

MFPA Leipzig GmbH
Test, supervisory and certification
board acc. to the
Local Construction Regulations
(SAC 02)



Unit III
Construction physics/structural fire prevention
General Manager:
Dipl.-Phys. Ingolf Kotthoff
Sound insulation work group
VMPA – sound test site acc. to DIN 4109

TEST REPORT

No. PB III/S – 03 – 308

Dated 20/10/2003 2. copy

Principal: Kaindl Flooring GmbH
Walsenweg 12
A-5071 Wals bei Salzburg

Subject of application: Determination of the reduction of impact sound pressure level according to DIN EN ISO 140-8 of Kaindl laminate flooring materials of the thicknesses 6.8 and 8.0 mm with acoustic foil in the test stand

Sample received: 08/10/2003

Test date: 16/10/2003

Prepared by: Dipl.-Ing. (FH) M. Deinert

This test report consists of 6 sheets and 2 Annexes.

The test report shall be published in unabridged form only. Publication – also of excerpts – shall be subject to the prior written approval by MFPA Leipzig GmbH. The form can be used separately from the test report.

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für das Bauwesen Leipzig mbH
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1. Task

Reduction of impact sound pressure level in accordance with DIN EN ISO 140-8 of Kaindl laminate flooring of the thicknesses 6.8 mm and 8 mm with acoustic foil shall be determined by order of the principal

Kaindl Flooring GmbH
Walsersweg 12
A-5071 Wals bei Salzburg

at a solid ceiling (reinforced concrete) at the test stand of MFPA Leipzig GmbH.

2. Test specimen and test assembly

The laminate flooring materials of the thicknesses 6.8 mm and 8 mm, each backed by acoustic foil were supplied on 08/10/2003 and installed in the test stand of MFPA Leipzig GmbH by Messrs. HP Pelzer international GmbH on 16/10/2003. The laminate was installed as Clic System.

The following versions were tested:

1st version: Kaindl laminate flooring material 6.8 mm thick

(from top to bottom)

- Kaindl laminate flooring material, 6.8 mm thick, substrate plate HDF, area related weight 5.73 kg/m², backed by 0.5 mm thick acoustic foil, area related weight 0.85 kg/m²
- Reinforced concrete raw ceiling 140 mm thick

Size of test specimen: 10.5 m²

2nd version: Kaindl laminate flooring material 8.0 mm thick

(from top to bottom)

- Kaindl laminate flooring material, 8.0 mm thick, area related weight 7.37 kg/m², backed by 0.5 mm thick acoustic foil, area related weight 0.85 kg/m² 0.5 mm
- Reinforced concrete raw ceiling 140 mm thick

Size of test specimen: 10.6 m²

In addition, a uniform load of 20 kg/m² was distributed at the test specimens by means of one weight piece each per square meter.

- Kaindl laminate flooring material 6.8 mm (without acoustic foil)
Size of individual member, length 1285 mm, width 192 mm, thickness 6.5 mm
area related weight 5.37 kg/m²
- Kaindl laminate flooring material 8.0 mm (without acoustic foil)
Size of individual member, length 1285 mm, width 192 mm, thickness 8.0 mm
area related weight 7.37 kg/m²
- Acoustic foil, thickness 0.5 mm, area related weight 0.85 kg/m²

3. Measuring place and test method

The measurements were carried out at a solid ceiling (reinforced concrete) with a thickness of 140 mm in accordance with DIN EN ISO 140-8, section 5.2.3 in the test stand of MFGPA Leipzig GmbH. The volume of the space below the ceiling (reception room) was 63.5 m³. The ceiling area was 24.6 m².

The plan of the reception room showed a right angle and three oblique angles. The 24 cm thick masonry consisted of sand-lime bricks 2 DF, raw density class 2.0.

The floor was provided with floating screed.

The measurement was carried out according to category II (large test specimen) of DIN EN ISO 140-8, March 1998 issue.

The measurement was carried out on 29/01/2003.

Reduction of impact sound pressure level was calculated according to:

- DIN EN ISO 717-2, January 1997 issue

The impact sound pressure was measured by a mobile microphone in the reception room below at 5 positions of the standard tapping machine at the unfinished ceiling and 5 positions of the standard tapping machine at the unfinished ceiling with applied test specimen. The measurement was carried out at 1/3-octave bands of 50 – 5000 Hz. The normalised impact sound pressure level results from the equation

$$L_n = L + 10 \lg A/A_0 \text{ in dB}$$

Where:

- L_n normalised impact sound pressure level
- L impact sound pressure
- A equivalent absorption area in the reception room in m², determined from the measurement of the reverberation time and the volume of the reception room
- A_0 reference absorption area (A_0 is defined to 10 square meters)

Reduction of impact sound pressure level was determined from the difference of the normalised impact sound pressure level of the unfinished ceiling and the unfinished ceiling with the flooring applied in accordance with the following equation:

$$\Delta L = L_{n,o} - L_n$$

Where:

ΔL	reduction of impact sound pressure level
$L_{n,o}$	normalised impact sound pressure level of the solid standard ceiling without the flooring applied
L_n	normalised impact sound pressure level of the solid standard ceiling with the flooring applied

The evaluated reduction of impact sound pressure level ΔL_w was calculated according to the following equations:

$$L_{n,r} = L_{n,r,o} - \Delta L$$

$$\Delta L_w = 78 \text{ dB} - L_{n,r,w}$$

Where:

$L_{n,r}$	calculated normalised impact sound pressure level of the reference ceiling with the flooring to be tested
$L_{n,r,o}$	normalised impact sound pressure level of the reference ceiling according to DIN EN ISO 717-2
$L_{n,r,w}$	evaluated normalised impact sound pressure level of the reference ceiling of the flooring to be tested
ΔL_w	evaluated reduction of impact sound pressure level of the test specimen

Implementation and extent of measurements are in compliance with the principles of the working group of the sound test authorities approved by the Building Inspectorate in co-ordination with NABau – sub-committee 00.71.02.

4. Measuring instruments

The following measuring instruments were used:

Instrument	Type	Manufacturer
Real time analyser with sound generator	840	Norsonic
Free field microphone	1220	Norsonic
Pre-amplifier	1201	Norsonic
Calibration unit	4231	B & K
Output amplifier	235	Norsonic
Standard tapping machine	211	Norsonic
Loudspeaker combination (Dodecahedron)	229	Norsonic

The measuring instruments are calibrated at regular intervals and the measuring chain is calibrated prior to and after each measuring.

5. Measuring results and evaluation

The normalised impact sound pressure levels of the ceiling without and with test assembly are listed in the following table 1.

Table 1: Normalised impact sound pressure level L_n in dB depending on the frequency

1/3 Octave band center frequency Hz	Ceiling without test assembly L_n / dB	Kaindl laminate flooring material 6.8 mm thick with acoustic foil 0.5 mm thick L_n / dB	Kaindl laminate flooring material 8.0mm thick with acoustic foil 0.5 mm thick, L_n / dB
100	60,8	57,4	56,7
125	63,8	61,1	59,8
160	63,5	60,5	61,6
200	69,1	65,3	65,3
250	70,0	65,2	66,7
315	69,3	63,3	63,9
400	68,3	61,6	63,1
500	68,8	60,7	63,5
630	68,4	60,0	61,4
800	69,4	57,6	55,0
1000	69,5	54,0	48,7
1250	69,4	48,7	42,9
1600	69,7	43,5	38,9
2000	70,2	38,8	35,6
2500	70,7	33,8	30,4
3150	71,0	27,1	26,5

The following normalised impact sound pressure levels $L_{n,w}$ were calculated:

Ceiling without test assembly $L_{n,w} = 76$ (-10) dB

Ceiling with test assembly:

Kaindl laminate flooring material 6.8 mm thick with acoustic foil $L_{n,w} = 58$ dB

Kaindl laminate flooring material 8.0 mm thick with acoustic foil $L_{n,w} = 58$ dB

The following evaluated reduction of impact sound pressure level ΔL_w and the spectral adaptation value $C_{I,\Delta}$ were determined for the tested floor structure with acoustic foil (table 2).

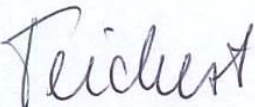
Table 2: Test set-up and results of the different versions tested

Version.	Test assembly	Reduction of impact sound pressure level/spectrum – adaptation value	Refer to Annex
1	Kaindl laminate flooring material 6.8 mm thick with acoustic foil 0.5 mm thick	$\Delta L_w = 18$ dB $C_{I,\Delta} = -10$ dB	1
2	Kaindl laminate flooring material 8.0 mm thick with acoustic foil 0.5 mm thick	$\Delta L_w = 18$ dB $C_{I,\Delta} = -10$ dB	2

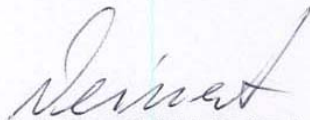
For the graphical and tabular representation of the ΔL values depending on the frequency please refer to Annex 1.

6. Hint to the test results

The values determined are test values which were measured in the test stand. They refer exclusively to the test specimens given in Annex 1 and 2.


Dr.-Ing. H.-J.-Teichert
Head of the sound control test unit




Dipl.-Ing. (FH) M. Deinert
Responsible for preparation

Improvement of impact insulation ISO 140-8:1998

Laboratory measurements of the reduction of transmitted impact noise by floor coverings on a heavy standard floor

Manufacturer Kaindl Flooring GmbH

Product identification: Kaindl Laminatfußboden 6,8 mm

Client: Kaindl Flooring GmbH

Test room identification: / Prüfraum

Test specimen mounted by: Client

Date of test: 16.10.2003

Description of the specimen:

- Kaindl laminate flooring
 - substrate plate HDF, laminate flooring without acoustic foil 6.8 mm thick
- acoustic foil 0.5 mm thick
- reinforced concrete raw ceiling 140 mm thick

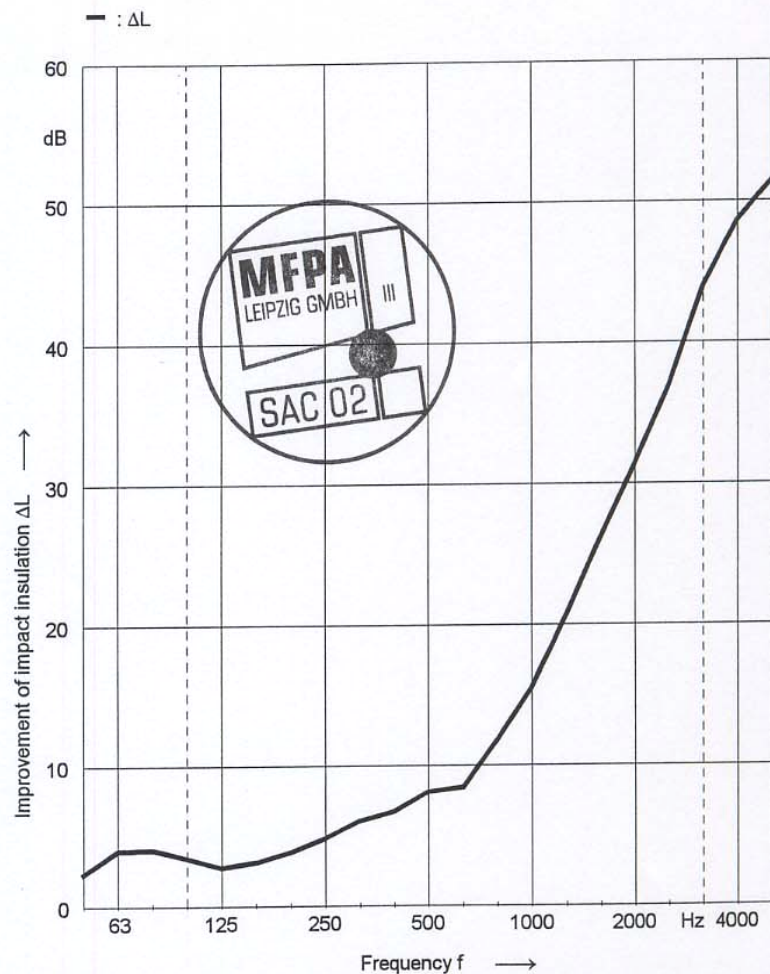
Mass per unit: 6,5 kg/m²

Temperature [°C]: 18

Humidity [%]: 60

Receiving room Volume: 63,5 m³

Frequency [Hz]	Ln,o 1/3 oct. [dB]	ΔL 1/3 oct. [dB]
50	62,7	2,3
63	65,8	3,9
80	61,6	4,0
100	60,8	3,4
125	63,8	2,7
160	63,6	3,1
200	69,1	3,8
250	70,0	4,8
315	69,3	6,0
400	68,3	6,7
500	68,8	8,1
630	68,4	8,4
800	69,4	11,8
1000	69,5	15,5
1250	69,4	20,7
1600	69,7	26,2
2000	70,2	31,4
2500	70,7	36,9
3150	71,0	43,9
4000	71,6	48,6
5000	70,7	51,4



Rating according to ISO 717-2

$\Delta L_w = 18$ dB

$C_{l,\Delta} = -10$ dB

$C_{l,r} = -1$ dB

The results are based on test made with an artificial source under laboratory conditions (engineering method)

MFPA Leipzig GmbH

No. of test report: PB III/S-03-308

Leipzig, 17.11.2003

Reichert

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Improvement of impact insulation ISO 140-8:1998

Laboratory measurements of the reduction of transmitted impact noise by floor coverings on a heavy standard floor

Manufacturer Kaindl Flooring GmbH

Product identification: Kaindl Laminatfußboden 8,0 mm

Client: Kaindl Flooring GmbH

Test room identification: / Prüfraum

Test specimen mounted by: Client

Date of test: 16.10.2003

Description of the specimen:

- Kaindl laminate flooring
 - substrate plate HDF, laminate flooring without acoustic foil 8.0 mm thick
- acoustic foil 0.5 mm thick
- reinforced concrete raw ceiling 140 mm thick

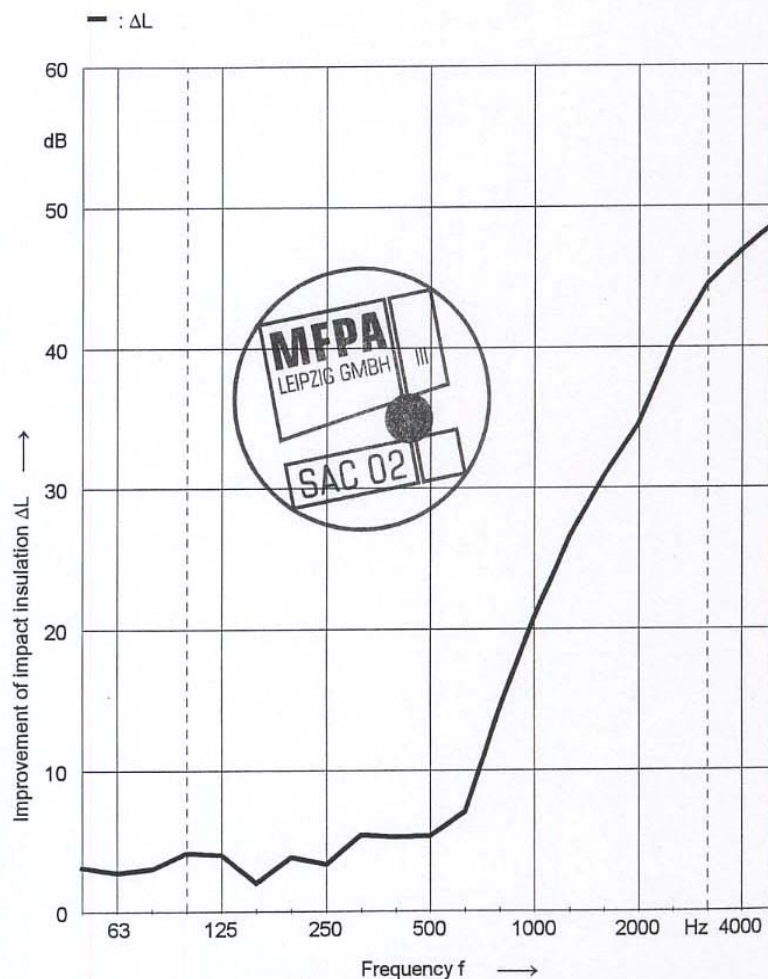
Mass per unit: 8,3 kg/m²

Temperature [°C]: 18

Humidity [%]: 60

Receiving room Volume: 63,5 m³

Frequency [Hz]	$L_{n,o}$ 1/3 oct. [dB]	ΔL 1/3 oct. [dB]
50	62,7	3,1
63	65,8	2,7
80	61,6	3,0
100	60,8	4,1
125	63,8	4,0
160	63,6	2,0
200	69,1	3,8
250	70,0	3,3
315	69,3	5,4
400	68,3	5,2
500	68,8	5,3
630	68,4	7,0
800	69,4	14,4
1000	69,5	20,8
1250	69,4	26,5
1600	69,7	30,8
2000	70,2	34,6
2500	70,7	40,3
3150	71,0	44,5
4000	71,6	46,8
5000	70,7	48,8



Rating according to ISO 717-2

$\Delta L_w = 18$ dB

$C_{l,\Delta} = -10$ dB

$C_{l,r} = -1$ dB

The results are based on test made with an artificial source under laboratory conditions (engineering method)

MFPA Leipzig GmbH

No. of test report: PB III/S-03-308

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