

Engineering Data

ED 19100

Group: **WSHP**

Part Number: ED 19100

Date: **November 2009**

Sound Power Ratings – Enfinity™ Model VFC-VFW Vertical Water Source Heat Pumps

Introduction

An exceptional level of Indoor Environmental Quality (IEQ) and personal comfort should be goals for all HVAC designs. Sound quality and the associated sound levels are a few of the many key parameters in measuring personal comfort. To deliver this type of comfort, acoustic consultants may have to be involved for complex and acoustically sensitive applications such as performing arts centers, theaters, and large gathering spaces. However, it is the HVAC designer and the project architect working together who are most likely tasked with creating a comfortable acoustic environment. Given the potentially significant noise contributions from the HVAC system, the HVAC designer must be equipped with specialized tools to help facilitate important acoustic design decisions.

Daikin has developed several tools to assist the design team in evaluating the acoustic performance of HVAC systems. The Application Guide – HVAC Acoustic Fundamentals¹ is a detailed technical reference manual with comprehensive acoustic fundamentals combined with typical HVAC system acoustic analysis guidance. When used in conjunction with Daikin's Acoustic Analyzer™ software and published sound power data from the manufacturer, the design team can estimate the room sound levels. These tools can help to estimate the affect of the HVAC equipment sound levels both in the space and outside of the building. The information generated by the Acoustic Analyzer™ software can help determine if the resulting room sound levels can meet the specifications or if further acoustic attenuation, alternative HVAC equipment or building modifications are necessary.

¹ Daikin Applied Application Guide – HVAC Acoustic Fundamentals, catalog
AG 31-010

System Analysis

Three types of acoustic analyses can be performed with Daikin's Acoustic Analyzer™ software. These include outdoor sound, zoned comfort systems and central systems. This Engineering Document focuses on the Enfinity Vertical Water Source Heat Pump sound power data and the resulting indoor sound levels based on a zoned comfort system. However, the Acoustic Analyzer™ software can be used to evaluate the acoustic performance of the following other system types:

- **Outdoor Sound** – this is used to estimate sound levels at the property line or at an adjacent building. The sound source is typically an air-cooled chiller, rooftop unit or cooling tower.
- **Zoned (Decentralized) Comfort Systems** – this is used to estimate sound levels of indoor equipment that resides in or near the occupied space. These include systems that reside in the occupied space (i.e. console water source heat pumps) and units that are ducted away from or above the occupied space (i.e. horizontal and vertical water source heat pumps). The Acoustic Analyzer™ software takes the room effect, duct breakout, return and discharge air noise, and radiated sound pathways into consideration.
- **Central Systems** – this is used to estimate sound levels from HVAC equipment that serve multiple spaces such as a chilled water air handler with multiple VAV boxes in several zones. This analysis tends to be based on larger equipment with greater sound power levels. The Acoustic Analyzer™ divides central systems into two categories; “Large” for applications with open office spaces and “Defined” for all other

applications. The Acoustic Analyzer™ can perform several acoustic evaluations of a central system, including:

- Supply and return duct sound. A special feature allows the mechanical room to be included in the return air path. This is specifically meant for vertical self-contained systems that often use the mechanical room as the return air plenum.
- Diffuser sound.
- Terminal unit radiated sound.
- Sound transmitted through a wall.
- Sound breakout from any node on the supply or return duct.

The “Zoned (Decentralized) Comfort Systems” analysis should be the basis for evaluating the occupied space sound levels for a water source heat pump system.

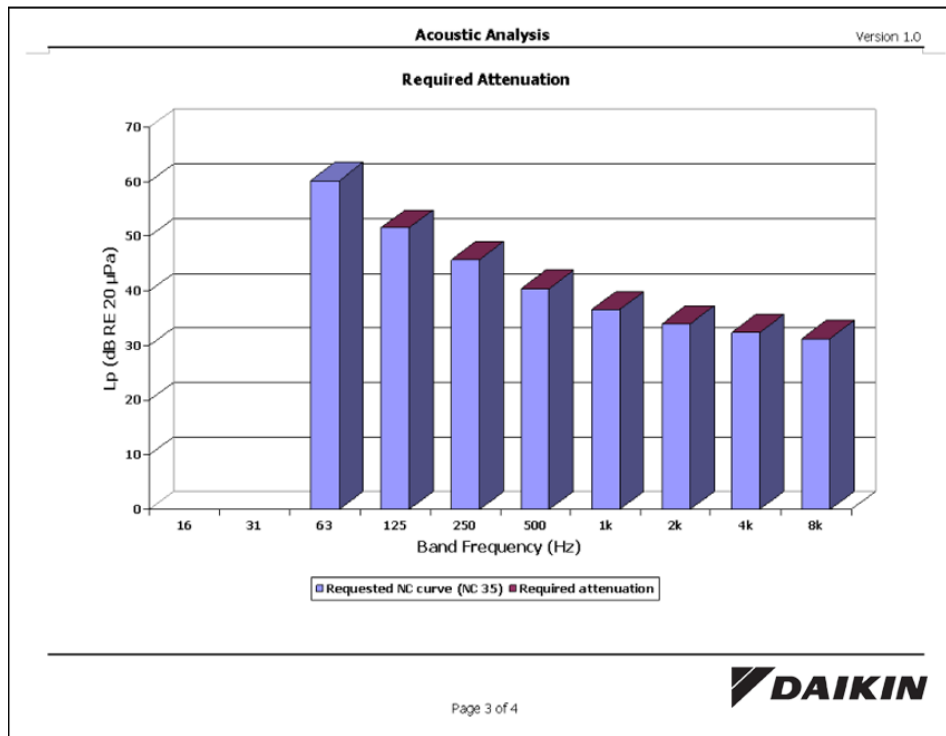
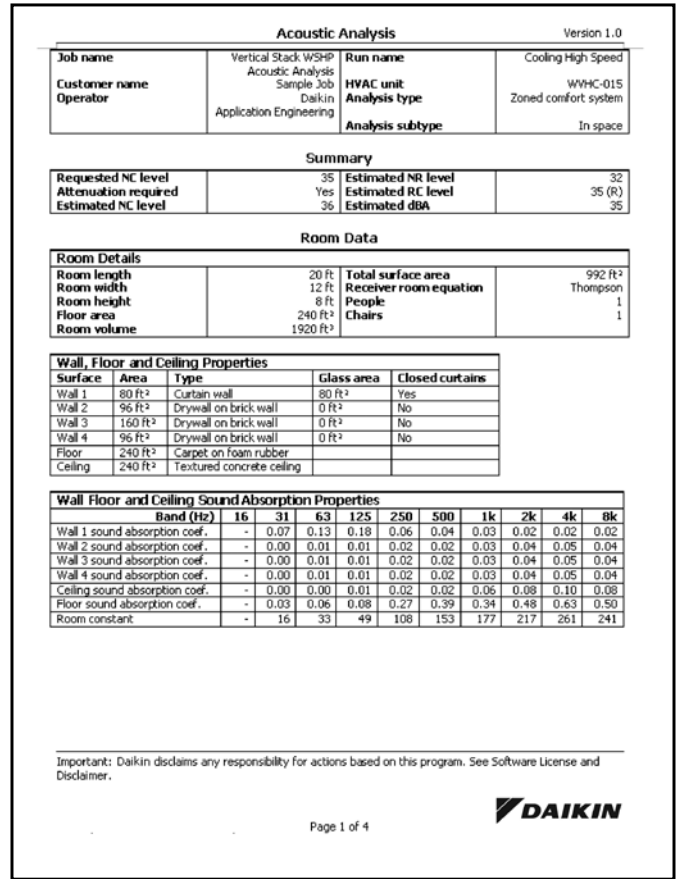
For return air sound power input values, subtract 1 dB from each of the published values for free inlet and case radiated data.

Analysis Summary and Output Reports

To assist the design team in making decisions regarding the proposed system, the Acoustic Analyzer™ provides an easy to follow summary of the calculated results. The summary report provides the basic acoustic analysis information including the room effect calculations, attenuation guidance, and a plot of the resulting sound criteria.

The sound criteria can be determined based on Noise Criteria (NC), Room Criteria (RC) or Noise Rating (NR). An example of the NC evaluation and report is shown in Figure 1.

Figure 1: Examples of the NC Evaluation and Report



Getting a Copy

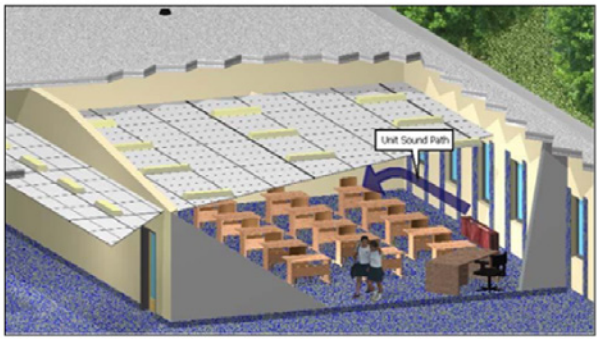
For a demo of the Acoustic Analyzer™ software, please visit www.DaikinApplied.com and follow these simple steps:


1. Click on the Design Tools link from the left side bar
2. Click on the Software link from the drop down list.
3. On the Software page, click on the Acoustic Analyzer™ Software Demo link.

To order a copy of the software, simply contact your local Daikin sales representative. Use the Sales Locator link on the Software page to find the closest Daikin sales Representative near you.

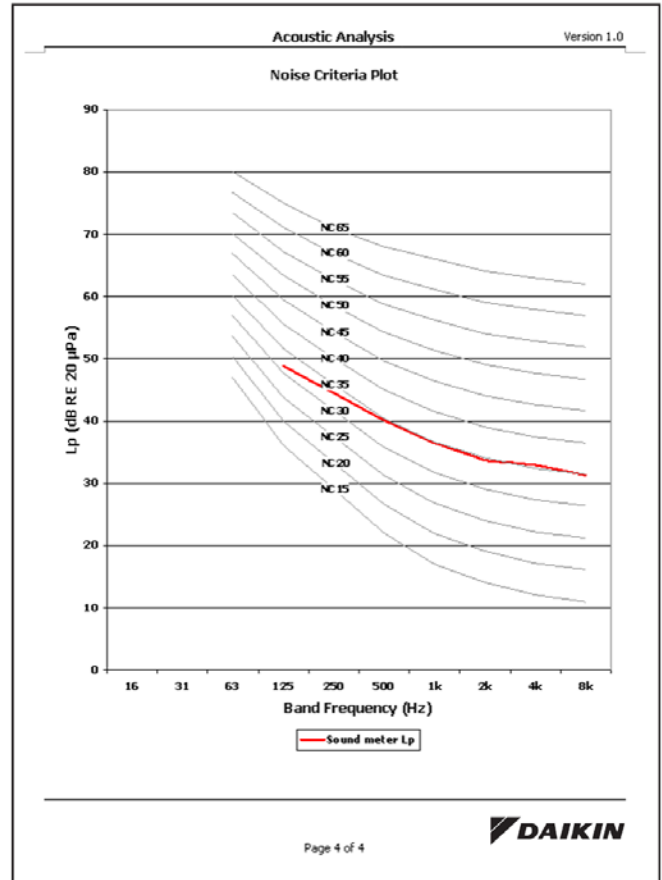
Acoustic Analysis Version 1.0

Acoustic Performance										
Band (Hz)	16	31	63	125	250	500	1k	2k	4k	8k
HVAC unit Lw	-	-	-	51	50	47	44	42	42	40
Room Effect at Room Center, Receiver Measuring Height										
Room effect	-	-3	1	2	6	7	8	8	9	9
Lp (dB RE 20 µPa) - Distance 12 ft										
Sound meter Lp	-	-	-	49	44	40	36	34	33	31
Requested NC curve (NC 35)	-	-	60	52	46	40	37	34	32	31
Required attenuation	-	-	-	0	0	0	0	0	0	0





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Sound Power Fundamentals

What is the Difference between Sound and Noise?

Sound pressure is what causes our ear drums to vibrate and what is captured by a microphone to make an audio recording. “Noise” however, is what many people consider an annoyance, a distraction or even a painful reminder of excessive sound pressure. Noise, simply put, can cause an undesirable affect if not properly managed. However, this noise can create a subtle background sound level that can improve the indoor environmental quality if properly designed into the building.

In HVAC systems, noise can lead to uncomfortable indoor environmental quality. However, this same “noise” if properly controlled or attenuated can enhance the comfort of a building by creating subtle background noise. While other noises both inside and outside of the occupied space can affect the indoor noise levels, the HVAC system designer should strive to ensure that the noise levels produced by the HVAC system are appropriate for the space. To do so, the sound pressure must be determined.

What is 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 (symbol is Pa) or when expressed in decibels (symbol is dB) the term is known as Sound Pressure Level. This pressure is what is measured by a microphone or perceived by our ear drums.

Sound pressure is very much dependent on the acoustic environment where it is measured or heard. As an example, a room with hard surfaces such as hardwood floors, gypsum wall boards and hard ceilings will have a significantly different measured sound pressure from a room with “soft” absorbent surfaces such as carpets, wall hangings and acoustic tile ceilings. Other factors include the effects of reflective surfaces, distance to the receiver or microphone, room surface treatments, the quantity and location of sound absorbing materials, physical barriers, and the influence of other sound sources in the space. All of these influences should be considered when assessing the acoustic performance of an HVAC system in a particular occupied space.

What is Sound Power?

Sound Power, P_{ac} is a measure of the sonic energy over a unit of time for a given sound source emitted by the source in all directions. This represents the acoustic property of the sound source expressed in watts. Sound power expressed in decibels (dB) is known the Sound Power Level, L_w expressed in a very low base level of energy given as 0.00000000001 or 10^{-12} W.

Most important is that sound power is the acoustic “signature” of the particular sound source. This signature is totally independent of any affect that a room might have on the resulting sound pressure measured in that space.

Sound power is determined in a controlled acoustic environment under tightly controlled laboratory conditions. These laboratories can be reverberant or anechoic rooms with sophisticated sound intensity measurement instrumentation. Sound power can vary dramatically under different operating conditions such as fan speed, static pressure, compressor loading and thermal conditions under which the HVAC system is operating. For this reason, sound power is determined in accordance with ARI Sound Standards to ensure uniformity between different manufactures of similar equipment types. All reputable HVAC manufacturers should publish sound power data for their equipment to assist the system designer in assessing the resulting acoustic affect for a given application.

Table 1 provides a comparison between several different sound sources.

Table 1: Sound Power Sources

Situation and Sound Source	Sound Power P_{ac} watts	Sound Power Level L_w dB re 10^{-12} W
Rocket engine	1,000,000 W	180 dB
Turbojet engine	10,000 W	160 dB
Siren	1,000 W	150 dB
Heavy truck engine or loudspeaker rock concert	100 W	140 dB
Machine gun	10 W	130 dB
Jackhammer	1 W	120 dB
Excavator, trumpet	0.3 W	115 dB
Chain saw	0.1 W	110 dB
Helicopter	0.01 W	100 dB
Loud speech	0.001 W	90 dB
Usual talking	10^{-5} W	70 dB
Refrigerator	10^{-7} W	50 dB

What is the difference between Sound Pressure and Sound Power?

Understanding the difference between sound pressure and sound power is very important when assessing the acoustical performance of the HVAC system. As mentioned above, sound power is the acoustic signature of the equipment, while sound pressure is the resulting measure of what your ear will hear. From the sound power data provided by the manufacturer, an acoustic analysis can be performed using software tools such as the Acoustic Analyzer™. Sound power data is entered into the acoustic analysis tool along with the room properties to calculate the resulting room sound pressure level.

Noise Criteria (NC) and Room Criteria (RC)

In order to understand the potential effect of HVAC-related sound on the building occupants, several criteria have been established to rate or measure the sound to determine its acceptability. To do so, an estimate of both the perceived loudness and the sound quality of the noise should be understood. By using the calculated sound pressure level, the Noise Criteria (NC) or Room Criteria (RC) can be used to determine its acceptability depending on the nature of the application and the desired effect. In general, NC is a single-number rating that is somewhat sensitive to the relative loudness and speech interference properties of a given sound spectrum². The RC method is a family of criterion curves and a rating procedure that assesses background noises in spaces, both on the basis of its effect on speech, and on subjective sound quality³. Both criteria have advantages and disadvantages when attempting to characterize HVAC system generated background noise. The HVAC designer should become fully knowledgeable of the assessment criteria and desired outcome before drawing conclusions regarding the suitability of any solution or a given application. In some cases, seeking the advice of a professional acoustical consultant may be necessary to achieve the desired acoustic performance for the application.

Sound Rating Standards

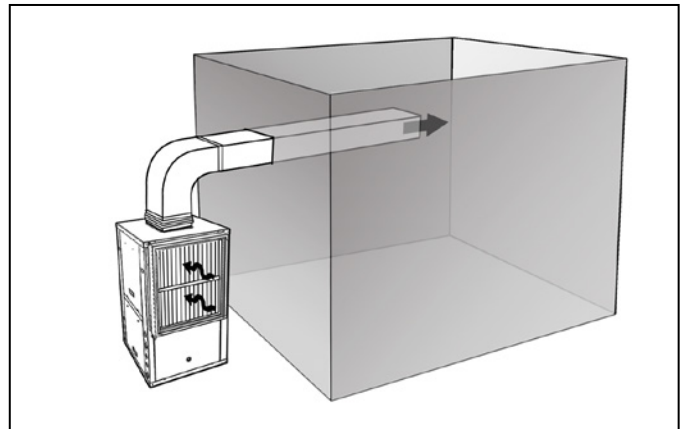
Standard AHRI 260-2001 - Sound Rating of Ducted Air Moving and Conditioning Equipment

Several AHRI standards have been developed to ensure that HVAC manufacturers, who choose to follow the standard, can provide sound power data in accordance documented requirements and recognized industry procedures. The purpose of Standard AHRI 260-2001 is to establish a method of sound rating the indoor portions of ducted air moving and conditioning equipment and to provide definitions; requirements for acquiring mapped sound data; Sound Power Level calculations and ratings; minimum data requirements for published sound ratings; and conformance conditions⁴. As a result, Daikin can provide industry recognized sound power levels to assist HVAC designers in assessing the acoustic performance of the HVAC system.

AHRI 260-2001 has been used to establish the radiated sound power levels for a horizontal or vertical water source heat pump for several different return and discharge air configurations. One of the most common

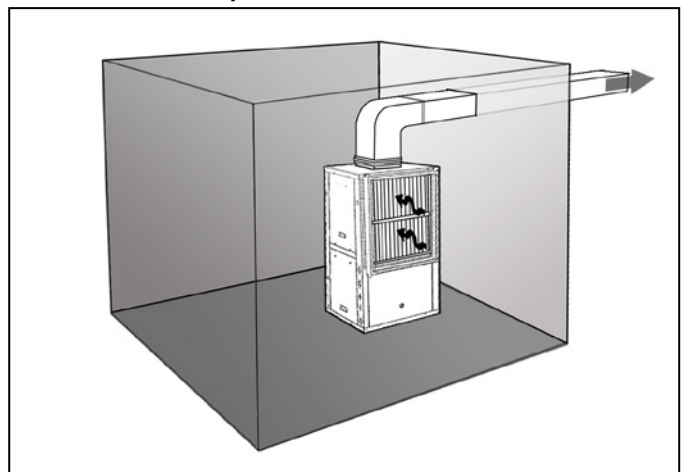
configurations for water source heat pumps is known as the “ducted discharge”. This best represents a typical furred-in application similar to a residential condo, college dormitory or high-rise hotel installation with the return air register located in an adjoining space and where the supply air is ducted into the occupied space. The typical free inlet test setup for ducted discharge arrangements is shown in [Figure 2](#).

Figure 2: Typical Free Inlet Test Set-up for “Ducted Discharge” Applications



Another common configuration has the water source heat pump unit located in a mechanical closet adjacent to the occupied space. A measure of the sound levels inside the mechanical space can be best determined using the free inlet combined with the casing radiated configuration. The test setup for this is shown in [Figure 3](#).

Figure 3: Typical Free Inlet Combined with Casing Radiated Test Set-up



² 2007 ASHRAE Handbook – HVAC Applications, Sound and Vibration Control, “NC: Noise Criteria Method” page 47.31

³ 2007 ASHRAE Handbook – HVAC Applications, Sound and Vibration Control, “RC: Room Criteria Method” page 47.31

⁴ Standard AHRI 260-2001 - Sound Rating of Ducted Air Moving and Conditioning Equipment, Section 1.1 Purpose

Field Installation Guidelines

It is always important to ensure that each unit is installed with the utmost attention to detail. Most importantly, follow the manufacturer's installation instructions! These installation guidelines should be followed to minimum vibration transmission to the building structure and to minimize discharge air and casing radiated sound levels.

Ductwork Attenuation

Suggested duct layout for multiple diffuser application

- All ductwork should conform to industry standards of good practice as described in ASHRAE Systems Guide.
- Ductwork is normally applied to ceiling, closet or floor mounted heat pumps on the discharge of the unit.
- A discharge collar is provided on all models to facilitate ductwork connection. The inclusion of a canvas connector is recommended between the discharge collar and duct transformation (enlargement).
- The heat pump location must allow the incorporation of an elbow, without turning vanes, after the transformation from discharge collar to full trunk duct to interrupt line-of-sight propagation of sound rays. One inch (25mm) acoustic duct lining should extend in both directions for a distance of at least two equivalent duct diameters.
- For maximum attenuation, the last five equivalent duct diameters before each air outlet (register) should be lined with one inch (25mm) acoustic duct liner.
- Elbows, tees or dampers create turbulence and distortion in the airflow. A straight length of 5 to 10 equivalent duct diameters is recommended to smooth out flow before the next fitting or terminal. Take-off of diffuser necks directly from the bottom of a trunk duct produces noise. If utilizing volume control dampers, locate them several equivalent duct diameters upstream from the air outlet.

- For a hotel, motel, dormitory or nursing home application, using a single duct register discharge from one machine, a maximum velocity of 500 to 600 fpm (2.54 to 3.048 m/s) is suggested. These applications involve system static pressures as low as 0.05 inches of water (0.012 kPa) and relatively short duct lengths. Discharge duct must include full lining and a square elbow without turning vanes. Return air for these applications should enter through a low side wall filter-grille and route up the stud space to ceiling plenum. Return air ceiling grilles are not recommended.
- For closet mounted heat pumps with return air through louvered doors, avoid line-of-sight connection between rear of louvers and air inlet to heat pump for maximum sound attenuation. Louver section should be boxed in and lined with one inch (25mm) acoustic material if louver space does not permit a break in line-of-sight transmission.
- Unit must be located on top of a vibration absorbing material such as a rubber (Isolation pad) that is the same size as the base of the unit, to minimize vibration and noise (Figure 4). Alternatively, the unit can have a ducted return air with the opening facing the door and the major access panels facing 90° to the door.

Figure 4: Typical Vertical Unit Closet Installation

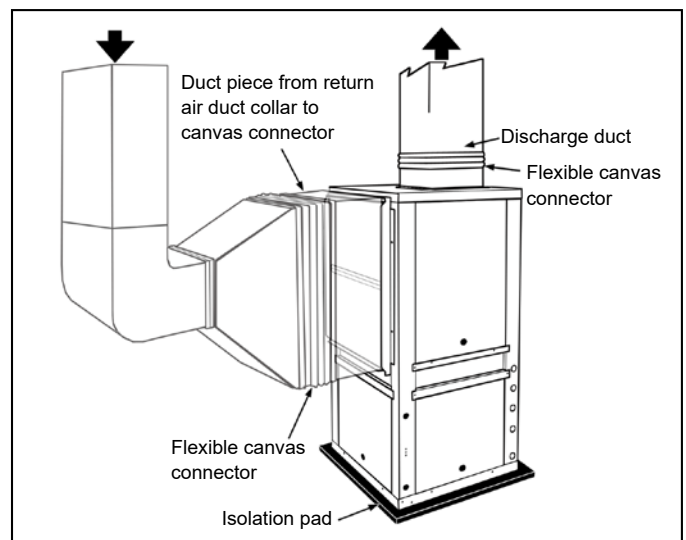


Figure 5: Typical VFC Installation – Closet, Non-Ducted Return



1. Discharge air
2. Acoustic thermal duct lining - 10 feet
3. Low voltage wiring to unit control box
4. Line voltage disconnect
5. Flexible duct collar
6. Louvered closet door
7. Condensate drain
8. Flexible, braided, stainless steel return hose with flow controller/ball valve with port
9. Flexible, braided, stainless steel supply hose with Y-strainer/ball valve with port
10. Access to unit control box
11. LED annunciator lights indicate unit operation status and faults
12. Full vibration isolation pad between unit and floor
13. Minimum distance between return air duct collar and wall for non-ducted return applications
 - Size 009-012 – 5 inches
 - Size 015-024 – 5 inches
 - Size 030-036 – 6 inches
 - Size 042-048 – 8 inches
 - Size 060-070 – 10 inches

AHRI 260-2001 Sound Power Data

Low Cooling Mode, 0.3" External Static Pressure

Table 2: AHRI 260-2001 Sound Data, Low Cooling Mode, 0.3" External Static Pressure

Size	AHRI 260-2001 Sound Data ² , Low Cooling Mode, 0.3" External Static Pressure															
	Radiated, Ducted SA, Ducted RA								Radiated, Ducted SA, Free RA ⁴							
	125	250	500	1000	2000	4000	8000	dB "A"	125	250	500	1000	2000	4000	8000	dB "A"
009	56	55	53	52	46	40	37	56	57	58	56	55	49	45	43	59
012	57	52	51	50	45	40	36	54	58	55	56	53	48	45	41	58
015	63	51	52	48	40	35	29	54	58	50	56	52	47	42	37	57
019	64	50	52	48	41	35	29	54	58	51	56	51	47	42	36	56
024	59	57	58	57	50	46	38	60	60	58	62	59	56	53	48	64
030	59	56	58	56	52	47	42	60	63	60	62	60	59	56	52	66
036	59	57	58	57	54	49	40	61	63	59	62	60	60	57	50	66
042	77	65	61	60	54	49	46	66	75	67	65	63	59	56	51	68
048	66	65	64	63	55	47	41	66	68	68	67	66	59	54	48	69
060	68	64	64	59	55	49	40	65	69	65	66	62	60	55	47	68
070	69	66	65	61	56	51	41	66	70	67	66	63	60	55	48	68
Size	Discharge Into Space ³															
	125	250	500	1000	2000	4000	8000	dB "A"								
009	58	65	56	55	49	44	42	60								
012	57	61	55	53	48	43	40	58								
015	57	55	47	47	44	44	36	53								
019	57	54	47	48	44	44	36	53								
024	60	62	56	59	56	57	51	64								
030	61	63	58	61	58	57	52	65								
036	63	65	56	61	58	57	51	65								
042	74	66	61	64	58	57	48	68								
048	71	71	64	64	58	55	47	68								
060	70	66	63	61	61	59	51	68								
070	71	67	64	62	62	59	50	68								

- Notes:**
1. Cooling and heating conditions per ISO Standard 13256-1 water-loop rating conditions.
 2. Data based on sound measurements made in a reverberant room on representative units.

Table References:

- ² Data is based on rated CFM.
- ³ In accordance with ARI 260-2001, Section 4.5.5 "Free Inlet or Free Discharge".
- ⁴ In accordance with ARI 260-2001, Section 4.5.3 "Free Inlet (or Free Discharge) Combined with Casing Radiated Test"

Cooling Mode, 0.6" External Static Pressure

Table 3: AHRI 260-2001 Sound Data, Cooling Mode, 0.6" External Static Pressure

Size	AHRI 260-2001 Sound Data ² , Cooling Mode, 0.6" External Static Pressure															
	Radiated, Ducted SA, Ducted RA								Radiated, Ducted SA, Free RA ⁴							
	125	250	500	1000	2000	4000	8000	dB "A"	125	250	500	1000	2000	4000	8000	dB "A"
009	58	60	58	58	50	45	40	61	60	62	60	59	52	47	45	63
012	59	56	56	53	48	43	38	58	61	59	60	56	51	48	44	61
015	65	53	55	51	45	39	34	56	60	53	57	55	50	45	40	59
019	67	53	55	51	44	39	33	57	60	54	57	54	50	45	40	59
024	66	59	58	57	51	47	39	61	64	60	62	60	57	54	49	65
030	61	59	60	57	55	51	47	62	66	63	63	62	61	58	54	67
036	62	59	58	58	56	50	42	63	67	61	63	61	61	57	50	67
042	78	67	64	63	56	52	49	68	76	71	67	66	61	58	54	71
048	69	70	66	64	55	48	42	68	71	72	68	66	60	53	49	70
060	69	65	65	60	56	50	41	66	71	67	68	64	61	59	48	70
070	70	67	66	62	57	52	42	67	72	69	68	65	61	59	49	70
Size	Discharge Into Space ³															
	125	250	500	1000	2000	4000	8000	dB "A"								
009	63	71	61	59	52	47	43	66								
012	61	66	60	56	51	47	42	62								
015	61	58	51	52	48	46	39	57								
019	61	57	51	51	48	46	39	56								
024	63	64	57	60	57	58	51	65								
030	65	67	60	64	61	59	53	68								
036	65	68	59	63	59	57	51	67								
042	76	69	64	66	60	59	48	70								
048	73	69	66	64	58	53	46	69								
060	73	69	66	63	63	61	52	70								
070	74	70	67	64	64	61	51	71								

- Notes:**
1. Cooling and heating conditions per ISO Standard 13256-1 water-loop rating conditions.
 2. Data based on sound measurements made in a reverberant room on representative units.

Table References:

- ² Data is based on rated CFM.
- ³ In accordance with ARI 260-2001, Section 4.5.5 "Free Inlet or Free Discharge".
- ⁴ In accordance with ARI 260-2001, Section 4.5.3 "Free Inlet (or Free Discharge) Combined with Casing Radiated Test"

Low Fan Only Mode, 0.3" External Static Pressure

Table 4: AHRI 260-2001 Sound Data, Low Fan Only Mode, 0.3" External Static Pressure

Size	AHRI 260-2001 Sound Data ² , Low Fan Only Mode, 0.3" External Static Pressure															
	Radiated, Ducted SA, Ducted RA								Radiated, Ducted SA, Free RA ⁴							
	125	250	500	1000	2000	4000	8000	dB "A"	125	250	500	1000	2000	4000	8000	dB "A"
009	55	54	53	52	46	39	34	56	57	58	56	54	49	44	41	58
012	57	50	51	49	44	39	32	53	58	55	57	53	47	44	39	58
015	42	46	51	45	39	34	21	51	50	49	53	48	46	41	32	54
019	42	46	50	44	39	34	20	50	49	49	54	48	46	41	32	54
024	50	54	56	55	49	45	36	58	57	57	61	59	56	53	48	64
030	52	54	58	55	52	47	38	60	58	58	61	59	58	54	47	64
036	52	54	57	56	54	49	38	60	59	58	61	60	60	57	49	66
042	74	64	60	60	54	48	43	65	73	66	64	64	59	55	51	68
048	67	65	64	61	53	45	35	65	68	67	67	65	59	53	46	69
060	65	64	62	58	54	49	38	64	68	65	65	61	59	55	46	67
070	66	66	63	60	55	51	39	65	69	67	65	62	59	55	47	67
Size	Discharge Into Space ³															
	125	250	500	1000	2000	4000	8000	dB "A"								
009	57	65	56	55	49	44	41	60								
012	57	61	54	52	47	42	39	57								
015	51	55	46	48	44	44	35	53								
019	51	54	47	48	44	43	35	53								
024	58	61	56	58	55	56	50	63								
030	60	63	57	61	58	57	51	65								
036	63	65	56	60	57	56	50	65								
042	71	66	60	63	57	55	44	66								
048	69	67	64	63	56	53	44	67								
060	69	65	63	61	60	59	50	67								
070	70	66	64	62	61	59	49	68								

- Notes:**
1. Cooling and heating conditions per ISO Standard 13256-1 water-loop rating conditions.
 2. Data based on sound measurements made in a reverberant room on representative units.

Table References:

- ² Data is based on rated CFM.
- ³ In accordance with ARI 260-2001, Section 4.5.5 "Free Inlet or Free Discharge".
- ⁴ In accordance with ARI 260-2001, Section 4.5.3 "Free Inlet (or Free Discharge) Combined with Casing Radiated Test"

High Fan Only Mode, 0.6" External Static Pressure

Table 5: AHRI 260-2001 Sound Data, High Fan Only Mode, 0.6" External Static Pressure

Size	AHRI 260-2001 Sound Data ² , High Fan Only Mode, 0.6" External Static Pressure															
	Radiated, Ducted SA, Ducted RA								Radiated, Ducted SA, Free RA ⁴							
	125	250	500	1000	2000	4000	8000	dB "A"	125	250	500	1000	2000	4000	8000	dB "A"
009	58	59	57	57	50	44	38	60	60	62	59	59	52	47	43	62
012	58	54	55	52	47	42	35	57	61	59	60	56	51	48	44	61
015	45	48	51	46	43	36	24	52	52	53	55	49	48	43	34	56
019	45	49	51	46	42	36	24	51	53	53	55	50	49	43	34	56
024	52	54	56	55	49	45	35	58	59	58	61	59	56	53	47	64
030	54	56	59	56	54	48	39	61	62	61	62	60	60	55	48	66
036	54	56	58	58	55	50	39	62	61	59	62	61	61	56	48	66
042	75	66	62	63	56	51	47	67	76	71	67	67	61	58	54	71
048	71	68	63	63	54	46	38	67	72	72	65	64	58	51	43	69
060	67	65	64	59	55	52	39	65	70	66	67	63	60	61	46	69
070	68	67	65	61	56	54	40	66	71	68	67	64	60	61	47	70
Size	Discharge Into Space ³															
	125	250	500	1000	2000	4000	8000	dB "A"								
009	63	71	61	59	52	47	43	65								
012	61	66	60	56	51	46	41	62								
015	55	56	51	50	47	46	39	55								
019	55	57	50	51	47	46	38	56								
024	60	62	57	59	56	57	49	64								
030	64	66	60	63	60	58	53	67								
036	65	67	59	62	59	57	50	66								
042	73	69	63	65	60	57	46	69								
048	71	71	63	64	57	51	43	68								
060	72	68	65	63	62	63	51	70								
070	73	69	66	64	63	63	50	70								

Notes: 1. Cooling and heating conditions per ISO Standard 13256-1 water-loop rating conditions.
 2. Data based on sound measurements made in a reverberant room on representative units.

Table References:

² Data is based on rated CFM.

³ In accordance with ARI 260-2001, Section 4.5.5 "Free Inlet or Free Discharge".

⁴ In accordance with ARI 260-2001, Section 4.5.3 "Free Inlet (or Free Discharge) Combined with Casing Radiated Test"



Daikin Applied Training and Development

Now that you have made an investment in modern, efficient Daikin equipment, its care should be a high priority. For training information on all Daikin HVAC products, please visit us at www.DaikinApplied.com and click on Training, or call 540-248-9646 and ask for the Training Department.

Warranty

All Daikin equipment is sold pursuant to its standard terms and conditions of sale, including Limited Product Warranty. Consult your local Daikin Applied representative for warranty details. Refer to Form 933-430285Y. To find your local Daikin Applied representative, go to www.DaikinApplied.com.

Aftermarket Services

To find your local parts office, visit www.DaikinApplied.com or call 800-37PARTS (800-377-2787). To find your local service office, visit www.DaikinApplied.com or call 800-432-1342.

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