



Designation: F3387 – 23

Standard Practice for Respiratory Protection¹

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1. Scope

1.1 This practice 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.

1.2 This practice covers the use of respirators to protect persons against the inhalation of harmful air contaminants and oxygen-deficient atmospheres in the workplace. The following are not covered by this practice:

- 1.2.1 Underwater breathing devices,
- 1.2.2 Aircraft oxygen systems,
- 1.2.3 Supplied-air suits,
- 1.2.4 Use of respirators under military combat conditions, and
- 1.2.5 Medical inhalators and resuscitators.

1.3 *Units*—The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

¹ This practice is under the jurisdiction of ASTM Committee F23 on Personal Protective Clothing and Equipment and is the direct responsibility of Subcommittee F23.65 on Respiratory.

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2. Referenced Documents

2.1 ASTM Standards:²

F3537 Guide for Respirator Fit Testing Methods

F3620 Practice for Respiratory Protection—Respirator Use—Physical Qualifications for Personnel

2.2 ANSI Standards:³

ANSI/ASSE Z117.1 Safety Requirements for Entering Confined Spaces

ANSI/ASSE Z88.2 Practices for Respiratory Protection

ANSI Z88.10 Respirator Fit Testing Methods

2.3 CAN/CSA Standards:⁴

CAN/CSA Z94.4 Selection, Use, and Care of Respirators

CAN/CSA Z180.1 Compressed Breathing Air and Systems

2.4 CGA Standards:⁵

CGA C-7 Guide to Classification and Labeling of Compressed Gases

CGA G-7.1 Commodity Specification for Air

2.5 NFPA Standards:⁶

NFPA 1851 Standard on Selection, Care, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting

NFPA 1981 Standard on Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency Services

2.6 Federal Standards:⁷

29 CFR Part 1910.134 Respiratory Protection

29 CFR Part 1910.146 Permit-Required Confined Spaces

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

⁴ Available from Canadian Standards Association (CSA), 178 Rexdale Blvd., Toronto, ON M9W 1R3, Canada, <http://www.csagroup.org>.

⁵ Available from Compressed Gas Association (CGA), 14501 George Carter Way, Suite 103, Chantilly, VA 20151, <http://www.cganet.com>.

⁶ Available from National Fire Protection Association (NFPA), 1 Batterymarch Park, Quincy, MA 02169-7471, <http://www.nfpa.org>.

⁷ Available from U.S. Government Printing Office, Superintendent of Documents, 732 N. Capitol St., NW, Washington, DC 20401-0001, <http://www.access.gpo.gov>.

42 CFR Part 84 Respiratory Protective Devices
49 CFR Part 180 Continuing Qualification and Maintenance
of Packagings

3. Terminology

3.1 Definitions:

3.1.1 *abrasive blasting respirator, n*—airline respirator designed to protect the wearer from inhalation of, impact of, and abrasion by materials used or generated in abrasive blasting.

3.1.2 *aerodynamic diameter, n*—diameter of a unit density sphere having the same terminal settling velocity as the particle in question.

3.1.3 *aerosol, n*—particles, solid or liquid, suspended in air (for example, dust, fumes, mists, or fibers).

3.1.4 *airline respirator (supplied-air respirator, SAR), n*—atmosphere-supplying respirator in which the respirable air is supplied from a hose or breathing tube rather than being carried by the wearer.

3.1.5 *air-purifying respirator, n*—respirator in which ambient air is passed through an air-purifying element by either inhalation or by means of a blower.

3.1.6 *ambient air pump, n*—motorized blower used to supply air to a continuous-flow airline respirator.

3.1.7 *approved, v*—respirator for which a formal certificate was issued by the National Institute for Occupational Safety and Health (NIOSH) or by NIOSH and the Mine Safety and Health Administration (MSHA) in accordance with 42 CFR Part 84 and is maintained in full compliance with the certificate.

3.1.8 *assigned protection factor, APF, n*—minimum expected workplace level of respiratory protection that would be provided by a properly functioning and used respirator or a class of respirators to properly fitted and trained wearers when all elements of an effective respirator program are established and being implemented.

3.1.9 *atmosphere-supplying respirator, ASR*—class of respirators that supply a respirable atmosphere independent of the workplace atmosphere.

3.1.9.1 *Discussion*—This class includes airline respirators and self-contained breathing apparatus (SCBA).

3.1.10 *bioaerosol, n*—liquid droplet (generated, for example, by coughing, sneezing) or a solid particle (generated, for example, by sweeping, shoveling) suspended in the air that is living or originates from living organisms.

3.1.10.1 *Discussion*—Bioaerosols include living or dead microorganisms, fragments, toxins, and particulate waste products from all varieties of living things. They are capable of causing infection and an adverse or allergic response potentially leading to disease. Individual bioaerosols most often range in size from 0.4 to 3937 μm . (0.01 to 100 μm) in diameter.

3.1.11 *biomonitoring, v*—determination of the concentration of a substance in biological fluids or tissue and used for occupational exposure surveillance.

3.1.12 *canister (air purifying), n*—container with (1) gas- and vapor-removing sorbent or catalyst, or (2) gas- and

vapor-removing sorbent or catalyst that removes gases and vapors and filter that removes particles from inspired air (or air drawn through the unit).

3.1.12.1 *Discussion*—Typically attached to a full-face piece, either mounted directly to the chin or connected to a breathing tube so the canister may be worn in the front or back of the person. Respirators with air-purifying canisters are approved by NIOSH as gas masks and contain an approval number TC-14G-xxxx.

3.1.13 *canister (carbon dioxide scrubbing), n*—container filled with a chemical used to remove carbon dioxide from exhaled air before that air is rebreathed in a closed-circuit SCBA.

3.1.14 *canister (oxygen generating), n*—container filled with a chemical that generates oxygen by chemical reaction used in closed-circuit SCBA.

3.1.15 *cartridge, n*—small container filled with sorbents or catalysts that remove gases and vapors from the inspired air.

3.1.15.1 *Discussion*—The cartridge may also have particulate filters that are an integral part or ones that are replaceable.

3.1.16 *ceiling limit, n*—maximum allowable concentration of an airborne contaminant that shall not be exceeded at any time.

3.1.17 *certified, v*—see *approved*.

3.1.18 *change schedule, n*—time interval after which a used filter, cartridge, or canister is replaced with a new one.

3.1.19 *confined space, n*—enclosed space not designed for human occupancy that has the following characteristics: restricted entry and exit, primary function is something other than human occupancy, and contains potential or known respiratory hazards.

3.1.19.1 *Discussion*—Examples of confined spaces include, but are not limited to: tanks, silos, vessels, pits, sewers, pipelines, tank cars, boilers, septic tanks, and utility vaults. See 29 CFR 1910.146 and ANSI/ASSE Z117.1 for more details on permit-required confined spaces.

3.1.20 *contaminant, n*—potentially harmful, irritating, or nuisance airborne material.

3.1.21 *continuous-flow respirator*—atmosphere-supplying respirator that provides a continuous flow of respirable air to the respiratory inlet covering.

3.1.22 *demand respirator, n*—atmosphere-supplying respirator that admits respirable air to the respiratory inlet covering only when a negative pressure is created inside the respiratory inlet covering by inhalation.

3.1.23 *dust, n*—aerosol consisting of mechanically produced solid particles derived from the breaking up of larger particles.

3.1.24 *end-of-service-life indicator, ESLI, n*—system or device that warns the wearer of the approach of the end of adequate respiratory protection.

3.1.25 *escape-only respirator, n*—respirator intended only for use during emergency egress from a hazardous atmosphere.

3.1.26 *filter, n*—material used in air-purifying respirators to remove solid or liquid aerosols from inspired air; some filters are encapsulated in a container and some are not.