

ANSI/AMCA Standard 300-14

Reverberant Room Method for Sound Testing of Fans

An American National Standard
Approved by ANSI on August 14, 2014



**AIR MOVEMENT AND CONTROL
ASSOCIATION INTERNATIONAL INC.**

The International Authority on Air System Components

ANSI/AMCA Standard 300-14

Reverberant Room Methods for Sound Testing of Fans



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AMCA Publications

Authority	AMCA Standard 300-14 was adopted by the membership of the Air Movement and Control Association International Inc. on August 21, 2014. It was approved by the American National Standards Institute on August 14, 2014.
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Related AMCA Documents

Related Publications	AMCA Publication 302	<i>Application of Sone Loudness Ratings for Non-Ducted Air Moving Devices</i>
	AMCA Publication 303	<i>Application of Sound Power Level Ratings for Fans</i>
	AMCA Publication 311	<i>Certified Ratings Program — Product Rating Manual for Fan Sound Performance</i>
Related Standards	ANSI/AMCA Standard 301	<i>Methods for Calculating Fan Sound Ratings from Laboratory Test Data</i>
	ANSI/AMCA Standard 320	<i>Laboratory Methods of Sound Testing of Fans Using Sound Intensity</i>

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Reverberant Room Method For Sound Testing of Fans

1. Purpose

This standard establishes a method of determining the sound power levels of a fan. It was originally developed in response to the need for a reliable and accurate method of determining the sound power levels of fan equipment.

2. Scope

This standard applies to fans of all types and sizes. It is limited to the determination of airborne sound emission for the specified setups. Vibration is not measured, nor is the sensitivity of airborne sound emission to vibration effects determined.

The size of a fan that can be tested in accordance with this standard is limited only by the practical aspects of the test setups. Dimensional limitations, test subject dimensions, and air performance will control the test room size, power and mounting requirements for the test subject.

The test setup requirements in this standard establish the laboratory conditions necessary for a successful test. Rarely will it be possible to meet these requirements in a field situation. This standard is not intended for field measurements.

3. Definitions/Units of Measure/Symbols

3.1 Definitions

3.1.1 Blade passage frequency (BPF)

The frequency of fan impeller blades passing a single fixed object, per the following formula:

$$BPF = (\text{number of blades})(\text{fan rotational speed, rev/min})/60, \text{ in Hz.}$$

3.1.2 Chamber

An enclosure used to regulate airflow and absorb sound; it may also conform to air test chamber conditions given in ANSI/AMCA Standard 210 [1].

3.1.3 Decibel (dB)

A dimensionless unit of level in logarithmic terms for expressing the ratio of a power or power-like quantity to a similar reference quantity (see Sections 3.1.13 and 3.1.14).

3.1.4 Ducted fan

A fan having a duct connected to either its inlet, its outlet or to both.

3.1.5 End reflection

A phenomenon that occurs whenever sound is transmitted across an abrupt change in area, such as at the end of a duct in a room. When end reflection occurs, some of the sound entering the room is reflected back into the duct and does not escape into the room.

3.1.6 Frequency

The number of times in one second that a periodic function repeats itself.

3.1.7 Informative

A term that indicates that the referenced material is provided as advice to the reader but does not constitute a mandatory requirement.

3.1.8 Non-ducted fan

A fan without ducts connected to its inlet and outlet.

3.1.9 Normative

A term that indicates that the referenced material, if applied, constitutes a mandatory requirement.

3.1.10 Octave band

The interval between any two frequencies having a ratio of two. Fan sound power levels are reported in eight standardized octave bands, shown in Table 2. Fan sound power levels may also be reported in one-third octave bands, also shown in Table 2.

3.1.11 Reverberant room

An enclosure meeting the requirements of Annex A or Annex A and B.

3.1.12 Shall and should

The word “shall” is to be understood as mandatory; the word “should” is to be understood as advisory.

3.1.13 Sound power level

Expressed in decibels (dB), the value of 10 times the logarithm (base 10) of the ratio of the sound power W to the reference sound power W_{ref} , according to:

$$L_W, \text{ in dB} = 10 \log_{10} (W/W_{\text{ref}}) \quad \text{Eq. 3.2-1}$$

3.1.14 Sound pressure level

Expressed in decibels (dB), the value of 20 times the logarithm (base 10) of the ratio of the sound pressure p to the reference sound pressure p_{ref} , according to:

$$L_p, \text{ in dB} = 20 \log_{10} (p/p_{\text{ref}}) \quad \text{Eq. 3.2-2}$$