Acoustic data

Standard: BS EN 13141-7:2010 — Ventilation for buildings. Performance testing of components/products for residential ventilation. Performance testing of a mechanical supply and exhaust ventilation units (including heat recovery) for mechanical ventilation systems intended for single family dwellings

Product **HRV10M Q Plus Eco**

		'A' Weighted Sound Power Levels dB re. 1pW Frequency Hz								Overall L_W	Overall L_{WA}	Casing Breakout dBA @ 3m
Speed		63	125	250	500	1k	2k	4k	8k			
16l/s @ 5Pa (18%)	Induct Outlet	34	31	32	30	22	16	19	23	61	38	10
	Induct Inlet	28	27	23	19	15	14	19	23	54	32	
	Breakout	13	14	18	22	18	18	18	21	40	28	
29l/s @ 11Pa (30%)	Induct Outlet	32	41	41	40	36	25	20	23	61	46	15
	Induct Inlet	32	37	29	26	23	18	19	23	59	39	
	Breakout	12	27	23	28	24	20	18	21	45	33	
44l/s @ 22Pa (41%)	Induct Outlet	36	46	53	48	45	37	27	24	67	55	23
	Induct Inlet	33	36	42	34	31	26	22	23	60	44	
	Breakout	14	24	37	35	32	28	20	21	48	41	
60l/s @ 33Pa (53%)	Induct Outlet	42	49	55	55	50	45	37	29	71	60	27
	Induct Inlet	34	38	44	39	37	34	27	24	62	47	
	Breakout	14	28	40	40	38	36	26	21	51	45	
75l/s @ 51Pa (65%)	Induct Outlet	45	52	62	59	55	51	44	36	75	65	33
	Induct Inlet	38	42	51	44	41	40	33	28	66	53	
	Breakout	20	30	46	45	42	42	32	22	57	50	
89l/s @ 70Pa (77%)	Induct Outlet	47	55	72	64	60	55	49	42	82	73	39
	Induct Inlet	42	45	59	51	45	44	38	32	71	60	
	Breakout	44	31	54	50	45	46	37	24	71	57	
104l/s @ 87Pa (88%)	Induct Outlet	51	57	63	71	63	58	52	46	81	72	45
	Induct Inlet	44	48	49	57	49	47	42	36	71	59	
	Breakout	43	35	47	62	50	49	41	27	71	63	
108l/s @ 100Pa (100%)	Induct Outlet	51	59	62	73	66	60	54	48	81	74	46
	Induct Inlet	43	49	50	57	50	49	44	39	71	60	
	Breakout	33	36	45	63	51	51	43	28	67	63	

Measurements taken at full speed with a resistance of 100Pa, then at the stated percentage speed settings of the unit and corresponding reduced pressure
Inlet and outlet levels are Induct (BS EN 13141-7 clause 6.4.2 requirement), casing breakout is hemispherical - for spherical subtract 3dB
Titon acoustic data is independently tested at Sound Research Laboratories
Data is specifically tested for the Eco unit (100% bypass) - non bypass variants with deeper heat exchangers will offer lower acoustic levels

MD0268d-04, SRL report C23276/T03, 17/03/17

Acoustic data

Product **HRV10M Q Plus Eco**

		Sound Power Levels dB re. 1pW Frequency Hz								Overall L_W	Overall L_{WA}	Overall dBA @ 3m Hemispherical	Overall dBA @ 3m Spherical
Speed		63	125	250	500	1k	2k	4k	8k				
16l/s @ 5Pa (18%)	Open Outlet	42	34	34	30	21	15	18	24	44	31	14	11
	Open Inlet	36	30	25	19	14	13	18	24	37	26	9	6
	Breakout	39	30	27	25	18	17	17	22	40	28	10	7
29l/s @ 11Pa (30%)	Open Outlet	40	44	43	40	35	24	19	24	48	41	23	20
	Open Inlet	40	40	31	26	22	17	18	24	43	31	13	10
	Breakout	38	43	32	31	24	19	17	22	45	33	15	12
44l/s @ 22Pa (41%)	Open Outlet	44	49	55	48	44	36	26	25	57	50	32	29
	Open Inlet	41	39	44	34	30	25	21	24	47	38	21	18
	Breakout	40	40	46	38	32	27	19	22	48	41	23	20
60l/s @ 33Pa (53%)	Open Outlet	50	52	57	55	49	44	36	30	61	56	38	35
	Open Inlet	42	41	46	39	36	33	26	25	49	42	25	22
	Breakout	40	44	49	43	38	35	25	22	51	45	27	24
75l/s @ 51Pa (65%)	Open Outlet	53	55	64	59	54	50	43	37	66	61	43	40
	Open Inlet	46	45	53	44	40	39	32	29	55	48	30	27
	Breakout	46	46	55	48	42	41	31	23	57	50	33	30
89l/s @ 70Pa (77%)	Open Outlet	55	58	74	64	59	54	48	43	75	67	50	47
	Open Inlet	50	48	61	51	44	43	37	33	62	54	37	34
	Breakout	70	47	63	53	45	45	36	25	71	57	39	36
104l/s @ 87Pa (88%)	Open Outlet	59	60	65	71	62	57	51	47	73	70	52	49
	Open Inlet	52	51	51	57	48	46	41	37	60	56	39	36
	Breakout	69	51	56	65	50	48	40	28	71	63	45	42
108l/s @ 100Pa (100%)	Open Outlet	59	62	64	73	65	59	53	49	74	71	54	51
	Open Inlet	51	52	52	57	49	48	43	40	61	57	39	36
	Breakout	59	52	54	66	51	50	42	29	67	63	46	43

Measurements taken at full speed with a resistance of 100Pa, then at the stated percentage speed settings of the unit and corresponding reduced pressure

To enable simplified comparisons with other manufacturers data the above information is tested in accordance with BS EN 13141-7, the end reflection as defined in EN ISO 5135 for a 125mm (204x60mm) duct mounted flush with the wall, has been removed to provide an open outlet/open inlet sound power measurement (see page 1 of 2 for original data)

Figures shown are not 'A' weighted (other than the overall L_{WA}/dBA columns)

Titon acoustic data is independently tested at Sound Research Laboratories

Data is specifically tested for the Eco unit (100% bypass) - non bypass variants with deeper heat exchangers will offer lower acoustic levels

MD0268d-04, SRL report C23276/T03, 17/03/17

Acoustic Testing – Powered products

Acoustic testing of Titon mechanical ventilation products is measured in accordance with the following standards:-

CME – BS EN 13141-6 – "Ventilation for buildings. Performance testing of components/products for residential ventilation. Exhaust ventilation system packages used in a single dwelling"

MVHR – BS EN 13141-7 – "Ventilation for buildings. Performance testing of components/products for residential ventilation. Performance testing of a mechanical supply and exhaust ventilation units (including heat recovery) for mechanical ventilation systems intended for single family dwellings"

The results (1st page) are presented in the following format which provides details of the acoustic performance of the unit at each of the standard speed settings.

The 'A' Weighted Sound Power Level in dB is an "in-duct" measurement for the Outlet (supply) and Inlet (extract) and are given across the frequency range from 63Hz to 8kHz.

The overall level is the logarithmic addition of the frequency bands to give a single figure, this is provided with and without 'A' weighting

The casing breakout is a sound pressure level at a distance of 3 metres, this figure is the lowest quoted and is usually stated in catalogue details. It is calculated from the Overall L_{WA} (sound power level) with a reduction to convert to the sound pressure at 3 metres (see page 7).

Acoustic data

Titon

Standard: BS EN 13141-7:2010 Ventilation for buildings. Performance testing of components/products for residential ventilation. Performance testing of a mechanical supply and exhaust ventilation units (including heat recovery) for mechanical ventilation systems intended for single family dwellings

Product **HRV2.85 Plus Eco**

Speed		'A' Weighted Sound Power Levels dB re. 1pW Frequency Hz 63	125	250	500	1k	2k	4k	8k	Overall L_W	Overall L_{WA}	Casing Breakout dBA @ 3m
15l/s @ 1Pa (18%)	Induct Outlet	28	35	32	32	27	17	19	23	56	39	
	Induct Inlet	28	28	25	21	15	15	19	23	54	33	11
	Breakout	4	16	17	25	21	17	18	21	36	29	
29l/s @ 7Pa (30%)	Induct Outlet	34	46	41	45	41	33	24	23	64	50	
	Induct Inlet	30	34	33	30	24	20	19	23	57	39	14
	Breakout	7	22	21	27	25	19	19	21	40	31	
45l/s @ 18Pa (41%)	Induct Outlet	37	52	48	54	54	44	36	30	70	59	
	Induct Inlet	33	41	40	37	35	29	22	23	61	45	19
	Breakout	9	28	26	31	31	24	21	21	45	36	
61l/s @ 40Pa (53%)	Induct Outlet	44	57	53	59	61	51	45	41	75	64	
	Induct Inlet	38	46	45	43	43	36	28	24	66	51	24
	Breakout	14	33	32	36	37	30	26	21	51	41	
75l/s @ 65Pa (65%)	Induct Outlet	48	59	58	63	65	57	50	47	79	69	
	Induct Inlet	41	49	48	47	48	41	33	27	70	55	27
	Breakout	16	36	35	40	40	34	31	22	54	45	
88l/s @ 83Pa (76.5%)	Induct Outlet	51	62	62	65	69	62	55	52	82	72	
	Induct Inlet	46	52	52	50	51	45	37	31	74	58	33
	Breakout	19	40	40	48	44	40	37	25	59	51	
93l/s @ 100Pa (100%)	Induct Outlet	51	64	63	66	70	63	55	53	82	73	
	Induct Inlet	46	53	53	51	52	47	39	33	74	59	34
	Breakout	24	41	42	48	46	42	39	27	59	52	

Measurements taken at full speed with a resistance of 100Pa, then at the stated percentage speed settings of the unit and corresponding reduced pressure
Inlet and outlet levels are Induct (BS EN 13141-7 clause 6.4.2 requirement), casing breakout is hemispherical - for spherical subtract 3dB
Titon acoustic data is independently tested at Sound Research Laboratories
Data is specifically tested for the Eco unit (100% bypass) - non bypass variants with deeper heat exchangers will offer lower acoustic levels

MD0268f-03, SRL report 23276/T01, 07/10/16

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A second page of the same results is also provided with the same information presented in an alternative format, this is provided to enable simplified direct comparisons to some competitor units where “open outlet” or “open inlet” data is being quoted (outside the requirements of 13141-7).

The overall level is the logarithmic addition of the frequency bands to give a single figure, this is provided with and without ‘A’ weighting.

The open outlet and open inlet figures are calculated from the induct levels given on page 1 by deducting the end reflection (as defined in EN ISO 5135 for a duct flush with the wall).

The overall levels have also been given as a sound power (L_w) and sound pressure at a distance of 3 meters, both hemispherical and spherical. The only A weighted data is the overall “dBA” at 3 metres.

Acoustic data

Product **HRV2.85 Plus Eco**

		Sound Power Levels dB re. 1pW Frequency Hz								Overall L_w	Overall dBA @ 3m Hemispherical	Overall dBA @ 3m Spherical
Speed		63	125	250	500	1k	2k	4k	8k			
15l/s @ 1Pa (18%)	Open Outlet	36	38	34	32	26	16	18	24	42	21	18
	Open Inlet	36	31	27	21	14	14	18	24	38	16	13
	Breakout	30	32	26	28	21	16	17	22	36	11	8
29l/s @ 7Pa (30%)	Open Outlet	42	49	43	45	40	32	23	24	52	32	29
	Open Inlet	38	37	35	30	23	19	18	24	42	21	18
	Breakout	33	38	30	30	25	18	18	22	40	14	11
45l/s @ 18Pa (41%)	Open Outlet	45	55	50	54	53	43	35	31	60	41	38
	Open Inlet	41	44	42	37	34	28	21	24	48	28	25
	Breakout	35	44	35	34	31	23	20	22	45	19	16
61l/s @ 40Pa (53%)	Open Outlet	52	60	55	59	60	50	44	42	65	47	44
	Open Inlet	46	49	47	43	42	35	27	25	53	33	30
	Breakout	40	49	41	39	37	29	25	22	51	24	21
75l/s @ 65Pa (65%)	Open Outlet	56	62	60	63	64	56	49	48	69	51	48
	Open Inlet	49	52	50	47	47	40	32	28	57	37	34
	Breakout	42	52	44	43	40	33	30	23	54	27	24
88l/s @ 83Pa (76.5%)	Open Outlet	59	65	64	65	68	61	54	53	73	55	52
	Open Inlet	54	55	54	50	50	44	36	32	60	40	37
	Breakout	45	56	49	51	44	39	36	26	59	33	30
93l/s @ 100Pa (100%)	Open Outlet	59	67	65	66	69	62	54	54	73	55	52
	Open Inlet	54	56	55	51	51	46	38	34	61	41	38
	Breakout	50	57	51	51	46	41	38	28	59	34	31

Measurements taken at full speed with a resistance of 100Pa, then at the stated percentage speed settings of the unit and corresponding reduced pressure
To enable simplified comparisons with other manufacturers data the above information is tested in accordance with BS EN 13141-7, the end reflection as defined in EN ISO 5135 for a 125mm (204x60mm) duct mounted flush with the wall, has been removed to provide an open outlet/open inlet sound power measurement (see page 1 of 2 for original data)
Figures shown are not 'A' weighted (other than the overall dBA columns)
Titon acoustic data is independently tested at Sound Research Laboratories
Data is specifically tested for the Eco unit (100% bypass) - non bypass variants with deeper heat exchangers will offer lower acoustic levels

MD0268f-03, SRL report 23276/T01, 07/10/16

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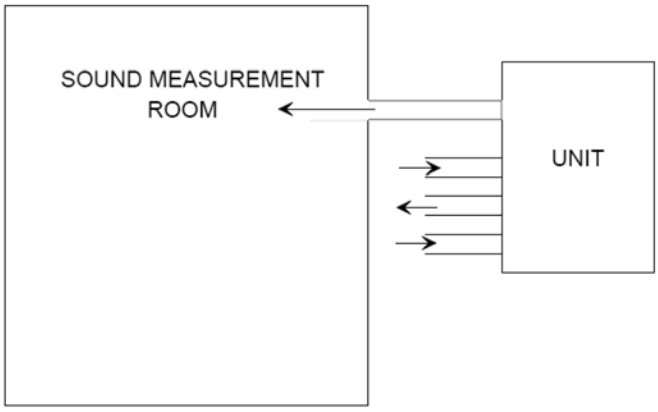
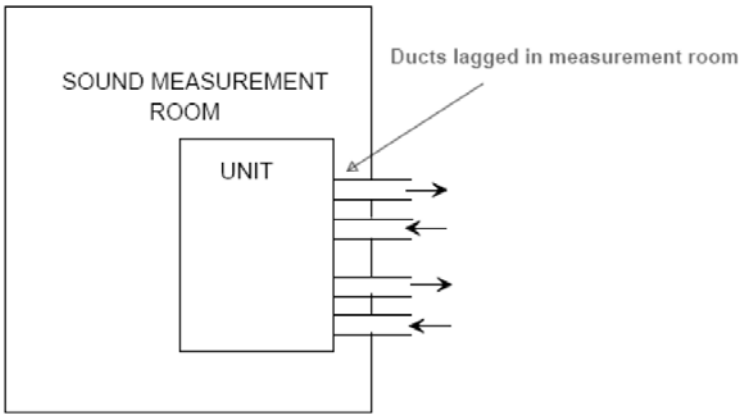
MVHR – Installation set up used during testing

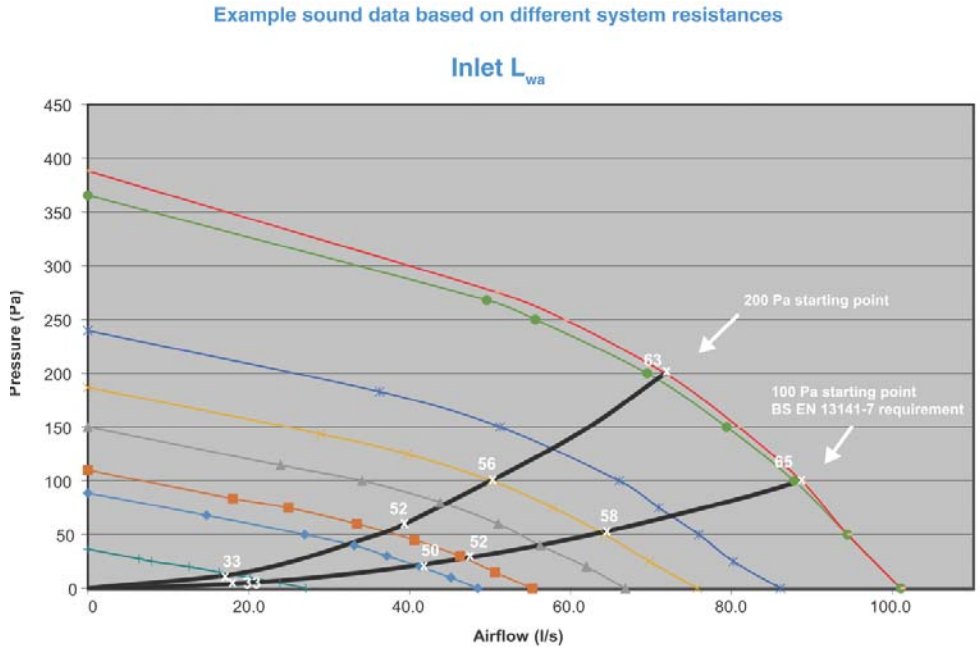
Induct sound power level measurement – the unit is installed with the outlet (or inlet) connected to the measurement room and a pressure difference of 100Pa is set across the inlet to outlet connections whilst the unit is operated at full speed. The test is then repeated to measure the casing breakout. A number of reduced speed settings are also taken with the pressure difference reducing with the flow rate.



Casing breakout – the inlet and outlet ducts are connected to a separate room so the only noise measured is breakout from the casing.

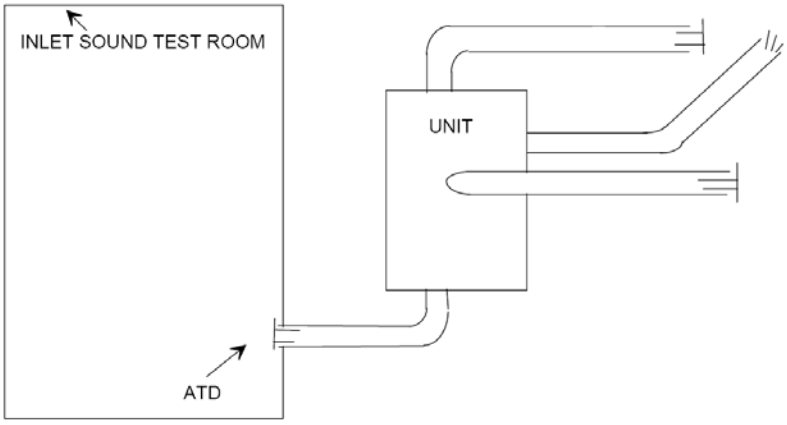


The performance graph below shows the inlet acoustic levels starting at 100Pa and also 200Pa, the acoustic level is similar at the same speed setting with a reduction of 2 dB at the higher resistance.

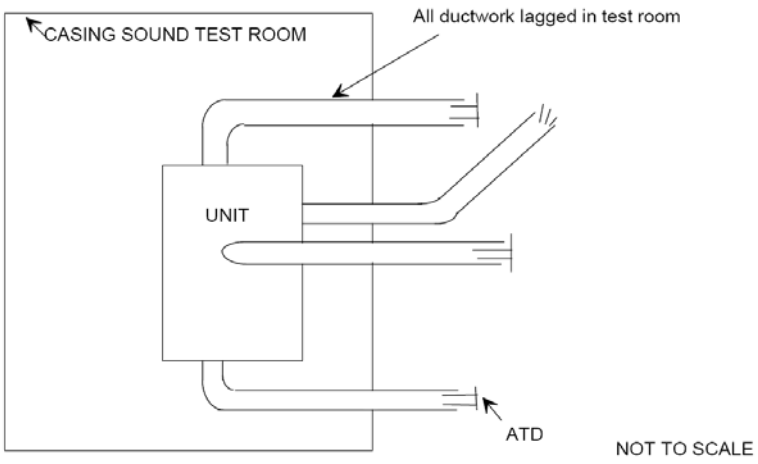


CME – Installation set up used during testing

Inlet sound power levels – all 3 inlets from the CME are fitted with a standard duct set up (as BS EN 13141-6, one is connected to the measuring room and the inlet sound power level recorded.
The three inlets connected with 90 degree bend, 0.5m duct and air terminal device
The single outlet connected with 0.5m duct, 45 degree bend 2m duct, and grille.
All duct work 204 x 60mm plastic.



Casing breakout – the inlet and outlet ducts are connected to a separate room so the only noise measured is breakout from the casing.



Glossary

Sound Power Level (SWL or L_{WA}) – is a measurement of the actual sound level created at the source, it is not therefore affected by the environment in which the product is installed. This will always be the highest levels quoted as no reductions have been applied for either the environment or distance from the source. Actual installed levels will therefore be significantly lower than these figures but they are useful from which to base any system calculations.

Sound Pressure Level (SPL or L_{pA}) – this must be quoted at a given distance and is dependant on both the distance from the source and environment (a hard walled reflective surface will have a higher level than a soft furnished room which absorbs more sound). Titon levels are given at a distance of 3m (which is commonly quoted) and are free field, hemispherical radiation.

Free field – An environment in which there are no reflective surfaces (useful to describe the sound pressure levels for comparative purposes)

Hemispherical radiation – Sound radiates from a source in all directions, where the product is mounted on a wall or ceiling some sound if reflected from this mounting face. The casing sound pressure levels are based on hemispherical radiation which will be slightly higher than spherical radiation.

Calculation:

SPL = SWL – 20 log r – 8 dB, where r = distance from source

Or, **SPL = SWL – 17.54 dB** (when r = 3m)

Spherical radiation –

Calculation:

SPL = SWL – 20 log r – 11 dB, where r = distance from source

Or, **SPL = SWL – 20.54 dB** (when r = 3m), i.e 3 dB quieter than hemispherical.

'A'Weighting – this is a correction to the frequency bands to replicate the sensitivity of the human ear to different frequencies. The weighting can be removed from the octave bands if required, the corrections are given in the table below.

Frequency Hz	63	125	250	500	1000	2000	4000	8000
'A' Weighting	-26	-16	-9	-3	0	1	1	-1

Octave band – sound is produced at various frequencies and is therefore measured across a range of frequency or Octave bands (as the above table). The figures can be combined to give an overall level using logarithmic addition.

Induct levels – a measurement of sound that is taken inside the duct of a ventilation system, this is likely to be a higher level than a non ducted or open inlet/open outlet measurement.

Casing Breakout – a measurement of the sound that breaks out of the casing of a unit, the sound from the inlet and outlets of the unit does not form part of this measurement.