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ANSI/AIHA Z88.10-2010

Respirator Fit Testing Methods

*A Publication by
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American National Standard — Respirator Fit Testing Methods

Secretariat

American Industrial Hygiene Association

Approved: December 3, 2010

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Published by
American Industrial Hygiene Association
2700 Prosperity Ave., Suite 250
Fairfax, VA 22031
www.aiha.org

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Printed in the United States of America.

Stock No: SRPA10-423
ISBN: 978-1-935082-24-8

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FOREWORD (This foreword is not part of the American National Standard/AIHA Z88.7–2010)

The purpose of this standard is to provide clear and consistent guidance with regard to the respirator fit testing components of an effective respiratory protection program.

The respirator fit test itself is simply one facet of fit testing. An effective program requires much more, including a qualified person to perform the fit test. This standard provides guidance on exactly what knowledge and skills are necessary in order to perform as a qualified fit test operator.

This standard contains information to aid program managers and fit test operators in preparing to perform a proper fit test. This includes guidance regarding potential interference from other personal protective equipment with the respirator, detailed information on respirators used for fit testing, selection of respirators prior to fit testing, and other considerations that must be met if the fit test is to be effective.

A single fit test exercise protocol cannot model all workplace activities encountered by respirator users. Recognizing this, the standard provides flexibility regarding fit test exercise protocols. Exercises may be selected that are more representative of actual workplace activities, including repeated respirator donning.

Annex A1 is informative and is not considered part of the standard.

Annex A2 is mandatory for future inclusion of new fit test methodologies into this standard.

Annex B is informative and is not considered part of the standard.

Suggestions for the improvement of this standard are welcome. They should be sent to the American Industrial Hygiene Association®, 2700 Prosperity Avenue, Suite 250, Fairfax, VA 22031.

This standard was processed and approved for submittal to ANSI by the Accredited Standards Committee Z88 on Respiratory Protection. Consensus was reached through a process involving the entire Z88 Committee in a series of reviews and in the final vote of approval. Committee approval of the standard does not necessarily imply that all committee members voted for its approval. At the time it approved this standard, the Z88 Committee had the following members:

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American National Standard — Respirator Fit Testing Methods

1 Scope and Purpose

1.1 Scope. This standard provides guidance on how to conduct fit testing of tight-fitting respirators and appropriate methods to be used. Fit testing is only one element of a complete respiratory protection program. Examples of complete respiratory protection programs are defined in ANSI Z88.2, 29 CFR 1910.134 (OSHA), etc.

1.2 Purpose. This standard provides requirements for conducting respirator fit testing and includes:

- qualifications for fit test operators
- specific fit test methods
- interpretation of fit test results
- record keeping
- methods to validate new fit test methods

The intent of fit testing is to evaluate sealing surface leakage. Other sources of leakage may contribute to the total leakage detected.

1.3 “SHOULD and SHALL.” The provisions of this standard are mandatory in nature where the word “shall” is used and advisory in nature where the word “should” is used.

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

2 Normative References

American National Standard for Respiratory Protection ANSI/AIHA Z88.2.

American National Standard for Respiratory Protection – Respirator Use: Physical Qualifications for Personnel. ANSI/AIHA® Z88.6–2006.

3 Definitions

3.1 Aerodynamic diameter: The diameter of a unit density sphere having the same settling velocity as the particle in question.

3.2 Aerosol: Particles, solid or liquid, suspended in air.

3.3 Canister/cartridge: A container with a filter, sorbent, or catalyst, or combination of these items, which removes specific contaminants from the air passed through the container.

3.4 Challenge agent: An aerosol, vapor, or gas used by the fit test method for detecting respirator leakage.

3.5 Challenge pressure: The negative static pressure established inside the respirator facepiece during a controlled negative pressure fit test.

3.6 Facepiece: See tight-fitting respirator.

3.7 Filter: A component used in respirators to remove aerosols from the inspired air.

3.8 Fit factor: A numeric expression of how well a tight-fitting respirator fits a wearer during a quantitative fit test. It is the ratio of the measured challenge agent concentration outside the respirator (C_{out}) to its concentration inside the respirator (C_{in}). (Fit factor = C_{out}/C_{in}).

3.9 Fit test: The use of a qualitative or quantitative protocol to evaluate sealing

surface leakage of a specific tight-fitting respirator while worn by an individual.

3.10 Fit test method: A combination of instrumentation, technology, and protocols used to conduct a respirator fit test. An accepted method may have more than one accepted protocol.

3.11 Fit test operator: A person qualified by training and experience with demonstrated ability to properly perform qualitative or quantitative fit tests and evaluate test results.

3.12 Fit test protocol: Specific step-by step instructions for conducting a respirator fit test.

3.13 Qualitative fit test (QLFT): A pass/fail fit test included in this standard that relies on the subject's sensory response to detect a challenge agent.

3.14 Quantitative fit test (QNFT): A fit test included in this standard that uses an instrument to measure face seal leakage.

3.15 Required fit factor (RFF): The numeric value established as a pass/fail point or acceptance criterion for a quantitative fit test.

3.16 Respirator: A personal protective device designed to protect the wearer from the inhalation of hazardous atmospheres.

3.17 Tight-fitting respirator: A respirator with a facepiece, hood or helmet that is designed to form a complete seal with the face or neck. This includes a hood or helmet with a neck seal (neck dam).

3.18 User seal check: A procedure conducted by the wearer to determine if a tight-fitting respirator is properly donned.

4 Fit Testing Rationale

The purpose of respirator fit testing is to verify that the selected make, model, and size of a tight-fitting respirator adequately fits the wearer. This is accomplished so there is reasonable assurance that the wearer has learned to don the respirator

properly and can achieve the anticipated protection during use. Fit testing is a critical component of a respirator training program.

5 Qualifications of Fit Test Operators

5.1 General Qualifications. Fit test operators shall be properly trained and demonstrate a proficiency in the fit test method(s) being used. The respiratory protection program administrator is responsible for evaluating and verifying the training and qualification of operators.

Program administrators may wish to consider the benefits of formal training programs from outside providers for fit test operators. An evaluation form for fit test operators is in Annex A1. Continue training fit test operators until all questions on the form can be marked "acceptable" by the evaluator. Determination of acceptability for each item is left to the discretion of the respiratory protection program administrator.

5.2 Specific Qualifications for Fit Test Operators

5.2.1 They shall be familiar with ANSI Z88.10 along with the appropriate sections of the respiratory protection program concerning respirator fit testing, inspection, cleaning, maintenance, and storage.

5.2.2 They shall demonstrate a general knowledge of respirators used by the wearer in the workplace by:

- Identifying respirator components and their functions;
- Demonstrating respirator inspection, cleaning, and maintenance procedures;
- Identifying different make, model, style, and size respirators;
- Discussing respirator capabilities and limitations as related to respirator fit testing; and
- Demonstrating and evaluating proper donning and doffing procedures including user seal checks.