AHRI Standard 300-2025 (SI/I-P)

Sound Rating and Sound Transmission Loss of Packaged Terminal Air-conditioners and Heat Pumps

AIR-CONDITIONING, HEATING, & REFRIGERATION INSTITUTE

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IMPORTANT

SAFETY DISCLAIMER

AHRI does not set safety standards and does not certify or guarantee the safety of any products, components, or systems designed, tested, rated, installed, or operated in accordance with this standard/guideline. It is strongly recommended that products be designed, constructed, assembled, installed, and operated in accordance with nationally recognized safety standards and code requirements appropriate for products covered by this standard/guideline.

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ICS Code: 17.140.01

Note:

This standard supersedes AHRI Standard 300-2015 (R2021).

AHRI CERTIFICATION PROGRAM DISCLAIMER

AHRI standards are developed independently of AHRI Certification activities and can have scopes that include products that are not part of the AHRI Certification Program. The scope of the applicable AHRI Certification Program can be found on the AHRI website at www.ahrinet.org.

Intent

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

Review and Amendment

This standard is subject to review and amendment as technology advances.

2025 Edition

This edition of AHRI Standard 300*, Sound Rating and Sound Transmission Loss of Packaged Terminal Air-conditioners and Heat Pumps*, was prepared by the 300 Standards Work Group and the Airside Standards Technical Committee. The standard was approved by the Standards Committee on 27 February 2025.

Origin and Development of AHRI Standard 300

The initial publication was ARI Standard 300-1988, *Sound Rating and Transmission Loss of Packaged Terminal Equipment*. Subsequent revisions were:

- ARI Standard 300-2000, *Sound Rating and Transmission Loss of Packaged Terminal Equipment*
- ANSI/AHRI Standard 300-2008, *Sound Rating and Transmission Loss of Packaged Terminal Equipment*
- ANSI/AHRI Standard 300-2015, *Sound Rating and Transmission Loss of Packaged Terminal Equipment*
- AHRI Standard 300-2015 (R2021), *Sound Rating and Transmission Loss of Packaged Terminal Equipment*

Summary of Changes

AHRI Standard 300-2025 (SI/I-P) contains the following updates to the previous edition:

- Updated defined terms to harmonize with industry language, including the title of the standard.
- Removed the references to AHRI 1140 and update other references to the new version where necessary.
- Updates to Section 4.2:
    1. Allow for tests to be conducted with both the damper open and or closed
    2. Updated the filler wall requirements

Committee Personnel

300 Standards Work Group

Participant	Interest Category Classification	Voting Member Role	State or Province/ Country
Paul Bauch Johnson Controls, Inc.	Product Manufacturer	Chair	PA, USA
Edgar Duroni Price Industries Inc	Product Manufacturer	Primary	MB, Canada
Dan Int-Hout Nailor Industries	Product Manufacturer	Primary	TX, USA
Jim Kline Intertek	Testing Laboratory	Primary	NY, USA
Stephen Lind Lind Acoustics LLC	Product Manufacturer	Primary	WI, USA
Greg Meeuwsen Trane U.S. Inc.	Product Manufacturer	Primary	WI, USA
Kim Osborn Nortek Air Solutions, LLC	Product Manufacturer	Primary	MO, USA
Richard Phillips GE Appliances, a Haier Company	Product Manufacturer	Primary	KY, USA
Lee Tetu Carrier Corporation	Product Manufacturer	Primary	NY, USA
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Randal Zimmerman Air System Components, Inc.	Product Manufacturer	Alternate for TBD	TX, USA
Maria Woodbury	AHRI Staff Liaison		

300 Standards Work Group Scope:

The 300 SWG is responsible for the revision of AHRI 300-2015 (R2022) with minor modifications to keep the standard current in accordance with ANSI requirements.

Sound Standards Technical Committee

Participant	Interest Category Classification	Voting Member Role	State or Province/ Country
Derrick Knight Trane U.S. Inc.	Product Manufacturer	Chair	WI, USA
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David Winnes Multistack LLC	Product Manufacturer	Primary	WI, USA
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Sound Standards Technical Committee Scope:

The Sound STC is responsible for development and maintenance of standards and guidelines related to sound and vibration of Heating, Ventilation, Air Conditioning, and Refrigeration (HVAC/R) equipment.

Out of scope for this Standards Technical Committee are standards that are not related to sound or vibration performance, including seismic and shipping.

Standards Committee

Company/Organization	Participant	Voting Role
Voting Organizations		
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Daikin Applied Americas Inc.	Henry Ernst, Vice Chair	Primary
A.O. Smith Corporation	Hammam Amaireh	Primary
Bradford White Corp.	Bryan Ahee	Primary
Carrier Corporation	Dominique Taudin	Primary
Copeland	Aditya Sakhalkar	Primary
Danfoss	Justin Prosser	Primary
ebm-papst Inc.	Armin Hauer	Primary
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Lennox International Inc.	Bruce Perkins	Primary
Nailor Industries	Gus Faris	Primary
Rheem Manufacturing Company	Gene Havard	Primary
Swegon North America Inc.	Karl Peterman	Primary
Jerry Yeh		AHRI Staff Liaison

These lists represent the membership at the time the Standards Work Group, Standards Technical Committee, and the Standards Committee were balloted on the final text of this edition. Since that time, changes in the membership may have occurred. Membership on these committees shall not in and of itself constitute an endorsement by the committee members or their employers of any document developed by the committee on which the member serves.

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SOUND RATING AND SOUND TRANSMISSION LOSS OF PACKAGED TERMINAL AIR-CONDITIONERS AND HEAT PUMPS

Section 1. Purpose

This standard establishes definitions, test requirements, rating requirements, minimum data requirements for *published ratings*, conformance conditions, and a method to determine sound transmission loss for *packaged terminal air-conditioners* and *packaged terminal heat pumps*.

Section 2. Scope

This standard applies to the indoor and outdoor sections of factory-made *packaged terminal air-conditioners* and *packaged terminal heat pumps* as described in AHRI 310/380 (CSA-C744).

Section 3. Definitions

All terms in this document shall follow the standard industry definitions in the ASHRAE *Terminology* website unless otherwise defined in Section 3.2. These standard-specific defined terms are italicized throughout the standard.

3.1 Expression of Provisions

Terms that provide clear distinctions between requirements, recommendations, permissions, options, and capabilities.

3.1.1 "Can" or "cannot"

Express an option or capability.

3.1.2 "May"

Signifies a permission expressed by the document.

3.1.3 "Must"

Indication of unavoidable situations and does not mean that an external constraint referred to is a requirement of the document.

3.1.4 "Shall" or "shall not"

Indication of mandatory requirements to strictly conform to the standard and where deviation is not permitted.

3.1.5 "Should" or "should not"

Indication of recommendations rather than requirements. In the negative form, a recommendation is the expression of potential choices or courses of action that is not preferred but not prohibited.

3.2 Standard-Specific Definitions

3.2.1 A-weighted Sound Power Level (L_{wA})

The logarithmic summation of A-weighted, *one-third octave band sound power levels*.

3.2.2 Octave Band

A band of sound covering a range of frequencies such that the highest is twice the lowest.

3.2.3 One-third Octave Band

A band of sound covering a range of frequencies such that the highest frequency is the cube root of two times the lowest.

3.2.4 Outdoor-indoor Transmission Class (OITC)

The A-weighted sound reduction calculated using the equipment sound transmission loss in the range of 80 Hz to 4000 Hz, as measured in accordance with ASTM 1332 using data taken in accordance with test method E90.

3.2.5 Packaged Terminal Air-conditioner

A wall sleeve and a separate unencased combination of heating and cooling assemblies specified by the builder and intended for mounting through the wall that includes a prime source of refrigeration, separable outdoor louvers, forced ventilation, and heating availability by purchaser's choice of at least hot water, and steam or electric resistance heat.

3.2.6 Packaged Terminal Heat Pump

A separate unencased refrigeration system with the same function and configuration as a *packaged terminal air-conditioner* installed in a cabinet that utilizes reverse cycle refrigeration as the prime heat source and has other supplementary heat source availability by purchaser's choice of at least hot water, steam, or electric resistance heat.

3.2.7 Published Rating

A statement of the assigned values of those performance characteristics, under stated *rating conditions*, where a unit can be chosen to fit the application. These values apply to all units of the same nominal size and type (identification) produced by the same manufacturer. This 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*.

3.2.7.1 Application Rating

A rating based on tests performed at *rating conditions* other than *standard rating conditions*.

3.2.7.2 Standard Rating

A rating based on tests performed at *standard rating conditions*.

3.2.8 Rating Conditions

Any set of operating conditions a single level of performance results and causes only that level of performance to occur.

3.2.9 Reference Sound Source (RSS)

A portable, aerodynamic sound source that produces a known stable broadband sound.

3.2.10 Sound Power Level (L_w)

Ten times the logarithm to the base ten of the ratio of the sound power radiated by the source to a reference sound power, expressed in decibels, dB. The reference sound power used in this standard is 1 picowatt, pW.

3.2.11 Sound Transmission Class (STC)

A single-number rating derived from sound transmission loss data in accordance with the method described in ASTM E413 using data taken in accordance with test method E90.

3.2.12 Standard Rating Conditions

Rating conditions used as the basis of comparison for performance characteristics.

Section 4. Test Requirements

4.1 Test Requirements

Unit sound power ratings shall be determined by tests conducted in a reverberation room or using sound intensity as follows:

1) If the reverberation room method is used, L_w for the unit under test shall be determined according to AHRI 220. The reverberation room shall meet the requirements of and be qualified in accordance with AHRI 220. An *RSS* shall be used that meets the performance requirements and is calibrated in accordance with AHRI 250.
2) If the sound intensity method is used, L_w for the unit under test shall be conducted in accordance with AHRI 230.
3) Sound tests for the determination of sound transmission loss shall be conducted in accordance with ASTM E90.
4) Indoor sound power ratings shall be determined in accordance with AHRI 350. Outdoor sound power ratings shall be determined in accordance with AHRI 270.

4.2 Mounting of Equipment for Testing

Equipment shall be mounted in a way that is representative of a design application of the product.

4.2.1 Indoor Sound Rating

The unit shall be mounted in accordance with the provisions of AHRI 350.

4.2.2 Outdoor Sound Rating

The unit shall be mounted to have the minimum protrusion outdoors as recommended by the manufacturer. The unit shall not be recessed.

4.2.3 Sound Transmission Loss

The unit shall be mounted in accordance with the provisions of ASTM E90 with the unit not running. The specimen shall be isolated from the filler wall structure using gaskets and sealant, unless otherwise specified by the manufacturer. The filler wall shall meet all the requirements of Annex A3 of ASTM E90. The filler wall depth shall not exceed the depth of the wall sleeve. This rating shall be calculated using the area of the outside dimensions of that portion of the wall sleeve that penetrates the outer face of the wall. The position of the damper, if equipped, shall be recorded.

Note: Units that use or contain an operable damper can be tested open, closed, or both.

4.3 Electrical Characteristics

Tests shall be performed at the rated voltage(s), phase, and frequency specified on the unit nameplate, and measured at the unit service connection.

4.4 Operation

All components required to produce the *standard rating* cooling capacity under the applicable AHRI standard shall be operated while data is being taken. *Standard rating conditions* (cooling) for the applicable standard shall be maintained.

4.5 Test Method Measurement Reproducibility

Sound power levels, L_w, obtained from either reverberant room or sound intensity methods made in conformance with this standard are expected to result in measurement standard deviations that are equal to or less than those in Table 1. For the reverberation room method, this table represents the uncertainty that can result from using AHRI 220 and an *RSS* calibrated in accordance with AHRI 250. For the sound intensity method, the uncertainties in this table include uncertainty in the sound intensity measurement due to the test environment, background noise levels, and selection of measurement points as defined in AHRI 230. The standard deviations in Table 1 do not account for variations of sound power caused by changes in operating conditions.

Table 1 Reproducibility in the Determination of Non-ducted Equipment Sound Power Levels

Octave Band Center Frequency, Hz	*One-third Octave Band* Center Frequency, Hz	Maximum Standard Deviation of Reproducibility, dB
63	50 to 80	4.0
125	100 to 160	3.0
250	200 to 315	2.0
500 to 4000	400 to 5000	1.5
8000	6300 to 10,000	3.0

Section 5. Rating Requirements

5.1 Introduction

The sound ratings shall be applicable for the complete unit operating. The ratings shall be comprised of the following:

1) Un-weighted *octave band* L_w, dB (125 Hz to 8000 Hz are required, 63 Hz is optional)
2) Overall L_{wA}, dB (100 Hz to 10,000 Hz are required, 50 Hz to 10,000 Hz are optional)
3) *STC*
4) Un-weighted *one-third octave band* L_w, dB (optional)
5) *OITC* (optional)

5.2 Sound Transmission Loss

This standard employs three distinct characterizations for sound transmission loss as follows:

1) *One-third octave band*
2) *STC*
3) *OITC*

5.3 Rating Requirements

Indoor sound ratings shall be determined in accordance with the provisions of AHRI 350. Outdoor sound ratings shall be determined in accordance with the provisions of AHRI 270. *STC* shall be determined in accordance with ASTM E413 using data taken in accordance with test method ASTM E90. *OITC* shall be determined in accordance with ASTM E1332 using data taken in accordance with test method ASTM E90.

5.4 Application Ratings

Application sound ratings for conditions other than standard shall be based upon tests conducted at those conditions.

5.5 Rating Tolerances

Any equipment selected at random and tested in any qualified laboratory in accordance with this standard shall not have a sound rating higher than the equipment's published sound rating, and shall not have *STC* or *OITC* values less than the selected equipment's published *STC* and *OITC* values.

Section 6. Minimum Data Requirements for Published Ratings

As a minimum, *published ratings* shall include all *standard ratings*. All claims to ratings within the scope of this standard shall include the statement "Rated in accordance with AHRI Standard 300". All claims to ratings outside the scope of this standard shall include the statement "Outside the scope of AHRI Standard 300". *Application ratings* within the scope of the standard shall include a statement of the conditions under which the ratings apply.

6.1 Published Ratings

Published sound power ratings shall be for the unit with all components that are necessary to produce the AHRI standard thermal rating running. The sound power ratings shall include Section 6.1(1) and Section 6.1(2). Section 6.1(3) is optional.

1) The un-weighted *octave band* L_w to the nearest decibel from 125 Hz to 8000 Hz (63 Hz is optional).
2) The overall L_{wA} to the nearest decibel covering the range of 100 Hz to 10,000 Hz (or optionally from 50 Hz to 10,000 Hz).
3) Optionally, the un-weighted *one-third octave band* L_w to the nearest 0.1 decibel can be published.

6.2 Published Transmission Loss Ratings

Published transmission loss ratings shall include *one-third octave band* transmission loss data and *STC*.

6.3 Standard Sound Rating

When AHRI *standard rating conditions* have been established for the equipment, a standard sound rating shall be published for the unit operating at those conditions.

6.4 Publishing Requirements

Manufacturer's published literature shall include:

1) Method of sound test (either AHRI 220 or AHRI 230)
2) *Rating conditions* (AHRI 310/380 [CSA-C744] and application rating points)

Section 7. Marking and Nameplate Data

As a minimum, the nameplate shall display the manufacturer's name, model designation, and electrical characteristics.

Nameplate voltages for 60 Hz systems shall include one or more of the equipment nameplate voltage ratings shown in Table 1 of AHRI 110. Nameplate voltages for 50 Hz systems shall include one or more of the utilization voltages shown in Table 1 of IEC 60038.

Section 8. Conformance Conditions

While conformance with this standard is voluntary, conformance shall not be claimed or implied for products or equipment within the standard's Purpose (Section 1) and Scope (Section 2) unless such product claims meet all of the requirements of the standard, and all of the testing and rating requirements are in complete compliance with the standard. Any product that has not met all the requirements of the standard shall not reference, state, or acknowledge the standard in any written, oral, or electronic communication.

APPENDIX A. REFERENCES – NORMATIVE

This appendix lists standards, handbooks, and other publications essential to the development and implementation of the standard. All references in this appendix are part of the standard.

A.1. AHRI Standard 110-2024, *Air-conditioning and Refrigerating Equipment Nameplate Voltage*, 2024, Air-Conditioning, Heating, and Refrigeration Institute, 2311 Wilson Blvd., Suite 400, Arlington, VA 22201, USA.

A.2. AHRI Standard 230-2022, *Sound Intensity Testing Procedures for Determining Sound Power of HVAC Equipment*, 2022, Air-Conditioning, Heating, and Refrigeration Institute, 2311 Wilson Blvd., Suite 400, Arlington, VA 22201, USA.

A.3. AHRI Standard 270-2015 with Addendum 1, *Sound Rating of Outdoor Unitary Equipment*, 2016, Air-Conditioning, Heating, and Refrigeration Institute, 2311 Wilson Blvd., Suite 400, Arlington, VA 22201, USA.

A.4. AHRI/CSA Standard 310/380-2017 (CSA-C744-17), *Packaged Terminal Air-conditioners and Heat Pumps*, 2017, Air-Conditioning, Heating, and Refrigeration Institute, 2311 Wilson Blvd., Suite 400, Arlington, VA 22201, USA.

A.5. AHRI Standard 350-2015 (R2021), *Sound Rating of Non-ducted Indoor Air-conditioning Equipment*, 2021, Air-Conditioning, Heating, and Refrigeration Institute, 2021, 2311 Wilson Blvd., Suite 400, Arlington, VA 22201, USA.

A.6. ANSI/AHRI Standard 220-2022, *Reverberation Room Qualification and Testing Procedures for Determining Sound Power of HVAC Equipment*, 2022, Air-Conditioning, Heating, and Refrigeration Institute, 2311 Wilson Blvd., Suite 400, Arlington, VA 22201, USA.

A.7. ANSI/AHRI Standard 250-2022, *Performance and Calibration of Reference Sound Sources Equipment*, 2022, Air-Conditioning, Heating, and Refrigeration Institute, 2311 Wilson Blvd., Suite 400, Arlington, VA 22201, USA.

A.8. ASHRAE Terminology. ASHRAE. Accessed November 15, 2023. https://www.ashrae.org/technical-resources/free-resources/ashrae-terminology.

A.9. ASTM E90-09(2016), *Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements*, 2016, ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, USA.

A.10. ASTM E413-22, *Classification for Rating Sound Insulation,* 2022, ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, USA.

A.11. ASTM E1332-22 *Standard Classification for Rating Outdoor-Indoor Sound Attenuation*, 2022, ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, USA.

A.12. IEC 60038, *IEC Standard Voltages*, 2002, International Electrotechnical Commission, 3 rue de Varembe, P.O. Box 131, CH 1211 Geneva 20, Switzerland.

APPENDIX B. REFERENCES – INFORMATIVE

This appendix lists standards, handbooks and other publications that can provide useful information and background but are not essential for the use of this standard. All references in this appendix are not part of the standard.

None.