Determination of sound insulation of the Vilpe Wive 100 replacement intake vent

Customer

Vilpe Oy
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Order reference

PAS7PT20000603

Contact person

Eurofins Expert Services Oy
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Assignment

To determine the sound insulation of the Vilpe Wive 100 replacement intake vent.

Test specimens

The replacement intake vents delivered by the customer to Eurofins Expert Services Oy were received on 18 March 2020. The construction drawings and other information regarding the tested specimens are presented in Appendix 2.

The replacement intake vents were installed in a double-leaf plasterboard wall built into the measuring opening between the two reverberation rooms. The thickness of the wall was 300mm, and the construction was 2 x plasterboard / wool / 2 x plasterboard. The single-number sound insulation values $D_{n,e,w}$ of the intact wall construction are shown in Table 1. The measurements were repeated for three identical vents with the same configuration.

The airborne sound insulation of the samples was determined by dual-channel measurements using two fixed sound sources and rotating microphones.
The samples were tested on 19 May 2020 at Eurofins Expert Services Oy, Research Hall 1 (address: Tekniikantie 15 A, 02150 Espoo).

The measurements were carried out by Ville Joensuu of Eurofins Expert Services Oy.

Methodology

The single value sound insulation index $D_{n,e}$ was determined according to *EN ISO 10140-1:2016* [1] and *EN ISO 10140-2:2010* [2] and the single value weighted sound insulation indices $D_{n,e,w}$, $D_{n,e,w} + C$ and $D_{n,e,w} + C_{tr}$ were determined according to *EN ISO 717-1:2013* [3]. The measuring equipment and the dimensions of the measurement rooms are given in Appendix 3.

Findings

Table 1 shows the single value sound insulation index $D_{n,e,w}$ and the spectrum adaptation terms C and C_{tr} determined over the frequency range 100-3150 Hz.

The sound insulation per 1/3 octave is given in Appendix 1.

Table 1. Single-number sound insulation value of the Vilpe Wive 100 replacement intake vent.

No.	Type	$D_{n,e,w}$ dB	$D_{n,e,w} + C$ dB	$D_{n,e,w} + C_{tr}$ dB
1.	Wilpe Wive 100 replacement intake vent with thermostat	35	34	33
1b.	Wilpe Wive 100 replacement intake vent with thermostat and silencer	38	37	36
2.	Wilpe Wive 100 replacement intake vent with thermostat	34	34	33
2b	Wilpe Wive 100 replacement intake vent with thermostat and silencer	37	37	36
3.	Wilpe Wive 100 replacement intake vent with thermostat	35	35	33
3b	Wilpe Wive 100 replacement intake vent with thermostat and silencer	36	36	35
4.	Wilpe Wive 100 replacement intake vent with thermostat and silencer. Room-side cover closed.	45	44	43
5.	Intact test wall 300mm (2 x plasterboard / wool / 2x plasterboard)	68	67	63

The airborne sound insulation index $D_{n,e,w} + C_{tr}$ can be used, for example, to assess sound insulation in urban traffic noise, and $D_{n,e,w} + C$ can be used, for example, to assess sound insulation for jet aircraft in the vicinity of an airport [2, Appendix A].

The airborne sound insulation per 1/3 octave is shown in Appendix 1. The repeatability of the single value reading obtained as a laboratory measurement is 1 dB.

Espoo, 12.6.2020

[Signature – Mika Lojander, specialist]

[Signature – Ville Joensuu, tester]

Report is electronically signed

Eurofins Expert Services Oy is a notified body, No. 0809.

Our laboratory (T001, Eurofins Expert Services Oy) is accredited by FINAS Accreditation Services to perform tests according to EN ISO 10140-2:2010 and EN ISO 717-1:1996.

References

[1] *EN ISO 10140-1:2016 Acoustics – Laboratory measurements of airborne sound insulation of building elements – Part 1: Application rules for specific products*
[2] *EN ISO 10140 – 2:2010 Acoustics – Measurement of sound insulation in buildings and of building elements – Part 2: Laboratory measurements of airborne sound insulation of building elements*
[3] *EN ISO 717-1:2013 Acoustics – Rating of sound insulation in buildings and of building elements – Part 1: Airborne sound insulation*

Appendices 3

Distribution Electronically approved by the customer

Customer: Vilpe Oy

Product:1 Vilpe Wive 100 replacement intake vent

Sound insulation of replacement intake vent

Thermostat: Yes 380030

Test date: 19.5.2020

Measurement *ISO 10140:2010.*

Rating *ISO 717-1:2013.*

Silencer: No

Filter: Yes

Wall thickness:	300	mm
Test room temperature:	19	°C
Test room humidty:	37	%
Sending room (1) volume:	102	m^3
Receiving room (2) volume:	131	m^3

f Hz	$D_{n,e}$ dB	$D_{n,e,F}$ dB
50	29.3	
63	38.7 *)	42.5
80	42.6 *)	43.9
100	47.7 *)	45.1
125	47.4 *)	51.5
160	46.7	
200	46.7	
250	40.1	
315	31.9	
400	27.4	
500	33.6	
630	33.5	
800	30.3	
1000	32.1	
1250	33.4	
1600	35.7	
2000	39.9	
2500	41.6	
3150	42.4	
4000	42.9	
5000	43.2	

*) Minimum result

[graph]

Sound insulation of replacement intake vent:	$D_{n,e,w}(C; C_{tr})$	=	35 (-1;-2) dB

Quantities and units

f	Frequency, Hz
$D_{n,e}$	Single-number sound insulation value of outdoor air vent at third-octave band, dB
$D_{n,e,F}$	Single-number sound insulation value of wall at third-octave band, dB
$D_{n,e,w}$	Single-number sound insulation value of outdoor air vent, dB
C	Spectrum adaptation term, general, dB
C_{tr}	Spectrum adaptation term, traffic noise, dB

Customer: Vilpe Oy

Product:1b Vilpe Wive 100 replacement intake vent

Sound insulation of replacement intake vent

Thermostat: Yes 380030

Test date: 19.5.2020

Silencer: Yes 380023

Measurement *ISO 10140:2010.*

Rating *ISO 717-1:2013.*

Filter: Yes

Wall thickness:	300	mm
Test room temperature:	19	°C
Test room humidty:	37	%
Sending room (1) volume:	102	m^3
Receiving room (2) volume:	131	m^3

f Hz	$D_{n,e}$ dB	$D_{n,e,F}$ dB
50	28.8	
63	35.7	
80	43.5 *)	43.9
100	49.1 *)	45.1
125	49.1 *)	51.5
160	48.2	
200	46.3	
250	39.1	
315	30.5	
400	34.7	
500	37.3	
630	35.0	
800	33.7	
1000	34.9	
1250	36.2	
1600	38.3	
2000	42.4	
2500	45.3	
3150	41.7	
4000	48.3	
5000	49.9	

*) Minimum result

[graph]

Sound insulation of replacement intake vent:	$D_{n,e,w}(C; C_{tr})$	=	37 (0;-1) dB

Quantities and units

f	Frequency, Hz
$D_{n,e}$	Single-number sound insulation value of outdoor air vent at third-octave band, dB
$D_{n,e,F}$	Single-number sound insulation value of wall at third-octave band, dB
$D_{n,e,w}$	Single-number sound insulation value of outdoor air vent, dB
C	Spectrum adaptation term, general, dB
C_{tr}	Spectrum adaptation term, traffic noise, dB

Customer: Vilpe Oy

Product:2 Vilpe Wive 100 replacement intake vent

Sound insulation of replacement intake vent

Thermostat: Yes 380030

Test date: 19.5.2020

Measurement *ISO 10140:2010.*

Rating *ISO 717-1:2013.*

Silencer: No

Filter: Yes

Wall thickness:	300	mm
Test room temperature:	19	°C
Test room humidty:	37	%
Sending room (1) volume:	102	m^3
Receiving room (2) volume:	131	m^3

f Hz	$D_{n,e}$ dB	$D_{n,e,F}$ dB
50	28.8	
63	35.2	
80	44.6 *)	43.9
100	48.9 *)	45.1
125	48.1 *)	51.5
160	46.8	
200	46.5	
250	40.1	
315	32.2	
400	27.9	
500	33.2	
630	33.5	
800	30.2	
1000	32.2	
1250	33.0	
1600	35.7	
2000	39.9	
2500	42.0	
3150	43.0	
4000	43.4	
5000	43.7	

*) Minimum result

[graph]

Sound insulation of replacement intake vent:	$D_{n,e,w}(C ; C_{tr})$	=	34 (0;-1) dB

Quantities and units

f	Frequency, Hz
$D_{n,e}$	Single-number sound insulation value of outdoor air vent at third-octave band, dB
$D_{n,e,F}$	Single-number sound insulation value of wall at third-octave band, dB
$D_{n,e,w}$	Single-number sound insulation value of outdoor air vent, dB
C	Spectrum adaptation term, general, dB
C_{tr}	Spectrum adaptation term, traffic noise, dB

Customer: Vilpe Oy

Product:2b Vilpe Wive 100 replacement intake vent

Sound insulation of replacement intake vent

Thermostat: Yes 380030

Test date: 19.5.2020

Silencer: Yes 380023

Measurement *ISO 10140:2010.*

Rating *ISO 717-1:2013.*

Filter: Yes

Wall thickness:	300	mm
Test room temperature:	19	°C
Test room humidty:	37	%
Sending room (1) volume:	102	m^3
Receiving room (2) volume:	131	m^3

f Hz	$D_{n,e}$ dB	$D_{n,e,F}$ dB
50	28.8	
63	35.7	
80	43.5 *)	43.9
100	49.1 *)	45.1
125	49.1 *)	51.5
160	48.2	
200	46.3	
250	39.1	
315	30.5	
400	34.7	
500	37.3	
630	35.0	
800	33.7	
1000	34.9	
1250	36.2	
1600	38.3	
2000	42.4	
2500	45.3	
3150	47.1	
4000	48.3	
5000	49.9	

*) Minimum result

[graph]

Sound insulation of replacement intake vent:	$D_{n,e,w}(C;C_{tr})$	=	37 (0;-1) dB

Quantities and units

f	Frequency, Hz
$D_{n,e}$	Single-number sound insulation value of outdoor air vent at third-octave band, dB
$D_{n,e,F}$	Single-number sound insulation value of wall at third-octave band, dB
$D_{n,e,w}$	Single-number sound insulation value of outdoor air vent, dB
C	Spectrum adaptation term, general, dB
C_{tr}	Spectrum adaptation term, traffic noise, dB

Customer: Vilpe Oy

Product:3 Vilpe Wive 100 replacement intake vent

Sound insulation of replacement intake vent

Thermostat: Yes 380030

Test date: 19.5.2020

Measurement *ISO 10140:2010.*

Rating *ISO 717-1:2013.*

Silencer: No

Filter: Yes

Wall thickness:	300	mm
Test room temperature:	19	°C
Test room humidty:	37	%
Sending room (1) volume:	102	m^3
Receiving room (2) volume:	131	m^3

f Hz	$D_{n,e}$ dB	$D_{n,e,F}$ dB
50	27.0	
63	38.0 *)	42.5
80	45.0 *)	43.9
100	48.4 *)	45.1
125	48.5 *)	51.5
160	46.7	
200	46.6	
250	39.8	
315	31.8	
400	28.3	
500	33.3	
630	33.5	
800	30.7	
1000	32.3	
1250	33.0	
1600	36.3	
2000	40.1	
2500	42.0	
3150	43.5	
4000	43.7	
5000	44.3	

*) Minimum result

[graph]

Sound insulation of replacement intake vent:	$D_{n,e,w}(C;C_{tr})$	=	35 (0;-2) dB

Quantities and units

f	Frequency, Hz
$D_{n,e}$	Single-number sound insulation value of outdoor air vent at third-octave band, dB
$D_{n,e,F}$	Single-number sound insulation value of wall at third-octave band, dB
$D_{n,e,w}$	Single-number sound insulation value of outdoor air vent, dB
C	Spectrum adaptation term, general, dB
C_{tr}	Spectrum adaptation term, traffic noise, dB

Customer: Vilpe Oy

Product:3b Vilpe Wive 100 replacement intake vent

Sound insulation of replacement intake vent

Thermostat: Yes 380030

Test date: 19.5.2020

Silencer: Yes 380023

Measurement *ISO 10140:2010.*

Rating *ISO 717-1:2013.*

Filter: Yes

Wall thickness:	300	mm
Test room temperature:	19	°C
Test room humidty:	37	%
Sending room (1) volume:	102	m^3
Receiving room (2) volume:	131	m^3

f Hz	$D_{n,e}$ dB	$D_{n,e,F}$ dB
50	26.9	
63	36.6	
80	45.1 *)	43.9
100	48.3 *)	45.1
125	49.2 *)	51.5
160	48.2	
200	46.6	
250	40.6	
315	31.9	
400	30.1	
500	34.2	
630	33.3	
800	33.2	
1000	34.4	
1250	36.2	
1600	38.3	
2000	43.2	
2500	46.3	
3150	48.0	
4000	48.7	
5000	50.5	

*) Minimum result

[graph]

Sound insulation of replacement intake vent:	$D_{n,e,w}(C ; C_{tr})$	=	36 (0;-1) dB

Quantities and units

f	Frequency, Hz
$D_{n,e}$	Single-number sound insulation value of outdoor air vent at third-octave band, dB
$D_{n,e,F}$	Single-number sound insulation value of wall at third-octave band, dB
$D_{n,e,w}$	Single-number sound insulation value of outdoor air vent, dB
C	Spectrum adaptation term, general, dB
C_{tr}	Spectrum adaptation term, traffic noise, dB

Customer: Vilpe Oy

Product:4 Vilpe Wive 100 replacement intake vent

Sound insulation of replacement intake vent

Thermostat: Yes 380030

Test date: 19.5.2020

Silencer: Yes 380023

Measurement *ISO 10140:2010.*

Rating *ISO 717-1:2013.*

Filter: Yes

Wall thickness:	300	mm
Test room temperature:	19	°C
Test room humidty:	37	%
Sending room (1) volume:	102	m^3
Receiving room (2) volume:	131	m^3

Room-side cover closed

f Hz	$D_{n,e}$ dB	$D_{n,e,F}$ dB
50	28.4	
63	37.0	
80	44.7 *)	43.9
100	49.8 *)	45.1
125	52.3 *)	51.5
160	51.2	55.3
200	48.1	
250	39.2	
315	34.3	
400	42.0	
500	41.3	
630	39.9	
800	44.8	
1000	43.8	
1250	46.0	
1600	46.9	
2000	52.5	
2500	53.1	
3150	51.6	
4000	53.0	
5000	57.9	

*) Minimum result

[graph]

Sound insulation of replacement intake vent:	$D_{n,e,w}(C; C_{tr})$	=	45 (-1;-2) dB

Quantities and units

f	Frequency, Hz
$D_{n,e}$	Single-number sound insulation value of outdoor air vent at third-octave band, dB
$D_{n,e,F}$	Single-number sound insulation value of wall at third-octave band, dB
$D_{n,e,w}$	Single-number sound insulation value of outdoor air vent, dB
C	Spectrum adaptation term, general, dB
C_{tr}	Spectrum adaptation term, traffic noise, dB

Customer: Vilpe Oy

Sound insulation of board wall

Test date: 19.5.2020
Measurement *ISO 10140:2010.*
Rating *ISO 717-1:2013.*

Board wall structure

Thickness: 300mm

Size: 1230mm x 1480mm

Construction: 2 x plasterboard / wool / 2 x plasterboard

Wall thickness:	300	mm
Test room temperature:	19	°C
Test room humidty:	37	%
Sending room (1) volume:	102	m^3
Receiving room (2) volume:	131	m^3

f Hz	$D_{n,e}$ dB	$D_{n,e,F}$ dB
50	37.1 *)	39.6
63	43.8 *)	44.3
80	45.2 *)	46.8
100	46.4 *)	48
125	52.8 *)	50.4
160	56.6 *)	53.2
200	57.0 *)	52.3
250	59.2 *)	54.7
315	60.4 *)	58
400	63.5 *)	63.9
500	65.1 *)	66
630	67.3 *)	67.3
800	66.2 *)	68
1000	68.2 *)	67.9
1250	73.8 *)	69.5
1600	79.7 *)	77.1
2000	81.4 *)	77.9
2500	84.3 *)	81.3
3150	86.3 *)	81.7
4000	83.1 *)	79.2
5000	76.7 *)	73.4

*) Minimum result

[graph]

Board wall structure:	$D_{n,e,w}$ (C ; C_{tr})	=	68 (-1;-5) dB

Quantities and units

f	Frequency, Hz
$D_{n,e}$	Single-number sound insulation value of outdoor air vent at third-octave band, dB
$D_{n,e,F}$	Single-number sound insulation value of wall at third-octave band, dB
$D_{n,e,w}$	Single-number sound insulation value of outdoor air vent, dB
C	Spectrum adaptation term, general, dB
C_{tr}	Spectrum adaptation term, traffic noise, dB

[image]

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MEASURING INSTRUMENTS AND REVERBERATION ROOMS

Measuring instruments:	Name	Serial number
Condenser microphone	B&K (Brüel & Kjær) 4943	2415044
Condenser microphone	B&K (Brüel & Kjær) 4943	2527717
Microphone preamplifiers	B&K 2669	2025241
Microphone preamplifiers	B&K 2669	2554550
Rotating microphone boom	B&K 3923	1678216
Rotating microphone boom	B&K 3923	2630663
Amplifier	Yamaha MX-1000	
Speakers	Sinmarc V121L	
Real-time analyser	Nor 121	31429
Standard audio source	B&K 4228	3063558

Dimensions of reverberation rooms:	Floor:	Height:	Volume:
Sound source room (RR 1)	4.7 m x 5.8 m	3.7 m	102 m^3
Reception room (RR 2)	5.0 m x 6.5 m	4.0 m	131 m^3

Thickness of concrete walls, floors and ceilings in the reverberation rooms 0.25 m