ANSI/ASHRAE Standard 120-2008 (Supersedes ANSI/ASHRAE Standard 120-1999)





# Method of Testing to Determine Flow Resistance of HVAC Ducts and Fittings

Approved by the ASHRAE Standards Committee on June 21, 2008; by the ASHRAE Board of Directors on June 25, 2008; and by the American National Standards Institute on June 26, 2008.

ASHRAE Standards are scheduled to be updated on a five-year cycle; the date following the standard number is the year of ASHRAE Board of Directors approval. The latest copies may be purchased from ASHRAE Customer Service, 1791 Tullie Circle, NE, Atlanta, GA 30329-2305. E-mail: orders@ashrae.org. Fax: 404-321-5478. Telephone: 404-636-8400 (worldwide) or toll free 1-800-527-4723 (for orders in US and Canada).

© Copyright 2008 ASHRAE

ISSN 1041-2336



American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.

1791 Tullie Circle NE, Atlanta, GA 30329 www.ashrae.org

## ASHRAE Standard Project Committee 120 Cognizant TC: TC 5.2, Duct Design SPLS Liaison: Robert G. Baker

Herman F. Behls, *Chair\** Bass Abushakra\* W. David Bevirt Patrick J. Brooks\* Richard A. Evans Kevin J. Gebke\* Jason D. King\* Marvin A. Koerber Thomas E. Ponder\* Gerald W. Sadler Clifford D. Smith

\*Denotes members of voting status when the document was approved for publication.

## **ASHRAE STANDARDS COMMITTEE 2007–2008**

Stephen D. Kennedy, Chair Nadar R. Jayaraman Hugh F. Crowther, Vice-Chair Byron W. Jones Robert G. Baker Jay A. Kohler Michael F. Beda James D. Lutz Donald L. Brandt Carol E. Marriott Steven T. Bushby R. Michael Martin Paul W. Cabot Merle F. McBride Kenneth W. Cooper Frank Myers Samuel D. Cummings, Jr. H. Michael Newman K. William Dean Lawrence J. Schoen Robert G. Doerr Bodh R. Subherwal Roger L. Hedrick Jerry W. White, Jr. Eli P. Howard, III Bjarne W. Olesen, BOD ExO Frank E. Jakob Lynn G. Bellenger, CO Claire B. Ramspeck, Assistant Director of Technology for Standards and Special Projects

# SPECIAL NOTE

This American National Standard (ANS) is a national voluntary consensus standard developed under the auspices of the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE). *Consensus* is defined by the American National Standards Institute (ANSI), of which ASHRAE is a member and which has approved this standard as an ANS, as "substantial agreement reached by directly and materially affected interest categories. This signifies the concurrence of more than a simple majority, but not necessarily unanimity. Consensus requires that all views and objections be considered, and that an effort be made toward their resolution." Compliance with this standard is voluntary until and unless a legal jurisdiction makes compliance mandatory through legislation.

ASHRAE obtains consensus through participation of its national and international members, associated societies, and public review.

ASHRAE Standards are prepared by a Project Committee appointed specifically for the purpose of writing the Standard. The Project Committee Chair and Vice-Chair must be members of ASHRAE; while other committee members may or may not be ASHRAE members, all must be technically qualified in the subject area of the Standard. Every effort is made to balance the concerned interests on all Project Committees.

The Assistant Director of Technology for Standards and Special Projects of ASHRAE should be contacted for:

- a. interpretation of the contents of this Standard,
- b. participation in the next review of the Standard,
- c. offering constructive criticism for improving the Standard, or
- d. permission to reprint portions of the Standard.

#### DISCLAIMER

ASHRAE uses its best efforts to promulgate Standards and Guidelines for the benefit of the public in light of available information and accepted industry practices. However, ASHRAE does not guarantee, certify, or assure the safety or performance of any products, components, or systems tested, installed, or operated in accordance with ASHRAE's Standards or Guidelines or that any tests conducted under its Standards or Guidelines will be nonhazardous or free from risk.

## ASHRAE INDUSTRIAL ADVERTISING POLICY ON STANDARDS

ASHRAE Standards and Guidelines are established to assist industry and the public by offering a uniform method of testing for rating purposes, by suggesting safe practices in designing and installing equipment, by providing proper definitions of this equipment, and by providing other information that may serve to guide the industry. The creation of ASHRAE Standards and Guidelines is determined by the need for them, and conformance to them is completely voluntary.

In referring to this Standard or Guideline and in marking of equipment and in advertising, no claim shall be made, either stated or implied, that the product has been approved by ASHRAE.

## CONTENTS

# ANSI/ASHRAE Standard 120-2008 Method of Testing to Determine Flow Resistance of HVAC Ducts and Fittings

SECTION	PAGE
Foreword	2
1 Purpose	2
2 Scope	2
3 Definitions, Symbols, and Subscripts	2
4 Compliance Requirements	3
5 Applicability	3
6 Instruments	3
7 Flow-Measuring Systems and Test Setups	9
8 Observations and Conduct of Test	18
9 Calculations	19
10 Test Results and Report	23
11 References	23
Informative Annex A: Error Analysis	23
Informative Annex B: Calibration	24
Informative Annex C: Time-Weighted Average	25
Informative Annex D: Leakage Measurement	26
Informative Annex E: Flexible Duct Test Setup Guide	29
Informative Annex F: Example Test Systems	30
Informative Annex G: Tables of Nozzle/Orifice Discharge Coefficients and Expansion Factors	33
Informative Annex H: Example Calculations	37
Informative Annex I: Estimating Procedures for Experimental Data	62
Informative Annex J: Bibliography	62

## NOTE

When addenda, interpretations, or errata to this standard have been approved, they can be downloaded free of charge from the ASHRAE Web site at www.ashrae.org.

© Copyright 2008 American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. 1791 Tullie Circle NE Atlanta, GA 30329 www.ashrae.org All rights reserved.