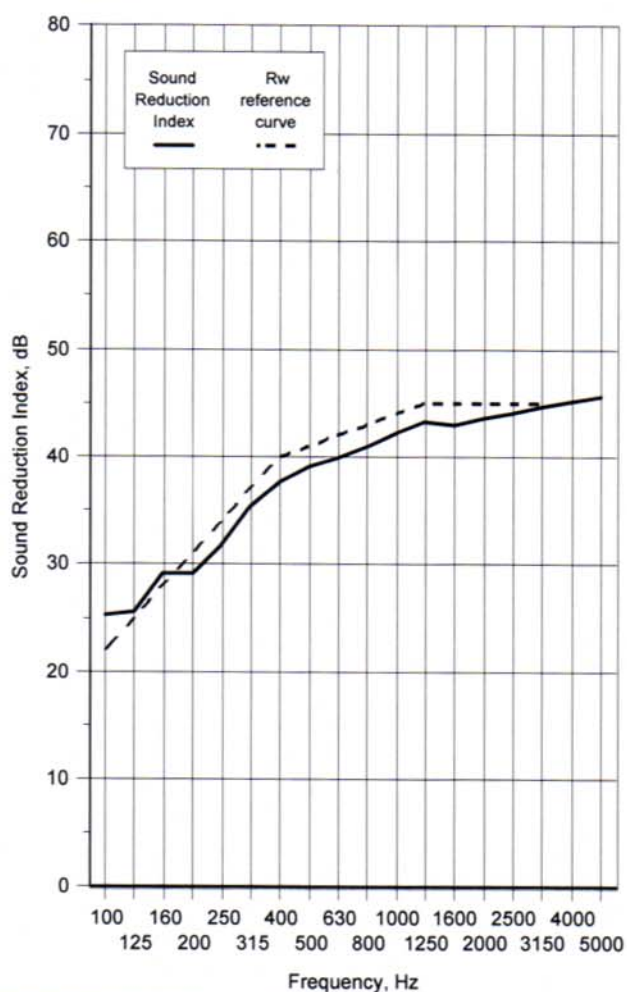
+ designates frequency beyond standard and not UKAS accredited

v1.6

Data Sheet 13

Test Number :	15	Air temperature:	12.1 °C
Client:	Lorient	Air humidity:	84 %
Test Date:	04/11/2008	Receiving room volume	300 m3
Sample height:	2.19 m	Source room volume:	115 m3
Sample width:	1.01 m	Sample weight:	25.7 kg/m2
Product	44 S3K door + 15mm pyrostop glass		
Identification:	Perimeter seals=Lorient DS Combined Acoustic, Smoke & Fire seal + IS1010 batwing - 'Threshold=2x IS1511 Firtree & IS4015 threshold plate		

Freq f Hz	Sound Reduction Index, dB	
	1/3 Oct	1/1 Oct
50+	26.8	21.7
63+	24.2	
80+	18.4	
100	25.2	26.3
125	25.6	
160	29.1	
200	29.1	31.3
250	31.7	
315	35.4	
400	37.6	38.8
500	39.1	
630	39.9	
800	41.0	42.0
1000	42.1	
1250	43.2	
1600	43.0	43.5
2000	43.6	
2500	44.1	
3150	44.7	45.2
4000	45.2	
5000	45.6	
6300+	46.1	47.6
8000+	47.5	
10000+	49.8 *	
Average 100-3150	37.2	



Rating according to BS EN ISO 717-1:1997

Rw(C;Ctr)= 41 (-1;-4) dB

Notes * designates measurement corrected for background

designates limit of measurement due to background

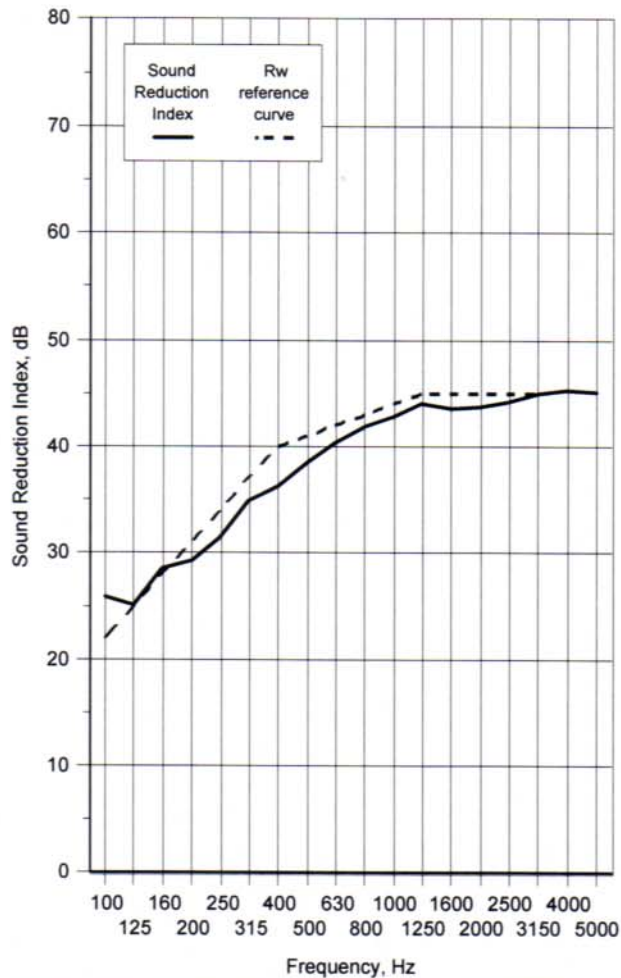
+ designates frequency beyond standard and not UKAS accredited

v1.5

Data Sheet 14

Test Number :	16	Air temperature:	12.1 °C
Client:	Lorient	Air humidity:	84 %
Test Date:	04/11/2008	Receiving room volume	300 m ³
Sample height:	2.19 m	Source room volume:	115 m ³
Sample width:	1.01 m	Sample weight:	28.6 kg/m ²
Product	44 S3K door + 23mm pyrostop glass		
Identification:	Perimeter seals=Lorient DS Combined Acoustic, Smoke & Fire seal + IS1010 batwing - Threshold=2x IS1511 Firtree & IS4015 threshold plate		

Freq f Hz	Sound Reduction Index, dB	
	1/3 Oct	1/1 Oct
50+	25.9	22.3
63+	24.5	
80+	19.4	
100	25.8	26.2
125	25.1	
160	28.5	
200	29.3	31.3
250	31.4	
315	34.9	
400	36.2	38.0
500	38.4	
630	40.3	
800	41.8	42.8
1000	42.8	
1250	44.0	
1600	43.5	43.8
2000	43.7	
2500	44.2	
3150	44.9	45.1
4000	45.3	
5000	45.2	
6300+	45.1	46.9
8000+	46.8	
10000+	49.9 *	
Average 100-3150	37.2	



Rating according to BS EN ISO 717-1:1997

Rw(C;Ctr)= **41 (-1;-4)** dB

Notes * designates measurement corrected for background

designates limit of measurement due to background

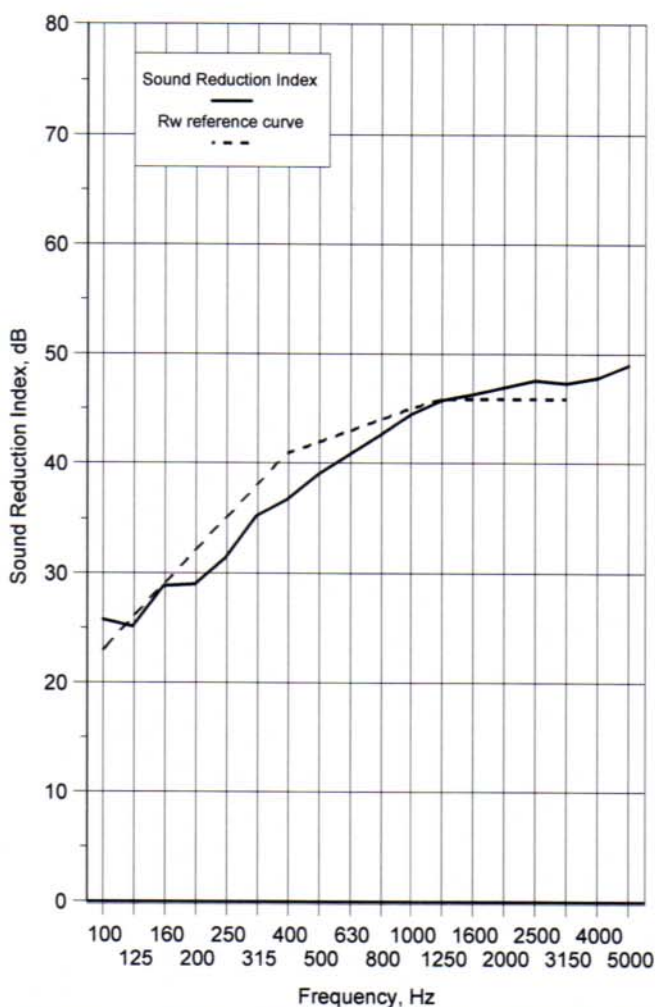
+ designates frequency beyond standard and not UKAS accredited

v1.6

Data Sheet 15

Test Number :	17	Air temperature:	12.1 °C
Client:	Lorient	Air humidity:	84 %
Test Date:	04/11/2008	Receiving room volume:	300 m3
Sample height:	2.19 m	Source room volume:	115 m3
Sample width:	1.01 m	Sample weight:	28.6 kg/m2
Product	44 S3K door + 23mm pyrostop glass		
Identification:	Fully caulked		

Freq f Hz	Sound Reduction Index, dB	
	1/3 Oct	1/1 Oct
50+	28.0	22.5
63+	25.1	
80+	19.1	
100	25.7	26.3
125	25.1	
160	28.8	
200	28.9	31.1
250	31.4	
315	35.2	
400	36.8	38.5
500	39.0	
630	40.8	
800	42.6	44.1
1000	44.5	
1250	45.8	
1600	46.3	47.0
2000	47.0	
2500	47.6	
3150	47.3	48.0
4000	47.8	
5000	49.0	
6300+	50.5	52.1
8000+	51.9 *	
10000+	55.1 #	
Average 100-3150	38.3	



Rating according to BS EN ISO 717-1:1997

Rw(C;Ctr)= **42 (-1;-5)** dB

Notes : * designates measurement corrected for background

designates limit of measurement due to background

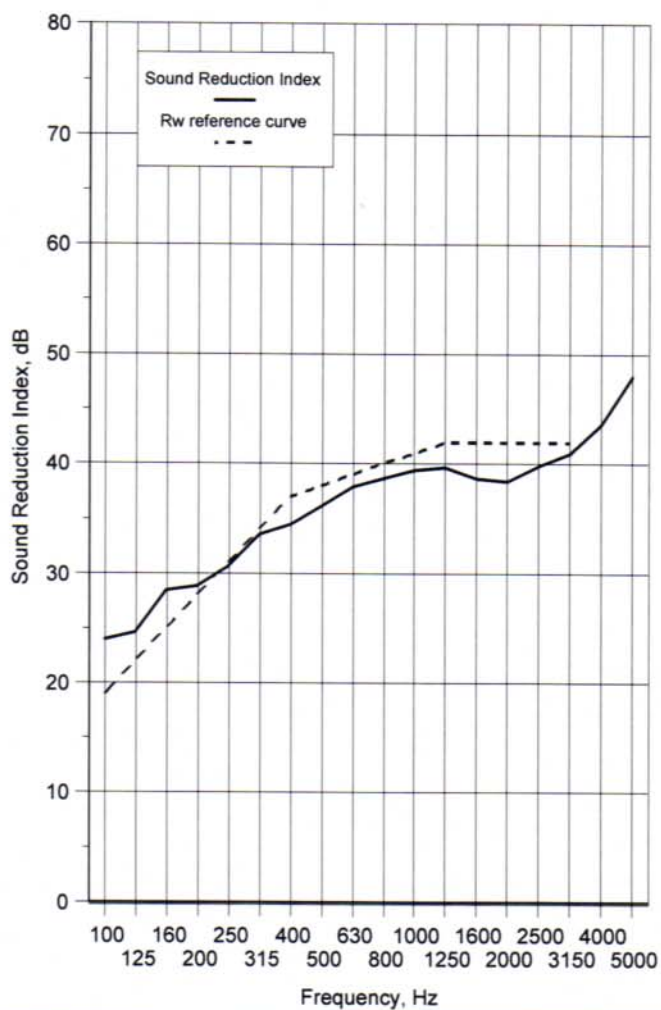
+ designates frequency beyond standard and not UKAS accredited

v1.6

Data Sheet 16

Test Number :	18	Air temperature:	12.1 °C
Client:	Lorient	Air humidity:	84 %
Test Date:	04/11/2008	Receiving room volume:	300 m ³
Sample height:	2.19 m	Source room volume:	115 m ³
Sample width:	1.01 m	Sample weight:	28.2 kg/m ²
Product	44 S2 door + 7mm pyrodur glass		
Identification:	Fully caulked		

Freq f Hz	Sound Reduction Index, dB	
	1/3 Oct	1/1 Oct
50+	29.5	21.0
63+	23.3	
80+	17.5	
100	23.9	25.3
125	24.6	
160	28.4	
200	28.8	30.6
250	30.6	
315	33.6	
400	34.5	35.9
500	36.1	
630	37.9	
800	38.7	39.3
1000	39.4	
1250	39.7	
1600	38.7	38.9
2000	38.4	
2500	39.8	
3150	41.0	43.4
4000	43.7	
5000	48.0	
6300+	51.1	52.2
8000+	52.2 *	
10000+	53.4 *	
Average 100-3150	34.6	



Rating according to BS EN ISO 717-1:1997

Rw(C;Ctr)= **38 (-1;-3)** dB

Notes : * designates measurement corrected for background

designates limit of measurement due to background

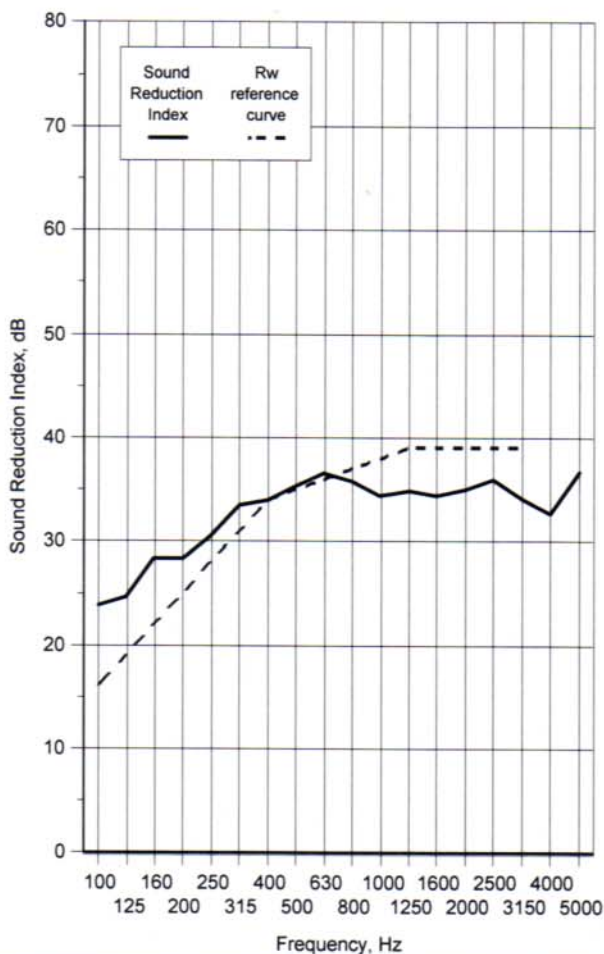
+ designates frequency beyond standard and not UKAS accredited

v1.6

Data Sheet 17

Test Number : 19
Client: Lorient
Test Date: 04/11/2008
Sample height: 2.19 m
Sample width: 1.01 m
Product 44 S2 door + 7mm pyrodur glass
Identification: Perimeter seals=Lorient DS Combined Acoustic, Smoke & Fire seal + IS1010 batwing - Threshold=IS8040 dropseal & IS4015 threshold plate
Air temperature: 12.1 °C
Air humidity: 84 %
Receiving room volume 300 m3
Source room volume: 115 m3
Sample weight: 28.2 kg/m2

Freq f Hz	Sound Reduction Index, dB	
	1/3 Oct	1/1 Oct
50+	27.7	20.6
63+	23.8	
80+	16.9	
100	23.8	25.2
125	24.6	
160	28.4	
200	28.4	30.3
250	30.5	
315	33.4	
400	33.9	35.1
500	35.3	
630	36.6	
800	35.8	35.0
1000	34.4	
1250	34.8	
1600	34.4	35.1
2000	35.0	
2500	35.9	
3150	34.1	34.2
4000	32.7	
5000	36.8	
6300+	40.1	42.2
8000+	42.3	
10000+	46.1 *	
Average 100-3150	32.5	



Rating according to BS EN ISO 717-1:1997

Rw(C;Ctr)= **35 (-1;-2)** dB

Notes * designates measurement corrected for background

designates limit of measurement due to background

+ designates frequency beyond standard and not UKAS accredited

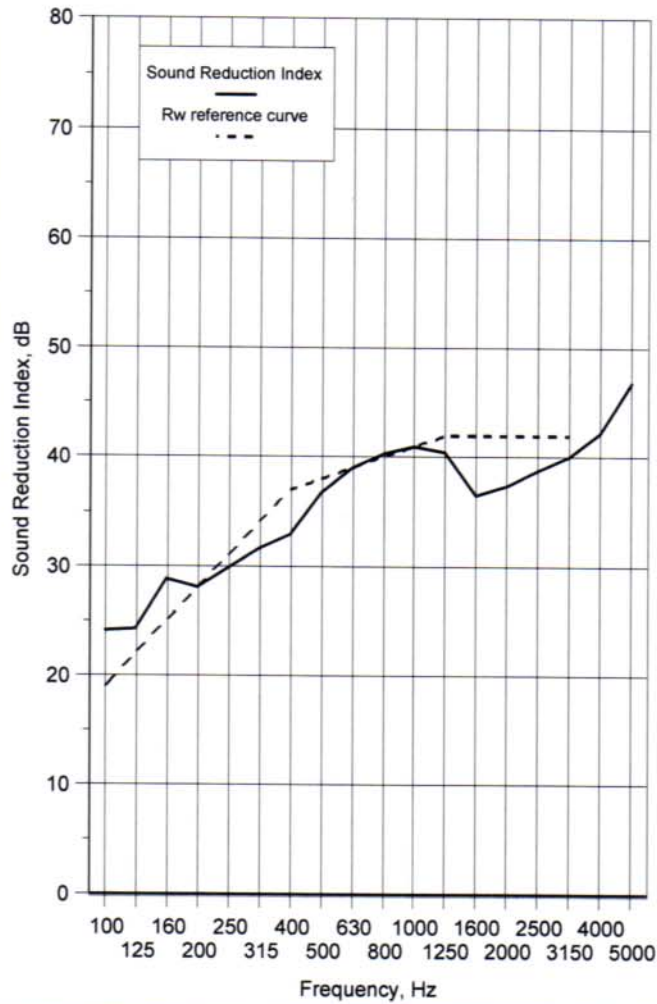
v1.6

Data Sheet 18

Test Number : 20
Client: Lorient
Test Date: 04/11/2008
Sample height: 2.19 m
Sample width: 1.01 m
Product 44 S2 door
Identification: fully caulked

Air temperature: 12.1 °C
Air humidity: 84 %
Receiving room volume: 300 m3
Source room volume: 115 m3
Sample weight: 29.9 kg/m2

Freq f Hz	Sound Reduction Index, dB	
	1/3 Oct	1/1 Oct
50+	26.7	21.2
63+	25.8	
80+	17.5	
100	24.1	25.2
125	24.2	
160	28.8	
200	28.1	29.6
250	29.8	
315	31.6	
400	32.9	35.5
500	36.8	
630	39.1	
800	40.3	40.6
1000	40.9	
1250	40.5	
1600	36.5	37.5
2000	37.4	
2500	38.8	
3150	40.0	42.2
4000	42.3	
5000	46.8	
6300+	50.6	52.3
8000+	52.5 *	
10000+	55.0 #	
Average 100-3150	34.4	



Rating according to BS EN ISO 717-1:1997

Rw(C;Ctr)= 38 (-1;-3) dB

Notes : * designates measurement corrected for background

designates limit of measurement due to background

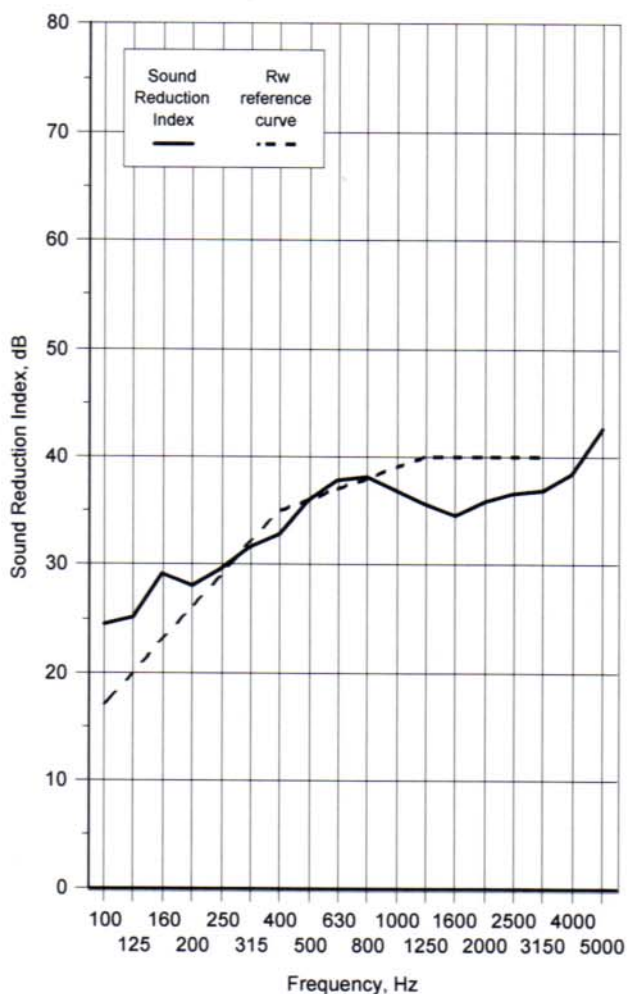
+ designates frequency beyond standard and not UKAS accredited

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Data Sheet 19

Test Number :	21	Air temperature :	12.1 °C
Client:	Lorient	Air humidity:	84 %
Test Date:	04/11/2008	Receiving room volume	300 m3
Sample height:	2.19 m	Source room volume:	115 m3
Sample width:	1.01 m	Sample weight:	29.9 kg/m2
Product	44 S2 door		
Identification:	Perimeter seals=Lorient DS Combined Acoustic, Smoke & Fire seal + IS1010 batwing - Threshold=IS8040 dropseal & IS4015 threshold plate		

Freq f Hz	Sound Reduction Index, dB	
	1/3 Oct	1/1 Oct
50+	25.0	21.4
63+	24.1	
80+	18.3	
100	24.4	25.8
125	25.1	
160	29.1	
200	28.1	29.5
250	29.6	
315	31.6	
400	32.8	35.0
500	35.9	
630	37.9	
800	38.2	36.8
1000	36.9	
1250	35.6	
1600	34.5	35.5
2000	35.8	
2500	36.6	
3150	36.9	38.7
4000	38.4	
5000	42.6	
6300+	46.4	47.6
8000+	47.6	
10000+	49.4 *	
Average 100-3150	33.1	



Rating according to BS EN ISO 717-1:1997

Rw(C;Ctr)= 36 (-1;-2) dB

Notes * designates measurement corrected for background

designates limit of measurement due to background

+ designates frequency beyond standard and not UKAS accredited

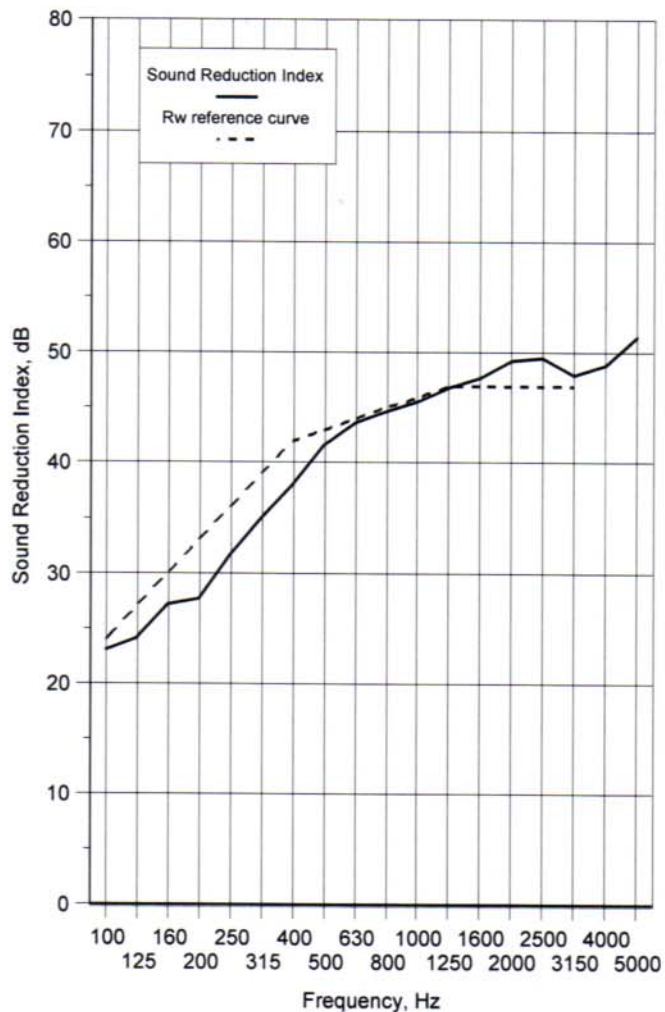
v1.6

Data Sheet 20

Test Number : 22
Client: Lorient
Test Date: 04/11/2008
Sample height: 2.19 m
Sample width: 1.01 m
Product 44 S3G door
Identification: Fully caulked

Air temperature: 12.1 °C
Air humidity: 84 %
Receiving room volume: 300 m3
Source room volume: 115 m3
Sample weight: 27.4 kg/m2

Freq f Hz	Sound Reduction Index, dB	
	1/3 Oct	1/1 Oct
50+	24.0	19.9
63+	23.6	
80+	16.5	
100	23.1	24.5
125	24.1	
160	27.1	30.5
200	27.7	
250	31.6	
315	35.0	
400	38.0	
500	41.6	40.4
630	43.6	
800	44.7	45.6
1000	45.6	
1250	46.8	
1600	47.7	
2000	49.3	
2500	49.5	48.7
3150	48.0	
4000	48.9	49.2
5000	51.4	
6300+	53.3	
8000+	54.4	54.2
10000+	55.1	
Average 100-3150	39.0	



Rating according to BS EN ISO 717-1:1997

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

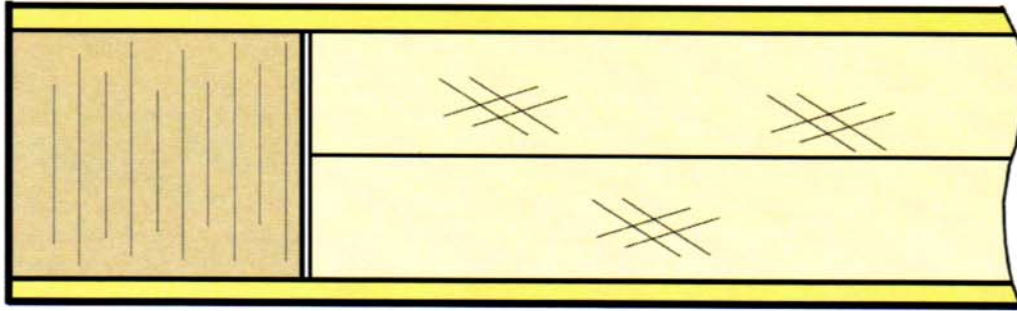
Notes : * designates measurement corrected for background

designates limit of measurement due to background

+ designates frequency beyond standard and not UKAS accredited

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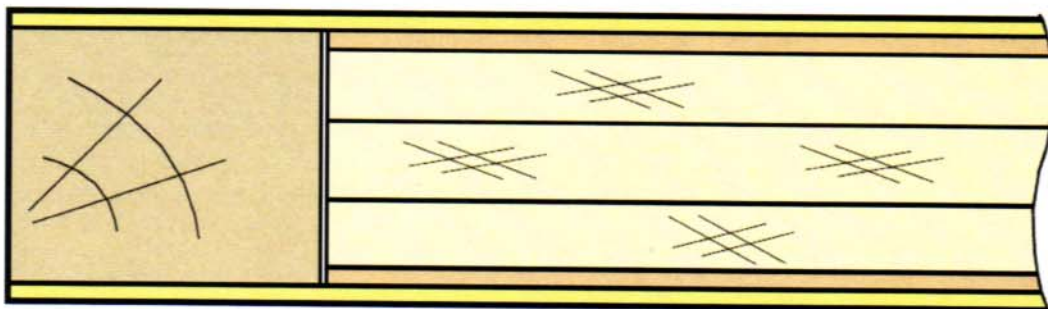
Drawing 1: S2 Doors



44 S2: consisting of:

- 2 layers of SAUERLAND 19 VL - 520 kg/m³

Drawing 2: S3K and S3G Doors



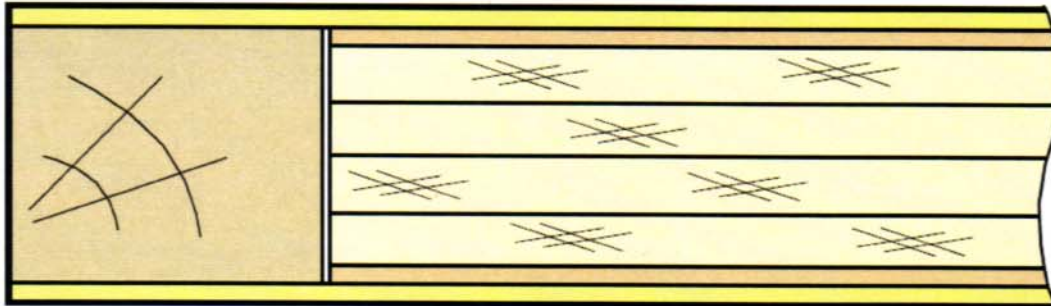
44 S3K: consisting of:

- 3 layers of SAUERLAND 10.6 VL - 560 kg/m³
- 2 layers of 3mm cork

44 S3G: consisting of:

- 3 layers of SAUERLAND 10.6 VL - 560 kg/m³
- 2 layers of 3mm rubber cork

Drawing 3: S4K and S4G Doors



54 S4K: consisting of:

- 2 layers of SAUERLAND 10.6 VL - 560 kg/m³ - outer layers
- 2 layers of SAUERLAND 10.6 VV - 630 kg/m³ - centre layers
- 2 layers of 3mm cork

54 S4G: consisting of:

- 2 layers of SAUERLAND 10.6 VL - 560 kg/m³ - outer layers
- 2 layers of SAUERLAND 10.6 VV - 630 kg/m³ - centre layers
- 2 layers of 3mm rubber cork

Appendix 1

Test Procedure

Measurement of Sound Transmission in accordance with BS EN ISO 140-3 : 1995 - TP15

In the laboratory, airborne sound transmission is determined from the difference in sound pressure levels measured across a test sample installed between two reverberant rooms. The difference in measured sound pressure levels is corrected for the amount of absorption in the receiving room. The test is done under conditions which restrict the transmission of sound by paths other than directly through the sample. The source sound field is randomly incident on the sample.

The test sample is located and sealed in an aperture within the brick dividing wall between the two rectangular reverberant (i.e. acoustically "live") room, both of which are constructed from 215mm brick with reinforced concrete floors and roofs. The brick wall has dimensions of 4.8m wide x 3.1m high and 550mm nominal thickness and forms the whole of the common area between the two rooms.

One of the rooms is used as the receiving room and has a volume of 300 cubic metres. It is isolated from the surrounding structure and the adjoining room by the use of resilient mountings and seals ensuring good acoustic isolation. The adjoining source room has a volume of 115 cubic metres.

Broad band noise is produced in the source room from an electronic generator, power amplifier and loudspeaker. The resulting sound pressure levels in both rooms are sampled using a microphone mounted on an oscillating boom and connected to a real time analyser. The signal is filtered into one third octave band widths, integrated and averaged. The value obtained at each frequency is known as the average sound pressure level for either the source or the receiving room. The change in level across the test sample is termed the sound pressure level difference, i.e.

$$D = L_1 - L_2$$

where

D is the equivalent Sound Pressure level difference in dB

L₁ is the equivalent Sound Pressure level in the source room in dB

L₂ is the equivalent Sound Pressure level in the receiving room in dB

SRL

The Sound Reduction Index (R) also known by the American terminology Sound Transmission Loss, is defined as the number of decibels by which sound energy randomly incident on the test sample, is reduced in transmitting through it and is given by the formula:

$$R = D + 10 \log_{10} \frac{S}{A} \dots \text{in decibels}$$

where

S is the area of the sample

A is the total absorption in the receiving room

both dimensions being in consistent units

The Sound Reduction Index is an expression of the laboratory sound transmission performance of a particular element or construction. It is a function of the mass, thickness, sealing method of mounting etc. and is independent of the overall area of the sample.

However, when an example of this construction is installed on site, the sound insulation obtained will depend upon its surface area, as well as the absorption in the receiving room. The larger the area the greater the sound energy transmitted. Also, the overall sound insulation is affected by the sound transmission through other building elements, some of which may have an inferior performance to the sample tested. In practice, therefore, the potential sound reduction index of a construction is not fully realised on site. Furthermore, the sound reduction index of a particular sample of that construction can only be measured accurately in a laboratory, because only under such controlled conditions can the sound transmission path be limited to the sample under test.

R_w , C and C_{tr} have been calculated in accordance with the relevant section of BS EN ISO 717-1 :1997 from the results of laboratory tests carried out in accordance with BS EN ISO 140-3 : 1995.

Appendix 2

Measurement Uncertainty BS EN ISO 140-3:1995 - TP15

The following values of uncertainty are based on a standard uncertainty multiplied by a coverage factor of $k = 2$, which provides a level of confidence of approximately 95%.

Frequency, Hz	Uncertainty, \pm dB
100	2.6
125	2.4
160	2.1
200	2.1
250	1.5
315	1.5
400	1.2
500	1.2
800	1.0
1000	1.0
1250	1.0
1600	1.0
2000	1.0
2500	1.0
3150	1.0