

# **ANSI/AMCA Standard 204-05 (R2012)**

## **Balance Quality and Vibration Levels for Fans**

An American National Standard  
Approved by ANSI on March 28, 2012



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

The International Authority on Air System Components

# ANSI/AMCA Standard 204-05 (R2012)

## Balance Quality and Vibration Levels for Fans

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Air Movement and Control Association International  
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Arlington Heights, Illinois  
60004

## AMCA Publications

### Authority

This edition of ANSI/AMCA Standard 204 was adopted by the membership of the Air Movement and Control Association International, Inc., on 03 August 2003. It was reaffirmed by the Air Movement Division and approved as an American National Standard on March 28, 2012.

This standard addresses the need of both the users and manufacturers of fans for technically accurate but uncomplicated information of the subjects of fan balance precision and vibration levels. The data presented herein is referenced to applicable national and international standards and is in harmony with these standards, including ISO 14694:2003, Industrial fans - Specification for balance quality and vibration levels. Information from the reference standards is supplemented by years of experience on the part of committee members and from other contributors in the industry.

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Related Publications	AMCA Publication 11	<i>Certified Ratings Program - Operating Manual</i>
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	AMCA Publication 211	<i>Certified Ratings Program - Air Performance</i>
Related Standards	ANSI/AMCA Standard 210	<i>Laboratory Methods of Testing Fans for Aerodynamic Performance Rating</i>

## Contents

<b>1. Purpose and Scope</b>	<b>1</b>
1.1 Purpose	1
1.2 Scope	1
<b>2. Normative References</b>	<b>1</b>
<b>3. Definitions / Units of Measure / Symbols</b>	<b>1</b>
3.1 Definitions	1
3.2 Units of measure	3
3.3 Symbols	3
<b>4. Application Categories</b>	<b>4</b>
<b>5. Balancing</b>	<b>4</b>
5.1 Balance quality grade	5
5.2 Permissible residual unbalance	5
<b>6. Vibration</b>	<b>5</b>
6.1 Measurement requirements	5
6.2 Fan support system	9
6.3 Factory tests	9
6.4 Vibration limits for operation in-situ	9
<b>7. Other Rotating Components</b>	<b>9</b>
<b>8. Documentation</b>	<b>10</b>
8.1 Balance	10
8.2 Vibration	10
<b>Annex A SI / I-P Conversion Table (Informative)</b>	<b>11</b>
<b>Annex B Relationships (Informative)</b>	<b>12</b>
<b>Annex C Maximum Permissible Residual Imbalance (Informative)</b>	<b>14</b>
<b>Annex D Instruments and Calibration (Informative)</b>	<b>16</b>
D.1 Instruments	16
D.2 Calibration	16
<b>Annex E References (Informative)</b>	<b>17</b>



# Balance Quality and Vibration Levels for Fans

## 1. Purpose and Scope

This standard addresses the subjects of fan balance and vibration. It is part of a series of standards and publications listed in Annex E that cover important aspects related to the design, manufacture and use of fans.

Other standards exist that deal with the vibration of machines in general. This standard considers only fans. Vibration is recognized to be an important parameter regarding the mechanical operation of fans. Balance quality is a precondition to satisfactory mechanical operation.

### 1.1 Purpose

The purpose of this standard is to define appropriate fan balance quality and operating vibration levels to individuals who specify, manufacture, use, and maintain fans.

### 1.2 Scope

This standard covers fans with rigid rotors, generally found in commercial heating, ventilating and air conditioning; industrial process applications; mine/tunnel ventilation applications, and power generation applications. Other applications are not specifically excluded, except as follows:

Excluded are installations that involve severe forces, impacts, or extreme temperature acting on the fan.

Fan foundations and installation practices are beyond the scope of this standard. Foundation design and fan installation are not normally the responsibilities of the fan manufacturer. It is fully expected that the foundation upon which the fan is mounted will provide the support and stability necessary to meet the vibration criteria of the fan as it is delivered from the factory.

Other factors such as impeller cleanliness, aerodynamic conditions, background vibration, operation at rotational speeds other than those agreed upon, and maintenance of the fan affect fan vibration level but are beyond the scope of this standard.

This standard is intended to cover only the balance or vibration of the fan and does not take into account the effect of fan vibration on personnel, equipment, or processes.

Any or all portions of this standard, or modifications thereof, are subject to agreement between the concerned parties.

## 2. Normative References

The following standards contain provisions that, through specific reference in this text, constitute provisions of this American National Standard. At the time of publication of this standard the editions indicated were valid.

All standards are subject to revision, and parties to agreements based on this American National Standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed below.

[1] **ANSI S2.7-1982 (R1997)**

*Balancing Terminology*

American National Standards Institute

11 West 42nd Street, New York, NY 10035 U.S.A

[2] **ISO 1925:2001**

*Mechanical Vibration – Balancing Vocabulary*

International Organization for Standardization

1 Rue de Varembe, Case Oistake 56, Ch-1211, Geneve 20, SWITZERLAND

[3] **ANSI S2.19-1989 (R1997)**

*Balance Quality of Rigid Rotating Bodies* (ISO 1940)

American National Standards Institute,

11 West 42<sup>nd</sup> Street, New York, NY 10035 U.S.A.

## 3. Definitions / Units of Measure / Symbols

### 3.1 Definitions

#### 3.1.1 Balancing

The process of adding or removing mass in a plane or planes on a rotor in order to move the center of gravity towards the axis of rotation.

#### 3.1.2 Balance quality grade

The recommended limits for residual unbalance of a rotor based upon the intended application. (Note: Commonly used balance quality grades in ANSI S2.19 refer to the vibration that would result if the rotor operated in free space, i.e., Balance Quality Grade G6.3 corresponds to a shaft vibration of 6.3 mm/s velocity, at the operating rotational speed of the rotor). The value represents the product of the unbalance multiplied by the angular velocity and divided by the weight of the rotor.

#### 3.1.3 Displacement

The distance that a body moves from a stationary or neutral position.