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 **HRV1.35 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			
14l/s @ 3Pa (18%)	Induct Outlet	42	39	41	42	33	20	20	24	69	47	14
	Induct Inlet	27	36	30	29	18	15	19	24	55	38	
	Breakout	4	17	20	23	28	15	19	24	37	31	
29l/s @ 20Pa (40%)	Induct Outlet	49	56	59	57	58	47	39	32	78	64	23
	Induct Inlet	31	50	47	45	35	29	22	24	67	52	
	Breakout	12	31	34	35	37	27	24	24	49	41	
33l/s @ 26Pa (45%)	Induct Outlet	50	59	62	60	59	51	43	37	79	66	26
	Induct Inlet	31	51	49	47	40	33	25	24	68	55	
	Breakout	12	32	36	38	39	30	27	24	51	43	
39l/s @ 38Pa (52%)	Induct Outlet	52	60	64	62	64	55	47	42	81	69	29
	Induct Inlet	34	52	53	50	41	36	28	25	70	57	
	Breakout	17	35	39	42	41	34	31	24	54	46	
44l/s @ 48Pa (58%)	Induct Outlet	55	63	66	65	66	63	51	47	84	72	31
	Induct Inlet	36	53	54	52	43	42	31	26	71	58	
	Breakout	22	36	41	43	42	40	35	26	56	48	
49l/s @ 63Pa (66%)	Induct Outlet	56	64	70	67	68	69	54	51	86	75	33
	Induct Inlet	43	53	56	55	46	47	34	28	73	60	
	Breakout	26	37	43	45	44	44	38	27	58	51	
58l/s @ 90Pa (80%)	Induct Outlet	59	67	72	71	71	69	58	56	88	77	36
	Induct Inlet	44	56	59	58	49	48	39	32	75	63	
	Breakout	38	39	46	49	47	46	42	31	65	54	
60l/s @ 100Pa (100%)	Induct Outlet	60	66	72	71	71	69	59	57	89	78	36
	Induct Inlet	43	56	60	58	50	50	40	33	76	64	
	Breakout	33	39	47	49	47	46	43	31	63	54	

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

MD0219a-05, SRL report 23068/T01, 16/03/17

Acoustic data

Product **HRV1.35 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				
14l/s @ 3Pa (18%)	Open Outlet	48	41	41	41	32	19	19	25	50	40	22	19
	Open Inlet	33	38	30	28	17	14	18	25	40	30	12	9
	Breakout	30	33	29	26	28	14	18	25	37	31	14	11
29l/s @ 20Pa (40%)	Open Outlet	55	58	59	56	57	46	38	33	64	59	42	39
	Open Inlet	37	52	47	44	34	28	21	25	54	44	27	24
	Breakout	38	47	43	38	37	26	23	25	49	41	23	20
33l/s @ 26Pa (45%)	Open Outlet	56	61	62	59	58	50	42	38	67	61	44	41
	Open Inlet	37	53	49	46	39	32	24	25	55	47	29	26
	Breakout	38	48	45	41	39	29	26	25	51	43	26	23
39l/s @ 38Pa (52%)	Open Outlet	58	62	64	61	63	54	46	43	69	65	48	45
	Open Inlet	40	54	53	49	40	35	27	26	57	49	32	29
	Breakout	43	51	48	45	41	33	30	25	54	46	29	26
44l/s @ 48Pa (58%)	Open Outlet	61	65	66	64	65	62	50	48	72	69	51	48
	Open Inlet	42	55	54	51	42	41	30	27	59	52	34	31
	Breakout	48	52	50	46	42	39	34	27	56	48	31	28
49l/s @ 63Pa (66%)	Open Outlet	62	66	70	66	67	68	53	52	75	72	55	52
	Open Inlet	49	55	56	54	45	46	33	29	61	54	37	34
	Breakout	52	53	52	48	44	43	37	28	58	51	33	30
58l/s @ 90Pa (80%)	Open Outlet	65	69	72	70	70	68	57	57	77	74	56	53
	Open Inlet	50	58	59	57	48	47	38	33	63	57	39	36
	Breakout	64	55	55	52	47	45	41	32	65	54	36	33
60l/s @ 100Pa (100%)	Open Outlet	66	68	72	70	70	68	58	58	77	74	57	54
	Open Inlet	49	58	60	57	49	49	39	34	64	58	40	37
	Breakout	59	55	56	52	47	45	42	32	63	54	36	33

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

MD0219a-05, SRL report 23068/T01, 16/03/17

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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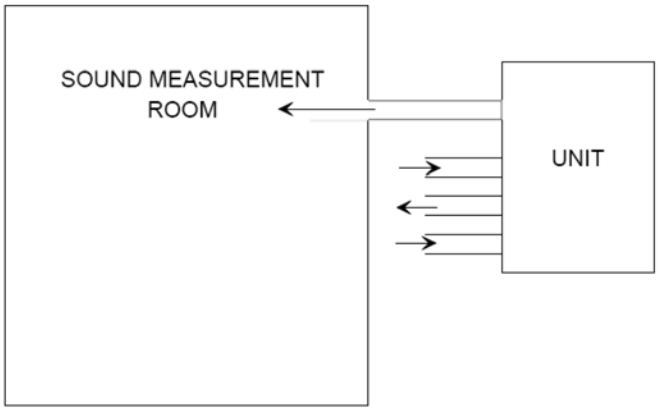
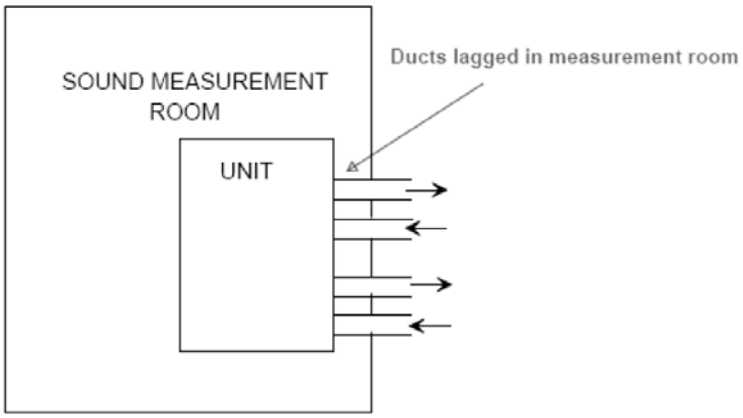
MVHR – Installation set up used during testing

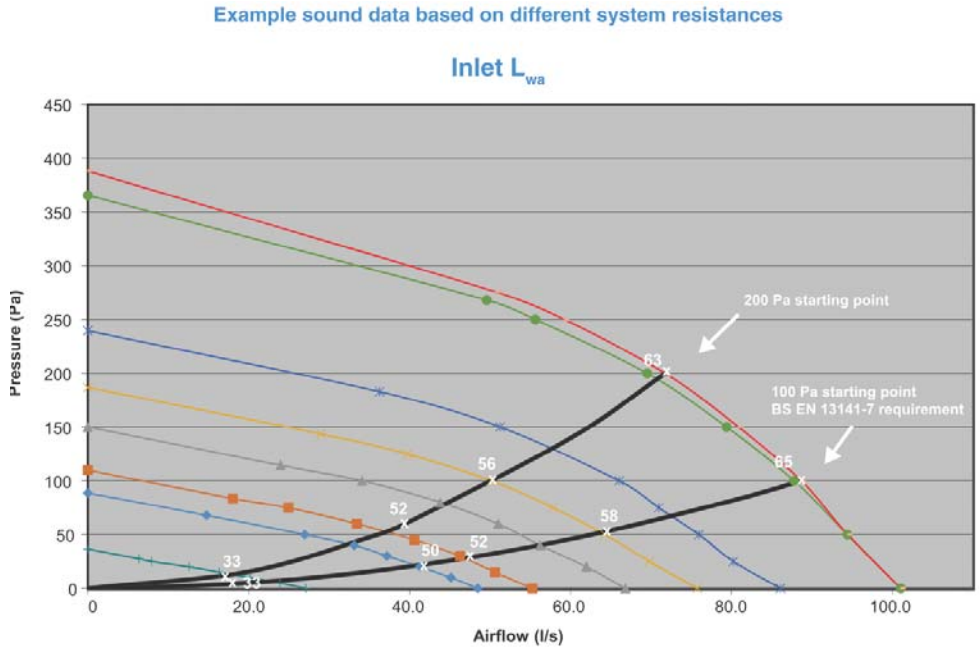
Induct sound power level measurement – the unit is installed with the outlet (or inlet) connected to the measurement room and a pressure difference of 100Pa is set across the inlet to outlet connections whilst the unit is operated at full speed. The test is then repeated to measure the casing breakout.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

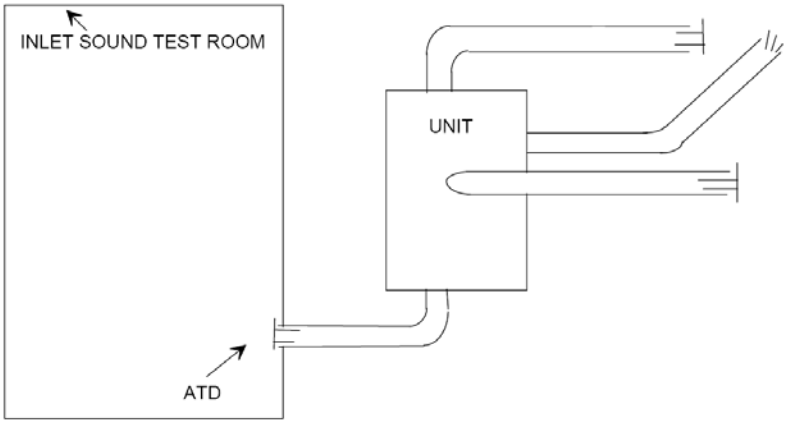


The performance graph below shows the inlet acoustic levels starting at 100Pa and also 200Pa, the acoustic level is similar at the same speed setting with a reduction of 2 dB at the higher resistance.

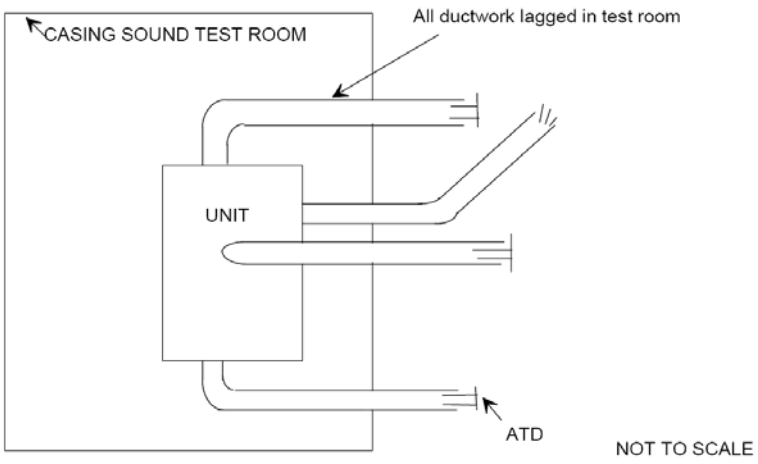


CME – Installation set up used during testing

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.