

Test report

No. 164 32099/Z01-Z04e



This is a translation of Test Report No. 16432099/Z01-Z04 dated 09 October 2006

Date of report 09. October 2006

Client **Hilti Entwicklungsgesellschaft mbH**
Hiltistrasse 6

86916 Kaufering
Germany

Order Determination of the sound reduction index R
acc. to DIN EN ISO 140-3:2005-03, rating
acc. to DIN EN ISO 717-1:1997-01

Determination of the
normalized level difference $D_{n,e}$
acc. to DIN EN 20 140-10:1992-09, rating
acc. to DIN EN ISO 717-1:1997-01

Determination of the sound transmission loss TL
acc. to ASTM standard E 90 - 04, rating
acc. to ASTM standard E 413 - 04

Object Double metal stud partition wall with opening, sealed with
firestop cushion - product designation
"Hilti Brandschutzkissen CP 651N"

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- 3 Procedure
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- 5 Instructions for use

Data sheets (7 pages)
Total 17 pages



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Landesbauordnung: BAY24
Sachverständige Prüfstelle Gruppe I
für Eignungs- und Güteprüfung nach DIN 4109

1 Order

The company Hilti Entwicklungsgesellschaft mbH, Kaufering commissioned the **ift** Schallschutzzentrum (Centre for Acoustics), to determine the sound reduction index R of a double metal stud partition wall, mounted to a window test opening as set out by to DIN EN ISO 140-3:2005-03 and to estimate the weighted sound reduction index R_w acc. to DIN EN ISO 717-1:1997-01.

Some measurements included a wall opening provided with different fillings.
 For these measurements also the normalized level difference $D_{n,e}$ as per DIN EN 20 140-10:1992-09 referring to the opening as well as the weighted normalized level difference $D_{n,e,w}$ were determined.

2 Object

2.1 Description of test specimen

2.1.1 Partition wall construction

Product

Manufacturer*	Metal stud partition wall with double stud frame	
Date of manufacture*	Metal stud partition wall mounted by ift Centre for Acoustics	
Sampling	26-07-2006	
Dimensions (W x H)	By the ift Centre for Acoustics at builders' merchants	
Mass per unit area	1230 mm x 1480 mm	
Total thickness	47.6 kg/m ²	
Configuration:	2 x 12.5 mm	GKF
	50 mm	Metal stud frame
		Mineral fibre insulation 40 mm
	5 mm	Separating joint, air gap
		Design - symmetrical

Cladding 1st layer

Manufacturer	Knauf Gips AG
Product designation	Knauf Piano Sound insulation board F
Material	Fire resistant board, GKF
Thickness of board	12.5 mm
Size of board	1230 mm x 1480 mm
Mass per unit area	11 kg/m ²
Assembly	Screwed to stud frame, screws spaced at approx. 700 mm, screw size 3.9 x 25 mm, without butt joints

Cladding 2nd layer

Manufacturer	Knauf Gips AG
Product designation	Knauf Piano sound insulation board F
Material	Fire-resistant board, GKF
Thickness of board	12.5 mm
Size of board	1230 mm × 1480 mm
Mass per unit area	11 kg/m ²
Assembly	Screwed to stud frame, screws spaced at approx. 200 mm, screw size 3.9 x 35 mm, without butt joints

Stud frame

Type	Metal stud made from 50 mm C-sections (CW 50x50x06) mounted with 5 mm air gap between studs
Profile cross section (D x W x T)	50 mm × 50 mm × 0,6 mm
Spacing	675 mm / 250 mm
Clearance between claddings	105 mm
Material	Sheet steel
Assembly	inserted into edge sections

Edge section

Type	Floor and ceiling trims made from sheet steel (UW 50)
Profile cross section (D x W x T)	40 mm x 50 mm x 0.6 mm
Assembly	PE-sealing strip 45 mm x 3 mm bonded to sections, sections mounted to test rig opening using Halfen screws, screws spaced at 300 mm

Cavity insulation

Manufacturer*	Deutsche Rockwool Mineralwoll GmbH & Co. OHG
Product designation*	Termarock 40
Material*	Mineral wool fire-resistant board
Size of board	1000 mm × 625 mm
Thickness of board*	40 mm
Density	44.3 kg/m ³
Linear airflow resistance*	$r > 12 \text{ kPa s/m}^2$
Fixing method	Clamped between stud frame

Opening

Clear opening dimensions (W x H)	600 mm x 500 mm
Position	Centre of stud partition
Reveals	Perimeter cladding using 2 x 12.5 mm GKF
Joints	Sealed with silicone
Separating joint of stud frame	Bridged with reveal claddings

2.1.2 Firestop cushion

Product	Firestop cushion
Manufacturer*	Hilti Entwicklungsgesellschaft mbH
Date of manufacture* (encoded)	CP 651N-S 195062 CP 651N-M 194062 CP 651N-L 193062
Sampling	By client monitored by the ift
Product designation	Hilti firestop cushion (Brandschutzkissen) CP 651N-S, CP 651N-M, CP 651N-L
Dimensions (l x w x h), approx.	300 mm x 175 mm x 30 mm (CP 651N-S) 300 mm x 90 mm x 27 mm (CP 651N-M) 300 mm x 55 mm x 23 mm (CP 651N-L)
Density	273 kg/m ³
Design:	Outer bag fibreglass fabric d ~ 0.1 mm Filling granulate wrapped in film
Assembly	
Installation	by client
Installation sequence	Cushions of different sizes are placed in the opening and flattened using a hammer
Installation position	Approx. 80 mm projection on source room side Approx. 60 mm projection on receiving room side
Installation modification	For measurement No. 16432099.Z04 the firestop cushion size M was replaced with a cushion size S and 5 electric cables of approx. 8 – 12 mm Ø

The description is based on inspection of the test specimen at **ift** Centre for Acoustics. Article designations/numbers as well as material specifications were given by the client. Additional manufacturer data are marked with *).

2.2 Mounting to test rig

Test rig	Window test rig ("Z-wall"): Test rig with suppressed flanking transmission as per EN ISO 140-1. The joint of the test opening is filled with permanently elastic closed-pore sealant.
Mounting of test specimens	Metal stud partition wall: by personnel of ift Centre for Acoustics Firestop cushions: by client
Mounting position	Mounting of double stud partition on source room side to test opening of window test rig (Z-wall) as per EN 20140-3:1995 + A1:2004, Annex H. The acoustic separation was not bridged.

Assembly	Floor and ceiling sections, as well as edge supports were screwed to test rig (Halfen screws M6, screws spacing $e = 300 - 500$ mm)
Sealing of test rig	Sealing between test rig and edge sections via PE sealing strips of 45 mm x 3 mm. Edge joints between cladding and test rig sealed with sealant type Perennator 2001 S grey.

2.3 Representation of test specimen

The constructional details were inspected solely on the basis of the characteristics to be classified.

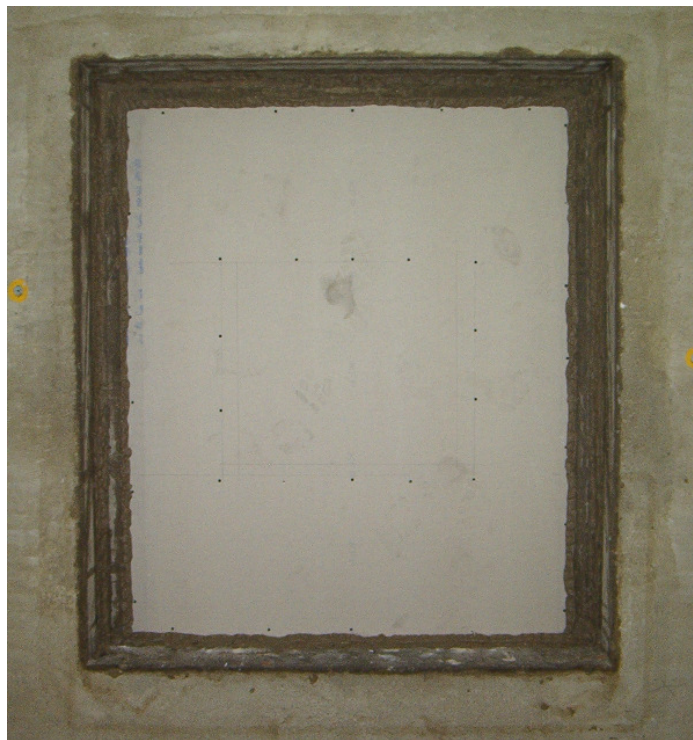


Fig. 1 Photo of installed metal stud partition, taken by ift Centre for Acoustics



Fig. 2 Photo of metal stud partition with opening, taken by ift Centre for Acoustics – horizontal section of stud partition.

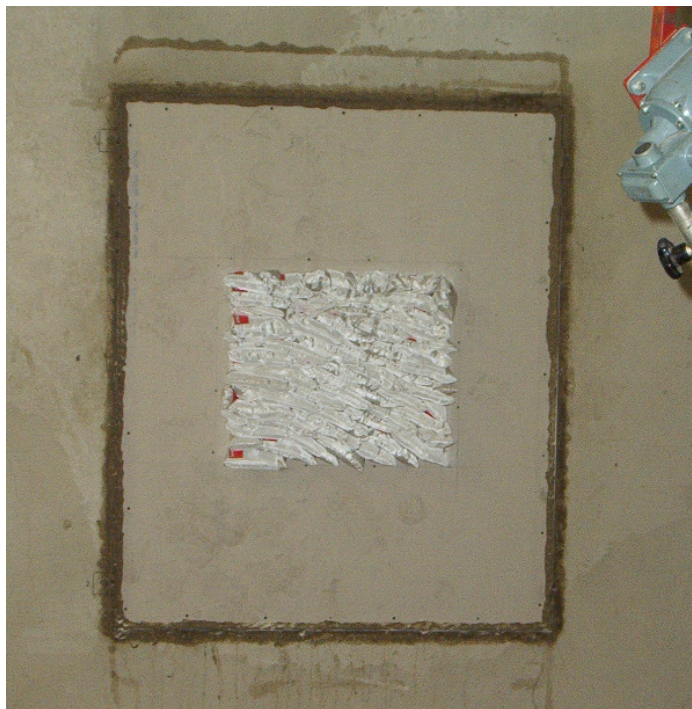


Fig. 3 Photo of metal stud partition with installed firestop cushion, taken by ift Centre for Acoustics



Fig. 4 Photo of cable opening, taken by ift Centre for Acoustics

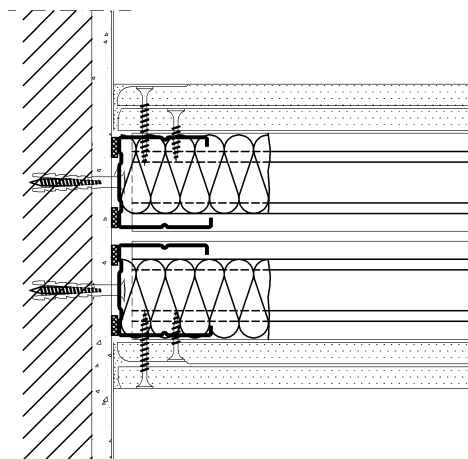


Fig. 5 Sectional drawing of metal stud partition W115, Source: www.knauf.de

3 Procedure

3.1 Sampling

Selection of test specimen	Selection of the test specimens from the sealed pallets delivered to the ift was performed by the client and monitored.
Scope of sampling	1
Delivered to ift	on 26 July 2006 by the client
Registration number	20399/01

3.2 Process

Basis

EN ISO 140-1:1997 + A1:2004	Acoustics - Measurement of sound insulation in buildings and of building elements - Part 1: Requirements for laboratory test facilities with suppressed flanking transmission
EN 20140-3:1995 + A1:2004	Acoustics - Measurement of sound insulation in buildings and of building elements - Part 3: Laboratory measurements of airborne sound insulation of building elements
EN 20140-10:1992	Acoustics - Measurement of sound insulation in buildings and of building elements - Part 10: Laboratory measurement of airborne sound insulation of small building elements
EN ISO 717-1 : 1996	Acoustics - Measurement of sound insulation in buildings and of building elements - Part 1: Airborne sound insulation
ASTM E 90 - 04	Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
ASTM E 413 - 04	Classification for Rating Sound Isolation

Equivalent to the national versions:

DIN EN ISO 140-1:2005-03, DIN EN ISO 140-3:2005-03, DIN EN ISO 140-10:1992-09 und DIN EN ISO 717-1 : 1997-01

Boundary conditions As specified by the standards

Test noise Pink noise

Measuring filter One-third-octave band filter

Measurement limits

Background noise level The background noise level of the receiving room was determined during measurement and the receiving room level L_2 was corrected by calculation as set out by EN 20140-3:1995 + A1:2004 Clause 6.5.

Maximum sound insulation Maximum sound insulation of the test set-up was $R_{w,Max} = 62$ dB. It was not corrected by calculation.

Measurement of reverberation time Arithmetical mean: Six measurements each of 2 loudspeaker and 6 microphone positions (total of 12 measurements).

Measurement equation A
$$A = 0,16 \cdot \frac{V}{T} \text{ m}^2$$

Measurement of sound level difference Minimum of 2 loudspeaker positions and rotating microphones

Measurement equations
$$R = L_1 - L_2 + 10 \cdot \lg \frac{S}{A} \text{ dB}$$

$$D_{n,e} = L_1 - L_2 + 10 \cdot \lg \frac{A_0}{A} \text{ dB}$$

KEY

A	Equivalent absorption surface in m ²
A ₀	Reference absorption surface = 10 m ²
D _{n,e}	Normalized sound level difference in dB
L ₁	Sound level of source room in dB
L ₂	Sound level of receiving room in dB
R	Sound reduction index in dB
S	Test surface of test specimen in m ² ; S = 1,88 m ²
T	Reverberation times in s
V	Volume of receiving room in m ³
S	Test surface of test specimen in m ²

3.3 Test equipment

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

3.4 Testing

Date	27 July 2006
Test engineer	Mr. Stefan Bacher

4 Detailed results

The values referring to the measured sound reduction index, sound transmission loss or normalized level difference of the tested specimens are plotted against frequency in the enclosed data sheets and are tabled.

As per EN ISO 717-1 : 1996-12 for the frequency range 100 Hz to 3150 Hz the weighted sound reduction index R_w (related to test surface $S = 1,88 \text{ m}^2$), the weighted normalized level difference $D_{n,e,w}$ for the opening and the spectrum adaptation terms C and C_{tr} as well acc. to ASTM E 413 – 04 for the frequency range 125 Hz to 4000 Hz, the Sound Transmission Class STC are calculated according to Table 1.

Table 1 Measured results

Data Sheet No.	Record No.	Opening in stud partition	Filling of opening	Results in dB		
				R_w (C; C_{tr})	$D_{n,e,w}$ (C; C_{tr})	STC
1 / 2	Z01	None	none	62 (-2; -7)	--	62
3 / 4	Z02	600 mm x 500 mm	none	8 (-1; 0)	--	7
5 / 6 / 7	Z03	600 mm x 500 mm	Firestop cushion	50 (-1; -5)	58 (-2; -6)	50
	Z04	600 mm x 500 mm	Firestop cushion and cables	50 (-2; -6)	57 (-2; -6)	49

5 Instructions for use

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

5.1 Calculated value

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

5.2 Validity of test results

The data and results given refer solely to the described test specimen. Testing for sound insulation does not allow any statement to be made on any further characteristics regarding performance and quality of the construction submitted.

ift Rosenheim

9. October 2006



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 ift Centre for Acoustics



Stefan Bacher, Dipl.-Ing. (FH)
 Test Engineer
 ift Centre for Acoustics

Sound Reduction Index acc. to ISO 140 - 3

Laboratory measurements of airborne sound insulation of building elements

Client: Hilti Entwicklungsgesellschaft mbH, 86916 Kaufering, Germany

Product designation **Hilti Brandschutzkissen CP 651N**



Partition wall construction

2 x 12.5 mm GKF
50 mm Metal stud frame
Mineral fibre insulation 40 mm
5 mm Separating joint, air gap
Design - symmetrical

Partition wall without opening

Total thickness 155 mm
Mass per unit area 47.6 kg/m²

Date 27 July 2006

Test surface S 1.25 m × 1.50 m = 1.88 m²

Test rig as per EN ISO 140-1

Test Noise Pink noise

Volumes of test rooms $V_S = 101 \text{ m}^3$
 $V_E = 67.5 \text{ m}^3$

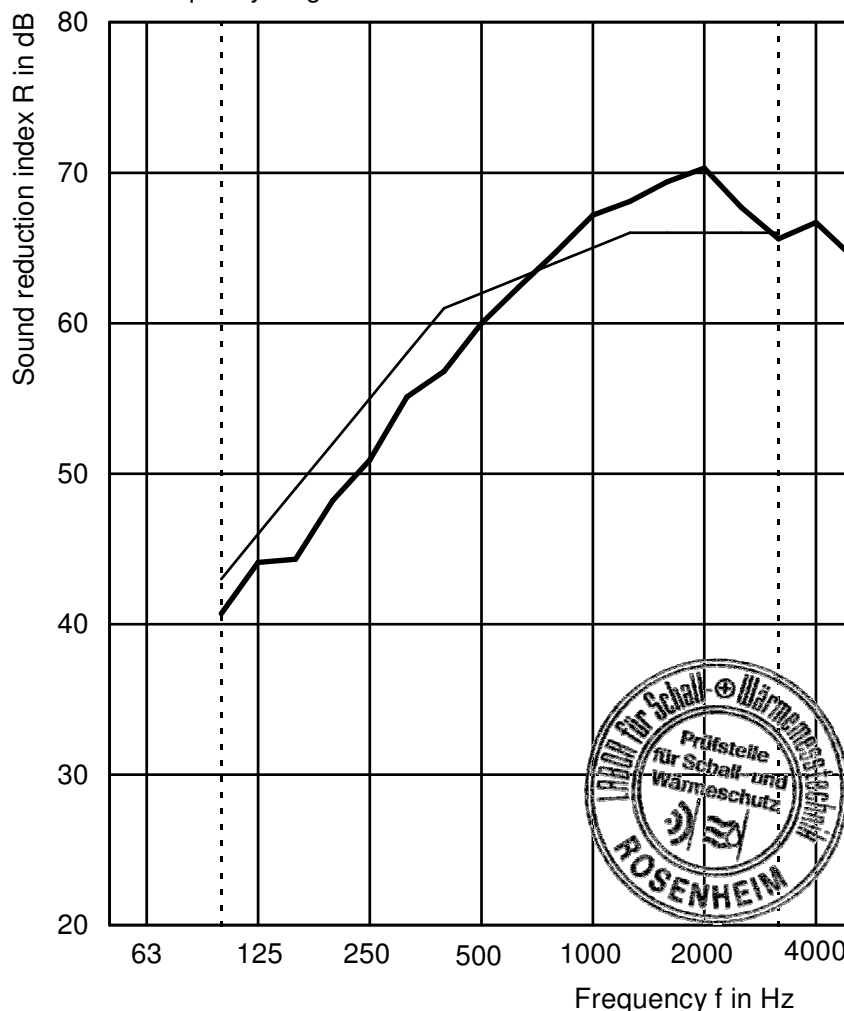
Maximum sound reduction index
 $R_{w,max} = 62 \text{ dB}$ (related to test surface)

Installation by client

Climate in test rooms 25 °C / 65 % RH

f in Hz	R in dB
50	
63	
80	
100	40,7
125	44,1
160	44,3
200	48,2
250	50,9
315	55,1
400	56,8
500	60,0
630	62,4
800	64,7
1000	67,2
1250	68,1
1600	69,4
2000	70,3
2500	67,7
3150	65,6
4000	66,7
5000	64,4

— shifted reference curve
— measurement curve
..... frequency range acc. to reference curve of EN ISO 717-1



Rating acc. to EN ISO 717-1 (in one-third-octave bands):

$R_w (C; C_{tr}) = 62 (-2; -7) \text{ dB}$
 $C_{50-3150} = - \text{ dB}; C_{100-5000} = -1 \text{ dB}; C_{50-5000} = - \text{ dB}$
 $C_{tr,50-3150} = - \text{ dB}; C_{tr,100-5000} = -7 \text{ dB}; C_{tr,50-5000} = - \text{ dB}$

Test report No.: **164 32099/Z01-Z04e**

Data sheet 1, measurement Z01

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Centre for Acoustics

9. October 2006

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Head of Testing Department

Sound Transmission Loss acc. to ASTM E90 - 04



Client: Hilti Entwicklungsgesellschaft mbH, 86916 Kaufering

Product designation **Hilti Brandschutzkissen CP 651N**

Partition wall construction

2 x 12.5 mm GKF
50 mm Metal stud frame
Mineral fibre insulation 40 mm
5 mm Separating joint, air gap
Design - symmetrical

Date of test 27 July 2006

Test surface S $1.25 \text{ m} \times 1.50 \text{ m} = 1.88 \text{ m}^2$

Test rig as per EN ISO 140-1

Test noise Pink noise

Volumes of test rooms $V_S = 101 \text{ m}^3$
 $V_E = 67.5 \text{ m}^3$

Maximum sound reduction index
 $R_{w,max} = 62 \text{ dB}$ (related to test surface)

Installation by client

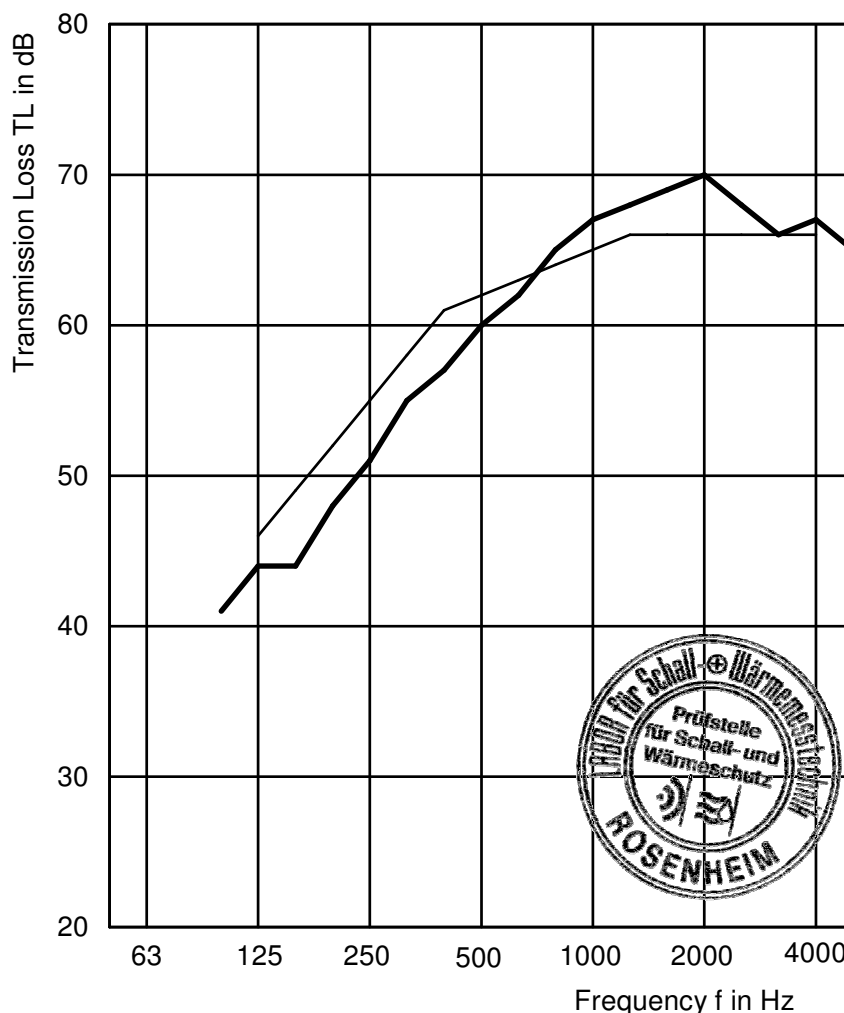
Climate in test rooms $25^\circ \text{C} / 65\% \text{ RH}$

Partition wall without opening

Total thickness 155 mm
Mass per unit area 47.6 kg/m^2

f in Hz	TL in dB
50	
63	
80	
100	41
125	44
160	44
200	48
250	51
315	55
400	57
500	60
630	62
800	65
1000	67
1250	68
1600	69
2000	70
2500	68
3150	66
4000	67
5000	65

— shifted reference curve
— measurement curve



Rating acc. to ASTM E413 - 04:

STC = 62 dB

Test report No.: **164 32099/Z01-Z04e**

Data sheet 2, measurement Z01

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Centre for Acoustics

9. October 2006

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Head of Testing Department

Sound Reduction Index acc. to ISO 140 - 3

Laboratory measurements of airborne sound insulation of building elements

Client: Hilti Entwicklungsgesellschaft mbH, 86916 Kaufering, Germany

Product designation **Hilti Brandschutzkissen CP 651N**



Partition wall construction

2 x 12.5 mm GKF
50 mm Metal stud frame
Mineral fibre insulation 40 mm
5 mm Separating joint, air gap
Design - symmetrical

Open opening of 600 mm x 500 mm in partition centre

Total thickness 155 mm

Date of test 27 July 2006

Test surface S $1.25 \text{ m} \times 1.50 \text{ m} = 1.88 \text{ m}^2$

Test rig Nach EN ISO 140-1

Test noise Pink noise

Volumes of test rooms $V_S = 101 \text{ m}^3$
 $V_E = 67.5 \text{ m}^3$

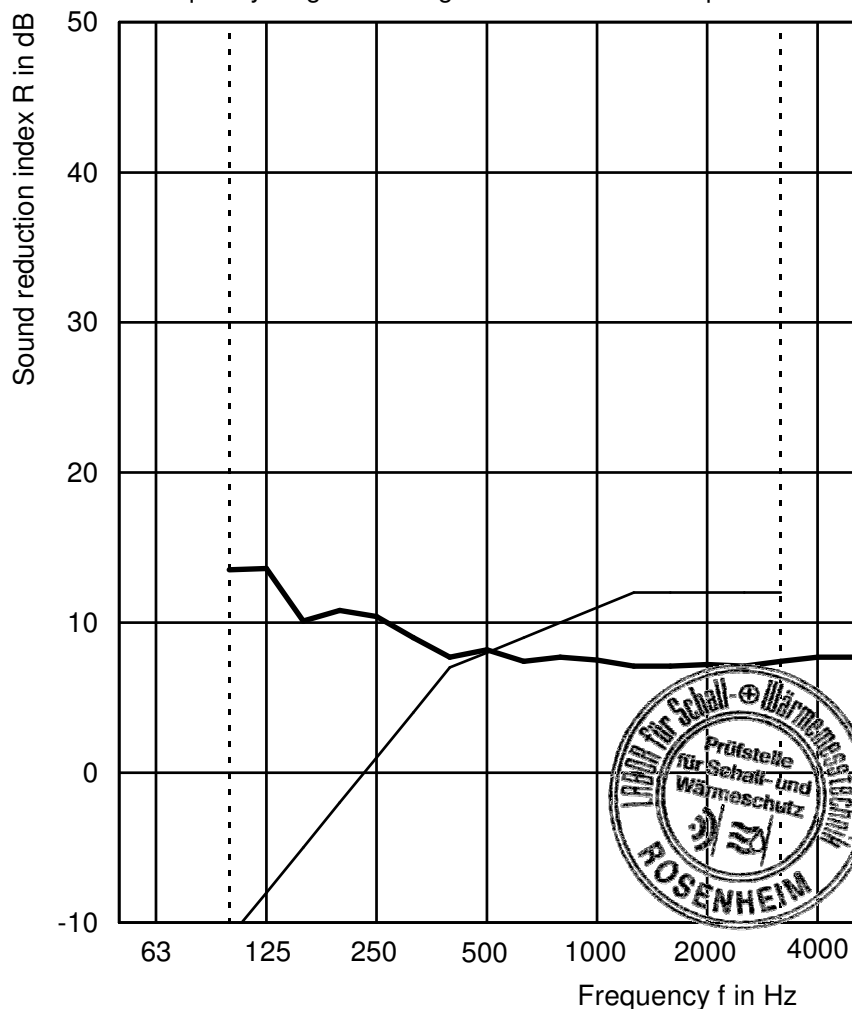
Maximum sound reduction index
 $R_{w,max} = 62 \text{ dB}$ (related to test surface)

Installation by client

Climate in test rooms $25^\circ \text{C} / 65\% \text{ RH}$

f in Hz	R in dB
50	
63	
80	
100	13,5
125	13,6
160	10,1
200	10,8
250	10,4
315	9,0
400	7,7
500	8,2
630	7,4
800	7,7
1000	7,5
1250	7,1
1600	7,1
2000	7,2
2500	7,1
3150	7,4
4000	7,7
5000	7,7

— shifted reference curve
— measurement curve
..... frequency range according to reference curve as per EN ISO 717-1



Rating acc. to EN ISO 717-1 (in one-third-octave bands):

$R_w (C; C_{tr}) = 8 (-1; 0) \text{ dB}$
 $C_{50-3150} = - \text{ dB}; C_{100-5000} = -1 \text{ dB}; C_{50-5000} = - \text{ dB}$
 $C_{tr,50-3150} = - \text{ dB}; C_{tr,100-5000} = 0 \text{ dB}; C_{tr,50-5000} = - \text{ dB}$

Test report No.: **164 32099/Z01-Z04e**

Data sheet 3, measurement Z02

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Centre for Acoustics

9. October 2006

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Sound Transmission Loss acc. to ASTM E90 - 04

Client: Hilti Entwicklungsgesellschaft mbH, 86916 Kaufering, Germany

Product designation **Hilti Brandschutzkissen CP 651N**



Partition wall construction

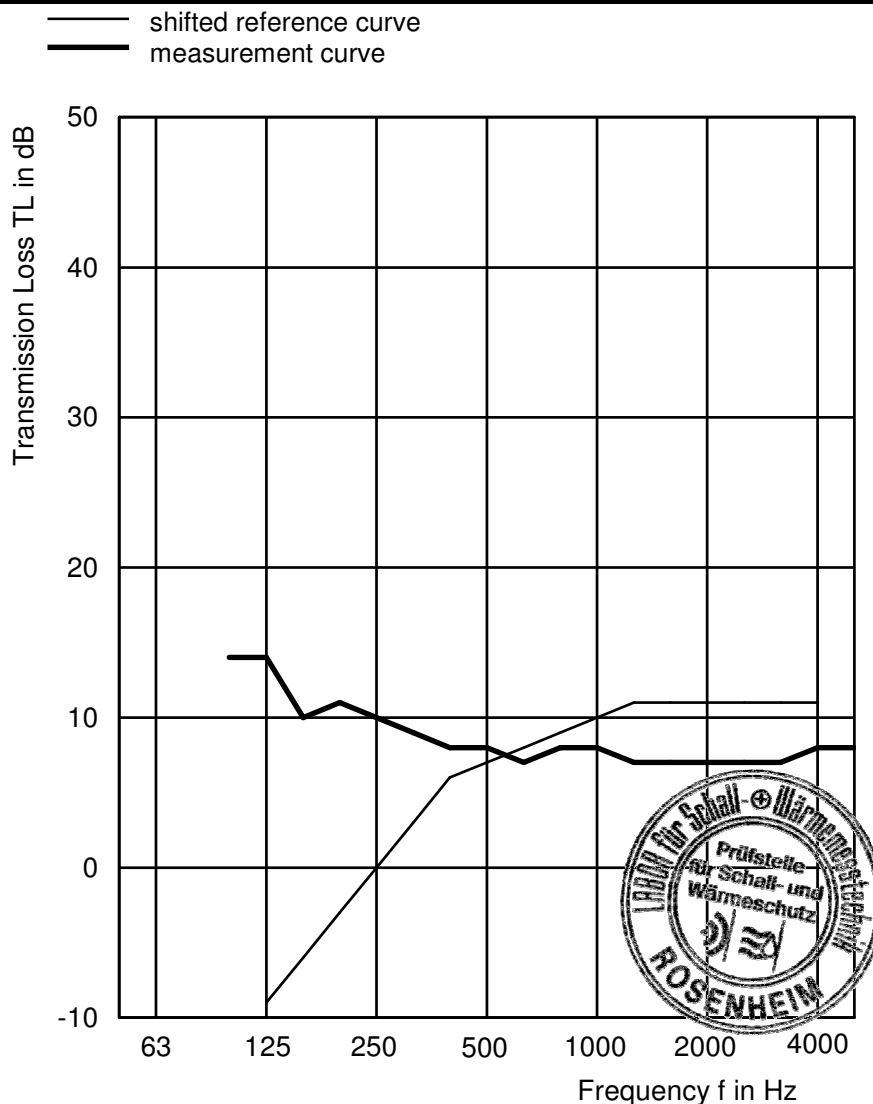
2 x 12.5 mm GKF
50 mm Metal stud frame
Mineral fibre insulation 40 mm
5 mm Separating joint, air gap
Design - symmetrical

Open opening of 600 mm x 500 mm in partition centre

Total thickness 155 mm

Date of test 27 July 2006
Test surface S $1.25 \text{ m} \times 1.50 \text{ m} = 1.88 \text{ m}^2$
Test rig as per EN ISO 140-1
Test noise Pink noise
Volumes of test rooms $V_S = 101 \text{ m}^3$
 $V_E = 67.5 \text{ m}^3$
Maximum sound reduction index
 $R_{w,max} = 62 \text{ dB}$ (related to test surface)
Installation by client
Climate in test rooms $25 \text{ }^\circ\text{C} / 65 \% \text{ RH}$

f in Hz	TL in dB
50	
63	
80	
100	14
125	14
160	10
200	11
250	10
315	9
400	8
500	8
630	7
800	8
1000	8
1250	7
1600	7
2000	7
2500	7
3150	7
4000	8
5000	8



Rating acc. to ASTM E413 - 04:

STC = 7 dB

Test report No.: **164 32099/Z01-Z04e**

Data sheet 4, measurement Z02

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Centre for Acoustics

9. October 2006

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Dr. Joachim Hessinger, Dipl.-Phys.
Head of Testing Department

Sound Reduction Index acc. to ISO 140 - 3

Laboratory measurements of airborne sound insulation of building elements

Client: Hilti Entwicklungsgesellschaft mbH, 86916 Kaufering, Germany

Product designation **Hilti Brandschutzkissen CP 651N**



Partition wall construction

2 x 12.5 mm GKF
50 mm Metal stud frame
Mineral fibre insulation 40 mm
5 mm Separating joint, air gap
Design - symmetrical

Date of test 27 July 2006
Test surface S $1.25 \text{ m} \times 1.50 \text{ m} = 1.88 \text{ m}^2$
Test rig as per EN ISO 140-1
Test noise Pink noise
Volumes of test rooms $V_S = 101 \text{ m}^3$
 $V_E = 67.5 \text{ m}^3$

**Opening of 600 mm x 500 mm in partition centre
filled with firestop cushion (measurement Z03)**

Additional cable opening (measurement Z04)

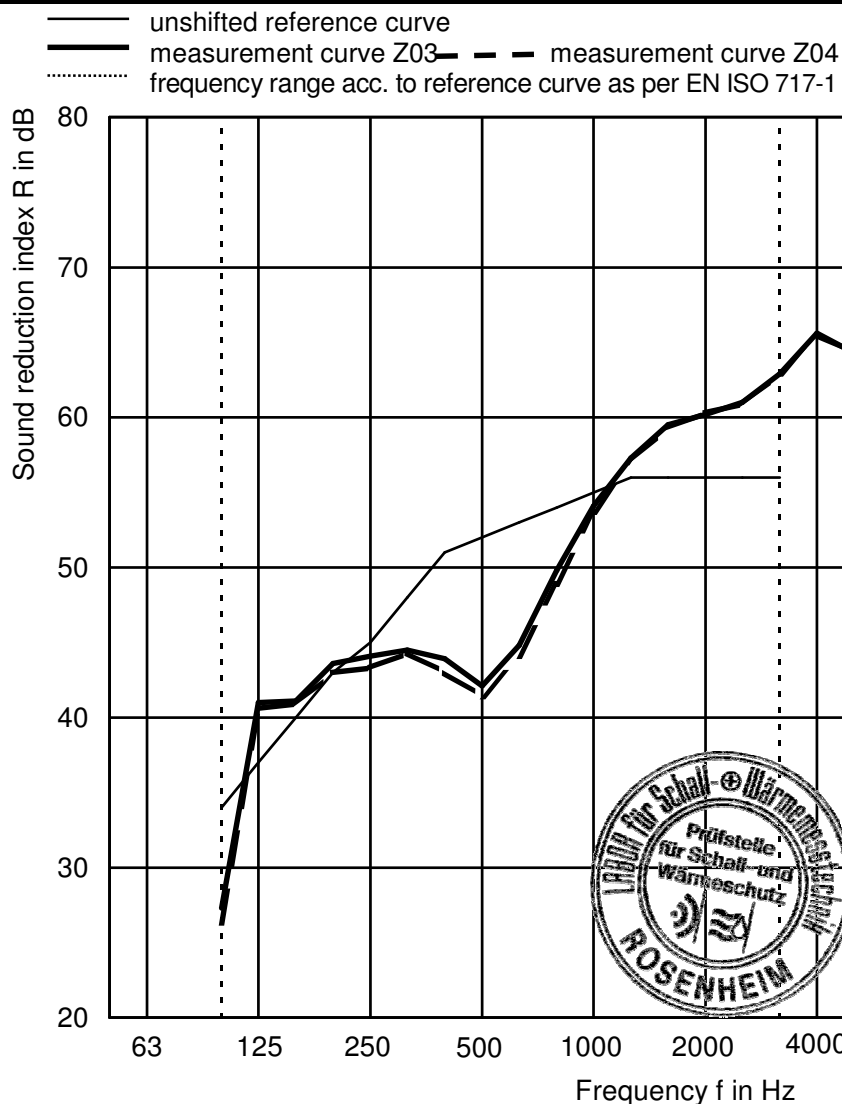
Total thickness 155 mm

Maximum sound reduction index
 $R_{w,max} = 62 \text{ dB}$ (related to test surface)

Installation by client

Climate in test rooms $25^\circ \text{C} / 65\% \text{ RH}$

f in Hz	R in dB Z03	R in dB Z04
50		
63		
80		
100	27,3	26,3
125	41,0	40,6
160	41,1	40,9
200	43,6	43,0
250	44,1	43,3
315	44,5	44,3
400	43,9	43,0
500	42,1	41,4
630	44,8	44,1
800	49,8	48,9
1000	54,1	53,7
1250	57,3	57,1
1600	59,5	59,3
2000	60,2	60,3
2500	61,0	60,9
3150	62,9	62,9
4000	65,6	65,5
5000	64,3	64,3



Rating acc. to EN ISO 717-1 (in one-third-octave bands):

Meas curve Z03 $R_w (C; C_{tr}) = 50 (-1; -5) \text{ dB}$ $C_{100-5000} = 0 \text{ dB}$; $C_{tr,100-5000} = -5 \text{ dB}$

Meas curve Z04 $R_w (C; C_{tr}) = 50 (-2; -6) \text{ dB}$ $C_{100-5000} = -1 \text{ dB}$; $C_{tr,100-5000} = -6 \text{ dB}$

Test report No.: **164 32099/Z01-Z04e**

Data sheet 5, measurements Z03 and Z04

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Centre for Acoustics

9. October 2006

J. Hessinger
Dr. Joachim Hessinger, Dipl.-Phys.
Head of Testing Department

Sound Transmission Loss acc. to ASTM E90 - 04

Client: Hilti Entwicklungsgesellschaft mbH, 86916 Kaufering, Germany

Product designation **Hilti Brandschutzkissen CP 651N**



Partition wall construction

2 x 12.5 mm GKF
50 mm Metal stud frame
Mineral fibre insulation 40 mm
5 mm Separating joint, air gap
Design - symmetrical

Test date 27 July 2006
Test surface S $1.25 \text{ m} \times 1.50 \text{ m} = 1.88 \text{ m}^2$
Test rig as per EN ISO 140-1
Test noise Pink noise
Volumes of test rooms $V_S = 101 \text{ m}^3$
 $V_E = 67.5 \text{ m}^3$

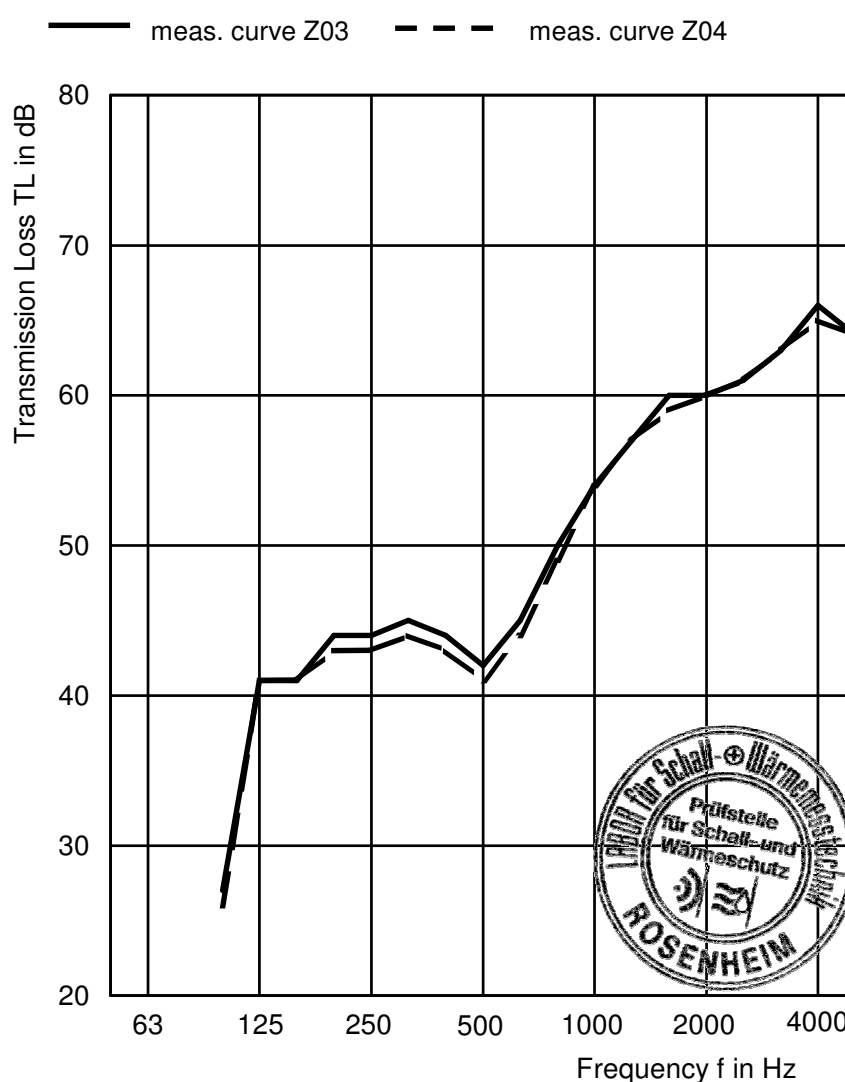
**Opening of 600 mm x 500 mm in partition centre
filled with firestop cushion (measurement Z03)**

Additional cable opening (measurement Z04)

Total thickness 155 mm

Maximum sound reduction index
 $R_{w,max} = 62 \text{ dB}$ (related to test surface)
Installation by client
Climate in test rooms $25 \text{ }^\circ\text{C} / 65 \text{ \% RH}$

f in Hz	TL in dB Z03	TL in dB Z04
50		
63		
80		
100	27	26
125	41	41
160	41	41
200	44	43
250	44	43
315	45	44
400	44	43
500	42	41
630	45	44
800	50	49
1000	54	54
1250	57	57
1600	60	59
2000	60	60
2500	61	61
3150	63	63
4000	66	65
5000	64	64



Rating acc. to ASTM E413 - 04:

Meas. curve Z03 **STC = 50 dB**

Meas. curve Z04 **STC = 49 dB**

Test report No.: **164 32099/Z01-Z04e**

Data sheet 6, measurement Z03 and Z04

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Centre for acoustics

9. October 2006

J. Hessinger
Dr. Joachim Hessinger, Dipl.-Phys.
Head of Testing Department

Normalized Level Difference acc. to ISO 140 - 10

Laboratory measurement of airborne sound insulation of small building elements

Client: Hilti Entwicklungsgesellschaft mbH, 86916 Kaufering; Germany

Product designation **Hilti Brandschutzkissen CP 651N**



Partition wall construction

2 x 12.5 mm GKF
50 mm Metal stud frame
Mineral fibre insulation 40 mm
5 mm Separating joint, air gap
Design - symmetrical

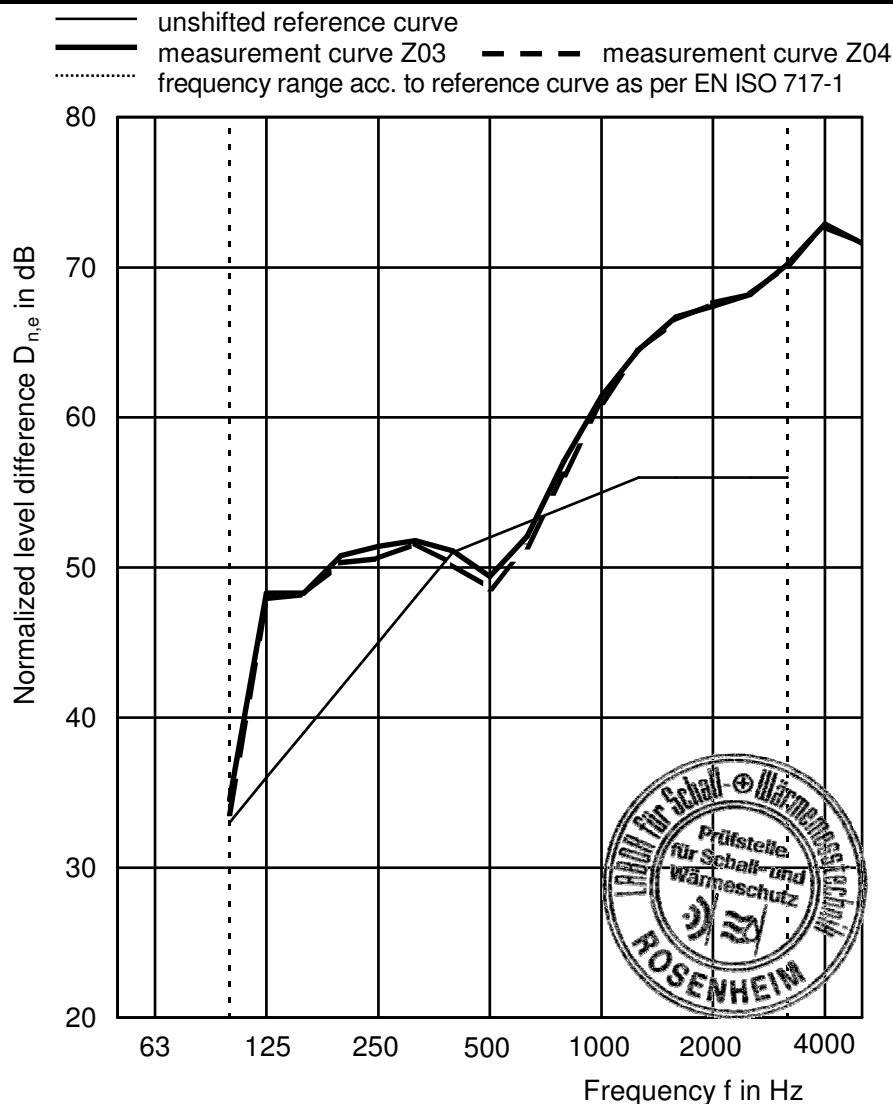
Date of test 27 July 2006
Reference absorption surface $A_0 = 10 \text{ m}^2$
Test rig as per EN ISO 140-1
Test noise Pink noise
Volumes of test rooms $V_S = 101 \text{ m}^3$
 $V_E = 67.5 \text{ m}^3$
Maximum sound reduction index
 $D_{n,e,w,max} = 69 \text{ dB}$ (related to test surface)
Installation by client
Climate in test rooms $25 \text{ }^\circ\text{C} / 65 \text{ \% RH}$

Opening of 600 mm x 500 mm in partition centre filled with firestop cushion (measurement Z03)

Additional cable opening (measurement Z04)

Total thickness 155 mm

f in Hz	$D_{n,e}$ in dB	$D_{n,e}$ in dB
	Z03	Z04
50		
63		
80		
100	34,5	33,6
125	48,3	47,9
160	48,3	48,2
200	50,8	50,3
250	51,4	50,6
315	51,8	51,6
400	51,1	50,2
500	49,4	48,6
630	52,1	51,4
800	57,1	56,2
1000	61,4	61,0
1250	64,5	64,4
1600	66,7	66,5
2000	67,4	67,6
2500	68,2	68,2
3150	70,2	70,2
4000	72,9	72,7
5000	71,6	71,6



Rating acc. to EN ISO 717-1 (in one-third-octave bands):

Meas. curve $D_{n,e,w} (C; C_{tr}) = 58 (-2; -6) \text{ dB}$ $C_{100-5000} = -1 \text{ dB}; C_{tr,100-5000} = -6 \text{ dB}$
Meas. curve $D_{n,e,w} (C; C_{tr}) = 57 (-2; -6) \text{ dB}$ $C_{100-5000} = -1 \text{ dB}; C_{tr,100-5000} = -6 \text{ dB}$

Test report No.: **164 32099/Z01-Z04e**

Data sheet 7, measurement Z03 and Z04

ift Rosenheim

Centre for Acoustics

9. October 2006

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