STANDARD

ANSI/AMCA Standard 204-20

Balance Quality and Vibration Levels for Fans

An American National Standard
Approved by ANSI on March 19, 2020

Air Movement and Control Association International

AMCA Corporate Headquarters
30 W. University Drive, Arlington Heights, IL 60004-1893, USA
communications@amca.org ▪ Ph: +1-847-394-0150 ▪ www.amca.org

© 2020 AMCA International, Inc.

ANSI/AMCA Standard 204-20

Balance Quality and Vibration Levels for Fans

Air Movement and Control Association International
30 West University Drive
Arlington Heights, Illinois
60004

AMCA Publications

Authority ANSI/AMCA Standard 204 was adopted by the membership of the Air Movement and Control Association International Inc. on March 13, 2020. It was approved as an American National Standard on March 19, 2020.

Copyright © 2005 by the Air Movement and Control Association International Inc.

All rights reserved. Reproduction or translation of any part of this work beyond that permitted by Sections 107 and 108 of the United States Copyright Act without the permission of the copyright owner is unlawful. Requests for permission or further information should be addressed to the executive director, Air Movement and Control Association International Inc. at 30 West University Drive, Arlington Heights, IL 60004-1893, U.S.A.

Objections The Air Movement and Control Association (AMCA) International Inc. will consider and take action upon all written complaints regarding its standards, certification programs or interpretations thereof. For information on procedures for submitting and handling complaints, write to:

AMCA International
30 West University Drive
Arlington Heights, IL 60004-1893
U.S.A.

European AMCA
Avenue des Arts, numéro 46
à Bruxelles (1000 Bruxelles)

Asia AMCA Sdn Bhd
No. 7, Jalan SiLC 1/6,
Kawasan Perindustrian SiLC Nusajaya,
Mukim Jelutong, 79200 Nusajaya, Johor
Malaysia

Disclaimer AMCA uses its best efforts to produce publications for the benefit of the industry and the public in light of available information and accepted industry practices. However, AMCA does not guarantee, certify or assure the safety or performance of any products, components or systems tested, designed, installed or operated in accordance with AMCA publications or that any tests conducted under its publications will be non-hazardous or free from risk.

Review Committee

Larry West	Chair	Howden North America Inc.
Chaitanya Johar	Member	AAON
David Hustvedt	Member	AcoustiFLO LLC
Murat Pilge	Member	Cvsair - CVS Havalandirma A.S.
Andrew Guinta	Member	Daltec Process Fans
Marcel Kamutzki	Non-Voting Member	Daltec Process Fans
Ang Kheng Tiong Nicholas	Member	Dong Guan Wolter Chemco Ventilation Ltd
Armin Hauer	Non-Voting Member	ebm-papst Inc.
Kenneth Kuntz	Member	Greenheck
Sameh Ezzat	Member	hammam industries&co.
David DeKold	Member	Hartzell Air Movement
Brad Skidmore	Member	Loren Cook Company
Anujkumar Pandey	Member	Maico Gulf LLC
Abhijit Rajendra Bhosale	Non-Voting Member	Nehmeh (NOVOVENT HVAC SOLUTIONS)
Aron Reid	Member	New York Blower
Kim G. Osborn	Non-Voting Member	Nortek Air Solutions
Brian Graybill	Member	Nortek Air Solutions, LLC
Neal Boyd	Member	Northern Blower Inc.
Timur Suleymanov	Member	Phoenix Manufacturing
Jerry Xiong	Non-Voting Member	S&P USA Ventilation Systems, LLC
Jaime Yeh	Member	Twin City Fan Companies, Ltd.
Yongning Chen	Member	Zhejiang Yilida Ventilator Co., Ltd
Tim Orris	AMCA Staff Liaison	AMCA International, Inc.

Contents

1. Purpose **1**

2. Scope **1**

3. Normative References **1**

4. Definitions/Symbols **2**
4.1 Definitions 2
4.2 Symbols 5

5. Units of Measure **5**

6. Application Categories **5**

7. Balancing **6**
7.1 Balance quality grades 6
7.2 Permissible residual unbalance 7

8. Vibration **8**
8.1 Measurement requirements 8
8.2 Fan support system 12
8.3 Factory tests 12
8.4 Vibration limits for operation in situ 12

9. Other Rotating Components **13**

10. Documentation **14**
10.1 Balance 14
10.2 Vibration 14

Annex A SI/I-P Converion Table (Informative) **15**

Annex B Relationships (Informative) **16**

Annex C Maximum Permissable Residual Imbalance (Informative) **19**

Annex D Instruments & Calibration (Informative) **21**
D.1 Instruments 21
D.2 Calibration 21

Annex E Digital Overall Vibration Calculation (Informative) **22**

Annex F References (Informative) **23**

Balance Quality and Vibration Levels for Fans

1. Purpose

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

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

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.

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:

- Installations that involve severe forces, impacts or extreme temperatures acting on the fan are excluded.
- Fan foundations and installation practices are beyond this standard's scope. Foundation design and fan installation are not normally the fan manufacturer's responsibility. 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-is from the factory.
- Other factors, such as impeller cleanliness, aerodynamic conditions, background vibration, operation at rotational speeds other than those agreed upon and fan maintenance, affect fan vibration levels but are beyond this standard's scope.
- This standard is intended to cover only the fan's balance or vibration and does not consider 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.

3. Normative References

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

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

ISO 21940-2:2017, Mechanical vibration — Rotor balancing — Part 2: Vocabulary
ISO 21940-11:2016, Mechanical vibration — Rotor balancing — Part 11: Procedures and tolerances for rotors with rigid behavior
ISO 21940-21:2012, Mechanical vibration — Rotor balancing — Part 21: Description and evaluation of balancing machines