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Determination of the reduction of transmitted impact noise by floor coverings on a heavyweight (concrete) standard floor – Testing in the laboratory according to ISO 10140-1 and -3 (former ISO 140-8) and ISO 717-2

(1 appendix)

Client

Rescon Mapei AB

Test object

A ceramic flooring on a flexible underlay.

The lowest part of the flooring consisted of a “soft/flexible” 2,3 mm thick underlay glued to the laboratory floor. On the underlay clinkers were molded with mortar. The clinker were 7-8 mm thick.

Pictures of the test objects can be seen later in this report.

Arrival of the test objects

Just before the test

Date of test

2012-01-15

Results

The results can be used when the flooring is applied on a rigid concrete slab.

A flooring with good impact sound insulation shall have highest possible ΔL_w and $\Delta L_w + C_{I\Delta}$.

The results are summarized in table 1. The appendix gives a more complete account.

The results is valid for the tested objects only.

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Tabell 1 - Resultat

Flooring of type:	Weighted reduction of impact sound pressure level ΔL_w (dB)	The spectrum adaption term for the floor covering. $C_{1\Delta}$ (dB)	Flooring class according to the Swedish standard SS 25267, edition 3	Enclosure
A ceramic flooring with a flexible underlay	10	-6	5	1

Use of the results

For any heavyweight (concrete) floor with a floor covering the weighted impact sound insulation plus the spectrum adaption term can be calculated according to:

$$L_{n,w} + C_1 = L_{n,w,1} + C_{1,1} - \Delta L_w - C_{1\Delta}$$

For any heavyweight (concrete) floor with a floor covering the weighted impact sound insulation can be calculated according to:

$$L_{n,w} = L_{n,w,1} - \Delta L_w$$

$L_{n,w,1}$ = Impact sound insulation for the heavyweight floor without floor covering.

$C_{1,1}$ = Adaption term for the heavyweight floor without floor covering.

ΔL_w = Weighted impact noise reduction for the floor covering.

$C_{1\Delta}$ = The spectrum adaption term for the floor covering.

Measurement method

ISO 10140-1, ISO 10140-3 (both replacing former ISO 140-8:1997), ISO 717-2:1996 and SS 25267 edition 3.

The tapping machine was placed in 9 positions on the heavyweight floor without floor covering and in 9 positions on the floor coverings. Each position was measured during 64 s.

Weighted reduction of impact sound pressure (ΔL_w) level is calculated according to:

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

$L_{n,r,w}$ is the weighted normalized impact sound pressure level of the reference floor in the standard.

The spectrum adaption term for the floor covering ($C_{1\Delta}$) is calculated according to:

$$C_{1\Delta} = C_{1,r,0} - C_{1,r}$$

$C_{1,r}$ The spectrum adaption term for the reference floor with the tested floor covering.

$C_{1,r,0}$ The spectrum adaption term for the reference floor ($C_{1,r,0} = -11$ dB)

Measurement uncertainty

Measurement uncertainty according to ISO 140/2:91(E) is given in table 2.

Table 2

1/3 octave bands (Hz)	Reproducibility according to ISO 140-8 (dB)
100	2,5
125	2,5
160	2,5
200	2,5
250	2
315	1,5
400	1,5
500	1,5
630	1,5
800	2
1000	3
1250	6
1600	9
2000	11
2500	11,5
3150	8

Mounting

The floorings were laid on SP:s concrete floor slab for measurement of reduction of impact noise.

Pictures of the floorings



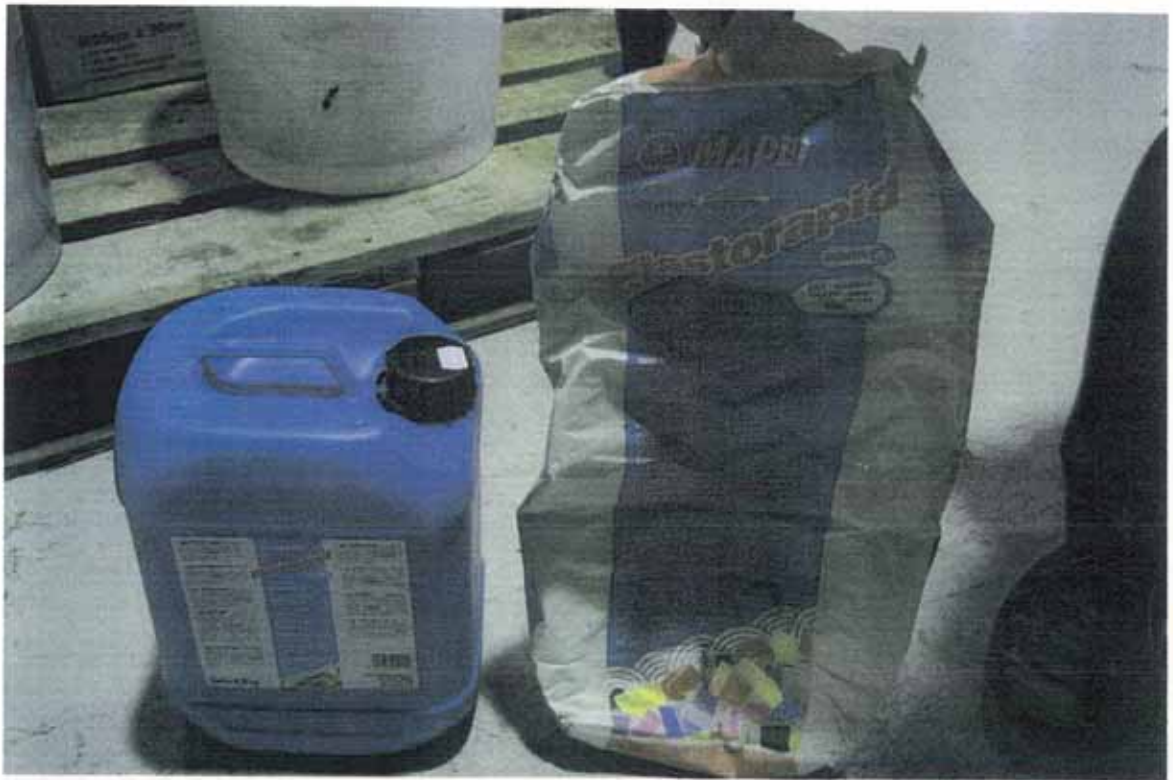
Picture 1 – The underlay of the flooring were glued on the laboratory concrete floor slab.



Picture 2 - The underlay 2,3 mm thick.



Picture 3 – The mortar and the clinkers during assembly. The clinkers were 7-8 mm thick.



Picture 4 – The mortar between underlay and clinker.



Picture 5 – The mortar between the clinker.



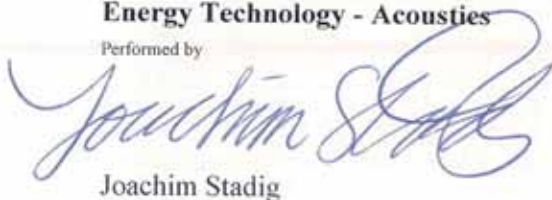
Picture 6 – The floor covering during assembly.

Equipment

<i>Equipment</i>	<i>Brand</i>	<i>Type</i>	<i>Serial no. / SP no.</i>
Sound level meter	Norsonic	830	500338
Program	SP	Stegdämp 21	v1.0, Rev. 960802
Calibrator	Brüel & Kjær	4230	1411048
Tapping machine	Brüel & Kjær	3204	78433
Microphone	Brüel & Kjær	4166	1011722
Preamplifier	Brüel & Kjær	2619	970931
Rotating stand	Brüel & Kjær	3923	681300
Power supply	Brüel & Kjær	2804	455245

**SP Technical Research Institute of Sweden
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Appendix

Determination of impact noise reduction in the laboratory according to ISO 10140-1 and -3 (former ISO 140-8) and ISO 717-2

Client: Rescon Mapei AB

Test object: A ceramic flooring on a flexible underlay.

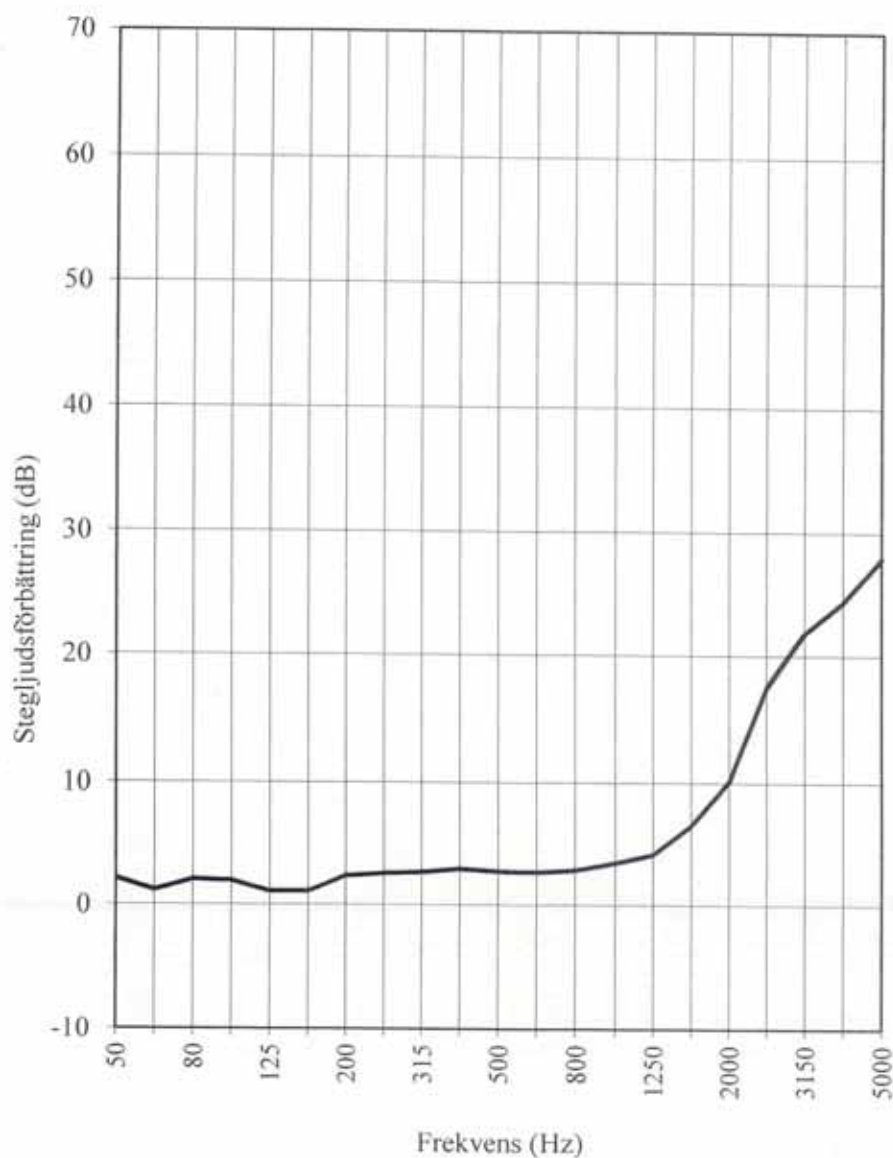
The flexible 2,3 mm thick underlay was glued to the laboratory floor.

On the underlay clinkers were molded with mortar.

Date: 2012-01-15

Standard floor: 150 mm homogenous concrete (4,2 m x 3,2 m)

Result: Impact sound reduction, ΔL and ΔL_w



Frequency (Hz)	ΔL (dB)
50	2,2
63	1,2
80	2,1
100	2,0
125	1,1
160	1,1
200	2,4
250	2,6
315	2,7
400	3,0
500	2,8
630	2,7
800	2,9
1000	3,5
1250	4,2
1600	6,6
2000	10,1
2500	17,5
3150	21,9
4000	24,4
5000	27,9

ΔL_w	10
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$C_{l\Delta}$	-6
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$L_{n,r,w}$	68
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$C_{l,r}$	-5
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