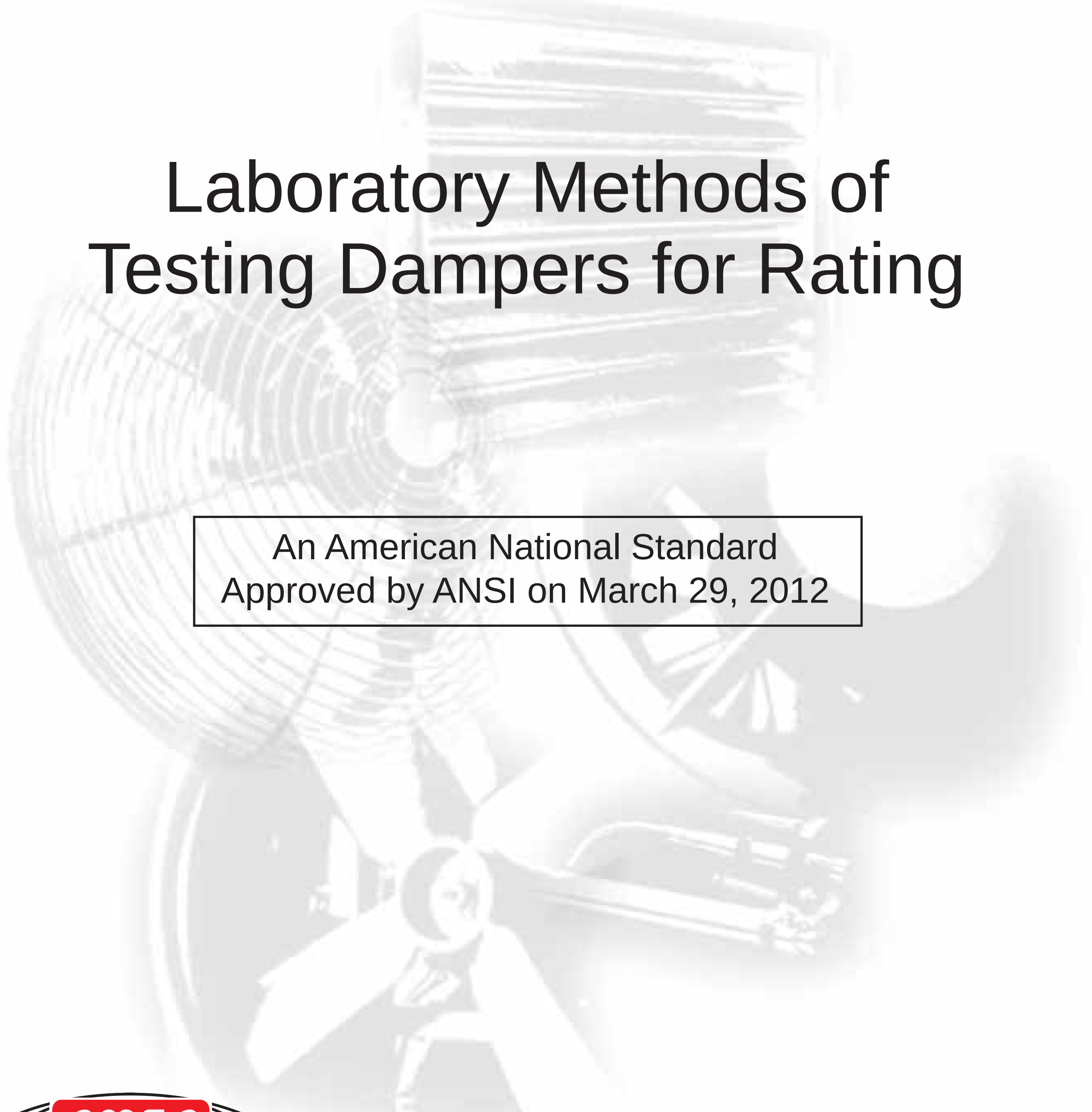
ANSI/AMCA Standard 500-D-12



Laboratory Methods of Testing Dampers for Rating

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AIR MOVEMENT AND CONTROL ASSOCIATION INTERNATIONAL, INC.

The International Authority on Air System Components

ANSI/AMCA Standard 500-D-12

Laboratory Methods of Testing Dampers for Rating

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AMCA Publications

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Related AMCA Documents

Related Publications	AMCA Publication 502	*Damper Application Manual for Heating, Ventilation, and Air-Conditioning*
	AMCA Publication 503	*Fire, Ceiling (Radiation), Smoke, and Fire/Smoke Damper Application Manual*
	AMCA Publication 511	*Certified Ratings Program - Product Rating Manual for Air Control Devices*

Related Standards	ANSI/AMCA Standard 510	*Methods of Testing Heavy Duty Dampers for Rating*
	ANSI/AMCA Standard 520	*Laboratory Methods for Testing Actuators*

Contents

Laboratory Methods of Testing Dampers for Rating

1. Purpose

The purpose of this standard is to establish uniform laboratory test methods for dampers. The characteristics to be determined include, as appropriate, air leakage, pressure drop, dynamic closure, and operational torque.

It is not the purpose of this standard to specify the testing procedures to be used for design, production, or field testing. Similarly, it is not the purpose of this standard to indicate or establish minimum or maximum performance ratings to be used for specifying these products.

2. Scope

This standard may be used as a basis for testing dampers when air is used as the test gas.

A test conducted in accordance with the requirements of this standard is intended to demonstrate the performance of a damper and is not intended to determine acceptability level for a damper. It is not within the scope of this standard to indicate the actual sequence of testing.

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

For more information on damper modulating control characteristics, see Annex C.

3. Definitions / Units of Measurement / Symbols

3.1 Definitions

3.1.1 Damper
A device mounted in a duct or opening which is used to vary the volume of air flowing through the duct or opening. It may be operated manually or mechanically and may have one or more blades.

3.1.1.1 Single blade damper
A damper having one blade.

3.1.1.2 Multi-blade damper
A damper having more than one blade. The damper is a parallel blade damper if the blades rotate in the same direction; and an opposed blade damper if adjacent blades rotate in opposite directions.

3.1.1.3 Curtain damper
A damper which uses a folded, interlocked series of blades.

3.1.1.4 Backdraft damper (shutter)
A backdraft damper is a damper which, when mounted in a duct or opening, permits the flow of air in one direction only. It is normally opened by the energy of the air stream, but may be opened and/or closed by mechanical means. A counter-balanced backdraft damper has weights and/or springs added to the blade or blades to facilitate or impede the opening or closing action.

3.1.2 Air control damper
A mechanical device which does not fit the definition of a damper and which when placed in a duct or opening is used to regulate airflow.

3.1.3 Free area
The minimum area through which air can pass. It is determined by multiplying the sum of the minimum distances between intermediate blades, top blade and head and bottom blade and sill, by the minimum distance between jambs. The percent of free area is the free area thus calculated, divided by the gross area of the air control damper × 100. See damper cross-sections (Figure 1).

3.1.3.1 Free area velocity
Airflow through a damper divided by its free area.

3.1.4 Face area
The total cross-sectional area of a damper, duct or wall opening.

3.1.4.1 Face area velocity
Airflow through a damper divided by its face area.

3.1.5 Psychrometrics

3.1.5.1 Dry-bulb temperature (t_d)
Dry-bulb temperature is the air temperature measured by a dry temperature sensor.

3.1.5.2 Wet-bulb temperature (t_w)
Wet-bulb temperature is the temperature measured by a temperature sensor covered by a water-moistened wick and exposed to air in motion. When properly measured, it is a close approximation of the temperature of adiabatic saturation.

3.1.5.3 Total temperature (t_t)
The temperature which exists by virtue of the internal and