



TECHNICKÝ A ZKUŠEBNÍ ÚSTAV STAVEBNÍ PRAHA, s. p.
pobočka 0400 - Teplice, zkušební laboratoř 1018.4
akreditovaná ČIA podle ČSN EN ISO/IEC 17025:2005
Tolstého 447, 415 03 Teplice, tel.: 417 537 382, fax: 417 537 414,
email: bartos@tzus.cz



Order No. Z040 15 0304

PROTOCOL

on measuring of sound reduction according
ČSN EN ISO 10140-2 a ČSN EN ISO 10140-4

NevPanel 12 mm – Rockwool 50 mm - NevPanel 12 mm

NevPanel 18 mm – Rockwool 50 mm - NevPanel 18 mm

No. 040 - 050808

Customers: Technický a zkušební ústav stavební Praha, s.p.
Branch 0100
Prosecká 811/76 A
190 00 Praha 9 – Prosek
Czech Republic

No. of copies: 2

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Annexes: 3

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Teplice, 09.12.2015



TZÚS Praha
branch Teplice

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040 - 050808

Page No.: 2
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1. BACKGROUND INFORMATION

1.1 Assignment of testing

Determine sound reduction of the walls that are described the par. 1.3. Measuring in laboratory conditions without flanking transmission according to ČSN EN ISO 10140-2 and ČSN EN ISO 10140-4 including application rules for specific products described by ČSN EN ISO 10140-1 and using of test facilities and equipment defined by ČSN EN ISO 10140-5.

Order No.: **O1040150102**

Sample manufacturer: **NEVPANEL YAPI MADEN ÜRETİM İTHALAT İHRACAT SANAYİ VE TİCARET LİMİTED ŞİRKETİ
BAĞDAT CADDESİ ÇOLAKOĞLU İŞ MERKEZİ NO:458/30
MALTEPE İSTANBUL**

Plant: **NEVPANEL YAPI MADEN ÜRETİM İTHALAT İHRACAT SANAYİ VE TİCARET LİMİTED ŞİRKETİ
ESKİŞEHİR ORGANİZE SANAYİ BÖLGESİ 28. CADDE NO:8
ESKİŞEHİR**

1.2 Place and date of testing

Technický a zkušební ústav stavební Praha, s.p., branch Teplice
Testing laboratory No. 1018.4 accredited by ČIA, Building acoustics laboratory V2
Tolstého 447
415 03 Teplice – Řetenice

Testing rooms: **K1 (emission room) and K2 (reception room).**

1.3 Sampling and tested structures

Data on sample composition were accepted from background information provided by the manufacturer. The mentioned weight and moisture data are intended for checking and documentary purposes and have an informative character only.

Reception date	TZÚS registration number	Sample identification	Date of installation	Date of testing
09. 09 .2015	VZ040153266	12-50-12	02.12.2015	04.12.2015
09. 09 .2015	VZ040153267	18-50-18	07.12.2015	08.12.2015

Table No. 1 – identification





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1) Producer declaration VZ040153266:

NevPanel	12 mm	12 kg/m ²
Rockwool	50 mm	2 kg/m ²
NevPanel	12 mm	12 kg/m ²
Total	74 mm	26 kg/m ²

1) Producer declaration VZ040153267:

NevPanel	18 mm	18 kg/m ²
Rockwool	50 mm	2 kg/m ²
NevPanel	18 mm	18 kg/m ²
Total	86 mm	38 kg/m ²

1.4 Preparation of samples and method of installation

The tested sample was supplied by the manufacturer. Visual check of the product type according to the presented specification was carried out upon receipt of the sample. Sample construction corresponds to the mentioned description. Sample installation was carried out by the personnel of TZÚS s.p. according to ČSN EN ISO 10140-1 Acoustics - Laboratory measurement of sound insulation of building elements - Part 1: Application rules for specific products.

2. TESTING PROCEDURES USED


2.1 Measuring method

Measuring was carried out in laboratory conditions without side routes of sound propagation in reverberation rooms of the building acoustics laboratory of TZÚS s.p. in Teplice. Sound insulation was measured in a form of sound reduction in accordance with ČSN EN ISO 10140-2 and ČSN EN ISO 10140-4.

Results were assessed in accordance with the standard ČSN EN ISO 717-1 Acoustics - Testing of sound insulation of building structures and in buildings - Part 1.

Sound reduction index R_w is the main result of testing that is objectively related to the tested structure.



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①	EN ISO 10140-2	Acoustics - Laboratory measurement of sound insulation of building elements - Part 2: Measurement of airborne sound insulation
②	EN ISO 10140-4	Acoustics - Laboratory measurement of sound insulation of building elements - Part 4: Measurement procedures and requirements

Tab. 2 – Testing methods used

③	EN ISO 10140-1	Acoustics - Laboratory measurement of sound insulation of building elements - Part 1: Application rules for specific products
④	EN ISO 10140-4	Acoustics - Laboratory measurement of sound insulation of building elements - Part 4: Measurement procedures and requirements

Tab. 3 – Supportive methods and requirements

Deviations from the standardized procedures:

This protocol on measuring does not include information about shape, construction and wall thickness of the laboratory LASA in accordance with ČSN EN ISO 10140-2 par. 9f. This information is confidential (pending patent) and can be shown by the head of the laboratory on customer request.

Test description:

The tested structure was installed in a testing opening between the emission and reception reverberation rooms using the specified technological procedure. Sound reduction is expressed as sound reduction R that is determined from the equation:

$$R = L_1 - L_2 + 10 \cdot \log \frac{S}{A}$$

Where L_1 is an average acoustic pressure level in the emission room (dB)
 L_2 an average acoustic pressure level in the reception room (dB)
 S area of the tested partition structure (m²)
 A equivalent absorption area of the reception room (m²)

It is to be determined from the measured reverberation time according to the equation:

$$A = 0,16 \frac{V}{T}$$

V capacity of the reception room (m³)
 T reverberation time of the reception room (s)





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Testing consists in measuring a difference of acoustic pressure levels in the emission and reception rooms when a source of sound propagating a broadband noise signal (white noise) is in operation. Absorbability in the reception room is corrected with a correction factor $10 \cdot \log(S/A)$ that was specified on the basis of measuring of reverberation time in the reception room. Measuring was carried out in laboratory conditions in accordance with ČSN EN ISO 140-3 in one-third octave frequency bands in the range from 100 Hz to 5,000 Hz. The measured frequency-dependable values of sound reduction R were compared with the values of the guiding curve defined in ČSN EN ISO 717-1. A single-figure parameter - sound reduction index - is the result of testing.

The adaptation terms (C ; C_T) that can be assigned to the R_w value in real conditions according to the type of spectrum of the source were determined. The C value represents a factor for pink noise weighed with the A function that approximately corresponds to the spectrum of noise during activities at home or traffic noise on motorways.

2.2 Instruments used

Norsonic type 118 – Integration sound-level meter of accuracy 1 complying with EC 60651, 60804, 61672-1, and 61260, primary memory for 2,500,000 pieces of data. Serial number 31991, 8012-OL-10073-14 valid to: 06/03/2016

Norsonic type 118 – Integration sound-level meter of accuracy 1 complying with EC 60651, 60804, 61672-1, and 61260, primary memory for 2,500,000 pieces of data. Serial number 32127, 8012-OL-10073-14 valid to: 06/03/2016

Microphone Norsonic type 1225 and pre-amp type 1205, serial No. 92003, test sheet No. test sheet: 8012-OL-10072-14 valid to: 06/03/2016

Microphone Norsonic type 1225 and pre-amp type 1205, serial No. 72839, test sheet No. test sheet: 8012-OL-10074-14 valid to: 06/03/2016

Norsonic acoustic calibrator, type 1251, serial No.: 31612. The meter complies with the requirements of the IEC 942, 8012-KL-10075-14 standard, valid to: 04/03/2016

Testo 608-H1, serial number 445815, calibration certificate KLT-10K-886 effective till 7 November 2015.

VOLTCRAFT DL180-THP, serial number 10052467, calibration certificate 1485/11 effective till 28 June 2016.

Sound field excitation set, Norsonic hemisphere, type 250 (120 dB).

The result calculation was realized on computer using software which includes evaluation according to ČSN EN ISO 717-1 Acoustics - Rating of sound insulation in buildings and of building elements - Part 1: Airborne sound insulation.





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3. RESULTS OF TESTS

TZÚS registration number	Tested structure	Sound reduction index Rw (C; Ctr)
VZ040153266	NevPanel 12 mm Rockwool 50 mm NevPanel 12 mm	38 (-1; -4) dB
VZ040153267	NevPanel 18 mm Rockwool 50 mm NevPanel 18 mm	43 (-1; -3) dB

Tab. 4 - Assessment of sound reduction according to ČSN EN ISO 717-1

Repeatability and reproducibility of the results of sound insulation tests was verified successfully through inter-laboratory comparison test in September 2014.

4. CONCLUSION

The results of the tests are listed in the annex. They are presented in a transparent way in Tab. 4.

This assessment applies to the results of the tests only. It does not substitute assessment of conformity according to legal regulations or other requirements.

The person responsible for technical aspects of the Report : Pavel Rubáš, PhD. 

Tests were carried out by : Lukáš Rulf

External cooperation : -----




Pavel Bartoš
Deputy manager of laboratory

END OF THE REPORT



Norsonic Brechbühl AG

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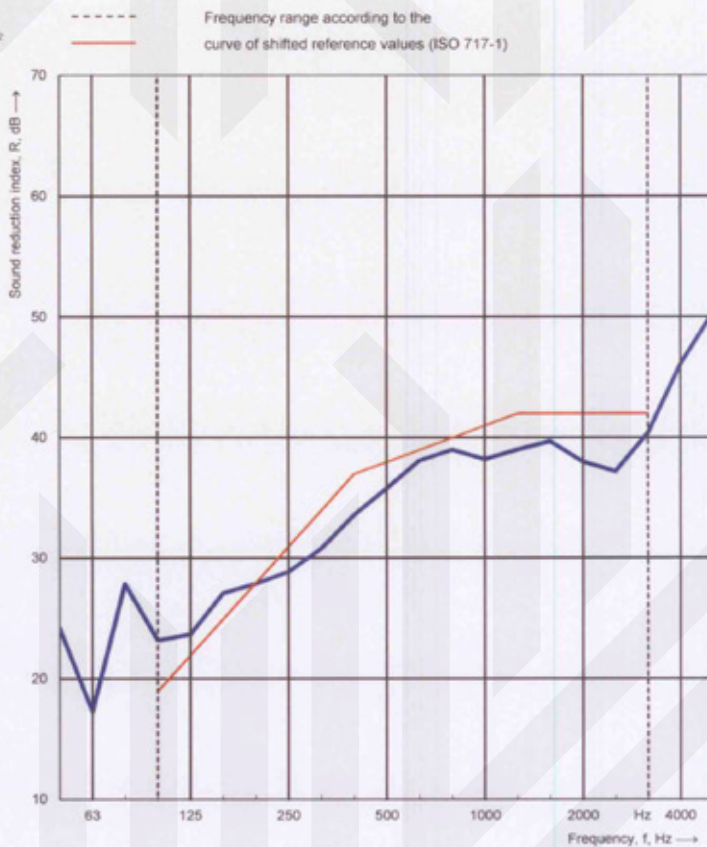
Sound reduction index according to ČSN EN ISO 10140-2 and ČSN EN ISO 10140-4

Laboratory measurements of airborne sound insulation of building elements

Client: TZÚS Praha, s.p., brach 0100, Prosecká, 811/76A, Praha 9, CZ Date of test: 4.12.2015
 Manufacturer: NEVPANEL HAFI MADER ÜRETİM İTHALAT İHRACAT SANAYİ VE TİCARET LİMİTED ŞİRKETİ, BAĞDAT CADDESİ ÇOLAKOĞLU İŞ MERKEZİ NO:46/30 MALTEPE İSTANBUL
 Test room identification: LASA Teplice
 Test specimen mounted by: TZUS workers
 Product identification: NevPanel 12 mm – Rockwool 50 mm - NevPanel 12 mm

Size of test opening: 10,10 m²
 Mass per unit area: 26 kg/m²
 Temperature: 17,7 °C
 Air humidity: 34 %
 Source room volume: 59,2 m³
 Receiving room volume: 52,6 m³

Frequency f [Hz]	R 1/3 octave [dB]
50	24,2
63	17,3
80	27,9
100	23,2
125	23,7
160	27,1
200	27,9
250	28,9
315	30,8
400	33,6
500	35,8
630	38,1
800	39,0
1000	38,2
1250	39,0
1600	39,7
2000	38,0
2500	37,2
3150	40,4
4000	46,1
5000	50,3



Rating according to ISO 717-1
 $R_w(C,C_2) = 38 (-1 ; -4) \text{ dB}$
 Evaluation based on laboratory measurement results obtained in one-third-octave bands by an engineering method.

$C_{50-3150} = -2 \text{ dB}$ $C_{50-5000} = -1 \text{ dB}$ $C_{100-5000} = 0 \text{ dB}$
 $C_{17,50-3150} = -5 \text{ dB}$ $C_{17,50-5000} = -5 \text{ dB}$ $C_{17,100-5000} = -4 \text{ dB}$

No. of test report:

Annex no. 1, Protocol no. 040-050808

Date: 9.12.2015

Signature: Pavel Ruppáš, Ph.D.





Norsonic Brechbühl AG

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Sound reduction index according to ČSN EN ISO 10140-2 and ČSN EN ISO 10140-4

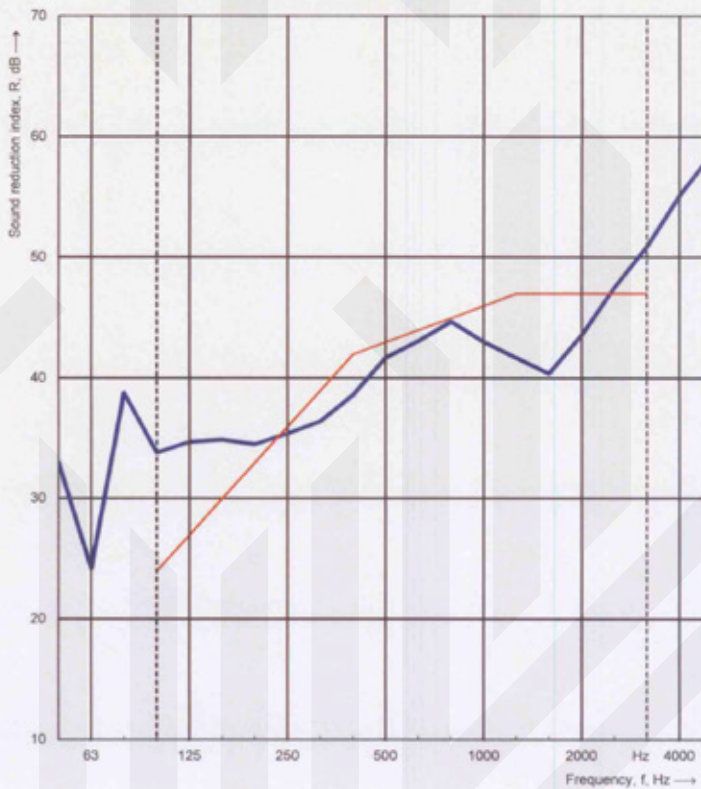
Laboratory measurements of airborne sound insulation of building elements

Client: TZÚS Praha, s.p., brach 0100, Prosecká, 811/76A, Praha 9, CZ Date of test: 8.12.2015
 Manufacturer: NEVPANEL YAPIL MADEREN ÜRETİM İTHALAT İHRACAT SANAYİ VE TİCARET LİMİTED ŞİRKETİ, BAĞDAT CADDESİ ÇOLAKOĞLU İŞ MERKEZİ NO:46636 MALTEPE İSTANBUL
 Test room identification: LASA Teplice
 Test specimen mounted by: TZUS workers
 Product identification: NevPanel 18 mm – Rockwool 50 mm - NevPanel 18 mm

Size of test opening: 10,00 m²
 Mass per unit area: 38 kg/m²
 Temperature: 18,4 °C
 Air humidity: 39 %
 Source room volume: 59,2 m³
 Receiving room volume: 52,6 m³

----- Frequency range according to the curve of shifted reference values (ISO 717-1)
 ————

Frequency f [Hz]	R 1/3 octave [dB]
50	33,0
63	24,2
80	38,8
100	33,8
125	34,7
160	34,9
200	34,5
250	35,4
315	36,4
400	38,6
500	41,7
630	43,1
800	44,7
1000	43,0
1250	41,7
1600	40,4
2000	43,6
2500	47,5
3150	50,9
4000	55,1
5000	58,6



Rating according to ISO 717-1
 $R_w(C,C_2) = 43 (-1 ; -3) \text{ dB}$
 Evaluation based on laboratory measurement results obtained in one-third-octave bands by an engineering method.

$C_{50-3150} = -1 \text{ dB}$ $C_{50-5000} = 0 \text{ dB}$ $C_{100-5000} = 0 \text{ dB}$
 $C_{125-3150} = -3 \text{ dB}$ $C_{125-5000} = -3 \text{ dB}$ $C_{125-100-5000} = -3 \text{ dB}$

No. of test report: Annex no. 2, Protocol no. 040-050808

Date: 9.12.2015

Signature: Pavel Rubiš, Ph.D.

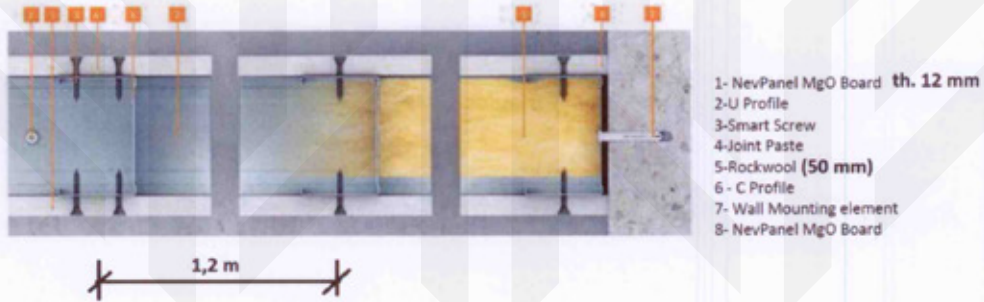


Annex no. 3, Protocol no. 040-50808

cross-section

INTERNAL WALL

Anti corrosion C and U profiles of 0,80 mm thickness is suggested to be used. 9mm and up NevPanel MgO Board are used on both sides of the studs. Rockwool of 50 density is placed in the studs. Application is done according to general instructions given above. All kinds of internal paint , wall paper and ceramic can be applied as finishing application. Paint primer is advised before painting .

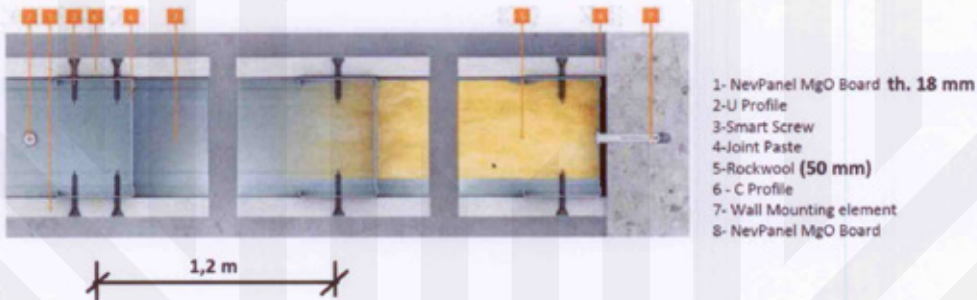


- 1- NevPanel MgO Board th. 12 mm
- 2-U Profile
- 3-Smart Screw
- 4-Joint Paste
- 5-Rockwool (50 mm)
- 6 - C Profile
- 7- Wall Mounting element
- 8- NevPanel MgO Board

Sample no. VZ040153266

INTERNAL WALL

Anti corrosion C and U profiles of 0,80 mm thickness is suggested to be used. 9mm and up NevPanel MgO Board are used on both sides of the studs. Rockwool of 50 density is placed in the studs. Application is done according to general instructions given above. All kinds of internal paint , wall paper and ceramic can be applied as finishing application. Paint primer is advised before painting .



- 1- NevPanel MgO Board th. 18 mm
- 2-U Profile
- 3-Smart Screw
- 4-Joint Paste
- 5-Rockwool (50 mm)
- 6 - C Profile
- 7- Wall Mounting element
- 8- NevPanel MgO Board

Sample no. VZ040153267





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pobočka 0400 - Teplice, zkušební laboratoř 1018.4
akreditovaná ČIA podle ČSN EN ISO/IEC 17025:2005
Tolstého 447, 415 03 Teplice, tel.: 417 719 020
e-mail: bartos@tzus.cz



Order No.: Z040 15 0304

REPORT

on measuring of sound absorption according to
ČSN EN ISO 354

No. 040-050809

Client: Technický a zkušební ústav stavební Praha, s.p.
Branch 0100 Praha
Prosecká 811/76A
190 00 Praha 9 – Prosek

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Teplice 09.12.2015



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1 BACKGROUND INFORMATION

1.1 Assignment of testing

Measure the sound absorption of two constructions made of NePanels. Measuring in laboratory conditions with diffuse sound field -omni-directional sound incidence according to EN ISO 354.

Order No.: **O1040150102**

Sample manufacturer: **NEVPANEL YAPI MADEN ÜRETİM İTHALAT İHRACAT SANAYİ VE TİCARET LİMİTED ŞİRKETİ
BAĞDAT CADDESİ ÇOLAKOĞLU İŞ MERKEZİ NO:458/30
MALTEPE İSTANBUL**

Plant: **NEVPANEL YAPI MADEN ÜRETİM İTHALAT İHRACAT SANAYİ VE TİCARET LİMİTED ŞİRKETİ
ESKİŞEHİR ORGANİZE SANAYİ BÖLGESİ 28. CADDE NO:8
ESKİŞEHİR**

1.2 Plase and date of test

Technical and test institute for constructions Prague, state enterprise, branch Teplice
Testing laboratory No. 1018.4 accredited by ČIA, Building acoustics laboratory
Reverberation room TZÚS
Tolstého 447
415 03 Teplice – Řetenice, CZ

Test room: S1 (reverberation room)

1.2 Preparation of samples and method of installation

Data on sample composition were accepted from background information provided by the manufacturer. The mentioned technical parameters are intended for checking and documentary purposes and have an informative character only.

Reception date	TZÚS registration number	Sample identification	Date of installation	Date of testing
09. 09 .2015	VZ040153266	12/50	30.11.2015	30 11.2015
09. 09 .2015	VZ040153267	18/50	30.11.2015	30 11.2015

Tab. 1 - Sample identification



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The samples were constructed on the floor of the chamber S1

1) Producer declaration VZ040153266:

Composition: NevPanel 12 mm – C profile 20 mm – Rockwool 50 mm

Testing area: 11,9 m²

1) Producer declaration VZ040153267:

Composition: NevPanel 18 mm – C profile 20 mm – Rockwool 50 mm

Testing area: 11,9 m²

1.3 Sampling and tested structures

The tested sample was supplied by the producer. Visual check of the product type according to the presented specification was carried out upon receipt of the sample. Sample construction corresponds to the mentioned description. Sample installation was carried out by the personnel of the client supervised by responsible TZUS s.p. employee. The sample was laid on the floor of the room S1. Installation complies with EN ISO 354.

2 TESTING PROCEDURES USED

2.1 Measuring method

Measuring was carried out in the reverberation room in accordance with EN ISO 354. The measurement is realized in an omni-directional sound waves impact on the sample and it is based on the measurement of reverberation time in the empty room and reverberation time in the room with test sample. Equivalent absorption area of the sample and the sound absorption coefficient α_s are determined from the difference of results. Measurements were realized within the range of frequency bands 1/3 oct. from 100 to 5000 Hz.

The test result is the set of sound absorption coefficient α_{si} values in the 1/3 octave bands in the range from 100 to 5000 Hz.

①	EN ISO 354:2003	Acoustics - Measurement of sound absorption in a reverberation room
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Tab. 2 – Testing methods used

Deviations from the standardized procedures: ----



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Test description:

The average reverberation time in a reverberation room is determined by measuring with the test sample installed and without the sample. Equivalent absorption area A_1 in square meters in empty reverberation room is calculated using the formula:

$$A_1 = \frac{55,3V}{cT_1} - 4Vm_1$$

Where

- V volume in cubic meters, an empty reverberation room;
- c speed of sound in air, meters per second (for the usual laboratory temperatures from $T = 15^\circ\text{C}$ to 30°C , the value is determined as $c = 331 + 0.6 t$ (m/s);
- T_1 reverberation time, in seconds, empty reverberation room;
- m_1 damping coefficient in air, m^{-1} , calculated in accordance with ISO 9613-1 in relation to the climatic conditions that were in the empty reverberation room during the measurement.

The value m_1 can be calculated from the coefficient α , which is used in ISO 9613-1, according to the formula:

$$m = \frac{\alpha}{10 \lg(e)}$$

Equivalent absorption area A_2 in square meters in reverberation room with the test sample is calculated using the formula:

$$A_2 = \frac{55,3V}{cT_2} - 4Vm_2$$

Where

- V, c have the same meaning as in the previous paragraph
- T_2 reverberation time, in seconds, reverberation room with the installed sample;



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m_2 damping coefficient in air, m^{-1} , calculated in accordance with ISO 9613-1 in relation to the climatic conditions that were in the reverberation room with the test sample during the measurement.

Equivalent absorption area A_T , in square meters is calculated using the formula:

$$A_T = A_2 - A_1 = 55,3V \left(\frac{1}{c_2 T_2} - \frac{1}{c_1 T_1} \right) - 4V(m_2 - m_1)$$

Where

c_1 speed of sound in air at temperature t_1 (empty room);
 c_2 speed of sound in air at temperature t_2 (room with test sample);
 $A_1, V, T_1, m_1, A_2, T_2$ a m_2 have the same meaning as in the previous paragraphs.

Sound absorption coefficient α of the sample is calculated using the formula:

$$\alpha_s = \frac{A_T}{S}$$

Where

A_T equivalent absorption area A_T , in square meters
 S area, in square meters, covered with the test sample



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2.2 Instruments used

Norsonic type 118 – integration noise meter of the precision class 1, complying with the standards IEC 60651, 60804, 61672-1, 61260, basic memory for 2,500,000 data items, serial number 31991, verification certificate No. 8012-OL-10073-14 valid till 06.03.2016.

Norsonic microphone, type 1225 and pre-amplifier, type 1205, serial number 32127, verification certificate No. 8012-OL-10073-14 valid till 06.03.2016.

Norsonic acoustic calibrator, type 1251, serial number 31612. The measuring instrument complies with the requirements of IEC 942, calibration certificate No. 8012-KL-10075-14 valid till 04.03.2016.

Thermometer, hygrometer and barometer Testo 608-H1, serial number 445815, calibration certificate No. KLT-10K-886 valid till 07.11.2015.

Set for excitation of noise field, hemisphere Norsonic, type 250 (120 dB)

3 RESULTS OF TESTS

The results of the tests are listed in the annexes.

4 CONCLUSION

This assessment applies to the results of the tests only. It does not substitute assessment of conformity according to legal regulations or other requirements.

The person responsible for
technical aspects of the Report : Pavel Rubáš, PhD.

Tests were carried out by : Lukáš Rulf

External cooperation : -----



Pavel Bartoš

Deputy of Accredited testing laboratory manager

END OF THE REPORT



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Sound absorption coefficient according to ISO 354:2003

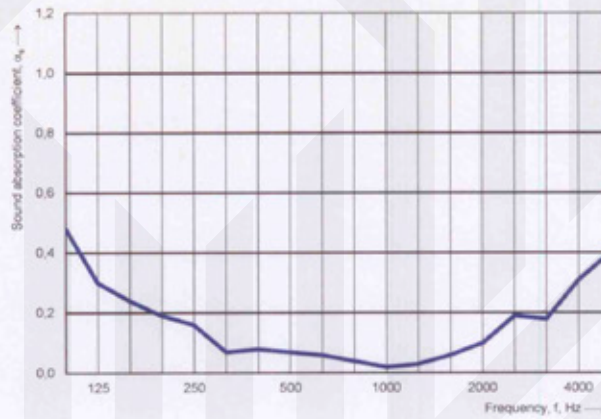
Measurement of sound absorption coefficient in a reverberation room

Client: TZÚS Praha, s.p., branch 0100, Prosecká 811/76A, Praha 9, CZ
 Description: NevPanel 12 mm – C profile 20 mm – Rockwool 50 mm

Date of test: 30.11.2015

Surface area:	11,90 m ²	Empty reverberation room:	Relative humidity:	75,0 %	Reverberation room with object:	Relative humidity:	88,0 %
Reverberation room volume:	206,2 m ³		Temperature:	18,5 °C		Temperature:	14,2 °C
			Barometric Pressure:	1010 kPa		Barometric Pressure:	992 kPa

Frequency f [Hz]	α_s
100	0,48
125	0,30
160	0,24
200	0,19
250	0,16
315	0,07
400	0,08
500	0,07
630	0,06
800	0,04
1000	0,02
1250	0,03
1600	0,06
2000	0,10
2500	0,19
3150	0,18
4000	0,31
5000	0,40



No. of test report: Annex no. 1, Protocol no. 040-050809

Date: 9.12.2015 0:00

Signature: Pavel Rubáš, Ph.D.





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Sound absorption coefficient according to ISO 11654

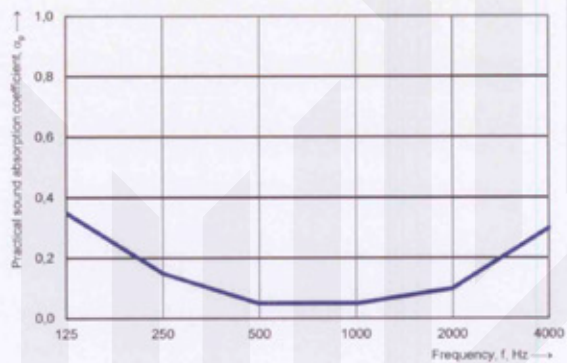
Measurement of sound absorption coefficient in a reverberation room

Client: TZÚS Praha, s.p., branch 0100, Prosecká 811/76A, Praha 9, CZ
 Description: NevPanel 12 mm – C profile 20 mm – Rockwool 50 mm

Date of test: 30.11.2015

Surface area:	11,90 m ²	Empty reverberation room:	Relative humidity:	75,0 %	Reverberation room with object:	Relative humidity:	88,0 %
Reverberation room volume:	206,2 m ³	Temperature:	18,5 °C	Temperature:	14,2 °C	Barometric Pressure:	992 kPa
		Barometric Pressure:	1010 kPa				

Frequency f [Hz]	α_p
125	0,35
250	0,15
500	0,05
1000	0,05
2000	0,10
4000	0,30



Weighted sound absorption coefficient according to ISO 11654
 $\alpha_w = 0,10$ (LH)

No. of test report: Annex no. 2, Protocol no. 040-050809

Date: 30.11.2015

Signature: Pavel Rubáš, Ph.D.





Norsonic Brechbühl AG

040-050809_3.xls

18.1.2016

Sound absorption coefficient according to ISO 354:2003

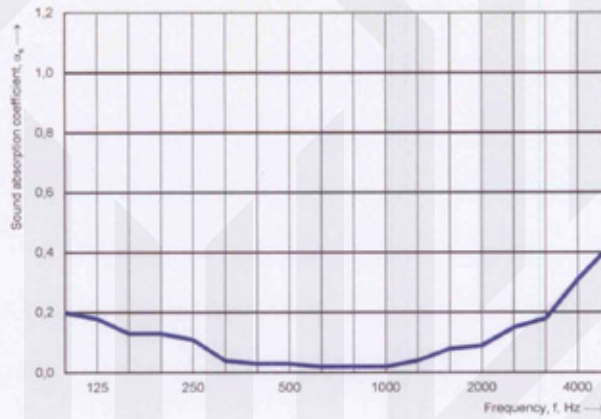
Measurement of sound absorption coefficient in a reverberation room

Client: TZÚS Praha, s.p., branch 0100, Prosecká 811/76A, Praha 9, CZ
 Description: NevPanel 18 mm – C profile 20 mm – Rockwool 50 mm

Date of test: 30.11.2015

Surface area:	11,90 m ²	Empty reverberation room:	Relative humidity:	75,0 %	Reverberation room with object:	Relative humidity:	88,0 %
Reverberation room volume:	206,2 m ³		Temperature:	18,5 °C		Temperature:	14,2 °C
			Barometric Pressure:	1010 kPa		Barometric Pressure:	992 kPa

Frequency f [Hz]	α_s
100	0,20
125	0,18
160	0,13
200	0,13
250	0,11
315	0,04
400	0,03
500	0,03
630	0,02
800	0,02
1000	0,02
1250	0,04
1600	0,08
2000	0,09
2500	0,15
3150	0,18
4000	0,31
5000	0,42



No. of test report: Annex no. 3, Protocol no. 040-050809

Date: 30.11.2015

Signature: Pavel Rubáš, Ph.D.





Norsonic Brechbühl AG

040-050809_4.xls

18.1.2016

Sound absorption coefficient according to ISO 11654

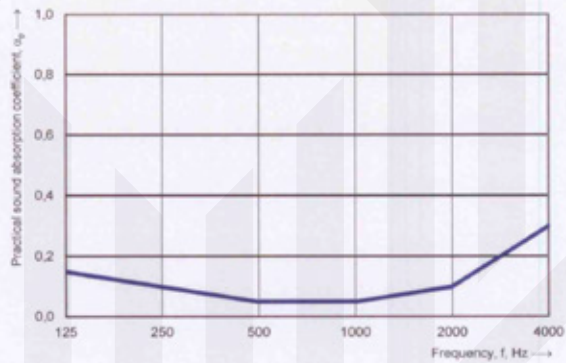
Measurement of sound absorption coefficient in a reverberation room

Client: TZÚS Praha, s.p., branch 0100, Prosecká 811/76A, Praha 9, CZ
 Description: NevPanel 18 mm – C profile 20 mm – Rockwool 50 mm

Date of test: 30.11.2015

Surface area:	11,90 m ²	Empty reverberation room:	Relative humidity:	75,0 %	Reverberation room with object:	Relative humidity:	88,0 %
Reverberation room volume:	206,2 m ³		Temperature:	18,5 °C		Temperature:	14,2 °C
			Barometric Pressure:	1010 kPa		Barometric Pressure:	992 kPa

Frequency f [Hz]	α_p
125	0,15
250	0,10
500	0,05
1000	0,05
2000	0,10
4000	0,30



Weighted sound absorption coefficient according to ISO 11654
 $\alpha_w = 0,10$ (H)

No. of test report: Annex no. 4, Protocol no. 040-050809

Date: 30.11.2015

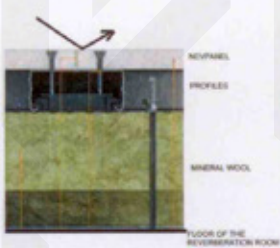
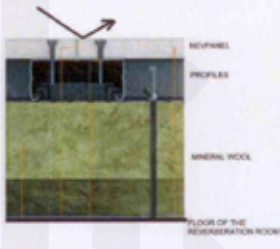
Signature: Pavel Rubáš, Ph.D.



Annex no. 5, Protocol no. 040-050809

Evaluation according to ČSN EN ISO 11654

Acoustics - Sound absorbers for use in buildings - Rating of sound absorption and VDI 3755/2000

Sample	α_w	Class ČSN EN ISO 11654 --- VDI 3755/200
<p>NEVPANEL 12 mm</p> 	0,10 (LH)	--- <i>reflective</i>
<p>NEVPANEL 18 mm</p> 	0,10 (H)	--- <i>reflective</i>

Tab. 1 - α_w

Class	α_w ISO 354	Description
ISO 11654		VDI 3755/2000
A	0,90; 0,95; 1,00	very high absorptive
B	0,80; 0,85	very high absorptive
C	0,60; 0,65; 0,70; 0,75	high absorptive
D	0,30; 0,35; 0,40; 0,45; 0,50; 0,55	absorptive
E	0,15; 0,20; 0,25	low absorptive
---	0,05; 0,10	reflective

Tab. 2 - classification





TECHNICKÝ A ZKUŠEBNÍ ÚSTAV STAVEBNÍ PRAHA, s. p.
pobočka 0400 - Teplice, zkušební laboratoř

Tolstého 447, 415 03 Teplice, tel.: 417 537 382, fax: 417 537 414,
email: bartos@tzus.cz

Zakázkové číslo: Z040 15 0304

PROTOCOL

on measuring of reduction in impact sound pressure level
ČSN EN ISO 10140-1 a ČSN EN ISO 10140-3

040-050810

NevPanel 12 mm

NevPanel 18 mm

Customers: Technický a zkušební ústav stavební Praha, s.p.
Branch 0100
Prosecká 811/76 A
190 00 Praha 9 – Prosek
Czech Republic

No. of copies: 2

Copy No.:

Annexes: 3

Caution: Without the written consent of TZÚS, the Report may not be reproduced otherwise than as a whole unit. The results apply to the mentioned subject of testing only.



Teplice 09.12.2015



TZÚS Praha
branch Teplice

Protocol no.:
040-050808

Page No.: 2
Total pages: 6

1. BACKGROUND INFORMATION

1.1 Assignment of testing

Determine the reduction in impact sound pressure level of the floors that are described the par. 1.3. Measuring in laboratory conditions without flanking transmission according to ČSN EN ISO 10140-3 and ČSN EN ISO 10140-4 including application rules for specific products described by ČSN EN ISO 10140-1 and using of test facilities and equipment defined by ČSN EN ISO 10140-5.

Order No.:

OI040150102

Sample manufacturer:

**NEVPANEL YAPI MADEN ÜRETİM İTHALAT İHRACAT
SANAYİ VE TİCARET LİMİTED ŞİRKETİ
BAĞDAT CADDESİ ÇOLAKOĞLU İŞ MERKEZİ NO:458/30
MALTEPE İSTANBUL**

Plant:

**NEVPANEL YAPI MADEN ÜRETİM İTHALAT İHRACAT
SANAYİ VE TİCARET LİMİTED ŞİRKETİ
ESKİŞEHİR ORGANİZE SANAYİ BÖLGESİ 28. CADDE NO:8
ESKİŞEHİR**

1.2 Place and date of testing

Technický a zkušební ústav stavební Praha, s.p., branch Teplice
Testing laboratory No. 1018.4 accredited by ČIA, Building acoustics laboratory V2
Tolstého 447
415 03 Teplice – Řetenice

Testing rooms:

K3 (emission room) and K2 (reception room).

1.3 Sampling and tested structures

Data on sample composition were accepted from background information provided by the manufacturer. The mentioned weight and moisture data are intended for checking and documentary purposes and have an informative character only.



	TZÚS Praha	Protocol no.:	Page No.:	3
	branch Teplice	040-050808	Total pages:	6

Reception date	TZÚS registration number	Sample identification	Date of installation	Date of testing
09.09.2015	VZ040153266	12	18.11.2015	19.11.2015
09.09.2015	VZ040153267	18	25.11.2015	26.11.2015

Table No. 1 – identification

1) Producer declaration VZ040153266:

NevPanel	12 mm	12 kg/m ²
Rockwool	50 mm	2 kg/m ²
Total	62 mm	14 kg/m ²

1) Producer declaration VZ040153267:

NevPanel	18 mm	18 kg/m ²
Rockwool	50 mm	2 kg/m ²
Total	68 mm	20 kg/m ²

1.4 Preparation of samples and method of installation

The tested sample was supplied by the manufacturer. Visual check of the product type according to the presented specification was carried out upon receipt of the sample. Sample construction corresponds to the mentioned description. Sample installation was carried out by the personnel of TZÚS s.p. according to ČSN EN ISO 10140-1 Acoustics - Laboratory measurement of sound insulation of building elements - Part 1: Application rules for specific products.

2. TESTING PROCEDURES USED


2.1 Measuring method

Measuring was carried out in laboratory conditions without side routes of sound propagation in reverberation rooms of the building acoustics laboratory of TZUS s.p. in Teplice. Sound insulation was measured in a form of sound reduction in accordance with ČSN EN ISO 10140-3 and ČSN EN ISO 10140-4.

Results were assessed in accordance with the standard ČSN EN ISO 717-2 Acoustics – Rating of sound insulation in buildings and of building elements – Part 2: Impact sound insulation

Reduction in impact sound pressure level ΔL_w the main result of testing that is objectively related to the tested structure.



	TZÚS Praha branch Teplice	Protocol no.: 040-050808	Page No.: 4 Total pages: 6
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①	ČSN EN ISO 10140-3	Acoustics - Laboratory measurement of sound insulation of building elements - Part 3: Measurement of impact sound insulation
②	ČSN EN ISO 10140-4	Acoustics - Laboratory measurement of sound insulation of building elements - Part 4: Measurement procedures and requirements

Tab. 1 – Testing methods used

③	ČSN EN ISO 10140-1	Acoustics - Laboratory measurement of sound insulation of building elements - Part 1: Application rules for specific products
④	ČSN EN ISO 10140-4	Acoustics - Laboratory measurement of sound insulation of building elements - Part 4: Measurement procedures and requirements

Tab. 2 – Supportive methods and requirements

Deviations from the standardized procedures:

This protocol on measuring does not include information about shape, construction and wall thickness of the laboratory LASA in accordance with ČSN EN ISO 10140-2 par. 9f. This information is confidential (pending patent) and can be shown by the head of the laboratory on customer request.

Test description:

The tested structure was installed in on the reference heavy ceiling using the specified technological procedure. Reduction in impact sound pressure level is expressed as L_n difference that is determined from the equation:

$$L_n = L_i + 10 \cdot \log \frac{A}{A_0}$$

Where L_i is an average impact acoustic pressure level in the emission room caused by the normalized impact source (dB)
 A equivalent absorption area of the reception room (m^2)
 A_0 10 m^2 , reference absorption

The difference ΔL is determined from the equation:

:

$$\Delta L = L_{n0} - L_n$$

kde L_{n0} is an average impact acoustic pressure level in the emission room without tested floor (dB)
 L_n is an average impact acoustic pressure level in the emission room with tested floor (dB)





TZÚS Praha
branch Teplice

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2.2 Instruments used

Norsonic type 118 – Integration sound-level meter of accuracy 1 complying with EC 60651, 60804, 61672-1, and 61260, primary memory for 2,500,000 pieces of data. Serial number 31991, 8012-OL-10073-14 valid to: 06/03/2016

Norsonic type 118 – Integration sound-level meter of accuracy 1 complying with EC 60651, 60804, 61672-1, and 61260, primary memory for 2,500,000 pieces of data. Serial number 32127, 8012-OL-10073-14 valid to: 06/03/2016

Microphone Norsonic type 1225 and pre-amp type 1205, serial No. 92003, test sheet No. test sheet: 8012-OL-10072-14 valid to: 06/03/2016

Microphone Norsonic type 1225 and pre-amp type 1205, serial No. 72839, test sheet No. test sheet: 8012-OL-10074-14 valid to: 06/03/2016

Norsonic acoustic calibrator, type 1251, serial No.: 31612. The meter complies with the requirements of the IEC 942, 8012-KL-10075-14 standard, valid to: 04/03/2016

Testo 608-H1, serial number 445815, calibration certificate KLT-10K-886 effective till 7 November 2015.

VOLTCRAFT DL180-THP, serial number 10052467, calibration certificate 1485/11 effective till 28 June 2016.

Sound field excitation set, Norsonic hemisphere, type 250 (120 dB).

Standardized impact source KIK

The result calculation was realized on computer using software which includes evaluation according to ČSN EN ISO 717-1 Acoustics - Rating of sound insulation in buildings and of building elements - Part 1: Airborne sound insulation.

3. VÝSLEDKY ZKOUŠEK

TZÚS registration number	Tested structure	Reduction in impact sound pressure level ΔL_w
VZ040153266	NevPanel 12 mm Rockwool 50 mm	18 dB
VZ040153267	NevPanel 18 mm Rockwool 50 mm	15 dB





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Repeatability and reproducibility of the results of sound insulation tests was verified successfully through inter-laboratory comparison test in September 2014.

4. CONCLUSION

The results of the tests are listed in the annex. They are presented in a transparent way in Tab. 4.

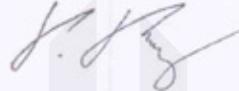
This assessment applies to the results of the tests only. It does not substitute assessment of conformity according to legal regulations or other requirements.

The person responsible for
technical aspects of the Report : Pavel Rubáš, PhD. 

Tests were carried out by : Lukáš Rulf

External cooperation




Pavel Rubáš, PhD.
Branch manager

END OF THE REPORT



Norsonic Brechbühl AG

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18.1.2016

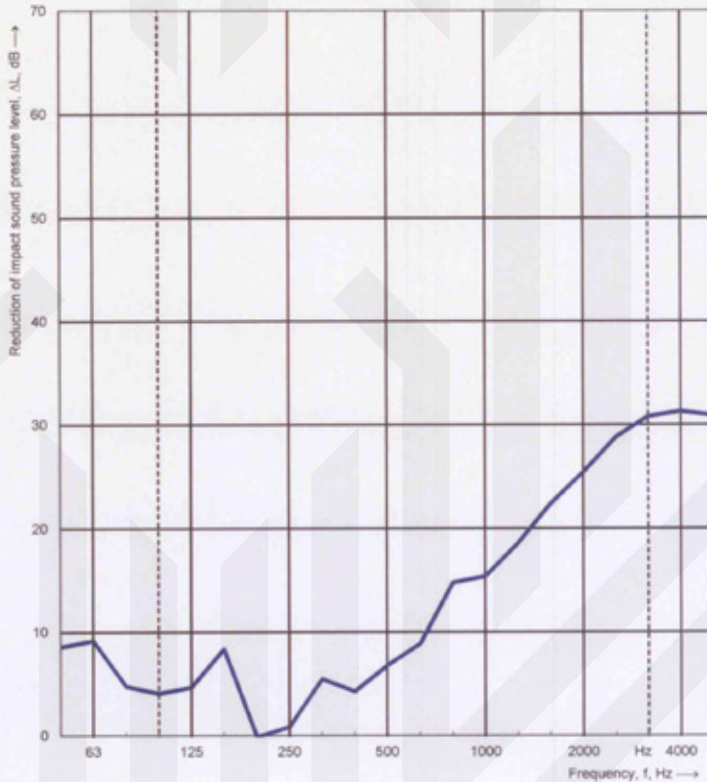
Sound reduction index according to ČSN EN ISO 10140-3 and ČSN EN ISO 10140-4

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

Client: TZÚS Praha, s.p., brach 0100, Prosecká, 611/76A, Praha 9, CZ Date of test: 19.11.2015
 Manufacturer: NEVPANEL KAP MIDEV ÜRETİM (TİHALAT İBRACAT SANAYİ VE TİCARET LİMİTED ŞİRKETİ BAŞDAT CADDESİ ÇOLUKOĞLU İŞ MERKEZİ NO:48/36 MALTEPE İSTANBUL
 Test room identification: LASA Teplice
 Test specimen mounted by: TZÚS workers
 Product identification: NevPanel 12 mm – Rockwool 50 mm

Air humidity: 45,0 % Frequency range for rating according to ISO 717-2
 Mass per unit area: 14 kg/m²
 Curing time: 360 s
 Temperature: 17,4 °C
 Source room volume: NPD m³
 Receiving room volume: 59,2 m³

Frequency f [Hz]	L _{p,0} 1/3 octave [dB]	ΔL 1/3 octave [dB]
50	63,9	8,6
63	65,9	9,2
80	64,7	4,8
100	68,2	4,1
125	69,5	4,7
160	74,2	8,4
200	70,9	-0,1
250	73,9	0,9
315	73,5	5,5
400	74,1	4,3
500	72,8	6,8
630	72,0	8,9
800	73,2	14,8
1000	72,7	15,4
1250	73,1	18,6
1600	72,4	22,4
2000	71,4	25,4
2500	70,8	28,8
3150	69,3	30,8
4000	65,8	31,3
5000	62,7	30,9



Rating according to ISO 717-2
 ΔL_w = 18 dB C_{1,w} = -11 dB C_{2,w} = dB
 These results are based on test made with an artificial source under laboratory conditions obtained in one-third-octave bands by an engineering method.

No. of test report: Annex no. 1, Protocol no. 040-050810
 Date: 9.12.2015 Signature: Pavel Rubáš, Ph.D.





Norsonic Brechbühl AG

040-050810_2.xls

18.1.2016

Sound reduction index according to ČSN EN ISO 10140-3 and ČSN EN ISO 10140-4

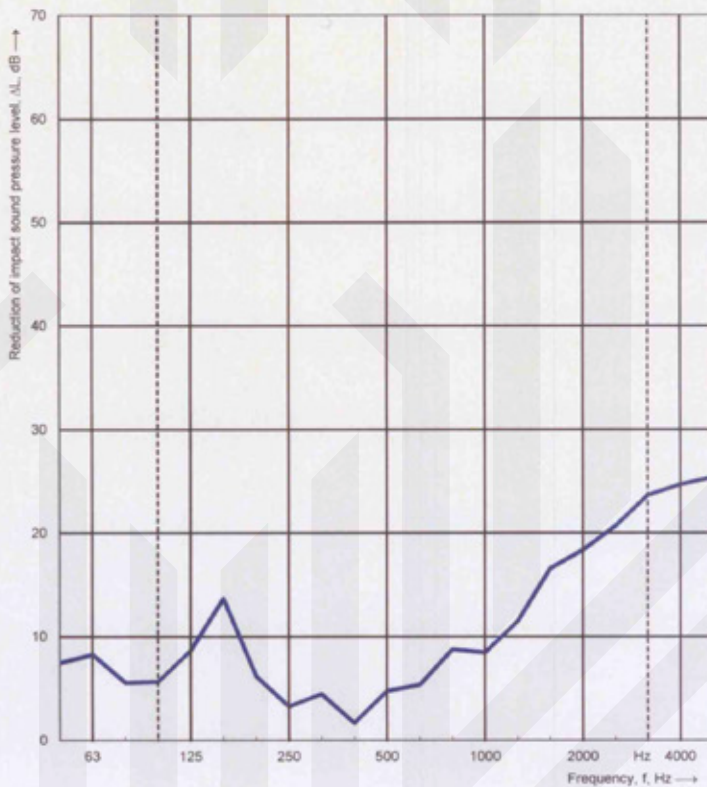
Laboratory measurements of the reduction of transmitted impact noise by floor coverings on a heavyweight standard floor

Client: TZÚS Praha, s.p., brach 0100, Prosecká, 811/76A, Praha 9, CZ Date of test: 26.11.2015
 Manufacturer: NEVPANEL VÁPÍ MADERNÝ DŘETÍM (THALAT IMBACAT SARAYI VE TICARET LIMITED ŞİRKETİ), BAŞÇAT CADESI/ÇOLAKOĞLU İŞ MERKEZİ NO:48/301 MALTEPE İSTANBUL
 Test room identification: LASA Teplice
 Test specimen mounted by: TZUS workers
 Product identification: NevPanel 18 mm – Rockwool 50 mm

Air humidity: 41,0 %
 Mass per unit area: 20 kg/m²
 Curing time: 360 s
 Temperature: 18,8 °C
 Source room volume: NPD m³
 Receiving room volume: 59,2 m³

Frequency range for rating according to ISO 717-2

Frequency f [Hz]	L _{w,C} 1/3 octave [dB]	ΔL 1/3 octave [dB]
50	63,9	7,5
63	65,9	8,3
80	64,7	5,6
100	68,2	5,7
125	69,5	8,7
160	74,2	13,7
200	70,9	6,2
250	73,9	3,3
315	73,5	4,5
400	74,1	1,7
500	72,8	4,8
630	72,0	5,4
800	73,2	8,8
1000	72,7	8,5
1250	73,1	11,5
1600	72,4	16,6
2000	71,4	18,4
2500	70,8	20,7
3150	69,3	23,7
4000	65,8	24,7
5000	62,7	25,4



Rating according to ISO 717-2
 ΔL_w = 15 dB C_{1,w} = -8 dB C_{2,w} = -3 dB
 These results are based on test made with an artificial source under laboratory conditions obtained in one-third-octave bands by an engineering method.

No. of test report: Annex no. 2, Protocol no. 040-050810

Date: 9.12.2015

Signature:

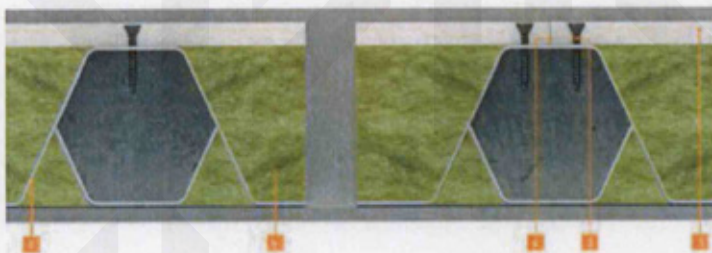
(Handwritten signature)
 Pavel Rubáš, Ph.D.
 PRAHA, s.p. TECHNICKÝ ÚSTAV STAVITELSTVÍ
 Katedra akustických zkoušek laboratorní
 Teplice

Annex no. 3, Protocol no. 040-50810

cross-section

RAISED FLOOR SYSTEMS

Suggested thicknesses of NevPanel MgO Board are 18mm when used in raised floor systems. System should be constructed by using an appropriate corrosion protected steel/ wood etc. based substructure. Panels are cut in appropriate dimensions and fixed with appropriate construction elements.- Construction elements may vary according to the preset substructure to be used . Bonding product suggestions for raised floor application : Ceramic adhesive mortar, flexmortelpolyurethane foam, acrylic mastic and similarproducts may be used as an adhesive. Natural stone, ceramic, laminated/wood parquet , carpet can be applied as finishing application. 50 density or beyond Rockwool may be used if required by the present design / application

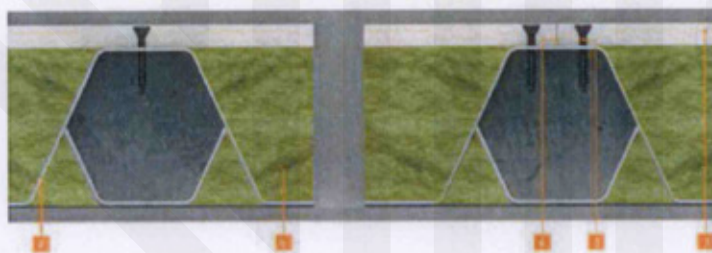


- 1 NevPanel MgO Board 12 mm
- 2 Raised Floor system structure
- 3 Smart Screw
- 4 Joint Paste
- 5 Rockwool 50 mm

Sample no. VZ040153266

RAISED FLOOR SYSTEMS

Suggested thicknesses of NevPanel MgO Board are 18mm when used in raised floor systems. System should be constructed by using an appropriate corrosion protected steel/ wood etc. based substructure. Panels are cut in appropriate dimensions and fixed with appropriate construction elements.- Construction elements may vary according to the preset substructure to be used . Bonding product suggestions for raised floor application : Ceramic adhesive mortar, flexmortelpolyurethane foam, acrylic mastic and similarproducts may be used as an adhesive. Natural stone, ceramic, laminated/wood parquet , carpet can be applied as finishing application. 50 density or beyond Rockwool may be used if required by the present design / application



- 1 NevPanel MgO Board 18 mm
- 2 Raised Floor system structure
- 3 Smart Screw
- 4 Joint Paste
- 5 Rockwool 50 mm

Sample no. VZ040153267

