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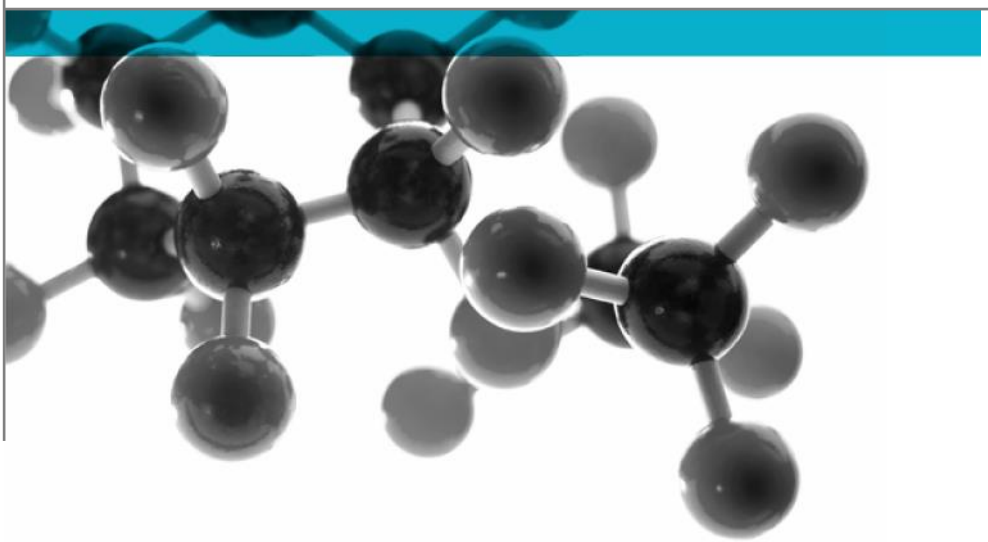
BS EN ISO 10140-2:2010



Test of: Fire Products

Acoustics - Laboratory measurement of sound insulation of building elements. Measurement of airborne sound insulation

Date: 07/02/2020

Copy: 1

Issue No.: 1

A Report To:
Sika Service AG
Tueffenwies 16
CH-8408 Zurich
Switzerland

Document Reference:
BMTMTP/F14022/AR6

The details of the sponsor of the original test report BMT/MTP/F14022 are held on file by Warringtonfire. This report is additional to that issued originally as BMT/MTP/F14022 and dated 7th March 2014. The original report shall remain valid and is not replaced by the additional report.

Contents

Page No.

Summary of Performance

The following performance was achieved from the specimens tested. Full details of the testing and specimen construction are described in the report.

Test No.	Product Name	Product Type	Test Description	Test Result – specimen only 1m² (R_w (C;C_{tr}))	Test Result – specimen and partition 14.2m² (R_w (C;C_{tr}))	Test Result - Dnew (R_w (C;C_{tr}))
1	Sikacryl® 621 Fire	Fire Products	Sikacryl® 621 Fire On source room side of wall, 15mm deep x 60mm wide x 2000mm high, woth 55mm deep stonewall (60kg/m3) backing	51 (-1;-6) dB	62 (-1;-6) dB	61 (-1;-6) dB
2	Sikacryl® 621 Fire	Fire Products	Sikacryl® 621 Fire On source room side of wall, 25mm deep x 60mm wide x 2000mm high, woth 55mm deep stonewall (60kg/m3) backing	51 (-1;-6) dB	63 (-1;-7) dB	61 (-1;-6) dB

1 Introduction

The test specimen was supplied by the sponsor and delivered to WARRINGTONFIRE on 28 January 2014. The specimen was installed into a timber stud partition within the test chamber by the sponsor.

Test Details

The specimen was tested to BS EN ISO 10140-2:2010 Acoustics - Laboratory measurement of sound insulation of building elements. Measurement of airborne sound insulation

Testing was conducted at Warringtonfire, Chiltern House, Stocking Lane, Hughenden Valley, Buckinghamshire. HP14 4ND on the 28 January 2014.

For details of the testing, please see Section 3, Methodology.

Supporting Construction Description

The partition consisted of two wall leaves separated by a 150mm air gap. Each wall leaf was constructed of nominal 45mm x 90mm softwood studs at 600mm centres with two layers of 15mm plasterboard on each face. The stud wall cavities were filled with 100mm thick Rockwool insulation.

Laboratory Construction Details

The laboratory consists of a source room and a receive room that are completely separated by a 50mm gap filled with mineral wool. Intersections of the floor, wall and ceiling planes are all perpendicular. The rooms have opposite openings for the installation of the test specimen formed by masonry piers and lintels. The depth of the piers is greater in the source room than the receive room.

The walls are of timber frame construction, approx. 190mm thick, symmetrical through the thickness. Studs are 90mm deep at 600mm centres with mineral wool insulation between them. Resilient bars approx. 20mm deep are fixed to the studwork. Two layers of 15mm gypsum board are fixed to the bars on both the inner and outer face.

The ceilings consist of 150mm deep timber joists with mineral wool insulation installed between joists. Resilient bars approx. 20mm deep are fixed to the lower edge of the joists. Two layers of 15mm gypsum board are fixed to the bars on the inner face only.

The floors are assembled from sound absorbing boards on a rubber underlay.

Dimensions:

	Volume	Width	Length	Height
	m^3	m	m	m
Source room	82.4	5.49	6.03	2.49
Receive room	69.6	5.49	5.09	2.49

2 Test Specimen Details

Product Name	Sikacryl® 621 Fire
Product Type	Fire Products
Material Type	Sealants / mineral wool

See Summary of Performance and Appendix's 1,2 and 3 for more details

3 Methodology

Airborne Sound Insulation Test

- The loudspeakers were placed in the corners of the source room
- The sound level meter was calibrated prior to testing.
- 5 measurements were taken in the source room, at fixed positions.
- 5 measurements were taken in the receive room at fixed positions.
- Background measurements were taking at each third octave frequency between 50Hz and 5000Hz.
- 6 Reverberation measurements were taken in the receive room, in accordance with BS EN ISO 3382-2:2008 interrupted, engineering method.
- Calculations, including C & C_{tr}, were carried out in accordance with BS EN ISO 717-1

- The sound reduction index was calculated using the following formula from BS EN ISO 10140-2:2010:

$$R_w = L1 - L2 + 10Log\left(\frac{S}{A}\right)\ dB$$

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 $A = \frac{0.16V}{T}$

Where:

V = The volume of the receive room
T = the reverberation time measured in seconds

1. Logarithmic average of 5 Measurements (L1 & L2)
2. Deduction of L1s from L2s
3. Area of test specimen (S) divided by equivalent sound absorption area (A)
4. Weighted Final Result R_w dB

Test Equipment

Equipment	Equipment reference number
Bruel & Kjaer Sound Level Meter (Type 2270)	ACT-009
Bruel & Kjaer Microphones (Type 4189)	ACT-010 & ACT-016
Bruel & Kjaer Calibrator (Type 4231)	ACT-011
Amplifiers	ACT-007 & ACT-049
Noise Generators	ACT-008 & ACT-009
Loudspeakers (EV ZX1-90PA)	ACT-006, ACT-021, ACT-022
Graphic Equaliser (DBX Dual Channel)	ACT-023

4 Parameters & Limitations

Parameters

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

- Sound level meter (microphone) was located as required
- Sound sources (loudspeakers) were located as required
- Reverberation Time readings were greater than 20dB but not so large that the observed decay cannot be represented by a straight line.
- Background noise measurements were 10dB below L2 measurements.
- Temperature was reported to within ± 0.1°C
- Barometric pressure was reported to within ± 0.01 Mbar (±1 Pa)
- Humidity was reported to within ± 1%
- Frequencies 50Hz, 63Hz and 80Hz are outside of our UKAS accreditation, and are for reference only. These frequencies do not affect the over R_W figure.
- R'_{max} of the test chambers was measured to be 65dB
- The test chambers are two cuboid rooms 5.49m wide and a ceiling height of 2.58m, volumes of chambers for testing are reported with the individual test data

Limitations

- The results only relate to the behaviour of the specimen submitted for test, as described in the Technical Specification (Section 2), and under the particular conditions of test.
- The results are not intended to be the sole criteria for assessing the acoustic performance of the element in use nor do they necessarily reflect the actual behaviour once installed on site.
- 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. WARRINGTONFIRE will be able to offer a review of the procedures adopted for a particular test to ensure that they are consistent with current practices.
- The results are solely for use by the sponsor and the stated purpose.
- The sponsor cannot rely on information provided without consent from WARRINGTONFIRE.
- Any recommendations are specific to the assignment and the sponsor.
- Extracts from the report are not permitted.

5 Authorisation

	Issued by:	**Authorised by:**
Signature:		
Name:	Martin Durham	Lee Grant-Riach
Title:	Laboratory Manager	Lead Technical Officer
Date of Issue	7th February 2020	

Appendix 1 – Summary of Results & Test Data Sheets – Specimen only 1m^2 (2 Pages)

Product Name	Sikacryl® 621 Fire
Product Type	Fire Products

Data Sheet Ref.	**Variations**		**Test Result R_w (C;C_{tr})**
BMTMTP/F14022/AR6/P001	Test Description	Sikacryl® 621 Fire On source room side of wall, 15mm deep x 60mm wide x 2000mm high, woth 55mm deep stonewall (60kg/m3) backing	51 (-1;-6) dB
BMTMTP/F14022/AR6/P002	Test Description	Sikacryl® 621 Fire On source room side of wall, 25mm deep x 60mm wide x 2000mm high, woth 55mm deep stonewall (60kg/m3) backing	51 (-1;-6) dB

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Laboratory measurement to BS EN ISO 10140-2 - Airborne Sound Insulation of Building Elements

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Sponsor:	**Sika Services AG**
Product Name/Desc.	**Sikacryl® 621 Fire**
Product Type	Fire Products
Material Type	Sealants / mineral wool
Variations:	
Test Description	Sikacryl® 621 Fire On source room side of wall, 15mm deep x 60mm wide x 2000mm high, woth 55mm deep stonewall (60kg/m3) backing

For detailed technical specification, please refer to Section 2 of the report

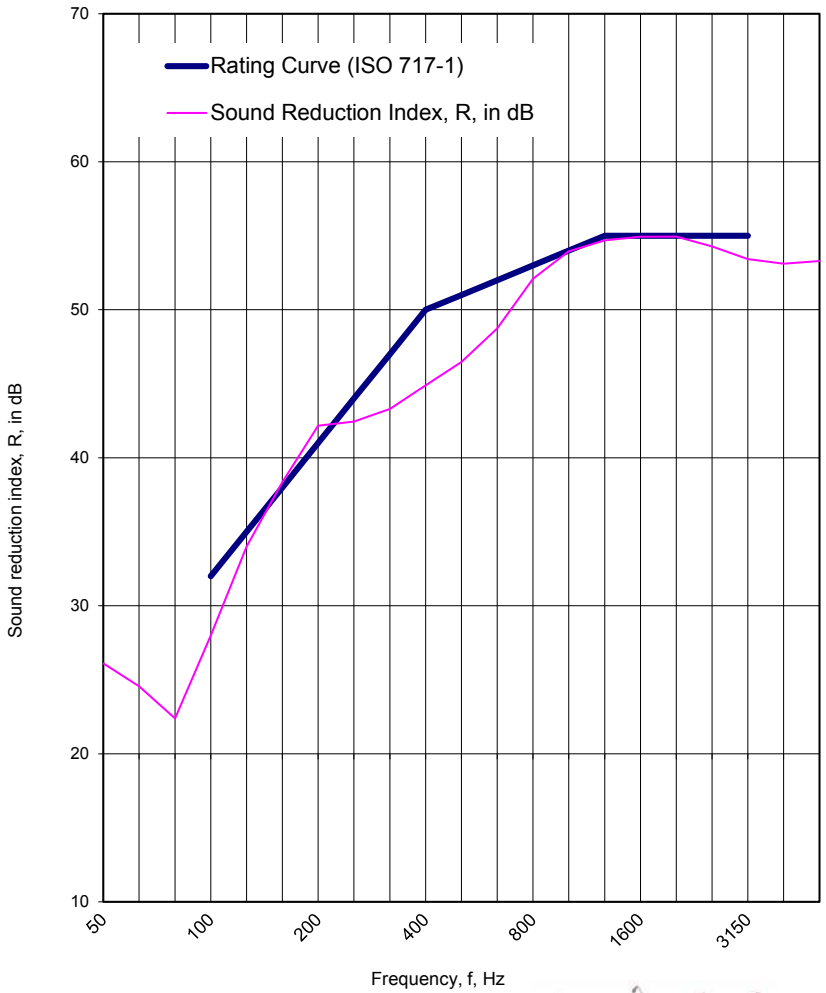
Data sheet Ref. BMTMTP/F14022/AR6/P001

Date of Test: 28/01/2014

Source Room Volume:		86.00	m^3
Receive Room Volume:		63.00	m^3
Specimen Installed By:		Client	
Area of Specimen (S):		1.00	m^2
	Sour.	Rec.	
Temp. in Test Rooms:	17.1	17.1	°C
Static Pressure:	100900.0	100900.0	Pa
Humidity in Test Rooms:	52.3	52.3	%

f, Hz		*R*, dB
50+		26.1
63+		24.6
80+		22.4
100		28.0
125		34.0
160		38.4
200		42.2
250		42.4
315		43.3
400		44.9
500		46.5
630		48.7
800		52.1
1000		53.9
1250		54.7
1600		54.9
2000		54.9
2500	≥	54.3
3150	≥	53.4
4000	≥	53.1
5000	≥	53.3
AAD		-26.9

Frequency range for rating in accordance with ISO 717-1



R_w =	**51 dB**	$C_{(50-3150)}$ =	-3 dB	$C_{tr\ (50-3150)}$ =	-11 dB
R_w+C =	**50 dB**	$C_{(50-5000)}$ =	-2 dB	$C_{tr\ (50-5000)}$ =	-11 dB
R_w+C_{tr} =	**45 dB**	$C_{(100-5000)}$ =	-1 dB	$C_{tr\ (100-5000)}$ =	-6 dB

Lee Grant-Riach
Lead Technical Officer

≥ indicates that the measurement at this frequency was corrected for background noise

+ indicates that the frequency is outside of our UKAS accreditation and is for information only

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Laboratory measurement to BS EN ISO 10140-2 - Airborne Sound Insulation of Building Elements

1762

Sponsor:	**Sika Services AG**
Product Name/Desc.	**Sikacryl® 621 Fire**
Product Type	Fire Products
Material Type	Sealants / mineral wool
Variations:	
Test Description	Sikacryl® 621 Fire On source room side of wall, 25mm deep x 60mm wide x 2000mm high, woth 55mm deep stonewall (60kg/m3) backing

For detailed technical specification, please refer to Section 2 of the report

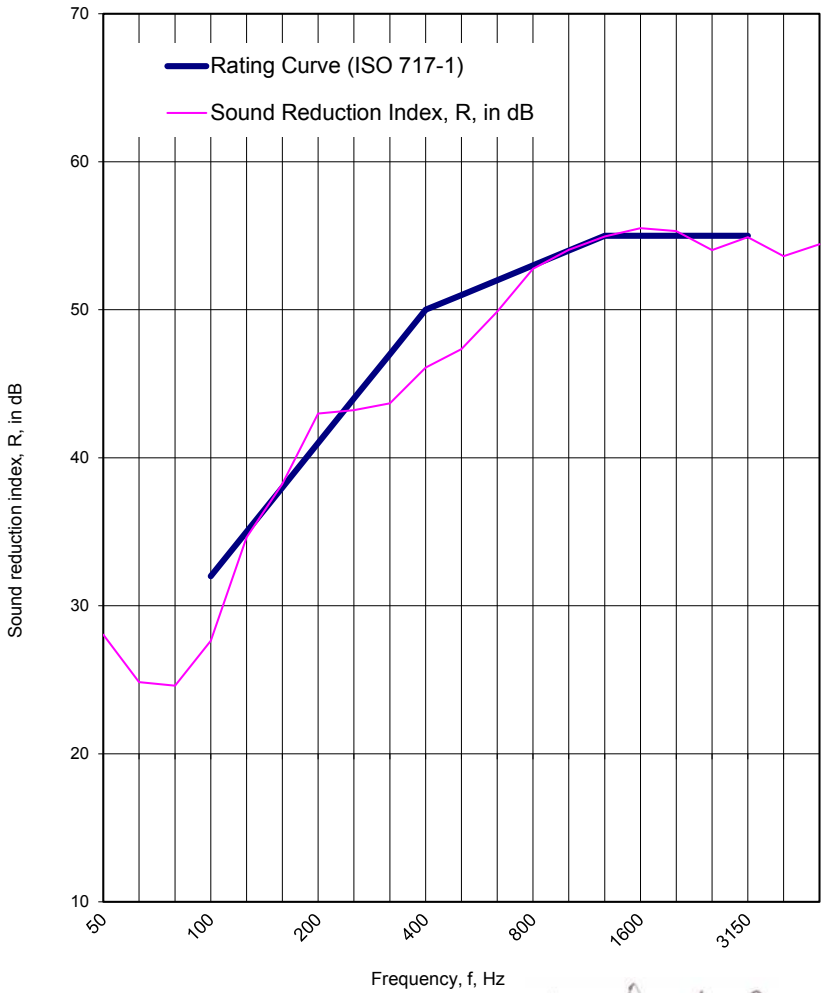
Data sheet Ref. BMTMTP/F14022/AR6/P002

Date of Test: 28/01/2014

Source Room Volume:		86.00	m^3
Receive Room Volume:		63.00	m^3
Specimen Installed By:		Client	
Area of Specimen (S):		1.00	m^2
	Sour.	Rec.	
Temp. in Test Rooms:	17.1	17.1	°C
Static Pressure:	100900.0	100900.0	Pa
Humidity in Test Rooms:	52.3	52.3	%

f, Hz		*R*, dB
50+		28.1
63+		24.8
80+		24.6
100		27.6
125		34.6
160		38.2
200		43.0
250		43.2
315		43.7
400		46.1
500		47.3
630		49.9
800		52.8
1000		54.0
1250		55.0
1600		55.5
2000		55.3
2500	≥	54.0
3150	≥	54.9
4000	≥	53.6
5000	≥	54.4
AAD		-19.9

Frequency range for rating in accordance with ISO 717-1



R_w =	**51 dB**	$C_{(50-3150)}$ =	-2 dB	$C_{tr\ (50-3150)}$ =	-10 dB
R_w+C =	**50 dB**	$C_{(50-5000)}$ =	-1 dB	$C_{tr\ (50-5000)}$ =	-10 dB
R_w+C_{tr} =	**45 dB**	$C_{(100-5000)}$ =	0 dB	$C_{tr\ (100-5000)}$ =	-6 dB

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Lead Technical Officer

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Appendix 2 – Summary of Results & Test Data Sheets – Specimen and partition 14.2m^2 (2 Pages)

Product Name	Sikacryl® 621 Fire
Product Type	Fire Products

Data Sheet Ref.	**Variations**		**Test Result R_w (C;C_{tr})**
BMTMTP/F14022/AR6/P001	Test Description	Sikacryl® 621 Fire On source room side of wall, 15mm deep x 60mm wide x 2000mm high, woth 55mm deep stonewall (60kg/m3) backing	62 (-1;-6) dB
BMTMTP/F14022/AR6/P002	Test Description	Sikacryl® 621 Fire On source room side of wall, 25mm deep x 60mm wide x 2000mm high, woth 55mm deep stonewall (60kg/m3) backing	63 (-1;-7) dB

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Sponsor:	**Sika Services AG**
Product Name/Desc.	**Sikacryl® 621 Fire**
Product Type	Fire Products
Material Type	Sealants / mineral wool
Variations:	
Test Description	Sikacryl® 621 Fire On source room side of wall, 15mm deep x 60mm wide x 2000mm high, woth 55mm deep stonewall (60kg/m3) backing

For detailed technical specification, please refer to Section 2 of the report

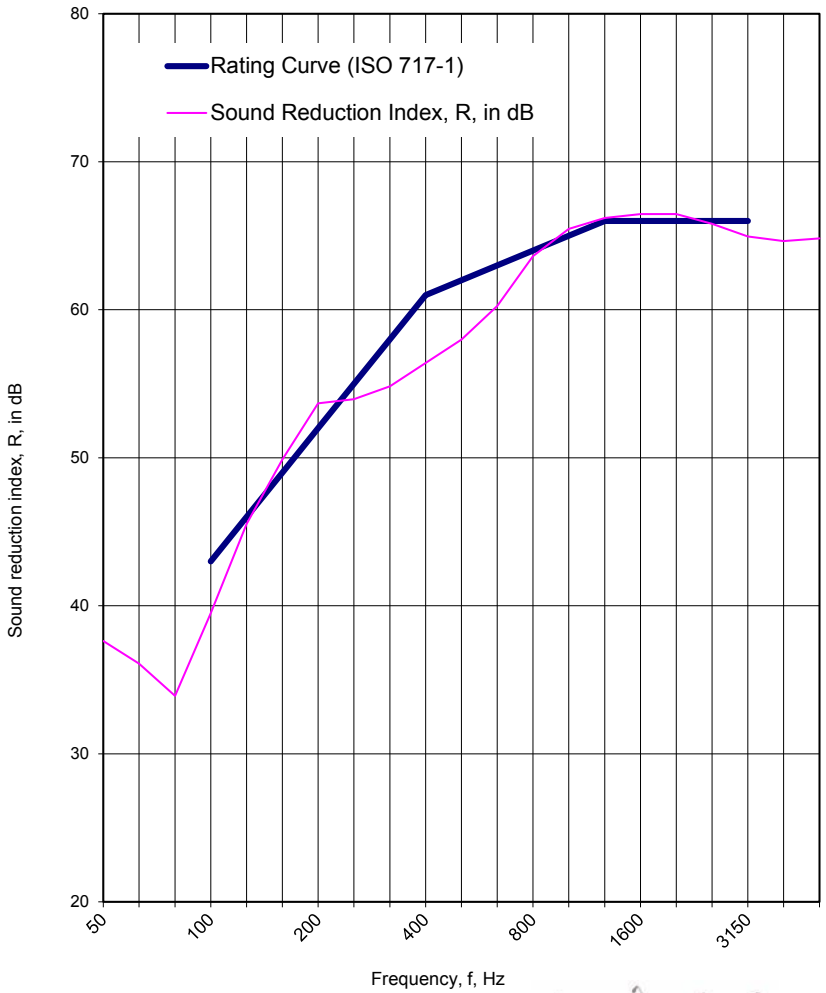
Data sheet Ref. BMTMTP/F14022/AR6/P001

Date of Test: 28/01/2014

Source Room Volume:		86.00	m^3
Receive Room Volume:		63.00	m^3
Specimen Installed By:		Client	
Area of Specimen (S):		14.20	m^2
	Sour.	Rec.	
Temp. in Test Rooms:	17.1	17.1	°C
Static Pressure:	100900.0	100900.0	Pa
Humidity in Test Rooms:	52.3	52.3	%

f, Hz		*R*, dB
50+		37.6
63+		36.1
80+		33.9
100		39.5
125		45.5
160		49.9
200		53.7
250		54.0
315		54.8
400		56.4
500		58.0
630		60.3
800		63.6
1000		65.5
1250		66.2
1600		66.5
2000		66.5
2500	≥	65.8
3150	≥	64.9
4000	≥	64.6
5000	≥	64.8
AAD		-21.1

Frequency range for rating in accordance with ISO 717-1



R_w =	62 dB	$C_{(50-3150)}$ =	-2 dB	$C_{tr\ (50-3150)}$ =	-11 dB
R_w+C =	61 dB	$C_{(50-5000)}$ =	-1 dB	$C_{tr\ (50-5000)}$ =	-11 dB
R_w+C_{tr} =	56 dB	$C_{(100-5000)}$ =	0 dB	$C_{tr\ (100-5000)}$ =	-6 dB

Lee Grant-Riach
Lead Technical Officer

≥ indicates that the measurement at this frequency was corrected for background noise

+ indicates that the frequency is outside of our UKAS accreditation and is for information only

Laboratory measurement to BS EN ISO 10140-2 - Airborne Sound Insulation of Building Elements

1762

Sponsor:	**Sika Services AG**
Product Name/Desc.	**Sikacryl® 621 Fire**
Product Type	Fire Products
Material Type	Sealants / mineral wool
Variations:	
Test Description	Sikacryl® 621 Fire On source room side of wall, 25mm deep x 60mm wide x 2000mm high, woth 55mm deep stonewall (60kg/m3) backing

For detailed technical specification, please refer to Section 2 of the report

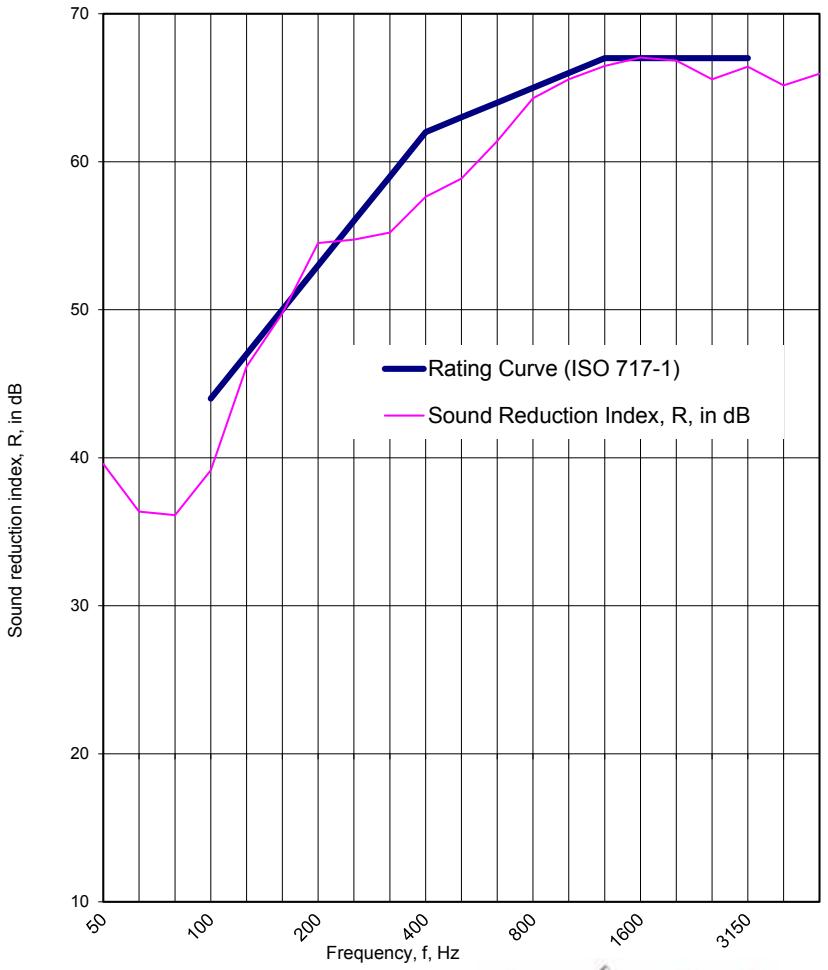
Data sheet Ref. BMTMTP/F14022/AR6/P002

Date of Test: 28/01/2014

Source Room Volume:		86.00	m^3
Receive Room Volume:		63.00	m^3
Specimen Installed By:		Client	
Area of Specimen (S):		14.20	m^2
	Sour.	Rec.	
Temp. in Test Rooms:	17.1	17.1	°C
Static Pressure:	100900.0	100900.0	Pa
Humidity in Test Rooms:	52.3	52.3	%

f, Hz		*R*, dB
50+		39.6
63+		36.4
80+		36.1
100		39.2
125		46.2
160		49.8
200		54.5
250		54.7
315		55.2
400		57.6
500		58.9
630		61.4
800		64.3
1000		65.6
1250		66.5
1600		67.0
2000		66.8
2500	≥	65.6
3150	≥	66.4
4000	≥	65.2
5000	≥	65.9
AAD		-25.9

Frequency range for rating in accordance with ISO 717-1



R_w =	63 dB	$C_{(50-3150)}$ =	-2 dB	$C_{tr\ (50-3150)}$ =	-11 dB
R_w+C =	62 dB	$C_{(50-5000)}$ =	-2 dB	$C_{tr\ (50-5000)}$ =	-11 dB
R_w+C_{tr} =	56 dB	$C_{(100-5000)}$ =	-1 dB	$C_{tr\ (100-5000)}$ =	-7 dB

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Lead Technical Officer

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Appendix 3 – Summary of Results & Test Data Sheets – Dnew (2 Pages)

Product Name	Sikacryl® 621 Fire
Product Type	Fire Products

Data Sheet Ref.	**Variations**		**Test Result R_w (C;C_{tr})**
BMTMTP/F14022/AR6/P001	Test Description	Sikacryl® 621 Fire On source room side of wall, 15mm deep x 60mm wide x 2000mm high, woth 55mm deep stonewall (60kg/m3) backing	61 (-1;-6) dB
BMTMTP/F14022/AR6/P002	Test Description	Sikacryl® 621 Fire On source room side of wall, 25mm deep x 60mm wide x 2000mm high, woth 55mm deep stonewall (60kg/m3) backing	61 (-1;-6) dB

Laboratory measurement to BS EN ISO 10140-2 - Airborne Sound Insulation of Building Elements

1762

Ref. No.: BMTMTP/F14022/AR6//P001

Sponsor: Sika Services AG
Date of Test: 28/01/2014

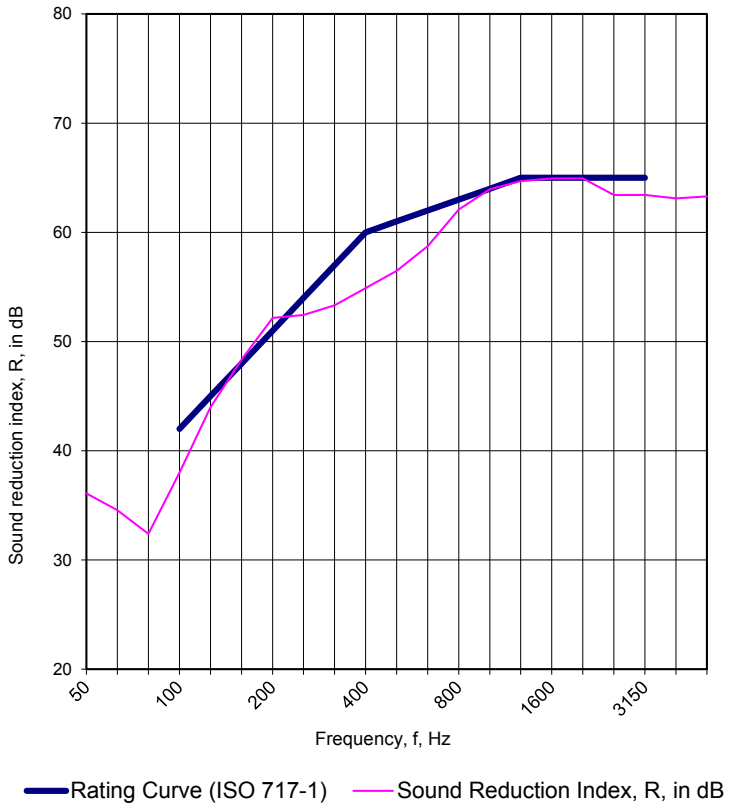
Test Specimen Installed By: Client

Source Room Volume: 86.00 m^3
Receive Room Volume: 63.00 m^3

Temperature in Test Rooms: 17.1 °C
Static Pressure: 100900.0 Pa
Humidity in Test Rooms: 52.3 %
Test Specimen Description: Sikacryl® 621 Fire On source room side of wall, 15mm deep x 60mm wide x 2000mm high, woth 55mm deep stonewall (60kg/m3) backing

f, Hz		*R* ,dB
50+		36.1
63+		34.6
80+		32.4
100		38.0
125		44.0
160		48.4
200		52.2
250		52.4
315		53.3
400		54.9
500		56.5
630		58.7
800		62.1
1000		63.9
1250		64.7
1600		64.9
2000		64.9
2500	≥	63.4
3150	≥	63.4
4000	≥	63.1
5000	≥	63.3
AAD		-27.7

Frequency range for rating in accordance with ISO 717-1



$D_{n,e,w}$ =	**61 dB**
$D_{n,e,w}+C$ =	**60 dB**
$D_{n,e,w}+C_{tr}$ =	**55 dB**

$C_{(50-3150)}$ =	-3 dB	$C_{tr\ (50-3150)}$ =	-11 dB
$C_{(50-5000)}$ =	-2 dB	$C_{tr\ (50-5000)}$ =	-11 dB
$C_{(100-5000)}$ =	-1 dB	$C_{tr\ (100-5000)}$ =	-6 dB

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Laboratory measurement to BS EN ISO 10140-2 - Airborne Sound Insulation of Building Elements

1762

Ref. No.: BMTMTP/F14022/AR6//P002

Sponsor: Sika Services AG
Date of Test: 28/01/2014

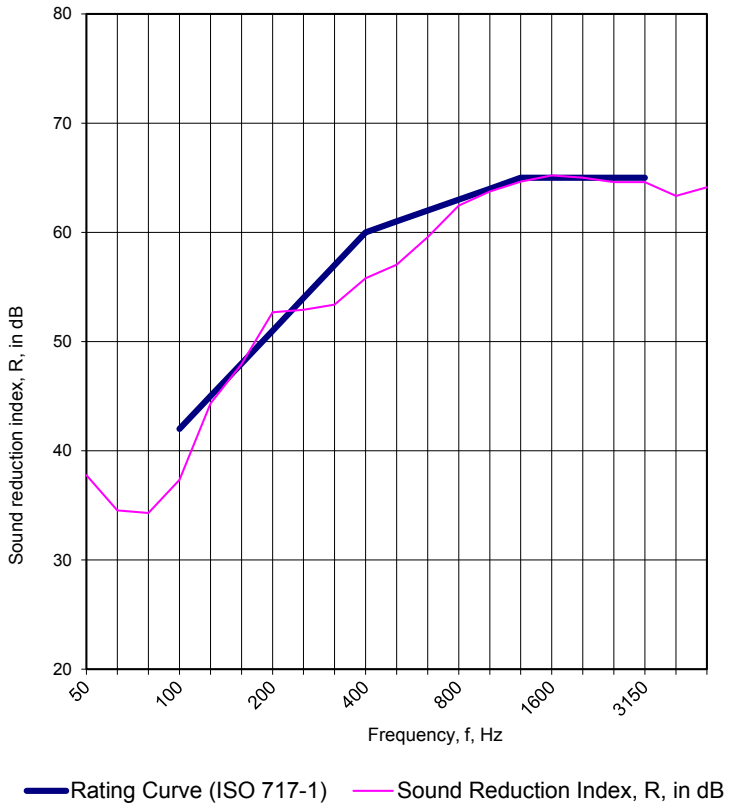
Test Specimen Installed By: Client

Source Room Volume: 88.80 m^3
Receive Room Volume: 67.50 m^3

Temperature in Test Rooms: 17.1 °C
Static Pressure: 100900.0 Pa
Humidity in Test Rooms: 52.3 %
Test Specimen Description: Sikacryl® 621 Fire On source room side of wall, 25mm deep x 60mm wide x 2000mm high, woth 55mm deep stonewall (60kg/m3) backing

f, Hz		*R*, dB
50+		37.8
63+		34.5
80+		34.3
100		37.3
125		44.3
160		47.9
200		52.7
250		52.9
315		53.4
400		55.8
500		57.0
630		59.6
800		62.5
1000		63.7
1250		64.7
1600		65.2
2000		65.0
2500	≥	64.6
3150	≥	64.6
4000	≥	63.3
5000	≥	64.1
AAD		-22.6

Frequency range for rating in accordance with ISO 717-1



$D_{n,e,w}$ =	**61 dB**
$D_{n,e,w}+C$ =	**60 dB**
$D_{n,e,w}+C_{tr}$ =	**55 dB**

$C_{(50-3150)}$ =	-2 dB	$C_{tr\ (50-3150)}$ =	-10 dB
$C_{(50-5000)}$ =	-1 dB	$C_{tr\ (50-5000)}$ =	-11 dB
$C_{(100-5000)}$ =	-1 dB	$C_{tr\ (100-5000)}$ =	-7 dB

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