



AMERICAN NATIONAL STANDARD

ANSI/ASSE Z88.2 – 2015
American National Standard
Practices for Respiratory Protection

ANSI/ASSE Z88.2 – 2015



AMERICAN SOCIETY OF
SAFETY ENGINEERS

The information and materials contained in this publication have been developed from sources believed to be reliable. However, the American Society of Safety Engineers (ASSE) as secretariat of the ANSI accredited Z88 Committee or individual committee members accept no legal responsibility for the correctness or completeness of this material or its application to specific factual situations. By publication of this standard, ASSE or the Z88 Committee does not ensure that adherence to these recommendations will protect the safety or health of any persons or preserve property.

ANSI®
ANSI/ASSE Z88.2 – 2015

American National Standard

Practices for Respiratory Protection

Secretariat

American Society of Safety Engineers
520 N. Northwest Highway
Park Ridge, Illinois 60068

Approved March 4, 2015

American National Standards Institute, Inc.

American National Standard

Approval of an American National Standard requires verification by ANSI that the requirements for due process, consensus, and other criteria for approval have been met by the standards developer. Consensus is established when, in the judgment of the ANSI Board of Standards Review, substantial agreement has been reached by directly and materially affected interests. Substantial agreement means much more than a simple majority, but not necessarily unanimity. Consensus requires that all views and objections be considered, and that a concerted effort be made toward their resolution. The use of American National Standards is completely voluntary; their existence does not in any respect preclude anyone, whether he/she has approved the standards or not, from manufacturing, marketing, purchasing, or using products, processes, or procedures not conforming to the standards. The American National Standards Institute does not develop standards and will in no circumstance give an interpretation of any American National Standard. Moreover, no person shall have the right or authority to issue an interpretation of an American National Standard in the name of the American National Standards Institute. Requests for interpretation should be addressed to the secretariat or sponsor whose name appears on the title page of this standard.

Caution Notice: This American National Standard may be revised or withdrawn at any time.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 periodically to reaffirm, revise, or withdraw this standard. Purchasers of American National Standards may receive current information on all standards by calling or writing the American National Standards Institute.

Published April by:

American Society of Safety Engineers
520 N. Northwest Highway
Park Ridge, Illinois 60068
(847) 699-2929 • www.asse.org

Copyright ©2015 by American Society of Safety Engineers
All Rights Reserved.

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.

Printed in the United States of America

Foreword (This Foreword is not a part of American National Standard Z88.2-2015.)

The purpose of this standard is to help establish, implement and administer an effective respirator program.

Due to the withdrawal of the 1992 version of this standard by ANSI in 2002, this standard is viewed as a new standard rather than the fourth version. The American National Standard, *Practices for Respiratory Protection*, Z88.2-2015 was substantially delayed due to professional disagreements over appropriate assigned protection factors (APFs) for air-purifying half mask respirators and the associated drawn out appeals processes. On December 10, 2010, the ANSI Board of Standards Review Panel denied the final appeal and recommended the review process be started with a new subcommittee. The Z88 committee established a new Z88.2 subcommittee, and directed it to start with the existing draft Z88.2 standard. During the production of this standard, the Occupational Safety and Health Administration (OSHA) revised its Respiratory Protection standard to add definitions and requirements for APFs and Maximum Use Concentrations (MUCs). (See 63 FR 1152; 29 CFR 1910.134; 71 FR 50122, August 24, 2006). OSHA established APFs after thoroughly reviewing available literature, including workplace protection factor studies, comments submitted to the record and hearing testimony. APFs provide employers with critical information to use when selecting respirators for employees exposed to atmospheric contaminants found in industry. Proper respirator selection is an important component of an effective respiratory protection program. Accordingly, the OSHA APFs are necessary to protect employees who must use respirators to protect them from airborne contaminants. [See OSHA Guide, Assigned Protection Factors for the Revised Respiratory Protection Standard, Occupational Safety and Health Administration, U.S. Department of Labor, OSHA 3352-02, 2009].

In addition to OSHA rulemaking on APFs, OSHA also updated Appendix A to §1910.134: Fit Testing Procedures (Mandatory) [63 FR 20098, April 23, 1998; 69 FR 46993, August 4, 2004], and ANSI published the American National Standard, ANSI/AIHA Z88.10-2010 Respirator Fit Testing Methods, approved on December 3, 2010. These rules and standards thoroughly address the topics of APFs and fit testing. Additionally, the Z88 Committee approved the establishment of a Respirator APF Subcommittee, Z88.15, on July 23, 2008. Thus, this Z88.2 standard does not contain details on these topics, but does provide reference to the appropriate OSHA regulations and ANSI/AIHA Z88.10-2010.

This revision of the Z88.2 standard has also updated sections on oxygen deficiency (including an easy to use table indicating what types of respirators are required to work safely in increasingly dangerous oxygen-deficient environments), respirator selection, use of emergency respirators and respirator audits. Also added are new annexes on classification of and considerations for selection and use of respirators, establishing cartridge/canister change schedules, required fit factor value for respirator fit testing, calculating effective protection factors, compliance with compressed air dew point requirements, compressed breathing air equipment and systems and designations of positive-pressure respirators.

The first version of ANSI Z88.2 was approved August 11, 1969 and was a revision of the respiratory protection portion of American National Standard safety code for head, eye and respiratory protection, ASA Z2.1-1959. The second revision of this standard, ANSI Z88.2-1980, entitled American National Standard Practices for Respiratory Protection was approved on May 22, 1980. The third version of this standard, American National Standard for Respiratory Protection, ANSI Z88.2-1992, was approved August 6, 1992.

Revisions: The Z88 Committee welcomes proposals for revisions to this standard. Revisions are made to the standard periodically (usually five years from the date of the standard) to incorporate changes that appear necessary or desirable, as demonstrated by experience gained from the application of the standard. Proposals should be as specific as possible, citing the relevant section number(s), the proposed wording and the reason for the proposal. Pertinent documentation would enable the Z88 Committee to process the changes in a more-timely manner.

Interpretations: Upon a request in writing to the Secretariat, the Z88 Committee will render an interpretation of any requirement of the standard. The request for interpretation should be clear, citing the relevant section number(s) and phrased as a request for a clarification of a specific requirement. Oral interpretations are not provided.

No one but the Z88 Committee (through the Z88 Secretariat) is authorized to provide any interpretation of this standard.

Approval: Neither the Z88 Committee nor American National Standards Institute (ANSI) approves, certifies, rates or endorses any item, construction, proprietary device or activity.

Appendices/Addenda: Appendices are included in most standards to provide the user with additional information related to the subject of the standard. Appendices are not part of the approved standard.

Committee Meetings: The Z88 Committee meets periodically. Persons wishing to attend a meeting should contact the Secretariat for information.

Standard Approval: This standard was processed and approved for submittal to ANSI by the American National Standards Committee on Respiratory Protection, Z88. Approval of the standard does not necessarily imply (nor is it required) that all committee members voted for its approval. At the time ANSI approved this standard, the Z88 Committee had the following members:

James S. Johnson, Ph.D., CIH, QEP, Chair
Jonathan Szalajda, MSCE, MSIE, Vice Chair
Timothy R. Fisher, CSP, CHMM, ARM, CPEA, Secretary
Jennie Dalesandro, Administrative Technical Support

Organization Represented

Name of Representative

3M

Craig Colton, CIH
Geoffrey Betsinger, CIH
Michael Schmoldt, P.E., CIH, CHMM, CPEA

American Industrial Hygiene Association
American Iron & Steel Institute
American Society of Safety Engineers
American Welding Society
B&W Technical Services Y-12 LLC
Bevis Respirator Consultants
Chemrisk, Inc.
Consolidated Edison of New York
Draeger Safety Inc.
International Association of Fire Fighters

Richard Harley, CSP
Stephen Hedrick
Mark Haskew, CIH, CSP
Darell Bevis
Jennifer Sahmel, CIH, CSP
Gregg Slintak, CIH

Richard M. Duffy

International Safety Equipment Association

Earl Gee
Health Physics Society

JSJ and Associates
LAO Consulting, Inc.
National Fire Protection Association
National Institute of Occupational Safety & Health

Richard W. Metzler, Inc.
Safety Equipment America
Scott Safety
U.S. Department of the Army

U.S. Department of Energy

U.S. Department of Labor – OSHA
U.S. Department of the Navy
U.S. Nuclear Regulatory Commission
University of Cincinnati Medical Center
Wayne State University

Jeffrey Birkner, Ph.D., CIH
Cristine Fargo
Earl Gee
Sander Perle
Bruce Dicey
James S. Johnson, Ph.D., CIH, QEP
Ching-tsen Bien, CIH, P.E.

Roland BerryAnn
MaryAnn D'Alessandro
Richard Metzler, MSIE
Goran Berndtsson
Marty Lorkowski
Stephan Graham, CIH, CSP
Alice Weber
David Weitzman, CIH
Joel Rabovsky
John Steelnack
David Spelce, MS, CIH
Roger Pedersen
Roy T. McKay, Ph.D.
Sarunas S. Mingela, Ph.D., CIH, ROH,
CSP, CRSP, CHMM, CEP

Corresponding (non-voting) members:

Timothy E. Roberts, CIH, CSP
George Gruetzmacher, Ph.D., CIH, P.E.

Subgroup Z88.2 had the following members:

Richard W. Metzler, MSIE (Chair)
Geoffrey Betsinger, CIH
Ching-tsen Bien, CIH, P.E.
Jeffrey Birkner, Ph.D., CIH
Craig Colton, CIH
James S. Johnson, Ph.D., CIH, QEP
Marty Lorkowski
Roy McKay, Ph.D.
Bill Newcomb
Tim Rehak
Irene Richardson
Tim Roberts, CIH, CSP
Natalia Stakhiv
John Steelnack
David Spelce, MS, CIH
William Thomas, CIH, CHP

Contents	SECTION.....	PAGE
	1. Scope and Purpose	9
	1.1 Scope.....	9
	1.2 Purpose	9
	1.3 Exceptions	9
	2. Normative References	9
	3. Definitions	9
	4. Respirator Program Requirements.....	14
	4.1 Purpose	14
	4.2 Permissible Practice	14
	4.3 Employer Responsibility	14
	4.4 Wearer Responsibility	15
	4.5 Minimal Acceptance Respirator Program Elements	15
	5. Program Administration	16
	5.1 Respirator Program Administrator	16
	5.2 Respirator Program Administrator Qualifications.....	16
	5.3 Responsibilities.....	16
	6. Standard Operating Procedures (SOP).....	17
	6.1 Operating Procedure Elements for Respirator Use	17
	6.2 Special Considerations for Respirators Used for Emergency Escape.....	17
	7. Respirator Selection	18
	7.1 Hazard Assessment.....	18
	7.2 Respirator Selection	20
	8. Training.....	25
	8.1 Qualifications of the Respirator Trainer	25
	8.2 Training for Employees.....	25
	8.3 Training Frequency.....	27
	8.4 Records	27
	9. Respirator Fit Tests	27
	9.1 Fit Test Pass/Fail Criteria	27
	9.2 Respirator Fitting Problems	28
	9.3 Cleaning Fit-Test Respirators	28
	9.4 Fit Test Considerations.....	28
	9.5 Fit-Test Records	29
	10. Wearer Seal Checks.....	29
	10.1 Filtering Facepiece Respirator Wearer Seal Check.....	29
	10.2 Elastomeric Facepiece Respirator Wearer Seal Check.....	29

11. Maintenance, Inspection, Storage and Disposal	29
11.1 Decontaminating, Cleaning and Sanitizing	29
11.2 Inspection	30
11.3 Parts Replacement and Repair.....	30
11.4 Storage	30
11.5 Disposal	30
12. Breathing Gas.....	31
12.1 Breathing Gas Quality.....	31
12.2 Water Content.....	31
12.3 Breathing Air Systems	31
12.4 Compressed Gas Cylinders.....	32
13. Recordkeeping	32
Annex A:	
A.1 Guidance on Establishing Cartridge and Canister Change Schedules	36
A.2 Respirator Classification by Mode of Operation and Considerations for Selection and Use of Respirators	39
A.3 Oxygen Deficiency.....	44
A.4 Verbal Communications.....	47
A.5 Required Fit Factor	48
A.6 Positive-Pressure Designation.....	49
A.7 Effective Protection Factor (EPF)	50
A.8 Decontaminating, Cleaning and Sanitizing Respirators.....	52
A.9 Dew Point	54
A.10 Breathing Air Equipment and Systems	57
References	60

AMERICAN NATIONAL STANDARD Z88.2 PRACTICES FOR RESPIRATORY PROTECTION

1. SCOPE AND PURPOSE

1.1 Scope. This standard sets forth minimally accepted practices for occupational respirator use; provides information and guidance on the proper selection, use and maintenance of respirators and contains requirements for establishing, implementing and evaluating respirator programs. The standard covers the use of respirators to protect persons against the inhalation of harmful air contaminants and against oxygen-deficient atmospheres in the workplace. The following are not covered by this standard:

- a) underwater breathing devices;
- b) aircraft oxygen systems;
- c) supplied-air suits;
- d) use of respirators under military combat conditions, and
- e) medical inhalators and resuscitators.

1.2 Purpose. The purpose of this standard is to provide information and guidance on the proper selection, use and maintenance of respirators, which will help safeguard the life and health of respirator wearers. This standard is written for all persons concerned with respiratory protection, but especially for those primarily responsible for establishing and administering an acceptable respirator program. The standard contains requirements recommended for enforcement authorities in establishing regulations or codes for respiratory protection use.

1.3 Exceptions. Users of this standard shall be aware that regulatory agencies may have requirements that are different from this standard.

2. NORMATIVE REFERENCES

The following standards contain provisions that, through 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 indicated below.

ANSI Z88.6-2006, *Respiratory Protection - Respirator Use - Physical Qualifications for Personnel*

ANSI Z88.10-2010, *Respirator Fit Test Methods*

CGA C-7-2011, *Guide to the Preparation of Precautionary Labeling and Marking of Compressed Gas Containers*

CGA G-7.1-2011, *Commodity Specification for Air*

Code of Federal Regulations, Title 49, Part 180, *Continuing Qualification and Maintenance of Packaging*

United States Pharmacopoeia, 2009

National Fire Protection Association (NFPA) 1851, *Standard on Selection, Care, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting*, 2014 Edition

National Fire Protection Association (NFPA) 1981, *Standard on Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency Services*, 2013 Edition

3. DEFINITIONS

3.1 Abrasive Blasting Respirator. An airline respirator designed to protect the wearer from inhalation of, impact of and abrasion by materials used or generated in abrasive blasting.