ANSI/AMCA Publication 240-06

Laboratory Methods of Testing Positive Pressure Ventilators for Aerodynamic Performance Rating

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AIR MOVEMENT AND CONTROL ASSOCIATION INTERNATIONAL, INC.

The International Authority on Air System Components

ANSI/AMCA STANDARD 240-06

Laboratory Methods of Testing Positive Pressure Ventilators for Aerodynamic Performance Rating

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Foreword

Prior to the original publication of this standard in 1996, positive pressure ventilators (PPV's) were tested to ANSI/AMCA 210 [1]. The scope of ANSI/AMCA 210, however, includes only air moving devices designed with the impeller enclosed within a shroud or housing. Due to variations in the design of PPV's, some could be tested to ANSI/AMCA 210 while others could not. In 1992, the Air Movement and Control Association International, Inc. (AMCA) set out to develop a single method of test applicable to all PPV's by creating the AMCA 240 Draft Committee.

The test method devised by the committee is substantially the same as the outlet chamber test setup described in ANSI/AMCA 210. The principal difference between ANSI/AMCA 210 and ANSI/AMCA 240 is that in ANSI/AMCA 210, the outlet of the test unit is either mounted directly to the test chamber or connected to a duct that is mounted on the test chamber. In ANSI/AMCA 240, the test unit discharge is directed toward a doorway-sized opening into the test chamber. This setup approximates a real-world application of the equipment, and also accounts for entrained airflow.

ANSI/AMCA 240 is a special case of ANSI/AMCA 210, and therefore, a sizeable portion of the standard originates in ANSI/AMCA 210. This latest edition replaces many sections of text with reference to the parent standard in an effort to simplify the standard by emphasizing differences over similarities.

Authority

This publication was approved by the AMCA International membership on 14 October, 2004. It was approved as an American National Standard and became effective on 17 April, 2006.

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Laboratory Methods of Testing Positive Pressure Ventilators for Aerodynamic Performance Rating

1. Purpose and Scope

This standard establishes a uniform method of laboratory testing for the determination of the aerodynamic performance of a positive pressure ventilator (PPV) in terms of airflow rate, pressure, air density and rotational speed, for performance rating or guarantee purposes.

It is not the purpose of this standard to specify a testing procedure for the design, production, or field test of any PPV, or to serve as a manual for the construction, validation, or calibration of the test facility.

This standard may be used as the basis for the test of a PPV when air is used as the test gas. Each test shall be limited to one PPV per test.

A PPV tested according to this standard shall be free standing, without a ductwork connection to the test chamber, and thereby allowing for the measurement of entrained airflow.

Any item of equipment designed or intended for applications other than positive pressure ventilation is not within the scope of this standard.

The parties to a test for guarantee purposes may agree in writing on exceptions to this standard prior to the test. However, only a test that does not violate the mandatory requirements of this standard shall be designated as a test conducted in accordance with this standard.

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, 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.

ANSI/AMCA 210-99 *Laboratory Methods of Testing Fans for Aerodynamic Performance Rating*, Air Movement and Control Association International, Inc., 30. W. University Drive, Arlington Heights, IL 60004-1893 U.S.A., 1999

3. Definitions / Units of Measure / Symbols

3.1 Definitions

For the purposes of this standard, the following definitions apply: All other definitions shall conform to ANSI/AMCA 210, Section 3.

3.1.1 Positive pressure ventilator (PPV). A portable fan that can be positioned relative to an opening of an enclosure and cause it to be positively pressurized by discharge air velocity. It is principally used by firefighters to mitigate the effect of smoke and is also used to assist in inflating hot air balloons. (AMCA 99-0068)

3.1.2 Motor. A drive device other than an internal combustion engine, such as an electric motor, water turbine, hydraulic motor, air motor, and similar devices

3.1.3 Engine. A drive device which produces power through internal combustion and which uses a fuel such as gasoline.

3.1.4 PPV Position. The point representing a PPV position in three-dimensional space is taken as the intersection between the PPV axial centerline and the plane, perpendicular to the centerline, that contains the PPV center of the PPV impeller hub. All measurements pertaining to the PPV must be referenced to this point.

3.1.5 Setback. The horizontal distance between the PPV position and the opening to the test chamber, within a vertical plane perpendicular to the plane defined by the chamber opening.

3.1.6 Height. The vertical distance between the PPV position and the flat, horizontal surface on which the PPV is situated.

3.1.7 Tilt. The angle between the PPV axial centerline and the horizontal plane.

3.1.8 PPV Speed. The rotational speed of the PPV impeller.