ventive
naturally intelligent buildings

SRL 50 YEARS 1967 – 2017

ACOUSTIC DATA FOR VENTIVE WINDHIVE

CARRIED OUT BY SRL SOUND LABORATORIES

1. Company Details

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2. Location & Date of Sound Test

Test carried out by: Sound Research Laboratories

Location of Test: Holbrook House
Little Waldingfield
Sudbury
Suffolk
CO10 0TF
United Kingdom

Date of Test: 29/04/2019

3. Description of Test

Ventive Windhive was tested in various configurations.

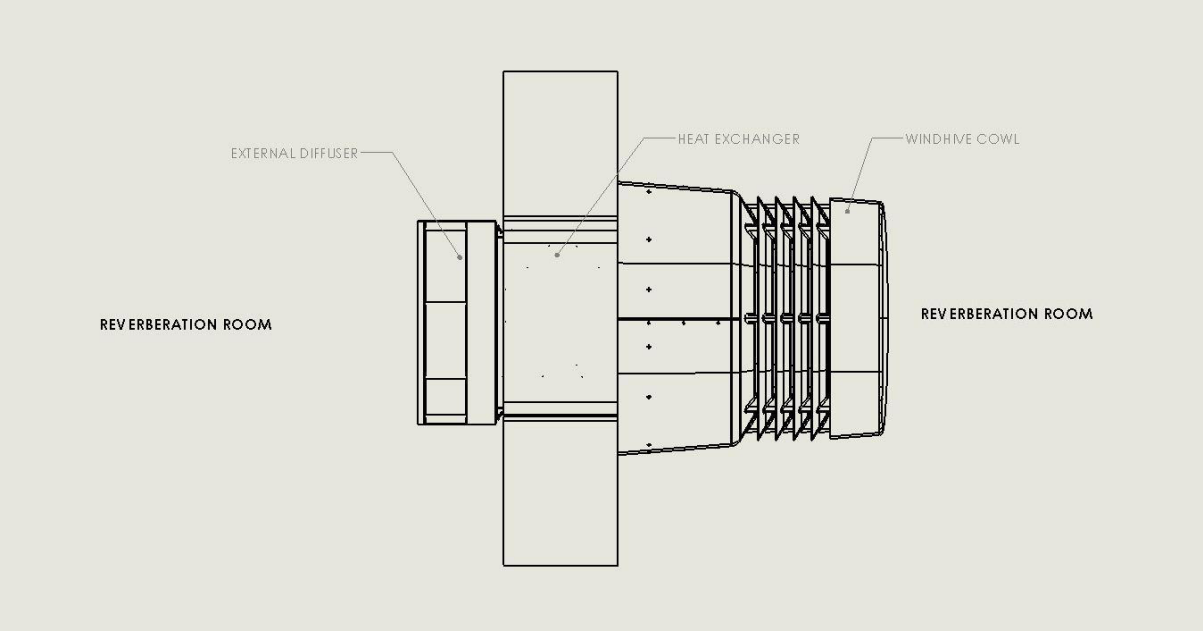
The sample was mounted/located and tested in accordance with the relevant standard. The method and procedure are described in Appendix A. The measurement uncertainty is given in Appendix B.

4. Results

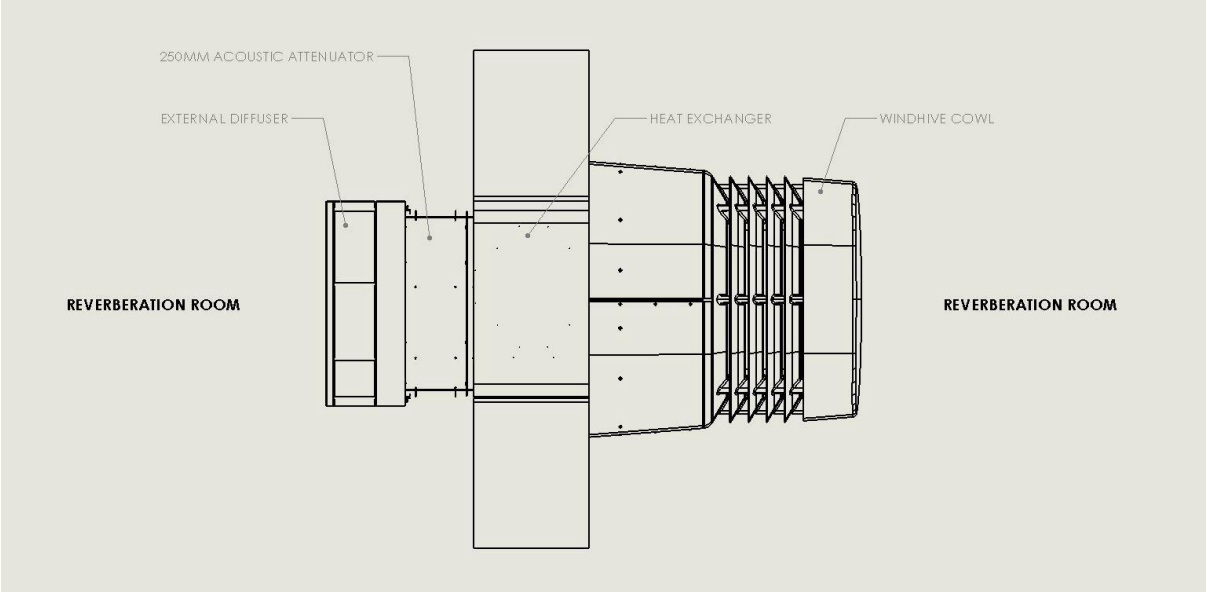
Test No	Description	$R_w(C;C_{tr})$
2	Windhive Standard, External Diffuser Dampers - Supply Fully Open, Extract Fully Open, Bypass Fully Open	14 (-1;-2)
3	Windhive Standard, External Diffuser, Dampers - Supply 50% Open, Extract 50% Open, Bypass Fully Closed	16 (0;-2)
4	Windhive Standard, 250mm Attenuator, External Diffuser Dampers - Supply 50% Open, Extract 50% Open, Bypass Fully Closed	19 (0;-2)
5	Acoustically Lined Windhive, 250mm Attenuator, External Diffuser Attenuated Heat Exchanger Dampers - Supply 50% Open, Extract 50% Open, Bypass Fully Closed	24 (-1;-5)
6	Windhive Standard, 250mm Attenuator, External Diffuser Attenuated Heat Exchanger Dampers - Supply 50% Open, Extract 50% Open, Bypass Fully Closed	22 (-1;-4)
7	Windhive Standard, 250mm Attenuator, External Diffuser Attenuated Heat Exchanger Dampers - Supply Fully Open, Extract Fully Open, Bypass Fully Closed	21 (-1;-3)
8	Windhive Standard, 250mm Attenuator, External Plenum Box 400mm Spigot Attenuated Heat Exchanger Dampers - Supply Fully Open, Extract Fully Open, Bypass Fully Closed	25 (-2;-5)
9	Windhive Standard, 250mm Attenuator, External Diffuser Attenuated Heat Exchanger Dampers - Supply Fully Open, Extract Fully Open, Bypass Fully Open	21 (-1;-4)

5. Drawings of Windhive Configurations

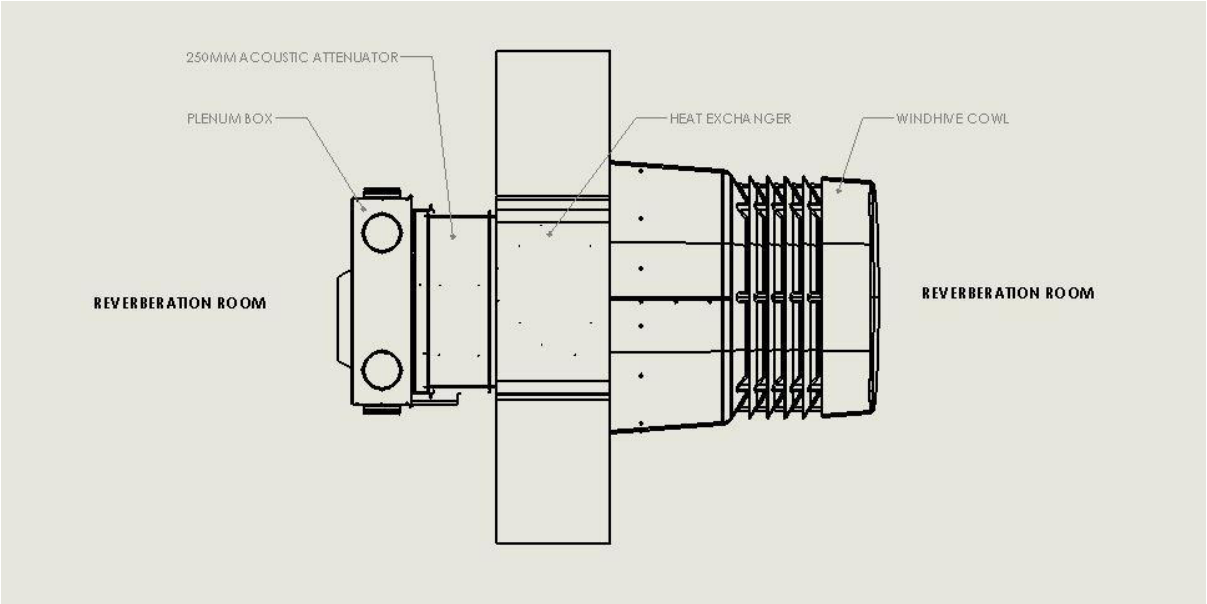
Drawing 1- SRL Tests 2 & 3



Drawing 2 – SRL Tests 4, 5, 6, 7, & 9



Drawing 3 – SRL Test 8



Appendix A – Test Procedure

Measurement of Sound Transmission in accordance with BS EN ISO 10140-2: 2010 – TP33

In the laboratory, airborne sound transmission is determined from the difference in sound pressure levels measured across a test sample installed between two reverberant rooms. The difference in measured sound pressure levels is corrected for the amount of absorption in the receiving room. The test is done under conditions which restrict the transmission of sound by paths other than directly through the sample. The source sound field is randomly incident on the sample.

The test sample is located and sealed in an aperture within the brick dividing wall between the two rectangular reverberant (i.e. acoustically "live") room, both of which are constructed from 215mm brick with reinforced concrete floors and roofs. The brick wall has dimensions of 8m wide x 3.1m high and 550mm nominal thickness and forms the whole of the common area between the two rooms.

One of the rooms is used as the receiving room and has a volume of 300 cubic metres. It is isolated from the surrounding structure and the adjoining room by the use of resilient mountings and seals ensuring good acoustic isolation. The adjoining source room has a volume of 115 cubic metres.

Broad band noise is produced in the source room from an electronic generator, power amplifier and loudspeaker. The resulting sound pressure levels in both rooms are sampled using a microphone mounted on an oscillating boom and connected to a real time analyser. The signal is filtered into one third octave band widths, integrated and averaged. The value obtained at each frequency is known as the average sound pressure level for either the source or the receiving room. The change in level across the test sample is termed the sound pressure level difference, i.e.

$$D = L1 - L2$$

where

D is the equivalent Sound Pressure level difference, dB
L1 is the equivalent Sound Pressure level in the source room, dB
L2 is the equivalent Sound Pressure level in the receiving room, dB

The Sound Reduction Index (R), also known by the American terminology Sound Transmission Loss, is defined as the number of decibels by which sound energy randomly incident on the test sample is reduced in transmitting through it and is given by the formula:

$$R = D + 10\log_{10}\frac{S}{A} \text{ ..... in decibels}$$

where

S is the area of the sample, m2
A is the total absorption in the receiving room, m2

The Sound Reduction Index is an expression of the laboratory sound transmission performance of a particular element or construction. It is a function of the mass, thickness, sealing, method of mounting etc. and is independent of the overall area of the sample.

However, when an example of this construction is installed on site, the sound insulation obtained will depend upon its surface area, as well as the absorption in the receiving room. The larger the area the greater the sound energy transmitted. Also, the overall sound insulation is affected by the sound transmission through other building elements, some of which may have an inferior performance to the sample tested. In practice, therefore, the potential sound reduction index of a construction is not fully realised on site. Furthermore, the sound reduction index of a particular sample of that construction can only be measured accurately in a

laboratory, because only under such controlled conditions can the sound transmission path be limited to the sample under test.

Rw, C and Ctr have been calculated in accordance with the relevant section of

BS EN ISO 717-1:2013 from the results of laboratory tests carried out in accordance with BS EN ISO 10140-2:2010.

Appendix B – Measurement Uncertainty

BS EN ISO 10140-2: 2010 – TP33

The following values of uncertainty are based on a standard uncertainty multiplied by a coverage factor of k = 2 , which provides a level of confidence of approximately 95%.

Frequency, Hz	Uncertainty, ± dB
100	3.2
125	2.9
160	2.5
200	2.5
250	1.8
315	1.8
400	1.5
500	1.5
630	1.2
800	1.2
1000	1.2
1250	1.2
1600	1.2
2000	1.2
2500	1.2
3150	1.2
Temperature	±0.8 °C
Humidity	±10 %RH
Static Pressure	±1 mbar

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