

Sound Power Data

For Water Source Heat Pumps



BOSCH

Reference Manual



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1 Introduction

Sound has become of increasing concern in the industry. Bosch has invested in a state of the art sound test facility to test our products according to the AHRI standard 260-2017 and what, if any, impact changes to the design may have on the unit sound spectrum.

It is important to understand the difference between Sound Power and Sound Pressure in the evaluation of the impact the Water Source Heat Pump will have on the occupied space.

1.1 Sound Power

Sound power is the energy radiated from the source, in this case the heat pump. The energy is radiated directly from the source and the acoustical characteristics of the space are not taken into account. Sound power is the base measure used by the engineer as the starting point to determine the resultant sound in the conditioned space. Building materials have acoustic characteristics that define the sound attenuation and enable the engineer to predict sound pressure levels in the conditioned space. So to sum up sound power is the basis for an acoustical evaluation of the sound that will be heard in a space.

All Sound Components are tested utilizing either a reverberation room (qualified by test) or using Sound Intensity. Reverberation room tests are conducted using the Comparison Method and a calibrated Reference Sound Source, while the sound intensity tests are conducted using measurements made at discrete points or by the scanning method. Sound ratings are in the form of octave band Sound Power Levels (dB) from 63 to 8000 Hz derived from one-third octave band measurements.

This sound measurement is the 'purest' since it does not include any assumptions for room size or furnishings.

1.2 Sound Pressure

Sound pressure is a measure of the dynamic pressure that causes local pressure fluctuations in the air molecules. These fluctuations can be measured in Pascals (Pa) or when expressed in decibels (dB) the term is known as Sound Pressure Level. This pressure is what is measured by a microphone or perceived by our ear drums.

The sound pressure is depend upon the nature of the space volume, furnishings and surface treatment. The design engineer's challenge is to convert Sound Power, taking into consideration the nature of the room, to predict Sound Pressure. Sound pressure levels are the measure used when trying to determine the resultant effects of the operating equipment on the conditioned space.

The sound pressure can be estimated for any room using the sound power levels, room volume and surface furnishing. The sound pressure can also be easily measured using simple equipment.

1.3 About AHRI 260 Sound Ratings

In 2001 ARI 260-2001 Sound Rating of Ducted Air Moving and Conditioning Equipment established the procedure for determining the sound power ratings for Water Source Heat Pumps. This standard has been updated multiple times and is now AHRI 260-2017.

The AHRI 260 provides test procedures and rating criteria for 5 configurations of the Water Source Heat Pumps:

- ▶ Ducted Inlet
- ▶ Casing Radiated
- ▶ Free Inlet
- ▶ Free Inlet/Casing Radiated
- ▶ Ducted Discharge

The most common configurations for the Water Source Heat Pumps are "Casing Radiated" & "Ducted Discharge".

Casing radiated sound power represents the sound a person would hear if they were standing directly in front of the unit. Ducted discharge sound power levels represent the sound a person would hear through air vents in a room when the heat pump is installed elsewhere.

The following tables present the Sound Power of the different series offered by Bosch. The data includes both the Casing Radiated and Ducted Discharge for horizontal and vertical units. As required in AHRI 260-2017 sound power in the 63 through 8000 Hz bands are presented. The 63 Hz sound power has a significant effect in the total sound power from a unit. It is therefore important when comparing sound power from different units that this frequency is included in the overall total. Additionally, all data presented in the following tables was collected at the AHRI rated CFM and static pressure for each unit.

1.4 Sound Attenuation Package

Bosch offers a sound reduction package for projects where a lower sound level is a requirement. This package includes a compressor blanket and close cell foam insulation.

1.5 Correction Factors

Correction factors are needed to adjust the frequency band by accounting for the loss of acoustical energy through the acoustical test duct during transmission to the test space. This is done so that the sound power presented is representative of what would be transmitted into a non-reflecting duct system. In accordance with AHRI 260, the correction factors listed within this document include a duct end correction and an acoustic test duct elbow correction. The ducted discharge data in the following sound power data tables already has the correction factors applied, and is not the raw data. The specific correction factors used can be found in the tables below.

Bosch is always trying to improve our data collection methods which has led to changes in our test setup over time. The QV/WQ correction factors are based off of a 16" by 20" unlined rectangular duct with turning vanes. The correction factors for all other models were based off of an 18" by 18" lined rectangular duct with turning vanes.

For reference see 2019 ASHRAE Applications Handbook, Section 49, page 49.24 Table 24.

Ducted Discharge Correction Factors - QV/WQ								
1/3rd Octave band (Hz)	50	63	80	100	125	160	200	250
Adjustment factor (dB)	9.889	8.136	6.452	5.034	4.802	3.682	2.894	5.303
1/3rd Octave band (Hz)	315	400	500	630	800	1000	1250	1600
Adjustment factor (dB)	4.865	4.556	6.364	6.233	6.146	4.094	4.060	4.037
1/3rd Octave band (Hz)	2000	2500	3150	4000	5000	6300	8000	10000
Adjustment factor (dB)	4.024	4.015	4.010	4.006	4.004	4.002	4.001	4.001

Ducted Discharge Correction Factors - All Other Models								
1/3rd Octave band	50	63	80	100	125	160	200	250
Adjustment factor	9.841	1.777	1.185	0.794	1.525	1.328	1.213	4.137
1/3rd Octave band	315	400	500	630	800	1000	1250	1600
Adjustment factor	4.087	4.054	7.035	7.022	7.014	7.009	7.006	7.003
1/3rd Octave band	2000	2500	3150	4000	5000	6300	8000	10000
Adjustment factor	7.002	7.001	7.001	7.001	7.000	7.000	7.000	7.000



Table values may vary slightly depending on unit configuration, model, and test setup.

2 Sound Power Data

2.1 LM/SM Series

LM/SM Sound Power Data - Vertical																					
Model	Load	Octave Band Sound Power Levels dBA, re 10-12 Watts																			
		Casing Radiated - Vertical										Ducted Discharge - Vertical									
		Center Frequency - Hz										Center Frequency - Hz									
		63	125	250	500	1000	2000	4000	8000	Overall	Overall (dBA)	63	125	250	500	1000	2000	4000	8000	Overall	Overall (dBA)
LM024 SM024	Cooling Part	79	66	60	54	53	44	38	31	79	59	75	67	60	67	63	59	56	49	77	68
	Cooling Full	80	63	60	54	54	47	40	37	80	60	76	68	62	68	65	61	58	52	78	70
	Heating Part	74	66	59	54	52	43	38	31	75	58	77	67	60	65	63	58	56	49	78	67
	Heating Full	74	65	61	53	54	45	39	34	75	59	77	70	62	68	65	61	59	53	79	70
	FAN Only	73	61	56	51	48	43	38	30	74	55	75	67	60	66	63	59	56	49	76	68
LM036 SM036	Cooling Part	75	61	53	50	45	39	34	31	75	54	78	65	56	61	59	55	53	46	79	64
	Cooling Full	75	65	55	52	49	43	41	40	76	56	89	71	59	63	62	59	57	51	89	68
	Heating Part	74	60	52	50	44	38	33	30	74	53	79	65	56	61	59	56	53	46	79	64
	Heating Full	73	66	57	51	48	42	39	36	74	56	80	68	59	63	62	59	58	52	81	67
	FAN Only	66	53	48	45	42	36	29	24	66	48	79	66	56	61	59	55	53	46	80	64
LM048 SM048	Cooling Part	75	69	56	52	50	43	36	32	76	58	82	70	59	63	63	59	58	52	83	68
	Cooling Full	77	75	60	53	53	48	40	36	79	62	88	75	64	67	66	64	62	58	89	72
	Heating Part	77	69	58	52	51	43	35	31	77	58	81	69	60	64	63	60	58	53	82	68
	Heating Full	76	75	69	53	53	47	39	34	79	64	83	74	64	67	66	64	63	58	84	71
	FAN Only	69	56	56	49	48	43	35	27	69	53	86	70	60	63	62	60	58	52	86	68
LM060 SM060	Cooling Part	82	66	58	55	51	45	42	37	82	60	89	73	63	67	63	61	60	54	89	70
	Cooling Full	79	72	62	58	55	49	47	42	80	62	94	79	68	70	68	66	66	61	94	75
	Heating Part	76	67	62	57	52	47	47	47	77	60	88	74	63	67	64	61	60	54	89	70
	Heating Full	82	74	63	58	56	49	46	42	82	63	94	79	68	70	68	66	66	61	94	75
	FAN Only	71	60	57	53	49	44	39	29	72	56	87	73	63	67	64	62	60	54	88	70
LM070 SM070	Cooling Part	82	68	61	57	52	49	44	36	82	61	92	78	67	69	68	66	64	59	93	74
	Cooling Full	80	72	63	59	54	51	46	39	81	63	97	83	72	72	73	70	69	64	97	79
	Heating Part	75	71	63	59	52	48	44	40	77	61	92	79	68	70	69	66	64	59	92	74
	Heating Full	77	74	64	60	55	50	45	37	79	63	96	82	73	73	74	70	69	64	96	79
	FAN Only	73	63	61	55	51	49	44	42	74	58	93	79	68	70	69	66	64	59	93	75

LM/SM Sound Power Data - Horizontal																						
Model	Load	Octave Band Sound Power Levels dBA, re 10-12 Watts																				
		Casing Radiated - Horizontal										Ducted Discharge - Horizontal										
		Center Frequency - Hz										Center Frequency - Hz										
		63	125	250	500	1000	2000	4000	8000	Overall	Overall (dBA)	63	125	250	500	1000	2000	4000	8000	Overall	Overall (dBA)	
LM024 SM024	Cooling Part	78	61	55	52	49	44	37	29	78	57	74	64	56	58	57	55	50	43	75	62	
	Cooling Full	76	63	56	53	53	45	39	31	76	58	74	67	59	62	60	59	55	49	75	66	
	Heating Part	78	61	55	52	49	45	38	29	78	57	75	64	55	58	56	54	50	43	76	61	
	Heating Full	81	62	55	53	53	45	38	30	81	59	75	67	58	61	60	58	55	49	76	65	
	FAN Only	70	60	53	49	47	44	37	28	71	53	69	63	55	74	56	54	50	43	76	71	
LM036 SM036	Cooling Part	82	62	55	52	51	45	40	34	82	59	79	67	57	60	59	56	51	44	79	64	
	Cooling Full	81	66	56	54	53	45	40	35	81	60	81	69	59	63	62	59	57	51	81	67	
	Heating Part	80	67	55	52	51	44	39	32	80	59	80	66	57	60	59	56	51	44	80	64	
	Heating Full	81	72	55	52	51	43	37	30	82	60	80	69	59	63	61	59	57	51	81	67	
	FAN Only	72	61	52	49	47	44	39	32	72	54	72	66	57	61	59	56	52	44	74	64	
LM048 SM048	Cooling Part	87	72	59	54	51	49	44	39	87	64	78	72	59	64	63	60	57	52	79	68	
	Cooling Full	86	75	56	54	50	45	37	30	86	64	78	73	51	66	66	63	61	57	80	71	
	Heating Part	84	73	59	56	50	48	43	36	84	63	79	71	59	65	64	59	57	52	80	68	
	Heating Full	83	76	55	53	49	45	36	30	84	63	78	73	61	66	66	63	61	57	80	71	
	FAN Only	74	56	55	52	50	49	44	38	74	56	74	70	58	65	64	59	57	52	76	68	
LM060 SM060	Cooling Part	83	68	59	57	54	50	45	40	83	62	84	76	66	68	68	63	60	53	85	72	
	Cooling Full	85	68	59	56	53	48	42	34	85	62	81	78	67	70	70	67	65	59	83	75	
	Heating Part	85	56	52	59	53	49	44	39	85	62	82	87	66	68	67	63	60	53	88	74	
	Heating Full	85	71	60	56	53	48	41	34	85	63	83	87	67	70	71	67	65	59	89	76	
	FAN Only	75	66	57	54	53	50	45	40	76	59	78	75	65	68	67	63	60	53	81	71	
LM070 SM070	Cooling Part	78	67	61	57	54	49	45	39	78	61	82	77	66	68	68	64	62	55	84	72	
	Cooling Full	79	69	61	60	56	51	46	39	80	62	85	81	71	74	73	69	67	62	87	78	
	Heating Part	86	70	64	58	54	48	43	36	86	64	81	78	66	69	67	64	61	55	83	72	
	Heating Full	83	70	65	61	57	52	47	38	83	64	85	81	71	73	73	69	67	62	87	77	
	FAN Only	75	65	58	55	52	48	44	37	76	58	81	76	66	69	67	64	62	56	83	72	

2.2 ES/CE Series

ES/CE Sound Power Data - Vertical																					
Model	Load	Octave Band Sound Power Levels dB, re 10-12 Watts																			
		Casing Radiated - Vertical										Ducted Discharge - Vertical									
		Center Frequency - Hz										Center Frequency - Hz									
		63	125	250	500	1000	2000	4000	8000	Overall	Overall (dBA)	63	125	250	500	1000	2000	4000	8000	Overall	Overall (dBA)
ES025 CE025	Cooling Part	69	61	50	45	41	34	27	24	70	50	75	61	44	48	50	45	40	34	75	55
	Cooling Full	74	69	55	52	45	39	32	25	75	57	73	70	49	56	50	47	46	36	75	59
	Heating Part	69	65	52	49	40	39	30	24	71	53	71	69	45	48	50	44	40	35	73	56
	Heating Full	73	72	56	53	46	39	32	24	76	59	73	75	50	56	53	48	47	37	77	62
	FAN Only	59	48	43	37	36	27	22	22	60	42	72	56	42	48	54	44	39	34	72	56
ES035 CE035	Cooling Part	86	61	54	52	46	40	33	26	86	62	72	65	51	59	59	55	51	39	74	63
	Cooling Full	80	72	59	57	54	49	41	32	81	62	75	72	58	64	57	56	58	49	77	66
	Heating Part	85	60	55	53	47	42	35	27	85	61	73	67	51	59	54	50	49	39	74	60
	Heating Full	86	72	62	56	55	50	42	32	86	64	76	70	59	65	55	56	58	50	78	66
	FAN Only	65	52	48	48	44	38	29	22	66	49	74	61	49	57	55	50	47	37	74	59
ES049 CE049	Cooling Part	78	63	54	51	49	41	33	26	79	56	77	68	55	60	57	53	52	43	78	63
	Cooling Full	78	71	62	58	60	53	45	36	79	64	90	78	67	70	60	61	63	57	91	72
	Heating Part	78	66	55	52	49	43	34	26	79	57	74	73	56	60	55	53	51	43	77	63
	Heating Full	81	72	63	59	60	53	45	35	82	64	86	83	72	73	62	60	63	57	88	74
	FAN Only	70	52	48	46	44	37	27	22	70	50	73	62	50	57	60	49	46	37	74	62
ES061 CE061	Cooling Part	77	69	62	60	62	58	52	42	78	66	80	68	57	61	58	53	54	44	80	64
	Cooling Full	80	69	63	60	62	58	52	42	81	66	91	77	66	69	63	60	62	55	91	72
	Heating Part	78	63	56	55	54	49	43	31	78	59	82	69	58	62	57	52	54	45	82	64
	Heating Full	79	67	63	60	62	57	51	41	80	66	90	78	66	69	62	59	62	55	90	71
	FAN Only	63	54	50	50	49	44	36	25	64	53	77	64	52	57	59	48	47	38	77	62
ES071 CE071	Cooling Part	75	58	57	52	46	41	34	28	75	55	82	67	55	65	52	49	50	39	83	64
	Cooling Full	79	65	63	59	57	52	47	38	79	62	96	80	67	70	59	60	63	53	96	74
	Heating Part	78	63	64	55	46	40	33	27	79	59	72	63	55	63	54	48	48	38	73	62
	Heating Full	81	66	64	60	56	51	46	37	81	63	82	73	64	73	59	57	60	52	83	71
	FAN Only	67	52	51	46	44	38	30	23	67	49	78	62	56	57	54	46	45	35	78	59



All ratings based upon Constant Airflow ECM fan motors.

ES/CE Sound Power Data - Horizontal

Model	Load	Octave Band Sound Power Levels dB, re 10-12 Watts																			
		Casing Radiated - Horizontal										Ducted Discharge - Horizontal									
		Center Frequency - Hz										Center Frequency - Hz									
		63	125	250	500	1000	2000	4000	8000	Overall	Overall (dBA)	63	125	250	500	1000	2000	4000	8000	Overall	Overall (dBA)
ES025 CE025	Cooling Part	69	61	50	45	41	34	27	24	70	50	75	61	44	48	50	45	40	34	75	55
	Cooling Full	74	69	55	52	45	39	32	25	75	57	73	70	49	56	50	47	46	36	75	59
	Heating Part	69	65	52	49	40	39	30	24	71	53	71	69	45	48	50	44	40	35	73	56
	Heating Full	73	72	56	53	46	39	32	24	76	59	73	75	50	56	53	48	47	37	77	62
	FAN Only	59	48	43	37	36	27	22	22	60	42	72	56	42	48	54	44	39	34	72	56
ES035 CE035	Cooling Part	86	61	54	52	46	40	33	26	86	62	72	65	51	59	59	55	51	39	74	63
	Cooling Full	80	72	59	57	54	49	41	32	81	62	75	72	58	64	57	56	58	49	77	66
	Heating Part	85	60	55	53	47	42	35	27	85	61	73	67	51	59	54	50	49	39	74	60
	Heating Full	86	72	62	56	55	50	42	32	86	64	76	70	59	65	55	56	58	50	78	66
	FAN Only	65	52	48	48	44	38	29	22	66	49	74	61	49	57	55	50	47	37	74	59
ES049 CE049	Cooling Part	78	63	54	51	49	41	33	26	79	56	77	68	55	60	57	53	52	43	78	63
	Cooling Full	78	71	62	58	60	53	45	36	79	64	90	78	67	70	60	61	63	57	91	72
	Heating Part	78	66	55	52	49	43	34	26	79	57	74	73	56	60	55	53	51	43	77	63
	Heating Full	81	72	63	59	60	53	45	35	82	64	86	83	72	73	62	60	63	57	88	74
	FAN Only	70	52	48	46	44	37	27	22	70	50	73	62	50	57	60	49	46	37	74	62
ES061 CE061	Cooling Part	77	69	62	60	62	58	52	42	78	66	80	68	57	61	58	53	54	44	80	64
	Cooling Full	80	69	63	60	62	58	52	42	81	66	91	77	66	69	63	60	62	55	91	72
	Heating Part	78	63	56	55	54	49	43	31	78	59	82	69	58	62	57	52	54	45	82	64
	Heating Full	79	67	63	60	62	57	51	41	80	66	90	78	66	69	62	59	62	55	90	71
	FAN Only	63	54	50	50	49	44	36	25	64	53	77	64	52	57	59	48	47	38	77	62
ES071 CE071	Cooling Part	75	58	57	52	46	41	34	28	75	55	82	67	55	65	52	49	50	39	83	64
	Cooling Full	79	65	63	59	57	52	47	38	79	62	96	80	67	70	59	60	63	53	96	74
	Heating Part	78	63	64	55	46	40	33	27	79	59	72	63	55	63	54	48	48	38	73	62
	Heating Full	81	66	64	60	56	51	46	37	81	63	82	73	64	73	59	57	60	52	83	71
	FAN Only	67	52	51	46	44	38	30	23	67	49	78	62	56	57	54	46	45	35	78	59



All ratings based upon Constant Airflow ECM fan motors.

2.3 EP/BP Series

EP/BP Sound Power Data - Vertical																					
Model	Load	Octave Band Sound Power Levels dBA, re 10-12 Watts																			
		Casing Radiated - Vertical										Ducted Discharge - Vertical									
		Center Frequency - Hz										Center Frequency - Hz									
		63	125	250	500	1000	2000	4000	8000	Overall	Overall (dBA)	63	125	250	500	1000	2000	4000	8000	Overall	Overall (dBA)
EP007	Cooling Full	83	64	48	43	42	38	32	27	83	58	71	60	47	51	57	51	45	37	72	59
	Heating Full	77	63	58	44	44	40	34	28	77	55	71	61	50	51	53	47	46	39	72	57
	FAN Only	68	54	43	42	42	37	31	24	68	48	70	58	50	51	56	47	46	39	71	58
EP009	Cooling Full	75	61	50	46	51	45	40	34	75	55	73	62	52	53	55	50	51	47	74	59
	Heating Full	72	62	53	46	51	45	40	34	73	55	72	63	53	54	56	50	50	47	73	60
	FAN Only	65	55	48	47	51	45	40	32	66	54	70	63	53	54	55	49	51	47	71	59
EP012 BP012	Cooling Full	77	66	58	51	51	45	41	35	77	58	78	71	61	58	56	51	51	48	79	63
	Heating Full	77	71	61	51	51	45	40	34	78	60	79	71	62	59	58	50	51	48	80	63
	FAN Only	77	61	56	51	51	45	39	33	77	57	79	71	61	61	70	59	51	48	80	71
EP015 BP015	Cooling Full	77	59	51	51	46	42	34	32	77	55	71	66	50	56	53	47	46	37	72	58
	Heating Full	80	63	56	57	55	51	45	40	80	61	71	68	53	57	58	48	46	38	73	61
	FAN Only	65	51	46	46	38	33	25	23	65	47	70	61	49	57	57	48	46	37	71	60
EP018 BP018	Cooling Full	86	71	62	53	49	47	45	41	86	63	88	69	52	59	57	50	48	39	88	65
	Heating Full	88	76	66	59	56	55	52	47	88	67	90	70	53	60	57	49	48	39	90	66
	FAN Only	69	50	48	49	42	35	30	24	69	50	72	62	51	59	58	49	48	39	73	61
EP024 BP024	Cooling Full	83	63	55	54	49	42	37	28	83	60	73	70	55	63	52	51	54	43	75	63
	Heating Full	84	71	56	54	50	44	41	32	84	61	73	73	56	63	54	50	53	42	76	64
	FAN Only	67	55	52	53	49	42	38	27	68	54	75	66	55	63	52	50	53	43	76	63
EP030 BP030	Cooling Full	72	67	58	56	52	45	38	28	73	58	71	70	55	63	52	51	54	43	74	63
	Heating Full	75	67	58	66	52	46	39	30	76	64	73	73	56	63	54	50	53	42	76	64
	FAN Only	68	58	55	56	52	45	38	26	69	57	69	66	55	63	52	50	53	43	72	62
EP036 BP036	Cooling Full	78	65	62	62	63	58	52	43	79	66	85	78	64	71	60	59	62	55	86	71
	Heating Full	77	67	63	63	64	59	52	44	78	67	83	79	67	71	61	58	61	55	85	71
	FAN Only	76	65	62	62	63	58	52	43	77	66	82	79	66	71	60	58	61	55	84	71
EP042 BP042	Cooling Full	85	71	58	57	55	46	46	39	85	63	83	73	58	66	57	56	56	50	84	67
	Heating Full	86	73	58	57	55	47	47	39	86	64	85	75	59	66	56	56	56	49	85	67
	FAN Only	71	56	55	57	55	46	46	37	72	59	86	73	59	66	57	56	56	49	86	67
EP048 BP048	Cooling Full	86	72	63	58	57	51	43	38	86	65	93	75	62	66	59	58	61	53	93	71
	Heating Full	86	73	63	58	57	52	44	37	86	65	89	75	62	66	58	56	60	52	89	69
	FAN Only	71	60	61	57	57	51	43	34	72	61	90	76	63	66	59	57	60	53	90	70
EP060	Cooling Full	88	63	61	59	57	53	48	39	88	65	93	78	65	66	60	57	60	54	93	71
	Heating Full	86	64	61	58	58	53	49	40	86	64	92	76	64	67	60	54	59	52	92	70
	FAN Only	71	59	60	58	57	53	48	39	72	61	93	77	65	66	60	55	60	53	93	71
EP070	Cooling Full	87	66	64	65	59	57	53	44	87	67	96	81	68	72	64	62	64	54	96	75
	Heating Full	89	73	67	66	61	58	54	46	89	69	95	80	68	72	64	59	63	53	95	74
	FAN Only	75	62	63	65	59	57	53	44	76	66	98	82	69	72	64	61	64	54	98	76

EP/BP Sound Power Data - Horizontal

Model	Load	Octave Band Sound Power Levels dBA, re 10-12 Watts																			
		Casing Radiated - Horizontal										Ducted Discharge - Horizontal									
		Center Frequency - Hz										Center Frequency - Hz									
		63	125	250	500	1000	2000	4000	8000	Overall	Overall (dBA)	63	125	250	500	1000	2000	4000	8000	Overall	Overall (dBA)
EP007	Cooling Full	83	64	48	43	42	38	32	27	83	58	71	60	47	51	57	51	45	37	72	59
	Heating Full	77	63	58	44	44	40	34	28	77	55	71	61	50	51	53	47	46	39	72	57
	FAN Only	68	54	43	42	42	37	31	24	68	48	70	58	50	51	56	47	46	39	71	58
EP009	Cooling Full	75	61	50	46	51	45	40	34	75	55	73	62	52	53	55	50	51	47	74	59
	Heating Full	72	62	53	46	51	45	40	34	73	55	72	63	53	54	56	50	50	47	73	60
	FAN Only	65	55	48	47	51	45	40	32	66	54	70	63	53	54	55	49	51	47	71	59
EP012 BP012	Cooling Full	77	66	58	51	51	45	41	35	77	58	78	71	61	58	56	51	51	48	79	63
	Heating Full	77	71	61	51	51	45	40	34	78	60	79	71	62	59	58	50	51	48	80	63
	FAN Only	77	61	56	51	51	45	39	33	77	57	79	71	61	61	70	59	51	48	80	71
EP015 BP015	Cooling Full	77	59	51	51	46	42	34	32	77	55	71	66	50	56	53	47	46	37	72	58
	Heating Full	80	63	56	57	55	51	45	40	80	61	71	68	53	57	58	48	46	38	73	61
	FAN Only	65	51	46	46	38	33	25	23	65	47	70	61	49	57	57	48	46	37	71	60
EP018 BP018	Cooling Full	86	71	62	53	49	47	45	41	86	63	88	69	52	59	57	50	48	39	88	65
	Heating Full	88	76	66	59	56	55	52	47	88	67	90	70	53	60	57	49	48	39	90	66
	FAN Only	69	50	48	49	42	35	30	24	69	50	72	62	51	59	58	49	48	39	73	61
EP024 BP024	Cooling Full	83	63	55	54	49	42	37	28	83	60	73	70	55	63	52	51	54	43	75	63
	Heating Full	84	71	56	54	50	44	41	32	84	61	73	73	56	63	54	50	53	42	76	64
	FAN Only	67	55	52	53	49	42	38	27	68	54	75	66	55	63	52	50	53	43	76	63
EP030 BP030	Cooling Full	72	67	58	56	52	45	38	28	73	58	71	70	55	63	52	51	54	43	74	63
	Heating Full	75	67	58	66	52	46	39	30	76	64	73	73	56	63	54	50	53	42	76	64
	FAN Only	68	58	55	56	52	45	38	26	69	57	69	66	55	63	52	50	53	43	72	62
EP036 BP036	Cooling Full	78	65	62	62	63	58	52	43	79	66	85	78	64	71	60	59	62	55	86	71
	Heating Full	77	67	63	63	64	59	52	44	78	67	83	79	67	71	61	58	61	55	85	71
	FAN Only	76	65	62	62	63	58	52	43	77	66	82	79	66	71	60	58	61	55	84	71
EP042 BP042	Cooling Full	85	71	58	57	55	46	46	39	85	63	83	73	58	66	57	56	56	50	84	67
	Heating Full	86	73	58	57	55	47	47	39	86	64	85	75	59	66	56	56	56	49	85	67
	FAN Only	71	56	55	57	55	46	46	37	72	59	86	73	59	66	57	56	56	49	86	67
EP048 BP048	Cooling Full	86	72	63	58	57	51	43	38	86	65	93	75	62	66	59	58	61	53	93	71
	Heating Full	86	73	63	58	57	52	44	37	86	65	89	75	62	66	58	56	60	52	89	69
	FAN Only	71	60	61	57	57	51	43	34	72	61	90	76	63	66	59	57	60	53	90	70
EP060	Cooling Full	88	63	61	59	57	53	48	39	88	65	93	78	65	66	60	57	60	54	93	71
	Heating Full	86	64	61	58	58	53	49	40	86	64	92	76	64	67	60	54	59	52	92	70
	FAN Only	71	59	60	58	57	53	48	39	72	61	93	77	65	66	60	55	60	53	93	71
EP070	Cooling Full	87	66	64	65	59	57	53	44	87	67	96	81	68	72	64	62	64	54	96	75
	Heating Full	89	73	67	66	61	58	54	46	89	69	95	80	68	72	64	59	63	53	95	74
	FAN Only	75	62	63	65	59	57	53	44	76	66	98	82	69	72	64	61	64	54	98	76

2.4 WQ/QV Series

WQ/QV Sound Power Data - Vertical																					
Model	Load	Octave Band Sound Power Levels dBA, re 10-12 Watts																			
		Casing Radiated - Vertical										Ducted Discharge - Vertical									
		Center Frequency - Hz										Center Frequency - Hz									
		63	125	250	500	1000	2000	4000	8000	Overall	Overall ARI-260:2017 (63Hz-8kHz) (dBA)	63	125	250	500	1000	2000	4000	8000	Overall	Overall ARI-260:2017 (63Hz-8kHz) (dBA)
QV024 WQ024	Cooling Full	73	62	54	56	44	40	32	31	73	55	78	72	63	67	64	57	54	48	79	68
	Heating Full	74	64	55	54	45	42	33	31	75	55	78	70	62	65	62	56	52	46	79	66
	FAN Only	67	53	46	41	39	29	25	25	67	45	75	65	56	60	58	50	44	37	76	62
QV030 WQ030	Cooling Full	73	60	54	50	43	38	31	30	74	53	78	73	63	67	64	58	55	48	79	71
	Heating Full	73	61	54	51	43	43	33	30	73	54	79	73	62	67	63	57	55	48	80	70
	FAN Only	65	52	49	42	35	31	25	25	66	45	72	66	56	60	56	50	45	36	73	66
QV036 WQ036	Cooling Full	78	67	56	56	49	45	39	35	78	58	80	73	65	70	68	61	60	54	81	72
	Heating Full	78	66	57	56	48	49	40	36	78	58	81	74	65	71	67	61	60	55	82	72
	FAN Only	66	52	51	45	39	34	26	25	67	47	76	65	59	64	60	54	50	43	77	65
QV042 WQ042	Cooling Full	74	62	58	56	50	46	38	35	75	57	80	73	67	70	67	62	60	55	82	72
	Heating Full	76	65	58	58	50	49	41	38	77	58	83	74	67	70	67	62	61	56	84	72
	FAN Only	66	53	52	45	38	34	27	25	67	48	76	69	61	65	61	56	53	46	78	66
QV048 WQ048	Cooling Full	79	67	59	54	49	45	39	38	80	58	83	76	65	69	67	62	60	53	84	71
	Heating Full	76	73	59	54	49	49	42	40	78	60	84	75	64	68	65	61	59	51	85	70
	FAN Only	71	58	52	46	40	35	28	25	71	49	80	69	62	64	61	57	53	45	81	66
QV060 WQ060	Cooling Full	80	66	60	55	52	46	42	42	80	59	86	79	69	71	69	63	61	55	87	71
	Heating Full	80	68	61	56	50	47	42	40	81	60	88	79	69	71	68	64	61	55	88	70
		70	58	53	46	42	36	29	26	71	50	83	75	63	66	64	58	55	48	84	66

WQ/QV Sound Power Data - Horizontal

Octave Band Sound Power Levels dBA, re 10-12 Watts																					
Model	Load	Casing Radiated - Horizontal										Ducted Discharge - Horizontal									
		Center Frequency - Hz										Center Frequency - Hz									
		63	125	250	500	1000	2000	4000	8000	Overall	Overall ARI-260:2017 (63Hz-8kHz) (dBA)	63	125	250	500	1000	2000	4000	8000	Overall	Overall ARI-260:2017 (63Hz-8kHz) (dBA)
QV024 WQ024	Cooling Full	75	60	56	52	52	41	35	32	75	56	78	71	63	66	63	55	53	47	80	67
	Heating Full	73	60	55	51	50	44	35	33	74	55	80	71	59	64	60	53	50	43	81	65
	FAN Only	67	53	48	40	39	30	24	24	67	46	76	64	57	59	60	48	43	35	76	62
QV030 WQ030	Cooling Full	76	63	54	53	49	44	38	35	76	56	79	72	64	65	64	58	57	51	80	68
	Heating Full	72	63	55	52	49	44	39	34	72	55	77	73	62	66	63	57	56	50	79	68
	FAN Only	70	55	50	46	44	40	36	30	70	50	77	68	58	61	58	52	49	42	78	63
QV036 WQ036	Cooling Full	81	60	58	55	54	47	41	38	81	59	79	73	66	69	67	61	60	56	81	71
	Heating Full	80	61	61	57	54	48	43	39	80	60	79	74	67	69	67	61	60	56	81	71
	FAN Only	67	54	53	49	45	41	38	32	67	51	74	68	60	64	61	55	53	47	76	65
QV042 WQ042	Cooling Full	75	62	61	59	53	47	42	38	76	60	81	73	66	71	69	64	64	60	82	74
	Heating Full	77	62	60	58	53	49	43	38	77	59	81	73	66	71	69	64	63	60	83	74
	FAN Only	67	54	53	50	48	39	34	28	67	52	75	68	59	65	61	56	55	49	76	66
QV048 WQ048	Cooling Full	78	66	59	54	49	46	40	37	78	58	83	73	65	69	69	61	59	53	84	72
	Heating Full	77	73	60	54	50	48	39	37	79	60	81	73	65	68	68	60	57	50	82	71
	FAN Only	70	56	57	47	39	34	27	25	70	52	77	68	60	65	61	55	52	44	78	66
QV060 WQ060	Cooling Full	82	68	62	58	50	47	41	42	82	60	87	78	70	72	70	65	62	56	88	74
	Heating Full	79	68	64	59	50	47	38	37	80	60	84	77	69	72	69	64	62	56	85	74
	FAN Only	74	60	60	50	44	41	32	28	75	55	79	74	64	67	64	58	54	47	81	68

2.5 LV/SV Series

LV/SV Sound Power Data - Vertical																						
Model	Load	Octave Band Sound Power Levels dBA, re 10-12 Watts																				
		Casing Radiated - Vertical										Ducted Discharge - Vertical										
		Center Frequency - Hz										Center Frequency - Hz										
		63	125	250	500	1000	2000	4000	8000	Overall	Overall (dBA)	63	125	250	500	1000	2000	4000	8000	Overall	Overall (dBA)	
LV007 SV007	Cooling Full	73	58	55	49	45	37	31	29	73	53	82	65	57	58	60	52	53	54	82	64	
	Heating Full	79	59	54	48	45	37	32	34	79	55	84	65	58	58	60	52	52	54	84	65	
	FAN Only	70	57	51	47	43	36	28	26	70	50	72	65	58	58	60	53	53	54	73	64	
LV009 SV009	Cooling Full	74	57	58	49	46	39	32	30	74	54	75	66	61	59	60	53	54	55	76	64	
	Heating Full	72	57	55	48	45	37	31	29	73	52	79	66	61	59	59	53	54	55	79	64	
	FAN Only	67	54	49	46	43	38	31	29	67	49	72	66	61	60	60	54	55	56	74	64	
LV012 SV012	Cooling Full	73	64	58	50	46	40	34	29	74	55	75	68	62	59	60	53	53	54	76	64	
	Heating Full	73	64	61	50	46	39	35	31	74	56	80	70	66	62	61	54	53	55	81	66	
	FAN Only	73	61	55	49	45	39	33	30	73	53	79	70	66	62	62	54	54	56	80	66	
LV015 SV015	Cooling Full	78	60	56	50	47	42	41	38	79	56	79	69	65	63	62	57	56	52	80	67	
	Heating Full	79	62	55	50	46	42	37	35	79	56	80	70	65	63	63	57	57	53	81	68	
	FAN Only	73	58	52	49	45	41	35	31	74	53	75	72	65	63	64	57	57	54	77	68	
LV018 SV018	Cooling Full	83	68	61	52	48	48	38	35	83	61	75	67	61	62	58	54	54	49	76	64	
	Heating Full	79	65	59	52	50	48	46	49	79	59	78	71	61	62	58	53	53	50	79	64	
	FAN Only	66	63	57	49	47	41	36	29	68	54	76	68	61	62	58	54	54	50	77	64	
LV024 SV024	Cooling Full	79	63	57	52	50	45	38	33	79	58	83	76	68	71	70	66	63	58	84	74	
	Heating Full	79	66	58	53	51	44	37	32	79	58	84	75	67	70	70	64	62	56	85	74	
	FAN Only	74	55	52	49	43	39	32	26	74	53	80	71	64	66	64	60	56	49	81	69	
LV030 SV030	Cooling Full	76	60	58	53	51	44	37	32	76	57	80	72	66	70	75	65	62	57	82	77	
	Heating Full	76	65	60	55	52	48	41	36	76	59	76	72	66	71	74	63	61	56	80	76	
	FAN Only	67	53	50	49	42	37	29	25	67	50	75	66	60	65	62	57	54	47	76	67	
LV036 SV036	Cooling Full	80	64	60	56	53	48	40	36	80	60	79	78	69	72	72	67	66	62	83	76	
	Heating Full	74	66	60	56	54	51	43	36	75	60	79	77	69	72	72	67	65	61	82	76	
	FAN Only	69	59	54	51	47	43	34	27	70	53	78	73	64	69	66	62	59	54	80	71	
LV041 SV041	Cooling Full	75	71	62	57	56	50	45	40	77	62	77	75	67	66	65	61	61	59	80	70	
	Heating Full	74	69	62	57	57	51	45	38	76	62	79	80	67	66	66	62	62	60	83	72	
	FAN Only	72	60	59	57	56	51	46	39	73	60	80	73	67	67	67	62	62	61	81	71	
LV042 SV042	Cooling Full	72	62	59	56	54	50	41	37	73	59	80	75	69	72	74	69	68	64	83	77	
	Heating Full	73	62	62	57	54	52	43	39	74	60	81	74	69	71	74	68	67	63	83	77	
	FAN Only	65	55	51	51	47	42	33	26	66	53	74	69	62	67	65	62	60	54	77	70	
LV048 SV048	Cooling Full	77	64	63	59	56	52	45	41	78	62	81	77	70	73	75	69	69	65	84	78	
	Heating Full	74	64	64	60	56	52	45	43	75	62	81	78	70	73	74	68	68	64	84	77	
	FAN Only	68	58	55	52	48	44	39	32	69	54	76	72	64	67	68	63	61	55	78	71	
LV060 SV060	Cooling Full	84	65	61	59	55	51	48	43	84	63	80	78	71	73	75	70	70	66	84	79	
	Heating Full	85	64	61	59	55	51	46	39	86	63	81	77	70	72	74	69	68	65	84	78	
	FAN Only	69	59	56	53	48	44	37	28	70	55	77	73	66	69	67	63	61	56	80	72	
LV070 SV070	Cooling Full	80	67	62	59	54	49	43	37	80	62	85	79	74	73	73	70	67	63	87	78	
	Heating Full	81	68	64	57	53	50	44	39	81	62	86	78	74	73	74	70	67	63	88	78	
	FAN Only	73	65	60	55	53	49	43	37	74	59	86	80	75	74	74	70	68	64	88	79	



Sound ratings for model sizes 007, 009, 012, 015, 018, 041, 070 based on PSC motor option.



Sound ratings for model sizes 024, 030, 036, 042, 048, 060 based on Constant airflow motor option.

LV/SV Sound Power Data - Horizontal																					
Model	Load	Octave Band Sound Power Levels dBA, re 10-12 Watts																			
		Casing Radiated - Horizontal										Ducted Discharge - Horizontal									
		Center Frequency - Hz										Center Frequency - Hz									
		63	125	250	500	1000	2000	4000	8000	Overall	Overall (dBA)	63	125	250	500	1000	2000	4000	8000	Overall	Overall (dBA)
LV007 SV007	Cooling Full	84	55	52	47	46	39	37	35	84	59	84	63	57	56	60	54	54	55	84	65
	Heating Full	85	58	49	47	46	40	37	42	85	60	82	62	55	53	58	53	53	55	82	63
	FAN Only	65	51	47	45	44	37	29	26	65	48	76	62	55	53	58	54	53	54	76	62
LV009 SV009	Cooling Full	86	54	55	47	47	41	38	37	86	61	82	64	61	56	60	55	55	56	82	65
	Heating Full	84	56	50	47	46	40	36	36	84	59	77	63	58	54	57	54	55	56	77	63
	FAN Only	62	48	45	44	44	39	32	29	62	48	76	63	58	55	58	55	55	56	76	63
LV012 SV012	Cooling Full	84	61	55	48	47	42	40	35	84	60	82	66	62	56	60	55	54	55	83	65
	Heating Full	85	62	56	49	47	43	40	38	85	61	78	67	63	57	59	55	54	56	79	64
	FAN Only	67	54	51	47	46	40	34	30	68	51	83	67	63	57	60	55	54	56	84	65
LV015 SV015	Cooling Full	85	58	54	49	48	44	46	44	85	61	86	69	66	62	65	59	58	54	86	69
	Heating Full	88	59	52	50	47	45	40	41	88	63	79	68	64	61	64	59	59	55	80	68
	FAN Only	68	53	51	48	47	42	37	32	68	52	77	71	64	61	65	59	59	56	79	68
LV018 SV018	Cooling Full	93	74	61	56	52	47	40	38	93	68	81	69	63	63	64	57	56	52	82	68
	Heating Full	90	74	62	56	51	46	42	40	90	66	78	71	62	63	62	56	56	53	79	67
	FAN Only	72	65	57	51	50	40	37	29	73	56	76	69	62	62	62	57	57	53	77	66
LV024 SV024	Cooling Full	82	68	63	56	55	44	39	34	82	62	78	73	66	69	71	65	62	56	80	74
	Heating Full	85	66	62	56	56	44	40	33	85	62	79	73	66	69	70	63	61	55	81	73
	FAN Only	66	59	59	51	48	40	34	27	67	54	75	68	62	65	63	59	55	48	76	68
LV030 SV030	Cooling Full	70	72	61	56	55	48	45	36	74	61	76	77	68	71	71	66	63	59	81	74
	Heating Full	72	70	60	57	53	48	47	42	74	61	77	75	67	70	73	64	62	57	81	75
	FAN Only	65	56	55	50	46	39	34	25	66	52	74	70	62	65	62	58	55	48	76	67
LV036 SV036	Cooling Full	80	67	60	57	57	50	43	38	80	62	77	76	69	73	75	69	67	63	82	78
	Heating Full	78	71	62	57	57	50	44	39	79	62	79	76	70	73	74	69	67	62	83	77
	FAN Only	68	56	55	52	49	43	36	29	69	54	73	71	64	68	67	63	60	54	77	71
LV042 SV042	Cooling Full	82	69	64	58	55	51	48	42	82	63	81	75	69	72	72	69	68	64	83	77
	Heating Full	85	76	64	59	55	52	48	45	85	65	81	74	68	71	71	68	67	63	83	76
	FAN Only	67	58	58	52	47	43	39	29	68	55	78	72	65	66	66	63	61	56	80	71
LV048 SV048	Cooling Full	75	65	64	59	54	46	41	40	76	61	79	75	69	73	74	69	69	65	83	78
	Heating Full	77	68	65	59	55	49	42	38	78	62	81	75	69	72	73	69	68	64	83	77
	FAN Only	68	59	58	52	48	41	39	29	69	55	75	70	63	67	66	63	60	54	77	70
LV060 SV060	Cooling Full	85	77	70	61	57	51	47	45	86	67	83	79	73	75	75	71	70	66	86	79
	Heating Full	87	78	70	62	56	52	46	40	88	68	83	79	72	74	75	70	70	66	86	79
	FAN Only	77	68	65	55	49	44	39	31	78	60	77	75	68	69	69	64	63	56	80	73
LV070 SV070	Cooling Full	83	72	67	65	60	53	43	41	83	66	80	81	66	69	70	67	65	61	84	75
	Heating Full	83	74	66	63	61	53	47	43	83	66	79	76	68	69	70	67	65	61	82	75
	FAN Only	76	71	66	64	60	51	42	43	78	66	77	80	68	69	71	68	66	62	83	75

i Sound ratings for model sizes 007, 009, 012, 015, 018, 041, 070 based on PSC motor option.

i Sound ratings for model sizes 024, 030, 036, 042, 048, 060 based on Constant airflow motor option.

2.6 CA Console

CA Sound Power Data										
Model	Load	Octave Band Sound Power Levels dB, re 10-12 Watts								
		Center Frequency - Hz								
		125	250	500	1000	2000	4000	8000	Overall	Overall ARI-260:2001 (100hz-10kHz)
CA009	Cooling Full	65	59	47	43	34	30	28	66	54
CA012	Cooling Full	65	58	52	44	37	33	28	66	55
CA015	Cooling Full	62	61	54	50	43	40	35	65	56
CA018	Cooling Full	70	62	55	51	45	40	34	70	59

2.7 EC Series

EC Sound Power Data																			
Model	Load	Octave Band Sound Power Levels dB, re 10-12 Watts																	
		Ducted Discharge - Vertical									Ducted Discharge - Horizontal								
		Center Frequency - Hz									Center Frequency - Hz								
		125	250	500	1000	2000	4000	8000	Overall	Overall ARI-260:2017 (100Hz-10kHz) (dBA)	125	250	500	1000	2000	4000	8000	Overall	Overall ARI-260:2017 (100Hz-10kHz) (dBA)
EC072	Cooling Full	67	64	64	65	61	56	49	72	68	67	64	64	65	61	56	49	72	68
EC096	Cooling Full	69	66	66	67	63	58	51	74	70	69	66	66	67	63	58	51	74	70
EC120	Cooling Full	74	71	71	72	68	63	56	79	75	67	64	64	65	61	56	49	72	68
EC150	Cooling Full										80	77	77	78	74	69	62	85	81
EC151	Cooling Full	80	77	77	78	74	69	62	85	81									
EC180	Cooling Full										70	67	67	68	64	59	52	75	71
EC181	Cooling Full	85	82	82	83	79	74	67	90	86									
EC210	Cooling Full	75	72	72	73	69	64	57	80	76									
EC240	Cooling Full	76	73	73	74	70	65	58	81	77									
EC242	Cooling Full										76	73	73	74	70	55	58	81	77
EC300	Cooling Full	84	81	81	82	78	73	66	89	85									
EC360	Cooling Full	85	82	82	83	79	74	57	90	86									

2.8 MC Series

MC Sound Power Data													
Model	Selected RPM	Selected Motor HP	Sound Data CFM	Octave Band Sound Power Levels dB, re 10-12 Watts									
				Ducted Discharge									
				Center Frequency - Hz									
				63	125	250	500	1000	2000	4000	8000	Overall	Overall ARI-260:2017 (63Hz-8kHz) (dBA)
360	813	7.5	9,500	94	87	82	85	80	77	72	69	96	86
	949	10	10,000	98	94	88	89	86	83	78	75	100	91
	1,111	15	11,000	101	100	93	92	91	87	82	79	104	95
	1,172	20	12,000	102	102	95	93	92	88	84	80	106	97
480	842	7.5	16,000	95	90	90	88	90	85	82	77	99	93
	1,072	10	15,000	103	103	93	90	89	86	82	76	106	95
	1,111	15	18,000	104	106	95	92	90	88	84	78	109	97
	1,172	20	19,000	105	109	97	93	92	89	86	80	111	99
600	813	7.5	19,000	85	91	86	82	79	75	70	65	94	85
	949	10	19,000	96	92	90	90	91	87	83	78	100	95
	1,034	15	21,000	97	95	92	92	92	89	85	80	102	96
	1,172	20	24,000	99	100	95	95	94	93	88	84	105	99
720	813	7.5	20,000	88	84	87	84	88	80	77	70	94	90
	842	10	22,000	94	88	89	88	87	81	79	75	97	91
	1,072	15	24,000	95	92	93	91	93	88	84	79	100	96
		20	25,000	99	100	95	95	94	93	88	84	105	99

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