

NFPA® 1987

Standard on Combination Unit Respirator Systems for Tactical and Technical Operations

2023 Edition



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NFPA® 1987

Standard on

Combination Unit Respirator Systems for Tactical and Technical Operations

2023 Edition

This edition of NFPA 1987, *Standard on Combination Unit Respirator Systems for Tactical and Technical Operations*, was prepared by the Technical Committee on Tactical and Technical Operations Respiratory Protection Equipment and released by the Correlating Committee on Fire and Emergency Services Protective Clothing and Equipment. It was issued by the Standards Council on April 4, 2022, with an effective date of April 24, 2022.

This edition of NFPA 1987 was approved as an American National Standard on April 24, 2022.

Origin and Development of NFPA 1987

In August 2015, the Standards Council responded to a new project request submitted by Brian Clifford of the Federal Bureau of Investigation. The request related to the use of respiratory protection equipment for emergency operations that incorporated a combination of respiratory protective methods in one system. This system, at a minimum, would contain the capabilities of a self-contained breathing apparatus (SCBA) and at least one other respiratory protective method [air-purifying respirator (APR) or powered air-purifying respirator (PAPR)]. After review, the Standards Council determined there was a well-established technical need and a demonstrated demand for a standard addressing design, use, testing, and certification of combined unit respirators (CUR) not covered by any existing standards.

The Standards Council assigned this new project to the Technical Committee on Tactical and Technical Operations Respiratory Protection Equipment, because it already had the expertise and diversity to fulfill the request. The technical committee met for the first time to discuss this new standard in July 2016, at NFPA headquarters in Quincy, MA. The Standards Council approved the draft of NFPA 1987 to enter revision cycle in August 2019, as a Fall 2021 document.

This edition of the standard specifies the minimum requirements for the certification (Chapter 4), design (Chapter 6), performance (Chapter 7), and testing (Chapter 8) of new combination unit respirators (CUR) and for replacement parts, components, and accessories for such respirators.

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Tactical and Technical Operations****2023 Edition**

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Information on referenced and extracted publications can be found in Chapter 2 and Annex D.

Chapter 1 Administration**1.1 Scope.**

1.1.1* This standard shall specify the minimum requirements for the design, performance, testing, and certification of new combination unit respirator (CUR) systems and for the replacement parts, components, and accessories for such respirators.

1.1.2 Reserved.

1.1.3 This standard shall not specify requirements for respiratory protection equipment that is used for firefighting operations.

1.1.4* This standard shall not specify requirements for any accessories not certified by the National Institute for Occupational Safety and Health (NIOSH) that could be attached to a CUR.

1.1.5 This standard shall not establish criteria for CURs for water or underwater operations.

1.1.6 This standard shall not establish criteria for protection from ionizing radiation.

1.1.7 Safety.

1.1.7.1 This standard shall not be construed as addressing all of the safety concerns associated with the use of CURs.

1.1.7.2 It shall be the responsibility of the persons and organizations that use CURs to establish safety and health practices and to determine the applicability of regulatory limitations prior to use.

1.1.7.3 This standard shall not be construed as addressing all of the safety concerns, if any, associated with the use of this standard by testing facilities.

1.1.7.4 It shall be the responsibility of the persons and organizations that use this standard to conduct testing of CURs to establish safety and health practices and to determine the applicability of regulatory limitations prior to using this standard for any designing, manufacturing, or testing.

1.1.8 Nothing herein shall restrict any jurisdiction or manufacturer from exceeding these minimum requirements.

1.2 Purpose.

1.2.1 The purpose of this standard shall be to establish minimum levels of CUR performance for respiratory protection for emergency services personnel in non-firefighting operations and in atmospheres that are categorized as follows:

- (1) Entry into and escape from immediately dangerous to life or health (IDLH) atmospheres when in open-circuit SCBA mode
- (2) Entry into non-IDLH and escape from IDLH and non-IDLH atmospheres when in APR mode or PAPR mode

1.2.2* Controlled laboratory tests used to determine compliance with the performance requirements of this standard shall not be deemed as establishing performance levels for all respiratory protective situations and IDLH atmospheres to which personnel can be exposed.

1.2.3 Use.

1.2.3.1 This standard shall not be interpreted or used as a detailed manufacturing or purchase specification.

1.2.3.2 This standard shall be permitted to be referenced in purchase specifications as minimum requirements.

1.2.3.3* This standard shall not address all performance or functional properties of CUR that can be of importance when references as part of purchase specifications.

1.3 Application.**1.3.1 Emergency Services Organizations.**

1.3.1.1 This standard shall apply to all CURs used by emergency services organizations for respiratory protection of its personnel during rescue, hazardous materials, and terrorist incident responses, and similar operations where products of combustion, oxygen deficiency, particulates, toxic products, or other IDLH atmospheres exist or could exist at the incident scene.

1.3.1.2* If the CUR is equipped with a universal emergency breathing safety system (UEBSS), the UEBSS performance requirements set forth in this standard shall apply only to CURs

used by emergency services organizations for respiratory protection of its personnel during the applications listed in 1.3.1.1.

1.3.2 This standard shall apply to the design, manufacturing, and certification of new CURs.

1.3.3 This standard shall apply to accessories attached to a CUR that are certified by NIOSH for use with that specific CUR.

1.3.4 Reserved.

1.3.5 This standard shall not apply to closed-circuit self-contained breathing apparatus (SCBA).

1.3.6 This standard shall not apply to accessories that can be attached to CURs but which are not certified by NIOSH for use with that specific CUR.

1.3.7* Except for the cautions and limitations specified in Chapter 5, this standard shall not apply to the use of CURs.

1.4 Units.

1.4.1 In this standard, values for measurement are followed by an equivalent in parentheses, but only the first stated value shall be regarded as the requirement.

1.4.2 Equivalent values in parentheses shall not be considered as the requirement because those values might be approximate.

Chapter 2 Referenced Publications

2.1 General. The documents or portions thereof listed in this chapter are referenced within this standard and shall be considered part of the requirements of this document.

2.2 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 1971, *Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting*, 2018 edition.

NFPA 1989, *Standard on Breathing Air Quality for Emergency Services Respiratory Protection*, 2019 edition.

NFPA 1994, *Standard on Protective Ensembles for First Responders to Hazardous Materials Emergencies and CBRN Terrorism Incidents*, 2018 edition.

2.3 Other Publications.

2.3.1 ANSI Publications. American National Standards Institute, Inc. (operations) 25 West 43rd Street, 4th Floor, New York, NY 10036; (headquarters) 1899 L Street, NW, 11th Floor, Washington, DC 20036.

ANSI/ASA S3.2, *Method for Measuring the Intelligibility of Speech over Communication Systems*, 2009, reaffirmed 2014.

ANSI/ISEA Z87.1, *American National Standard Occupational and Educational Personal Eye and Face Protection Devices*, 2015

2.3.2 ASTM Publications. ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959.

ASTM B117, *Standard Practice for Operating Salt Spray (Fog) Apparatus*, 2018.

ASTM D395, *Standard Test Method for Rubber Property—Compression Set*, 2018.

ASTM D412, *Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension*, 2016.

ASTM D572, *Standard Test Method for Rubber—Deterioration by Heat and Oxygen*, 2004, reapproved 2015.

ASTM D573, *Standard Test Method for Rubber—Deterioration in Air Oven*, 2004, reapproved 2015.

ASTM D624, *Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers*, 2000, reapproved 2012.

ASTM D746, *Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact*, 2014.

ASTM D1003, *Standard Test Method for Haze and Luminous Transmittance of Transparent Plastics*, 2013.

ASTM D2240, *Standard Test Method for Rubber Property—Durometer Hardness*, 2015e1.

ASTM D2632, *Standard Test Method for Rubber Property—Resilience by Vertical Rebound*, 2015.

ASTM D3182, *Standard Practice for Rubber—Materials, Equipment, and Procedures for Mixing Standard Compounds and Preparing Standard Vulcanized Sheets*, 2016.

2.3.3 CGA Publications. Compressed Gas Association, 8484 Westpark Drive, Suite 220, McLean, VA 22102.

CGA G-7.1, *Commodity Specification for Air*, 2018.

CGA V-1, *Standard for Compressed Gas Cylinder Valve Outlet and Inlet Connections*, 2019.

2.3.4 DoD Publications. Department of Defense, Naval Publications and Forms Center (NPFC), 5801 Tabor Avenue, Philadelphia, PA 19120.

MIL-STD-282, *Test Method Standard—Filter Units, Protective Clothing, Gas-Mask Components and Related Products: Performance Test Methods*, 2015.

2.3.5 EBU Publications. European Broadcasting Union, L'Ancienne-Route 17A, Postal Box 45 Grand-Saconnex, Geneva, Switzerland.

EBU Technical Recommendation R68, *Alignment level in digital audio production equipment and in digital audio recorders*, 2000.

2.3.6 EN Publications (CEN). European Committee for Standardization Central Secretariat, Rue de la Science 23, B-1040 Brussels, Belgium.

EN 136, *Respiratory protective devices. Full face masks. Requirements, testing, marking*, 1998.

EN 137, *Respiratory protective devices. Self-contained open-circuit compressed air breathing apparatus with full face mask. Requirements, testing, marking*, 2006.

2.3.7 IEC Publications. International Electrotechnical Commission, 3, rue de Varembe, P.O. Box 131, CH-1211 Geneva 20, Switzerland.

IEC 60268, *Sound System Equipment — Part 16: Objective Rating of Speech Intelligibility by Speech Transmission Index*, 2011.

2.3.8 ISO Publications. International Organization for Standardization, Chemin de Blandonnet 8, CP 401, 1214 Vernier, Geneva, Switzerland.

ISO Guide 27, *Guidelines for corrective action to be taken by a certification body in the event of misuse of its mark of conformity*, 1983.

ISO 9001, *Quality management systems — Requirements*, 2015.

ISO 16900-1, *Respiratory protective devices — Methods of test and test equipment — Part 1: Determination of inward leakage*, 2019.

ISO/IEC 17000, *Conformity assessment — Vocabulary and general principles*, 2004.

ISO/IEC 17011, *Conformity assessment — General requirements for accreditation bodies accrediting conformity assessment bodies*, 2017.

ISO/IEC 17021, *Conformity assessment — Requirements for bodies providing audit and certification of management systems*, 2015.

ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*, 2017.

ISO/IEC 17065, *Conformity assessment — Requirements for bodies certifying products, processes and services*, 2012.

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