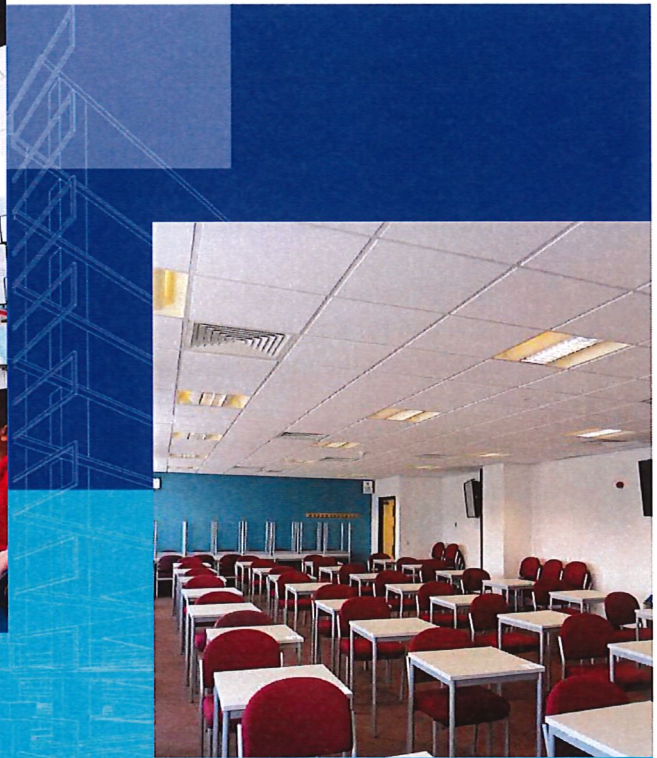
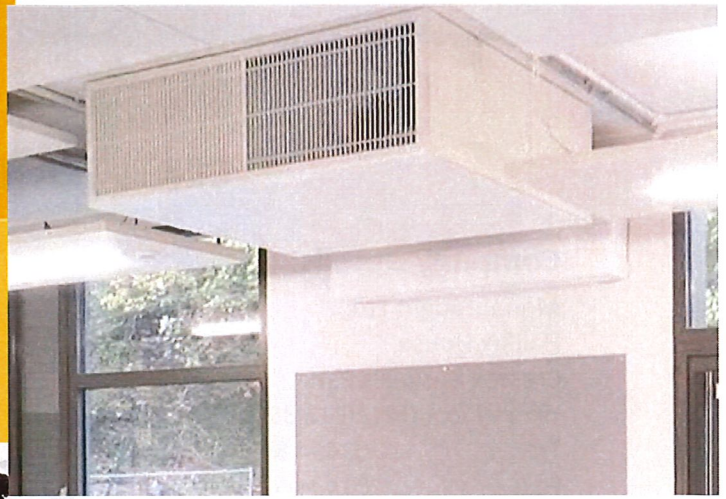


Established in
1974



Certificate of Conformity

Project Name – Davidson House Helios EC2000 system for Basement Shower block

 **Monodraught®**
engineering delivered. naturally

CERTIFICATE OF CONFORMANCE

Company Details:

Monodraught Ltd.
Halifax House
Cressex Business Park
High Wycombe, HP12 3SE
Tel: 01494 897700
Fax: 01494 532465
E-Mail: serviceteam@monodraught.com
Website: www.monodraught.com

Equipment Installed:

Helios EC2000 Ventilation systems serving the Shower Block

Acoustic Criteria

The acoustic design of the systems are based upon the unit being installed correctly and proper supply and exhaust air flow must be ensured to achieve the optimum performance. Varying from the design and installation requirements and also by incorrect operation can lead to a reduction in capacity or noise increase.

Noise figures are stated in sound power levels LWA in dB(A) (**conforms to ISO 3744 / 3745 & 3746 - DIN 45635, T.1**). Sound pressure levels LPA depend on room specific conditions. These conditions may affect the measurement result on site and vary from the catalogue data.

DIN 45635 standards DIN 45635 is a group of German standards with the first three parts written in-line with previously B-standards. The parts with numbers above 3 are the noise test code documents, covering a broad range of equipment, such as chimneys, internal combustion engines, air-cooled heat exchangers, etc. There are currently over 70 parts (with nonconsecutive numbering). In time some of these standards became obsolete or were amended by the DIN ISO versions listed in Table 1.

Table 1– List of sound power ISO standards

	Standard	Testing environment	Method accuracy ¹	Character of the noise	Sound power level obtained	ANSI/ASA equivalent	DIN equivalent
Sound pressure-based methods	ISO 3741	Reverberant room	Precision	Steady, broadband, narrow-band or discrete	A-weighted 1/1 or 1/3 octave bands	ANSI/ASA S12.51/ ISO 374	DIN EN ISO 3741:2009-11
	ISO 3743-1	Hard-walled room	Engineering	Any, but no isolated bursts	A-weighted 1/1 octave bands	ANSI/ASA S12.53 P1	DIN EN ISO 3743-1:2011-01
	ISO 3743-2	Special reverberation room	Engineering	Any, but no isolated bursts	A-weighted 1/1 octave bands	ANSI/ASA S12.53 P2	DIN EN ISO 3743-2:2009-11
	ISO 3744	Free-field over reflecting pane	Engineering	Any	A-weighted 1/1 or 1/3 octave bands	ANSI/ASA S12.54/ ISO 3744	DIN 45635-1:1984-04
	ISO 3745	Semi- or anechoic room	Precision	Any	A-weighted 1/1 or 1/3 octave bands	ANSI/ASA S12.55/ ISO 3745	DIN 45635-1:1984-04
	ISO 3746	Semi- or anechoic room	Survey	Any	A-weighted	ANSI/ASA S12.56/ ISO 3746	DIN 45635-1:1984-04
	ISO 3747	Reverberant field in situ	Engineering or survey	Steady, broadband, narrow-band or discrete	A-weighted from octave bands	ANSI/ASA S12.57/ ISO 3747	DIN EN ISO 3747

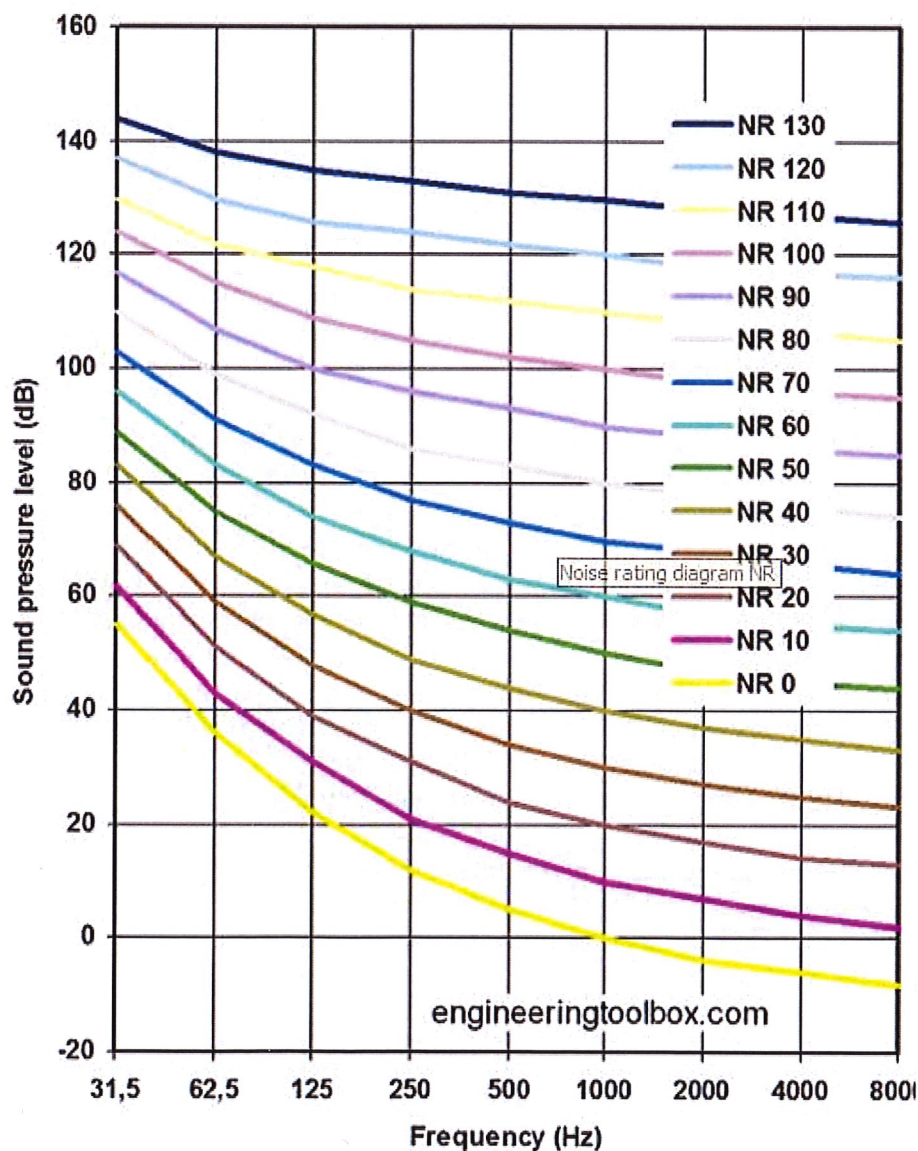
The ISO 3744 closely follows the ISO 3745 method, but is less stringent with regard to the requirements for the testing environment and the measurement setup. All noise source types are supported (steady, unsteady, fluctuating, isolated bursts). There is no limitation to the size of the source, providing that the conditions for the measurement are met. Measurements can be performed both indoors and outdoors, with one or more sound-reflecting planes present (for example, the floor). A flat outdoor area with no objects located close to the source or a semi-anechoic room is considered to be perfectly suitable for the requirements. Additional procedures are suggested to apply corrections if the environment is not ideal. The influence of the environment has to be determined either with the use of a reference sound source (preferred) or the room absorption measurements. A list of requirements must be met for the following components/conditions:

- Background noise level cannot exceed certain levels
- Sound field in the testing environment should be free of undesirable sound reflections from nearby objects or room boundaries (other than the reflecting pane)
- Reflecting pane should be greater in size than the measurement surface by at least 0.5 meters
- Instrumentation system has to meet the requirements of IEC 61672-1:2002, class 1 The object being tested should be enclosed in any of the four measurement surfaces:
- A hemisphere, half-hemisphere or quarter-hemisphere
- A right parallelepiped • A cylinder, half-cylinder or quarter-cylinder
- A combination of two segments, hemispherical, rectangular or cylindrical

NR common in Europe, NC common in USA

Have been developed by International Organisation for standardisation (ISO) to determine acceptable indoor environments for hearing preservation, speech communication and annoyance.

- As we know, sound pressure is the **effect** of the sound and varies dependant on the environment, distance from the source etc
- The NR rating system was devised to ensure that if equipment (such as ventilation) generates a sound or noise, this sound/noise falls within permissible levels for the designated application
- Sound pressure plotted on a graph. The highest NR curve is the rating.
- For example, at 125 Hz, a source has an SPL of 60 dB. When plotted, this falls between the lines for NR40 and NR50. If we stop here the source has an NR rating of 40. However.....
- If the same source has an SPL of 60dB at 500Hz, when plotted this falls between the lines of NR50 and NR60 the NR rating would be 50.



75%

Frequency [dB]	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
26% D1:100% D2:75%	51.6	52.6	49.9	42.4	38.4	31.5	23.1	23.2

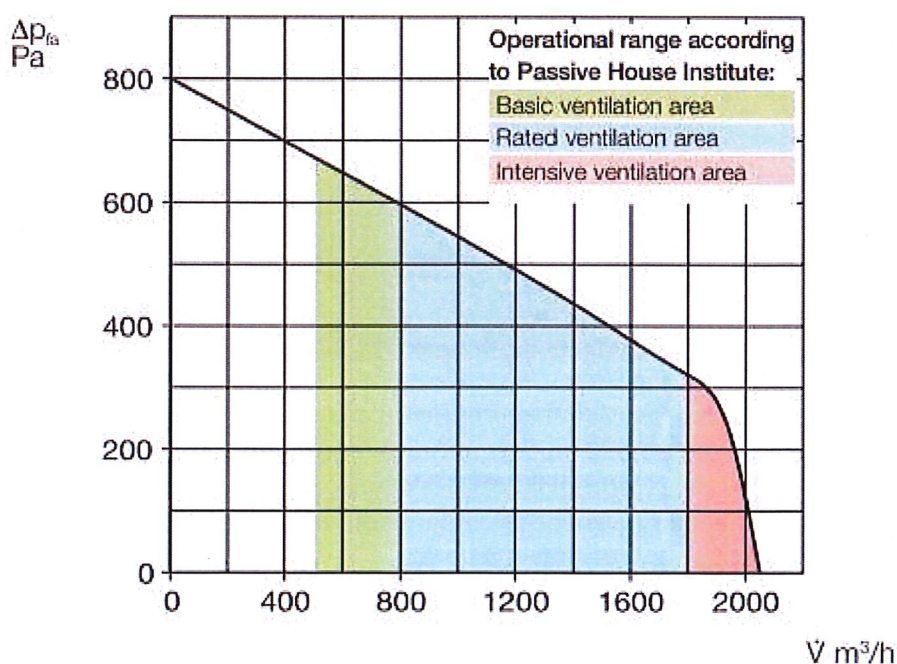
Recommended noise levels

Noise rating curve	Application
NR 25	Concert halls, broadcasting and recording studios, churches
NR 30	Private dwellings, hospitals, theatres, cinemas, conference rooms
NR 35	Libraries, museums, court rooms, schools, hospitals operating theaters and wards, flats, hotels, executive offices
NR 40	Halls, corridors, cloakrooms, restaurants, night clubs, offices, shops
NR 45	Department stores, supermarkets, canteens, general offices
NR 50	Typing pools, offices with business machines
NR 60	Light engineering works
NR 70	Foundries, heavy engineering works

Equipment – Acoustic data

KWL EC 2000 D

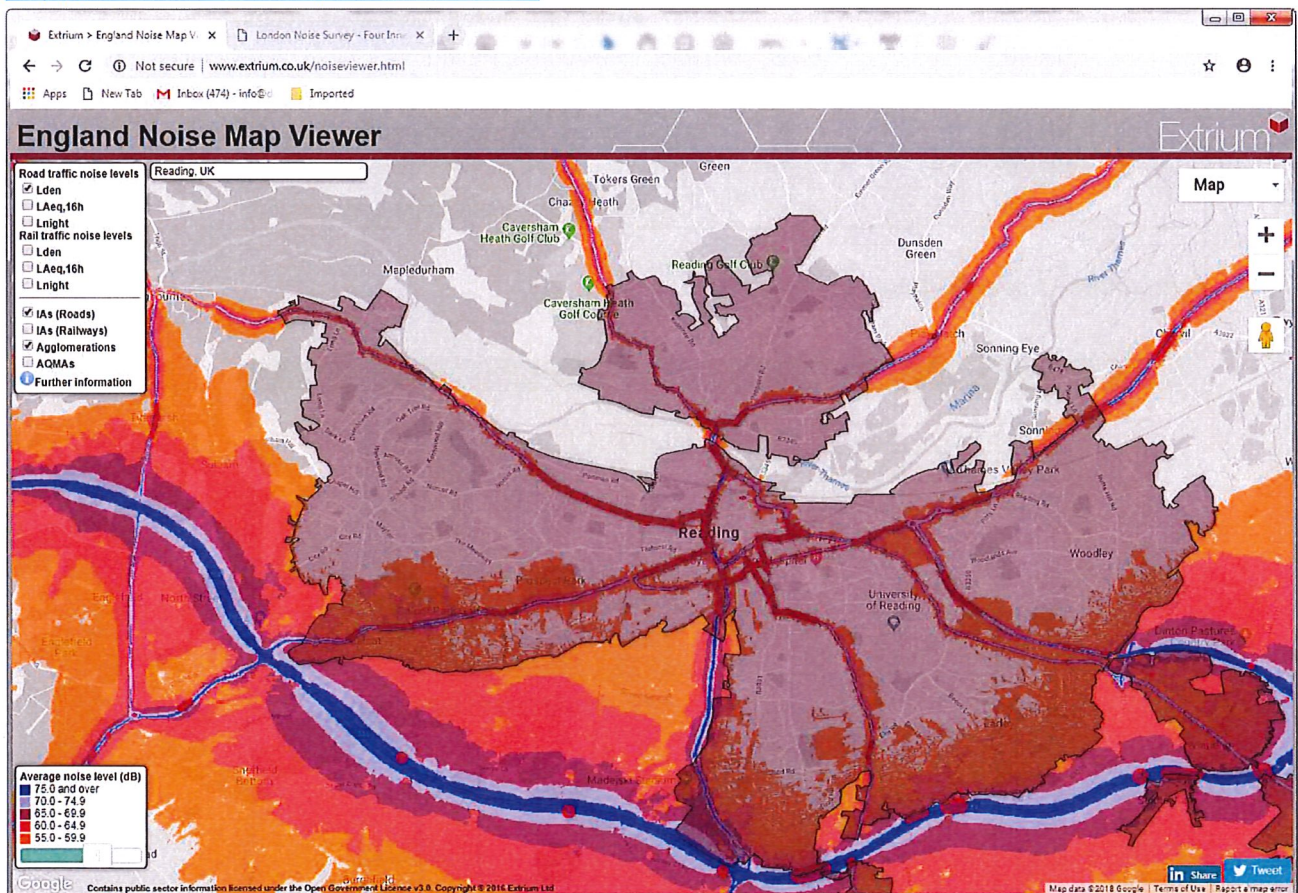
Frequency	Hz	Total	125	250	500	1k	2k	4k	8k
L _{WA} Extract	dB(A)	59	56	52	48	49	47	45	40
L _{WA} Supply	dB(A)	77	66	68	67	72	69	69	64



Technical data	KWL EC 2000 D			KWL EC 2000 D With water heater battery		
	Type	Ref.-No.		Type	Ref.-No.	
For ceiling installation	KWL EC 2000 D Pro	4175		KWL EC 2000 D Pro WW	4176	
Air flow volume on speed step ¹⁾	③	②	①	③	②	①
Supply-/Extract air flow vol. Vm³/h approx.	1800	1150	720	1800	1150	720
Sound levels dB(A) ²⁾						
Supply L _{WA} (sound power level)	77	67	57	77	67	57
Extract L _{WA} (sound power level)	59	50	40	59	50	40
Power fan 2 x W	395	245	150	395	245	150
Voltage/Frequency	3 N - 400 V, 50 Hz			3 N - 400 V, 50 Hz		
Max. Amps A - ventilation	6.2 / - / -			6.2 / - / -		
- pre-heater	10.1 / 10.1 / 10.1			10.1 / 10.1 / 10.1		
- max. total	16.3 / 10.1 / 10.1			16.3 / 10.1 / 10.1		
Heat power/heater battery kW	-			8.1 (at 60/40 °C) / 7.3 (at 50/40 °C) / 4.6 (at 40/30 °C)		
Electric pre-heater kW	7.0			7.0		
Summer Bypass	automatic			automatic		
Wiring Diagram no.	1008			1008		
Temperature operation range	-20 °C to +40 °C			-20 °C to +40 °C		
Weight approx. kg	265			270		

¹⁾ Figures relate to the operational range defined by FHI (Passive House Institute). ²⁾ at 100 Pa.

<http://www.extrium.co.uk/noiseviewer.html>



Based on the information obtained from the Manufacturer Helios and after carrying out the site commissioning, we can confirm that the EC2000 unit conforms to regulation ISO 3744 / 3745 & 3746 - DIN 45635, T.1 as at 50% fan speed the systems will produce 48dB(A) at the extract end and 67 dB(A) at the supply end, which is less than reading average street noise of 70 dB(A) (see above map).

SIGNATURE: _____

[Handwritten Signature]

DATE: 25/10/18

TITLE: BUSINESS DEVELOPMENT MANAGER

Project name: Davidson House

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