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 **HRV Cooler Plus - Deactive**

		'A' Weighted Sound Power Levels dB re. 1pW								Overall	Overall	*Overall*	*Overall*
		Frequency Hz											
Speed		63	125	250	500	1k	2k	4k	8k	L_W	L_{WA}	*dBA @ 3m Hemispherical*	*dBA @ 3m Spherical*
12l/s @ 1Pa (8.8%)	Induct Outlet	18	24	23	21	17	19	20	23	46	30	*13*	*10*
	Induct Inlet	18	24	21	22	21	19	21	24	46	31	*13*	*10*
	Breakout	26	35	49	48	43	39	29	23	60	53	*35*	*32*
29l/s @ 6Pa (19.2%)	Induct Outlet	21	38	35	25	23	20	21	23	55	40	*23*	*20*
	Induct Inlet	22	28	27	24	22	19	21	24	50	33	*16*	*13*
	Breakout	27	37	54	51	45	41	31	24	64	56	*39*	*36*
47l/s @ 16Pa (32.2%)	Induct Outlet	26	41	51	34	32	25	21	23	62	52	*34*	*31*
	Induct Inlet	28	34	48	31	27	21	21	23	59	48	*31*	*28*
	Breakout	29	39	55	53	48	43	34	24	66	58	*40*	*37*
64l/s @ 29Pa (45.3%)	Induct Outlet	32	45	51	40	39	32	22	23	65	53	*35*	*32*
	Induct Inlet	34	39	46	37	33	25	21	23	62	48	*30*	*27*
	Breakout	32	41	53	61	51	46	37	25	67	62	*44*	*41*
82l/s @ 46Pa (58.3%)	Induct Outlet	37	50	57	48	46	38	27	24	70	59	*41*	*38*
	Induct Inlet	41	43	52	44	39	30	22	24	68	54	*36*	*33*
	Breakout	34	42	50	63	52	48	39	26	68	64	*46*	*43*
99l/s @ 68Pa (71.3%)	Induct Outlet	49	54	56	54	51	44	32	25	77	61	*43*	*40*
	Induct Inlet	53	47	50	51	45	35	24	23	79	57	*39*	*36*
	Breakout	42	46	51	65	54	50	41	28	72	66	*48*	*45*
117l/s @ 96Pa (84.4%)	Induct Outlet	57	57	59	57	54	48	37	28	84	64	*47*	*44*
	Induct Inlet	57	50	53	55	48	39	28	24	83	61	*43*	*40*
	Breakout	61	46	53	63	55	51	43	29	87	66	*48*	*45*
134l/s @ 100Pa (100%)	Induct Outlet	51	58	59	56	54	48	37	29	79	64	*46*	*43*
	Induct Inlet	49	53	53	54	48	40	29	25	76	59	*41*	*38*
	Breakout	55	47	53	67	56	52	44	30	81	68	*50*	*47*

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

Acoustic data

Product **HRV Cooler Plus - Deactive**

Speed		Sound Power Levels dB re. 1pW Frequency Hz 63	125	250	500	1k	2k	4k	8k	Overall L_W	Overall L_{WA}	Overall dBA @ 3m Hemispherical	Overall dBA @ 3m Spherical
12l/s @ 1Pa (8.8%)	Open Outlet	26	27	25	21	16	18	19	24	32	27	10	7
	Open Inlet	26	27	23	22	20	18	20	25	33	28	11	8
	Breakout	52	51	58	51	43	38	28	24	60	53	35	32
29l/s @ 6Pa (19.2%)	Open Outlet	29	41	37	25	22	19	20	24	43	32	15	12
	Open Inlet	30	31	29	24	21	18	20	25	36	29	12	9
	Breakout	53	53	63	54	45	40	30	25	64	56	39	36
47l/s @ 16Pa (32.2%)	Open Outlet	34	44	53	34	31	24	20	24	54	45	27	24
	Open Inlet	36	37	50	31	26	20	20	24	50	41	24	21
	Breakout	55	55	64	56	48	42	33	25	66	58	40	37
64l/s @ 29Pa (45.3%)	Open Outlet	40	48	53	40	38	31	21	24	55	46	29	26
	Open Inlet	42	42	48	37	32	24	20	24	50	41	24	21
	Breakout	58	57	62	64	51	45	36	26	67	62	44	41
82l/s @ 46Pa (58.3%)	Open Outlet	45	53	59	48	45	37	26	25	61	52	35	32
	Open Inlet	49	46	54	44	38	29	21	25	56	47	30	27
	Breakout	60	58	59	66	52	47	38	27	68	64	46	43
99l/s @ 68Pa (71.3%)	Open Outlet	57	57	58	54	50	43	31	26	63	55	38	35
	Open Inlet	61	50	52	51	44	34	23	24	62	51	33	30
	Breakout	68	62	60	68	54	49	40	29	72	66	48	45
117l/s @ 96Pa (84.4%)	Open Outlet	65	60	61	57	53	47	36	29	68	59	41	38
	Open Inlet	65	53	55	55	47	38	27	25	66	54	36	33
	Breakout	87	62	62	66	55	50	42	30	87	66	48	45
134l/s @ 100Pa (100%)	Open Outlet	59	61	61	56	53	47	36	30	66	58	41	38
	Open Inlet	57	56	55	54	47	39	28	26	62	54	36	33
	Breakout	81	63	62	70	56	51	43	31	81	68	50	47

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 150mm (220x90mm) 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

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 **HRV Cooler Plus - Active**

		'A' Weighted Sound Power Levels dB re. 1pW								Overall	Overall	*Overall*	*Overall*
		Frequency Hz											
Speed		63	125	250	500	1k	2k	4k	8k	L_W	L_{WA}	*dBA @ 3m Hemispherical*	*dBA @ 3m Spherical*
62l/s @ 35Pa (46.2%)	Induct Outlet	41	47	53	46	43	33	23	23	69	55	*37*	*34*
	Induct Inlet	40	41	49	42	37	25	20	23	67	51	*33*	*30*
	Breakout	26	35	49	48	43	39	29	23	60	53	*35*	*32*
72l/s @ 43Pa (53.9%)	Induct Outlet	42	48	53	48	45	36	24	23	70	56	*38*	*35*
	Induct Inlet	43	43	56	44	39	28	21	23	71	57	*39*	*36*
	Breakout	27	37	54	51	45	41	31	24	64	56	*39*	*36*
83l/s @ 52Pa (61.6%)	Induct Outlet	45	51	62	55	48	38	26	24	74	63	*45*	*42*
	Induct Inlet	44	46	53	47	41	30	21	23	71	55	*37*	*34*
	Breakout	29	39	55	53	48	43	34	24	66	58	*40*	*37*
93l/s @ 62Pa (69.3%)	Induct Outlet	47	52	55	55	51	40	29	24	74	60	*43*	*40*
	Induct Inlet	47	48	53	56	44	33	23	23	74	59	*41*	*38*
	Breakout	32	41	53	61	51	46	37	25	67	62	*44*	*41*
103l/s @ 71Pa (76.9%)	Induct Outlet	50	54	57	58	53	43	31	25	77	62	*44*	*41*
	Induct Inlet	51	50	52	54	46	35	26	23	77	58	*41*	*38*
	Breakout	34	42	50	63	52	48	39	26	68	64	*46*	*43*
114l/s @ 84Pa (84.6%)	Induct Outlet	55	56	58	58	54	45	34	26	82	63	*46*	*43*
	Induct Inlet	56	52	53	56	48	38	28	24	83	61	*43*	*40*
	Breakout	42	46	51	65	54	50	41	28	72	66	*48*	*45*
124l/s @ 99Pa (92.3%)	Induct Outlet	66	57	59	58	56	47	36	28	92	68	*50*	*47*
	Induct Inlet	67	53	55	57	49	40	30	25	93	67	*50*	*47*
	Breakout	61	46	53	63	55	51	43	29	87	66	*48*	*45*
134l/s @ 100Pa (100%)	Induct Outlet	60	57	60	57	56	47	37	28	87	65	*48*	*45*
	Induct Inlet	64	54	56	57	50	41	32	26	90	66	*48*	*45*
	Breakout	55	47	53	67	56	52	44	30	81	68	*50*	*47*

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

Acoustic data

Product **HRV Cooler Plus - Active**

Speed		Sound Power Levels dB re. 1pW Frequency Hz 63	125	250	500	1k	2k	4k	8k	Overall L_W	Overall L_{WA}	Overall dBA @ 3m Hemispherical	Overall dBA @ 3m Spherical
62l/s @ 35Pa (46.2%)	Open Outlet	49	50	55	46	42	32	22	24	57	49	31	28
	Open Inlet	48	44	51	42	36	24	19	24	54	44	27	24
	Breakout	52	51	58	51	43	38	28	24	60	53	35	32
72l/s @ 43Pa (53.9%)	Open Outlet	50	51	55	48	44	35	23	24	58	50	33	30
	Open Inlet	51	46	58	44	38	27	20	24	59	50	33	30
	Breakout	53	53	63	54	45	40	30	25	64	56	39	36
83l/s @ 52Pa (61.6%)	Open Outlet	53	54	64	55	47	37	25	25	65	57	39	36
	Open Inlet	52	49	55	47	40	29	20	24	58	49	31	28
	Breakout	55	55	64	56	48	42	33	25	66	58	40	37
93l/s @ 62Pa (69.3%)	Open Outlet	55	55	57	55	50	39	28	25	62	56	38	35
	Open Inlet	55	51	55	56	43	32	22	24	61	54	37	34
	Breakout	58	57	62	64	51	45	36	26	67	62	44	41
103l/s @ 71Pa (76.9%)	Open Outlet	58	57	59	58	52	42	30	26	64	58	40	37
	Open Inlet	59	53	54	54	45	34	25	24	62	53	35	32
	Breakout	60	58	59	66	52	47	38	27	68	64	46	43
114l/s @ 84Pa (84.6%)	Open Outlet	63	59	60	58	53	44	33	27	67	58	41	38
	Open Inlet	64	55	55	56	47	37	27	25	66	55	37	34
	Breakout	68	62	60	68	54	49	40	29	72	66	48	45
124l/s @ 99Pa (92.3%)	Open Outlet	74	60	61	58	55	46	35	29	75	60	42	39
	Open Inlet	75	56	57	57	48	39	29	26	75	56	39	36
	Breakout	87	62	62	66	55	50	42	30	87	66	48	45
134l/s @ 100Pa (100%)	Open Outlet	68	60	62	57	55	46	36	29	70	59	42	39
	Open Inlet	72	57	58	57	49	40	31	27	73	56	39	36
	Breakout	81	63	62	70	56	51	43	31	81	68	50	47

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 150mm (220x90mm) 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

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 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 and Inlet and are given across the frequency range from 125Hz 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 meters, 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 meters.

Acoustic data

Titon®

Standard: BS EN 13141-7:2004

Product **HRV1 Qplus**

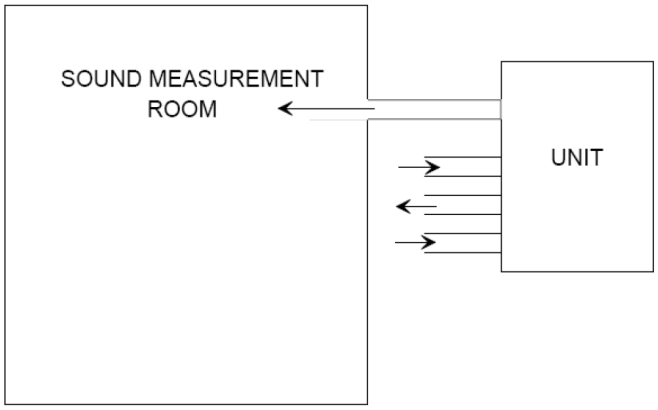
		'A' Weighted Sound Power Levels dB re. 1pW Frequency Hz							Overall	Overall	Casing Breakout
Speed		125	250	500	1k	2k	4k	8k	L_W	L_{WA}	dBA @ 3m
1	Outlet	31	32	36	24	16	18	22	49	39	9
	Inlet	26	24	29	18	16	18	22	43	32	
	Breakout	11	15	23	14	13	18	22	31	27	
2	Outlet	42	42	49	40	31	21	22	59	51	14
	Inlet	31	32	35	24	17	18	22	48	38	
	Breakout	16	21	29	19	15	18	22	37	31	
3	Outlet	45	46	50	55	37	27	23	63	57	16
	Inlet	33	36	36	31	20	18	22	51	41	
	Breakout	22	26	31	26	17	18	22	41	34	
4	Outlet	49	50	51	58	42	33	26	67	60	20
	Inlet	36	39	39	36	24	19	22	54	44	
	Breakout	23	28	35	31	20	19	22	43	37	
5	Outlet	51	53	54	56	46	38	30	69	60	23
	Inlet	39	42	41	39	28	20	22	57	47	
	Breakout	26	35	37	34	24	22	22	47	40	
6	Outlet	54	56	57	57	50	42	36	72	63	27
	Inlet	42	45	45	41	32	23	22	59	49	
	Breakout	28	33	44	36	28	24	22	50	45	
7	Outlet	58	59	60	60	54	46	41	75	66	32
	Inlet	44	47	49	45	37	27	23	62	53	
	Breakout	30	36	49	39	32	28	22	54	50	
8	Outlet	59	63	63	63	59	50	46	77	69	33
	Inlet	47	51	51	47	42	31	25	65	56	
	Breakout	32	38	49	42	37	32	24	55	51	

Measurements taken at full speed with a resistance of 50Pa, then at the nominal speed settings of the unit and corresponding pressure.
Inlet and outlet levels are Induct

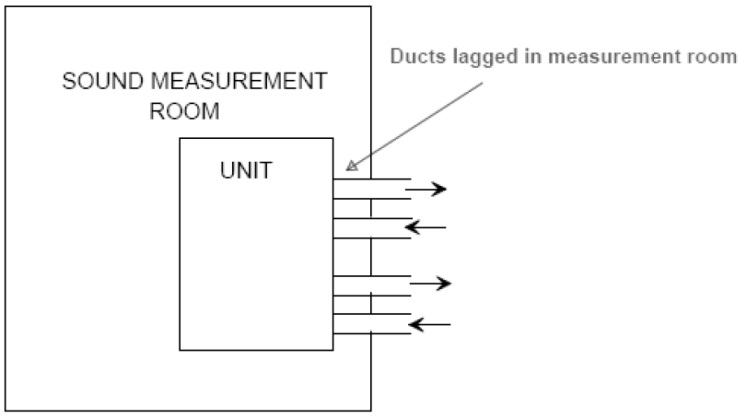
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MVHR – Installation set up used during testing

In-duct sound power level measurement – the unit is installed with the outlet (or inlet) connected to the measurement room and

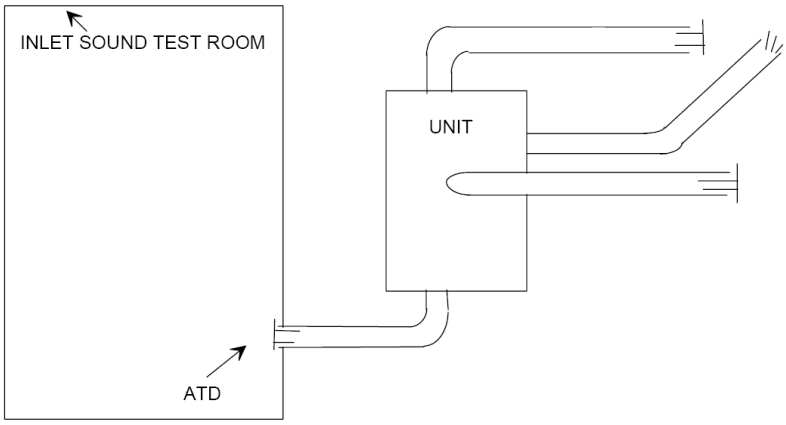


Casing breakout – the inlet and outlet ducts are connected to a separate room so the only noise measured is breakout from the casing

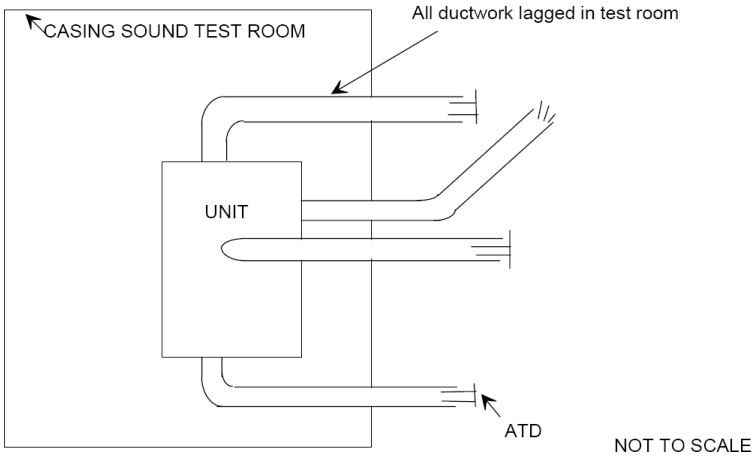


CME – Installation set up used during testing

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, air terminal device
The single outlet connected with 0.5m duct, 45 degree bend, 2m duct, 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 – 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 – 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.

'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	125	250	500	1000	2000	4000	8000
'A' Weighting	-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.

In Duct 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 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.