IEEE

American National Standard for Radiation Protection Instrumentation Test and Calibration— Air Monitoring Instruments

N323C

Accredited by the American National Standards Institute

Sponsored by the
National Committee on Radiation Instrumentation, N42

IEEE
3 Park Avenue
New York, NY 10016-5997, USA

6 November 2009

ANSI N323C-2009

Documents
Document Sharing Hub

Authorized licensed use limited to: Tsinghua University. Downloaded on February 27,2026 at 02:13:32 UTC from IEEE Xplore. Restrictions apply.

Full document details: IEEE N323C - American National Standard for Radiation Protection Instrumentation Test and Calibration - Air Monitoring Instruments

Documents
Document Sharing Hub
Authorized licensed use limited to: Tsinghua University. Downloaded on February 27,2026 at 02:13:32 UTC from IEEE Xplore. Restrictions apply.
Full document details: IEEE N323C - American National Standard for Radiation Protection Instrumentation Test and Calibration - Air Monitoring Instruments

American National Standard for Radiation Protection Instrumentation Test and Calibration— Air Monitoring Instruments

Sponsor
National Committee on Radiation Instrumentation, N42

Accredited by the
American National Standards Institute

Secretariat
Institute of Electrical and Electronics Engineers, Inc.

Approved 21 May 2009
American National Standards Institute

Documents
Document Sharing Hub

Authorized licensed use limited to: Tsinghua University. Downloaded on February 27,2026 at 02:13:32 UTC from IEEE Xplore. Restrictions apply.

Full document details: IEEE N323C - American National Standard for Radiation Protection Instrumentation Test and Calibration - Air Monitoring Instruments

Abstract: Test and calibration requirements for air monitoring instruments used for the detection and measurement of airborne radioactive substances are established.
Keywords: calibration, radioactive air monitoring, tests

The Institute of Electrical and Electronics Engineers, Inc.
3 Park Avenue, New York, NY 10016-5997, USA

Copyright © 2009 by the Institute of Electrical and Electronics Engineers, Inc.
All rights reserved. Published 6 November 2009. Printed in the United States of America.

IEEE is a registered trademark in the U.S. Patent & Trademark Office, owned by the Institute of Electrical and Electronics Engineers, Incorporated.

PDF: ISBN 978-0-7381-6110-5 STD95993
Print: ISBN 978-0-7381-6111-2 STDPD95993

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

Documents
Document Sharing Hub

Authorized licensed use limited to: Tsinghua University. Downloaded on February 27,2026 at 02:13:32 UTC from IEEE Xplore. Restrictions apply.

Full document details: IEEE N323C - American National Standard for Radiation Protection Instrumentation Test and Calibration - Air Monitoring Instruments

TERMS OF USE

Please Read Carefully

The Institute of Electrical and Electronics Engineers, Inc., ("IEEE") owns the copyright to this Document in all forms of media. Copyright of the text retrieved, displayed, or output from this Document is owned by IEEE and is protected by the copyright laws of the United States and by international treaties. The IEEE reserves all rights not expressly granted to the user.

Except as allowed by the copyright laws of the United States of America, applicable international treaties, or any license or agreement the user or the user's employer may have entered into with the IEEE or one of its authorized distributors, the user may not copy and/or distribute copies of this Document, nor significant portions of the document, in any form, nor may the user post this document on any intranet, website, or database without prior written permission from the IEEE.

Permission and/or requests for licenses should be directed to:

IEEE Standards Association
Standards Licensing and Contracts
stds.ipr@ieee.org
+1-732-562-6397

or in writing:

IEEE Standards Association
Standards Licensing and Contracts
445 Hoes Lane
Piscataway, NJ 08854

Authorized licensed use limited to: Tsinghua University. Downloaded on February 27,2026 at 02:13:32 UTC from IEEE Xplore. Restrictions apply.

Full document details: IEEE N323C - American National Standard for Radiation Protection Instrumentation Test and Calibration - Air Monitoring Instruments

American National Standard

An American National Standard implies a consensus of those substantially concerned with its scope and provisions. An American National Standard is intended as a guide to aid the manufacturer, the consumer, and the general public. The existence of an American National Standard does not in any respect preclude anyone, whether he has approved the standard or not, from manufacturing, marketing, purchasing, or using products, processes, or procedures not conforming to the standard. American National Standards are subject to periodic reviews and users are cautioned to obtain the latest editions.

CAUTION NOTICE: This American National Standard may be revised or withdrawn at any time. The procedures of the American National Standards Institute require that action be taken to affirm, revise, or withdraw this standard no later than five years from the date of publication. Purchasers of American National Standards may receive current information on all standards by calling or writing the American National Standards Institute.

Authorization to photocopy portions of any individual standard for internal or personal use is granted by the Institute of Electrical and Electronics Engineers, Inc., provided that the appropriate fee is paid to Copyright Clearance Center. To arrange for payment of licensing fee, please contact Copyright Clearance Center, Customer Service, 222 Rosewood Drive, Danvers, MA 01923 USA; +1-978-750-8400. Permission to photocopy portions of any individual standard for educational classroom use can also be obtained through the Copyright Clearance Center.

Documents
Document Sharing Hub

Authorized licensed use limited to: Tsinghua University. Downloaded on February 27,2026 at 02:13:32 UTC from IEEE Xplore. Restrictions apply.

Full document details: IEEE N323C - American National Standard for Radiation Protection Instrumentation Test and Calibration - Air Monitoring Instruments

Introduction

This introduction is not part of ANSI N323C-2009, American National Standard for Radiation Protection Instrumentation Test and Calibration—Air Monitoring Instruments.

This standard is the responsibility of the Accredited American Standards Committee on Radiation Instrumentation, N42. The standard was approved by N42 letter ballot.

Notice to users

Laws and regulations

Users of these documents should consult all applicable laws and regulations. Compliance with the provisions of this standard does not imply compliance to any applicable regulatory requirements. Implementers of the standard are responsible for observing or referring to the applicable regulatory requirements. IEEE does not, by the publication of its standards, intend to urge action that is not in compliance with applicable laws, and these documents may not be construed as doing so.

Copyrights

This document is copyrighted by the IEEE. It is made available for a wide variety of both public and private uses. These include both use, by reference, in laws and regulations, and use in private self-regulation, standardization, and the promotion of engineering practices and methods. By making this document available for use and adoption by public authorities and private users, the IEEE does not waive any rights in copyright to this document.

Updating of IEEE documents

Users of IEEE standards should be aware that these documents may be superseded at any time by the issuance of new editions or may be amended from time to time through the issuance of amendments, corrigenda, or errata. An official IEEE document at any point in time consists of the current edition of the document together with any amendments, corrigenda, or errata then in effect. In order to determine whether a given document is the current edition and whether it has been amended through the issuance of amendments, corrigenda, or errata, visit the IEEE Standards Association Web site at http://ieeexplore.ieee.org/xpl/standards.jsp, or contact the IEEE at the address listed previously.

For more information about the IEEE Standards Association or the IEEE standards development process, visit the IEEE-SA Web site at http://standards.ieee.org.

Errata

Errata, if any, for this and all other standards can be accessed at the following URL: http://standards.ieee.org/reading/ieee/updates/errata/index.html. Users are encouraged to check this URL for errata periodically.

Copyright © 2009 IEEE. All rights reserved.

Documents
Document Sharing Hub

Authorized licensed use limited to: Tsinghua University. Downloaded on February 27,2026 at 02:13:32 UTC from IEEE Xplore. Restrictions apply.

Full document details: IEEE N323C - American National Standard for Radiation Protection Instrumentation Test and Calibration - Air Monitoring Instruments

Interpretations

Current interpretations can be accessed at the following URL: http://standards.ieee.org/reading/ieee/interp/index.html.

Patents

Attention is called to the possibility that implementation of this standard may require use of subject matter covered by patent rights. By publication of this standard, no position is taken with respect to the existence or validity of any patent rights in connection therewith. The IEEE is not responsible for identifying Essential Patent Claims for which a license may be required, for conducting inquiries into the legal validity or scope of Patents Claims or determining whether any licensing terms or conditions provided in connection with submission of a Letter of Assurance, if any, or in any licensing agreements are reasonable or non-discriminatory. Users of this standard are expressly advised that determination of the validity of any patent rights, and the risk of infringement of such rights, is entirely their own responsibility. Further information may be obtained from the IEEE Standards Association.

Copyright © 2009 IEEE. All rights reserved.

Documents
Document Sharing Hub

Authorized licensed use limited to: Tsinghua University. Downloaded on February 27,2026 at 02:13:32 UTC from IEEE Xplore. Restrictions apply.

Full document details: IEEE N323C - American National Standard for Radiation Protection Instrumentation Test and Calibration - Air Monitoring Instruments

Participants

At the time it approved this standard, the Accredited Standards Committee on Radiation Instrumentation, N42, had the following membership:

Michael P. Unterweger, *Chair*

Louis Costrell, *Deputy Chair*

William Ash, *Administrative Secretary*

Organization Represented ..... *Name of Representative*

Bartlett Services ..... Morgan Cox
Canberra ..... Markku Koskelo
Chew, M.H ..... Jack M. Selby
Commerce Dept, U.S. NIST ..... Michael P. Unterweger
..... Louis Costrell (*Alt.*)
Consultant ..... Frank X. Masse
Department of Homeland Security ..... Peter Shebell
Entergy-ANO ..... Ron Schwartz
Health Physics Society ..... Sandy Perle
IEEE ..... Louis Costrell
..... Anthony Spurgin (*Alt.*)
..... Michael P. Unterweger (*Alt.*)
International Medcom ..... Don Sythe
Lawrence Berkeley National Laboratory ..... Edward J. Lampo
Lawrence Livermore National Laboratory ..... Gary Johnson
NASA, GSFC ..... R. Sachidananda Babu
Nuclear Regulatory Commission ..... Cynthia Jones
Nuclear Standards Unlimited ..... Al N. Tschaeche
Oak Ridge National Laboratory ..... Peter J. Chiaro, Jr.
..... Charles Britton (*Alt.*)
ORTEC ..... Ronald M. Keyser
Pacific Northwest National Laboratory ..... Richard Kouzes
Swinth Associates ..... Kenneth L. Swinth
U.S. Army ..... Edward Groeber
U.S. Nuclear Regulatory Commission ..... Cynthia G. Jones
Members-At-Large ..... Ernesto Corte
..... Joseph C. McDonald
..... Paul L. Phelps
..... Joseph Stencel
..... Lee J. Wagner

Copyright © 2009 IEEE. All rights reserved.
Documents
Document Sharing Hub
Authorized licensed use limited to: Tsinghua University. Downloaded on February 27,2026 at 02:13:32 UTC from IEEE Xplore. Restrictions apply.
Full document details: IEEE N323C - American National Standard for Radiation Protection Instrumentation Test and Calibration - Air Monitoring Instruments

At the time this standard was approved, Subcommittee N42.RPI had the following membership:

Morgan Cox, *Co-Chair*
Jack M. Selby, *Co-Chair*

Dru Carson
Peter J. Chiaro, Jr.
Jack Cooley
Leo Faust
Edward Groeber
Jerry Hiatt
Mark D. Hoover
Ron Keyser
J. C. McDonald
Robert Murphy
Cheryl Olson
Scott Rogers
Michael P. Unterweger
Ed Walker
Chuan-Fu Wu

At the time this standard was approved, the ANSI N323C Working Group had the following members:

Michelle L. Johnson, *Co-Chair*
Mark D. Hoover, *Co-Chair*

L. Bryan Belvin
Brent Blunt
Morgan Cox
Stephen A. Epperson
Michael S. Ford
Robert J. Ford
John A. Glissmeyer
Robert A. Kellner
Timothy Martinson
George J. Newton
John C. Rodgers
Johnafred M. Thomas
James T. Voss

Copyright © 2009 IEEE. All rights reserved.
Documents
Document Sharing Hub
Authorized licensed use limited to: Tsinghua University. Downloaded on February 27,2026 at 02:13:32 UTC from IEEE Xplore. Restrictions apply.
Full document details: IEEE N323C - American National Standard for Radiation Protection Instrumentation Test and Calibration - Air Monitoring Instruments

Contents

1. Overview 1
1.1 Scope 1
1.2 Purpose 2
1.3 Special word usage 2

2. Relationship to other standards 2

3. Definitions 3

4. Program elements 6
4.1 Type testing 6
4.2 Acceptance testing 6
4.3 Initial calibration 7
4.4 Functional checks 7
4.5 Maintenance and recalibration 8
4.6 Performance tests 9

5. Air flow rate calibrations 10

6. Instrument calibrations 10
6.1 Pre-calibration inspection 10
6.2 As-found readings 11
6.3 Electronic calibration 11
6.4 Meters and chart recorders 11
6.5 Background response verification 12
6.6 Calibration of background subtraction 13
6.7 Alarm circuit verification 13
6.8 Radiological calibration 13

7. Additional calibration requirements for particulate and noble gas monitors 13
7.1 Alpha and beta particulate monitors 14
7.2 Keep-alive sources 14
7.3 Noble gas monitors 14

8. Calibration for special conditions 15

9. Facilities, conditions, and equipment 16
9.1 Calibration facility 16
9.2 Test and calibration conditions 16
9.3 Calibration standards 17
9.4 Maintenance of standards 17
9.5 Check sources 18

10. Documentation 18
10.1 Facility documentation 18
10.2 Instrument documentation 19

Copyright © 2009 IEEE. All rights reserved.

Documents
Document Sharing Hub

Authorized licensed use limited to: Tsinghua University. Downloaded on February 27,2026 at 02:13:32 UTC from IEEE Xplore. Restrictions apply.

Full document details: IEEE N323C - American National Standard for Radiation Protection Instrumentation Test and Calibration - Air Monitoring Instruments