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 **HRV10.25M 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			
12l/s @ 2Pa (18%)	Induct Outlet	28	30	33	31	25	18	19	23	54	37	13
	Induct Inlet	25	26	28	18	17	14	19	23	51	33	
	Breakout	4	17	28	23	21	14	17	20	40	31	
34l/s @ 3Pa (30%)	Induct Outlet	29	52	47	45	40	30	20	23	68	54	24
	Induct Inlet	23	37	39	30	28	17	19	23	55	42	
	Breakout	2	20	39	37	30	18	17	20	49	42	
56l/s @ 12Pa (41%)	Induct Outlet	36	51	63	54	50	44	33	25	73	64	30
	Induct Inlet	24	40	48	39	39	28	20	23	60	49	
	Breakout	11	33	45	42	42	30	19	20	56	48	
75l/s @ 27Pa (53%)	Induct Outlet	43	55	67	65	57	53	44	36	78	70	34
	Induct Inlet	30	44	51	47	46	37	28	24	64	54	
	Breakout	14	27	47	46	44	39	28	21	58	51	
95l/s @ 44Pa (65%)	Induct Outlet	49	59	78	69	63	59	51	43	88	79	39
	Induct Inlet	35	49	58	52	50	44	36	29	70	60	
	Breakout	30	32	54	51	47	45	35	23	64	57	
118l/s @ 55Pa (77%)	Induct Outlet	52	63	69	78	68	64	56	49	85	79	42
	Induct Inlet	39	52	55	59	55	48	42	36	72	62	
	Breakout	25	35	48	58	52	49	41	25	63	59	
139l/s @ 80Pa (88%)	Induct Outlet	56	66	71	88	72	68	61	54	92	88	46
	Induct Inlet	47	56	58	63	58	52	47	41	76	66	
	Breakout	32	39	49	63	56	53	46	29	68	64	
144l/s @ 100Pa (100%)	Induct Outlet	59	67	72	86	75	69	63	55	92	87	49
	Induct Inlet	52	56	59	60	60	53	48	42	79	65	
	Breakout	44	39	50	66	57	54	47	30	73	67	

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

MD0317b-04, SRL report 23276/T01, 17/03/17

Acoustic data

Product **HRV10.25M 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				
12l/s @ 2Pa (18%)	Open Outlet	36	33	35	31	24	17	18	24	40	32	15	12
	Open Inlet	33	29	30	18	16	13	18	24	36	27	10	7
	Breakout	30	33	37	26	21	13	16	21	40	31	13	10
34l/s @ 3Pa (30%)	Open Outlet	37	55	49	45	39	29	19	24	56	46	28	25
	Open Inlet	31	40	41	30	27	16	18	24	44	35	17	14
	Breakout	28	36	48	40	30	17	16	21	49	42	24	21
56l/s @ 12Pa (41%)	Open Outlet	44	54	65	54	49	43	32	26	66	58	40	37
	Open Inlet	32	43	50	39	38	27	19	24	51	44	26	23
	Breakout	37	49	54	45	42	29	18	21	56	48	30	27
75l/s @ 27Pa (53%)	Open Outlet	51	58	69	65	56	52	43	37	71	65	48	45
	Open Inlet	38	47	53	47	45	36	27	25	56	49	32	29
	Breakout	40	43	56	49	44	38	27	22	58	51	34	31
95l/s @ 44Pa (65%)	Open Outlet	57	62	80	69	62	58	50	44	81	73	55	52
	Open Inlet	43	52	60	52	49	43	35	30	62	55	38	35
	Breakout	56	48	63	54	47	44	34	24	64	57	39	36
118l/s @ 55Pa (77%)	Open Outlet	60	66	71	78	67	63	55	50	79	76	59	56
	Open Inlet	47	55	57	59	54	47	41	37	63	59	41	38
	Breakout	51	51	57	61	52	48	40	26	63	59	42	39
139l/s @ 80Pa (88%)	Open Outlet	64	69	73	88	71	67	60	55	88	85	68	65
	Open Inlet	55	59	60	63	57	51	46	42	67	63	45	42
	Breakout	58	55	58	66	56	52	45	30	68	64	46	43
144l/s @ 100Pa (100%)	Open Outlet	67	70	74	86	74	68	62	56	87	84	66	63
	Open Inlet	60	59	61	60	59	52	47	43	67	62	45	42
	Breakout	70	55	59	69	57	53	46	31	73	67	49	46

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

MD0317b-04, SRL report 23276/T01, 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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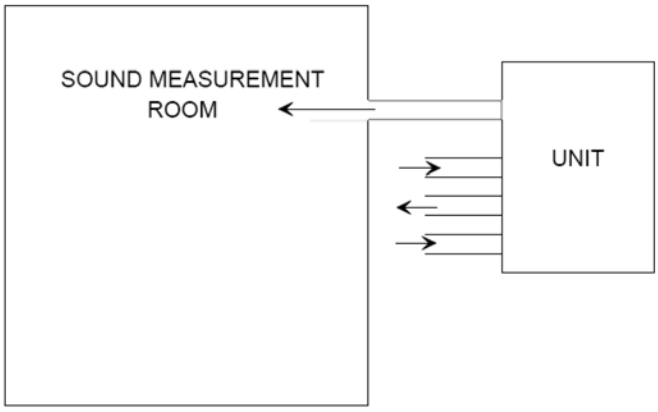
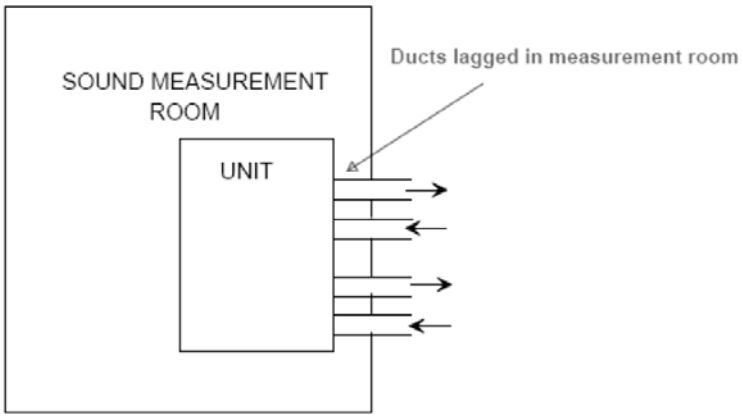
MVHR – Installation set up used during testing

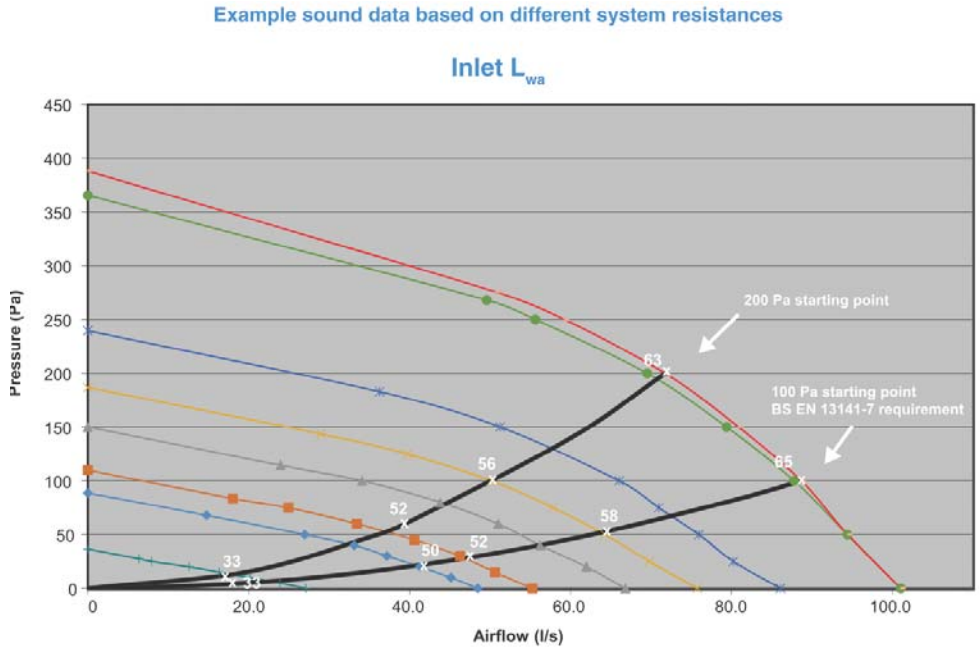
Induct sound power level measurement – the unit is installed with the outlet (or inlet) connected to the measurement room and a pressure difference of 100Pa is set across the inlet to outlet connections whilst the unit is operated at full speed. The test is then repeated to measure the casing breakout.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

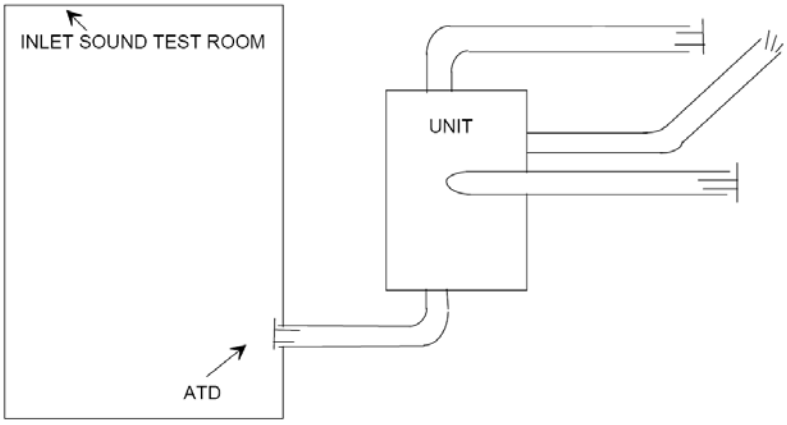


The performance graph below shows the inlet acoustic levels starting at 100Pa and also 200Pa, the acoustic level is similar at the same speed setting with a reduction of 2 dB at the higher resistance.

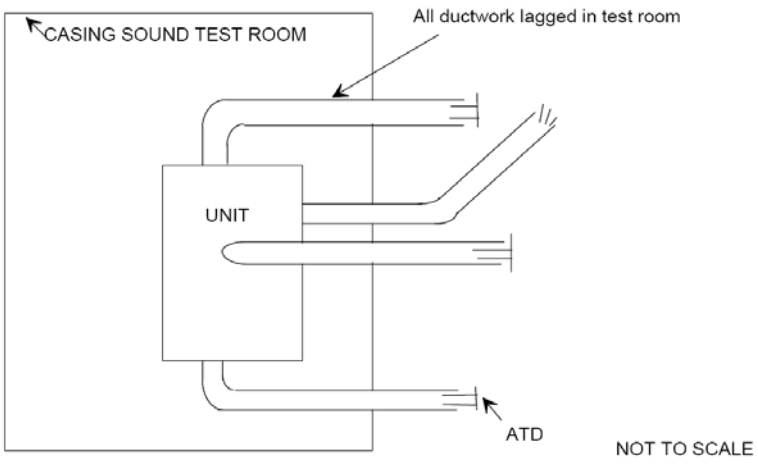


CME – Installation set up used during testing

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.