

2001 STANDARD for

SOUND RATING OF DUCTED AIR MOVING AND CONDITIONING EQUIPMENT



AIR-CONDITIONING &
REFRIGERATION
INSTITUTE

Standard 260

IMPORTANT

SAFETY RECOMMENDATIONS

It is strongly recommended that the product be designed, constructed, assembled and installed in accordance with nationally recognized safety requirements appropriate for products covered by this standard.

ARI, as a manufacturers' trade association, uses its best efforts to develop standards employing state-of-the-art and accepted industry practices. However, ARI does not certify or guarantee safety of any products or systems designed, tested, rated, installed or operated in accordance with these standards or that any tests conducted under its standards will be non-hazardous or free from risk.

Note:

This is a new standard.

Foreword:

Ducted Equipment must be sound rated in relation to its various individual Sound Components to describe it acoustically and to provide the necessary information for predicting application sound levels. This standard addresses the sound rating of these various Sound Components. Ducted air-conditioning equipment can have ducted discharge, ducted inlet, free inlet (or free discharge) combined with casing radiated, or casing radiated Sound Components depending on its specific manufactured configuration.

All Sound Components are acoustically described/rated by utilizing a "Mapped" Sound Rating approach that is typically referenced to the product's supply fan operating map. The supply fan is contained in the Base Unit of the product. In addition, this standard defines an approach to account for and add the acoustical effects of product Appurtenances (such as modulation devices or inlet/discharge plenums) and Other Sound Sources (such as the refrigeration circuit, exhaust fans, etc.) to the Base Unit Mapped Sound Rating. Thus, Mapped Sound Ratings can be developed for a given product configuration and each of its various Sound Components.

All ducted product Sound Components are rated utilizing a Reverberation Room Technique, modeled after AMCA Standard 300. Reverberation room tests are conducted using a Comparison Method and a Reference Sound Source calibrated in accordance with ARI Standard 250.

Sound ratings are in the form of Octave Band Sound Power Levels (dB) from 125 to 8,000 Hz derived from One-Third Octave Band (dB) measurements for the various product Sound Components. Sound ratings may be provided for the 63 Hz Octave Band if the reverberation room has been qualified in accordance with ARI Standard 280.

A listing of current ARI Sound Standards is located in Appendix C.

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SOUND RATING OF DUCTED AIR MOVING AND CONDITIONING EQUIPMENT

Section 1. Purpose

1.1 Purpose. The purpose of this standard 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 conditions.

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 all ducted air moving and conditioning equipment containing fans as defined in Section 3 of this standard.

Examples of such equipment when ducted are:

- a. Unitary Air-Conditioners, as defined in ARI Standard 210/240 and ARI Standard 340/360
- b. ARI-Source Unitary Heat Pumps, as defined in ARI Standard 340/360
- c. Water-Source Heat Pumps, as defined in ISO 13256-1
- d. Fan-Coil Air-Conditioners, as defined in ARI Standard 440
- e. Central-Station Air-Handling Units, as defined in ARI Standard 430

2.2 Exclusions. This standard does not apply to:

- a. Air Control and Distribution Devices, which are covered by ARI Standard 880
- b. Packaged Terminal Air-Conditioners, which are covered by ANSI/ARI Standard 300
- c. Outdoor sound from outdoor portions of Ducted Equipment that would be covered under ARI Standards 270 and 370
- d. The sound radiated from ductwork attached to the fan and/or equipment when such ductwork is not offered by the manufacturer as a standard part of the equipment
- e. The casing (base pan) radiated sound

component for rooftop or down draft products

Section 3. Definitions

All terms in this document shall follow the standard industry definitions established in the current edition of *ASHRAE Terminology of Heating, Ventilation, Air-Conditioning and Refrigeration*, unless otherwise defined in this section.

3.1 Acoustic Test Duct. The duct used to convey the sound of the unit configuration under test to the reverberation room during a ducted discharge or the ducted inlet sound component test. A Duct End Correction (*E*) must be added to the sound data measured in the reverberation room to account for the presence of an open-ended duct terminating in the reverberation room.

3.2 Acoustic Test Duct Elbow. An elbow added to the Acoustic Test Duct during a reverberation room test to facilitate testing. An adjustment must be made (in addition to the Duct End Correction) to the sound data to account for the presence of the Acoustic Test Duct Elbow. Appendix D of this standard defines the Atkins sound attenuation adjustments.

3.3 Base Unit. A factory-made encased assembly consisting of one or more fans meant to be connected to a duct and other necessary equipment to perform one or more of the functions of circulating, cleaning, heating, cooling, humidifying, and mixing of air, but which does not always include a source of heating or cooling.

3.3.1 Appurtenance. An addition to a Base Unit for purposes of control, isolation, safety, static pressure regain, wear etc.

Examples of Appurtenances include:

- a. Coil(s)
 1. Cooling coil
 2. Cooling and dehumidifying coil
 3. Water spray (wetted coil)
 4. Heating coil
- b. Electric heater(s)
- c. Air filter
- d. Dampers
- e. Moisture eliminator
- f. Fan-motor drive
- g. Gas heat exchangers
- h. Inlet or discharge plenums
- i. Modulating devices in the fan inlet/discharge