



Technical Report

*Laboratory measurement of sound insulation of doorsets in accordance with
BS EN ISO 10140-2:2010*

Report:	SAUER/AFDSL1415042014
Prepared for:	Sauerland and Acoustic & Fire Door Solutions Ltd
Date:	14 th & 15 th April 2014
Conducted by:	Dunstan Ferris, Technical Consultant

CONFIDENTIAL

1.0 Testing & Technical Services centre

Our dedicated Testing and Technical Services Centre hosts an indicative fire test furnace, many cycling rigs, air and smoke leakage testing equipment, environmental chambers, as well as a state of the art, purpose-built acoustic transmission suite. The facilities are supported by experienced technicians and technical consultants who are equipped with extensive and diverse knowledge of regulations, products and processes related to acoustic, smoke and fire containment. The facilities are available for a range of activities including experimental work, testing prototypes, new development or redevelopment projects.

Our Technical and Testing Services team work closely with you throughout the whole process; from the construction of the test specimens to the submission of a final test report. And with well over 30 years' accumulated knowledge and industry experience; we're well equipped to guide you through the maze of current regulations to ensure that your products receive certification quickly and cost-effectively.

We are committed to offering a professional service that offers complete confidentiality so you can be confident that any testing will be treated with the utmost discretion.

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Contents

1.0	Introduction	2
2.0	Purpose of test	4
2.1	Testing details	4
2.2	Instrumentation used	4
2.3	Test specimen	5
2.4	Test procedure	5
2.5	Limitations & parameters	6
3.0	Results summary and Data	7 - 21
5.0	Photos of test samples	22 - 26
6.0	Drawings	27 - 39

2.1 Purpose of test

To determine the sound reduction index of various doorsets in accordance with BS EN ISO 10140-2:2010. Laboratory measurement of sound insulation of building elements -- Part 2: Measurement of airborne sound insulation.

The results from these measurements are presented in tables and graphs within this document. The results are given in 1/3rd octave bands over the frequency range 100Hz to 3150Hz.

Dunstan Ferris, Technical Consultant
 For and on behalf of Lorient Testing & Technical Facilities

2.2 Testing details

- < The doorsets were supplied by **Sauerland and Acoustic & Fire Door Solutions Ltd** and installed by **Lorient Testing & Technical Services**.
- < The measurements recorded were made between **14th & 15th April 2014**.
- < Recorded by **Dunstan Ferris, Lorient Testing & Technical Services**, Unit 19, Wentworth Road, Newton Abbot, Devon, TQ12 FRR.

2.3 Instrumentation used

Instrument type	Make/model	Serial No.
Sound Level Meter	B&K Type 2270	2746609
Acoustic Calibrator	B&K Type 4231	2734238
Microphone (Source room)	B&K Type 4189	2748682
Microphone (Receiver room)	B&K Type 4189	2643376
Pre-amplifier (Source room)	B&K Type ZC0032	15937
Pre-amplifier (Receiver room)	B&K Type 2669	2709246
Omnipower Speaker	B&K Type 4292-L	007012
Power Amplifier	B&K Typer 2734	012010

Lorient Testing & Technical Services

2.4 Test specimen

Door type:	Double Leaf Doorsets - Trisound S3K, S3D and S4G manufactured in accordance with the relevant AFDS Ltd Method Statements.
Frame dimensions:	1990mm wide x 2190mm high x 90mm
Leaf dimensions:	940mm wide x 2127mm high

2.5 Test procedure

Airborne sound insulation test

- < An OmniPower speaker was placed in the corner of the source room at speaker position one and speaker position two.
- < The sound level meter was calibrated prior to testing.
- < Five measurements were taken in the source room, at fixed positions at speaker position one and speaker position two.
- < Five measurements were taken in the receive room, at fixed positions at speaker position one and speaker position two.
- < Background measurements were taken at each third octave frequency between 100Hz and 3150Hz.
- < 6 reverberation measurements were taken in the receive room, in accordance with BS EN ISO 3382-2:2008 interrupted, engineering method.
- < Calculations, including C&Ctr, were carried out in accordance with BS EN ISO717-1
- < The sound reduction index was calculated using the following formula from BS EN ISO 10140-2:2010:

$$R_w = L_1 - L_2 + 10 \log \left(\frac{S}{A} \right) \text{ dB}$$

Where:

L1 is the logarithmic average of the source room measurements.

L2 is the logarithmic average of the receive room measurements.

S is the area of the test specimen.

A is the equivalent absorption area, where $A = \frac{0.16V}{T}$

V = The volume of the receive room.

T = The reverberation time measured in seconds.

1. Logarithmic average of 5 Measurements at speaker position one and speaker position two. (L1 & L2)
2. L1 – L2 (L1 level minus L2 level).
3. Area of test specimen (S) divided by equivalent sound absorption area (A).
4. Weighted final result R_w dB

2.6 Limitations and parameters

The test fulfilled all criteria required of ISO 10140-2, including;

- < Sound level meter (microphone) was located as required.
- < Sound source (loudspeaker) was located as required.
- < T20 Reverberation time measurements were used and could be represented by a straight line.
- < Background noise measurements were more than 10 dB below L2 measurements.
- < Temperature was reported within +/- 0.1deg C.
- < Barometric pressure was reported to within +/- 0.01 Mbar (+-1 Pa).
- < Humidity was reported to within +/- 1%.
- < R_{max} of the test chambers was measured to be R_w 80 dB
- < Source room volume : 68.40m³.
- < Receiving room volume : 50.00m³.

2.7 Personnel present

Dunstan Ferris	Lorient Polyproducts
Martin Hooley	Lorient Polyproducts
Chris Gough	Door consulting

3.0 Results summary and Data

Test No.	Product Identification	Results R_w
140414 001	57mm S3D pair of doors in a hardwood frame. Fully-caulked.	R_w 39 dB
140414 002	57mm S3D pair of doors in a hardwood frame. LAS1212 to jamb and head stops. LP1504DS to jambs and head (interrupted at hinges). Two rows of LP1004DS at meeting stile (bypassing latch). LAS4014si threshold plate. LAS8001si to the bottom of both doors.	R_w 39 dB
140414 003	57mm S3D pair of doors in a hardwood frame. LAS1212 to jamb and head stops. LP1504DS to jambs and head (interrupted at hinges). Two rows of LP1004DS at meeting stile (bypassing latch). LAS4014si threshold plate. LAS8001si to the bottom of both doors. Doors conditioned.	R_w 39 dB
140414 004	54mm S3K pair of doors in a hardwood frame. Fully-caulked.	R_w 40 dB
140414 005	54mm S3K pair of doors in a hardwood frame. Fully-caulked. Doors conditioned.	R_w 41 dB
140414 006	54mm S3K pair of doors in a hardwood frame. LAS1212 to jamb and head stops. LP1504DS to jambs and head (interrupted at hinges). Two rows of LP1004DS at meeting stile (bypassing latch). LAS4014si threshold plate. LAS8001si to the bottom of both doors.	R_w 39 dB
140414 007	54mm S3K pair of doors in a hardwood frame. LAS1212 to jamb and head stops. LP1504DS to jambs and head (interrupted at hinges). Two rows of LP1004DS at meeting stile (bypassing latch). LAS4014si threshold plate. LAS8001si to the bottom of both doors. Doors conditioned.	R_w 40 dB

Test No.	Product Identification	Results R_w
140414 008	54mm S3K pair of doors in a hardwood frame. LAS1212 to jamb and head stops. LP1504DS to jambs and head (interrupted at hinges). Two rows of LP1004DS at meeting stile (bypassing latch). LAS4014si threshold plate. LAS8001si to the bottom of both doors. Seals adjusted	R_w 40 dB
140415 001	54mm S4G pair of doors in a hardwood frame. Fully-caulked.	R_w 41 dB
140415 002	54mm S4G pair of doors in a hardwood frame. Fully-caulked. Doors conditioned.	R_w 41 dB
140415 003	54mm S4G pair of doors in a hardwood frame. LAS1212 to jamb and head stops. LP1504DS to jambs and head (interrupted at hinges). Two rows of LP1004DS at meeting stile (bypassing latch). LAS4014si threshold plate. LAS8001si to the bottom of both doors.	R_w 38 dB
140415 004	54mm S4G pair of doors in a hardwood frame. LAS1212 to jamb and head stops. LP1504DS to jambs and head (interrupted at hinges). Two rows of LP1004DS at meeting stile (bypassing latch). LAS4014si threshold plate. LAS8001si to the bottom of both doors. Adjustment made to meeting stile due to misalignment.	R_w 40 dB
140415 005	54mm S4G pair of doors in a hardwood frame. LAS1212 to jamb and head stops. LAS1011 to jambs and head (interrupted at hinges). Two rows of LAS1011 at meeting stile (bypassing latch). LAS4014si threshold plate. LAS8001si to the bottom of both doors.	R_w 40 dB

Acoustic performance of doorsets – tested in accordance with BS EN ISO 10140-2: 2010

57mm S3D pair of doors in a hardwood frame. Fully-caulked.

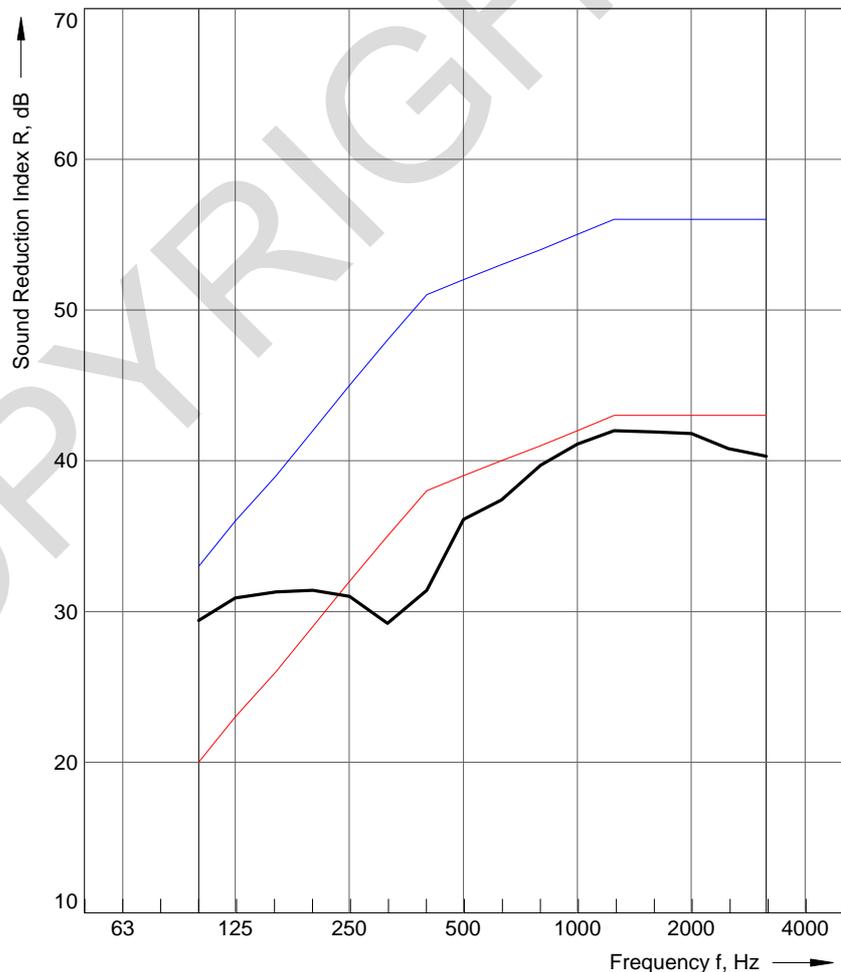
Test Date: 14/04/2014
Test Number: 140414 001

Test specimen installed by: Lorient Testing & Technical Services
Test room temperature: 18.3°C
Test room static pressure: 1035hpa
Test room relative humidity: 49%

Area S of test element: 4.40m²
Source room volume: 68.40m³
Receiving room volume: 50.00m³
Sample mass per unit area: 35.31kg/m²

— Sound reduction index (R) dB
 — Curve of reference values (EN ISO 717-1:1996)

Frequency f Hz	R 1/3 Octave dB
50	
63	
80	
100	29.4
125	30.9
160	31.3
200	31.4
250	31.0
315	29.2
400	31.4
500	36.1
630	37.4
800	39.7
1000	41.1
1250	42.0
1600	41.9
2000	41.8
2500	40.8
3150	40.3
4000	
5000	



Rating according to ISO 717-1

$$R_w (C; C_{tr}) = 39 (-1; -3) \text{ dB}$$

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

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

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



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Acoustic performance of doorsets – tested in accordance with BS EN ISO 10140-2: 2010

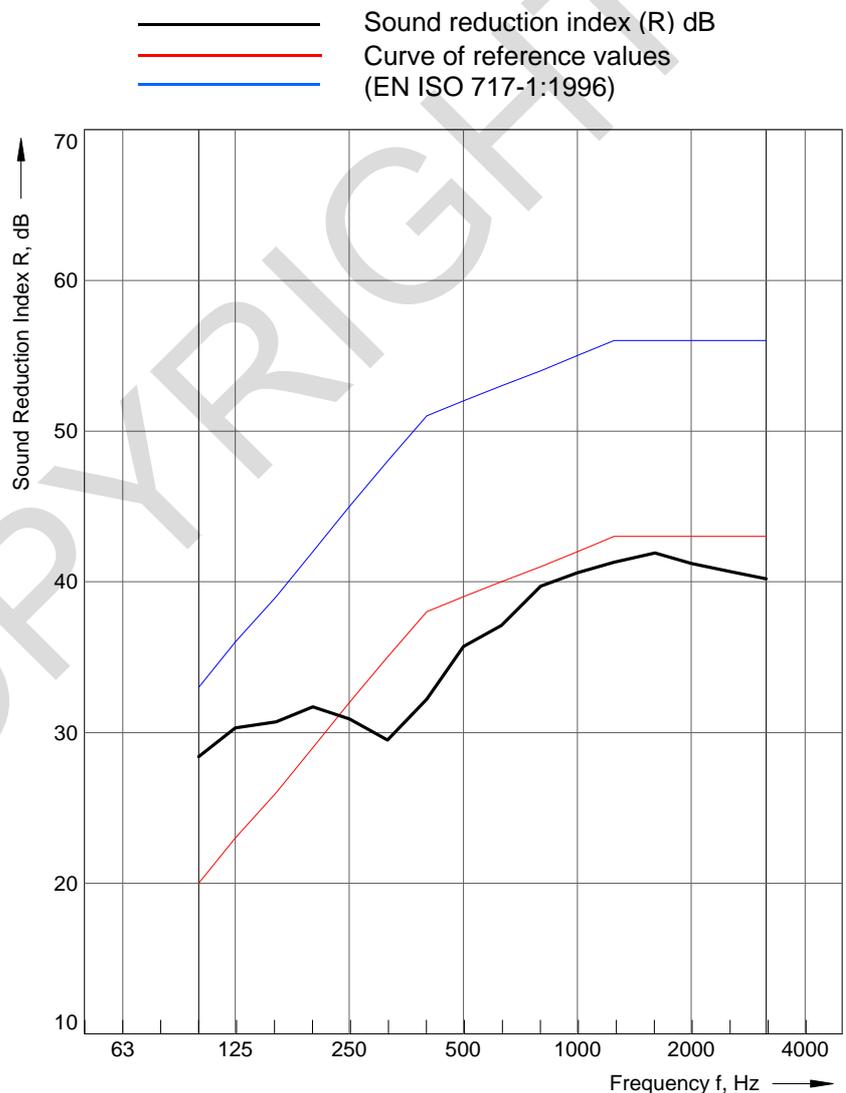
57mm S3D pair of doors in a hardwood frame. LAS1212 to jamb and head stops. LP1504DS to jambs and head (interrupted at hinges). Two rows of LP1004DS at meeting stile (bypassing latch). LAS4014si threshold plate. LAS8001si to the bottom of both doors.

Test Date: 14/04/2014
Test Number: 140414 002

Test specimen installed by: Lorient Testing & Technical Services
Test room temperature: 18.6°C
Test room static pressure: 1035hpa
Test room relative humidity: 49%

Area S of test element: 4.40m²
Source room volume: 68.40m³
Receiving room volume: 50.00m³
Sample mass per unit area: 35.31kg/m²

Frequency f Hz	R 1/3 Octave dB
50 63 80	
100	28.4
125	30.3
160	30.7
200	31.7
250	30.9
315	29.5
400	32.2
500	35.7
630	37.1
800	39.7
1000	40.6
1250	41.3
1600	41.9
2000	41.2
2500	40.7
3150	40.2
4000	
5000	



Rating according to ISO 717-1

$R_w (C; C_{tr}) = 39 (-1; -3) \text{ dB}$ $C_{50-3150} = \text{N/A dB}; C_{50-5000} = \text{N/A dB}; C_{100-5000} = \text{N/A dB};$
 Evaluation based on laboratory measurement results obtained in one-third-octave bands by an engineering method $C_{tr,50-3150} = \text{N/A dB}; C_{tr,50-5000} = \text{N/A dB}; C_{tr,100-5000} = \text{N/A dB};$



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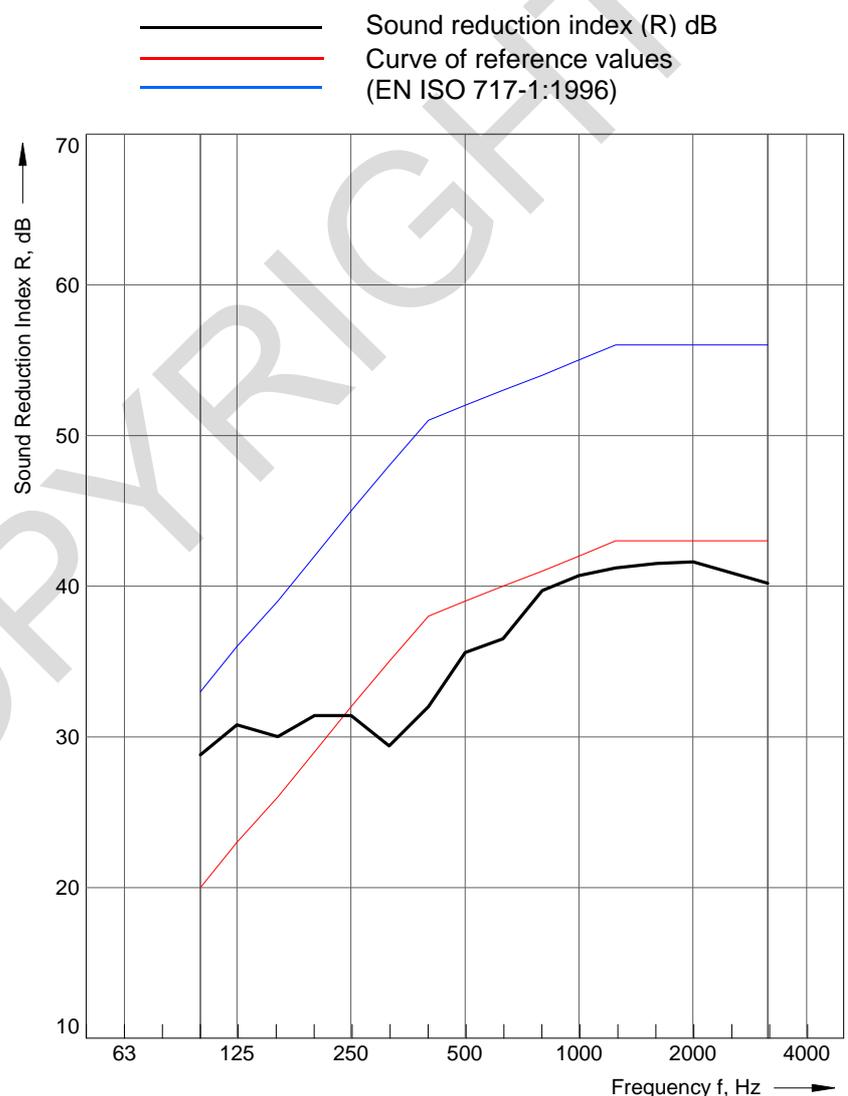
57mm S3D pair of doors in a hardwood frame. LAS1212 to jamb and head stops. LP1504DS to jambs and head (interrupted at hinges). Two rows of LP1004DS at meeting stile (bypassing latch). LAS4014si threshold plate. LAS8001si to the bottom of both doors.

Test Date: 14/04/2014
Test Number: 140414 003

Test specimen installed by: Lorient Testing & Technical Services
Test room temperature: 18.6°C
Test room static pressure: 1035hpa
Test room relative humidity: 48%

Area S of test element: 4.40m²
Source room volume: 68.40m³
Receiving room volume: 50.00m³
Sample mass per unit area: 35.31kg/m²

Frequency f Hz	R 1/3 Octave dB
50	
63	
80	
100	28.8
125	30.8
160	30.0
200	31.4
250	31.4
315	29.4
400	32.0
500	35.6
630	36.5
800	39.7
1000	40.7
1250	41.2
1600	41.5
2000	41.6
2500	40.9
3150	40.2
4000	
5000	



Rating according to ISO 717-1			
$R_w (C; C_{tr}) = 39 (-1; -3) \text{ dB}$	$C_{50-3150} = \text{N/A dB}$	$C_{50-5000} = \text{N/A dB}$	$C_{100-5000} = \text{N/A dB}$
Evaluation based on laboratory measurement results obtained in one-third-octave bands by an engineering method	$C_{tr,50-3150} = \text{N/A dB}$	$C_{tr,50-5000} = \text{N/A dB}$	$C_{tr,100-5000} = \text{N/A dB}$



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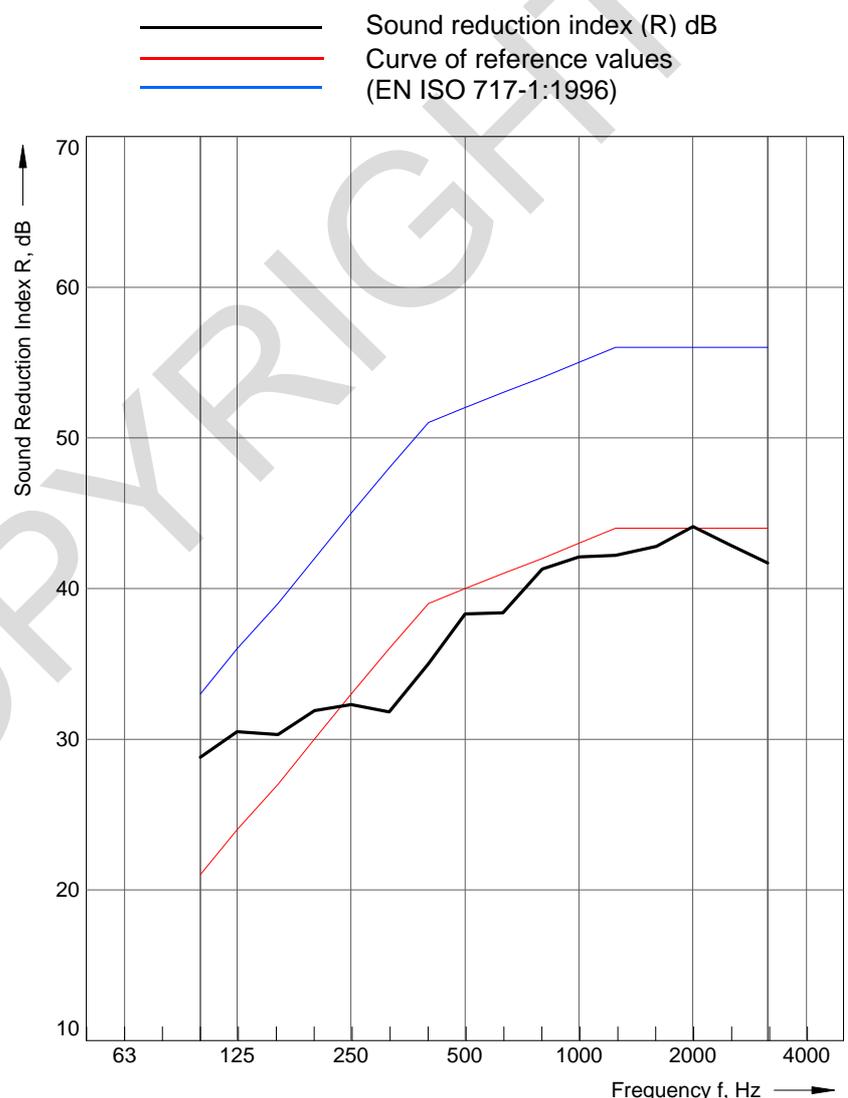
54mm S3K pair of doors in a hardwood frame. Fully-caulked.

Test Date: 14/04/2014
Test Number: 140414 004

Test specimen installed by: Lorient Testing & Technical Services
Test room temperature: 18.6°C
Test room static pressure: 1035hpa
Test room relative humidity: 48%

Area S of test element: 4.40m²
Source room volume: 68.40m³
Receiving room volume: 50.00m³
Sample mass per unit area: 33.26kg/m²

Frequency f Hz	R 1/3 Octave dB
50	
63	
80	
100	28.8
125	30.5
160	30.3
200	31.9
250	32.3
315	31.8
400	35.0
500	38.3
630	38.4
800	41.3
1000	42.1
1250	42.2
1600	42.8
2000	44.1
2500	42.9
3150	41.7
4000	
5000	



Rating according to ISO 717-1

$R_w (C; C_{tr}) = 40 (0; -2) \text{ dB}$

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

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



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54mm S3K pair of doors in a hardwood frame. Fully-caulked.
Doors conditioned.

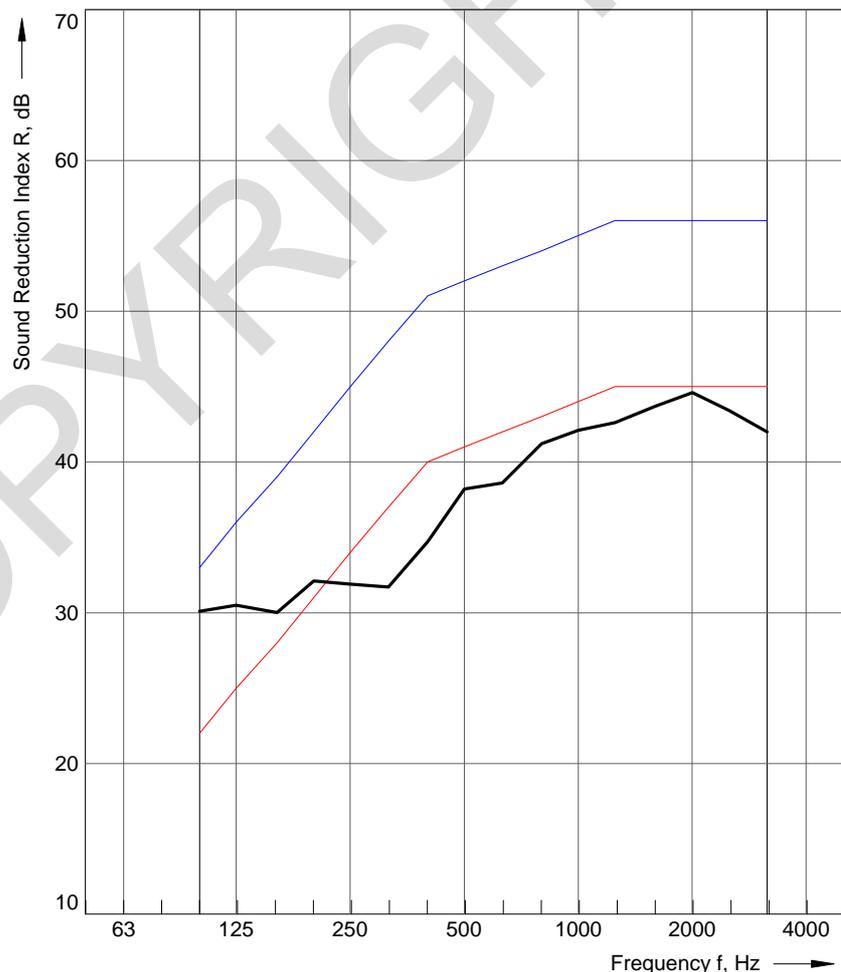
Test Date: 14/04/2014
Test Number: 140414 005

Test specimen installed by: Lorient Testing & Technical Services
Test room temperature: 19.0°C
Test room static pressure: 1035hpa
Test room relative humidity: 40%

Area S of test element: 4.40m²
Source room volume: 68.40m³
Receiving room volume: 50.00m³
Sample mass per unit area: 33.26kg/m²

— Sound reduction index (R) dB
— Curve of reference values (EN ISO 717-1:1996)

Frequency f Hz	R 1/3 Octave dB
50	
63	
80	
100	30.1
125	30.5
160	30.0
200	32.1
250	31.9
315	31.7
400	34.7
500	38.2
630	38.6
800	41.2
1000	42.1
1250	42.6
1600	43.7
2000	44.6
2500	43.4
3150	42.0
4000	
5000	



Rating according to ISO 717-1

$R_w (C; C_{tr}) = 41 (-1; -3) \text{ dB}$

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

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

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



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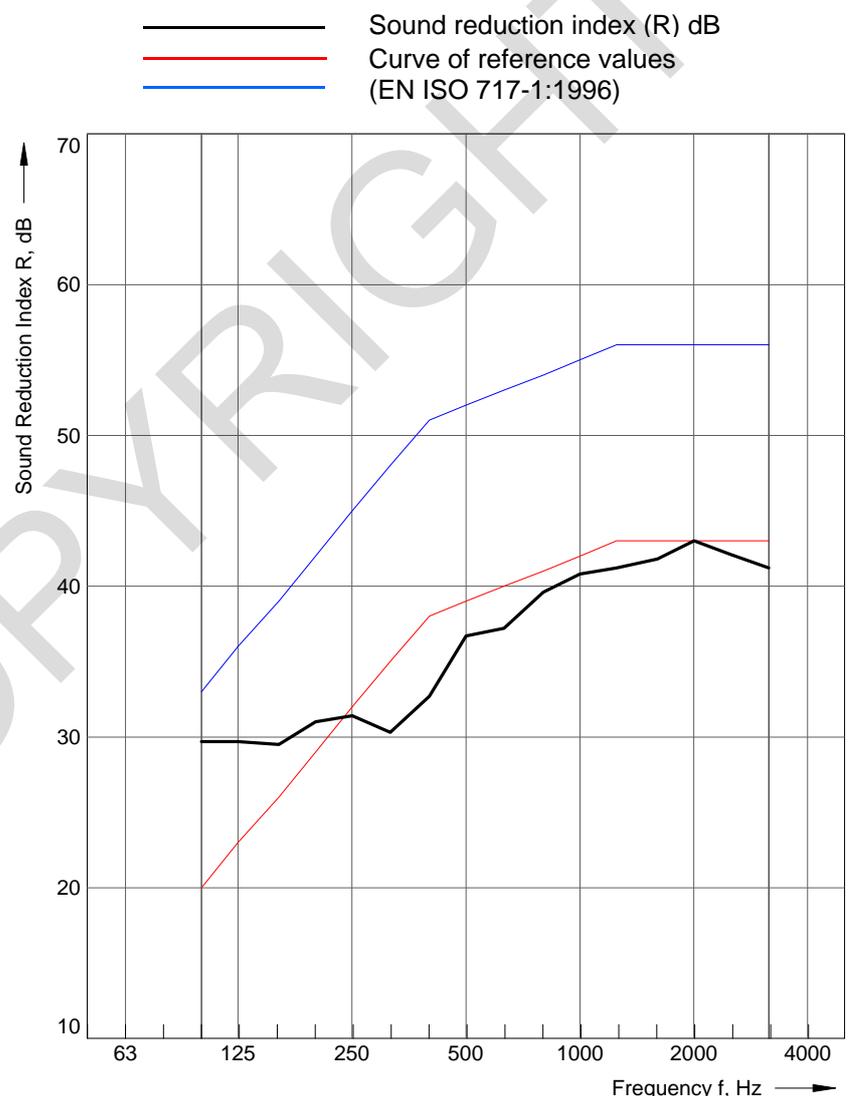
54mm S3K pair of doors in a hardwood frame. LAS1212 to jamb and head stops. LP1504DS to jambs and head (interrupted at hinges). Two rows of LP1004DS at meeting stile (bypassing latch). LAS4014si threshold plate. LAS8001si to the bottom of both doors.

Test Date: 14/04/2014
Test Number: 140414 006

Test specimen installed by: Lorient Testing & Technical Services
Test room temperature: 19.2°C
Test room static pressure: 1035hpa
Test room relative humidity: 40%

Area S of test element: 4.40m²
Source room volume: 68.40m³
Receiving room volume: 50.00m³
Sample mass per unit area: 33.26kg/m²

Frequency f Hz	R 1/3 Octave dB
50	
63	
80	
100	29.7
125	29.7
160	29.5
200	31.0
250	31.4
315	30.3
400	32.7
500	36.7
630	37.2
800	39.6
1000	40.8
1250	41.2
1600	41.8
2000	43.0
2500	42.1
3150	41.2
4000	
5000	



Rating according to ISO 717-1

$R_w (C; C_{tr}) = 39 (0; -3) \text{ dB}$

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

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



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54mm S3K pair of doors in a hardwood frame. LAS1212 to jamb and head stops. LP1504DS to jambs and head (interrupted at hinges). Two rows of LP1004DS at meeting stile (bypassing latch). LAS4014si threshold plate. LAS8001si to the bottom of both doors.

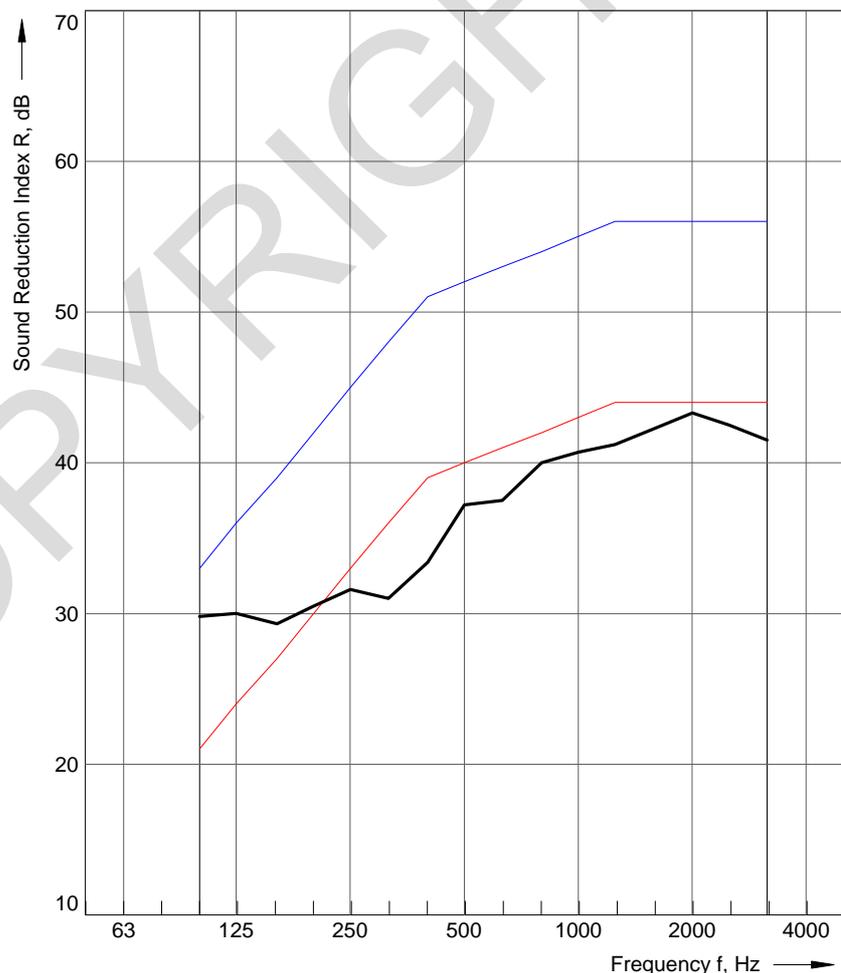
Test Date: 14/04/2014
Test Number: 140414 007

Test specimen installed by: Lorient Testing & Technical Services
Test room temperature: 19.3°C
Test room static pressure: 1035hpa
Test room relative humidity: 40%

Area S of test element: 4.40m²
Source room volume: 68.40m³
Receiving room volume: 50.00m³
Sample mass per unit area: 33.26kg/m²

— Sound reduction index (R) dB
 — Curve of reference values (EN ISO 717-1:1996)

Frequency f Hz	R 1/3 Octave dB
50	
63	
80	
100	29.8
125	30.0
160	29.3
200	30.5
250	31.6
315	31.0
400	33.4
500	37.2
630	37.5
800	40.0
1000	40.7
1250	41.2
1600	42.3
2000	43.3
2500	42.5
3150	41.5
4000	
5000	



Rating according to ISO 717-1

$R_w (C; C_{tr}) = 40 (-1; -3) \text{ dB}$ $C_{50-3150} = \text{N/A dB}; C_{50-5000} = \text{N/A dB}; C_{100-5000} = \text{N/A dB};$

Evaluation based on laboratory measurement results obtained in one-third-octave bands by an engineering method $C_{tr,50-3150} = \text{N/A dB}; C_{tr,50-5000} = \text{N/A dB}; C_{tr,100-5000} = \text{N/A dB};$



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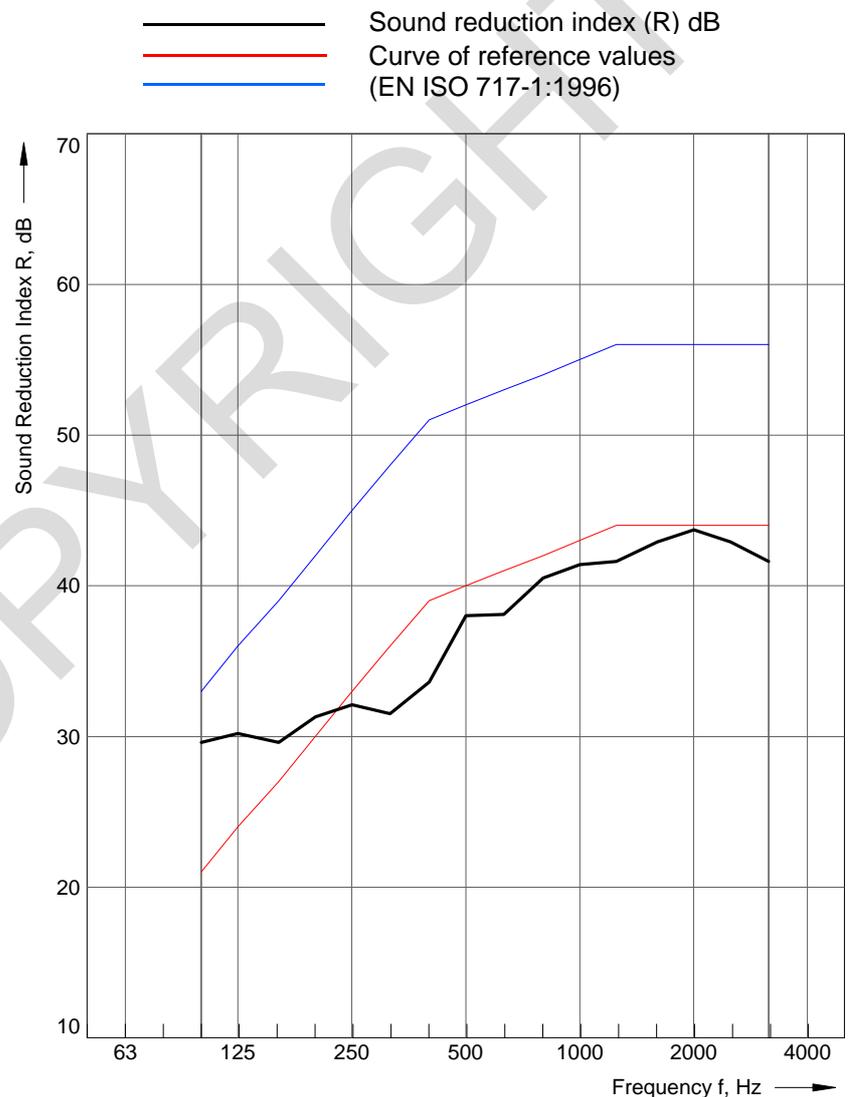
54mm S3K pair of doors in a hardwood frame. LAS1212 to jamb and head stops. LP1504DS to jambs and head (interrupted at hinges). Two rows of LP1004DS at meeting stile (bypassing latch). LAS4014si threshold plate. LAS8001si to the bottom of both doors.

Test Date: 14/04/2014
Test Number: 140414 008

Test specimen installed by: Lorient Testing & Technical Services
Test room temperature: 19.7°C
Test room static pressure: 1035hpa
Test room relative humidity: 41%

Area S of test element: 4.40m²
Source room volume: 68.40m³
Receiving room volume: 50.00m³
Sample mass per unit area: 33.26kg/m²

Frequency f Hz	R 1/3 Octave dB
50	
63	
80	
100	29.6
125	30.2
160	29.6
200	31.3
250	32.1
315	31.5
400	33.6
500	38.0
630	38.1
800	40.5
1000	41.4
1250	41.6
1600	42.9
2000	43.7
2500	42.9
3150	41.6
4000	
5000	



Rating according to ISO 717-1

$R_w (C; C_{tr}) = 40 (-1; -3) \text{ dB}$

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

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



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Acoustic performance of doorsets – tested in accordance with BS EN ISO 10140-2: 2010

54mm S4G pair of doors in a hardwood frame. Fully-caulked.

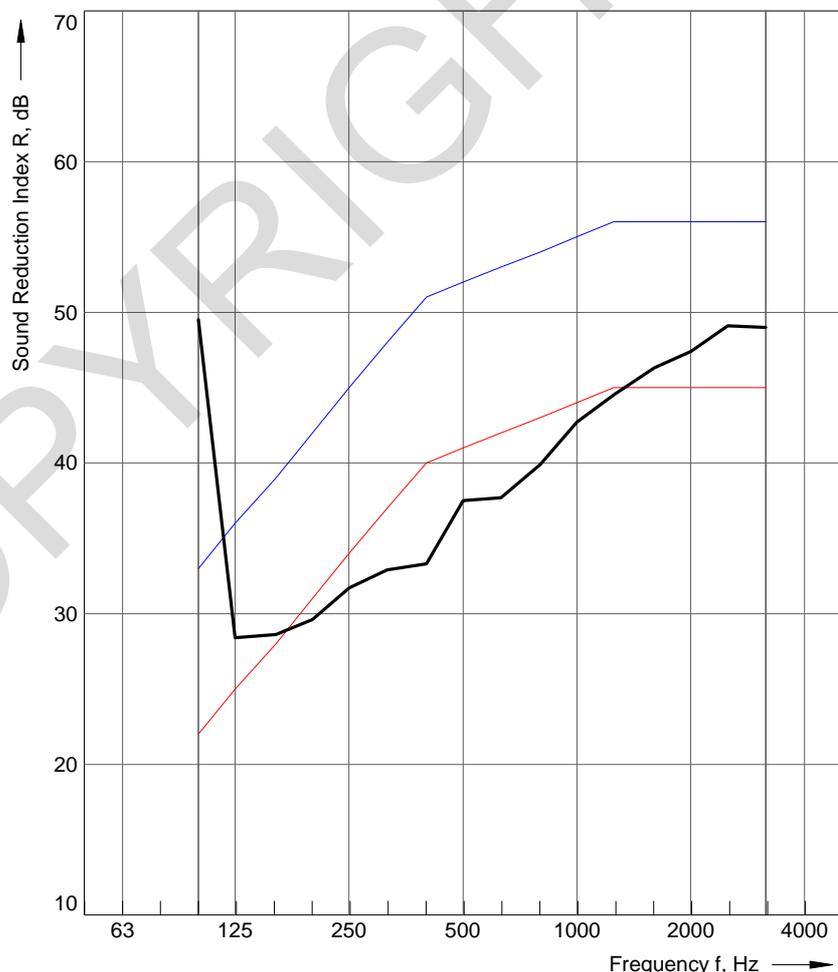
Test Date: 15/04/2014
Test Number: 140415 001

Test specimen installed by: Lorient Testing & Technical Services
Test room temperature: 18.5°C
Test room static pressure: 1036hpa
Test room relative humidity: 49%

Area S of test element: 4.40m²
Source room volume: 68.40m³
Receiving room volume: 50.00m³
Sample mass per unit area: 33.81kg/m²

— Sound reduction index (R) dB
 — Curve of reference values (EN ISO 717-1:1996)

Frequency f Hz	R 1/3 Octave dB
50	
63	
80	
100	49.5
125	28.4
160	28.6
200	29.6
250	31.7
315	32.9
400	33.3
500	37.5
630	37.7
800	39.9
1000	42.7
1250	44.5
1600	46.3
2000	47.4
2500	49.1
3150	49.0
4000	
5000	



Rating according to ISO 717-1

$$R_w (C; C_{tr}) = 41 (-1; -4) \text{ dB}$$

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

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

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



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Acoustic performance of doorsets – tested in accordance with BS EN ISO 10140-2: 2010

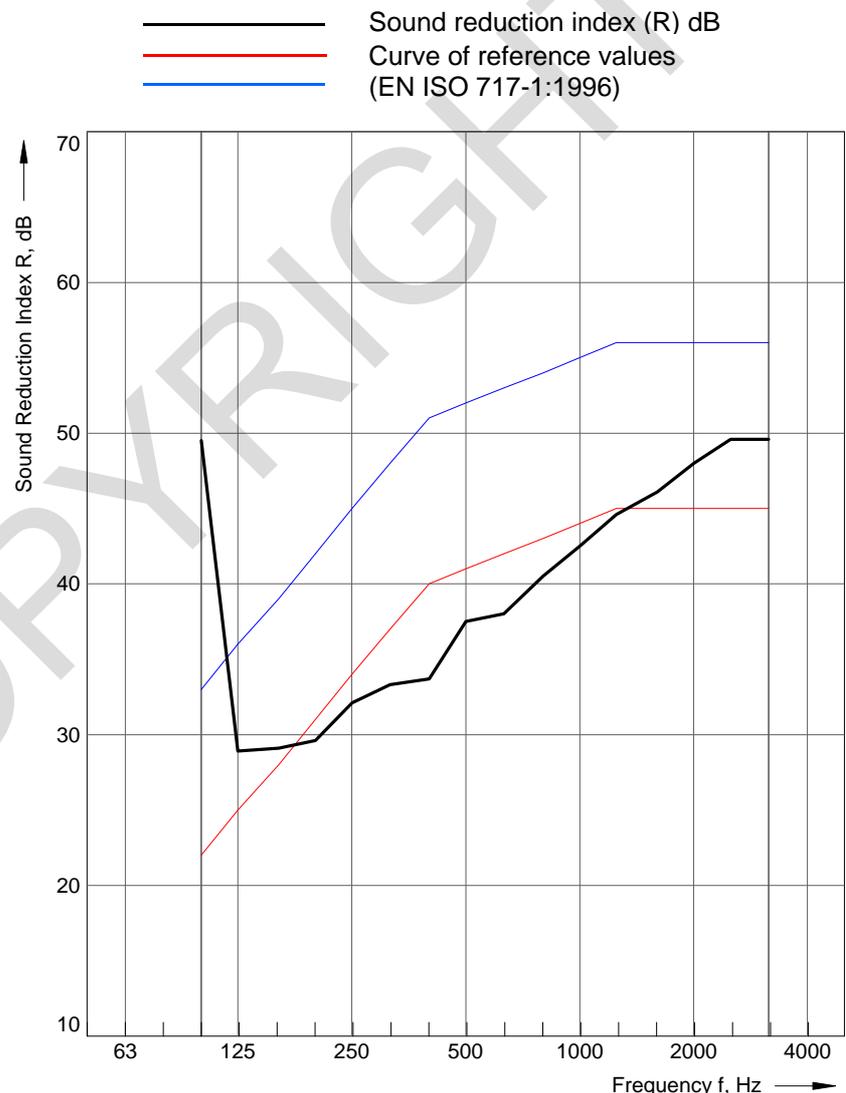
54mm S4G pair of doors in a hardwood frame. Fully-caulked.
Doors conditioned.

Test Date: 15/04/2014
Test Number: 140415 002

Test specimen installed by: Lorient Testing & Technical Services
Test room temperature: 18.6°C
Test room static pressure: 1036hpa
Test room relative humidity: 49%

Area S of test element: 4.40m²
Source room volume: 68.40m³
Receiving room volume: 50.00m³
Sample mass per unit area: 33.81kg/m²

Frequency f Hz	R 1/3 Octave dB
50	
63	
80	
100	49.5
125	28.9
160	29.1
200	29.6
250	32.1
315	33.3
400	33.7
500	37.5
630	38.0
800	40.5
1000	42.5
1250	44.6
1600	46.1
2000	48.0
2500	49.6
3150	49.6
4000	
5000	



Rating according to ISO 717-1

$R_w (C; C_{tr}) = 41 (-1; -3) \text{ dB}$

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

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



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Acoustic performance of doorsets – tested in accordance with BS EN ISO 10140-2: 2010

54mm S4G pair of doors in a hardwood frame. LAS1212 to jamb and head stops. LP1504DS to jambs and head (interrupted at hinges). Two rows of LP1004DS at meeting stile (bypassing latch). LAS4014si threshold plate. LAS8001si to the bottom of both doors.

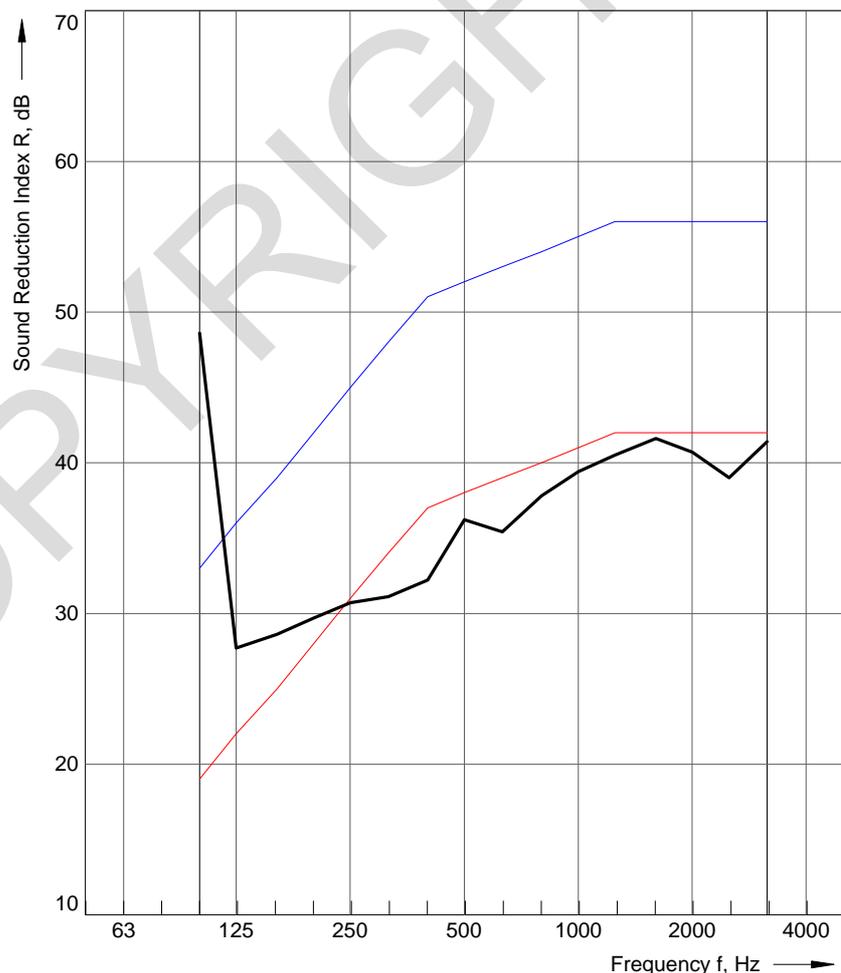
Test Date: 15/04/2014
Test Number: 140415 003

Test specimen installed by: Lorient Testing & Technical Services
Test room temperature: 18.8°C
Test room static pressure: 1037hpa
Test room relative humidity: 39%

Area S of test element: 4.40m²
Source room volume: 68.40m³
Receiving room volume: 50.00m³
Sample mass per unit area: 33.81kg/m²

— Sound reduction index (R) dB
 — Curve of reference values (EN ISO 717-1:1996)

Frequency f Hz	R 1/3 Octave dB
50	
63	
80	
100	48.6
125	27.7
160	28.6
200	29.7
250	30.7
315	31.1
400	32.2
500	36.2
630	35.4
800	37.8
1000	39.4
1250	40.5
1600	41.6
2000	40.7
2500	39.0
3150	41.4
4000	
5000	



Rating according to ISO 717-1

$R_w (C; C_{tr}) = 38 (0; -2) \text{ dB}$ $C_{50-3150} = \text{N/A dB}; C_{50-5000} = \text{N/A dB}; C_{100-5000} = \text{N/A dB};$

Evaluation based on laboratory measurement results obtained in one-third-octave bands by an engineering method $C_{tr,50-3150} = \text{N/A dB}; C_{tr,50-5000} = \text{N/A dB}; C_{tr,100-5000} = \text{N/A dB};$



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Acoustic performance of doorsets – tested in accordance with BS EN ISO 10140-2: 2010

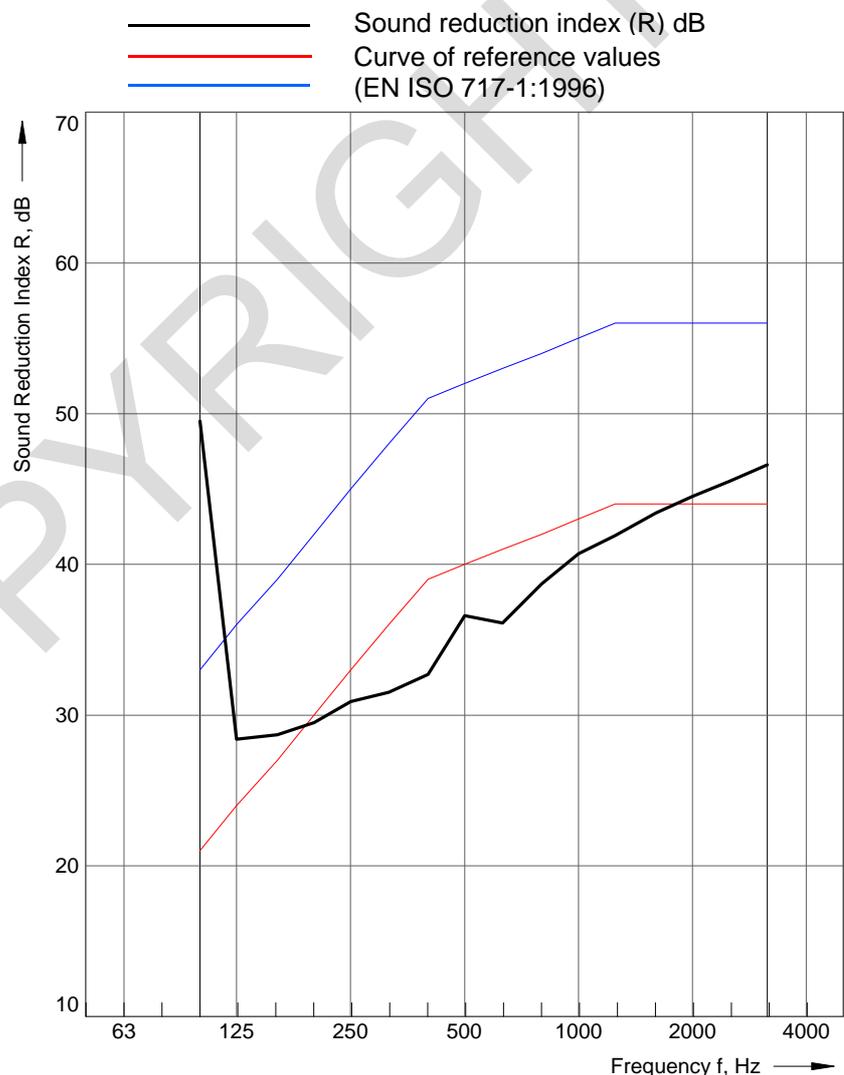
54mm S4G pair of doors in a hardwood frame. LAS1212 to jamb and head stops. LP1504DS to jambs and head (interrupted at hinges). Two rows of LP1004DS at meeting stile (bypassing latch). LAS4014si threshold plate. LAS8001si to the bottom of both doors. Adjustment made to meeting stile due to misalignment.

Test Date: 15/04/2014
Test Number: 140415 004

Test specimen installed by: Lorient Testing & Technical Services
Test room temperature: 19.3°C
Test room static pressure: 1037hpa
Test room relative humidity: 36%

Area S of test element: 4.40m²
Source room volume: 68.40m³
Receiving room volume: 50.00m³
Sample mass per unit area: 33.81kg/m²

Frequency f Hz	R 1/3 Octave dB
50	
63	
80	
100	49.5
125	28.4
160	28.7
200	29.5
250	30.9
315	31.5
400	32.7
500	36.6
630	36.1
800	38.7
1000	40.7
1250	41.9
1600	43.4
2000	44.5
2500	45.5
3150	46.6
4000	
5000	



Rating according to ISO 717-1

$R_w (C; C_{tr}) = 40 (-1; -3) \text{ dB}$

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

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



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Acoustic performance of doorsets – tested in accordance with BS EN ISO 10140-2: 2010

54mm S4G pair of doors in a hardwood frame. LAS1212 to jamb and head stops. LAS1011 to jambs and head (interrupted at hinges). Two rows of LAS1011 at meeting stile (bypassing latch). LAS4014si threshold plate. LAS8001si to the bottom of both doors.

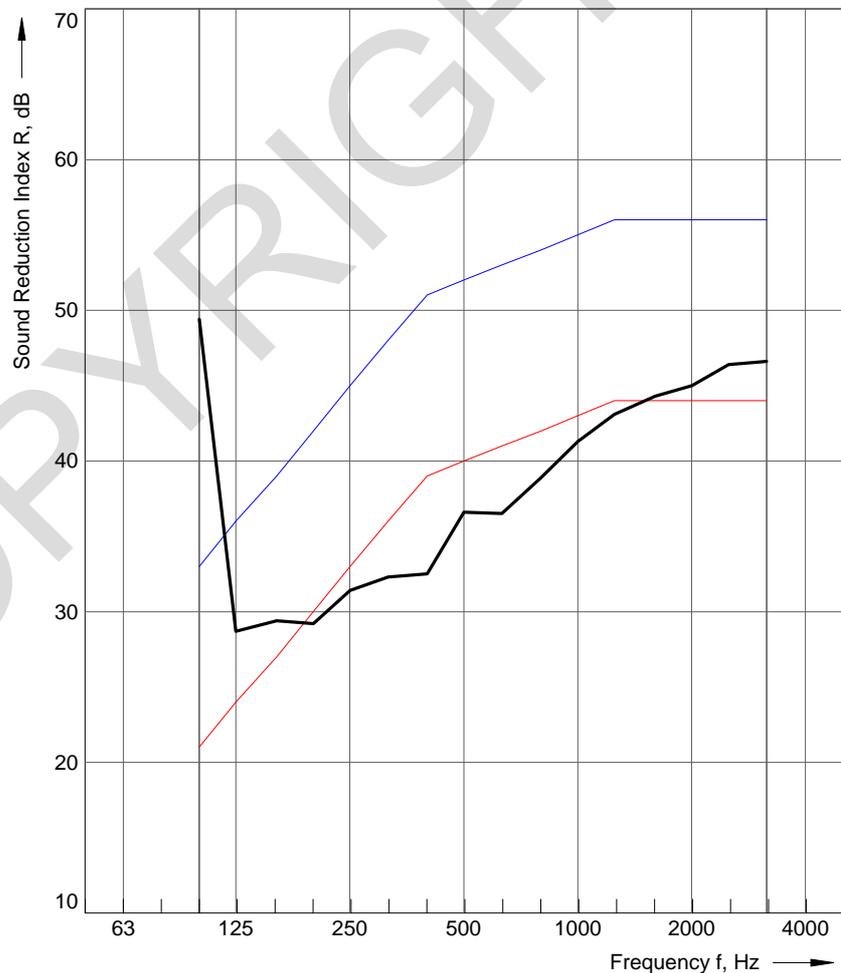
Test Date: 15/04/2014
Test Number: 140415 005

Test specimen installed by: Lorient Testing & Technical Services
Test room temperature: 19.5°C
Test room static pressure: 1037hpa
Test room relative humidity: 35%

Area S of test element: 4.40m²
Source room volume: 68.40m³
Receiving room volume: 50.00m³
Sample mass per unit area: 33.81kg/m²

— Sound reduction index (R) dB
 — Curve of reference values (EN ISO 717-1:1996)

Frequency f Hz	R 1/3 Octave dB
50	
63	
80	
100	49.4
125	28.7
160	29.4
200	29.2
250	31.4
315	32.3
400	32.5
500	36.6
630	36.5
800	38.9
1000	41.3
1250	43.1
1600	44.3
2000	45.0
2500	46.4
3150	46.6
4000	
5000	



Rating according to ISO 717-1

$$R_w (C; C_{tr}) = 40 (-1; -3) \text{ dB}$$

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

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

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



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5.0 Photos of test samples

S3D pair of doors - Fully-caulked



Two rows of LP1004DS to meeting stile



BS EN ISO 9001:2008
Certificate No. 03/04



BS EN ISO 14001:2004
Certificate No. 03/05 04/05/06

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LP1504DS fitted to Jambs and head. LAS1212 to jamb and head stops. LAS4014si to threshold with LAS8001si to bottom of both doors



BS EN ISO 9001:2008
Certificate No. 03/04



BS EN ISO 14001:2004
Certificate No. 04/05 541900

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S3K pair of doors - Fully-caulked



BS EN ISO 9001:2015
Certificate No. 00/04



BS EN ISO 14001:2004
Certificate No. 03/03 04/19/00

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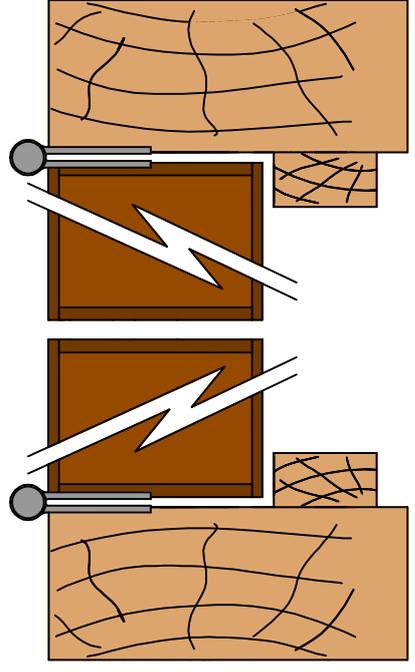
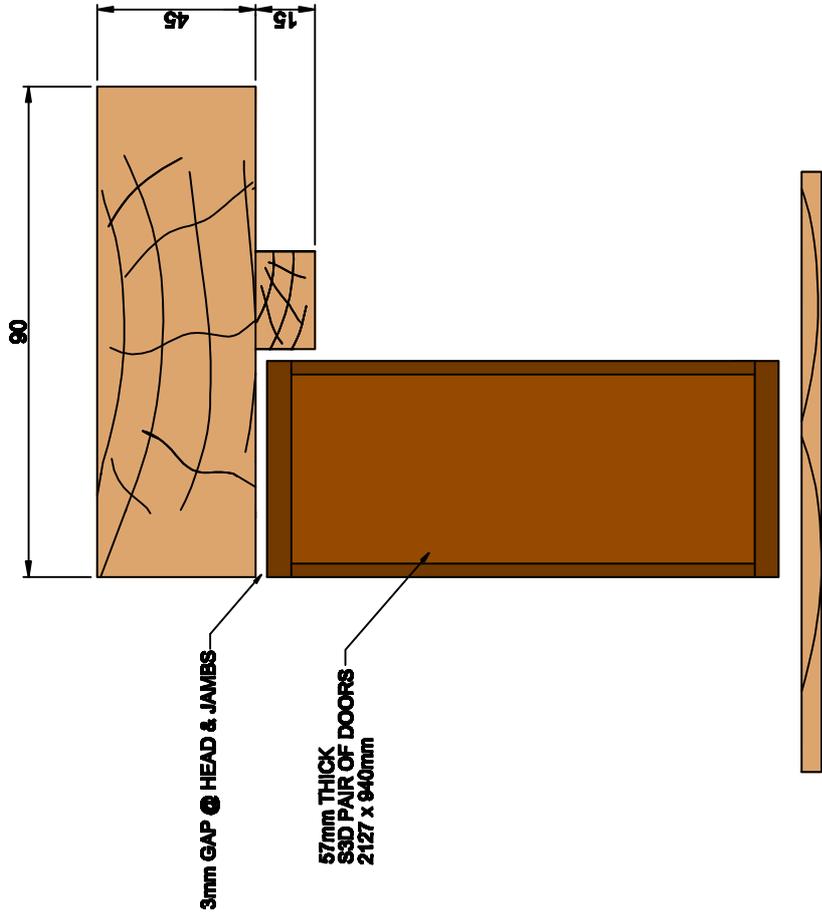
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S4G pair of doors - Fully-caulked





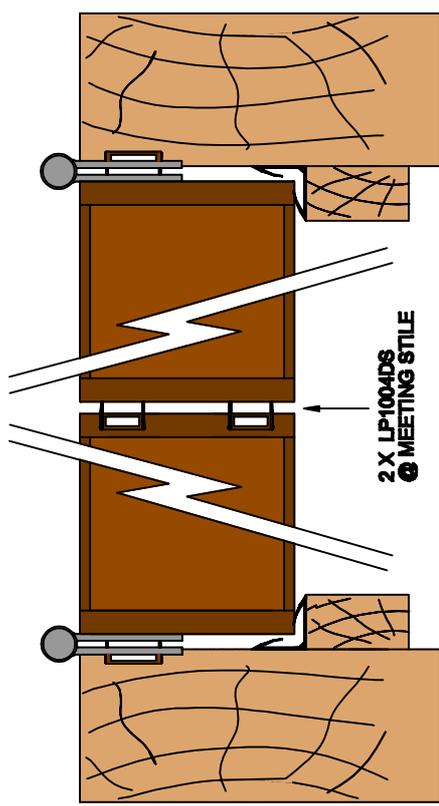
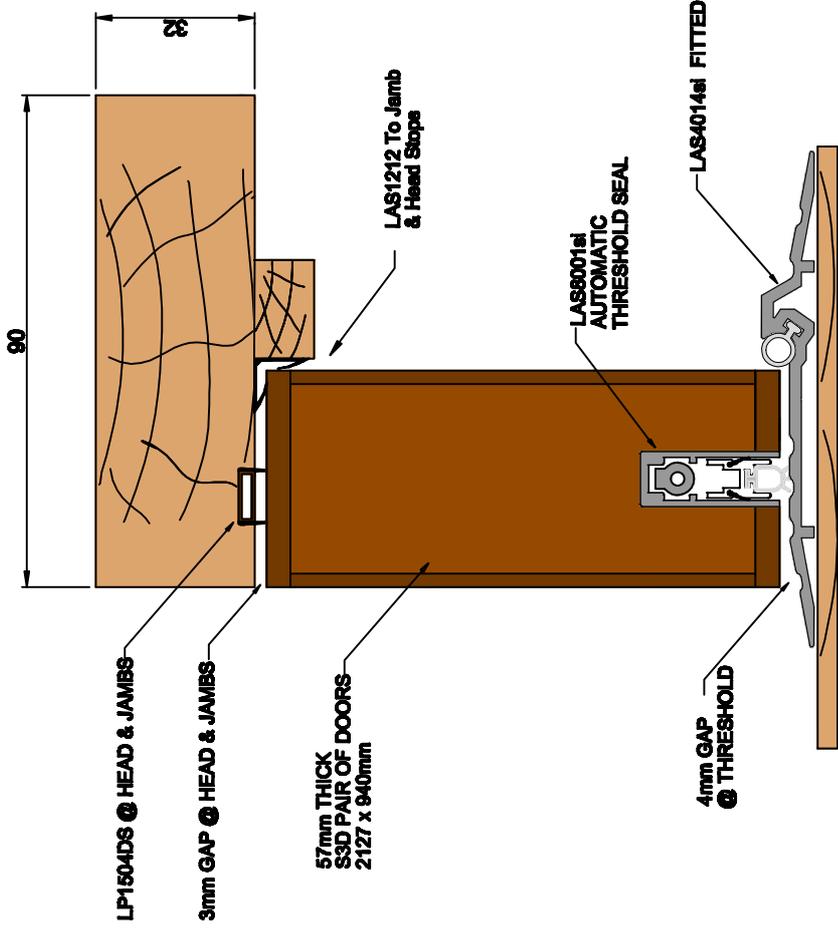
TEST : 140414 001

FULLY CAULKED

57mm (S3D) Sauerland Pairs - Hardwood Frame, Planted Stop
2127 x 940mm

 <p>LORIENT</p> <p>Testing & Technical Services</p>		<p>Discovery House Unit 19 Wentworth Road Heathfield Industrial Estate Newton Abbot Devon TQ12 6TL Tel: 01626 834252 Fax: 01626 833166 E : testing@lorientuk.com www.lorientuk.com</p>		<p>TITLE: SAUERLAND PAIRS</p>	
		SCALE	NTS	DATE	DRAWING NO:
		DRAWN	MNH	CHECKED	DF
		DATE	01/05/14	APPROVED	DF
01	FIRST ISSUE	xx/xx/xxxx			001
REV	DESCRIPTION	DATE			

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TEST : 140414 002

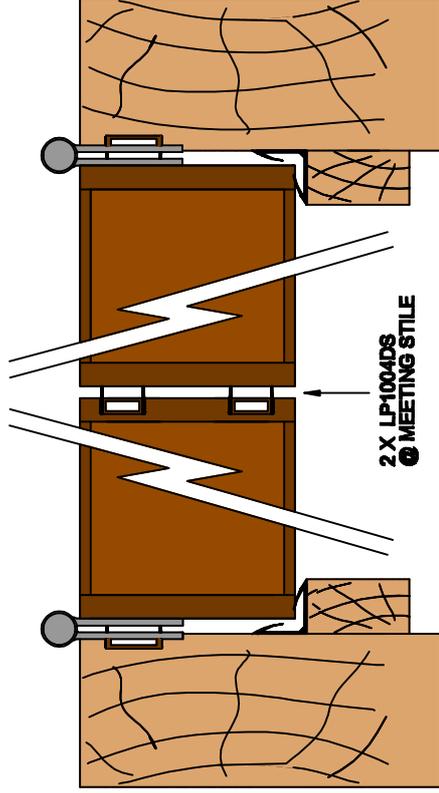
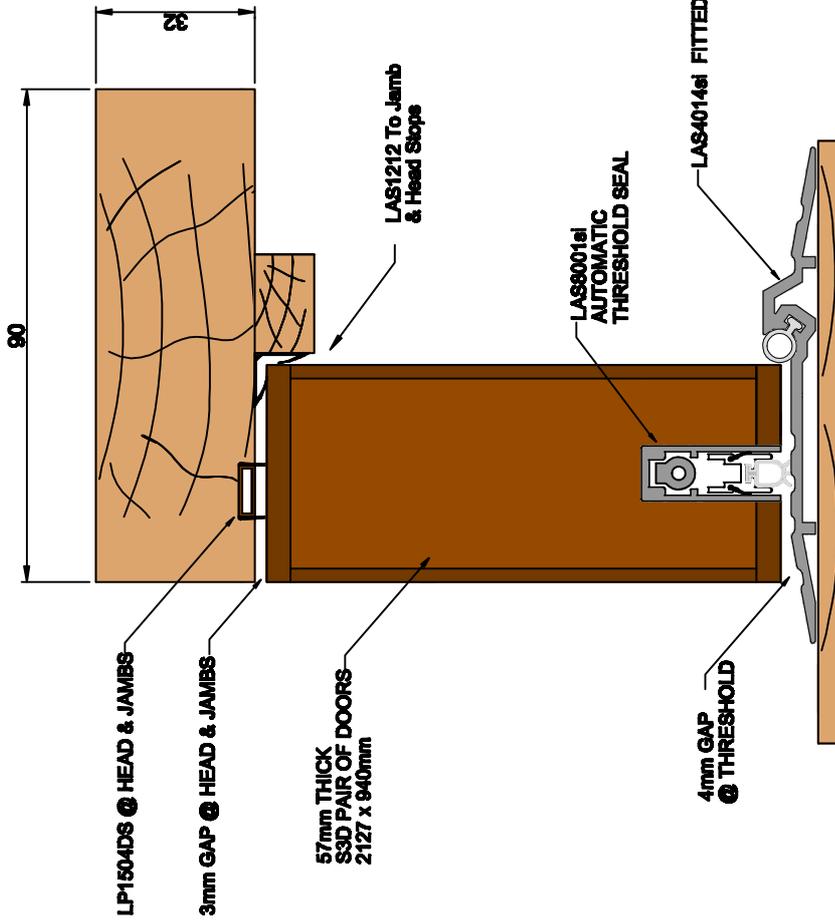
57mm (S3D) Sauerland Pairs - Hardwood Frame, Planted Stop
 2127 x 840mm
 LAS1212 to jamb and head stops.
 LP1504DS to jambs and head (interrupted at hinges)
 Two rows of LP1004DS at meeting stile (outer fins bypassing latch)
 LAS4014st threshold plate.LAS8001st to the bottom of both doors.



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REV	DESCRIPTION	DATE	APPROVED	DF		



TEST : 140414 003

57mm (S3D) Sauerland Pairs - Hardwood Frame, Planted Stop
 2127 x 940mm
 LAS1212 to jamb and head stops.
 LP1504DS to jambs and head (interrupted at hinges) .
 Two rows of LP1004DS at meeting stile (outer fins bypassing letstr) .
 LAS4014st threshold plate.LAS8001st to the bottom of both doors.
 Doors conditioned.



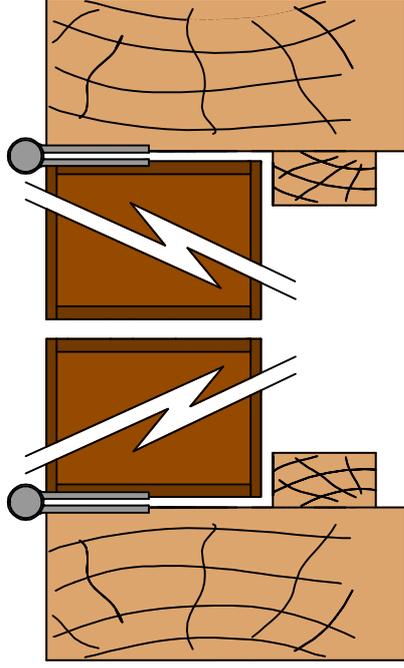
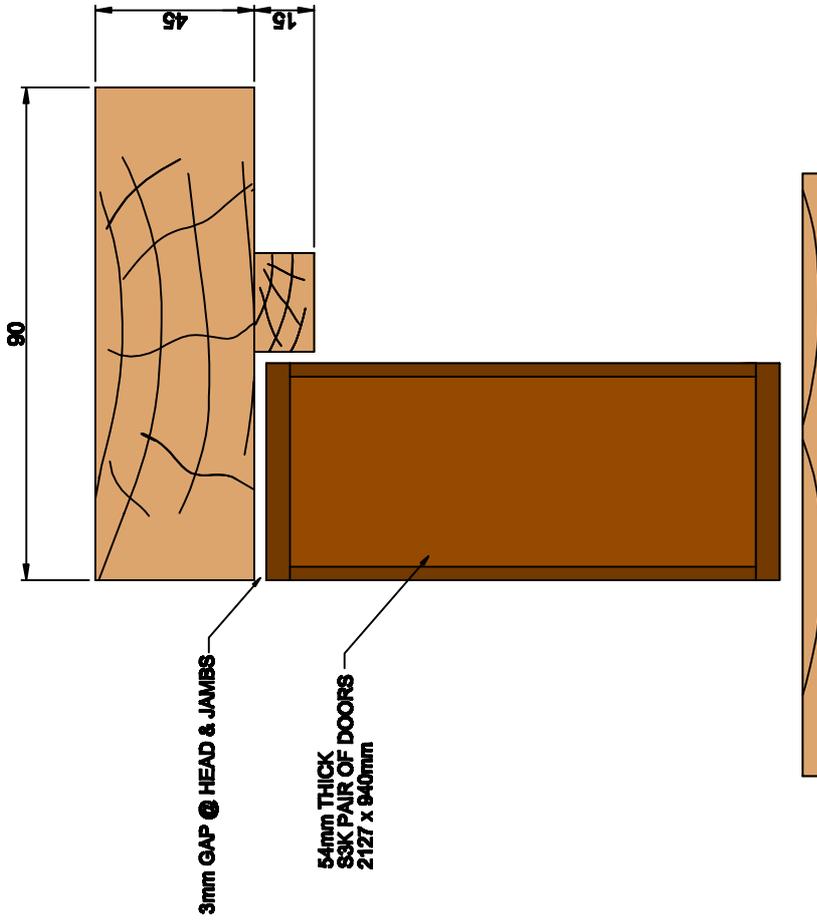
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APPROVED	DF	003



TEST : 140414 004

FULLY CAULKED

54mm (SSK) Sauerland Pairs - Hardwood Frame, Planted Stop
2127 x 940mm



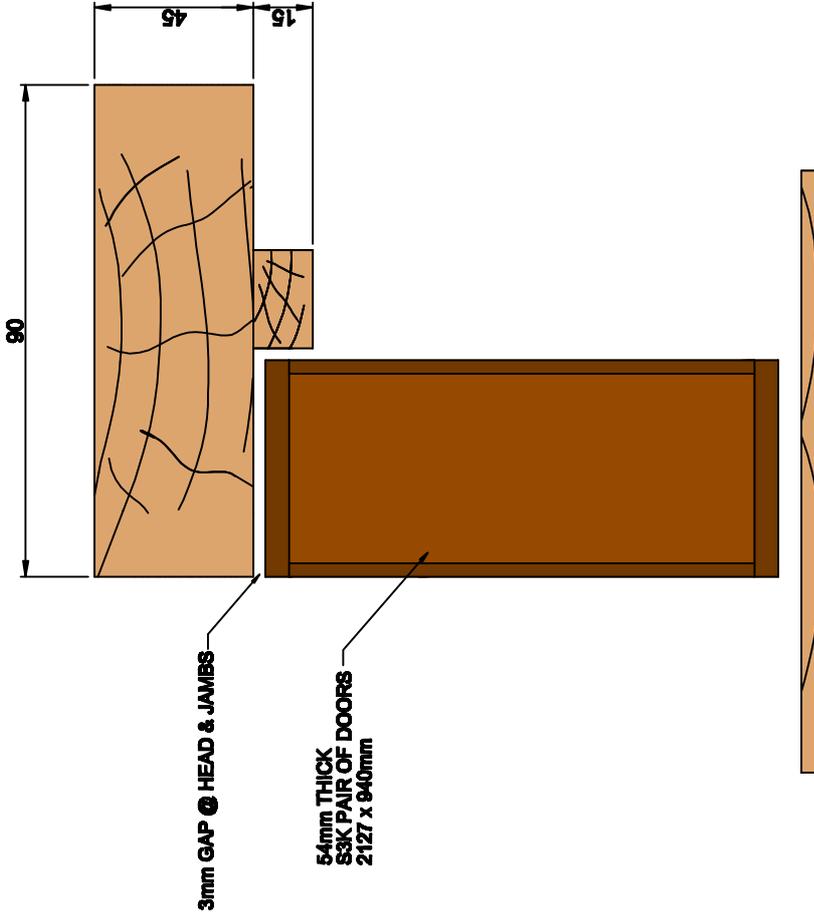
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TEST : 140414 005

FULLY CAULKED

54mm (S3K) Sauerland Pairs - Hardwood Frame, Planted Stop
2127 x 940mm
Doors conditioned.



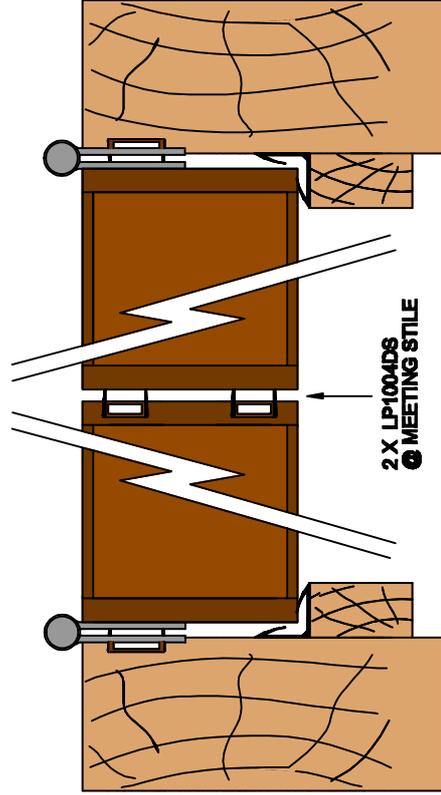
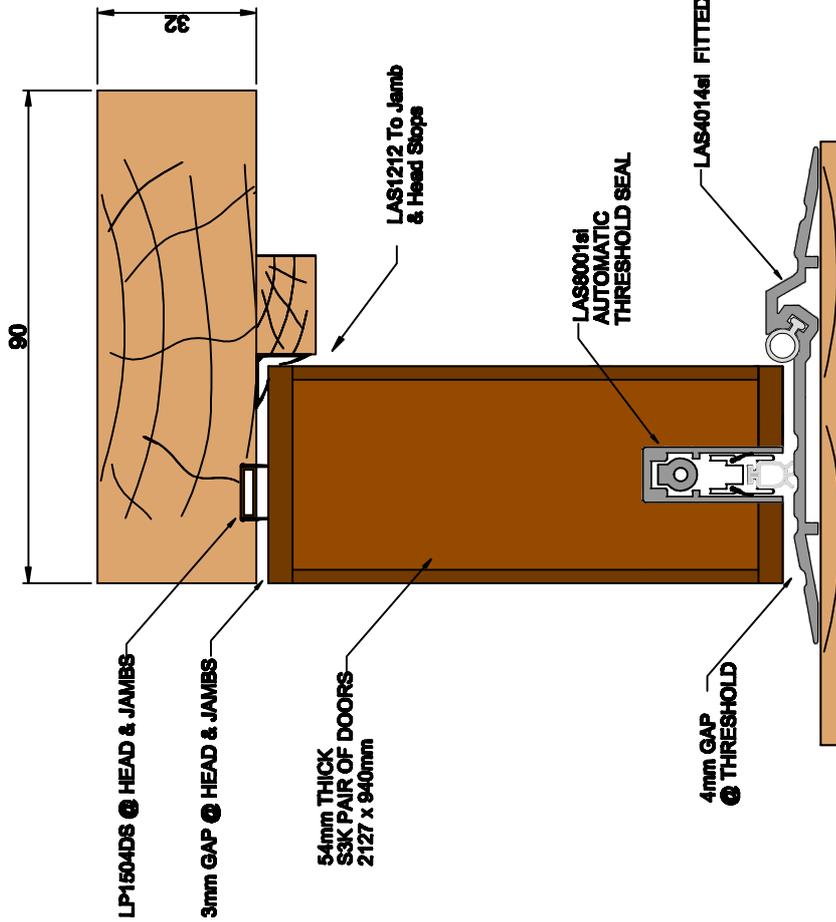
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			DRAWN	MNH		
			DATE	01/05/14		
01	FIRST ISSUE	xx/xx/xxxx	CHECKED	DF	DRAWING NO:	005
REV	DESCRIPTION	DATE	APPROVED	DF		

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TEST : 140414 006

54mm (S3K) Sauerland Pairs - Hardwood Frame, Planted Stop
 2127 x 940mm
 LAS1212 to jamb and head stops.
 LP1504DS to jamb and head (interrupted at hinges) .
 Two rows of LP1004DS at meeting stile (outer fins bypassing latch) .
 LAS4014ai threshold plate.LAS8001ai to the bottom of both doors.

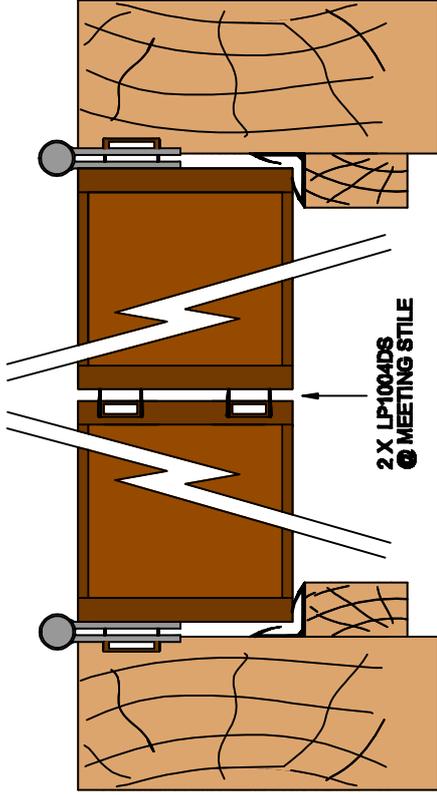
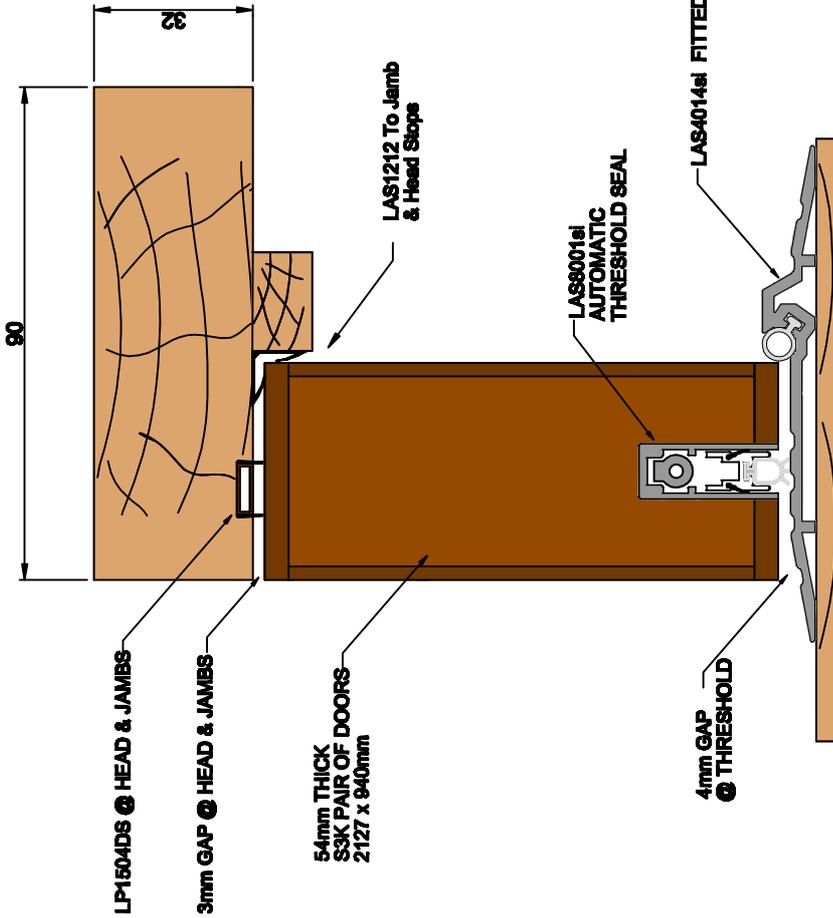


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			DRAWN	MNH		
			DATE	01/05/14		
01	FIRST ISSUE	xx/xx/xxxx	CHECKED	DF	DRAWING NO:	006
REV	DESCRIPTION	DATE	APPROVED	DF		



TEST : 140414 007

54mm (S3K) Sauerland Pairs - Hardwood Frame, Planted Stop
 2127 x 940mm
 LAS1212 to jamb and head stops.
 LP1604DS to jambs and head (interrupted at hinges) .
 Two rows of LP1004DS at meeting stile (outer fins bypassing later) .
 LAS4014sl threshold plate.LAS8001sl to the bottom of both doors.
 Doors conditioned.



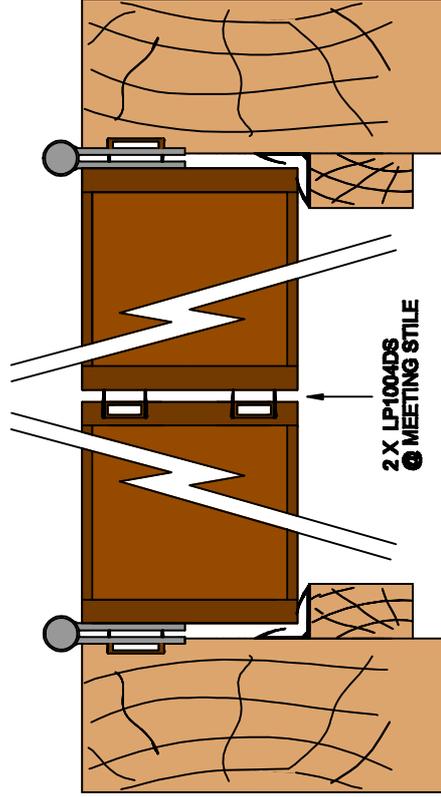
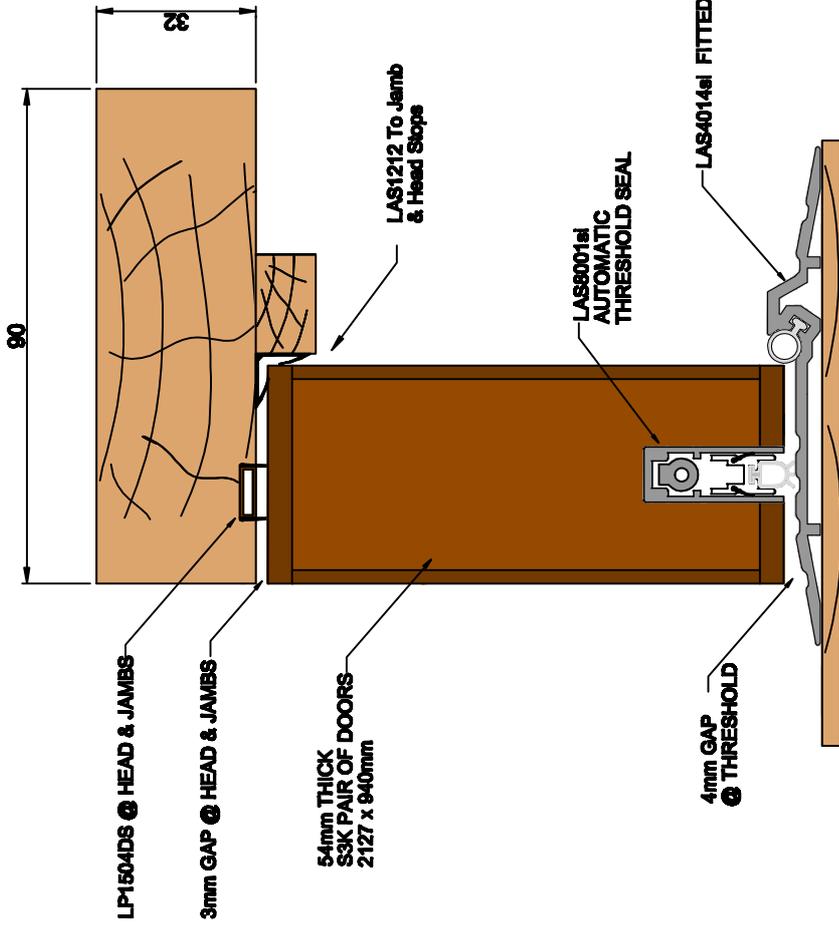
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REV	DESCRIPTION		DATE

SCALE	NTS	TITLE:	SAUERLAND PAIRS
DRAWN	MNH		
CHECKED	DF	DATE	01/05/14
APPROVED	DF	DRAWING NO:	007



TEST : 140414 008

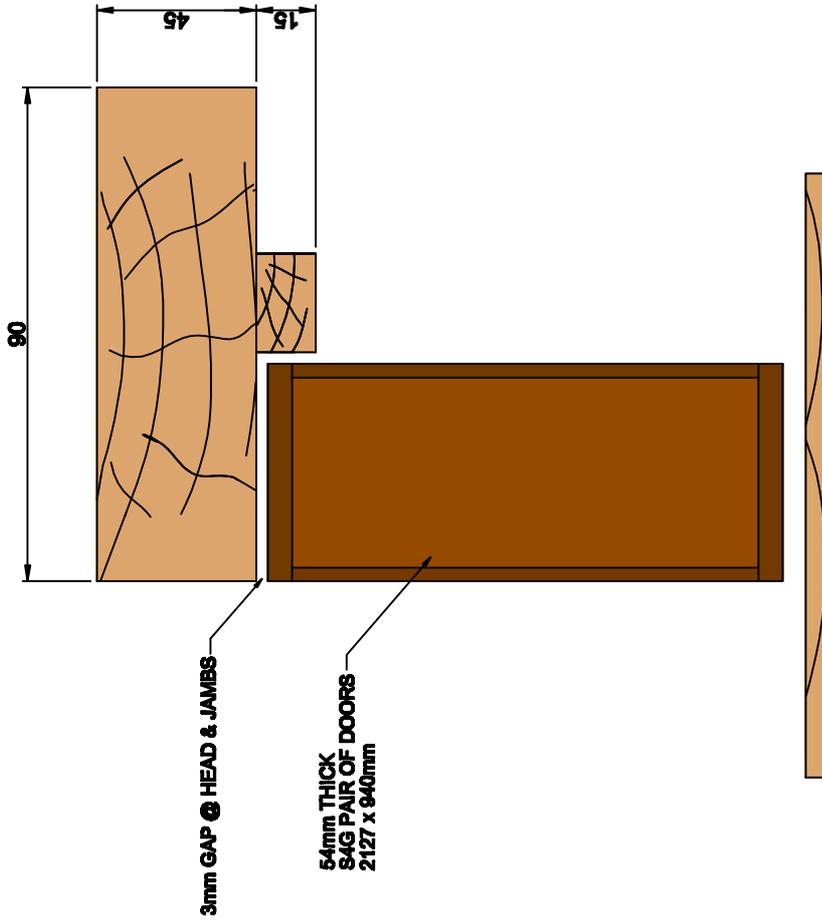
54mm (S3K) Sauerland Pairs - Hardwood Frame, Planted Stop
 2127 x 940mm
 LAS1212 to jamb and head stops.
 LP1504DS to jamb and head (interrupted at hinges) .
 Two rows of LP1004DS at meeting stile (outer fins bypassing letbit) .
 LAS4014sl threshold plate.LAS8001sl to the bottom of both doors.
 Seals adjusted.



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Testing & Technical Services

SCALE		TITLE:	
DRAWN	NTS	SAUERLAND PAIRS	
DATE	MNH	DRAWING NO:	
CHECKED	01/05/14	008	
APPROVED	DF		
APPROVED	DF		



TEST : 140415 001

FULLY CAULKED

54mm (S4G) Sauerland Pairs - Hardwood Frame, Planted Stop
2127 x 940mm



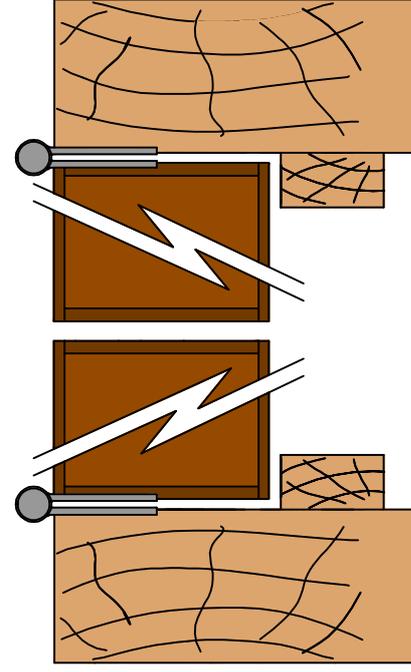
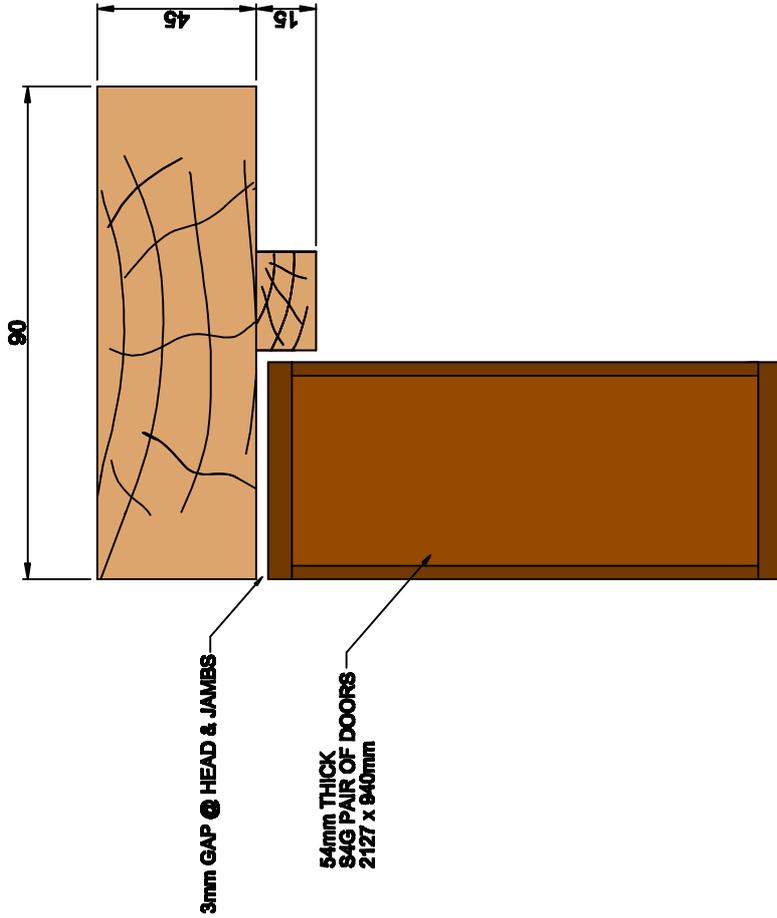
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Testing & Technical Services

					TITLE:	SAUERLAND PAIRS	
		SCALE	NTS		DRAWN	MNH	
		DATE	01/05/14		CHECKED	DF	DRAWING NO:
01	FIRST ISSUE	xx/xx/xxxx			APPROVED	DF	009
REV	DESCRIPTION						

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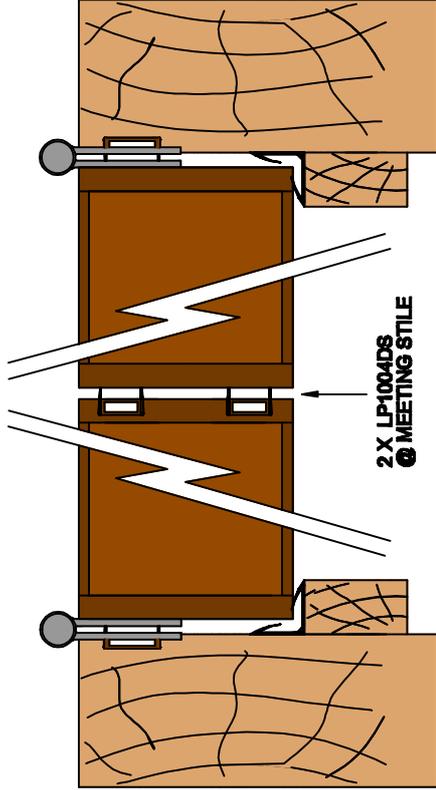
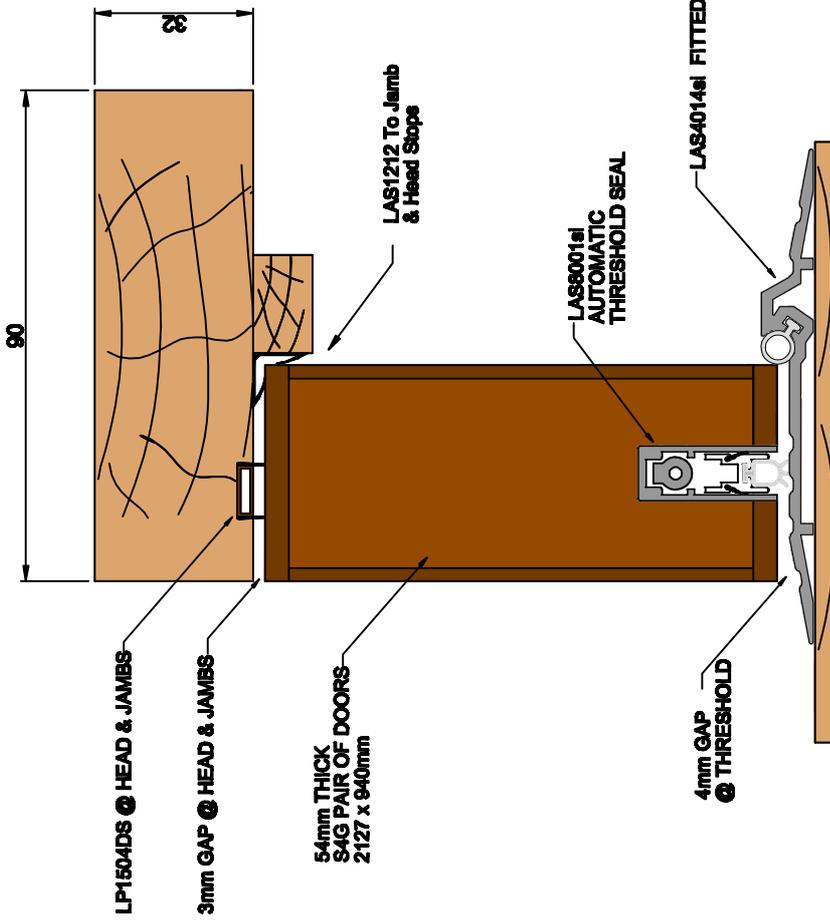
TEST : 140415 002

FULLY CALKED

54mm (S4G) Sauerland Pairs - Hardwood Frame, Planted Stop
2127 x 940mm
Doors conditioned.

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		Testing & Technical Services	SCALE DRAWN DATE CHECKED APPROVED	NTS MNH 01/05/14 DF DF	DRAWING NO: 010
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REV	DESCRIPTION	DATE			

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TEST : 140415 003

54mm (S4G) Sauerland Pairs - Hardwood Frame, Planted Stop
 2127 x 840mm
 LAS1212 to jamb and head stops.
 LP1504DS to jambs and head (interrupted at hinges)
 Two rows of LP1004DS at meeting stile (outer fins bypassing latch)
 LAS4014el threshold plates.LAS6001el to the bottom of both doors.

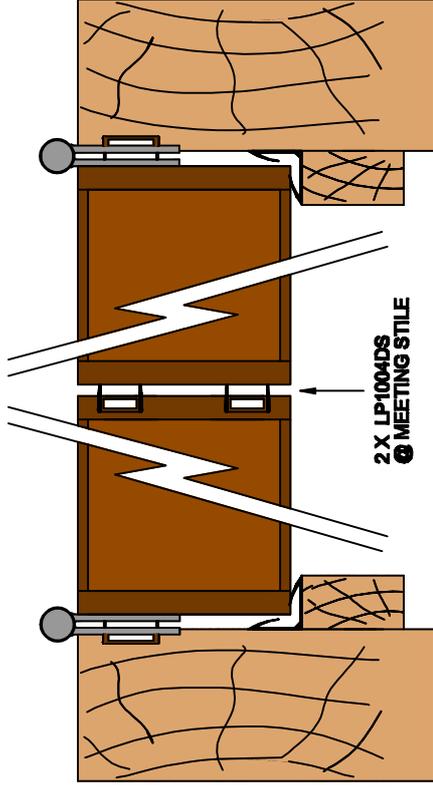
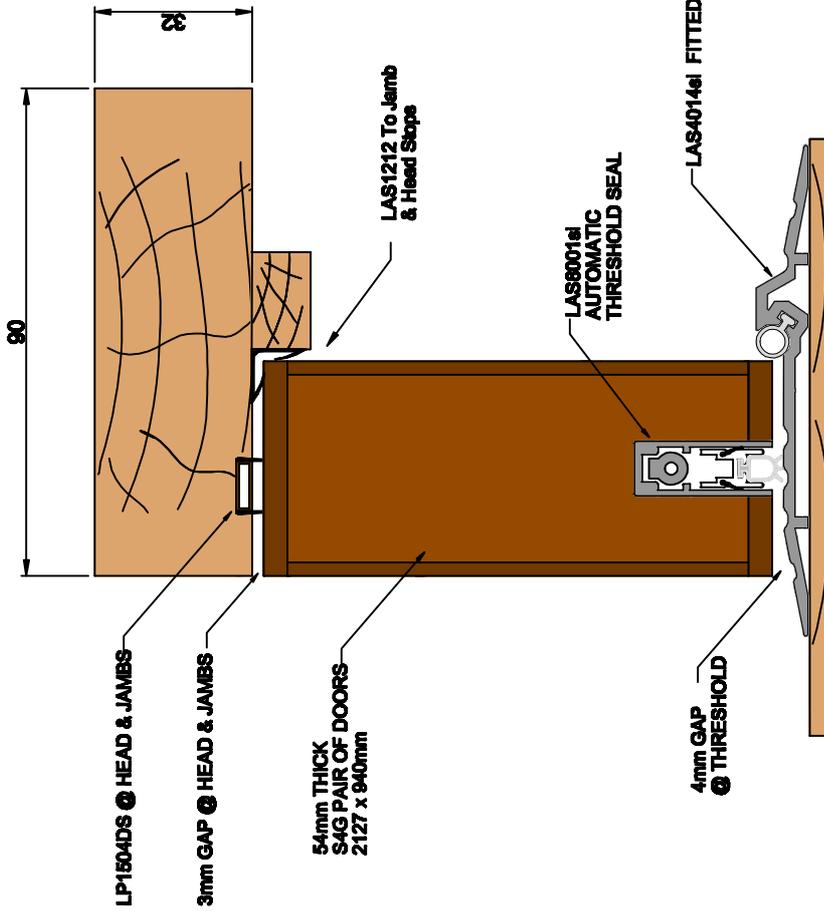


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			SCALE	NTS	TITLE:	SAUERLAND PAIRS
			DRAWN	MNH		
			DATE	01/05/14		
01	FIRST ISSUE	xx/xx/xxxx	CHECKED	DF	DRAWING NO:	011
REV	DESCRIPTION	DATE	APPROVED	DF		

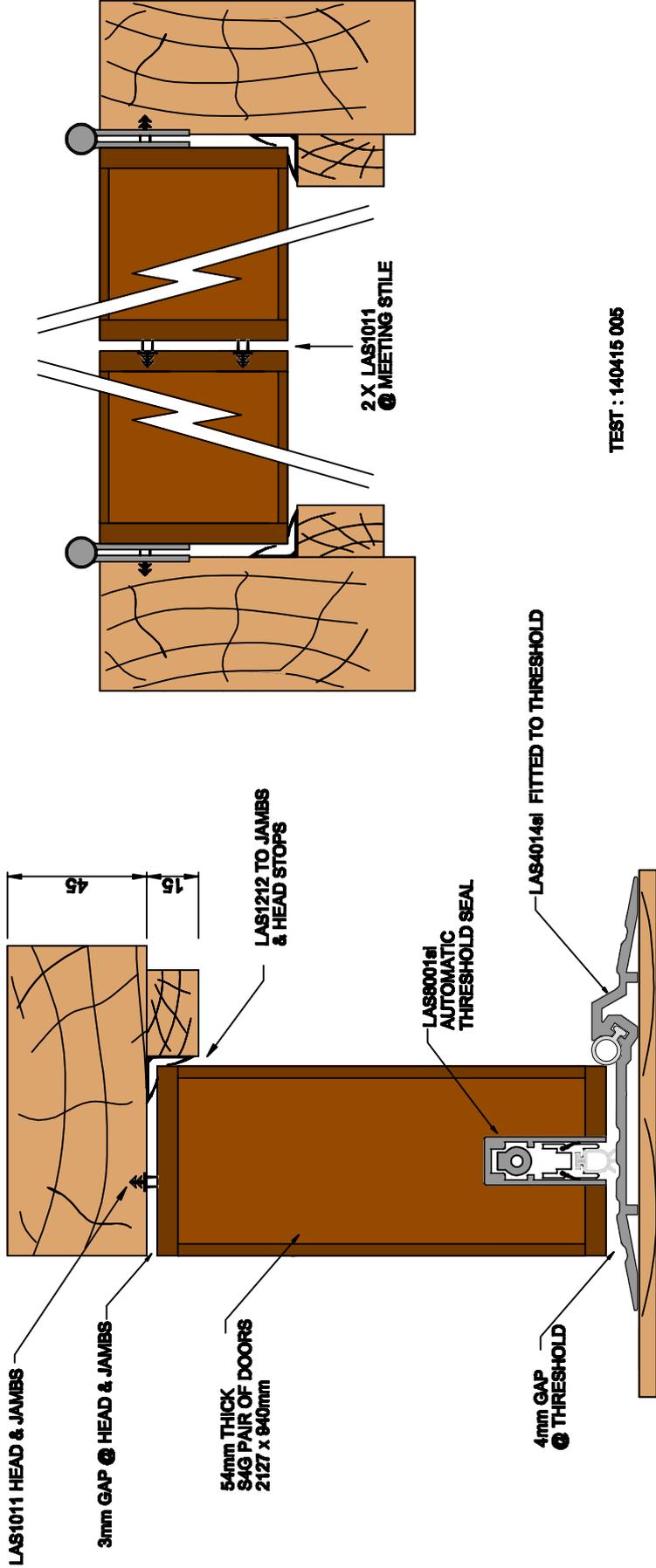


TEST : 140415 004

54mm (S4G) Sauerland Pairs - Hardwood Frame, Planted Stop
 2127 x 940mm
 LAS1212 to jamb and head stops.
 LP1604DS to jambs and head (interrupted at hinges)
 Two rows of LP1004DS at meeting stile (outer fits bypassing latch)
 LAS4014el threshold plate.LAS6001el to the bottom of both doors.
 Adjustment made to meeting stile due to misalignment.

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		SCALE	NTS	DRAWN	MNH	DATE
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TEST : 140415 005

54mm (S4G) Sauerland Pairs - Hardwood Frame, Planted Stop
 2127 x 940mm
 LAS1212 to jamb and head stops.
 LAS1011 to jamb and head (interrupted at hinges).
 Two rows of LAS1011 at meeting stile (outer fine bypassing letch) .
 LAS4014el threshold plate, LAS8001el to the bottom of both doors.

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