Evidence of Performance

Airborne sound insulation of fire rated products

Test Report 14-004052-PR01
(PB 01-E03-04-en-02)

Client	**Hilti Entwicklungsgesellschaft mbH** Hiltistr. 6 86916 Kaufering Germany
Product	Self - adhesive cabel seal against opening
Designation	Hilti Firestop Disc CFS-D 1”/25
Material Sealing material	one-sided film laminated adhesive pad, sealant based on Butyl, Ø ≈ 60 mm; d ≈ 4 mm; m = 14,6 g
Size of opening	25 mm x 25 mm
Basic element	Metal stud partition Double stud framing, double clad

Weighted normalized sound level difference of small building elements $D_{n,e,w}$
Spectrum adaption terms C and C_{tr}
Weighted sound reduction index R_w of element with penetration
Spectrum adaption terms C and C_{tr}
Sound Transmission Class STC of element with penetration

Opening sealed on both sides with
Hilti Firestop Disc CFS-D 1”/25
$D_{n,e,w}$ *(C; C_{tr})* = 70 (-2; -7) dB

Element with penetration sealed on both sides with
Hilti Firestop Disc CFS-D 1”/25
R_w *(C; C_{tr})* = 62 (-2; -7) dB
STC 62

Opening with cable, sealed on both sides with Hilti Firestop Disc CFS-D 1”/25
$D_{n,e,w}$ *(C; C_{tr})* = 71 (-3; -8) dB

Element with penetration (incl. cable) sealed on both sides with Hilti Firestop Disc CFS-D 1”/25
R_w *(C; C_{tr})* = 62 (-2; -7) dB
STC 62

ift Rosenheim
24.03.2015

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Basis

EN ISO 10140-1 : 2010
+ A1:2012 + A2:2014
EN ISO 10140-2 : 2010
EN ISO 717-1 : 2013
Additional
ASTM E 90-09
ASTM E 413-10-
14-004052-PR01 (PB 01-E03-04-de-02) dated 24.03.2015

Instructions for use

This test report serves to verify the sound insulation of fire rated products.

Validity

The data and results given relate solely to the tested and described specimen.

Testing the sound insulation does not allow any statement to be made on any further characteristics of the present construction regarding performance and quality.

Notes on publication

The **ift** Guidance Sheet "Conditions and Guidance for the Use of **ift** Test Documents" applies.

The cover sheet can be used as abstract.

Contents

The test report contains a total of 16 pages:

1 Object
2 Procedure
3 Detailed results
4 Instructions for use
Data sheets (5 pages)

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1 Object

1.1 Description of test specimen

Product	Self - adhesive cabel seal against opening
Product designation	Hilti Firestop Disc CFS-D 1”/25
Material	one-sided film laminated adhesive pad, sealant based on Butyl, Ø ≈ 60 mm; d ≈ 4 mm; m = 14,6 g
Test variants	- Test of double stud framing without openings - Test with opening 25 mm x 25 mm, sealed with Hilti Firestop Disc CFS-D 1”/25 - Test with opening 25 mm x 25 mm, with installed cable, sealed with Hilti Firestop Disc CFS-D 1”/25
Metal stud partition	
Manufacturer*	Metal stud partition mounted by **ift** Laboratory for Building Acoustics
Date of manufacture	20th of January 2015
Sampling	by **ift** Laboratory for Building Acoustics at builder’s merchant
Dimensions (W x H)	1,250 mm × 1,500 mm
Total thickness	155 mm
Structure	2 x 12.5 mm GKF 50 mm metal studs, mineral fibre insulation 40 mm 5 mm air 50 mm metal studs, mineral fibre insulation 40 mm 2 x 12,5 mm GKF
Stud framing	metal studs from 50 mm C-wall channel section (CW 50x50x06)
Cladding	Knauf Piano sound insulation board F, screw-fastened
Cavity insulation	ISOVER Protect BSP 40, mounted between stud framing
Penetration	
Clear opening	25 mm x 25 mm
Built-in components /Sealing	(test variant 1)
Cable	--
Fire rated product*	Hilti Firestop Disc CFS-D 1”/25
Installation	- Opening was sealed on both sides with self – adhesive Hilti Firestop Disc CFS-D 1”/25

Built-in components /Sealing	(test variant 2)
Cable*	NYY-J 5x1,5 RE, Ø = 13 mm
Fire rated product*	Hilti Firestop Disc CFS-D 1”/25
Installation	- Cable placed into opening, cable projects on both sides approx. 540 mm from partition, - Opening around cable were sealed with self – adhesive Hilti Firestop Disc CFS-D 1”/25

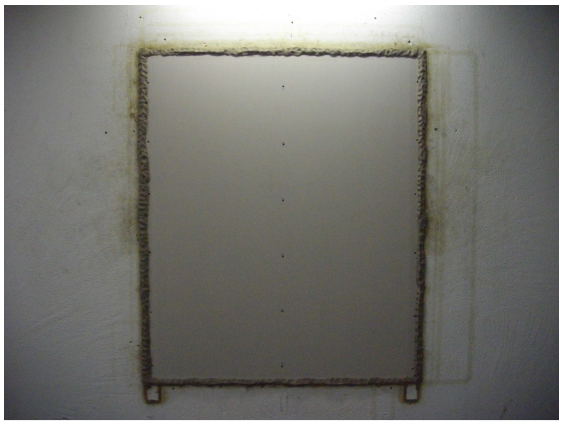
The description is based on inspection of the test specimen at **ift** Laboratory for Building Acoustics. Item designations / numbers as well as material specifications were provided by the client. Additional data provided by the client are marked with *

1.2 Mounting in test rig

Test rig	Window test rig „Z-Wall“ with suppressed flanking transmission acc. to EN ISO 10140-5: 2010 + A1:2014; the test rig includes a mounting frame with a continuous acoustic break which is sealed in the test opening with closed-cell permanently resilient sealant.
Mounting of test specimen	Mounted by **ift** Laboratory for Building Acoustics and employees of the client. The wall element was mounted by employees of **ift** Laboratory for Building Acoustics.
Mounting conditions	Wall element mounted in test opening of window test rig („Z-wall“) on source room. The acoustic separation wasn’t bridged. The wall element was sealed on both sides with sealant Type Perennator 2001 S grey.
Sealing	Built-in components were sealed towards partition with the adhesive pads.
Drying time	Rendering of the gypsum plasterboards was not necessary because the opening was in one board (without joints).

1.3 Representation of test specimen

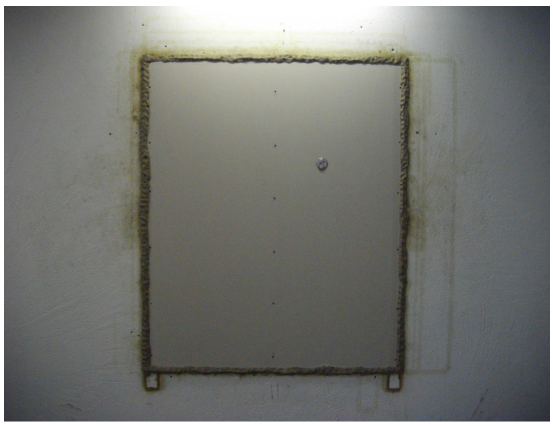
The structural details were examined solely on the basis of the characteristics to be classified.



Source room

Receiving room

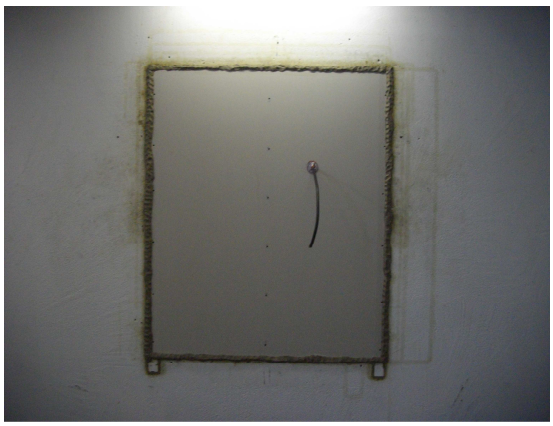
Fig. 1 Photos of metal stud partition mounted to window test rig, taken by **ift** Laboratory for Building Acoustics



Source room

Receiving room

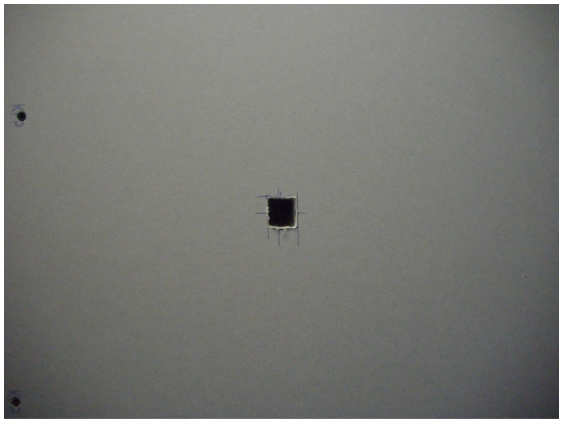
Fig. 2 Mounting of test variant 1



Source room

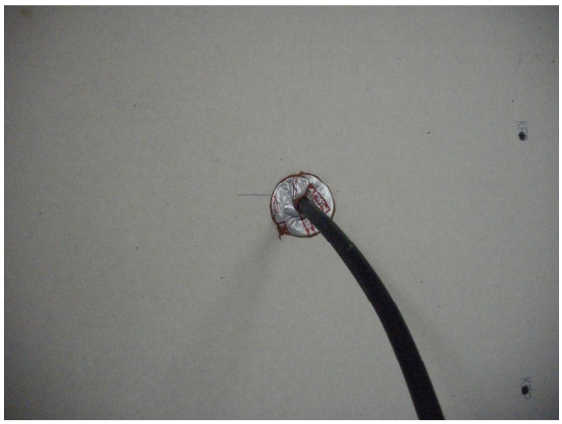
Receiving room

Fig. 3 Mounting of test variant 2



Opening

Detail of test variant 1



Detail of test variant 2

Hilti Firestop Disc CFS-D 1”/25

Fig. 4 Details of test variants

2 Procedure

2.1 Sampling

Sampling	The samples were selected by the client
Quantity	one marked, sealed pressure lock bag with 10 Pads
Manufacturer	Hilti Industriegesellschaft für Befestigungssysteme mbH
Manufacturing plant	Hilti Werk 6, fire rated production, Hilti Str.6, 86916 Kaufering
Batch number	DIH 9012015 P
Date of sampling	15th of January 2015
Procedure of sampling	Official sampling on 15th of January 2015 at production plant by auditors Mr. Karl Bohn (UL International Germany GmbH). The sealing (see fig. 5) of the marked-up samples was removed by an employee of ift Laboratory for Building Acoustics on the date of testing (29th of.January 2015)
Responsible for sampling	Mr. Dr. Johannes Huber
Delivery at **ift**	29th of.January 2015 by the client
ift registration number	38611

Samples Hilti Firestop Disc CFS-D 1”/25

Fig. 5 delivered samples, sealed and marked up

2.2 Process

Grundlagen

EN ISO 10140-1:2010 + A1 : 2012 + A2:2014	Acoustics; Laboratory measurement of sound insulation of building elements - Part 1: Application rules for specific products (ISO 10140-1:2010+Amd.1:2012+Amd.2:2014)
EN ISO 10140-2:2010	Acoustics; Laboratory measurement of sound insulation of building elements - Part 2: Measurement of airborne sound insulation (ISO 10140-2:2010)
EN ISO 717-1 : 2013	Acoustics; Rating of sound insulation in buildings and of building elements - Part 1: Airborne sound insulation

Correspond/s to the national German standard/s:
DIN EN ISO 10140-1:2014-09, DIN EN ISO 10140-2:2010-12 and DIN EN ISO 717-1 : 2013-06

Additional basis

ASTM E 90-09	Standard test method for laboratory measurement of airborne sound transmission loss of building partitions and elements
ASTM E 413-10	Classification for rating sound insulation
Boundary conditions	As specified by the standards. Upon request by the client additional evaluations of the STC were carried out in accordance with ASTM E 413-10.
Deviation	There are no deviations from the test method/s and/or test conditions acc. to EN ISO 10140. The volume of the test room falls below the minimum volume of 80 m³ as defined in ASTM E 90-09. The linear flow resistance of the insulating material was not determined.
Test noise	Pink noise
Measuring filter	One-third-octave band filter
Measurement limits	
Low frequencies	The dimensions of the receiving room were smaller than recommended for testing in the frequency range from 50 Hz to 80 Hz as per EN ISO 10140-4:2010 Annex A (informative). A moving loudspeaker was used.
Background noise level	The background noise level in the receiving room was determined during measurement and the receiving room level L_2 corrected by calculation as per EN ISO 10140-4: 2010 Clause 4.3.
Maximum sound insulation	For evaluation of the normalized level difference of the penetration through the wall the sound insulation of the wall alone was taken as maximum sound insulation. The difference

	between normalized sound level difference and maximum sound insulation of the test setup is partly smaller than 15 dB. For normalized sound level difference it was corrected by calculation as per EN ISO 10140-2:2010 Annex A. The graphs presented in the Annex include maximum sound insulation.
Measurement of reverberation time	Arithmetical mean: 6 measurements each of 2 loudspeaker positions with rotating microphone (total of 12 measurements).
Measurement equation A	$A = 0{,}16 \cdot \frac{V}{T}$ m²
Measurement of sound level difference	Minimum of 2 loudspeaker positions and rotating microphones.
Measurement equation	$R = L_1 - L_2 + 10 \cdot \lg \frac{S}{A}$ dB
Measurement equation $D_{n,e}$	$D_{n,e} = L_1 - L_2 + 10 \cdot \lg \frac{A_0}{A}$ in dB

KEY

A	Equivalent absorption area in m²
A_0	Reference absorption area (10 m²)
L_1	Sound pressure level source room in dB
L_2	Sound pressure level receiving room in dB
R	Sound reduction index in dB
$D_{n,e}$	Normalized sound level difference of small building elements in dB
T	Reverberation time in s
V	Volume of receiving room in m³
S	Testing area of the specimen in m²

2.3 Test apparatus

Device	Type	Manufacturer
Integrating sound meter	Type Nortronic 830	Norsonic-Tippkemper
Microphone preamplifiers	Type 1201	Norsonic-Tippkemper
Microphone unit	Type 1220	Norsonic-Tippkemper
Calibrator	Type 1251	Norsonic-Tippkemper
Dodecahedron loudspeakers	Own production	-
Amplifier	Type E120	FG Elektronik
Rotating microphone boom	Own production / Type 231-N-360	Norsonic-Tippkemper

The **ift** Laboratory for Building Acoustics participates in comparative measurements at the Physikalisch-Technische Bundesanstalt (PTB) in Braunschweig every three years, the last one was in April 2013. The sound level meter used, Series No. 17956, was DKD calibrated by the Company Norsonic Tippkemper (calibration agency) on 19th of January 2015.

2.4 Testing

Date	29th of January 2015
Operating Testing Officer	Mr. Stefan Bacher

3 Detailed results

The values of the measured sound reduction index of the wall element as well as the measured normalized sound level difference of small building elements of the tested elements are plotted as a function of frequency in the annexed data sheet and tabled.

They are used to calculate the weighted sound reduction index R_w / the weighted normalized sound level difference $D_{n,e,w}$ and the spectrum adaptation terms C and C_{tr} for the frequency range 100 Hz to 3,150 Hz, as described in Table 1. Additional to the rating according to EN ISO 717-1 a weighting according to ASTM E 413-10 was carried out. The sound transmission class STC according to ASTM E 413-10 for the frequency range from 125 Hz up to 4,000 Hz was calculated as follows:

Table 1 Results of acoustic tests

Data sheet No.	Component / Modification	Testing standard / Results in dB / Reference surface				
		EN ISO 10140-2	EN ISO 10140-2	ASTM E 413-10	EN ISO 10140-2	ASTM E 413-10
		Normalized sound level difference of penetrations	Sound insulation of the element with penetrations (without correction with maximum sound insulation)		Sound insulation of the element without penetrations	
		$D_{n,e,w}$ (C;C_{tr})	R_w (C;C_{tr})	STC	R_w (C;C_{tr})	STC
		A_0 = 10 m²	S = 1.88 m²	S = 1.88 m²	S = 1.88 m²	S = 1.88 m²
1	Metal stud partition	--	--	--	63 (-3;-8)	63
2	Metal stud partition with hole; closed with Hilti Firestop Disc CFS-D 1”/25	--	62 (-2;-7)	62	--	--
3	Metal stud partition with hole; closed with Hilti Firestop Disc CFS-D 1”/25	70 (-2;-7)	--	--	--	--

4	Metal stud partition with hole + cable; closed with Hilti Firestop Disc CFS-D 1”/25	--	62 (-2;-7)	62	--	--
5	Metal stud partition with hole + cable; closed with Hilti Firestop Disc CFS-D 1”/25	71 (-3;-8)	--	--	--	--

Referring to the tested values presented in Table 1 line 2 and 4 a correction for maximum sound insulation wasn’t performed by calculation (see Clause 2.2). With this correction the following values were determined for the sound insulation of the wall element with penetrations:

Table 2 Results of acoustic tests (additional information)

Data sheet No.	Component / Modification	Testing standard / Results in dB / Reference surface	
		EN ISO 10140-2	ASTM E 413-10
		Sound insulation of penetrations evaluated for a test area of 1.88 m² [1] (with correction with maximum sound insulation)	
		R_w ($C;C_{tr}$)	STC
		S = 1.88 m²	S = 1.88 m²
-	Metal stud partition with hole; closed with Hilti Firestop Disc CFS-D 1”/25	63 (-2;-7)	64
-	Metal stud partition with hole + cable; closed with Hilti Firestop Disc CFS-D 1”/25	63 (-2;-7)	64

[1] For the evaluation of the sound insulation of the penetration as a weighted sound reduction index and STC the measured values were corrected with maximum sound insulation according to Clause 2.2 and evaluated with a reference area of 1.88 m².

4 Instructions for use

4.1 Safety margin according to DIN 4109

Basis
DIN 4109:1989-11 Sound insulation in buildings, requirements and verifications

This test report is not an evidence of suitability as per DIN 4109: 1989-11. A calculated value is not indicated.

4.2 Constructions products list

As set out by the German Bauregelliste (Construction Products List), evidence of compliance in Germany is possible only in the form of an AbP (national technical test certificate). This test report cannot be used as a subtest to be included in a national technical test certificate (AbP).

4.3 Test standards

The standard series EN ISO 10140:2010 supersedes those, until the respective date, applicable parts of the standards series EN ISO 140 which describe laboratory tests. According to the two standard series, the test methods are identical.

Assessments as per ASTM E 413-10 were based on sound insulation testing as per EN ISO 10140-2 (previous EN ISO 140-3). For some details there are deviations from test standard ASTM E 90-09, in particular as regards the required room volume (min. 80 m³).

ift Rosenheim
Laboratory for Building Acoustics
24.03.2015

Sound reduction index according to ISO 10140 - 2

Laboratory measurements of airborne sound insulation of building elements

Client: Hilti Entwicklungsgesellschaft mbH, 86916 Kaufering (Germany)

Product designation Hilti Firestop Disc CFS-D 1”/25

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Design of test specimen

2 x 12.5 mm	GKF
50 mm	Metal stud CW 50 with 40 mm Mineral wool
5 mm	Air
50 mm	Metal stud CW 50 with 40 mm Mineral wool
2 x 12.5 mm	GKF

Metal stud partition without opening

Total thickness	155 mm
Area related mass	50.6 kg/m²

Test date	29th of January 2015
Test surface S	1.25 m x 1.50 m = 1.88 m²
Partition wall frame	Double-leaf concrete wall, insert
Test noise	pink noise
Volumes of test rooms	V_S = 104 m³ V_R = 67.5 m³

Maximum sound reduction index (not specified)

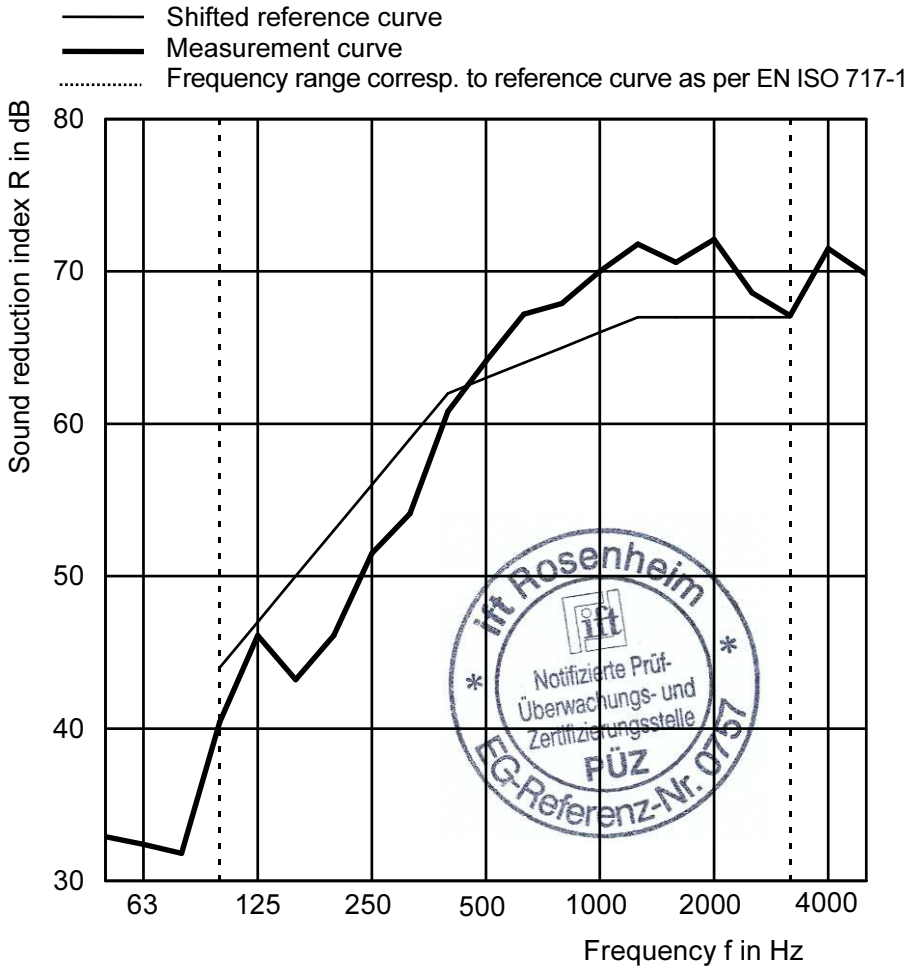
Mounting conditions

Wall element inserted in test opening. Joints to test stand sealed on both sides with plastic sealant.

Climate in test rooms 21 °C / 38% RH / 946 hPa

f in Hz	R in dB
50	32.9
63	32.4
80	31.8
100	40.4
125	46.1
160	43.2
200	46.1
250	51.5
315	54.1
400	60.8
500	64.1
630	67.2
800	67.9
1,000	70.0
1,250	71.8
1,600	70.6
2,000	72.1
2,500	68.6
3,150	67.1
4,000	71.5
5,000	69.8[x]

[x] Background noise level difference < 6 dB



Rating according to EN ISO 717-1 (in third octave bands):

R_w ($C;C_{tr}$) = 63 (-3;-8) dB $C_{50\text{-}3,150}$ = -5 dB; $C_{100\text{-}5,000}$ = -2 dB; $C_{50\text{-}5,000}$ = -4 dB

$C_{tr,50\text{-}3,150}$ = -14 dB; $C_{tr,100\text{-}5,000}$ = -8 dB; $C_{tr,50\text{-}5,000}$ = -14 dB

ift Rosenheim Laboratory for Building Acoustics
24.03.2015

S. Bacher

Mr. Stefan Bacher, Dipl.-Ing. (FH)
Operating Testing Officer

Sound reduction index according to ISO 10140 - 2

Laboratory measurements of airborne sound insulation of building elements

Client: Hilti Entwicklungsgesellschaft mbH, 86916 Kaufering (Germany)

Product designation Hilti Firestop Disc CFS-D 1”/25

ift ROSENHEIM

Design of test specimen

2 x 12.5 mm	GKF
50 mm	Metal stud CW 50 with 40 mm Mineral wool
5 mm	Air
50 mm	Metal stud CW 50 with 40 mm Mineral wool
2 x 12.5 mm	GKF

Metal stud partition with opening 25 mm x 25 mm
Opening sealed on both sides with Hilti Firestop Disc CFS-D 1”/25

Special features:
A correction for maximum sound insulation by calculation of test value wasn’t performed

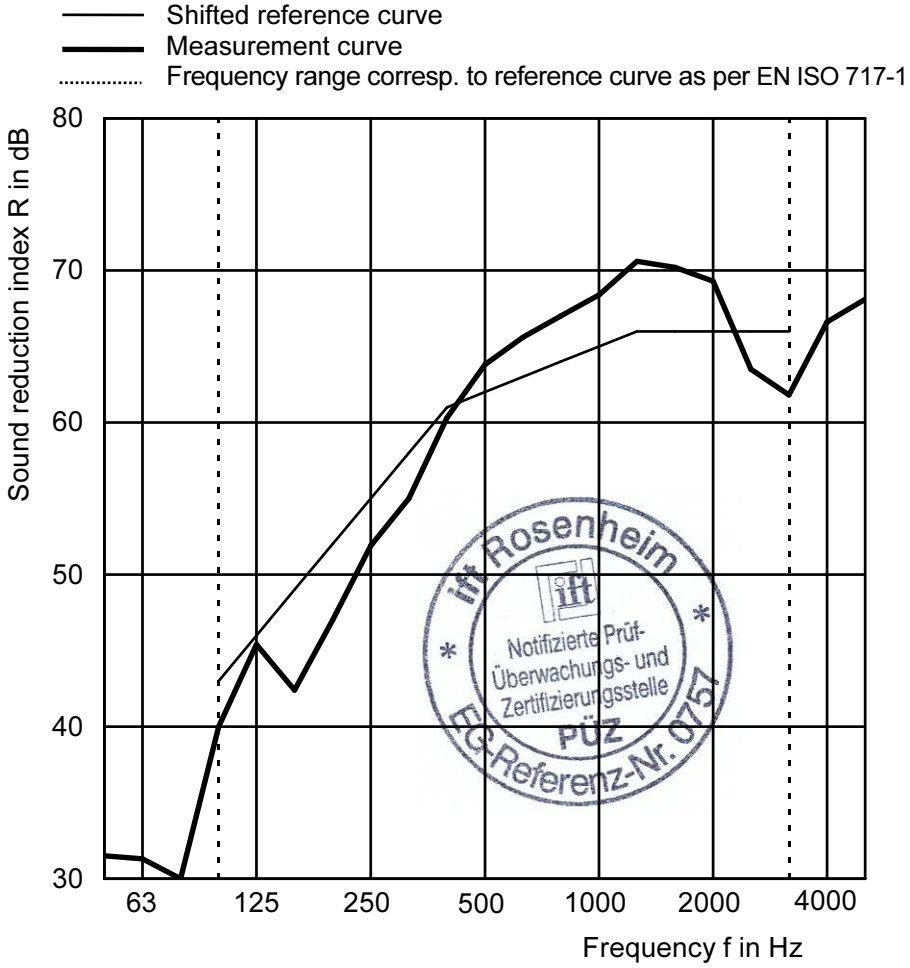
Test date	29th of January 2015
Test surface S	1.25 m x 1.50 m = 1.88 m²
Partition wall frame	Double-leaf concrete wall, insert
Test noise	pink noise
Volumes of test rooms	V_S = 104 m³ V_R = 67.5 m³

Maximum sound reduction index
$R_{w,max}$ = 63 dB (related to test area)

Mounting conditions
Element inserted in test opening closed by a wall unit.

Climate in test rooms 20 °C / 37% RH / 944 hPa

f in Hz	R in dB
50	31.5
63	31.3
80	30.0
100	40.0
125	45.4
160	42.4
200	47,0
250	51.9
315	55.0
400	60.3
500	63.8
630	65.6
800	67.0
1,000	68.4
1,250	70.6
1,600	70.2
2,000	69.3
2,500	63.5
3,150	61.8
4,000	66.6
5,000	68.1



Rating according to EN ISO 717-1 (in third octave bands):

R_w (C;C_{tr}) = 62 (-2;-7) dB $C_{50\text{-}3,150}$ = -5 dB; $C_{100\text{-}5,000}$ = -1 dB; $C_{50\text{-}5,000}$ = -4 dB

$C_{tr,50\text{-}3,150}$ = -14 dB; $C_{tr,100\text{-}5,000}$ = -7 dB; $C_{tr,50\text{-}5,000}$ = -14 dB

ift Rosenheim Laboratory for Building Acoustics
24.03.2015

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Operating Testing Officer

Normalized sound level difference acc. to ISO 10140 - 2

Laboratory measurements of airborne sound insulation of small building elements

Client: Hilti Entwicklungsgesellschaft mbH, 86916 Kaufering (Germany)

Product designation Hilti Firestop Disc CFS-D 1”/25

Design of test specimen

2 x 12.5 mm	GKF
50 mm	Metal stud CW 50 with 40 mm Mineral wool
5 mm	Air
50 mm	Metal stud CW 50 with 40 mm Mineral wool
2 x 12.5 mm	GKF

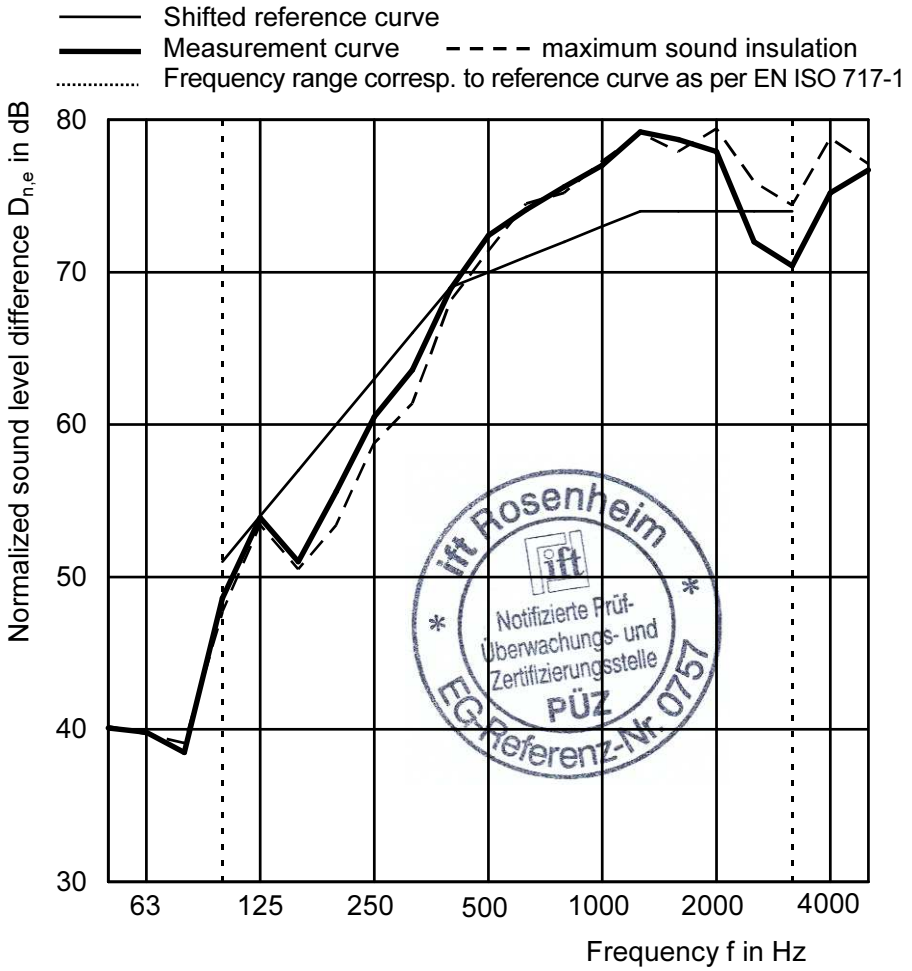
Metal stud partition with opening 25 mm x 25 mm
Opening sealed on both sides with Hilti Firestop Disc CFS-D 1”/25

Special features:
A correction for maximum sound insulation by calculation of test value was performed

Test date 29th of January 2015
Reference absorption area A_0 = 10 m²
Partition wall Double-leaf concrete wall, insert frame
Test noise pink noise
Volumes of test rooms V_S = 104 m³, V_R = 67.5 m³
Maximum sound insulation $D_{n,e,w,max}$ = 70 dB (related to A_0 = 10 m²)
Mounting conditions Element inserted in test opening closed by a wall unit.
Climate in test rooms 20 °C / 37% RH / 944 hPa

f in Hz	$D_{n,e}$ in dB
50	> 40.1
63	> 39.8
80	> 38.5
100	> 48.6
125	> 53.9
160	> 51.0
200	> 55.6
250	> 60.5
315	> 63.6
400	> 68.9
500	> 72.4
630	> 74.1
800	> 75.6
1,000	> 77.0
1,250	> 79.2
1,600	> 78.7
2,000	> 77.9
2,500	72.0
3,150	70.4
4,000	75.2
5,000	> 76.7

> Flanking transmission effect



Rating according to EN ISO 717-1 (in third octave bands):

$D_{n,e,w}$ ($C;C_{tr}$) = 70 (-2;-7) dB $C_{50\text{-}3,150}$ = -4 dB; $C_{100\text{-}5,000}$ = -1 dB; $C_{50\text{-}5,000}$ = -3 dB
$C_{tr,50\text{-}3,150}$ = -14 dB; $C_{tr,100\text{-}5,000}$ = -7 dB; $C_{tr,50\text{-}5,000}$ = -14 dB

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24.03.2015

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Mr. Stefan Bacher, Dipl.-Ing. (FH)
Operating Testing Officer

Sound reduction index according to ISO 10140 - 2

Laboratory measurements of airborne sound insulation of building elements

Client: Hilti Entwicklungsgesellschaft mbH, 86916 Kaufering (Germany)

Product designation Hilti Firestop Disc CFS-D 1”/25

ROSENHEIM

Design of test specimen

2 x 12.5 mm	GKF
50 mm	Metal stud CW 50 with 40 mm Mineral wool
5 mm	Air
50 mm	Metal stud CW 50 with 40 mm Mineral wool
2 x 12.5 mm	GKF

Metal stud partition with opening 25 mm x 25 mm
Filled with cable Ø 13 mm, on both sides sealed with Hilti Firestop Disc CFS-D 1”/25

Special features:
A correction for maximum sound insulation by calculation of test value wasn’t performed

Test date	29th of January 2015
Test surface S	1.25 m x 1.50 m = 1.88 m²
Partition wall frame	Double-leaf concrete wall, insert
Test noise	pink noise
Volumes of test rooms	V_S = 104 m³ V_R = 67.5 m³

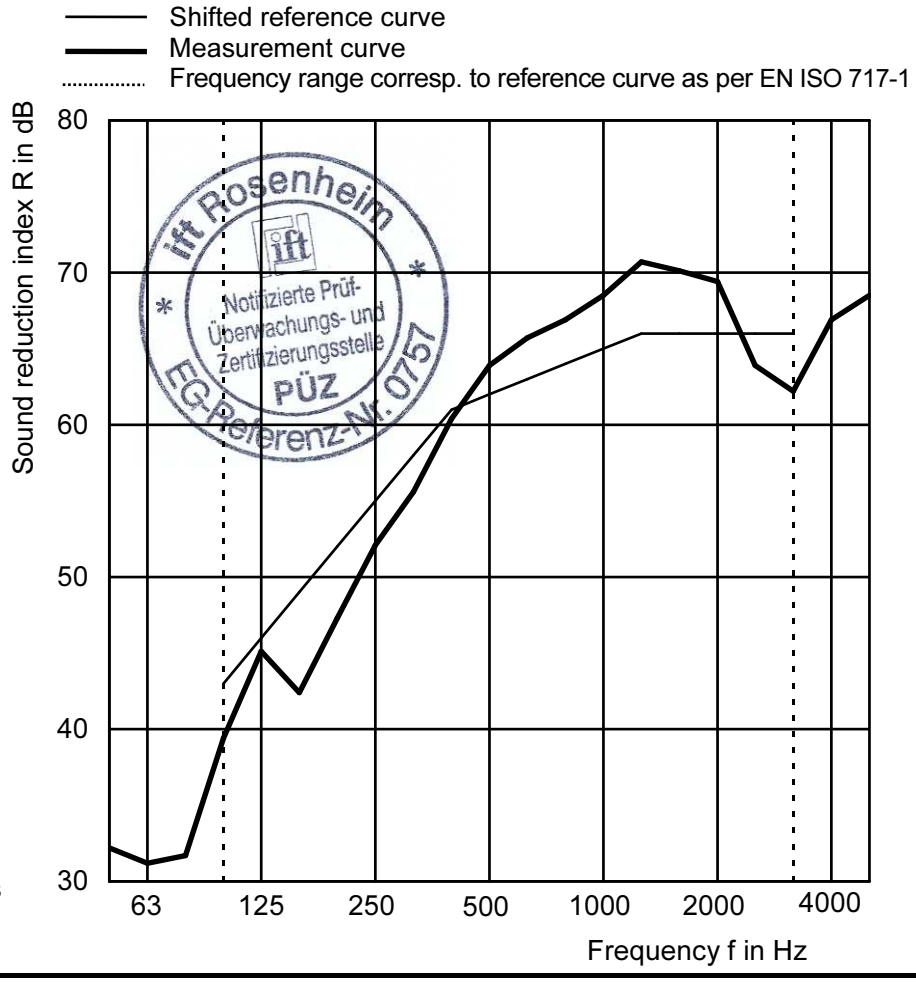
Maximum sound reduction index
$R_{w,max}$ = 63 dB (related to test area)

Mounting conditions
Element inserted in test opening closed by a wall unit.

Climate in test rooms 20 °C / 37% RH / 944 hPa

f in Hz	R in dB
50	32.2
63	31.2
80	31.7
100	39.4
125	45.1
160	42.4
200	47.3
250	52.1
315	55.6
400	60.4
500	63.9
630	65.7
800	66.9
1,000	68.5
1,250	70.7
1,600	70.1
2,000	69.4
2,500	63.9
3,150	62.2
4,000	66.9
5,000	68.5[x]

[x] Background noise level difference < 6 dB



Rating according to EN ISO 717-1 (in third octave bands):

R_w ($C;C_{tr}$) = 62 (-2;-7) dB $C_{50\text{-}3,150}$ = -4 dB; $C_{100\text{-}5,000}$ = -1 dB; $C_{50\text{-}5,000}$ = -3 dB

$C_{tr,50\text{-}3,150}$ = -14 dB; $C_{tr,100\text{-}5,000}$ = -7 dB; $C_{tr,50\text{-}5,000}$ = -14 dB

ift Rosenheim Laboratory for Building Acoustics
24.03.2015

Mr. Stefan Bacher, Dipl.-Ing. (FH)
Operating Testing Officer

Normalized sound level difference acc. to ISO 10140 - 2

Laboratory measurements of airborne sound insulation of small building elements

Client: Hilti Entwicklungsgesellschaft mbH, 86916 Kaufering (Germany)

Product designation Hilti Firestop Disc CFS-D 1”/25

Design of test specimen

2 x 12.5 mm	GKF
50 mm	Metal stud CW 50 with 40 mm Mineral wool
5 mm	Air
50 mm	Metal stud CW 50 with 40 mm Mineral wool
2 x 12.5 mm	GKF

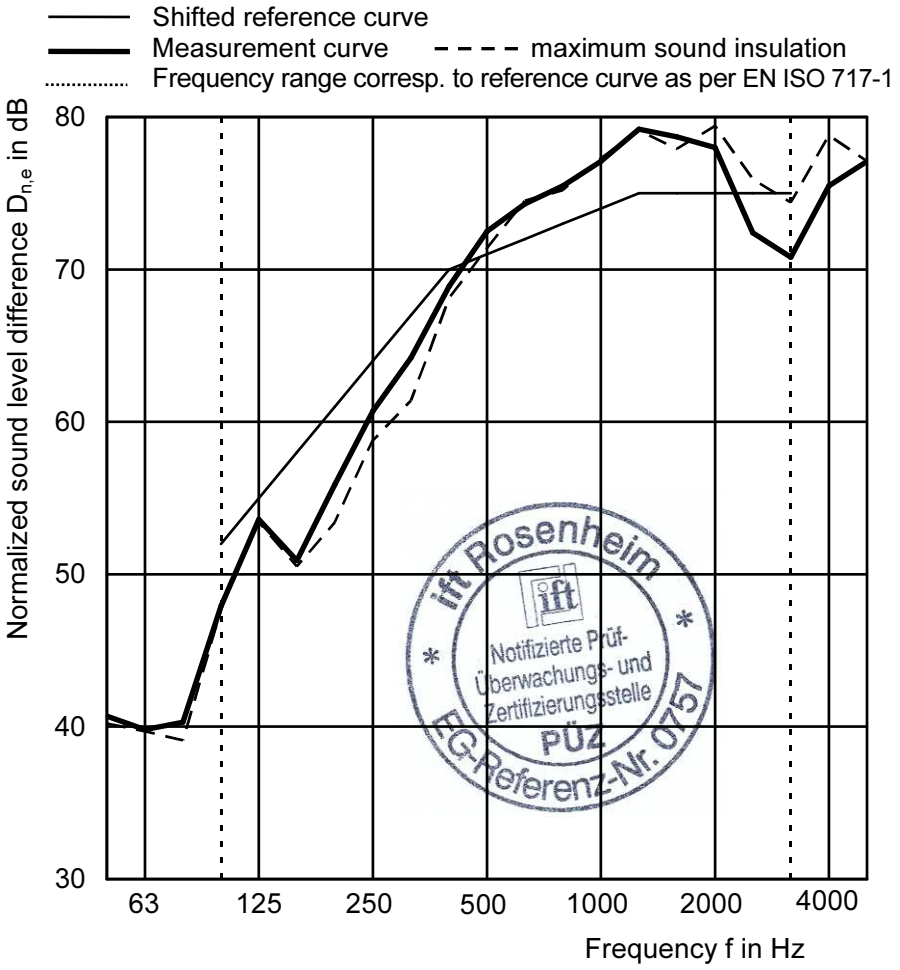
Metal stud partition with opening 25 mm x 25 mm
Filled with cable Ø 13 mm, on both sides sealed with Hilti Firestop Disc CFS-D 1”/25

Special features:
A correction for maximum sound insulation by calculation of test value was performed

Test date 29th of January 2015
Reference absorption area A_0 = 10 m²
Partition wall Double-leaf concrete wall, insert frame
Test noise pink noise
Volumes of test rooms V_S = 104 m³, V_R = 67.5 m³
Maximum sound insulation $D_{n,e,w,max}$ = 70 dB (related to A_0 = 10 m²)
Mounting conditions Element inserted in test opening closed by a wall unit.
Climate in test rooms 20 °C / 37% RH / 944 hPa

f in Hz	$D_{n,e}$ in dB
50	> 40.7
63	> 39.8
80	> 40.3
100	> 47.9
125	> 53.6
160	> 50.9
200	> 55.9
250	> 60.7
315	> 64.2
400	> 68.9
500	> 72.5
630	> 74.3
800	> 75.5
1,000	> 77.1
1,250	> 79.2
1,600	> 78.7
2,000	> 78.0
2,500	72.4
3,150	70.8
4,000	75.5
5,000	> 77.1[x]

[x] Background noise level difference < 6 dB
≥ Flanking transmission effect



Rating according to EN ISO 717-1 (in third octave bands):

$D_{n,e,w}$ ($C;C_{tr}$) = 71 (-3;-8) dB $C_{50-3,150}$ = -5 dB; $C_{100-5,000}$ = -2 dB; $C_{50-5,000}$ = -4 dB
$C_{tr,50-3,150}$ = -14 dB; $C_{tr,100-5,000}$ = -8 dB; $C_{tr,50-5,000}$ = -14 dB

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