

AN AMERICAN NATIONAL STANDARD

Measurement Uncertainty for Fluid Flow in Closed Conduits

ANSI/ASME MFC-2M-1983

SPONSORED AND PUBLISHED BY

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

United Engineering Center 345 East 47th Street New York, N. Y. 10017

Date of Issuance: August 31, 1984

This Standard will be revised when the Society approves the issuance of a new edition. There will be no addenda or written interpretations of the requirements of this Standard issued to this Edition.

This code or standard was developed under procedures accredited as meeting the criteria for American National Standards. The Consensus Committee that approved the code or standard was balanced to assure that individuals from competent and concerned interests have had an opportunity to participate. The proposed code or standard was made available for public review and comment which provides an opportunity for additional public input from industry, academia, regulatory agencies, and the public-at-large.

ASME does not "approve," "rate," or "endorse" any item, construction, proprietary device, or activity.

ASME does not take any position with respect to the validity of any patent rights asserted in connection with any items mentioned in this document, and does not undertake to insure anyone utilizing a standard against liability for infringement of any applicable Letters Patent, nor assume any such liability. Users of a code or standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, is entirely their own responsibility.

Participation by federal agency representative(s) or person(s) affiliated with industry is not to be interpreted as government or industry endorsement of this code or standard.

ASME does not accept any responsibility for interpretations of this document made by individual volunteers.

No part of this document may be reproduced in any form,
in an electronic retrieval system or otherwise,
without the prior written permission of the publisher.

Copyright © 1984 by
THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS
All Rights Reserved
Printed in U.S.A.

FOREWORD

(This Foreword is not part of American National Standard, Measurement Uncertainty for Fluid Flow in Closed Conduits, ANSI/ASME MFC-2M-1983.)

This Standard was prepared by Subcommittee 1 of the American Society of Mechanical Engineers Standards Committee on Measurement of Fluid Flow in Closed Conduits.

The methodology is consistent with that described in:

Joint Army, Navy, NASA, Air Force Propulsion Committee (JANNAF). ICRPG Handbook for Estimating the Uncertainty in Measurements Made with Liquid Propellant Rocket Engine Systems. CPIA Publication 180. AD 851127. Available from NTIS, 5285 Port Royal Road, Springfield, VA 22161.

U.S. Dept. of the Air Force. Arnold Engineering Development Center. Handbook: Uncertainty in Gas Turbine Measurements. USAF AEDC-TR-73-5. AD 755356. Available from NTIS, 5285 Port Royal Road, Springfield, VA 22161.

The Committee is indebted to the many engineers and statisticians who contributed to this work. Most noteworthy are J. Rosenblatt and H. Ku of the National Bureau of Standards for their helpful discussions and comments. The measurement uncertainty model is based on recommendations by the National Bureau of Standards. D. R. Keyser suggested the alternate model and other changes. B. Ringhiser programmed the Monte Carlo simulations for uncertainty intervals and outliers. Encouragement and constructive criticism were provided by:

G. Adams, *Chairman*, The Society of Automotive Engineers, Committee E33C, USAF, WPAFB, ASD
R. P. Benedict, *Chairman*, The American Society of Mechanical Engineers, Committee PTC19.1, Westinghouse
J. W. Thompson, Jr., ARO, Inc.
R. H. Dieck, Pratt & Whitney Aircraft
J. Ascough, National Gas Turbine Establishment, Great Britain
C. P. Kittredge, Consulting Engineer
R. W. Miller, Foxboro Co.

This Standard was approved by the ASME Standards Committee on Measurement of Fluid Flow in Closed Conduits and subsequently adopted as an American National Standard on March 17, 1983.