AHRI Standard 275-2018 (R2023) (SI/I-P)

2018 (Reaffirmed 2023) Standard for

Application of Outdoor Unitary Equipment A-weighted Sound Power Ratings

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ICS Code: 17.140.1

Note:

This standard supersedes ANSI/AHRI Standard 275-2010.
This standard was reaffirmed September 2023.

This version of the standard differs from that of 2010 in the following ways:

- The 2015 Edition of AHRI Standard 270 is now used for the rating.
- Expanded the scope to include the list of the products covered by AHRI Standard 270: Air-source Unitary Heat Pumps, Heat Pump Pool Heaters, Unitary Air-conditioners and Variable Refrigerant Flow (VRF) System.

Note: Although this standard is meant as an application for equipment rated per AHRI Standard 270, other standards that provide rating(s) similar to AHRI Standard 270 may be able to use the methodology, techniques and procedures described within this standard.

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APPLICATION OF OUTDOOR UNITARY EQUIPMENT A-WEIGHTED SOUND POWER RATINGS

Section 1. Purpose

1.1 *Purpose*. The purpose of this standard is to establish for outdoor unitary equipment: definitions, procedures for estimating A-weighted Sound Pressure Levels from the A-weighted Sound Power Ratings, and recommended application practices.

1.1.1 *Intent.* This standard is intended for the guidance of the industry, including manufacturers, engineers, installers, contractors and users.

1.1.2 *Review and Amendment.* This standard is subject to review and amendment as technology advances.

Section 2. Scope

2.1 *Scope*. This standard applies to the outdoor sections of factory-made air-conditioning and heat pump equipment as defined in the following AHRI standards, when rated in accordance with AHRI Standard 270.

2.1.1 AHRI Standard 210/240, *Unitary Air-conditioning and Air-source Heat Pump Equipment;*

2.1.2 AHRI Standard 340/360, *Commercial and Industrial Unitary Air-conditioning and Heat Pump Equipment* (cooling capacity ratings of equal to or less than 40.0 kW);

2.1.3 AHRI Standard 1230, *Variable Refrigerant Flow (VRF) Multi-split Air-conditioning and Heat Pump Equipment* (cooling capacity ratings of equal to or less than 40.0 kW)*;*

2.1.4 ANSI/AHRI Standards 1160 (I-P) and 1161 (SI), *Heat Pump Pool Heaters.*

Section 3. Definitions

All terms in this document will follow the standard industry definitions in the *ASHRAE Terminology* website (https://www.ashrae.org/resources--publications/free-resources/ashrae-terminology) unless otherwise defined in this section.

3.1 *Published Rating.* A statement of the assigned values of those performance characteristics, under stated rating conditions, by which a unit may be chosen to fit its application. These values apply to all units of like nominal size and type (identification) produced by the same manufacturer. As used herein, the term Published Rating includes the rating of all performance characteristics shown on the unit or published in specifications, advertising or other literature controlled by the manufacturer, at stated rating conditions.

3.1.1 *Application Rating.* A rating based on tests performed at application Rating Conditions (other than Standard Rating Conditions).

3.1.2 *Standard Rating.* A rating based on tests performed at Standard Rating Conditions.

3.2 *Rating Conditions*. Any set of operating conditions under which a single level of performance results, and which cause only that level of performance to occur.

3.2.1 *Standard Rating Conditions*. Rating Conditions used as the basis of comparison for performance characteristics.

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3.3 "Shall," "Should," "Recommended," or "It Is Recommended." "Shall," "should," "recommended," or "it is recommended" shall be interpreted as follows:

3.3.1 *Shall*. Where "shall" or "shall not" is used for a provision specified, that provision is mandatory if compliance with the standard is claimed.

3.3.2 *Should, Recommended, or It Is Recommended*. "Should," "recommended," or "it is recommended" is used to indicate provisions which are not mandatory, but which are desirable as good practice.

3.4 *Sound Power*. The rate at which acoustic energy is emitted from a source, expressed in Watts. This quantity is a function of the source only and independent of its surroundings.

3.5 *Sound Power Level, L_w*. Ratio of the Sound Power to a reference of 1 picowatt, expressed in decibels.

3.5.1 *A-weighted Sound Power Level, L_{wA}*. The logarithmic summation of A-weighted, one-third octave band Sound Power Levels. It is used for sound level rating in AHRI Standard 270 (Calculation can refer to AHRI Standard 270 Appendix D).

3.6 *Sound Pressure.* The difference between the pressure produced by an acoustic wave and the ambient air pressure. This quantity is a function of the source, its surroundings and distance to the receiver. It is measured by a microphone and perceived by the human ear.

3.7 *Sound Pressure Level, L_p*. Ratio of the Sound Pressure to a reference of 20 micro pascals, expressed in decibels. The reference of 20 micro pascals is the threshold of human hearing.

3.7.1 *A-weighted Sound Pressure Level L_{pA}* . The measured level obtained with a sound level meter using its A-weighting network or the level as calculated per this standard. The meter shall meet the requirements of ANSI/ASA Standard S1.4 Part 3.

3.8 *Sound Level Rating(s)*. The Sound Power Level(s) of the equipment when rated in accordance with AHRI Standard 270.

3.8.1 *Standard Sound Rating*. The Sound Power Level(s) of the equipment when rated at Standard Rating Conditions in accordance with AHRI Standard 270.

3.8.2 *Application Sound Rating*. The Sound Power Level(s) of the equipment when rated in accordance with AHRI Standard 270 at conditions other than Standard Rating Conditions.

Section 4. Procedure for Estimating A-weighted Sound Pressure Level(s)

4.1 *Introduction.* AHRI Standard 270 establishes a method of rating outdoor equipment in terms of Sound Power Level(s). AHRI Standard 275 provides the methodology for estimating the A-weighted Sound Pressure Level at a given location resulting from outdoor equipment based on A-weighted sound power level obtained via AHRI Standard 270. The application is dependent not only upon the equipment's A-weighted Sound Power Level rating but also upon several significant factors related to the application of the equipment. These factors include equipment location, barrier shielding, sound path, and distance as described in Sections 4.1.1 through 4.1.4 and Tables 1-4. Quantitative values for each of these factors and the equipment's A-weighted Sound Power Level rating are then used to estimate the A-weighted Sound Pressure Level at a given location.

4.1.1 *Equipment Location Factor*. This factor takes into consideration the effect of walls and other reflective surfaces adjacent to the equipment. Factors for typical equipment locations are given in Table 1 and described with Figures 1 through 5.

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