Determination of impact sound insulation
Laminate flooring 7 mm
PROVENT underlay

Requested by: SIA PEPI RER Ltd

Requested by

SIA PEPI RER Ltd
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Order

Literal 29.11.2006/ Helmut Wiemers

Contact person at VTT

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Task

Determination of impact sound insulation
Laminate flooring 7 mm with PROVENT parquet underlay

Sample

The customer delivered the sample of parquet underlay to VTT 30.11.2006 to be used in a measurement of the reduction of transmitted impact noise on a heavy weight standard floor. The following information was reported or measured:

PROVENT underlay	-polyethylene cell plastic ~ 3.6 mm and ~70 g/m^2
Laminate flooring	-HDF core and with HDF locking system
	- thickness: 7 mm, mass per unit area: 6.6 kg/m^2

Mounting and measuring

VTT mounted the underlay sample and the laminate flooring on to the concrete testing slab (area: 11.9 m^2). A uniformly distributed load of 21 kg/m^2 was mounted on the floor covering. The impact sound pressure levels were measured in a reverberation room below the test floor using a moving microphone. For the bare floor they were determined at the same tapping machine positions (five positions). Mounting and measuring:15.12.2006.

Methods and equipment

The normalized impact sound pressure level L_n and the reduction of sound pressure level (improvement of impact sound insulation) ΔL were measured according to the standard *EN ISO 140-8:1998* [1]. The single-number quantity for the sample ΔL_w and the weighted normalised impact sound pressure levels in buildings $L'_{n,w}$ were calculated according to *EN ISO 717-2:1996* [2] for follow concrete floor slabs (when the flooring sample is in place):

- 160, 200 and 240 mm concrete (385, 480 and 575 kg/m^2) and
- hollow core slabs 300, 375 and 500 kg/m^2

The sound level values of the concrete floors are given in sound isolation guides [3] [4].

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Measuring equipment and reverberation room:

Condenser microphone	B&K (Brüel&Kjær) 4943
Microphone preamplifier	B&K 2669
Rotating microphone boom	B&K 3923
Power amplifier	Yamaha MX-1000
Loudspeakers	Sinmarc V121L
Real-time analyser	Norsonic 830
Sound calibrator	B&K 4228
Tapping machine	B&K 3204

The construction thickness of the concrete wall and floor of the reverberation room is 0.25 m. The floor dimensions are 3.05 m and 3.90 m and the height is 4.70 m. The volume is 56 m^3. The dimensions of the concrete test slab are 3.05 m and 3.90 m and thickness is 160 mm

Results

The weighted normalized impact sound pressure levels $L'_{n,w}$ for different types of the slabs and the weighted reduction of impact sound pressure level ΔL_w are presented in Table 1. The reduction of impact sound pressure level ΔL in third octave bands for the flooring sample is shown in Appendix 1.

The results of the measurement are valid only for the measured samples.

Table 1. The weighted reduction of impact sound pressure level ΔL_w and the approximated weighted normalised impact sound pressure levels $L'_{n,w}$ for different concrete slabs and for hollow core slabs. The hollows have a circle or slightly elliptical shape. The volume of the room below the test floor is at most 50 m^3. *EN ISO 140-8:1997* and *EN ISO 717-2:1996.*

slab **floor covering**	**160/200/240 mm concrete slab** $L'_{n,w}$ **[dB]**	**300/375/500 kg/m² hollow core slab** $L'_{n,w}$ **[dB]**	ΔL_w **[dB]**
7 mm laminate and **PROVENT** underlay	**54/51/49**	**51/49/47**	**20**

Espoo, 19th January 2007

Pekka Sipari
Research Scientist

Reijo Heinonen
Research Engineer

References

[1] EN ISO 140 - Part 8:1998: Laboratory measurements of the reduction of transmitted impact noise by floor coverings on a heavyweight standard floor
[2] *EN ISO 717: Acoustics - Rating of sound insulation in buildings and of building elements - Part 2:1996: Impact sound insulation*
[3] *Ympäristöopas 99: Ääneneristys rakennuksessa. Ympäristöministeriö 2003*
[4] *Suomen Rakentamismääräyskokoelma: C5 - Ääneneristys - Ohjeet 1985*

APPENDIX 1 Results of the measurement
DISTRIBUTION Customer: Original (2) and VTT: Original

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Product: 7 mm laminate flooring and **PROVENT** underlay
Manufacturer: SIA PEPI RER Ltd., Latvia

Reduction of impact sound pressure level

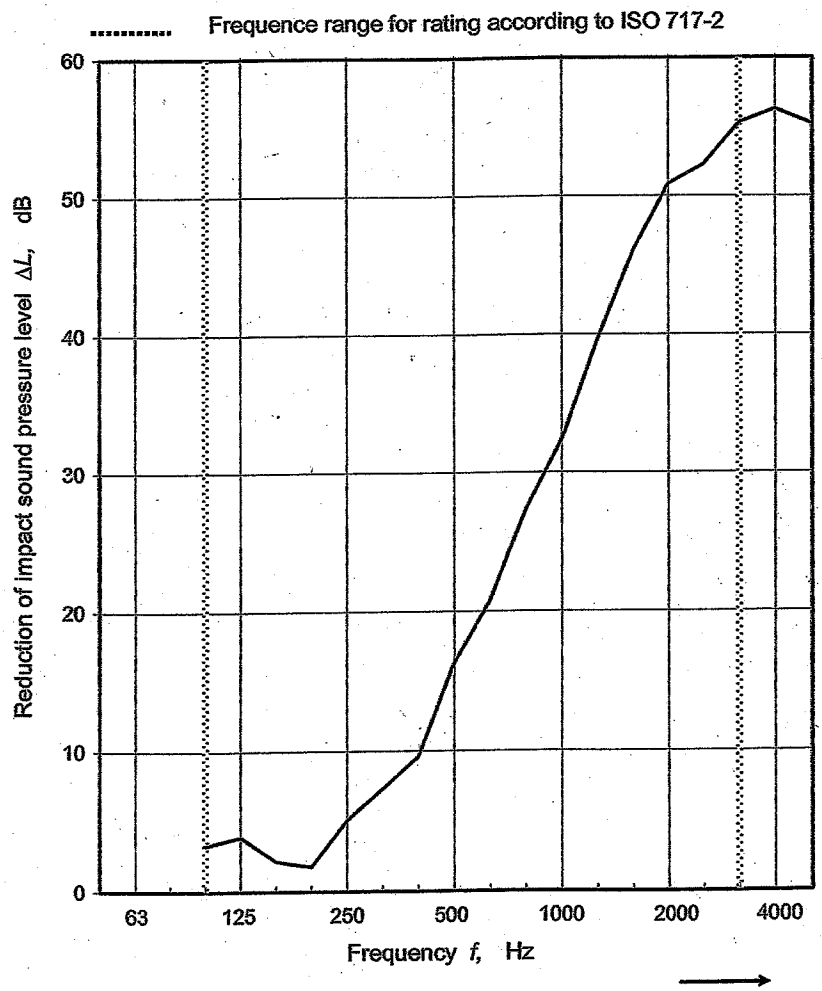
Measurement: *ISO 140-8:1997 ENISO1408:1998*
Rating: *ISO 717-2:1996 ENISO7172:1996*

Date of test: 15 December 2006
Test slab: Concrete 160 mm

Mass per unit area:	6.6	kg/m2
Curing time:		h
Air temp. in the source room:	20	°C
Air humidity in the source room:	35	%
Receiving room volume:	56	m^3

Frequency f Hz	$L_{n,0}$ Test slab 160 mm dB	ΔL One-third octave dB
50		
63		
80		
100	57,3	3,3
125	63,5	3,9
160	69,4	2,2
200	68,9	1,8
250	65,2	5,1
315	72,1	7,3
400	68,1	9,6
500	70,6	16,3
630	70,9	20,8
800	70,7	27,3
1000	70,0	32,4
1250	70,6	39,7
1600	71,4	46,1
2000	71,6	50,9
2500	70,8	52,3
3150	71,3	55,3
4000	69,4	56,3
5000	66,5	55,2

minimum value



Rating according to ISO 717-2:

ΔL_w = 20 dB

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

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